European Commission

European Financial Stability and Integration

April 2015

Banking and Finance

European Financial Stability and Integration

April 2015

EUROPEAN
COMMISSION

Brussels, 27.4.2015
SWD(2015) 98 final

COMMISSION STAFF WORKING DOCUMENT

European Financial Stability and Integration Review, April 2015

This document has been prepared by the Directorate-General for Financial Stability, Financial Services, and Capital Markets Union (DG FISMA).

This document is a European Commission staff working document for information purposes. It does not represent an official position of the Commission on this issue, nor does it anticipate such a position. It is informed by the international discussion on financial integration and stability, both among relevant bodies as well as in the academic literature. It presents these topics in a non-technical format that remains accessible to a non-specialist public.

TABLE OF CONTENTS

PREFACE

Since 2004, the European Commission has been publishing annual reviews of its monitoring of the financial system as part of the Single Market.[1]

The recent crisis has shown that financial risks need to be monitored more closely. As of 2011 this continuous monitoring was conferred to the European System of Financial Supervision (ESFS) and the European Systemic Risk Board (ESRB). EBA, ESMA, EIOPA and the ESRB have been monitoring different aspects of the financial system under their respective competencies and all of them are issuing regular reports on risks and vulnerabilities, often on a quarterly basis. The ECB also monitors financial stability and integration in Europe on a continuous basis.

Since November 2014, the ECB has become the single supervisor for the euro area's largest credit institutions. From 1 March 2015, the Single Resolution Board has taken up its work as well.

The present review does not interpret, pre-empt or prejudge any official reporting that any of the above mentioned bodies carries out within their mandate. It does not attempt to provide a comprehensive overview or analysis of all developments across all the different financial market segments. It focuses on selected market and policy developments from a European financial stability and integration perspective, within a broader Single Market perspective.

The present review reflects market and policy developments in 2014 and, where possible, during the first quarter of 2015.

[1] http://ec.europa.eu/internal_market/economic_analysis/reports/index_en.htm

ACKNOWLEDGMENTS

This report was prepared in the Directorate-General for Financial Stability, Financial Services, and Capital Markets Union (DG FISMA) under the direction of Jonathan Faull (Director-General), Oliver Guersent (Deputy Director-General), and Ugo Bassi (Director, Investment and company reporting).
The production of the report was coordinated by Miguel de la Mano (Head of Unit – Economic analysis and evaluation) and Harald Stieber. Individual contributors to the report were (in alphabetical order) Guillaume Adamczyk, Boris Augustinov, Chris Bosma, Miguel de la Mano, Hannah Hempell, Stan Maes, Dimitrios Magos, Sergio Masciantonio, Gundars Ostrovskis, Denada Prifti, Ana Maria Sanchez Infante, Harald Stieber, Saskia Van Ewijk, Javier Villar Burke, Bernhard Windisch and Alexandru Zeana.

Several colleagues from other parts of the European Commission, as well as several people from outside provided comments and suggestions that helped to improve the text. We are particularly grateful to (in alphabetical order) Markus Aspegren, Leonie Bell, Marie Bourke, Lukas Bortel, Frank Conrad, Pierre Darbre, Richard Davies, Christophe Doin, Helen Dobby, Gintaras Griksas, Anna Grochowska, Malachy Hargadon, Jonathan Haynes, Alexandra Hild, Nicole Hill, Maria Cruz Manzano, Marcos Martín Pérez, Raluca Maran, Armando Melone, Olli Mononen, Mario Nava, Mark Osborne, Peter Kerstens, Marco Petracco, Peter Pontuch, Adrien Rorive, Agnieszka Skonieczna, Elemer Tertak, Michael Thiel, Errikos Velissaratos, John Verrinder, Sheldon Warton-Woods and Ernesto Zangari.

Comments on the report would be gratefully received and should be sent to:

Directorate-General for Financial Stability, Financial Services, and Capital Markets Union (DG FISMA)
Unit B2: Economic analysis and evaluation
European Commission
B-1049 Brussels
Belgium
Or by e-mail to miguel.de-la-mano@ec.europa.eu or harald.stieber@ec.europa.eu

EXECUTIVE SUMMARY

This year's European Financial Stability and Integration Review (EFSIR) was launched at a conference organised with the European Central Bank on 27 April 2015 in Brussels.

The document has two main parts: the first part is more descriptive and data driven (Chapters 1, 2), the second part has a special focus on particular policy areas that impact European financial stability and integration developments including those expected to have a significant impact on economic growth (chapters 3-7).

Chapter 1 reviews financial market developments in 2014 and during the first months of 2015. The chapter shows how a series of economic indicators signal that the recovery of the EU economy is gaining traction. However, economic growth remains slow and output has yet to reach pre-crisis levels. Some risk and vulnerabilities of the European economy are also to be noted. Firstly, despite many years of extraordinary monetary stimulus, structural reforms and regulatory reforms, the EU and many other economies remain in a low growth and low inflation environment (also influenced by demographic trends), while historical high debt levels have hardly come down. Secondly, financial markets and financial system in the EU and abroad have overall been resilient over the past several months; however, some short episodes of volatility have also been observed. Finally, the protracted low yield environment may generate some risks linked to the search for yield, a potential sharp and disorderly reversal in the assessment of risk, the build-up of bubbles in specific market segments, potential reduction of private sector consumption, compression of profit margins for financial institutions against the guaranteed returns to policy holders (insurance corporations and pension funds), or a false sense of security that may lead to delaying consolidation. The chapter also analyses the developments in the different segments of the financial sector including bank loans, bonds and quoted shares.

Chapter 2 provides a comprehensive overview of the structure of the financial sector in the European Union. In particular, it provides a quantitative overview of the role of the financial system in channelling funding across the economy. The analysis presented here deals with questions such as who is providing credit, who is using this credit, in which form the credit is formalised or through which channels financial resources flow. Besides the size of the different institutional sector (e.g. households, non-financial corporations) in terms of assets and liabilities, the chapter also reviews the preferences of markets participants as reflected in the mix of products they choose to invest in or to use as a source of funding. These customer preferences in the provision and use of funding determine the importance and role that the financial sector, and its different segments, is to play in the European economy.

The chapter also analyses the three main channels that the European economy uses for financing its activities. First, organised markets: issuance of bonds, quoted shares or private placements. Secondly, financing channelled through the direct interaction of a firm with its stakeholders (i.e. customers, local and national authorities, employees, supplier, etc.) in the form of equity, loans or advances.

Direct financing requires that both the providers and the users of funding have the same preferences and to interact with each other. However, this is not always possible. Therefore, the third channel of financing is provided by financial institutions, which provide an intermediation service of connecting the resources of savers and depositors with those of borrowers and investors and of adapting the features of savings to the needs of investors through what is called maturity transformation. Although financial institutions do not generate net additional financial resources, they play a crucial role in allowing for the full mobilisation of the savings generated by the economy to be allocated to investment projects[2].

Once credit within the financial sector is netted out (e.g. interbank credit or the interactions of banks with the shadow banking) these three channels have broadly the same size, providing about one third of the total financing of the economy each.

The chapter also highlights the high level of interconnection and interaction between the different economic agents which can lead to high levels of complexity and interdependence.

[2] The financial sector also runs payment systems; however, this is beyond the scope of this chapter, which focuses on financing channels.

The information gathered and the discussion presented throughout this chapter can be a useful background for a number of Commission policies including the on-going work on developing capital markets union and for the investment plan for Europe.

In the second part, the review contains 5 special focus chapters on current issues of particular interest for understanding developments in financial market structure, regulation, and technology.

– *Chapter 3 discusses the role of private debt overhang in the EU.* 'Debt overhang' indicates a situation of excessive or non-sustainable debt. Although there is no universal consensus on an optimal level of debt, high debt by itself suggests vulnerability as it increases the fragility of agents to changes in the economic conditions. An excessive level of debt may damage growth, as corporates and households will tend to focus on increased savings, contracting investment and consumption as a consequence. This topic is particularly relevant since both the length and depth of the crisis, as well as the weakness of the recovery, cannot be understood without an analysis of the role of debt dynamics in the private sector and their negative impact on financial integration and risk sharing opportunities.

– *Chapter 4 reviews large financial risks facing households.* Financial risk, including longevity risk, is increasingly being shifted to households. A concrete example of this shift is the transition from defined benefits to defined contribution pension schemes. At the same time, households faced with increased longevity risk will have to increase their supplementary pension provisioning, and as such, personal pension products are becoming more important. However, to the extent that private households cannot successfully assume or mitigate some of the largest risks the latter may be better viewed as implicit liabilities of the government. Hence, large under-hedged/under-insured individual risks represent both a challenge from a financial integration and risk sharing perspective, and for short- and longer-term financial stability.

– *Chapter 5. Competition and Regulation in the Financial System.* The focus here is on how banking competition can influence contagion risk and systemic stability and how non-core banking activities, such as securitisation and trading, may affect the relationship between competition and stability. It argues for a closer coordination of financial regulation and competition enforcement *inter alia* to avoid that regulation itself becomes a barrier to entry. Also, the chapter recalls that financial regulation on its own would likely not achieve its objectives of stability and efficiency without competition enforcement.

– *Chapter 6. Cyber security risks in the financial sector.* Modern financial systems operate digitally and depend heavily on digital network infrastructure. Financial institutions operate critical payments and settlement systems and maintain sensitive customer information and customer deposits. New, sophisticated technologies for trading platforms, data warehouses and internet banking introduce challenges for cyber security. The interconnectedness among markets participants and financial institution makes the financial sector vulnerable to disruptions from cyber-attacks that pose a serious threat not only to them, but to overall financial system stability.

– *Chapter 7. Mapping the SME credit information landscape in the EU.* SMEs face a structural hurdle when accessing finance. Information on SMEs is usually with banks. Non-bank investors struggle to access credit information, and the control of credit information by the existing providers is a barrier to entry in the market for SME financing. The Commission's Communication on Long Term Financing announced a mapping exercise of the availability of credit information on SMEs across Europe. The rationale and result of this exercise are outlined in this chapter, as well as a number of policy actions that could have a beneficial impact for the Capital Markets Union agenda.

Chapter 1: Market developments[1]

1. INTRODUCTION

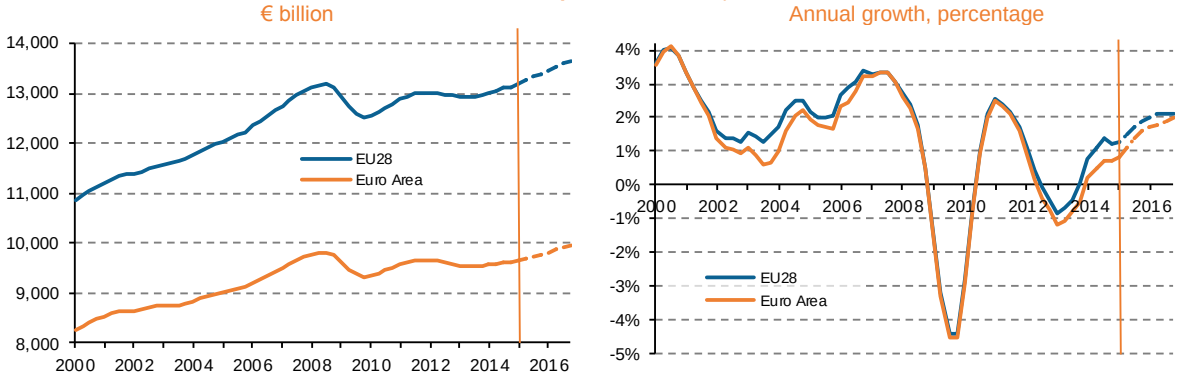
This chapter focuses on market developments in the provision of credit throughout 2014 and in early 2015. After setting out the general macroeconomic background in Section 2, the chapter analyses the three main sources of credit to the economy: banking intermediation (Section 3), debt markets (Section 4) and equity markets (Section 5). The analysis of the financial sector is discussed further, from a more structural point of view, in Chapter 2.

2. MACROECONOMIC AND FINANCIAL LANDSCAPE

2.1. Return to economic growth?[2]

The EU economy is entering its third year of recovery, but economic growth remains slow and output has yet to reach pre-crisis levels. For the first time since 2007, the economies of all EU Member States are expected to grow in 2015, according to the European Commission's 2015 winter forecast[3]. Over the course of 2015, economic activity is expected to pick up moderately in the EU and in the euro area, before growing further in 2016. Growth this year is forecast to rise to 1.7 per cent for the EU as a whole and to 1.3 per cent for the euro area. In 2016, annual growth should reach 2.1 per cent and 1.9 per cent respectively, on the back of strengthened domestic and foreign demand, an accommodating monetary policy and a broadly neutral fiscal stance (Chart 1).

Chart 1: **Gross domestic product**, market prices, chain linked



Notes: Data for 2015 and 2016 are forecast.
Source: Eurostat: National (quarterly) accounts, European Commission forecast and own calculations.

The pace of recovery remains slow as Europe continues to struggle to leave the legacy of the crisis behind. Momentum is weak, partly because of factors specific to the EU, some of which were already evident before the crisis, including structural weaknesses that have not yet been fully addressed. Private sector consumption has been the main driver of growth in the recovery, but investment has failed to recover and exports have done little to support growth. Economic recovery in the EU and the euro area is therefore expected to have lacked momentum in 2014, with annual GDP expected to have increased by 1.3 per cent in the EU and 0.8 per cent in the euro area.

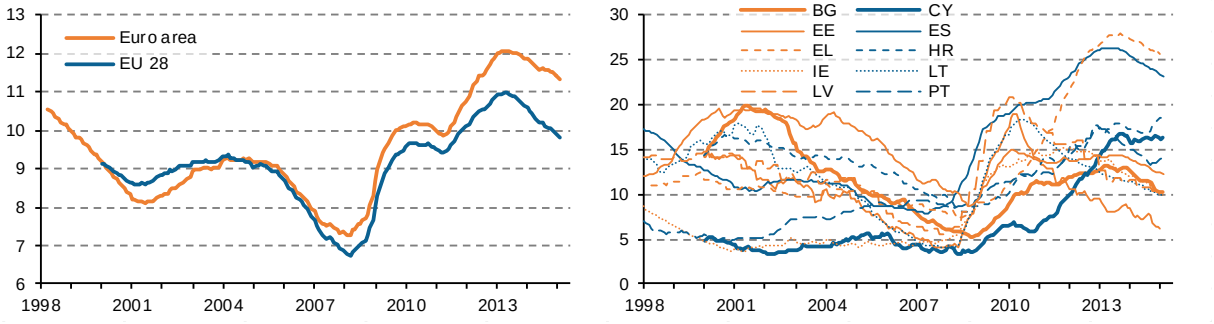
Growth prospects across Europe continue to be limited by a weak investment environment and high unemployment. However, since autumn 2014, a number of key developments have improved the near-term outlook. Oil prices have declined, the euro has depreciated noticeably, the ECB has announced quantitative easing, and the European Commission has presented its investment plan for Europe[4]. All these factors are expected to have a positive impact on growth.

As economic growth gains momentum, so will net job creation which accelerated over the course of the last year from a low level. Labour markets are forecast to improve towards late 2016. The unemployment rate is set to fall

[1] Authors: Javier Villar Burke, Chris Bosma and Alexandru Zeana with the support of Raluca Maran and Olli Mononen.
[2] This section draws extensively on the European Commission's 2015 winter forecast.
[3] See European Commission (2015b).
[4] See European Commission (2014a).

to 9.8 per cent in the EU and 11.2 per cent in the euro area in 2015 (Chart 2). Labour market reforms undertaken in recent years are expected to continue to deliver results and help unemployment rates decrease further in 2016. However, the momentum of employment growth is expected to remain too low to lead to a substantial improvement in the labour market situation.

Chart 2: **Unemployment rate**, Euro area, EU and a selection of countries, seasonally adjusted series



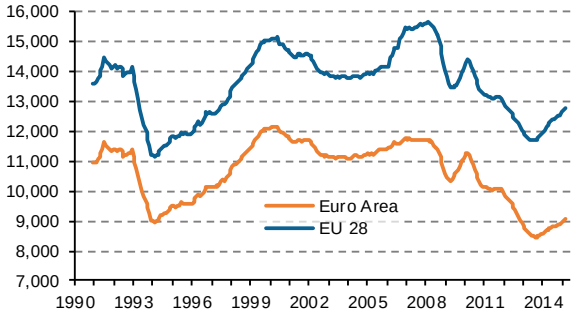
Source: ECB, Eurostat and own presentation.

Variance in economic performance is likely to continue since the pace of implementing reform, balance sheet adjustment and deleveraging among banks, the non-bank corporate sector, households and the public sector differ across Member States. Some will benefit more than others from the fall in oil prices, depending on the energy intensity of their economies and their energy taxation systems. This is also reflected in quite significant differences in impacts on unemployment rates across countries.

GDP growth in the EU and the euro area is expected to be led primarily by domestic demand which, in 2015 and 2016, should benefit from lower oil prices and more supportive monetary and fiscal policies. Implementation of structural reforms and reforms to the financial architecture (e.g. banking union) should also support an increase in domestic demand. In 2016, domestic demand should also start to be supported by the EU investment plan.

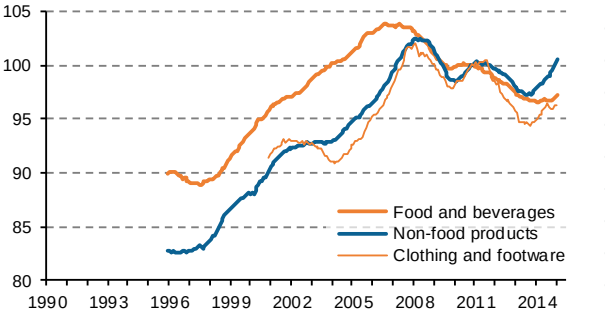
Lower energy prices are expected to be a key factor driving the expansion of private sector consumption. With slightly improved employment prospects and nominal rises in salaries for employees, disposable income is expected to increase further, while the very low consumer price inflation will boost real income this year. Households are expected to slightly increase their savings this year, reflecting willingness to restore savings levels eroded during the crisis, ongoing deleveraging and uncertainty.

Chart 3: **Car registrations**, passenger cars, number of cars (thousands), year-to-date sum



Note: The decline observed in the mid-1990s corresponds with the global recession (many European countries were affected in terms of unemployment and several currencies were devaluated) and to the Gulf War, which significantly impacted oil prices.
Source: ECB, Eurostat and own calculations.

Chart 4: **Retail sales**, Turnover index, deflated, one-year moving average



Source: ECB, Eutostat and own calculations.

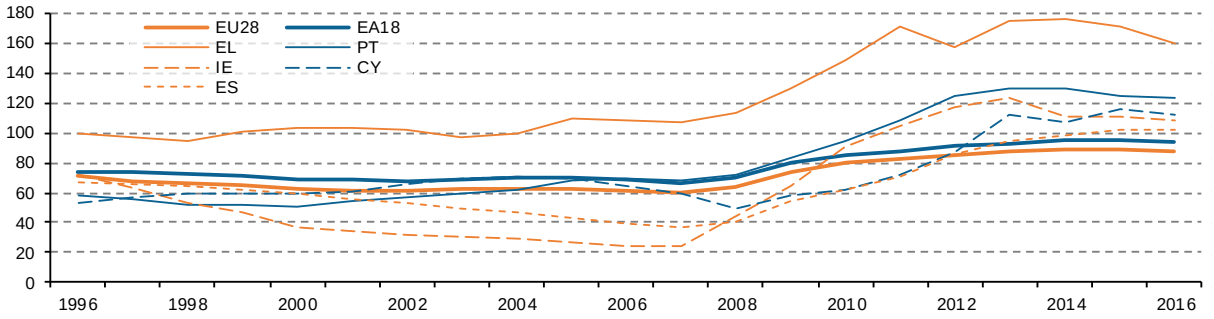
While investment has been held back in most EU Member States by deleveraging pressures in the corporate sector, fiscal constraints and heightened uncertainty, it should gradually benefit from strengthening demand prospects, a diminishing need for balance sheet adjustment, and improved credit conditions and profit margins. Investment in equipment is expected to pick up more strongly as of the second half of 2015, whereas the recovery in investment in construction will only become significant in 2016 when the negative impact of the ongoing adjustment in housing markets is reduced.

These dynamics are reflected in the evolution of car registrations (Chart 3) and retail sales, which gained momentum since late 2013 after over six years of decline. Absolute levels are still far from having recovered to pre-crisis values, however. In a similar vein, non-performing loans are abating from the peak of the crisis indicating a clear improvement in the real economy (Chart 16). However, they still represent a significant burden for parts of the banking system and highlight the legacy of the crisis for the economy, still in the process of healing.

2.2. Public accounts

The debt-to-GDP ratio is expected to peak at 88.4 per cent in the EU in 2014 and at 94.4 per cent in the euro area in 2015, before declining as inflation increases and the recovery picks up. Challenges to public debt sustainability continue, in particular against a background of sustained high debt levels in many Member States, increased downside risks to the economic outlook and low levels of inflation.

Chart 5: **General government debt**, selected countries, percentage of GDP



Note: General government includes Central government, State government, Local government and Social security funds; it does not include debt issued by public sector enterprises.
Source: European Commission: Eurostat (2007) and AMECO (2013).

However, there are some positive measures expected in the medium term. Key initiatives from the European Commission, i.e. the Investment Plan for Europe and the project on Capital Markets Union (CMU),[5] could significantly help improve economic and financial conditions. In addition, the Bank Recovery and Resolution Directive (BRRD)[6] and the Single Resolution Mechanism (SRM)[7] will make the bailing-in of debt instruments obligatory for bank resolutions as of 2016. These will alleviate the tense fiscal situation in Member States if further bank restructuring is needed and enable Member States to manage those crisis situations using very little, if any, taxpayer money, relying instead on the new bail-in regime and resolution funds (i.e. the Single Resolution Fund in the Banking Union and the national resolution funds in the other EU Member States) financed by the banking sector itself.

2.3. Interconnectedness and financial stability

In the past 20 to 30 years financial markets have become highly interconnected at the global level. However, the crisis has shown that, in some cases, this has led to high levels of instability and vulnerability. The bulk of the response to the crisis has been to stabilise the financial system as a precondition for a return to growth and jobs.

There are many examples of interconnections and potential instability generated by 'sudden stops' or reversal of funds, including global imbalances in terms of current and financial accounts. The programmes of quantitative easing implemented by the US central bank injected large amounts of liquidity and funding in the global system that quickly reached around the world, particularly to emerging economies. The mere announcement, in early 2014, of the potential tapering of such programmes triggered a flight of those investments and destabilised some currencies (e.g. in Turkey). The subprime crisis originated in the US but quickly spread to Europe and around the globe. The euro area sovereign debt crisis started in Greece, but quickly affected Ireland, Portugal, Spain in domino effect. Government bond yields skyrocketed in those countries and plummeted in other countries (e.g.

[5] See European Commission (2015a).
[6] Directive 2014/59/EU.
[7] Regulation (EU) No 806/2014.

Germany, Austria or Netherlands). More recently, Switzerland and Denmark have undertaken strong measures to defend their currencies.

Financial interconnections are even more prominent within the euro area since the creation of the single currency. Interlinkages among banks from different countries were highlighted by ECB interventions during the crisis and on Target2 balances[8].

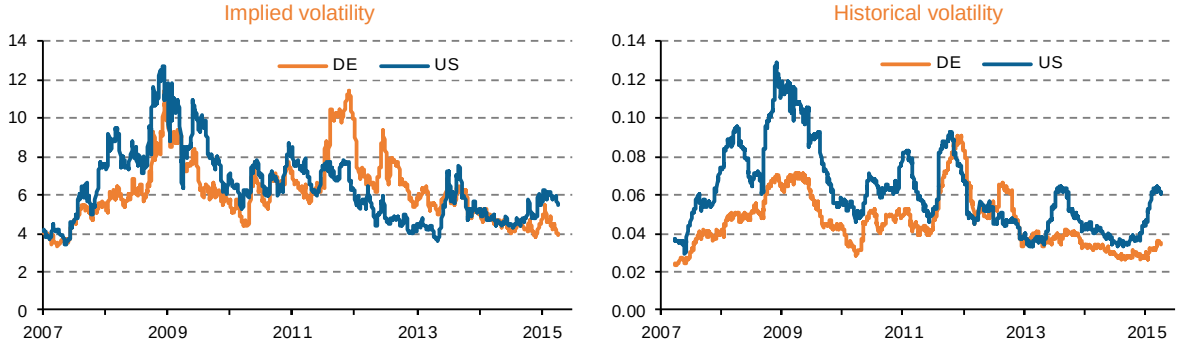
The crisis has shown that these interconnections can be too destabilising. Financial institutions are no longer 'too-big-to-fail' alone, but are 'systemically important' too, because the problem is not only one of size but also, particularly, of interconnection. A number of measures were taken to address these destabilising factors and break the 'doom loop', including the following:

- under Basel III rules and the credit requirements directive and regulation (CRD/CRR), banks are required to be better capitalised;
- systemically important banks are required to draw up recovery and resolution plans;
- the European Stability Mechanism (ESM) has been created to limit potential contagion across sovereign countries under financial stress;
- OTC derivatives are being directed to clearing platforms;
- more information is being gathered about interconnections and exposures;
- the Banking Union has shifted responsibility for supervision and resolution for the most significant banks from national to European levels;
- the European Systemic Risk Board (ESRB) and the Financial Stability Oversight Council (FSOC) in the US have been entrusted with a macro-prudential oversight function[9].

In addition, the proposed structural reform in the banking sector seek to separate the more fundamental activities of banks from other activities that have higher risks.

In extreme circumstances, the free movement of capital was restricted, as seen in the capital controls implemented in Iceland in 2008 and in Cyprus in 2013.

Chart 6: **Volatility on bond markets**, market prices, chain linked



Notes: Implied volatility: three months implied volatility calculated at 100 per cent moneyness; Historical volatility: Standard deviation of daily changes.
Source: Bloomberg and Commission calculations.

An integrated financial system that creates value for the overall economy requires a high level of interconnection but also needs to be balanced and robust. Stability in financial markets is a necessary condition for the European economy to return to growth and create jobs. The global crisis has not only damaged financial markets and financial institutions, but has also put a heavy strain on households, non-financial corporations and public authorities and has led to a disruption in the general productive chain based on complex interactions among economic actors.

Beyond traditional financial markets and financial institutions, the financial positions of the different economic agents in the economy need to be examined, along with the effects the financial crisis has had on them (see Chapter 2). Understanding the interconnections among the different economic agents in the economy is crucial

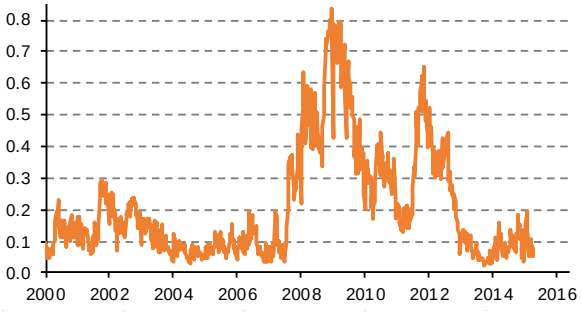
[8] Target2 is the system of money transfer between National Central Banks within the euro area.
[9] For further details about the regulatory reform agenda, see last year's review (European Commission, 2014b).

to detecting 'weak links' or 'bottlenecks'' in order to be able to encourage a virtuous cycle of economic growth built on robust foundations.

2.4. Confidence in the markets and in the broader economy

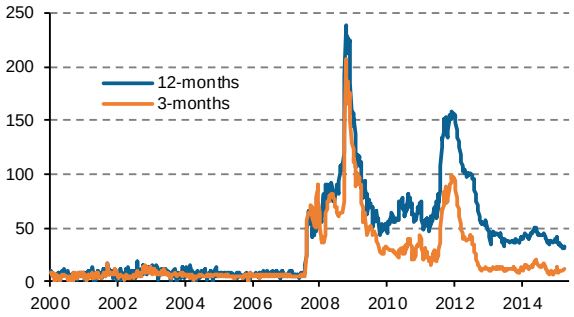
Over the period covered by this report, financial market conditions in the EU have continued to improve. Financial asset prices have risen across the board and market volatility has been low apart from some temporary hick-ups. Most of the typical indicators of market stress have eased and are now back at levels similar to those prevailing in the pre-crisis period, consolidating the trend noted in last year's review (Charts 7 and 8 and Charts A1 and A2 in the Annex). Although economic and geopolitical worries have led to increased volatility in financial markets in recent quarters, the overall trend in European equity markets has remained positive. Meanwhile, as the global search for yield continues and has become more pervasive across asset classes and geographic spread, the correlation measures for bond and equity markets have reached levels which make it difficult for investors to diversify risk.

Chart 7: **Systemic Stress Composite Indicator**, index



Source: ESRB: Risk Dashboard.

Chart 8: Euribor-OIS spread, basis points



Source: Bloomberg and own calculations.

2.5. Sovereign debt markets

The most remarkable trend in sovereign bond markets since early 2014 has been the rise in bond prices and narrowing of sovereign bond spreads (Chart 9), which continued in the second half of 2014. This trend is, at least as far as the benchmark sovereigns are concerned, a reversal from that noted in last year's review. The decline of sovereign bond yields has been significant. While some argue that the current low yields are consistent with very low nominal economic growth rates, other market observers assess that current yields reflect a mispricing of credit risk and note that many of the causes of the recent sovereign debt crisis have not been solved[10].

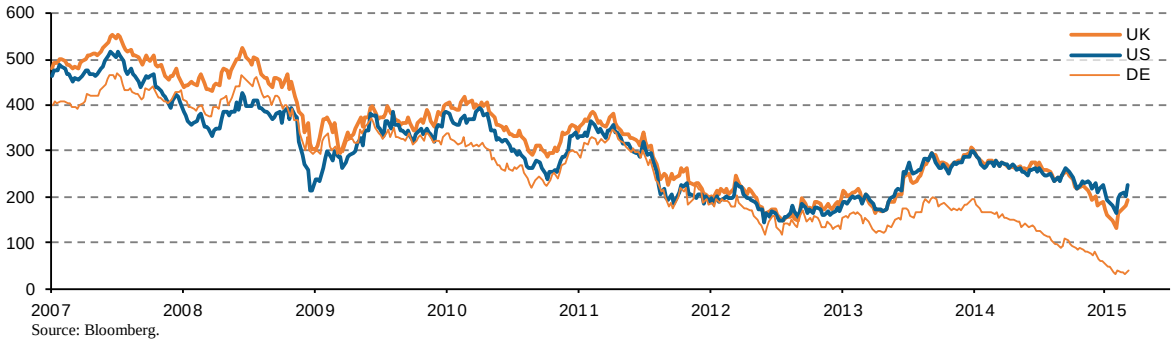
In 2013, the downward trend in benchmark sovereign bond markets seemed to have stopped and begun to reverse as, from spring 2013, benchmark yields rose amid an improving macroeconomic situation in the US and Germany, fuelled by US Federal Reserve's announcements about the gradual tapering of asset purchases.

At the beginning of 2014, benchmark yields started to decline amid mixed macroeconomic data releases in the euro area, financial turbulence in emerging markets and geopolitical tensions. These features remained present over the whole period covered in this review. In spring 2014, the downtrend was further and increasingly fuelled by declining long-term inflation expectations and forward guidance issued by central banks in the US and the euro area to keep policy rates low until the recovery is well entrenched. The decline continued when, in June, the ECB Governing Council decided to lower its key policy rates[11] and to introduce other monetary policy measures to improve the functioning of the monetary policy transmission mechanism. These included the launch, as of September 2014, of a series of six targeted long-term refinancing operations (TLTROs) with a fixed rate and maturity of four years. The ECB Governing Council's decision on 4 September to lower key rates further and to purchase non-financial private sector assets (asset-backed securities and covered bonds[12]) did not have a

[10] See, for instance, Kaminska (2014), Corporate & Institutional Banking (2014) or IMF (2014).
[11] In June, the ECB lowered its main refinancing rate to 0.15 per cent, while the deposit facility standing rate was set at -0.10 per cent, in negative territory for the first time ever. In September, the ECB cut its key interest rates by another 10 bps.
[12] The ECB's asset purchase programme was also intended to facilitate the revival of sound securitisation markets in Europe, while the covered bond programme contributed to a further easing in the euro-area banks funding costs.

significant effect on benchmark yields, but did impact on sovereign yields in the non-core euro area Member States.

Chart 9: **Yields on sovereign bonds**, 10 year benchmark, basis points



Source: Bloomberg.

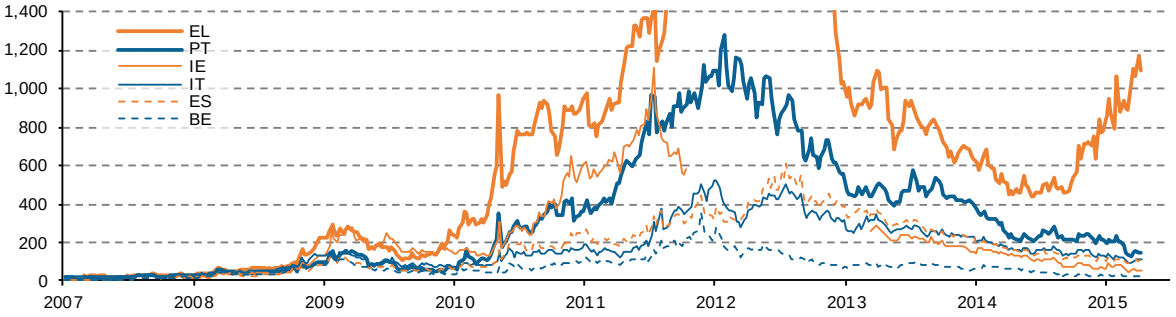
2014 saw bouts of increased volatility amid concerns about economic growth and due to country-specific events, for instance concerns about the Banco Espirito Santo and geopolitical tensions in the Middle East and Ukraine. However this widening of spreads was short-lived on each occasion. The downward trend continued, albeit at a slower pace, fuelled by widespread market expectations that the ECB's monetary stance would remain accommodative for a significant period, and would eventually include purchases of sovereign bonds. Expectations on the latter were further fuelled by Advocate General of the European Court of Justice's favourable opinion on the ECB's outright monetary transactions in January[13] and were reinforced by the Swiss National Bank's unexpected decision to abandon the Swiss franc peg to the euro.[14] The ECB's comprehensive assessment[15] did not have a visible impact on bond markets, as investors had largely discounted the outcome. Faced with a persistent decline in both headline harmonised index of consumer prices (HICP) inflation and market-based measures of inflation expectations, the ECB Governing Council finally decided at its January 22 meeting to embark on a sovereign debt purchase programme.

In the final months of 2014, the decline of the German benchmark Bund yields gained momentum, amid market expectations of weakening growth and disinflation dynamics fuelled, among others, by declining oil prices. In 2015, German Bund yields continued their decline first on speculation about the launch of a sovereign bond purchase program by the ECB and, later on, by the announcement of the ECB's expanded asset purchase programme (EAPP) and its actual implementation. From early 2014 till mid-April 2015, the yield on German 10-year Bund dropped by 180 basis points (bps) to a historical low of 15 bps and US Treasuries declined by 110 bps to 190 bps over the same period. The spread between the American and German long-term benchmark yields widened in the first three quarters of 2014, amid the effective tapering of US FED asset purchases,[16] improving US labour market conditions and increasing inflation.

Both core and non-core euro area sovereign bond yields narrowed significantly vis-à-vis the German yields over the whole period. The narrowing was particularly strong in the first half of 2014. Debt from non-core countries benefited from the ongoing adjustment of fiscal fundamentals and an increased search for yield, as well as from investors moving their portfolios away from emerging markets. The low ECB policy rate also made bonds from non-core countries attractive from a carry trade[17] perspective.

[13] See European Court of Justice (2015).
[14] See Swiss National Bank (2015).
[15] The comprehensive assessment included an asset quality review and a stress test and it was performed ahead of the SSM taking its responsibility of supervision. In parallel, the EBA also coordinated a stress test targeting banks both within the SSM and non-SSM Member States. Results were published in October 2014. See ECB (2014) and EBA (2014).
[16] On December 18, 2013, the Fed began to taper its bond purchases by $10 billion per month, to $75 billion. After a series of reductions throughout 2014, the program concluded following the Fed's October 29-30 meeting.
[17] Carry trade refers to the return obtained by banks when they invest in sovereign bonds liquidity borrowed from the central bank.

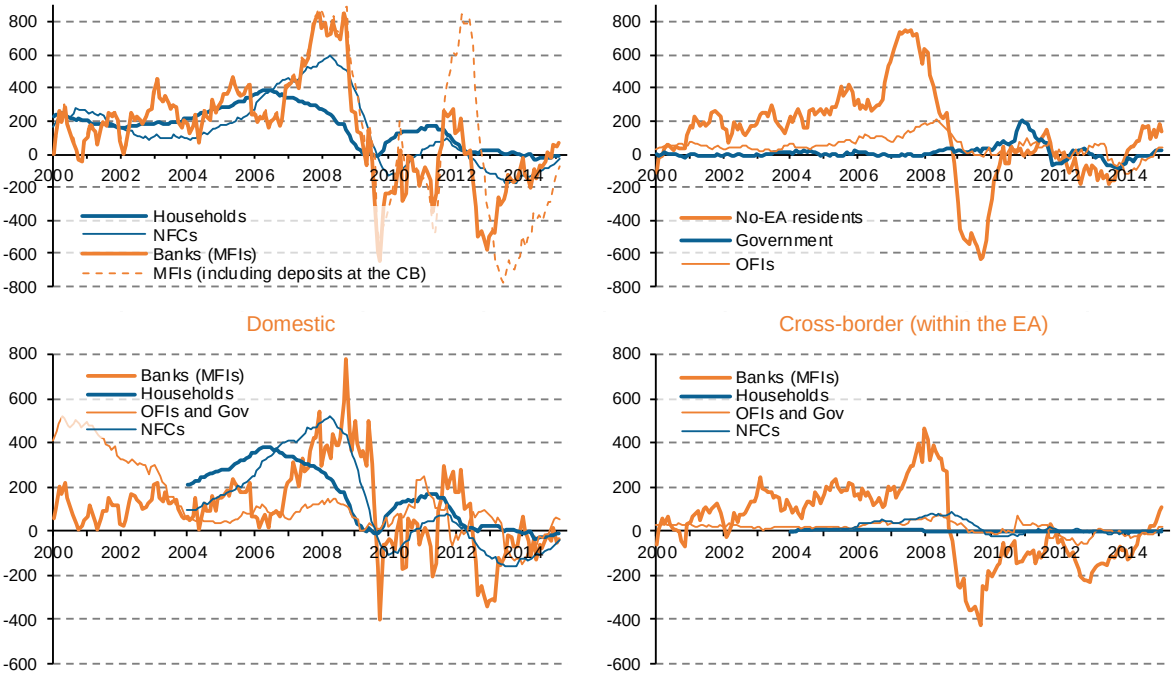
Chart 10: **Yields on sovereign bonds**, selected countries, spread to Germany, 10 year benchmark, basis points



Source: Bloomberg and own calculations.

EU sovereign bond yields outside the euro area took broadly the same course as their euro area equivalents. Spreads of Polish, Czech and Hungarian sovereign 10-year bonds to the equivalent German Bunds tightened to levels in place before the financial crisis erupted in 2008, and have outperformed many of their euro area equivalents over this period. The downward trend was interrupted in early 2014 (on account of a general pessimistic mood in the markets), in summer 2014 and near the year-end of 2014, amid concerns about spill-overs into eastern Europe of Russia's full blown economic and financial crisis.

Chart 11: **Loans by counterparts granted by Euro Area MFIs** (excluding the Eurosystem), net annual flows, € bn
Totals by sector



Notes: Net annual flows are calculated as new businesses minus redemptions. MFIs: Monetary and financial institutions (banks); NFCs: Non-financial corporations. Deposits at the central bank include current account, deposit facility and fixed term deposits.
Source: ECB: monetary statistics and own calculations.

3. CREDIT PROVIDED THROUGH BANK INTERMEDIATIONS: LOANS

3.1. Volume of loans

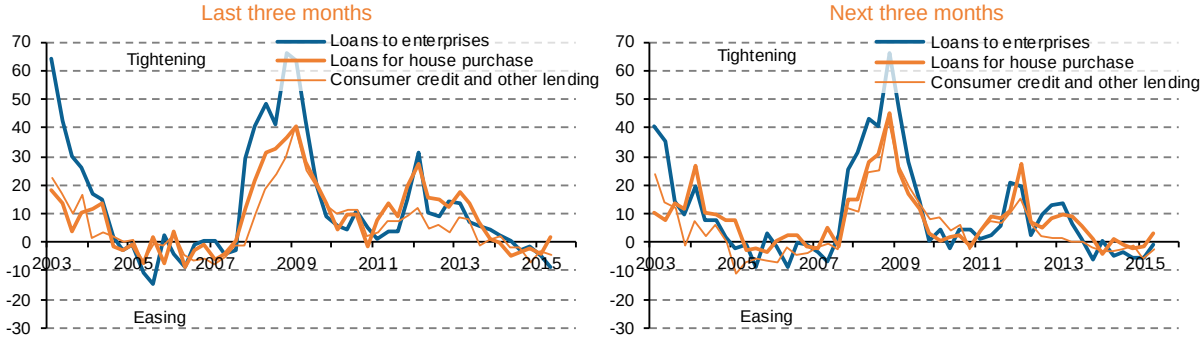
Bank loans are one of the main sources of financing for the non-financial part of the economy, but they are also important within the financial sector. About half of the loans provided by euro area banks financed non-financial corporations and households (€ 9 500 billion or 110 percent of euro area GDP) and the other half went to the financial sector and governments (€ 9 900 billion), including loans to non-euro area residents. These are, largely, financial institutions based in London, New York and other global financial centres (see Table A1 in the Annex for details).

3.2. Flow of loans

Throughout 2014, there was a positive trend in net flows of loans for most counterparts of euro area banks (Chart 11). Net loans to the financial sector, non-euro area residents and governments have returned to positive values since early to mid-2014. Net loans to non-financial companies (NFCs) have become less and less negative. However, net loans to households have remained flat, indicating that banks are merely replacing redemptions with new loans.

Cross-border lending is mainly to the financial sector (interbank loans or loans to other financial institutions). Market integration in the retail segment usually takes the form of cross-border ownership of banking assets, but loans provided by subsidiaries and branches of foreign groups to local households and non-financial corporations are counted as domestic in monetary statistics. Therefore, the data on domestic / cross-border loans fail to capture all the cross-border implications of these loans.

Chart 12: **Changes in credit standards applied to the approval of loans and credit lines**, euro area banks
Net percentage of banks reporting tightening of standards



Notes:Positive values represent net tightening and negative values net easing.
Source: ECB: Bank Lending Survey.

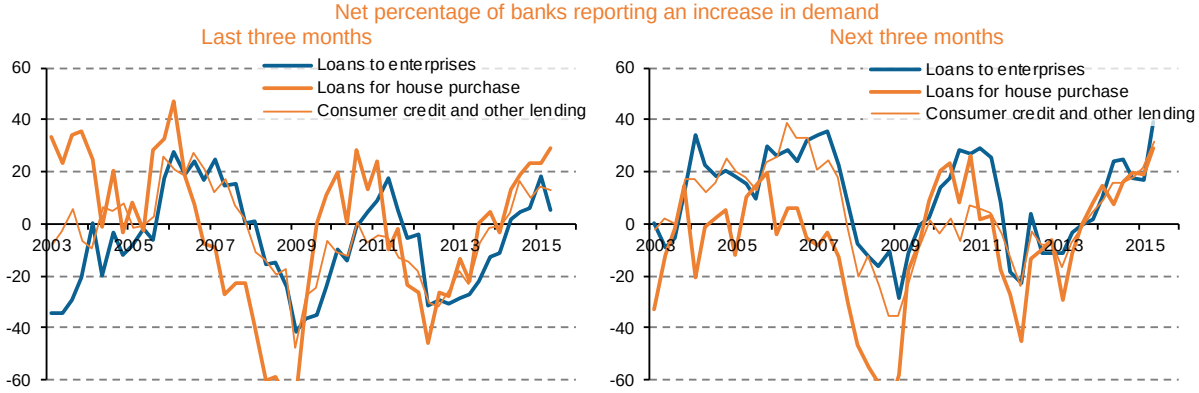
3.3. Interaction of credit supply and demand factors

In 2014 and early 2015, the ECB's bank lending survey highlights a turning point in supply and demand for loans. Lending standards (interest rates, collateral and guarantees required, fees and commissions, etc.) moved from net tightening to net easing (Chart 12) while demand for loans became positive for companies and households (Chart 13). The latest April 2015 edition of the bank lending survey confirms a gradual easing of lending conditions, in particular for enterprises. Credit standards continued to ease across firm size, driven by better bank liquidity positions and by increased competition. Contrasting with the developments for corporate loans, slight tightening was observed in credit standards on loans to households for house purchase. Credit demand continues to strengthen. The key force driving demand for corporate loans higher were factors related to inventories and working capital as well as the general level of interest rates.

In the second quarter of 2015, euro area banks expect more limited easing of credit standards on loans to enterprises and consumer credit and ongoing tightening of credit standards on housing loans.

The continued improvement in the April 2015 ECB bank lending survey is in line with the positive trends in bank lending volumes and flows (Chart 11) and suggests that banks are in a better position to support lending.

Chart 13: **Changes in the demand of loans and credit lines**, euro area banks
Net percentage of banks reporting an increase in demand



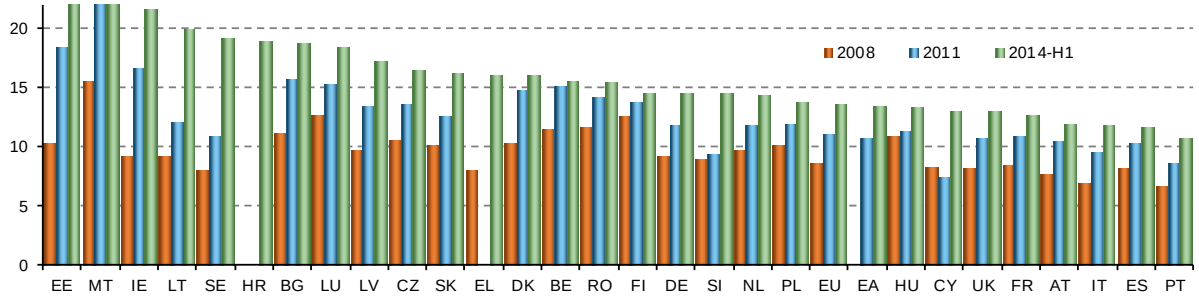
Source: ECB: Bank Lending Survey.

3.4. Solvency and asset quality

Capital ratios

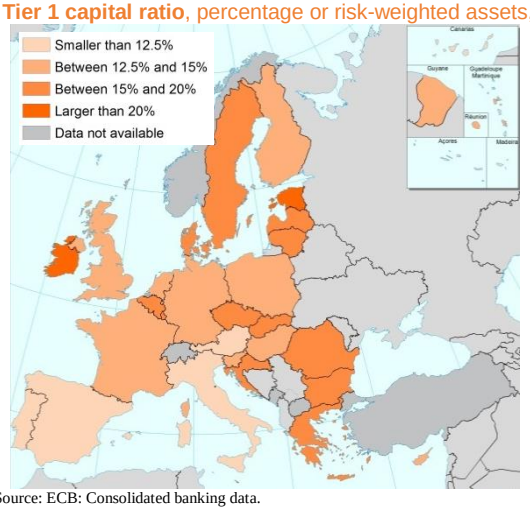
Banks' regulatory capital ratios improved significantly between 2008 and the first half of 2014 (Chart 14), increasing the system's capacity to withstand shocks. For instance, the average euro area Tier 1 ratio increased from 10.7 per cent in 2010 to 13.4 per cent by June 2014; overall capital ratios have also been improved. By June 2014, banking systems in all EU countries had Tier 1 capital ratios, well above regulatory requirements.

Chart 14: **Tier 1 capital ratio**, percentage or risk-weighted assets



Notes: Definitions of capital and risk-weighted assets may differ across countries and banks. Estonia: 2014-H1 = 31.5 per cent; Malta: 2011 = 52.2 per cent; 2014-H1 = 23.9 per cent.
Comparisons of semi-annual data with annual data should be taken with caution
Source: ECB: Consolidated banking data

Chart 15: **Tier 1 capital ratio**, percentage or risk-weighted assets, 2014-H1



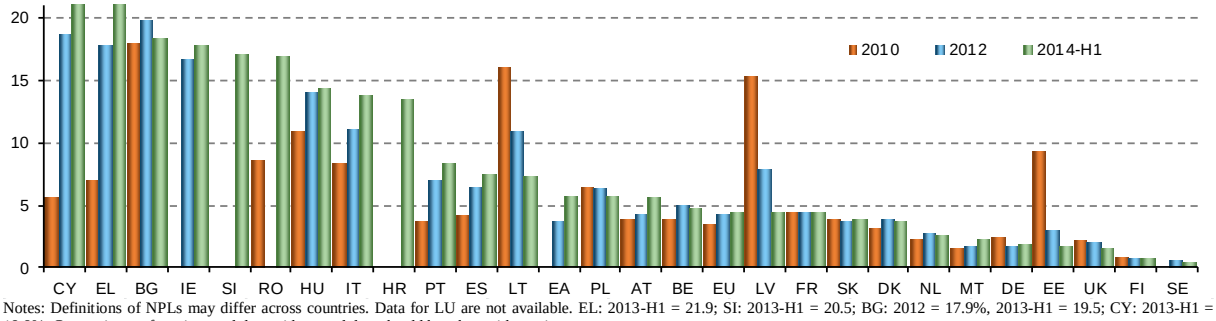
Source: ECB: Consolidated banking data.

The ECB's comprehensive assessment results (see ECB, 2014) were in line with expectations and showed that the banking system in the euro area is well capitalised overall and resilient to external shocks. Recent efforts by EU banks to increase their capital levels suggest that deleveraging pressures will be less acute in the near future.

Non-performing loans (NPLs)

Problems in the economy have impaired the capacity of households and NFCs to repay their debts and have let to significant increases in NPLs across the EU banking systems throughout the financial crisis. By June 2014, the average NPL ratio reached 5.6 per cent in the euro area and 4.5 per cent in the EU as a whole. Following the positive economic developments set out in section 2, the increase in NPLs has slowed down, halted or even reversed in most EU countries (Chart 16).

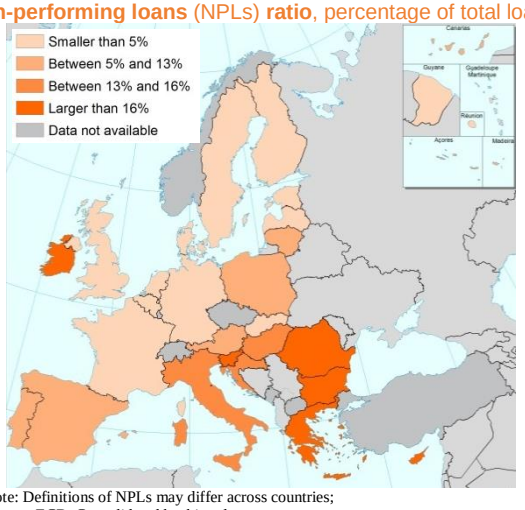
Chart 16: **Non-performing loans** (NPLs) ratio, percentage of total loans



Notes: Definitions of NPLs may differ across countries. Data for LU are not available. EL: 2013-H1 = 21.9; SI: 2013-H1 = 20.5; BG: 2012 = 17.9%, 2013-H1 = 19.5; CY: 2013-H1 = 18.8%. Comparisons of semi-annual data with annual data should be taken with caution
Source: ECB: Consolidated banking data

However, there are significant differences between Member States. Even taking into consideration all caveats and possible biases in measuring NPLs,[18] banking systems in Cyprus, Greece, Bulgaria, Ireland, Slovenia, Romania, Hungary, Italy or Croatia were strained by high levels of bad loans in the first semester of 2014 (over 10 per cent of gross loans), while banking systems in Sweden, Finland, the UK, Estonia, Germany, Malta and the Netherlands showed much lower levels (around or below 2 per cent). The three Baltic countries (Lithuania, Latvia and Estonia) show significant declines in NPLs between 2010 and early 2014.

Chart 17: **Non-performing loans** (NPLs) **ratio**, percentage of total loans, 2014-H1



Note: Definitions of NPLs may differ across countries;
Source: ECB: Consolidated banking data

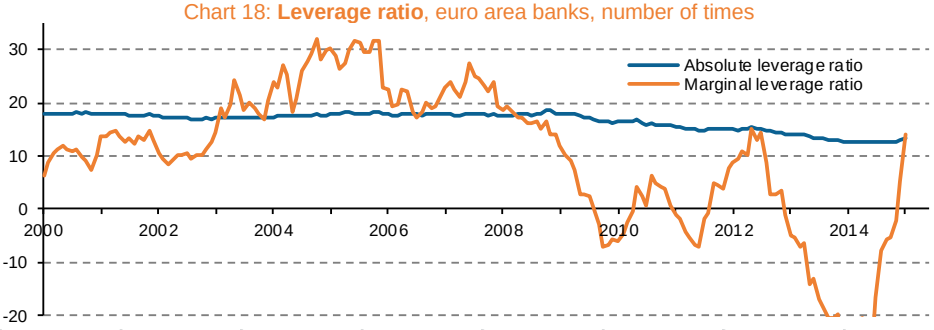
3.5. Leverage

A certain amount of leverage is needed for the well-functioning of an economy. Some authors[19] argue that, within a certain range, increasing leverage is positive for welfare and growth. But, the relationship seems more like an 'inverse U' with the impact of increasing leverage being positive up to a certain level and negative beyond that.

[18] There are large differences between countries in how NPLs are calculated (see last year's review for further details). The EBA (2013) proposed technical standards to harmonise the definition of NPLs at EU level. These came into force in late 2014 and they are not yet reflected in the statistics. As a result, international comparisons should be read with caution.
[19] See, for instance, Cecchetti and Kharroubi (2012).

Leverage accumulation in the run-up to the crisis led to excessive risk in the banking system.[20] Disorderly deleveraging could be a serious threat to macroeconomic and financial stability. However, deleveraging is necessary to correct the imbalances built prior to the crisis. The need to deleverage is intertwined with the need for banks to strengthen their capital positions. The leverage ratio provides valuable information about banks' risks and solvency from an 'unweighted' perspective, in addition to the one provided by regulatory capital ratios.

Chart 18: **Leverage ratio**, euro area banks, number of times

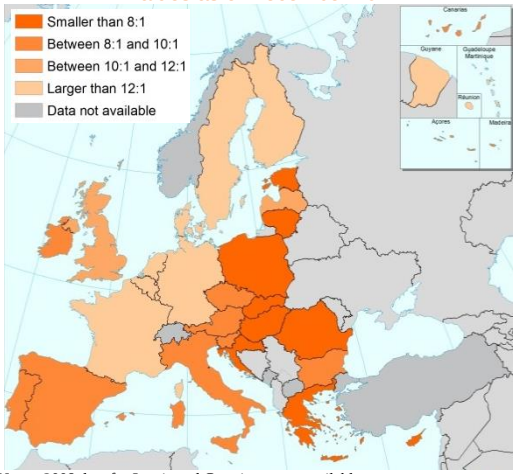


Notes: Leverage ratio is computed as the ratio of total assets to equity. The absolute ratios are computed from outstanding volumes of total assets and equity. The marginal ratios are computed from the respective annual flows. Annual flows are computed as the sum of net flows for 12 consecutive months through a rolling window. 'Net' refers to new transactions minus redemptions.
Source: ECB: Monetary statistics and own calculations.

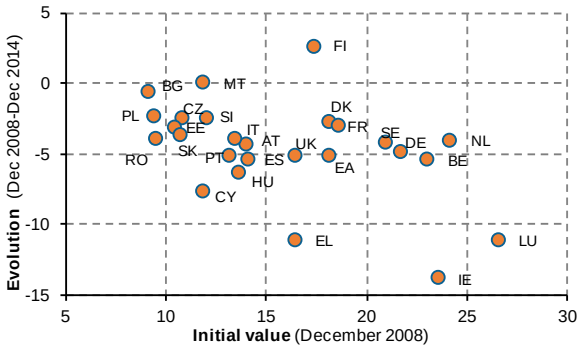
Data show that bank leverage has declined from about 18:1 on the outbreak of the crisis to less than 13:1 by December 2013 (see absolute leverage ratio on Chart 18). This appears to have been achieved through a very aggressive policy on new activities: the marginal leverage ratio has remained below 10: 1 since early 2009 (except for a short period in 2012). Since early 2013, the marginal leverage has been ratio negative, indicating that the reduction in leverage is not only a result of increasing capital but also contracting total assets. After strengthening their positions throughout 2013 and 2014, banks' total assets started to grow again in late 2014. The results of the comprehensive assessments clarified the situation for banks and reduced pressure to continue with aggressive deleveraging and leverage even increased slightly in late 2014 and early 2015.

Chart 19: **Leverage**, absolute leverage ratio, number of times

Values as of December 2014



Leverage in 2008 and evolution up to 2014



Notes: 2008 data for Latvia and Croatia are not available.
Source: ECB: Monetary statistics and own calculations.

While there has been a general trend towards declining leverage, the euro area average conceals significant differences between countries (Chart 19). Faced with market and regulatory pressures to deleverage, the banking systems with the highest initial leverage ratio would have been expected to be the ones that most reduced their leverage during the crisis. However, data suggest that this has not been the case. Between 2008 and 2014, countries reduced their leverage by between 2.5 and 6 points, regardless of the initial level of leverage. Exceptions to this generalised pattern would be Luxembourg, Ireland and Greece, where leverage decreased by

[20] See Basel III, paragraph 152.

more than 10 percentage points; and Finland, Bulgaria and Malta, where leverage hardly decreased or actually increased (Chart 19, right-hand panel). As a consequence, the ranking of countries has not substantially changed. The countries with the largest banks (Germany, France, the UK, the Netherlands, Sweden or Belgium) remain those with the highest levels of leverage (Chart 19, left-hand panel), while still complying with regulatory capital requirements through optimising the risk-weight of their assets. Banks in these countries are likely to be most affected by the introduction of a leverage ratio.

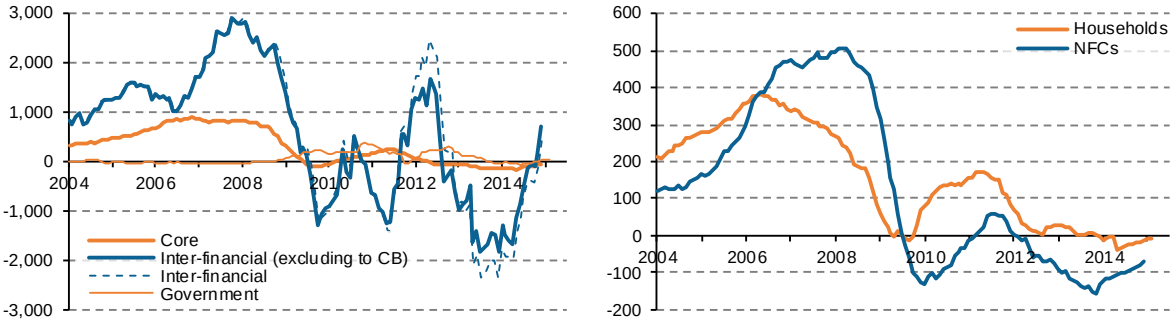
3.6. Overall provision of funding by banks

Several features stand out from the data on flows of credit provided by euro area banks (Chart 20). First, as noted in Section 3.2, flows of inter-financial credit are significantly larger than flows of credit provided to the non-financial parts of the economy.

Second, the build-up and burst of the financial bubble is more pronounced for inter-financial credit than for credit to the non-financial sectors of the economy. Throughout the crisis, flows of inter-financial credit have been very volatile while flows of credit to the non-financial economy have been less volatile. This can be explained, to a large extent, by the fact that credit to the non-financial economy typically has a long maturity period (e.g. a mortgage) while inter-financial credit typically has a very short maturity period (e.g. the bulk of unsecured interbank lending has a maturity period of a few days at most). In addition, inter-financial credit may formally have long maturity periods, but a much shorter effective maturity period (e.g. bond holdings, which can be divested at any time, regardless of their face maturity).

As a consequence, inter-financial credit can recover very quickly, but it can also be withdrawn more quickly. A series of regulatory reforms are being developed to address the financial instability generated by swings in inter-financial credit (see Chapter 2 of last year's review). Inter-financial credit has recovered strongly in 2014, while credit to the non-financial economy – although showing a positive trend – is still negative (loan redemptions are larger than 'fresh' new credit).

Chart 20: **Provision of credit by euro area banks**, net flows, year to date, € billion



Notes: Credit comprises loans and purchase of securities (equity, debt securities and derivatives). Core assets: credit provided to households and non-financial corporations. Inter-financial assets are computed by subtracting government and core assets to total assets.
Source: ECB: Monetary statistics and own calculations.

Third, within the producing sector, flows of credit to NFCs were more strongly affected by the crisis than flows of credit to households, which virtually always remained positive. This is driven by the fact that the bulk of credit to households is backed with collateral (e.g. mortgage credit) and therefore the borrower can usually get better financial conditions. Other factors may also have had an influence, such as capital requirement rules and a lower demand for credit from NFCs due to the slowdown in economic activity. However, in some cases, this may also reflect the difficulties faced by viable businesses in accessing affordable credit.

4. CREDIT OBTAINED THROUGH BONDS

4.1. Bond volumes

Between 2006 and 2013, the euro area bond markets expanded by 50 per cent, compared to a 12 percent increase in bank loans during the same period. The financing provided through bond markets in the euro area (€ 16 400 billion or 190 percent of euro area GDP) is of a similar size to the financing provided through bank loans, but the

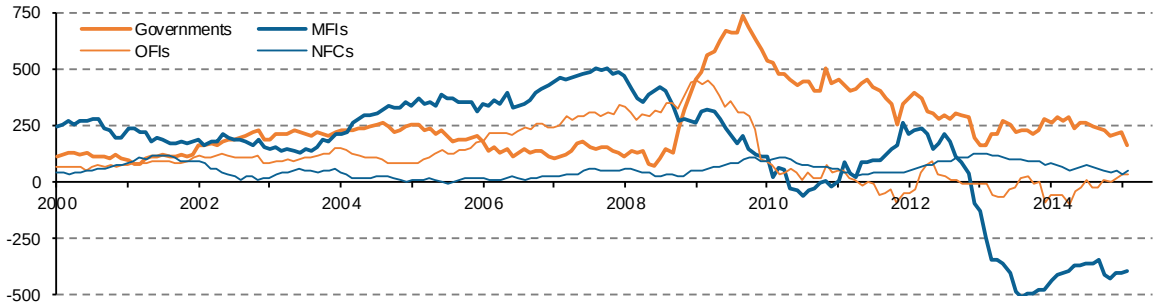
sector composition is different (see Table A2 in the Annex). Bonds issued by NFCs represent about 7 per cent of the total, with the rest being distributed almost evenly between the financial sector (MFIs and other financial institutions) and governments.

4.2. Net issues of bonds

The issuing of bonds has compensated, at least partly, for the financing gap arising from the collapse of the loan markets. Use of bonds as a source of funding by NFCs is relatively small (see Chart 13 in Chapter 2) and, as a result, migration from bank loans to market financing has mainly occurred within the financial system itself. Net annual government issue of bonds soared from about € 150 billion before the crisis to over € 700 billion in late 2009, and recently seems to have stabilised at around € 250 billion annually (Chart 21).

Except for a short revival in 2012, net issuing of bonds by banks has declined since 2007 and this decline accelerated in 2013 and 2014. This negative net issuing of bonds by MFIs (i.e. bond redemptions being larger than new issues) reflects the need for banks to reduce their levels of wholesale funding and to deleverage, particularly prior to the ECB's comprehensive assessment. However, the contraction in the volume of bonds issued by MFIs continued even after the results of the comprehensive assessment were released. According to the ECB,[21] market turmoil constrained banks to reduce their issuing of bonds. Data suggest that this was mainly true for medium-size and small banks but not for the bigger banks.[22]

Chart 21: **Bonds issued by Euro Area residents**, net flows, year to date, € billion



Source: ECB: Securities statistics and own calculations.

Bonds issuing by NFCs is much rarer than in the three other sectors. However, it has significantly increased compared to the pre-crisis period and currently stands at levels last seen after the bursting of the dotcom bubble. A substitution effect[23] in favour of direct bond issuing by NFCs has been seen since the early 2009 and still continues, confirmed by a broader use of debt securities across rating classes and sectors, notably for lower-rated investment-grade issuers and more cyclical sectors.

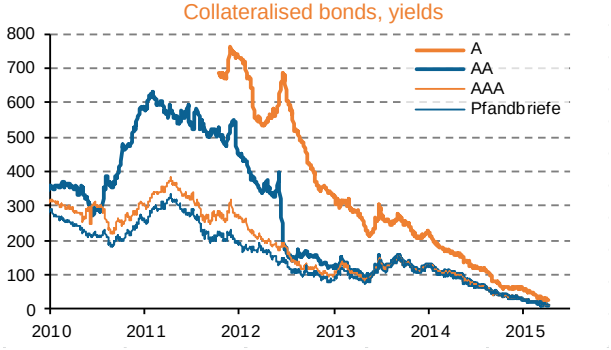
The European Commission and the EIB aim to stimulate investment in key strategic EU infrastructure through the project bond initiative (PBI) launched in November 2012. The PBI covers transport, energy and broadband, and establishes debt capital markets as an additional source of financing for infrastructure projects in these areas. The initiative is currently in the pilot phase, with the projects approved by the EIB Board before end 2014 to be signed with project promoters before the end of 2016. A high leverage effect for EU funds is foreseen, i.e. the amount of € 0.23 billion allocated from the EU budget is expected to leverage € 0.70 billion of EIB credit enhancement which in turn can attract up to € 4.0 billion of bond financing. As of the end of 2014, four projects in four different countries have been concluded under the PBI, covering all the three sectors, with an overall EIB credit enhancement of € 0.293 billion for a total project capital cost of over € 2 billion.

[21] ECB (2013), p. 18.
[22] The median share of debt securities in total assets has significantly decreased (from 14 percent to 7 percent) while the average share only marginally declined (from 17 percent to 15.5 per cent), see ECB (2013), p. 18, Chart 19.
[23] ECB (2009), p. 22.

Chart 22: **Euro area corporate bonds**, five-year maturity, basis points

By rating category, spreads to German sovereign bonds

Collateralised bonds, yields



Source: Bloomberg.

4.3. Market developments in bond markets

The decline in sovereign yield has spurred demand for assets in the riskier parts of the spectrum. Reflecting the improvement in market confidence, euro area corporate bonds spreads have narrowed across rating categories since early 2012 (Chart 22). Volatility also declined. The narrowing of credit spreads was particularly pronounced in the higher yielding bond segment, generating strong mark-to market returns for investors. Declining risk premiums supported the increase in the issuing of bonds by EU NFCs (Chart 21) and allowed them to compensate, to a certain extent, for the decline in bank loans. Credit default rates declined, broadly in line with declining credit spreads. In a low growth environment, credit spreads tend to be high, as do credit default rates. Therefore, the sustainability of the declines in these areas may be tested when monetary policy normalises.

5. CAPITAL OBTAINED THROUGH QUOTED SHARES

5.1. Volumes: market capitalisation of quoted shares

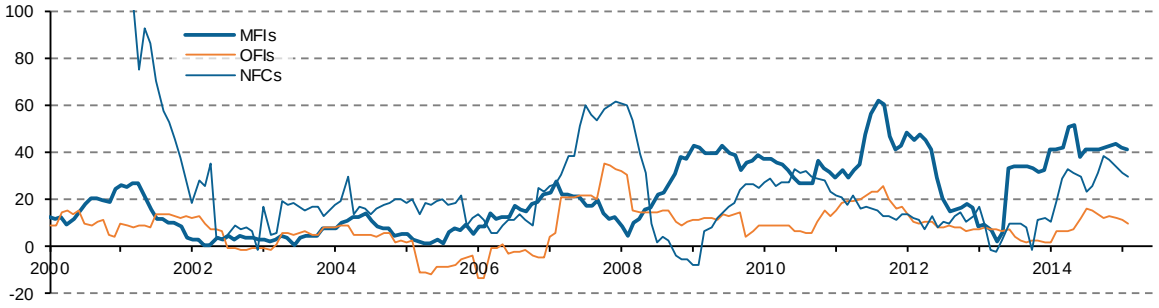
With a market capitalisation of € 5 900 billion in December 2014 (see Table A3 in the Annex), the euro area equity markets (quoted shares) are three times smaller than bond markets (Section 4.1) or the financing provided through bank loans (Section 3.1). NFCs issue the bulk of quoted shares (over 80 per cent), while the market capitalisation of banks and other financial institutions is much smaller.

The use of equity as a source of financing has two main advantages over debt (loans, bonds or other types or debt). First, equity is usually permanent, so does not need to be reimbursed. Second, if the company incurs losses, equity does not need to be paid out. Thus, from an investor's point of view, equity can yield higher returns but it entails higher risks than debt: in economic downturns, dividends can fall to zero and the value of the equity can also be reduced. This latter risk materialised during the crisis. Following the collapse in markets (Chart 24), market capitalisation of quoted shares issued by euro area residents shrank by half, from € 6 600 billion in 2007 to € 3 500 in 2008. By late 2014, market capitalisation had recovered to pre-crisis levels.

5.2. Net issues of quoted shares

Net issue data provides information about the recourse to capital markets without the distortion of price movements (Chart 23). With the collapse of financial markets in late 2008, NFCs postponed their issuing of new shares until the situation improved in 2009. Thereafter, net issuing of shares by NFCs came down to pre-crisis levels. With the improvements in the markets in late 2013, NFCs issued increasing volumes of shares throughout 2014. As in the case of bonds, the issuing of shares has alleviated credit constrains. However, in the aggregate, it appears insufficient to compensate for the financing gap left by the drop in loans, in particular as capital markets are accessible to larger companies rather than smaller businesses.

Chart 23: **Quoted shares issued by euro area residents**, net flows, year-to-date, € billion



Source: ECB: Securities statistics and own calculations

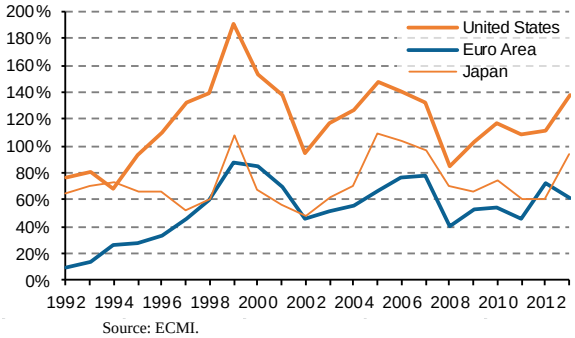
The issuing of shares by MFIs followed a different pattern. In the 2000s, this was relatively limited but, since early 2008, banks have been issuing increasing volumes of shares. As discussed in Section 3, this was driven by the need to absorb incurred losses, provision expected losses and ease the deleveraging process, and the pressure from regulatory reforms and the markets, including several rounds of stress testing and capital and transparency exercises. The willingness of banks to strengthen their capital positions continued throughout 2014, even after the results of the ECB comprehensive assessment were released.

5.3. Market developments in equity markets

EU stock markets were more volatile than bond markets. European stocks continued to increase in the first half of 2014, supported by strong corporate earnings and price-earnings ratios for EU stock indices that were well below their long-term average. However, in the summer, stock indices struggled and volatility spiked amid mounting geopolitical tensions and disappointing macro-data. Towards the end of 2014, stock markets recovered but remained volatile, due to rising global macroeconomic concerns (e.g. China and the significant drop in oil prices). Stock markets began 2015 on a rally, supported by both supplementary unconventional monetary policy stimulus and the pick-up of macroeconomic growth. The general increase was smooth and almost uninterrupted, while the market volatility index dropped significantly. Concerns may be raised with respect to the potential building of a bubble given such a rally and the historically high values of stock indices.

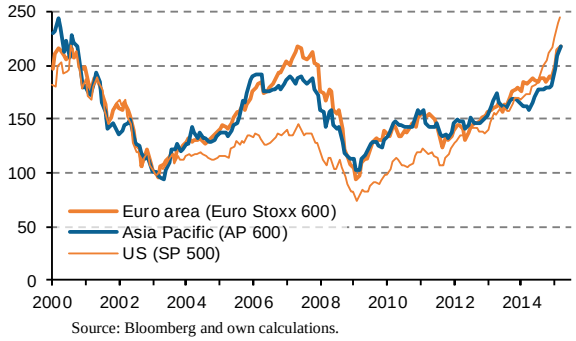
Chart 24: **Market capitalisation**

Percentage of GDP



Source: ECMI.

Index: 2003 Q1 = 100



Source: Bloomberg and own calculations.

The banking sub-index increased more than the overall index over the last couple of years, but this trend stalled in the first quarters of 2014 and even reversed over summer. However, with speculation about QE gaining strength over the last few months of 2014 and later on, as QE was actually implemented, banking shares recovered strongly.

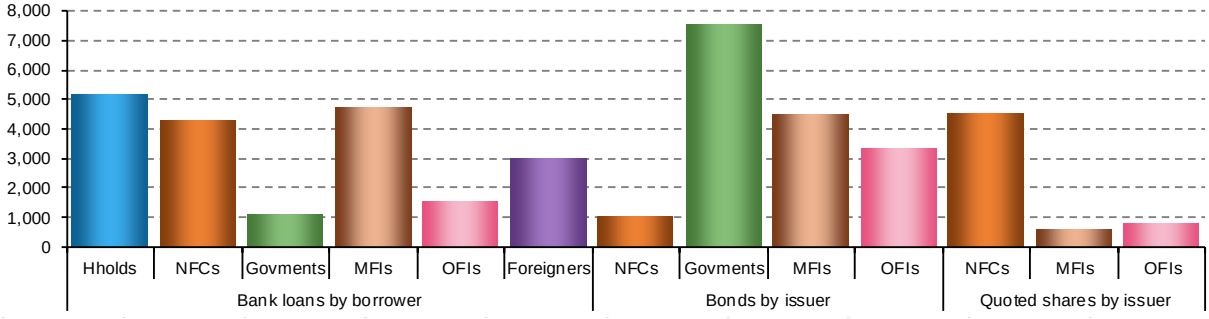
US stock market indices saw lower volatility than their EU equivalents despite higher valuations. Equity margin debt on the New York stock exchange has been at a new all-time height since 2014 (following previous peaks in 2001 and 2007), suggesting significant optimistic market sentiment.

6. CONCLUSIONS

This chapter shows how a series of economic indicators signal that the recovery of the EU economy is gaining traction. However, economic growth remains slow and output has yet to reach pre-crisis levels. Some risk and vulnerabilities of the European economy are to be noted. Firstly, despite many years of extraordinary monetary stimulus, structural reforms and regulatory reforms, the EU and many other economies remain in a low growth and low inflation environment (also influenced by demographic trends), while historical high debt levels have hardly come down. Secondly, financial markets and financial system in the EU and abroad have overall been resilient over the past several months; however, some short episodes of volatility have also been observed. Finally, the protracted low yield environment may generate some risks linked to the search for yield, a potential sharp and disorderly reversal in the assessment of risk, the build-up of bubbles in specific market segments, potential reduction of private sector consumption, compression of profit margins for financial institutions against the guaranteed returns to policy holders (insurance corporations and pension funds) or a false sense of security that may lead to delaying consolidation.

The chapter also analyses the developments in the different segments of the financial sector including bank loans, bonds and quoted shares. The distribution of the use of the different sources by each financial sector is summarised in Chart 25. An in-depth analysis of these and other sources of funding is further developed in Chapter 2.

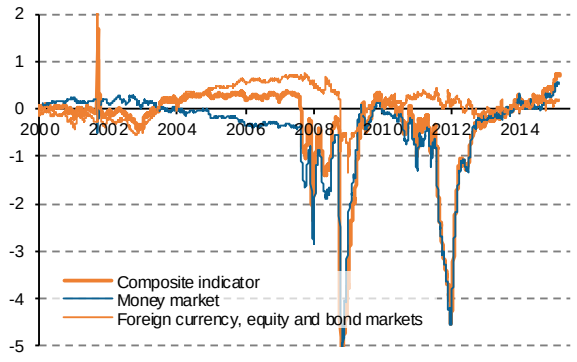
Chart 25: **Sources of funding used by the economy**
Loan intermediation and financial markets, outstanding amounts, December 2014, € billion



Source: ECB and own calculations.

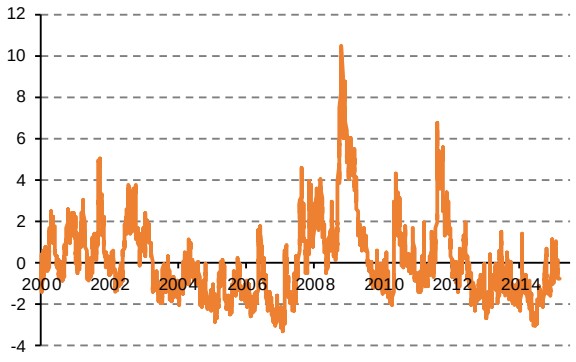
ANNEX: ADDITIONAL CHARTS AND TABLES

Chart A1: **Financial markets liquidity indicator**, euro area



Source: ESRB Risk Dashboard.

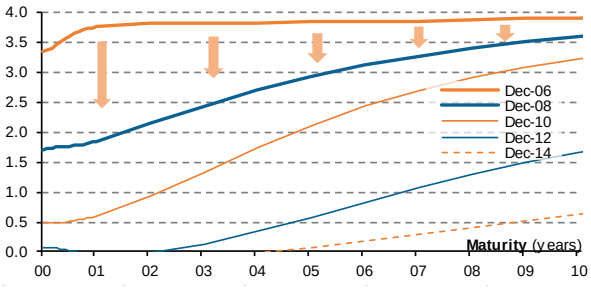
Chart A2: **Global risk aversion indicator**



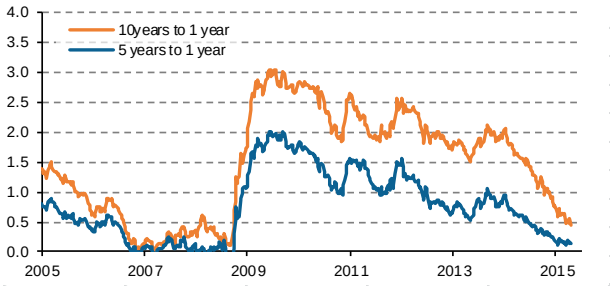
Source: ESRB Risk Dashboard.

Chart A3: **Yields**, AAA-rated government bonds, euro area, percentage

Yields curve (term structure)

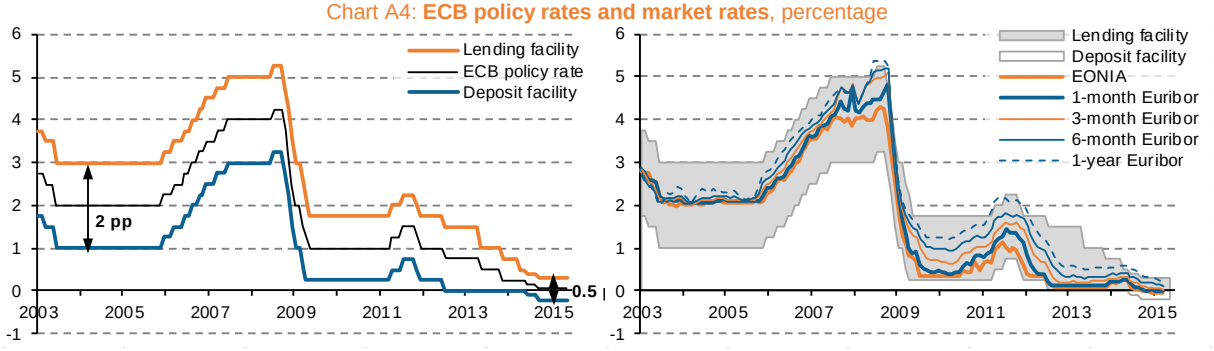


Slope of the yield curve, evolution



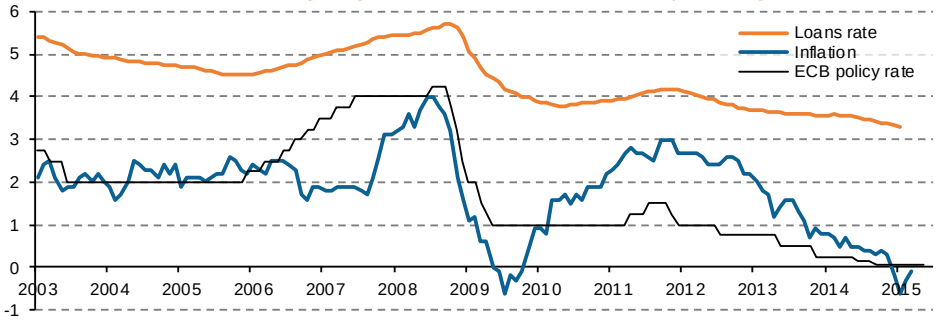
Source: ECB and own elaboration.

Chart A4: **ECB policy rates and market rates**, percentage



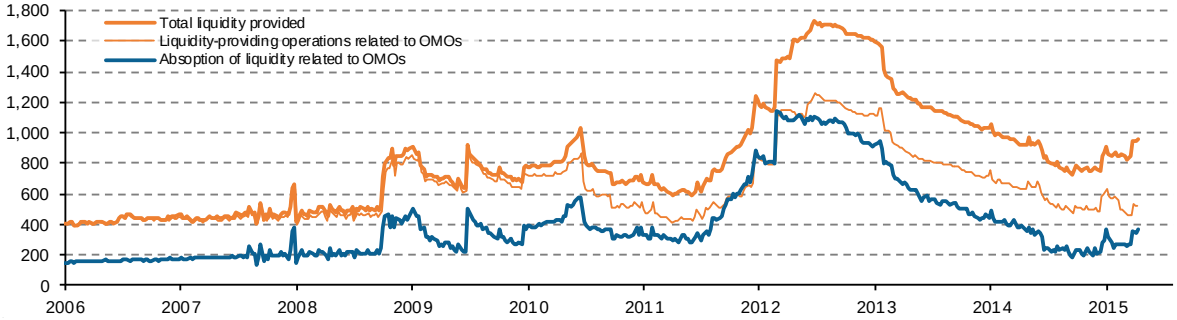
Source: ECB and own elaboration.

Chart A5: **ECB policy rate, loans rate and inflation**, percentage



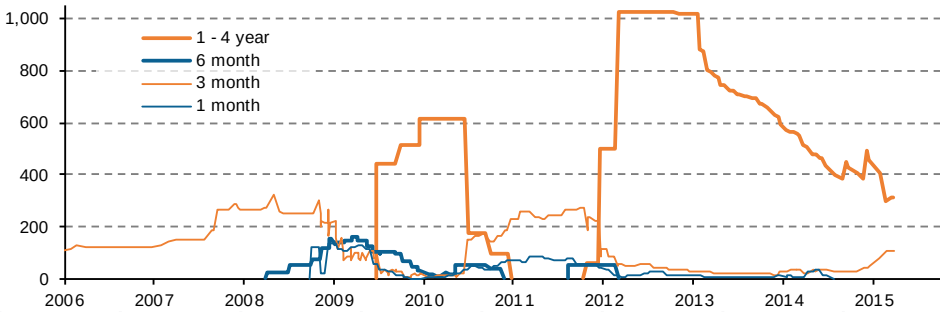
Note: 'Loans rate' is calculated as the weighted average of the rate charged on the different types of loans granted to households and non-financial corporations.
Source: ECB and own calculations.

Chart A6: **Liquidity provided by the Eurosystem**, € billion



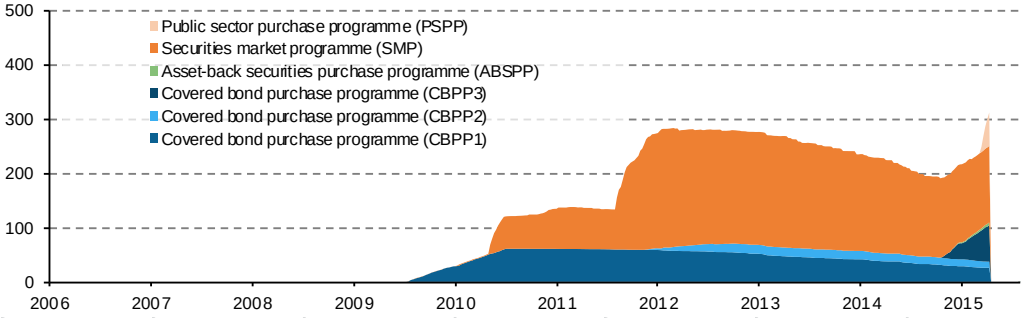
Notes: Total liquidity provided includes total lending to credit institutions related to MPOs, other claims on MFIs (this includes, inter alias, ELA provided by national central banks) and securities held for monetary policy purposes (see right-hand panel); Source: ECB: Monthly bulletin and own calculations.
Source: ECB: Monthly bulletin and own calculations.

Chart A7: **Outstanding amounts allotted in LTROs: breakdown by maturity**, € billion



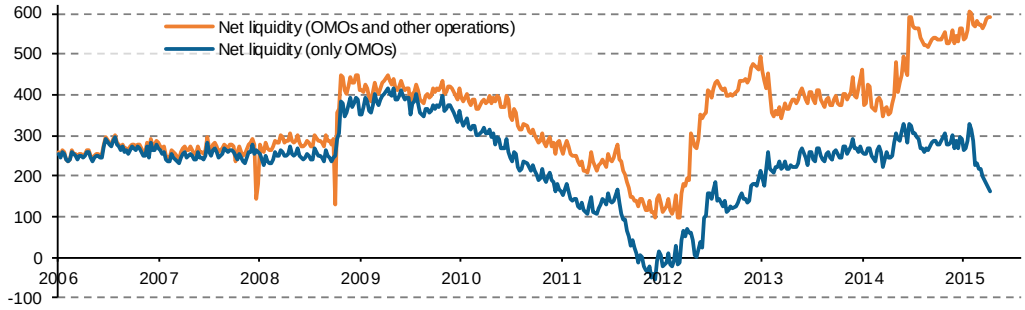
Source: ECB: Monthly bulletin and own calculations.

Chart A8: **Securities held by ECB**, € billion



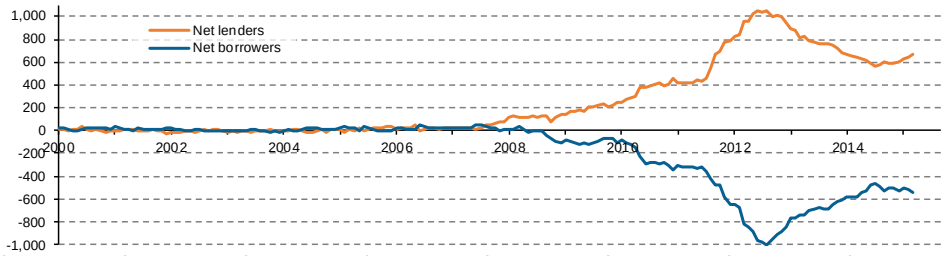
Note: Holdings for monetary policy purposes.
Source: ECB: Monthly bulletin and own calculations.

Chart A9: **Net central bank liquidity**, € billion



Notes: Net liquidity is calculated as the difference between total liquidity-providing operations related to OMOs and total absorption of liquidity related to OMOs. 'Other operations' include other claims on MFIs and securities held for monetary policy purposes. OMOs: open market operations.
Source: ECB and own calculations.

Chart A10: **Net balance with the Eurosystem (TARGET2)**, lenders vs borrowers, € billion



Note: Net lenders: Germany, Netherlands, Luxembourg, Findland. Net borrowers: Portugal, Ireland, Greece, Italy and Spain
Source: Institute of Empirical Economic Research – Osnabrück University (www.eurocrisismonitor.com) and own calculations.

Table A1: **Loans by counterparts granted by euro area banks (MFIs)**, outstanding volumes, € billion

Counterparty	2006	2007	2008	2009	2010	2011	2012	2013	2014
Interbank loans (excluding position at ECB)	4 763	5 412	5 824	5 511	5 126	5 295	4 851	4 766	4 764
Households	4 529	4 801	4 893	4 960	5 168	5 243	5 251	5 230	5 208
Non-financial corporations	3 840	4 389	4 827	4 691	4 668	4 720	4 536	4 345	4 275
Governments	814	959	973	1 002	1 218	1 160	1 153	1 082	1 117
Other financial institutions	771	958	1 055	1 132	1 196	1 203	1 256	1 074	1 152
Total loans to euro area residents	14 716	16 519	17 572	17 297	17 376	17 619	17 047	16 497	16 516
Loans to non-Euro area residents	2 927	3 295	3 242	2 822	2 963	3 022	2 868	2 726	3 014
Total loans provided by euro area banks	17 644	19 815	20 815	20 118	20 339	20 641	19 916	19 223	19 530

Notes: Other financial institutions include insurance corporations and pension funds, and other financial intermediaries. Interbank loans do not include the positions of the banks at the central bank.
Source: ECB: monetary statistics and own calculations.

Table A2: **Bonds issued by euro area residents**, outstanding volumes, € billion

Issuer	2006	2007	2008	2009	2010	2011	2012	2013	2014
Governments	4 729	4 859	5 282	5 901	6 499	6 853	6 991	7 263	7 505
Banks (MFIs)	4 548	5 037	5 265	5 367	5 234	5 514	5 397	4 883	4 510
Other financial institutions	1 237	1 553	2 214	3 156	3 216	3 209	3 282	3 210	3 325
Non-financial corporations	588	631	688	788	837	859	915	987	1 055
Total	11 102	12 081	13 449	15 212	15 786	16 435	16 586	16 342	16 394

Note: Other financial institutions include insurance corporations and pension funds, and other financial intermediaries.
Source: ECB: securities statistics and own calculations.

Table A3: **Quoted shares issued by euro area residents**, outstanding volumes (market capitalisation), € billion

Issuer	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-financial corporations	4,466	5,001	2,851	3,493	3,792	3,275	3,571	4,314	4,567
Banks (MFIs)	1,046	985	373	565	458	339	405	569	591
Other financial institutions	699	607	299	375	385	325	618	751	788
Total	6,211	6,592	3,523	4,433	4,635	3,939	4,593	5,634	5,945

Source: ECB: securities statistics and own calculations.

Table A4: **Credit provided by banks in the form of holdings of bonds,** euro area MFIs, outstanding volumes, € billion

Issuer	2006	2007	2008	2009	2010	2011	2012	2013	2014
Banks (MFIs)	1 637	1 740	1 976	2 080	1 886	1 852	1 852	1 643	1 427
Governments	1 278	1 197	1 245	1 482	1 524	1 396	1 627	1 694	1 848
Other financial institutions	428	767	1 150	1 280	1 358	1 353	1 267	1 191	1 116
Non-financial corporations	228	246	256	218	180	164	156	145	151
Total (euro area bonds)	3 571	3 949	4 628	5 060	4 949	4 765	4 902	4 673	4 543
Non-Euro area issuers	1 109	1 234	1 227	1 148	1 052	932	873	799	936
Total	4 680	5 183	5 855	6 207	6 001	5 697	5 775	5 472	5 479

Source: ECB: monetary statistics and own calculations.

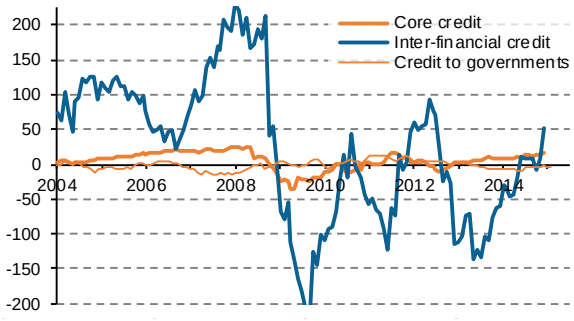
Table A5: **Credit provided by banks in the form of holdings of equity,** euro area MFIs, outstanding volumes, € billion

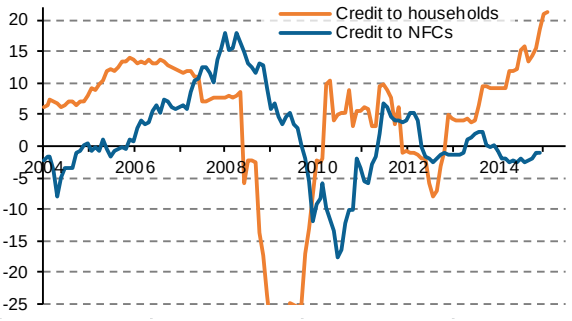
Issuer	2006	2007	2008	2009	2010	2011	2012	2013	2014
Banks (MFIs)	373	424	422	435	445	484	476	456	423
Other financial institutions	302	374	306	340	481	444	444	451	488
Non-financial corporations	500	497	469	461	308	284	309	325	268
Total (euro area shares)	1 173	1 295	1 197	1 236	1 233	1 212	1 228	1 232	1 174
Non-euro area issuers	293	342	276	280	303	295	301	328	335
Total	1 466	1 636	1 473	1 516	1 536	1 507	1 528	1 560	1 508

Notes: Includes all equity: quoted shares, non-negotiated shares and other types of equity. The Eurosystem is excluded from MFIs.
Source: ECB: monetary statistics and own calculations.

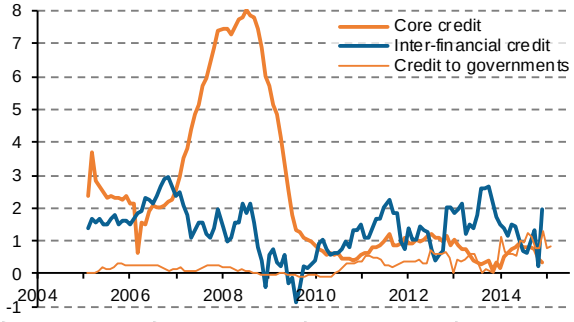
Chart A11: **Credit provided by banks**, net annual flows, € billion

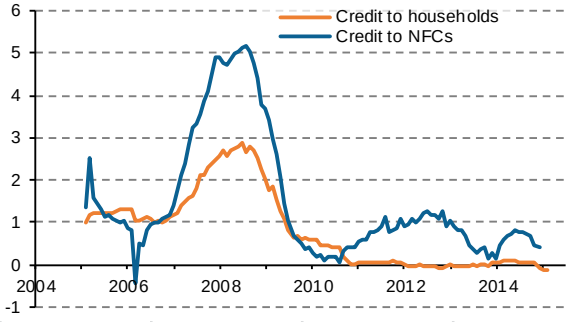
Belgium



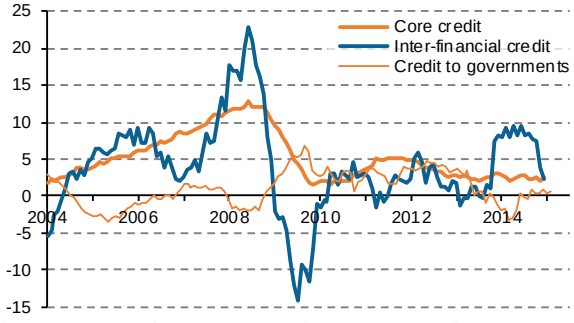


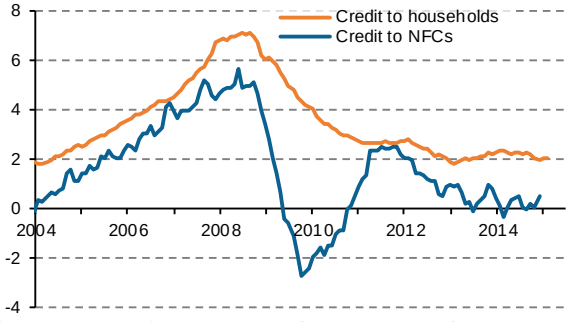
Bulgaria



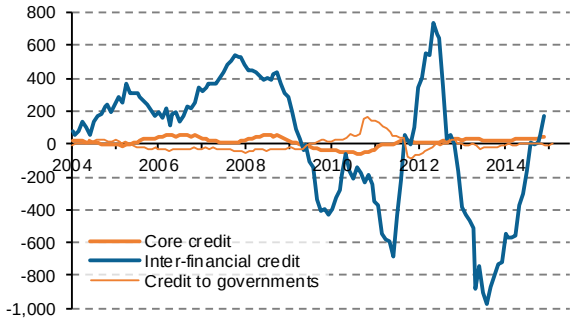


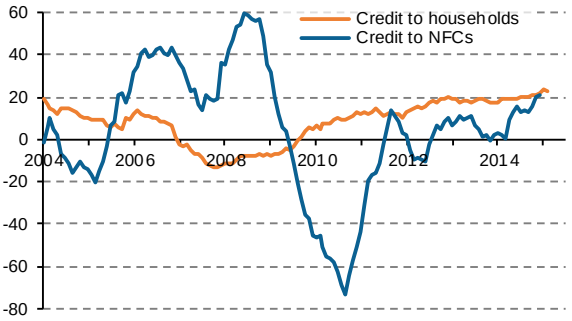
Czech Republic



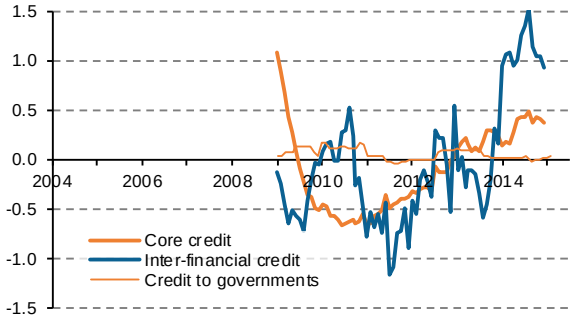


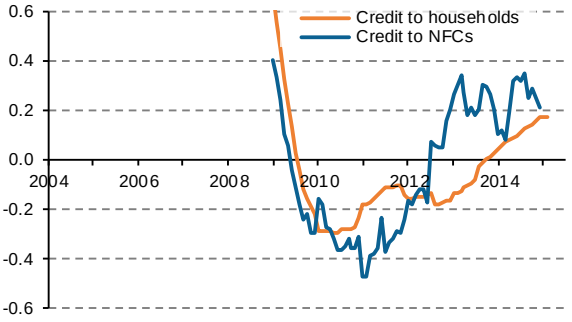
Germany



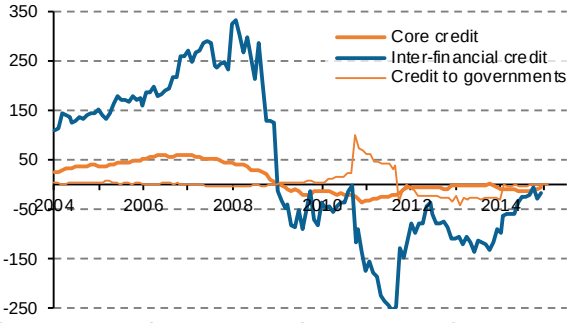


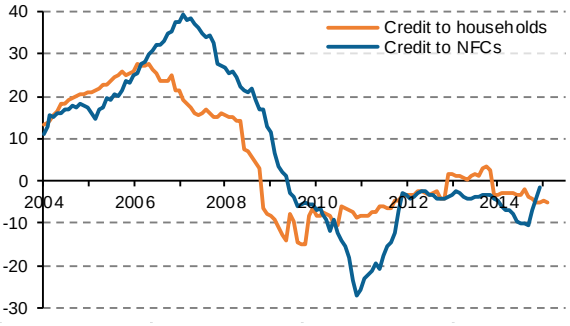
Estonia



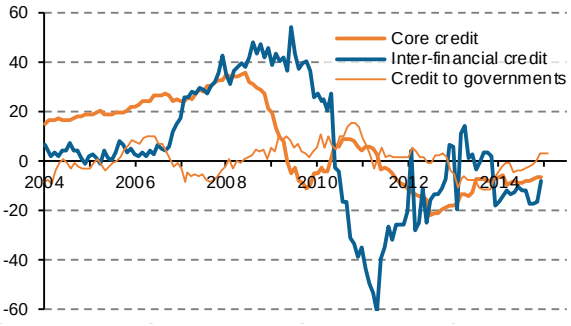


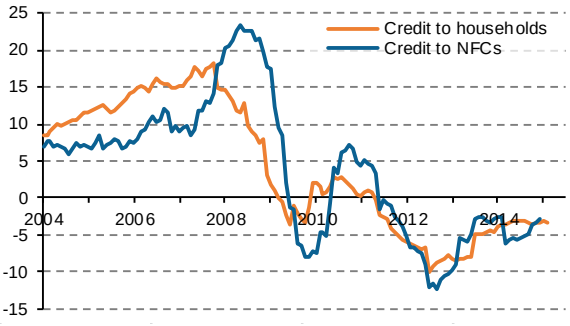
Ireland



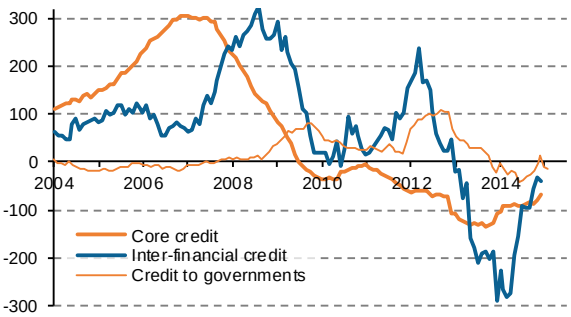


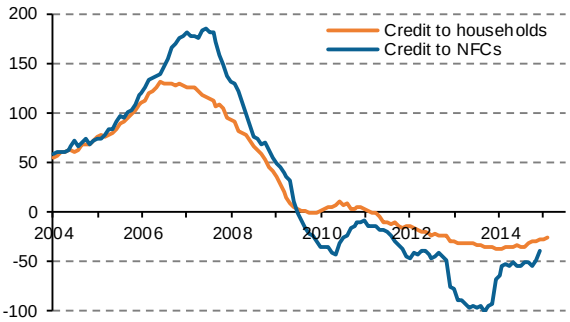
Greece



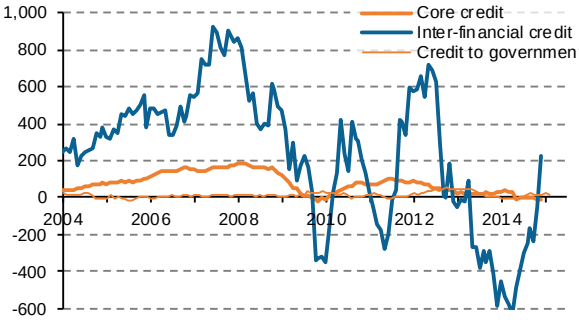


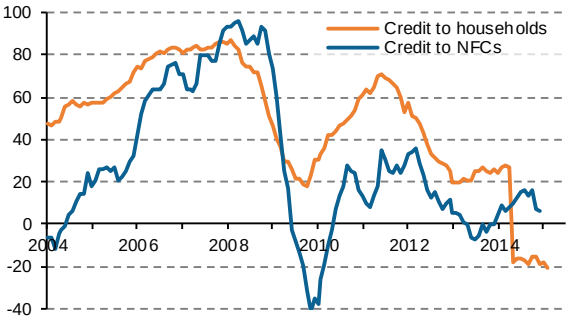
Spain



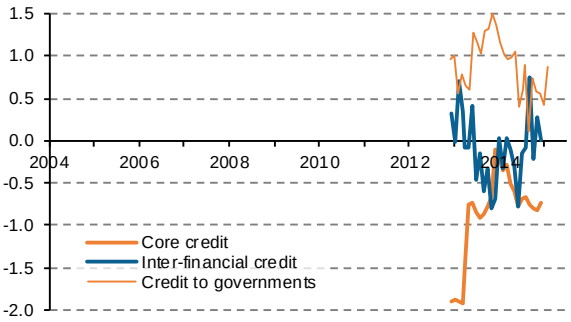


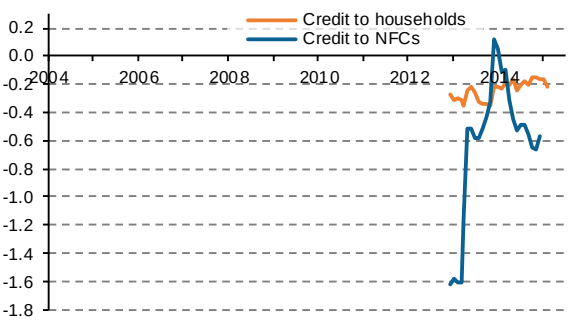
France



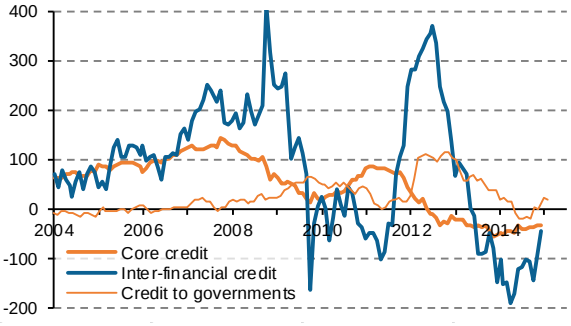


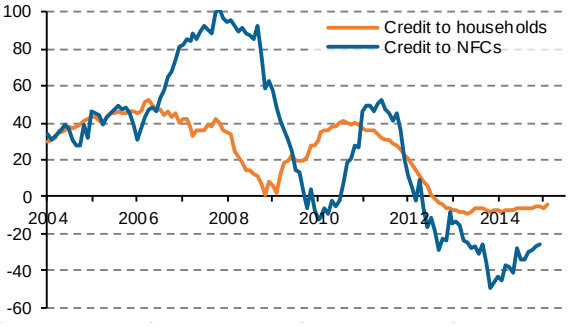
Croatia



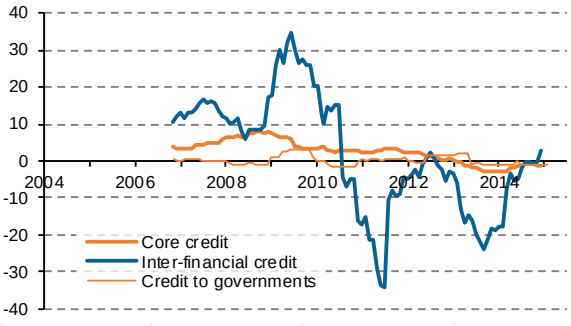


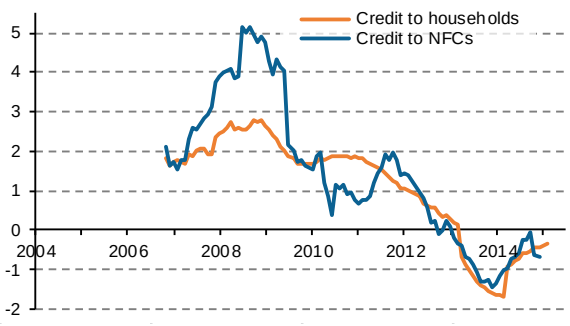
Italy



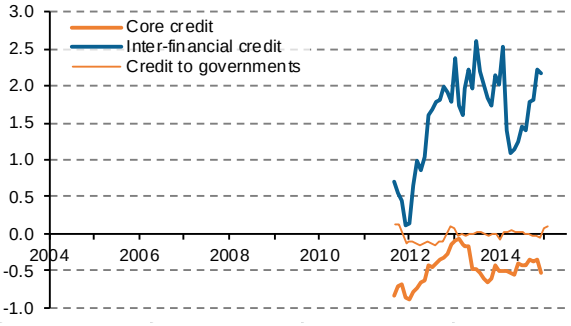


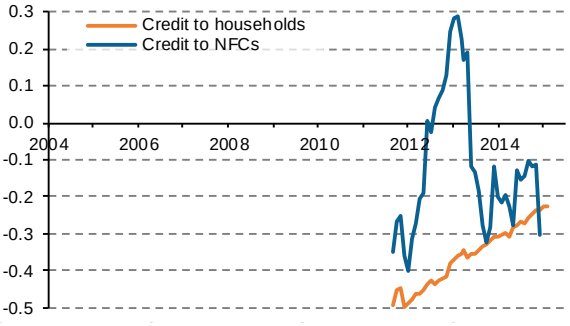
Cyprus



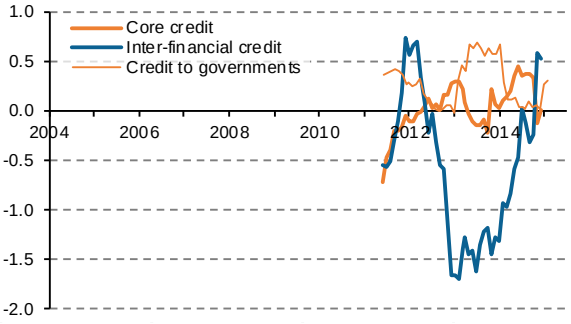


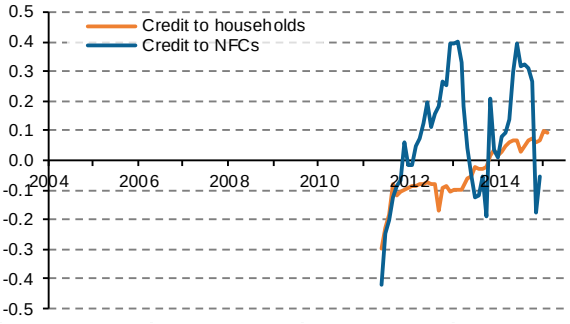
Latvia



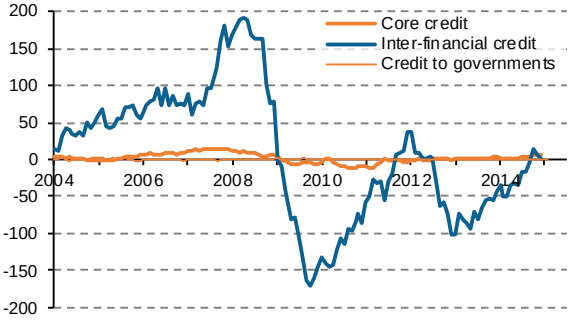


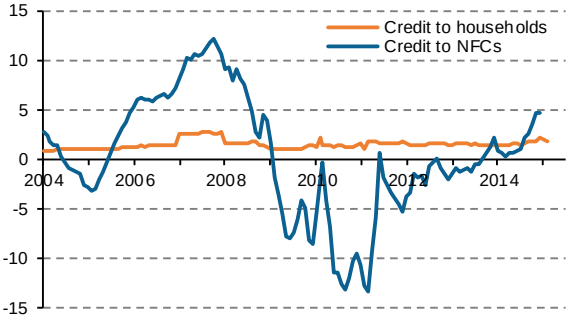
Lithuania



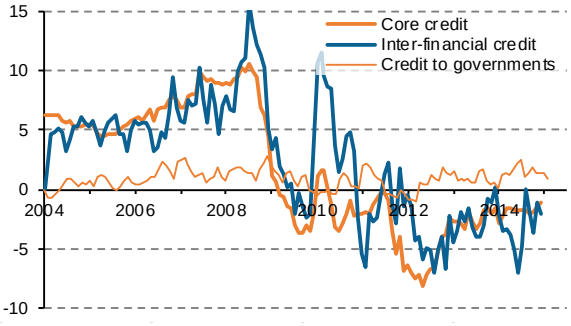


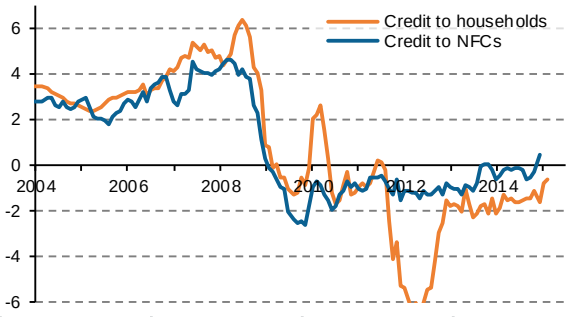
Luxembourg



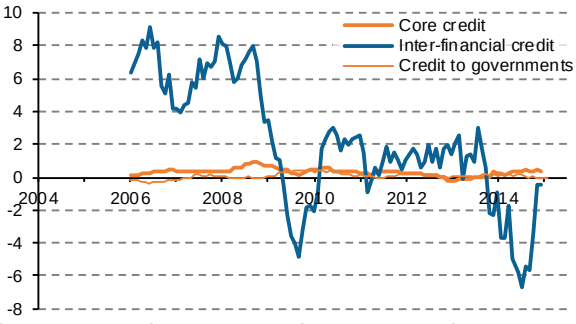


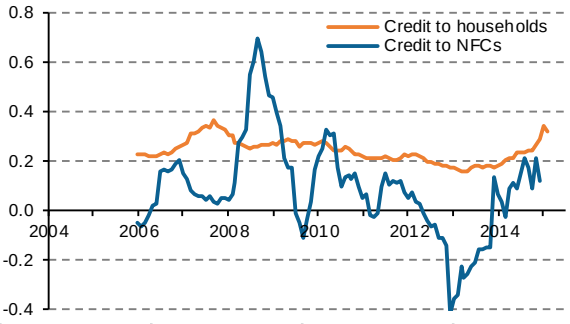
Hungary



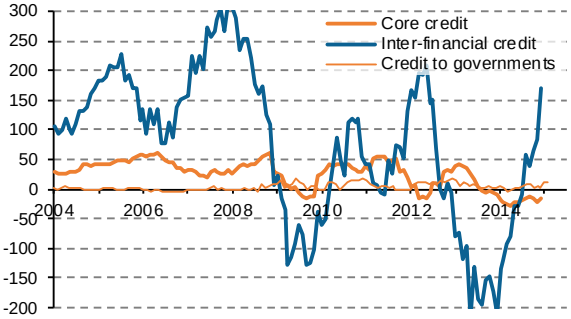


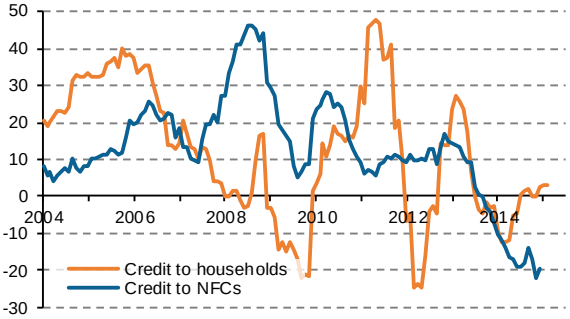
Malta



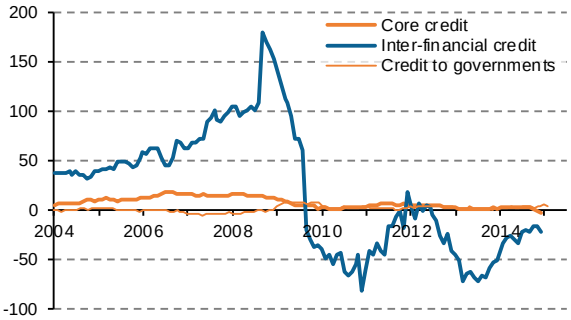


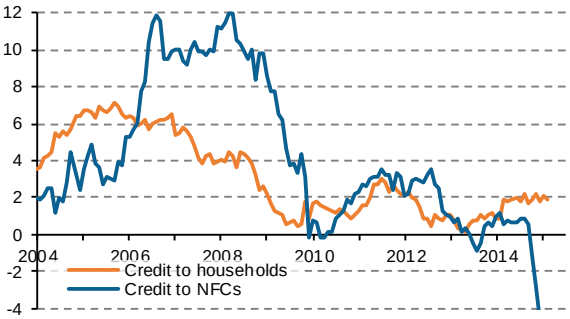
Netherlands



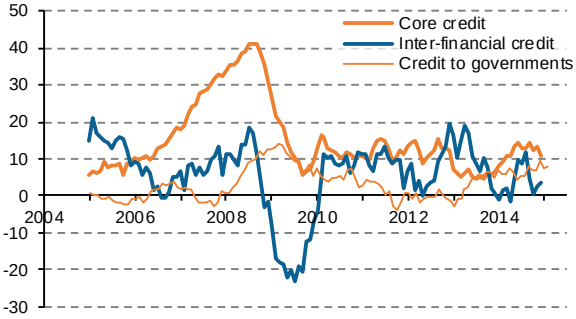


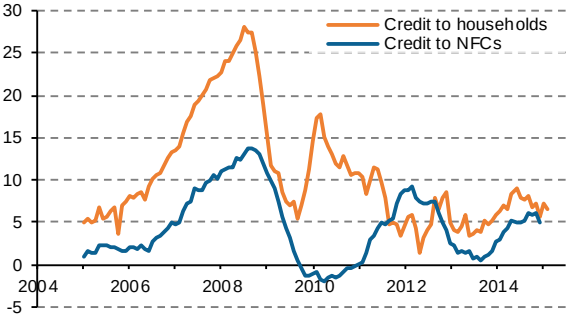
Austria



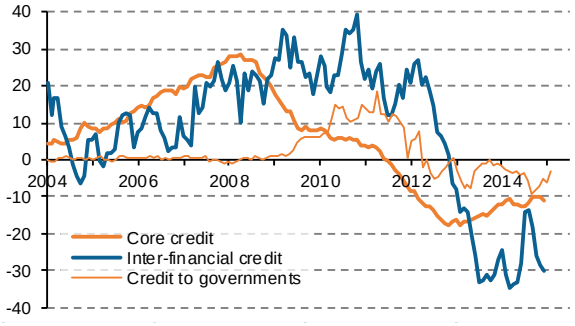


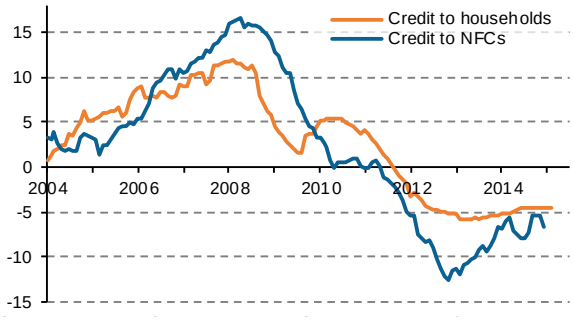
Poland



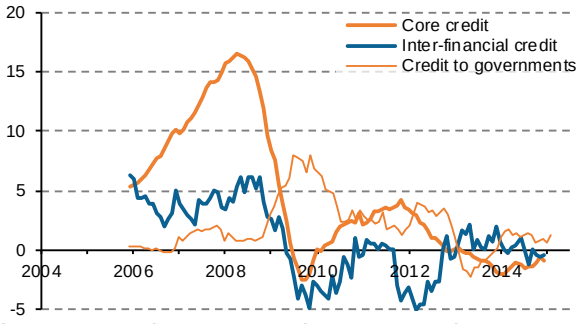


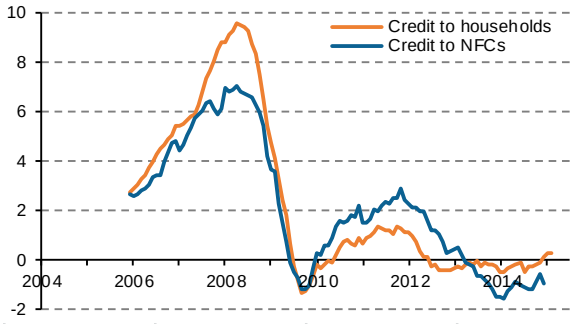
Portugal



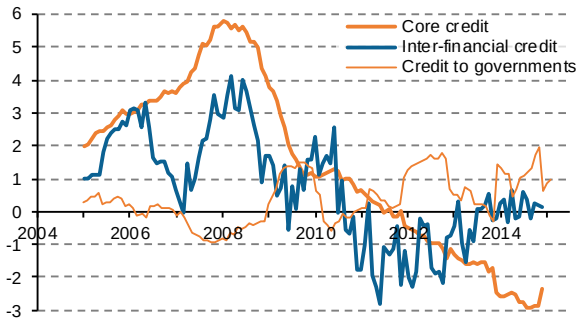


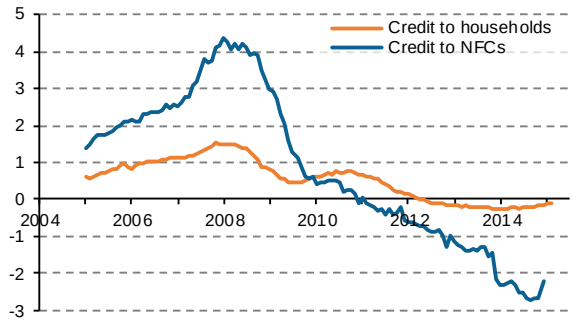
Romania



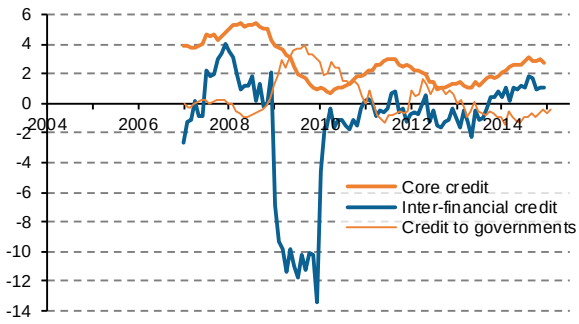


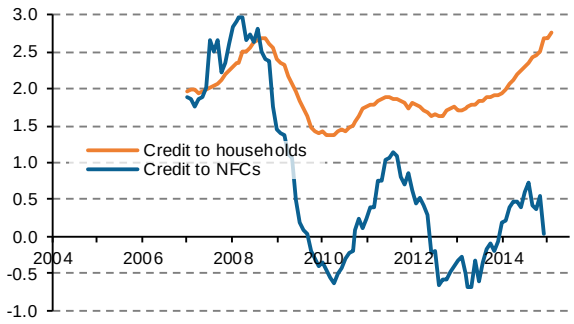
Slovenia



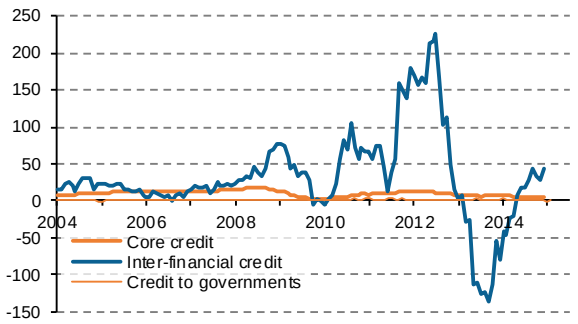


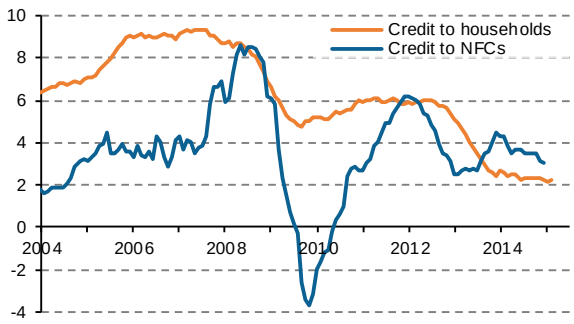
Slovakia

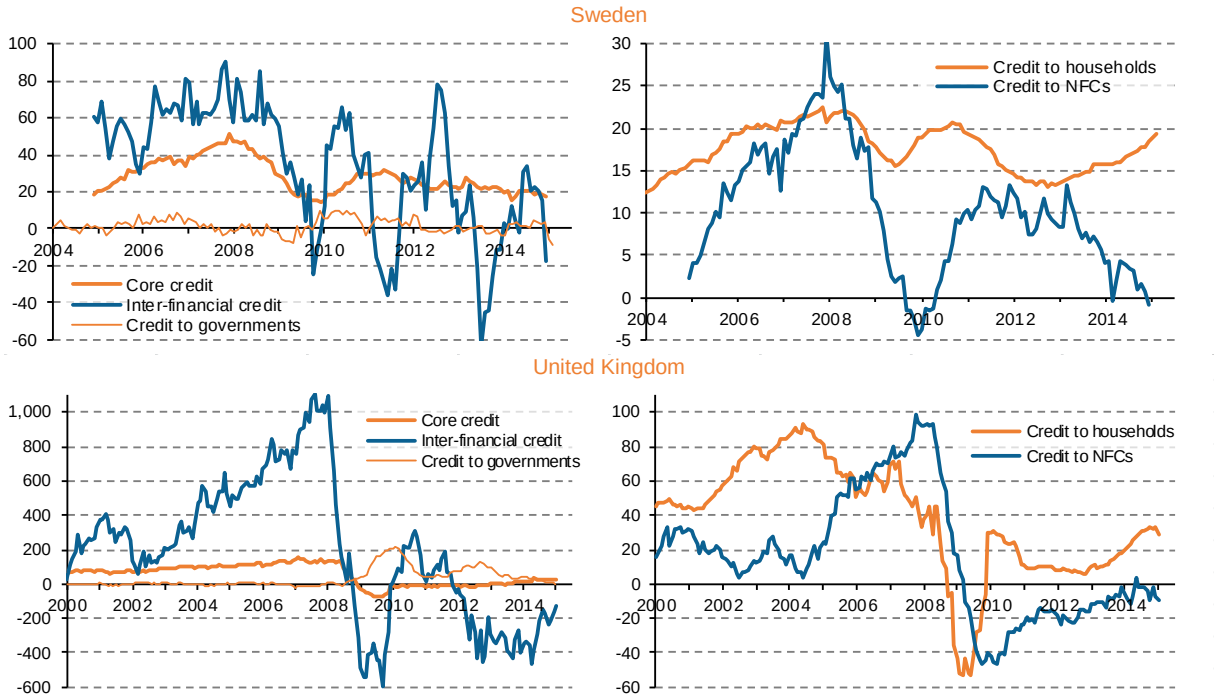




Finland







Notes: Net annual flows are calculated as new credits minus redemptions. Credit comprises loans and purchase of securities (equity, debt securities and derivatives). Core credit: credit provided to households and non-financial corporations. Inter-financial credit is computed by subtracting government and core credit to total assets. Inter-financial credit includes both private inter-financial credit and the positions of banks in the Central Bank (current accounts, deposit facility and fixed term deposits). Data for UK are in £ billion. Data for Denmark are not available.
Source: ECB: Monetary statistics, Bank of England and own calculations.

References

Basel Committee on Banking Supervision (2011). *Basel III: A global regulatory framework for more resilient banks and banking systems - revised version June 2011*.Bank of International Settlements. ISBN 92-9197-859-0.

Cecchetti S. G. and Kharroubi, E. (2012). *Reassessing the impact of finance on growth*. BIS Working Papers No 381. BIS.

Corporate & Institutional Banking (2014). *Investors face mispricing danger – the current credit conundrum.* Royal Bank of Scotland. 8 July.

European Banking Authority (2013). *EBA FINAL draft Implementing Technical Standards on Supervisory reporting on forbearance and non-performing exposures under Article 99(4) of Regulation (EU) No 575/2013, EBA/ITS/2013/03*.

European Banking Authority (2014). *Results of 2014 EU-wide stress test. Aggregate results. October 2014*.

European Central Bank (2009). *Monthly Bulletin, July 2009.*

European Central Bank (2013). *Banking structures report*.

European Central Bank (2014). *Aggregate report on the comprehensive assessment. October 2014.*

European Commission (2014a). *Communication from the Commission to the EP, the Council, the ECB, the EESC, the CoR and the EIB on An Investment Plan for Europe*. COM(2014) 903 final. 26 November.

European Commission. (2014b). *European Financial Stability and Integration Report (EFSIR). April 2014.* Brussels.

European Commission (2015a). *Capital Markets Union*. http://ec.europa.eu/finance/capital-markets-union/index_en.htm.

European Commission (2015b). *European Economic Forecast. Winter 2015.* European Economy 1/2015. February.

European Court of Justice (2015). *According to Advocate General Cruz Villalón, the ECB's Outright Monetary Transactions programme is compatible, in principle, with the TFEU*. Press Release No 2/15. 14 January.

European Parliament and Council (2014a). *Directive 2014/59/EU of 15 May 2014 establishing a framework for the recovery and resolution of credit institutions and investment firms and amending Council Directive 82/891/EEC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC, 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council*. Official Journal of the European Union L 173, 12.6.2014, pp. 190-348.

European Parliament and Council (2014b). *Regulation (EU) No 806/2014 of 15 July 2014 establishing uniform rules and a uniform procedure for the resolution of credit institutions and certain investment firms in the framework of a Single Resolution Mechanism and a Single Resolution Fund and amending Regulation (EU) No 1093/2010*. Official Journal of the European Union L 225, 30.7.2014, pp. 1-90.

International Monetary Fund (2014). *Global Financial Stability Report. October 2014*.

Kaminska, I. (2014). *A European savings glut or just mis-priced risk?* Financial Times – Alphaville, 3 September.

Swiss National Bank (2015). *Swiss National Bank discontinues minimum exchange rate and lowers interest rate to –0.75 %. Target range moved further into negative territory*. Press Release. 15 January.

Chapter 2: An overview of the European Financial System[1]

1. INTRODUCTION

This chapter provides an overview of the structure of the financial system in the European Union. It complements the information presented in Chapter 1, which focuses more on market developments. In particular, it seeks to quantify the role of the financial system in channelling funding across the economy and answers questions such as who provides credit, who uses it, what form does it take and what are the channels through which financial resources flow. This is particularly relevant in the current context where interest rates are low, prices are losing some of their information value[2] and some voices have expressed concern about the potential for a 'creditless' recovery.[3] This chapter therefore focuses on quantitative issues and should be read as a complement to reports from other sources about financial markets and financial stability which focus more on prices variables[4].

The chapter is intended to provide a background for the on-going work on developing capital markets union (CMU) and for the investment plan for Europe. CMU is a plan of the European Commission that aims at creating deeper and more integrated capital markets in the 28 Member States of the EU. With the CMU, the Commission will explore ways of reducing fragmentation in financial markets, diversifying financing sources, strengthening cross border capital flows and improving access to finance for businesses, particularly SMEs[5]. The investment plan for Europe aims at reversing the drop in investment to fuel the EU's recovery and meeting the long-term needs of the European economy[6].

1.1. The European financial system: an overview

In the EU, there are about 15 000 companies with access to capital markets through the issuance of either bonds or quoted shares. On the other hand, there are over 25 million companies and businesses that finance their activities through other means. Similarly, in the US, there are about 15 000 firms with access to capital markets and 5.7 million firms without.

A variety of funding source are available for financing the economy: the initial funds provided at the inception of a family business and the subsequent resources generated by the company (retained earnings), advances provided by customers or suppliers, intercompany loans, financing obtained from the government (e.g. government loans, but also tax claims not yet paid), bank loans, etc.

The chapter examines how the EU economy is financed by analysing the different sources of funding that are effectively being used by corporates and other economic agents. This includes funding obtained through the financial sector (e.g. bank loans or the issuance of securities in the financial markets) or not (e.g. family equity, intercompany loans or trade credit). The quantitative analysis draws mainly from the flow of funds statistics provided in national accounts.

Mapping the financial structure of the European economy requires an understanding of who is providing financial resources to whom and through which instruments or products. Given its different traditions and historical evolutions, financial markets and financial intermediation are more developed in western Europe (e.g. the UK, France or Germany) than in most eastern European countries. Therefore, an aggregate analysis for the EU or the euro area will be complemented with a country-by-country analysis. Also, with the maturity of financial products ranging from a few hours or days (e.g. interbank lending) to a few decades (e.g. mortgages), stock series need to be complemented with an analysis of flows.

---

[1] Authors: Javier Villar Burke, Boris Augustinov and Ana María Sánchez Infante with the support of Raluca Maran and Olli Mononen.
[2] Several reports have been signalling the potential risks of this low yield environment. See, for instance IMF (2013), EIOPA (2014a, 2014b), Joint Committee (2014), EBA (2014a), Tanner (2015), Thompson (2014) and Plender (2015). See also Chapter 1.
[3] See, for instance, Abiad, Dell'Ariccia and Li (2011), Sugawara and Zalduendo (2013) and Claessens, Kose and Terrones (2009).
[4] E.g. the ECB's annual *Financial Integration in Europe* and semi-annual *Financial Stability Review*, and the IMF's semi-annual *Global Financial Stability Review*. Most national central banks and other authorities produce similar reports.
[5] See European Commission (2015a and 2015b).
[6] See European Commission (2014c).

Financial interactions can be approached through six dimensions (from whom, to whom, what, where, how and how much), which imply over 500 000 combinations of individual relations, with their own time dynamics (see Table 1). This chapter tries to disentangle the complexities of this dense network by providing an overview of the main features of the European financial system.

Table 1: **Financial relations** in an economy: **dimensions**

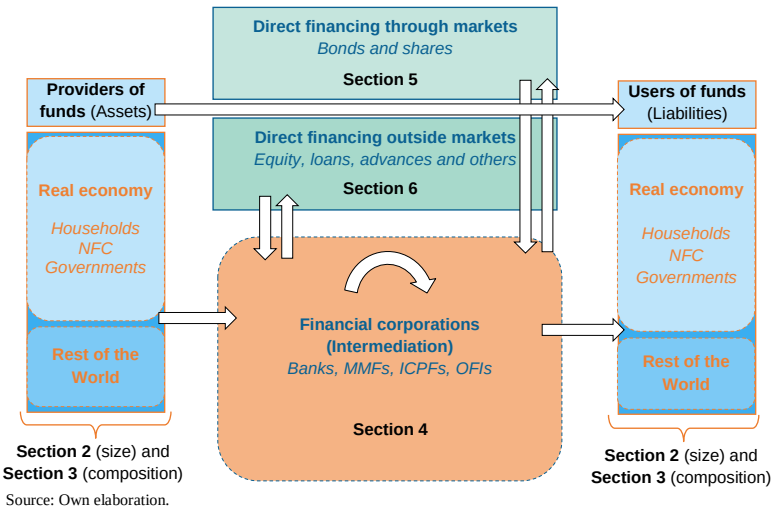
Who? Institutional sector	What? Instrument or product	Where? Geography	How much? Measurement
Households	Loans	European Union (EU28)	Absolute terms (Euro)
Non-financial corporations (NFCs)	Bonds	euro area (EA18)	Relative terms
Governments	Quoted shares	Member States (28)	Percentage of GDP
Monetary Financial Institutions (MFIs)	Unquoted shares	International comparisons	Percentage of balance sheet
Central banks	Deposits	United States	Growth rates
Credit institutions	Ins. technical Reserves	Japan	
Money Market Funds (MMFs)	Other assets / liabilities	China	
Insurance Corporations and Pension Funds (ICPFs)		Canada	
Insurance corporations (ICs)		G20	
Pension Funds (PFs)	**How? Circulation of funds**	**When? Time**	**How much? Variable**
Other Financial Institutions (OFIs)	Direct financing	Historical perspective	Stocks (outstanding volumes)
Investment funds (IFs)	Through markets	Annual series	Flows
Financial Vehicle Corporations (FVCs)	Outside markets	Monthly series	Gross issuances
Asset-backed financing	Financial intermediation		Redemptions
'Residual' OFIs			Net issuances
Non-residents (RoW)			

Source: Own elaboration.

The role of the financial sector –either through financial intermediation or through direct financing– can only be understood in the context of the broader economy that it is inserted in and serving to. Therefore, before entering into a detail analysis of the financial sector itself, Sections 2 and 3 focus on analysing the size of the different institutional sectors (e.g. households, governments, financial institutions, etc.) and the different instruments or products they used to formalise their financing relations.

The three subsequent sections cover the three main components of the financial sector as presented in Chart 1: financial intermediation (Section 4), financing through bond and equity markets (Section 5), and direct financing through other sources (Section 6). Finally, Section 7 wraps up the information that has been presented throughout the chapter.

Chart 1: Flow of funds in the economy and structure of the chapter



Source: Own elaboration.

A series of boxes complement the analysis and help better grasp the importance of the different financing channels. Box A discusses the role of non-financial assets and the role that can play the recently presented investment plan for Europe; Box B compares the financing mixed used by EU companies with those used in the US; Box C examines the interlinkages between banks and governments; Box D puts into context the size of financial institutions by comparing them against the size of NFCs; finally, Box E and F provides some additional details about bonds and quoted shares, respectively.

1.2. Financing as inter-temporal transfer of value

Financial relations such as receiving a loan from a bank or investing in a pension fund reflect an inter-temporal transfer of value and the price of time (as reflected in the interest rate). These inter-temporal transfers are critical to the well-functioning of the economy as they allow for an optimal allocation of resources. However, individuals will only be willing to participate in this temporal allocation of resources if they can be confident to be reimbursed in the future. In this context, the legal framework, including the judiciary system, makes sure that (economic) contracts are indeed not breached. Moreover, trust among market participants is critical for the smooth functioning of any economy and reaches far beyond written laws.

In the wake of the financial crisis, trust in general, and the access to finance in particular, significantly eroded: bank wholesale markets and stock exchanges collapsed in late 2008; firms and households struggled to get credit; non-performing loans skyrocketed; people that have been unemployed for two, three years or even longer lose the confidence in themselves and on society; political corruption cases and financial scandals jeopardise the feeling of justice… And all of this is leading to important frictions in our society and to the rise of extremisms.

In this context, the mapping presented in this chapter can be useful for understanding the financial positions among economic sectors and how they might have been affected by the outbreak of the financial crisis, in particular, the emergence of potential frictions that may be negatively affecting the functioning of the economy or jeopardising a robust consolidation of the recovery that will permit the generation of jobs and growth.

2. WHO? PROVIDERS AND USERS OF FINANCING: THE INSTITUTIONAL SECTORS

National accounts divide the economy into seven institutional sectors (see Table 1). *Non-financial corporations* produce the goods and services that *households* consume. The public sector, or *general government*, provides public goods and redistributes rents by collecting taxes and granting subsidies. Financial corporations are in charge of providing financial services such as payment systems, maturity transformation or financial intermediation. They can be further split into *monetary financial institutions*, *insurance corporations and pension funds*, and *other financial institutions*. Finally, any economy interacts with other countries, where the same sectors (households, non-financial corporations, public sector and financial corporations) can also be identified. However, the external sector is usually grouped together in a miscellaneous *rest of the world* category.

2.1. The flow of funds in the economy

The different channels through which sources of funds can ultimately find a need of financing are summarised in Chart 1. In modern economies, any non-financial operation in the economic cycle (e.g. provision of labour, provision of capital, sale of a product or service) is matched with a financial transaction (e.g. payment of salaries, payment of interest or dividends, payment for the purchase). The accumulation of all transactions over time is recorded on the balance sheets of the different institutional sectors which also reflect their financial position in terms of provision (assets) and use (liabilities) of financial resources.

In broad terms, agents with excess of financial resources (savers or investors) will provide funds to other agents with a financing need (borrowers). Two economic agents may directly agree with each other about the terms and conditions of a financial transaction (e.g. an intercompany loan). However, such operations are embedded with several constraints such as negotiation costs or limited liquidity.

Capital markets provide some flexibility both to investors and borrowers. For instance, investors do not need to stick to the overall maturity of the initial contract as they can sell their investment in shares or bonds in the secondary market in case they need liquidity. On the other hand, borrowers can access a wide pool of investors.

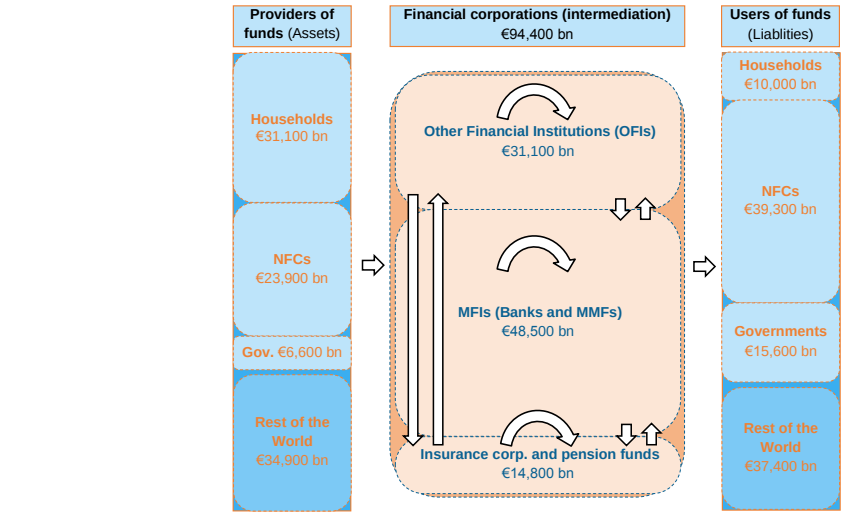
However, not all financing needs and excess funds can be channelled and matched through financial markets. A household willing to buy a house does not have the (financial and technical) capacity to issue securities in the markets. On the other hand, most households and businesses do not have the capacity to assess the creditworthiness of a potential borrower. In this context, financial intermediaries provide additional flexibility in channelling funds from savers to borrowers by exerting two critical functions: maturity transformation and the assessment of the creditworthiness of potential borrowers. For instance, financial intermediation allows for a

deposit placed by a household in a bank to be transformed into a mortgage to another household without direct interaction between the depositor and the mortgage borrower. In this context, financial intermediaries facilitate that all financial resources of the economy are allocated to productive projects and contribute to reduce the amount of idle resources.

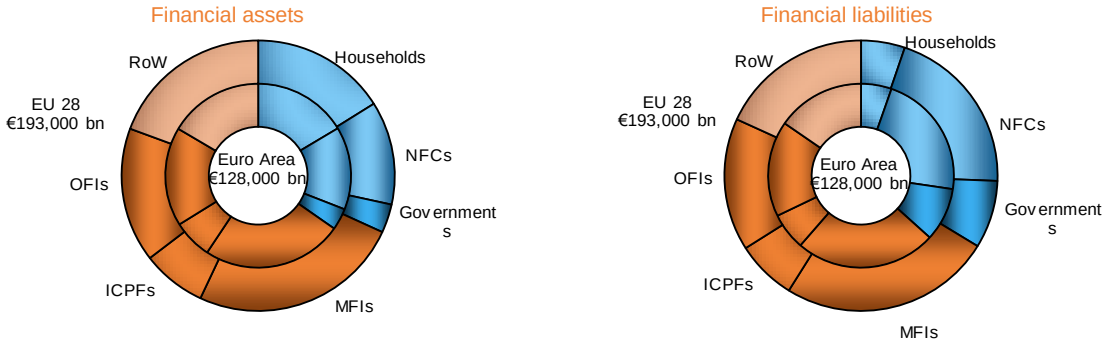
2.2. The size of the institutional sectors: aggregate analysis

In the third quarter of 2014, the EU economy had a total size, in terms of aggregated (financial) balance sheet of the institutional sectors, of about € 190 000 billion or 15 times annual GDP. Financial corporations represent about half of the economy of the euro area while households and NFCs represent about 15 per cent each. The balance sheet of governments is much smaller (Chart 2).

Chart 2: **Financing of the economy: size of institutional sectors**, 2014 Q3
EU 28, € billion



EU 28 and euro area, distribution across sectors



Notes: The height of each box is proportional to the actual size of the sector. Assets and liabilities of the real economy and RoW include funds channelled both through intermediation and direct financing.
Source: ECB, Eurostat and own calculations.

Households are the main net providers of funding in the economy while non-financial corporations and governments are net borrowers (Chart 2)[7]. Non-financial corporations can obtain credit because, on the one hand, they have large amounts of equity (see Section 3 for further details) and, on the other hand, they have significant amounts of tangible assets such as buildings, machinery and others that are not accounted for in the financial accounts (see Box A for further details). Governments borrow against their future collection of tax revenues.

Financial corporations have specific characteristics. Although financial corporations hold half of financial assets and liabilities of the economy, they do not generate or absorb net financing to the rest of the economy (i.e. their net financial worth is almost nil). This is explained by two factors. On the one hand, the intermediation role of the financial sector means that they channel financial resources between net lenders and net borrowers in the

[7] Net positions are calculated as financial assets minus financial liabilities.

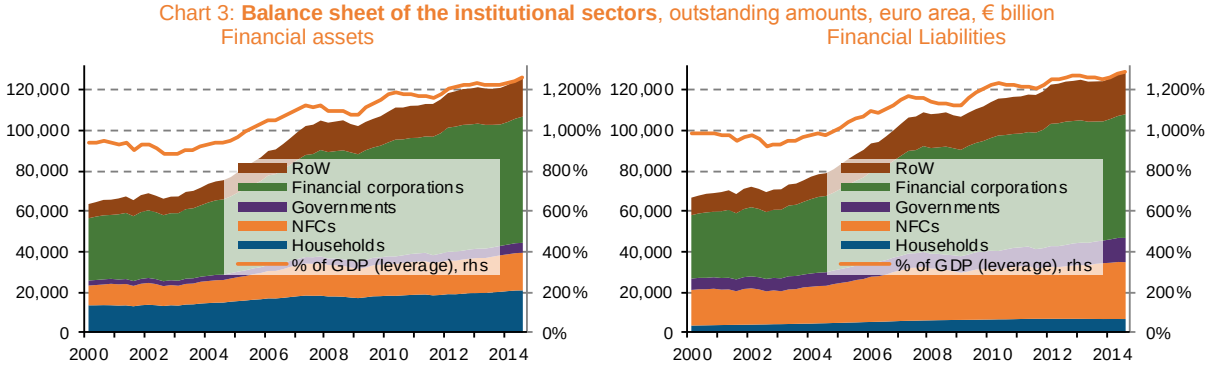
economy. On the other hand, the bulk of the balance sheet of financial corporations is just financial assets and liabilities and, therefore, tangible assets (non-financial assets) are insignificant.

Balance sheet evolution

Between 2000 and 2014, the size of the euro area economy in terms of financial assets and liabilities doubled (Chart 3) while nominal GDP only grew by 40 per cent[8]. As a consequence, the overall leverage of the euro area economy increased, particularly after 2005. In the last years, leverage growth has moderated, but there is no indication that leverage is declining. The last *Geneva report on the World Economy*[9] indeed highlights that, despite the length and the depth of the crisis, the world has not yet begun to deleverage; global debt-to-GDP is still growing, breaking new heights (page 1). The Geneva report also indicates that deleveraging interacts in a vicious loop with slow nominal growth as the latter makes the deleveraging process harder and the former exacerbates the economic slowdown (page 2)[10].

Financial corporations represent about half of the financial assets of the economy and its relative size has slightly increased since 2000. Concerns have been raised about a potential excessive size of the banking system in Europe[11]. In this context, a slight decline in the relative size of the financial sector is observed in the last few quarters. This is mainly explained by the process of deleveraging undertaken by banks in Europe (see Chapter 1 and Section 4 below).

Chart 3: **Balance sheet of the institutional sectors**, outstanding amounts, euro area, € billion



Notes: RoW: Rest of the world; NFCs: Non-financial corporations. Non-financial assets (such as buildings, machinery, land, etc.) are not reported.
Source: ECB, Eurostat and own calculations.

Households and non-financial corporations represent about 15 per cent each. Their joint relative size has significantly declined from representing almost 40 per cent of the euro area economy in the early 2000s to only 30 per cent in 2012. The financial balance sheet of the public sector is much smaller. Finally, non-euro area residents contribute to the euro area economy by providing (or absorbing) about 15 per cent of financial assets (those are mainly financial corporations from the UK, US and other financial centres).

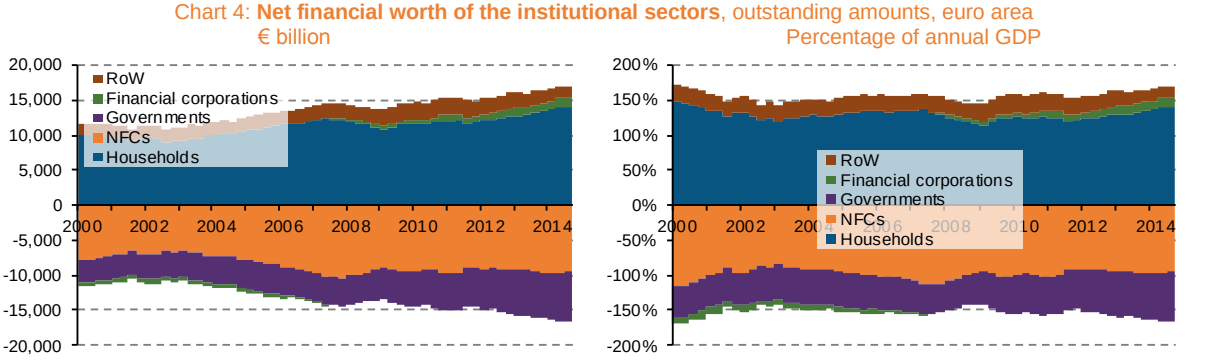
Net financial worth

The difference between financial assets and financial liabilities, or net financial worth, indicates the (cumulative) net contribution to the financing of the economy provided by each financial sector. When a sector has a positive net financial worth, it provides financing to other sectors; when net financing worth is negative, the sector is absorbing financing, in other words, it has a financing need to be covered by borrowing from other sectors. In this context, households are the main provider of funding to the economy (Chart 4). Indeed, household net savings represented more than 140 per cent of GDP in 2014 and ensured that other sectors obtained the financial resources they needed. The main net users of financial resources were NFCs and governments.

[8] The analysis at aggregate level should ideally be done for the EU as a whole. However, data for the euro area are often more complete and with longer time series. Therefore, most of the aggregate charts refer to the euro area. Nevertheless, trends and relative importance of the different sectors can be extrapolated for the EU as a whole. Data for individual countries within and beyond the euro area are also analysed throughout the chapter.
[9] See Buttiglione et al. (2014).
[10] For further details about the evolution of leverage and the problem of debt overhang, see Chapter 3.
[11] See, for instance, Pagano et al. (2014).

The balance sheet of the financial sector represents about half of the aggregated balance sheet of the economy (Chart 3). However, given their intermediation function, the net contribution of financial corporations to the financing of the economy is only incidental. The financing of the economy is completed by resources provided by the external sector (about 20 per cent of GDP).

Chart 4: **Net financial worth of the institutional sectors**, outstanding amounts, euro area



Notes: RoW: Rest of the World; NFCs: Non-financial corporations. Net financial worth is computed as financial assets minus financial liabilities.
Source: ECB, Eurostat and own calculations.

The financial and economic crisis triggered important financing needs in the public sector. Government net financial negative worth (net public debt) increased from € 4 000 billion in 2008 to over € 7 000 billion in 2014. This is explained by its function of automatic stabiliser (e.g. provision of social benefits) but also for the need of the public sector to step in to support financial institutions under stress. The household sector originated most of the financing created in the euro area economy: its net financial worth increased from € 11 000 billion in 2008 to almost € 14 000 billion in 2014. Financing ultimately coming from households also had to be used for compensating the withdrawal of funding resources by foreign investors, whose net positions significantly declined throughout the same period.

Net financial worth of NFCs remained rather stable throughout the crisis, except for the last few quarters when an increase in the use of resources is observed. Financial corporations have also slightly contributed to the financing of the economy during the financial crisis as their net financial worth moved from being marginally negative to marginally positive.

While the bulk of financial resources has always stemmed from households, there area two main factors that are eroding the capacity of households to continuously provide financing to the rest of the economy. In the short run, unacceptably high levels of unemployment entail a net absorption of financial resources. In the long run, demographic developments, including longer lives and reduced fertility rates, imply a shrinking share of working population with respect to the people already in retirement[12].

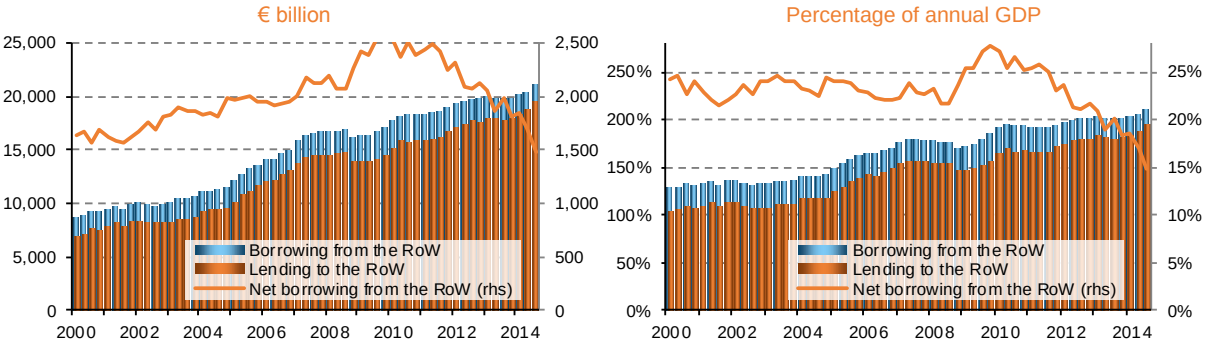
The external sector

The external position requires a special analysis as it can be affected by various factors such as the evolution of exchange rates or geopolitical developments. The relatively small net borrowing position of the euro area should be interpreted with caution as the risk stemming from exchange rate developments affect gross positions, which are much larger (Chart 5).

Exchange rate risks affect foreign positions (assets or liabilities) when they are denominated in foreign currency. Indeed, exchange rate fluctuations have a direct impact in the value of foreign currency denominated assets and liabilities of residents and, therefore, in their net worth. On top of that, euro denominated positions vis-à-vis non-residents are also affected by exchange rate risks, particularly when the counterpart's income is generated in foreign currency. Increases in the value of the liabilities of non-residents due to a Euro appreciation deteriorate the capacity of foreign borrowers to repay their debts. Similarly, actual or potential depreciation of the euro may raise concerns on the erosion of the value of Euro assets and reduce the willingness of foreign investors to provide lending in euro.

[12] See also Chapter 4.

Chart 5: **Positions of the euro area vis-à-vis the rest of the world**



Note: Note the use of two axes.
Source: ECB and own elaboration.

Similar analysis can be extended to countries outside the euro area which depend, to a certain extent, on external financing or which have significant positions in foreign currencies. The decision of the Swiss National Bank in early 2015 to discontinue the peg with the euro could be perceived as a materialisation of such risks. The appreciation of the Swiss franc of almost 30 per cent translated in an immediate increase of the debts of households that have taken mortgages in Swiss francs in countries like Poland, Croatia or Hungary. Austrian banks are also being affected, mainly through some of their subsidiaries.

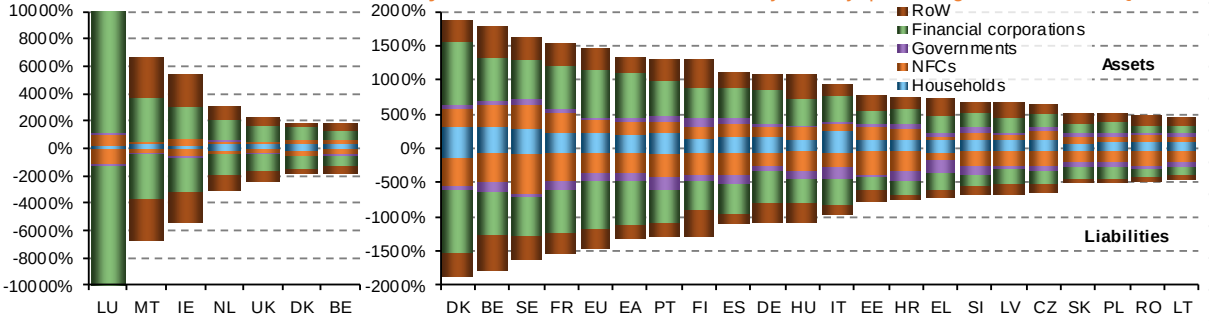
In the current context, pressures on exchange rates can come from the growing growth differential between the US on the one hand and the EU and euro area on the other hand. On top of that, different monetary policies in the two sides of the Atlantic, in particular with respect to the purchase of assets (quantitative easing), may also potentially impact exchange rates. This seems to have been the case throughout February and March 2015[13]. Foreign exchange volatility could have destabilizing effects on the funding of the European economy at a juncture where European sectors have not finished repairing their balance sheets.

These factors, and the crisis having been more severe in the EU than in the US, may explain to a large extent the decline in the net foreign funding positions of the euro area as a whole between 2009 and 2014 to reach very low levels (Chart 5)[14].

2.3. Institutional sectors: country analysis

European aggregates can conceal important divergences across countries. Indeed, the total size of the institutional sectors in the economy in terms of financial assets and liabilities ranges from less than 500 per cent of annual GDP in countries like Poland, Lithuania or Romania to more than 30 000 per cent of annual GDP in Luxembourg (Chart 6). The large size of Luxembourg is mainly explained by its financial sector. With total assets of € 7 900 billion in the third quarter of 2014, Luxembourgish financial corporations had a total size similar to financial corporations in Spain (€ 4 600 billion), Italy (€ 6 000 billion) or the Netherlands (€ 9 400 billion).

Chart 6: **Total assets and liabilities by institutional sector**, breakdown by country, percentage of GDP, 2014 Q3

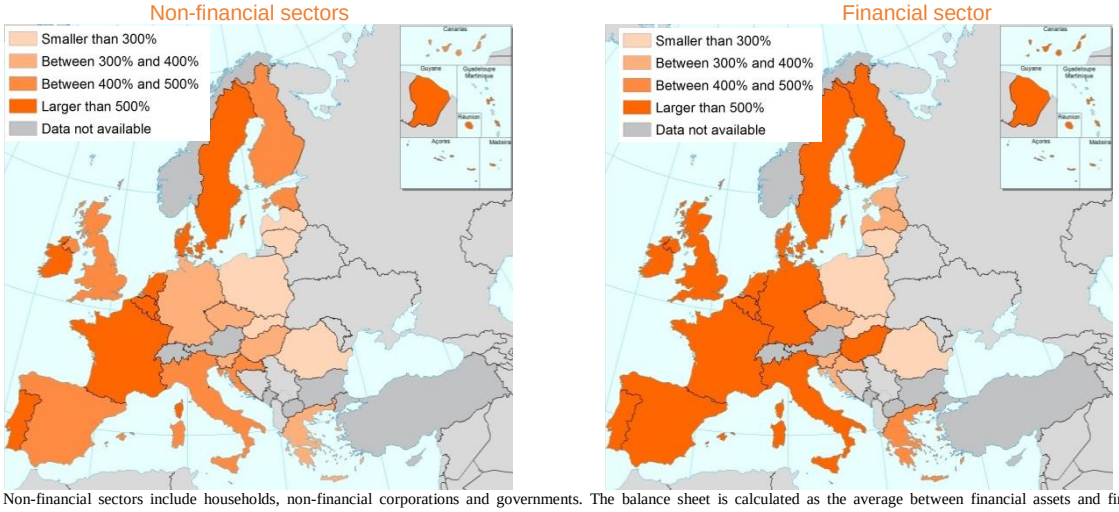


Notes: Data for Bulgaria, Cyprus and Austria are not available. LU: financial assets and liabilities of financial corporations = 19 000 per cent of GDP; financial assets and liabilities of RoW = 17 000 per cent of GDP; Total balance sheet = 37 000 per cent of GDP.
Source: ECB, Eurostat and own elaboration.

[13] While the ECB started its assets purchase programme in March, the US Fed is starting to discuss the possibility to raise interest rates.
[14] For further discussion about the risks facing the European economy in the current juncture, see Chapter 1.

Institutional sectors in Malta and Ireland, followed by the Netherlands and the UK, also have very large sizes (in relation to their respective GDPs), mainly explained by the size of their financial sector (see Chart 6)[15]. In general, western countries present larger sizes in terms of financial assets than eastern countries. This is partly explained by the longer tradition of financial intermediation in western countries, while eastern countries only developed it after their transition from communism. Also linked to that is the international expansion of banks headquartered in western countries, which manage some of the wholesale and other group operations from the parent company (see last year's review: European Commission, 2014a).

Chart 7: **Balance sheet of institutional sectors**, percentage of GDP, 2014 Q3

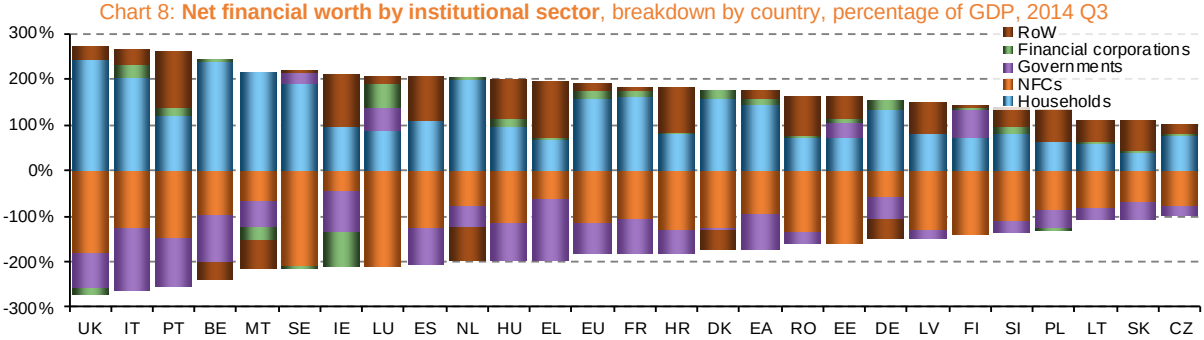


Notes: Non-financial sectors include households, non-financial corporations and governments. The balance sheet is calculated as the average between financial assets and financial liabilities.
Source: ECB, Eurostat and own elaboration.

Data on net financial worth by country provides also important insights (Chart 8). Households are confirmed as the main ultimate originator of financing in the economy and non-financial corporations as the main users, but relative sizes vary across countries. Households in Belgium, the UK, Malta and Italy are the ones who contribute the most to the financing of their economies in relative terms (over 200 per cent annual GDP) while the lowest net saving rates of households appear in Romania, Greece, Poland, Lithuania and Slovakia (less than 70 per cent annual GDP). The largest net users of financing, in relative terms, are NFCs in Luxembourg and Sweden and the lowest ones, NFCs in Germany, Ireland or Greece.

Net financial worth for all other sectors shows a mix picture. The public sector is, in general, a net user of financing (with the highest relative size in Belgium, Portugal, Greece and Italy, where the net borrowing position of the public sector represents over 100 per cent of GDP). Exceptions to those would be Sweden, Estonia, Luxembourg and Finland, where financial assets of the public sector are significantly larger than their financial liabilities.

Chart 8: **Net financial worth by institutional sector**, breakdown by country, percentage of GDP, 2014 Q3



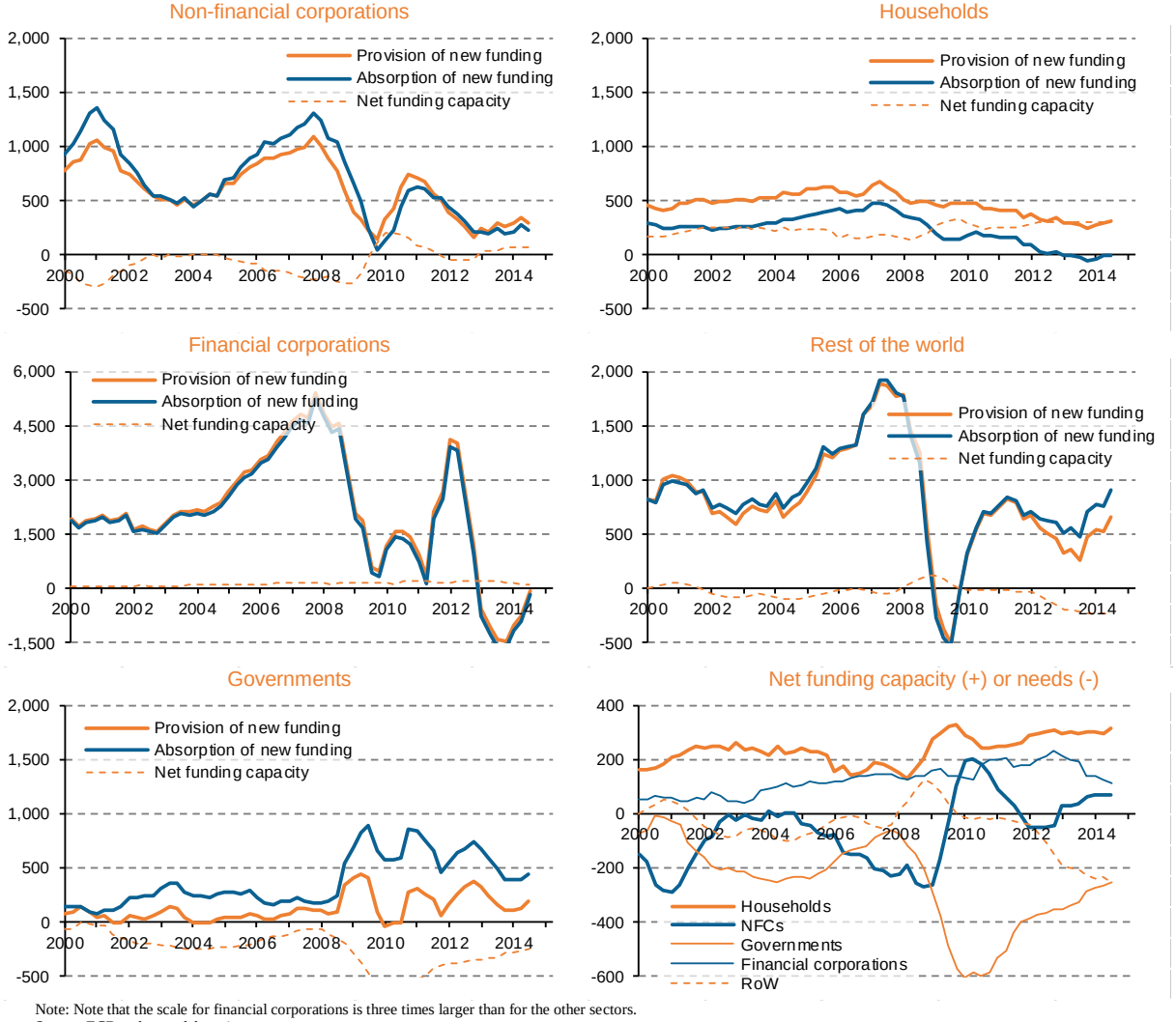
Notes: Data for BG, CY and AT are not available.
Source: ECB, Eurostat and own elaboration.

[15] For a detailed analysis of the financial sector, see Section 5.

The external sector provides net financing to the economy in a majority of countries (particularly in Greece, Portugal, Ireland, Spain and Croatia, where the cumulated net financing provided by the external sector was about 100 per cent annual GDP or larger), but in a number of cases, Member States are net savers with respect to the rest of the world (particularly in the Netherlands and Malta, which have all accumulated savings representing more than 50 per cent annual GDP).

As it has been shown for the euro area aggregate, despite the large size of the financial sector in terms of financial assets and liabilities, its net contribution to the financing of the economy is incidental in virtually all countries. As an extreme example, the balance sheet of the financial sector in Luxembourg represents 19 000 per cent of its GDP but the financial sector only contributes to the net financing of the economy by an amount equivalent to 50 per cent of GDP.

Chart 9: **Generation and use of new funding**, net annual transactions (flows), euro area, € billion



Note: Note that the scale for financial corporations is three times larger than for the other sectors.
Source: ECB and own elaboration.

2.4. Institutional sectors' dynamics

Until now, we have analysed the balance sheet of the different institutional sectors, which provides the stock or the financing positions accumulated over the years. An analysis of flows reveals a complementary view by focusing on the new assets and liabilities which are incurred over a given period.[16,17]

[16] Flows or transactions are expressed in net terms, that is, actual new assets (or liabilities) minus redemption over the period. It should not be confused with "net" as in net financial worth, which refers to assets minus liabilities in a given moment in time.

Flows in NFCs' balance sheets are highly pro-cyclical: they follow very closely the economic cycle, although with a short lag (Chart 9, top left panel). Indeed, after the dotcom bubble of the early 2000s, net transactions of NFCs' liabilities tracked the expansion of the mid 2000s, the burst of the bubble in the late 2000s, the short recovery of 2009-2010 and the second dip of 2012. However, a decoupling is observed since late 2013. Indeed, the improvement in the macroeconomic situation did not impact NFCs' net transactions, which continued to fall throughout 2014. Moreover, the peak of 2008 was similar to the peak of 2000-2001. However, the trough of 2009-2010 was much deeper than the one of 2003-2004. Thereafter, the series for NFCs have remained below the flows that would have been expected from the evolution of GDP[18]. Demand effects and demographic dynamics may be playing an important role in explaining this evolution[19].

Since the outbreak of the crisis, households have been providing increasing amounts of net funding to the rest of the economy. Data show how net transactions in liabilities (use of funds) have declined more significantly than net transactions in assets (provision of funds) (Chart 9, top-right panel). The decline in the absorption of new funding by households, which became zero or eventually negative in 2012 and 2013, is rather surprising given the huge size of their non-financial assets (see Box A).

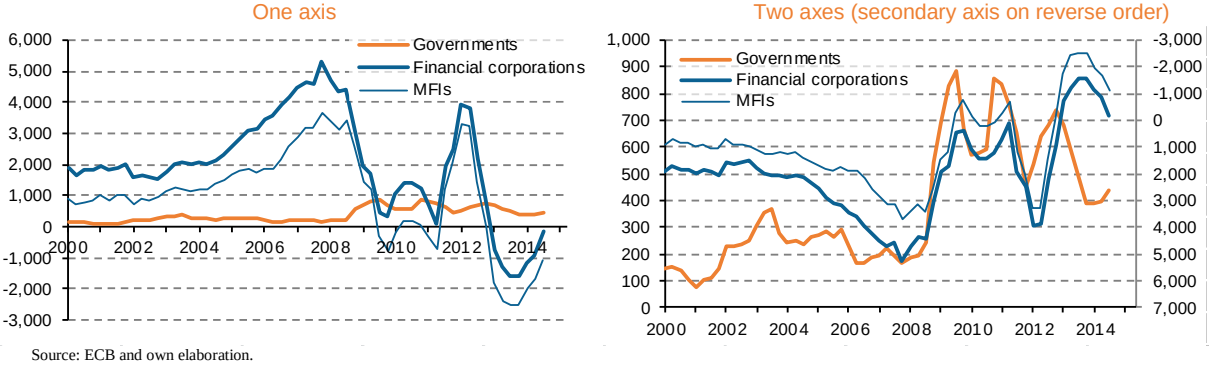
These dynamics may be linked to the increasing concentration of income in the highest quantiles. It is widely acknowledged that high income individuals tend to save more than lower income individuals, who use most of it for consumption. Following the work of Piketty (2014), but also discussions within the IMF or the OECD, among others, it has been argued that the increasing level of inequality can negatively affect economic growth[20].

Therefore, the very low levels of transactions in liabilities observed throughout the crisis may be explained, to a large extent, by the high levels of unemployment and the difficulties to obtain credit by large parts of the population. This is also reflected in the increasing level of non-performing loans (see Chapter 1, Section 3.4).

Two features stand out from the series on net transactions for financial intermediaries. Firstly, they triple the size of NFCs or households. Secondly, financial corporations' transactions are highly volatile with quick and large swings. Note that MFIs' transactions are the main drivers of the profile of the overall financial sector.

These high levels of volatility can have important consequences for stability, not only within the financial sector, but also for the larger economy. The interconnection between the banking sector and public accounts throughout the crisis has widely been acknowledged. This is indeed reflected on the series of net transactions of the government, which are highly influenced by the transactions observed in the financial sector (Chart 10). Having said that, it cannot be discarded that the movements in the series for financial corporations may also influence the funding positions and flows of other sectors in the economy, in particular, households and non-financial corporations.

Chart 10: **Interconnections between the financial sector and the public sector**
Net annual transactions of liabilities (absorption of funding), euro area, € billion



Source: ECB and own elaboration.

[17] Note that the change in the balance sheet depends not only on transactions but also on valuation changes (e.g. as a result of foreign exchange fluctuations) and other changes.
[18] For the evolution of GDP, see Chapter 1, Chart 1.
[19] A debate about *secular stagnation* is currently on-going (see for instance, Teulings and Baldwin, 2014; Wolf, 2014; or Piketty, 2014). For details about demographic dynamics and their impact on the economy, see Chapter 4.
[20] See, for instance, Ostry and Berg (2011), Ostry et al. (2014), IMF (2014), Cingano (2014) or OECD (2014).

The link between the financial sector and governments is explained by the large amounts of capital injected by public authorities in the early stages of the crisis to support the financial sector. On top of this, the series on governments reflect the automatic stabilisers, i.e. the social benefits provided by the public sector to compensate for the impact of the crisis (e.g. unemployment payments). Public deficit (net funding needs) have declined since 2010, partly explained by the improvement in the economic outlook and partly explained by the more constringent economic governance rules (Chart 9, bottom-left panel).

The volatility observed in the external sector in 2008-2009 is explained by the lower attachment to the economy of foreign investors and the high mobility of capital (Chart 9, middle-right panel). These series reflect the repatriation of funds by foreign investors to withstand the effects of the global financial crisis at home. While the provision and absorption of funding had traditionally evolved in parallel, a decoupling is observed since late 2011 indicating a net withdrawal of funding provided by international investors to the euro area economy (see also Chart 5).

3. WHAT? PRODUCTS AND INSTRUMENTS

The composition of assets within the non-financial sectors of the economy (households, non-financial corporations and governments) provides an indication on how the economy is organised and the possibilities (and potential need) for financial intermediation. If households keep their savings in the form of deposits, banks can intermediate and provide credit through loans. However, if households prefer to directly invest in bonds or equity, there is little room (and maybe even no need) for bank intermediation. In general, the product mix depends on the 'preferences' of economic agents, which are in fact a combination of factors such as the need of liquidity for transactional purposes, the remuneration level of the different instruments, risk aversion or entrepreneurial culture, among others. Transaction costs, informational barriers or bankruptcy regimes may also play a role. The recent debate about a 'capital markets union' can be summarised in an analysis of these factors driving the 'preferences' of investors for some products over the others and in detecting potential frictions that may be creating perverse incentives.[21]

The provision of funding can be formalised through different instruments or products with specific features in terms of liquidity, maturity or legal implications (see Table 1). Among the wide range of sources that are available for firms to finance their activities, a major divide appears between equity instruments (i.e. own resources) and debt instruments. Obtaining funding through equity instruments implies the transfer of property to equity providers and their involvement in decision-making. Consequently, the remuneration of equity depends on the results of the company. Therefore equity instruments constitute the first layer for the absorption of losses, but, in compensation for that, equity holders benefit from potential extraordinary profits. In principle, equity instruments are perpetual, so the holders need to find a buyer in case they want to untie their positions. In this context, *quoted shares* can be more easily liquidated than *other equity instruments* because they are quoted in organised markets. One should take into account that equity includes both fresh injections of capital (either at the inception of the company or at a later stage) and the earnings retained throughout the life of the firm. This applies both to quoted shares and to other equity instruments. The case of *insurance technical reserves* represents a special case of equity (see Sections 3.1 and 3.2 for further details).

On the other hand, debt instruments do not transfer property but usually require a fix (interest) payment[22] and the reimbursement of the principal within a specific time frame. *Bonds* are standardised debt instruments that are traded in organised markets. *Loans* are bilateral contracts, which cannot be traded unless they are 'converted' into bonds through securitisation. Besides borrowing from banks, firms can obtain *loans from other economic agents*. There are four types of such loans. First, loans agreed between two companies belonging to a group of companies (intragroup lending). Second, loans agreed between two companies not belonging to the same group, usually stemming from a supplier-customer relationship but that cannot be classified as trade credit. Third, loans provided by households to entrepreneurs and small firms (e.g. family and friends). Finally, loans provided by the

[21] The proposal of a capital markets union (CMU) by European Commission President Jean-Claude Juncker in his hearing in the Parliament has triggered an intense debate in the academia, industry and political spheres. See also the green paper on CMU and the accompanying staff working document presented by the European Commission (2015a and 2015b).
[22] Although interest rates can also be linked to some market indices, these variable interest rates do not depend on the performance of the company as it is the case for equity instruments.

State and public authorities whether subsidised or not (e.g. stemming from a government initiative to promote entrepreneurs and start-ups).

The economic transactions between a company and its suppliers, clients, employees and other stakeholders imply intrinsic financing resources that cannot be provided by capital markets nor by the financial sector. These sources of funding are usually generated by the difference between a 'continuous' accrual of economic value and a 'point-in-time' nature of payments and settlements. Therefore, they are not formalised in the form of a loan contract. These sources of funding can be grouped in the category of *trade credit and advances* (receivable or payable), where trade credit refers to the financing positions within the supplier-customer chain and advances refers to the relations with other stakeholders[23].

Many examples of such funding can be mentioned. When we purchase a plane ticket three months before our actual journey through a webpage, we are providing an advance to the air career. In business-to-business relations it is very common to make the payment up to ninety days after the delivery of goods. The employees of a company generate value on a daily basis but they only receive their wages on a monthly basis. Similarly, utility companies (e.g. electricity, water or internet suppliers) provide their services on a continuous basis but they are only paid at period end (e.g. once a month or once a quarter)…

Taxes due and *tax claims* have similar features to advances. Companies intermediate in the collection of VAT taxes, which are only cleared and settled once a quarter. Income taxes have an analogous nature. Annual income declarations are used to calculate the actual tax due to the State by each household for the precedent year and to settle the difference. The existence of those differences (tax reimbursements or the need to pay additional taxes) implies that households have been financing the State or the other way around.

The label *'derivatives'* include a wide range of instruments with very different features with the only commonality of being somehow linked to the evolution of an underlying asset. *Deposits (and currency)* are the most liquid instruments; they are usually kept for transactional purposes, although their holders may also receive a small remuneration.

In general, long-term sources of funding (e.g. equity, long-term loans or long-term bonds) should be used to finance long-term assets (e.g. buildings or machinery) and short-term source of funding should be used to finance current assets (e.g. inventories or advances to customers).

In any financial transaction, there are two counterparties involved: one provides the funds that the other one needs. As a consequence, any instrument is recorded as an asset by one counterpart and as a liability by the other one. The rest of this section analyses the evolution of the mix of instruments used by the different institutional sectors. Besides distinguishing the non-financial sectors of the economy from the financial sector, the provision of funding (assets) is singled out from the use of funding (liabilities).

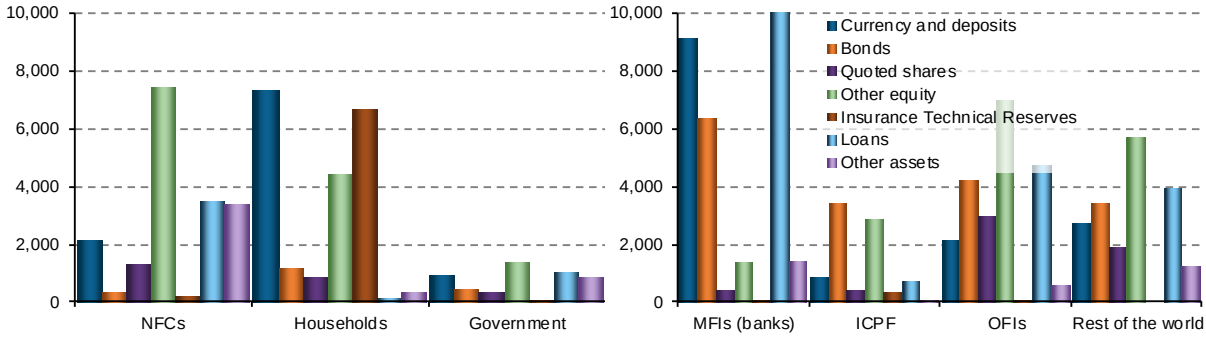
3.1. Provision of funds: instruments from the assets point of view

The main features of the instruments used by the different euro area sectors for keeping their savings or for providing financing to other agents in the economy are summarised in Chart 11[24]. About a quarter (24 per cent) of the assets of the non-financial sectors of the economy are held in the form of deposits and currency, mainly due to their function in transactions. A bit more than a quarter (30 per cent) is invested in non-quoted shares. This includes intra-group holdings of non-financial corporations, the holding of public corporations by governments and equity provided by households for family businesses.

Insurance technical reserves (including pensions and standardized guarantee schemes) are very significant for households (32 per cent of their assets) but rather irrelevant for NFCs and governments. NFCs provide (intercompany) loans by up to 18 per cent of their assets. Governments also provide loans to other sectors up to 21 per cent of their assets. Other assets (e.g. trade credit or tax claims) represent over 20 per cent of financial assets for both NFCs and governments.

[23] The financial sector can in fact play a role on trade credit and advances by providing liquidity through "factoring" and other forms of asset-back lending (see Section 4.4 for details).
[24] While Sections 3.1 and 3.2 focus of the euro area, the orders of magnitude are similar for the EU as a whole. Country data are discussed in Section 3.3.

Chart 11: **Provision of funds** (financial assets), euro area, 2014 Q3, € billion



Note: MFIs loans: € 12 600 bn. MFIs currency and deposits includes mainly interbank lending provided. NFCs: non-financial corporations, MFIs: monetary and financial institutions, ICPF: insurance corporations and pension funds, OFIs: other financial institutions. 'Other equity' includes holdings of investment funds shares, which is particularly significant for ICPF. 'Insurance technical reserves' include pensions and standardized guarantee schemes.
Source: ECB: euro area accounts.

Investment in market instruments (bonds and shares) is rather limited (less than 10 per cent of financial assets). NFCs invest mainly in shares (7 per cent of their financial assets) while households invest slightly more in bonds (5 per cent) than in shares (4 per cent).

In terms of evolution (Chart 12), the crisis eroded the value of the equity investments of the non-financial sectors of the economy (both quoted shares and other equity), both in 2008-2009 and during the second dip of 2011. 'Other equity' recovered pre-crisis values in 2013 while the investments by the non-financial sectors of the economy in quoted shares have not come back to pre-crisis levels yet. For disentangling how much it is due to low performance of these investments and how much is due to reallocation of resources to other types of assets, see Section 3.4, where flows are analysed.

All other assets of the non-financial part of the economy seem to have passed rather unscathed from the crisis as they have continuously expanded. Bonds represent a particular case as they expanded up to early 2011 and, thereafter, they stagnated or slightly declined.

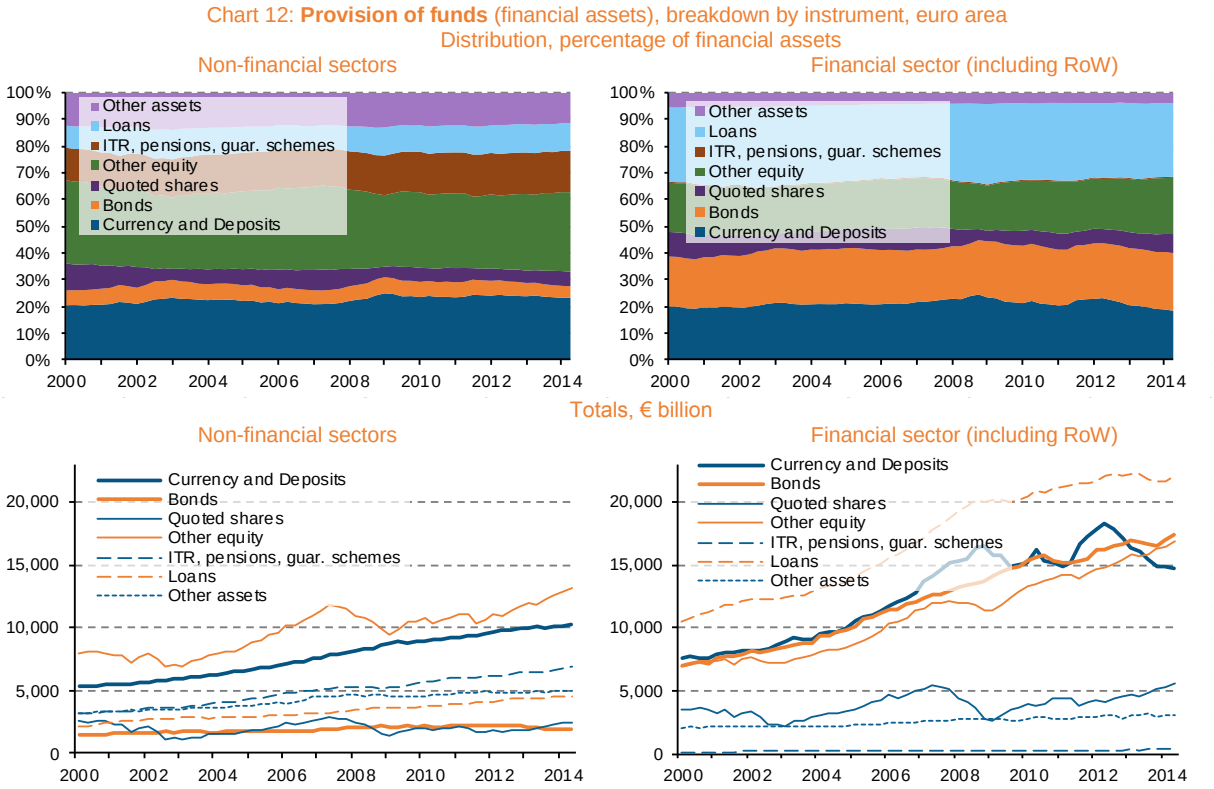
The instruments used by the financial sector are, to a large extent, influenced by the ones used by the non-financial part of economy as they determine its capacity to intermediate. The main financial assets of financial corporations are loans (40 per cent of MFIs' assets and 21 per cent of OFIs' assets). However, one should keep in mind that those loans include both loans to the economy and inter-financial loans. Similarly, the category 'currency and deposits' (20 per cent of the financial assets of the financial sector) corresponds mainly to interbank (or inter-financial) loans. Holdings of equity are an additional indication of the interconnections within the financial sector as it mainly reflects financial groups or holdings of investment fund shares (the latter particularly in the case of ICPFs). Having said that, some of the equity holdings also correspond to capital provided to the economy (see Section 4.3 for further details). Given their role as providers of credit, financial corporations invest a significant share of their assets in bonds: 40 per cent in the case of ICPFs and about 20 per cent in the case of MFIs and OFIs.

The rest of the world provides financing to the euro area through a variety of instruments, including equity (31 per cent of its financial assets), loans (20 per cent) and bonds (18 per cent).

As in the case of the non-financial part of the economy, the investments in equity by the financial sector were significantly hit by the financial crisis. However, they have clearly recovered beyond pre-crisis levels. The provision of loans by the financial sector stagnated in 2008-2009 and again from mid-2012 onwards. This is in part reflecting the process of deleveraging (see Chapter 1 and Section 4.2 below for further details). The holdings of bonds have continuously expanded even in the last years (contrarily to the holdings of bonds by the non-financial sectors of the economy).

The series 'currency and deposits' present a specific profile. This includes interbank loans provided by banks, which were particularly hit by the financial turmoil and the deterioration in confidence. This series has been influenced by the monetary policy of the central bank, particularly the LTROs and the purchase of securities (see Chapter 1).

Chart 12: **Provision of funds** (financial assets), breakdown by instrument, euro area



Notes: Non-financial sectors include households, NFCs and governments. The financial sector includes MFIs, OFIs and ICPFs. RoW: Rest of the World; NFCs: Non-financial corporations. ITR: Insurance technical reserves (it also includes pensions and standardized guarantee schemes). Non-financial assets (such as buildings, machinery, land, etc.) are not reported. For the financial sector, 'currency and deposits' includes interbank lending provided. Holdings of investment fund shares are included in 'Other equity'.
Source: ECB, Eurostat and own calculations.

Besides the disparate use of instruments across sectors, note the difference in size (see also Section 2 and Chart A1 in the Annex). In particular, the financial sector has a total size of over € 80 000 billion in terms of financial assets (including the RoW), which is about twice as big as the non-financial part of the economy (€ 43 700 billion). In relative terms, the balance sheet of the financial sector represents 830 per cent of euro area annual GDP and financial assets of the non-financial part of the economy economy represent 450 per cent of euro area annual GDP.

3.2. Sources of financing: instruments from the liabilities point of view

The sources of financing available for the economy are, to a large extent, determined by the type of instruments in which the different economic sectors invest their assets as presented in the previous section. However, given the intermediation function of the financial sector, the correspondence between assets and liabilities can be more complex.

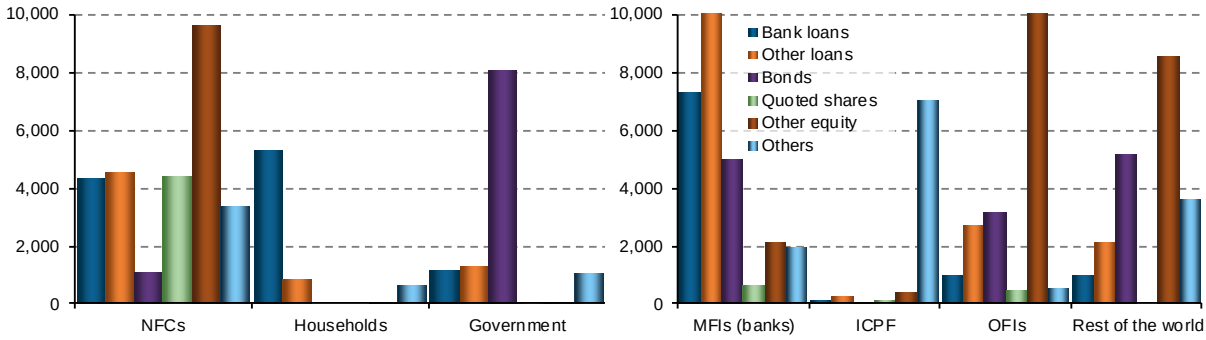
The funding mix differs from one sector to the other (Chart 13). **Non-financial corporations (NFCs)** finance their activities through a variety of sources. More than half of NFCs' activities are financed with own resources (51.4 per cent); the majority of which takes the form of equity other than quoted shares (35.2 per cent total liabilities) and, the rest, the form of quoted shares (16.2 per cent). Given that less than 0.05 per cent of EU companies have listed shares[25], a 16 per cent use of quoted shares points to well-developed equity markets (see Section 5.2 for further details).

Among debt instruments, loans are the most widely used by euro area firms. Bank loans and other loans represent about 15 per cent of total financing sources each. NFCs also recourse widely to trade credit and similar advances for financing their activities (9.0 per cent of liabilities). The issuance of bonds in capital markets is much less used (4.3 per cent). Finally, the remaining funding sources represent 3.2 per cent of the financial resources used by firms. Overall, NFCs finance 36 per cent of their activities through the financial sector (either

[25] There are over 22 million companies in the EU, but less than 9 thousand of them have listed shares.

by borrowing from banks or by issuing bonds or shares). Therefore, NFCs obtain the majority of their financing (64 per cent) from sources outside the financial sector.

Chart 13: **Sources of funding** (financial liabilities), euro area, 2014 Q3, € billion



Note: 'Bank loans' for MFIs correspond to interbank deposits received. 'Other loans' for MFIs correspond to deposit received (other than interbank): € 14 000 billion. 'Other equity' for OFIs: € 12 700 billion. NFCs: non-financial corporations, MFIs: monetary and financial institutions, ICPFs: insurance corporations and pension funds, OFIs: other financial institutions. 'Other financing' for ICPFs corresponds to insurance technical reserves. Investment fund shares and mutual fund shares are included in other equity.
Source: ECB: euro area accounts.

Households use bank loans as their main source of financing (75 per cent of their financial liabilities), while the use of other sources is more limited.

The bulk of **governments'** financial liabilities are bonds (about 70 per cent of their financial liabilities). Bank loans, other loans and 'other sources' (trade credit, pending bills, pending transfers, advanced taxes, etc.) represent about 10 per cent each.

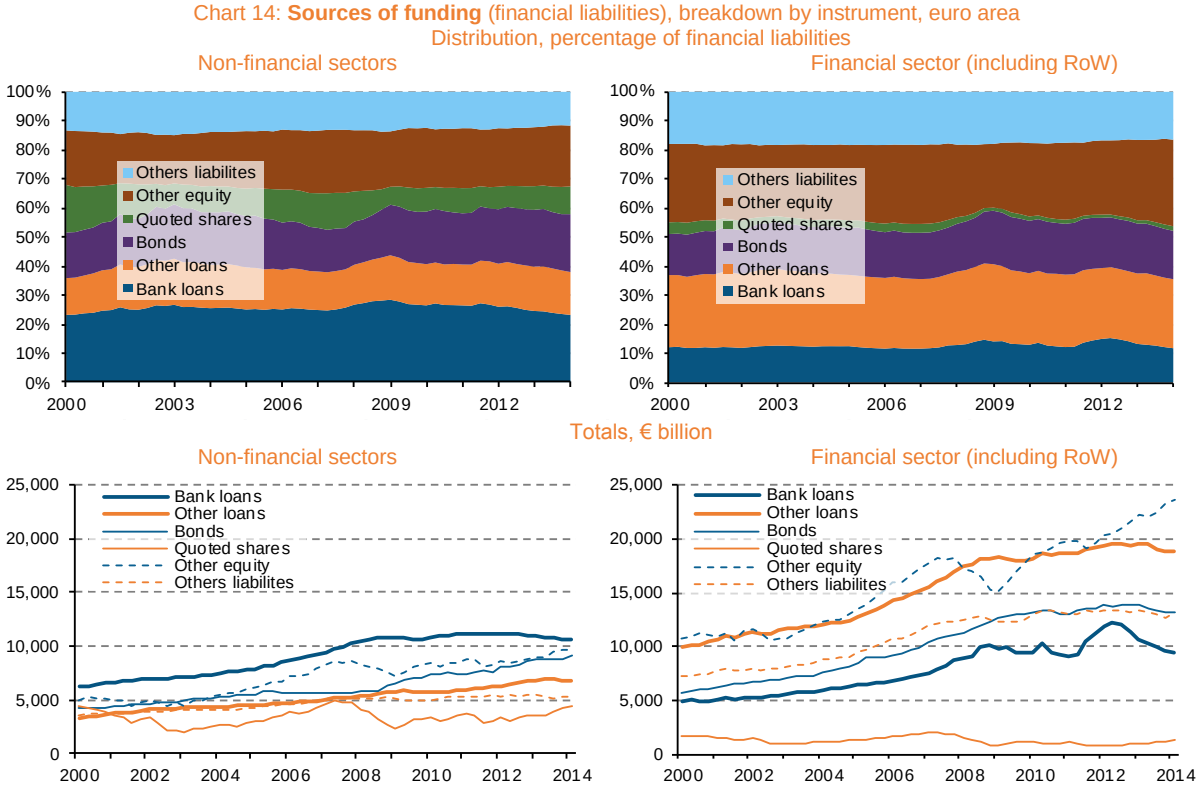
The **financial sector** stands out by the low level of equity issued in the market (2 per cent of its financial liabilities are quoted shares compared to 16 per cent for non-financial corporations). Capitalisation is particularly low for banks (less than 10 per cent of total equity compared to over 50 per cent in non-financial corporations[26]). Even when the financial sector is taken as a whole, the capitalisation is rather limited (36 per cent). One should take into consideration the interlinkages within the financial sectors (for instance, the equity of OFIs corresponds mainly to shares of investment funds and mutual funds[27]), which imply a lower loss absorption capacity than what the headline figure of equity may seem to suggest[28]. In the wake of the financial crisis and following both market pressure and regulatory reforms, the financial sector, and banks in particular, have been raising new capital and reinforced its loss absorption capacity[29].

The use of bonds as a source of funding is significant for banks (15 per cent) and for OFIs (18 per cent) and much less so for ICPFs. The most prominent source of funding for banks are deposits and loans provided by other sectors (45 per cent of financial liabilities) and interbank lending (24 per cent). These two categories are also somehow relevant for OFIs (a combined value of 18 per cent). The main source of financing for ICPFs are insurance technical reserves, which are included in the category 'Others'.

In terms of evolution (Chart 14), the crisis has more directly impacted equity (both quoted shares and other equity) as it was already observed from the perspective of assets. However equity recovered pre-crisis values already from mid-2010, particularly for equity other than quoted shares and more strongly for the financial sector. This is in line with the pressure to reduce leverage and increase capital levels. In the case of the non-financial part of the economy, a stagnation or even a decline in the volume of bank loans received is observed since the outbreak of the crisis. This is consistent with the evolution observed from the assets side (see Chart 12). A similar evolution is also observed for other liabilities, consisting mainly on trade credit, which is explained by the context of reduced economic activity and also, to a certain extent, by a certain decline in confidence observed since the outbreak of the crisis.

[26] See Kuehnhausen and Stieber (2014).
[27] A number of authors argue that, in the last 10 to 15 years, there has been an increased intra-financial system complexity via the lengthening of intermediation chains (Adrian and Shin, 2010).
[28] In this context, capital requirements legislation includes a correction for intragroup holdings of equity as these have a much lower loss absorption capacity.
[29] For further details, see Section 5.2.

Chart 14: **Sources of funding** (financial liabilities), breakdown by instrument, euro area



Notes: Real economy includes households, NFCs and governments. The financial sector includes MFIs, OFIs and ICPFs. RoW: Rest of the World; NFCs: Non-financial corporations. Deposits received by banks are included under the category 'Banks loans' (interbank deposits) or 'Other loans' (deposits other than interbank). Investment fund shares and mutual fund shares are included in other equity.
Source: ECB, Eurostat and own calculations.

This negative evolution in loans and other liabilities is more than compensated by the expansion in the issuance of bonds, which increased by over 60 per cent between mid-2008 and mid-2014 and loans other than bank loans (intercompany loans, loans from households and loans from governments), which increased by almost 30 per cent during the same period. After the correction of 2008-2009 (and a smaller one in 2011), equity has also expanded, particularly for non-quoted equity.

As a consequence, the total size of funding resources used by the non-financial part of the economy expanded from € 39 500 billion in late 2007 to over € 46,000 billion in mid-2014 (see Chart A2 in the Annex). Although an important part of this expansion is explained by the increase in government debt (from € 7 200 billion to € 11,600 billion in the same period), non-financial corporations also increased their use of funding (from € 26 200 billion to € 27,800 billion), but at a slower pace than in the mid-2000.

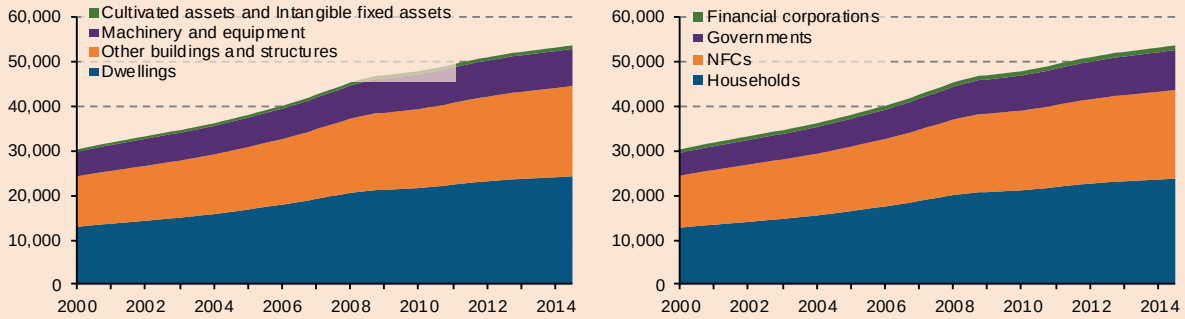
Apart from the significant expansion in 'other equity', which is mainly explained by the expansion of OFIs (particularly investment funds, see Section 4.1.1 for further details), the financial crisis reduced the growth rate in all other sources of financing, which stagnated since early 2012 and even started to decline since 2013, in most cases. As a consequence, the overall size of funding resources used by the financial sector has stagnated around € 80 000 billion since late 2011 (see Chart A2 in the Annex). This is in partly due to the excessive size reached by the financial sector (relative to the € 9 200 billion of the euro area GDP) and the need to deleverage (see also Chapter 1). Having said that, the different subsectors within the financial sector show divergent evolutions. The total size of the banking sector declined from a peak of almost € 35 000 billion in early 2012 to € 31 000 billion in mid-2014 while ICPFs and OFIs kept expanding (for further details, see Chapter 5). The external sector also slightly increased its absorption of funding provided by the euro area economy (see Chart 5).

Box A. **Non-financial assets and the investment plan for Europe**

The wealth of the economy goes beyond the financial assets and liabilities discussed throughout this chapter. Tangible assets such as buildings, machinery or stocks (inventories) are the actual foundations of an economy as they are indispensable to produce goods and services. Moreover, the existence of these non-financial assets explains, to a large extent, the capacity of households and non-financial corporations to borrow and obtain credit.

Sector accounts indicate that the euro area economy had accumulated almost € 55 000 billion, (equivalent to 550 per cent of GDP) of fixed assets[30]. The bulk of it is either residential real estate (45 per cent of the total) or other buildings and structures (38 per cent). Machinery and equipment is also significant (15 per cent), while the value of other assets is much lower (Chart B1, left-hand panel).

Chart B1: **Fixed assets**, euro area, outstanding volumes, nominal prices, € billion



Source: ECB, Eurostat and own calculations.

The majority of this wealth is owned by households (44 per cent of the total) or NFCs (37 per cent), followed by governments (17 per cent). The size of fixed assets owned by financial institutions is much more limited (Chart B1, right-hand panel). However, these numbers need to be qualified, particularly against financial assets and liabilities of the different sectors (see Charts 3). The wealth of households in the form of fixed assets is to be added to their net financial position (see Chart 4), while NFCs have negative net financial assets (see Chart 4). Finally, the valuation of government assets such as schools, roads and hospital are subject to a certain level of uncertainty as not many transactions are available to be used as a benchmark[31].

With respect to the evolution, an upwards trend in the value of fixed assets can be observed from the series on outstanding volumes (Chart B1) and that the growth has slowed down since the outbreak of the crisis. However, flow series provide a better overview of the dynamics of fixed assets (Chart B2). Two main points outstand. Firstly, the built up of a real estate bubble starting in the mid-2000s and the subsequent burst is clearly observed for both dwellings and other buildings and both for households and NFCs. A significant part of this swing can be explained by price effects.

Secondly, in the last few quarters, and after a short recovery, investment flows have decreased again. Although investment in fixed assets remains still positive, it is clearly lower than the levels observed prior to the crisis, particularly for machinery and equipment and for investments by governments[32].

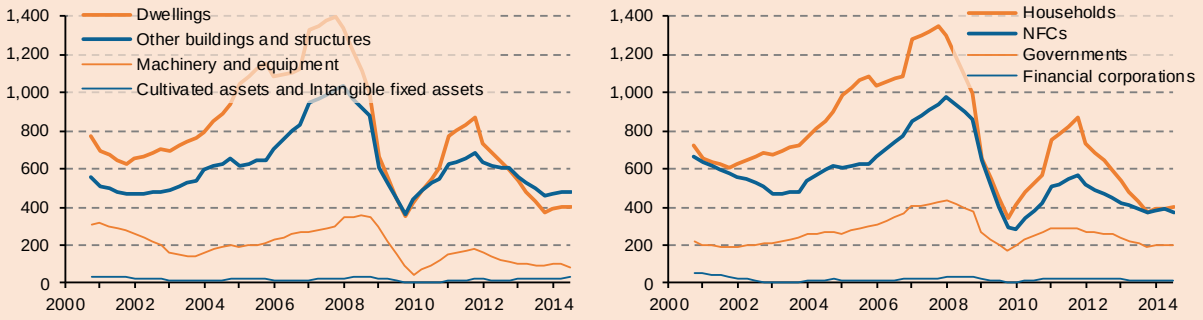
The decline in investment is closely related to the lack of credit and to the phenomenon of secular stagnation. A credit crunch may be constraining investment and economic growth, but also low economy activity may not require new investment nor additional credit. While, the exact causality may be difficult to disentangle, these dynamics represent a vicious circle.

An investment plan for Europe

This vicious circle was identified by the European Commission investment plan for Europe presented in late 2014[33]. In the short-term, weak investment slows economic recovery. In the longer term, the lack of investment hurts growth and competitiveness. Weak investment has a considerable impact on the capital stock, which in turn holds back Europe's growth potential, productivity, employment levels and job creation.

[30] This figure does not include inventories and other current assets.
[31] For further details, see Piketty (2014).
[32] Even more so, if one would take into account the effect of inflation. As a reference, consumer prices increased by about 30 per cent between 2000 and 2014. Therefore, the value of investments in 2014 should be corrected by about 30 per cent downwards to compare them with the value in the early 2000s. However, the evolution of prices for real estate and fixed assets may have had a slightly different evolution than consumer prices.
[33] See European Commission (2014c).

Chart B2: **Fixed assets**, euro area, net annual flows, nominal prices, € billion



Notes: Net indicates that the series correspond to increases on the real value of fixed assets beyond replacing depreciated assets; negative values indicate that depreciation was higher than gross investment.
Source: ECB, Eurostat and own calculations.

The investment plan has been identified as a priority of the Commission aiming at mobilising sources of investment finance to deliver at least € 315 billion of additional investment over the next three years, making sure this extra finance contributes to growth in ways that are adapted to each sector and geography.

The investment plan for Europe has three objectives: to provide additional fuel to the EU's recovery and reverse the drop in investment; to take a decisive step towards meeting the long-term needs of our economy by boosting competitiveness in strategic areas; and to strengthen the European dimension of the existing knowledge, human capital and physical infrastructure, and the interconnections that are vital to the European Single Market.

According to European Commission estimations, the investment plan has the potential to add € 330 to € 410 billion to the EU's GDP and create 1 to 1.3 million new jobs in the coming three years.

3.3. Instruments and products: country analysis

European aggregates may conceal wide differences across countries. Given that households and NFCs are the main providers of funding in the economy and that NFCs are the main net users of financing, the country analysis presented in this section focuses on the composition of households' assets, NFCs' financial assets and NFCs' financial liabilities across countries[34].

Provision of funding by households: country analysis

The size of households' financial assets as a source of financing for the rest of the economy varies widely from country to country. In relative terms, the households with the largest financial size are found in the Netherlands, Denmark, the UK and Belgium (about 300 per cent annual GDP) Sweden, Italy, Malta and Portugal and next in size. The smallest contributions to funding provided by the households sector relative to GDP appear in Slovakia, Romania, Lithuania, Poland and Latvia (smaller than annual GDP) followed by the Czech Republic, Hungary, Slovenia, Croatia or Estonia (Chart 15).

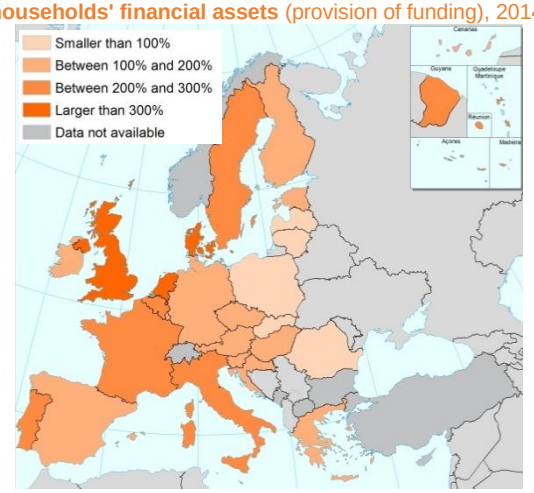
These data seem to depict a cliff between central and eastern European countries on one side and western and northern European countries on the other. The former have a much less developed financing structure in their economy than the latter. The composition of assets (Chart 16) provides further information about potential drivers and consequences of the different size of the household sector observed across countries. The breakdown by instrument seems to point to the divide between the East and the West to be explained, to a large extent, by investment products (e.g. insurance technical reserves and bond holdings).

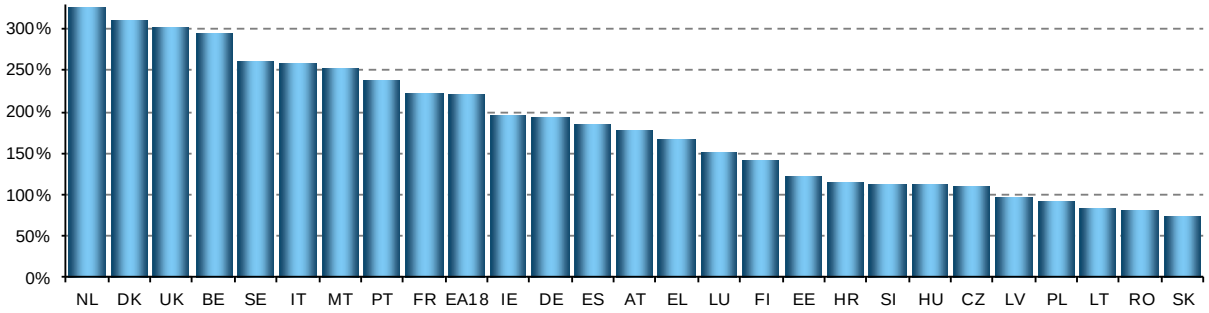
Households' financial assets can be classified in two groups. Currency, deposits and equity would be used for day-to-day needs[35]. Other investment products are used as a storage of wealth for future needs. Data seem to indicate that only when a minimum level of products for day-to-day needs has been achieved, households can invest in additional products. Countries where households' financial assets have reached about 150 per cent of GDP tend to invest increasing amounts of funds in investment products such as insurance technical reserves, pension funds and bonds (e.g. the UK, the Netherlands, Denmark, Belgium, Sweden, Belgium, Italy, Malta,

[34] For an in-depth analysis of financial intermediaries, see Section 4.
[35] In this context, currency and deposits are needed for transactional purposes; whereas equity, particularly equity other than quoted shares, reflects the entrepreneurial activities of many households as a way to earn their leaving.

France, Ireland and Germany). Pension features (pay-as-you-go vs funded plans) and demographic trends (e.g. aging population) may also play a role in the funds allocated to these investment products by households (see Chapter 4 on longevity).

Chart 15: **Total size of households' financial assets** (provision of funding), 2014 Q3, percentage of GDP





Notes: Data for Bulgaria and Cyprus are not available.
Source: ECB, Eurostat and own calculations.

The thesis that a minimum amount of currency, deposits and equity needs to be achieved before households invest in saving products is further reinforced by the proportion of each funding source within the total balance sheet of households. Indeed, countries with a smaller size of households' assets relative to GDP tend to have a larger proportion of their assets in the form of currency and deposits. For instance, in Slovakia, Croatia, the Czech Republic, Slovenia and Poland, currency and deposits represent more than half of households' financial assets[36].

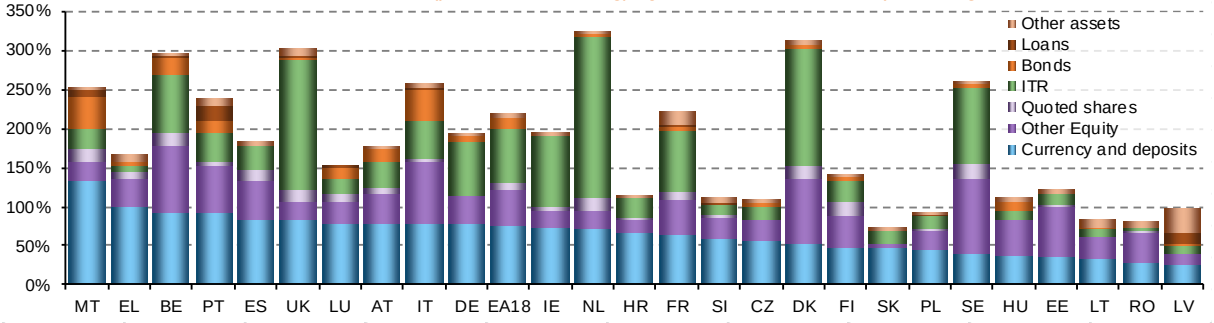
Note that, ultimately, households are the main net providers of financing to the economy and that the capacity of households to generate financial assets and their choices about the exact products used to keep their savings frame the financing system and the role of the financial sector, in particular, the capacity of the banking system to intermediate and provide loans. On the other hand, in countries where households have the capacity to keep their savings in the form of various investment products, other areas of the financial sector can be more developed, particularly insurance corporations and pension funds but also other financial institutions[37].

Provision and use of funding by non-financial corporations: country analysis

The distribution of the size of NFCs across countries is similar to the one of households, particularly for financial liabilities (Chart 17). The difference between assets and liabilities is driven by the significant amount of tangible assets in NFCs' balance sheet, particularly in the industrial sector, and explains why the NFCs sector is the main net user of funding (i.e. it shows a negative net worth position) in the economy (see Box A).

[36] Greece, and to a certain extent also Portugal, can be seen as a particular case. The intensity of the financial and economic strain that these countreis have suffered may have influenced households' behaviour with respect to the proportion of their assets kept in the form of currency and deposits, e.g. for precautionary reasons.
[37] See Section 4 for further details.

Chart 16: **Household assets** (provision of funding) **by instrument**, 2014 Q3, percentage of GDP



Notes: Data for Bulgaria and Cyprus are not available. ITR: Insurance Technical Reserves (it includes pensions and standardized guarantee schemes). For Germany, 'Other equity' includes also quoted shares.
Source: ECB, Eurostat and own calculations.

The overall size of financial liabilities is quite large in a number of countries, e.g. representing more than 300 per cent annual GDP (even more than 500 per cent in a few cases). An excessive size of financial liabilities can derive in the problems of debt overhang as discussed in Chapter 3. Having said that, one should take into account that own resources (quoted shares and other equity) represent a significant shares of financial liabilities (and those are exempted from the problems of debt overhang).

The composition of NFCs' financial assets (Chart 18) provides information about the transactional needs of NFCs (e.g. currency and deposits), about intragroup relationships (e.g. investment in equity or intragroup loans), about relationships with customers (e.g. advances and trade credit) or about idle resources that are temporarily invested (e.g. bonds).

In countries that host large corporations and industrial groups, NFCs tend to have a large amount of assets in the form of equity investments or in the form of company loans, which points to intragroup ownership and lending (e.g. Luxembourg, Denmark, Ireland, Sweden, Belgium and France); Hungary seems to be also part of this group. In countries where the financial sector is less developed, NFCs tend to provide relatively more financing facilities to their customers in the form of trade credit and advances (e.g. in Croatia, Romania, Italy, Czech Republic, Lithuania, Latvia, Poland and Slovakia trade credit represents about a third of the financial assets of NFCs). There are no significant differences in the relative holdings of currency and deposits by NFCs; this indicates that firms are confronted with similar transactional needs across countries.

In the current context where some firms are confronted with difficulties to access financing, it is critical to analyse the composition of their liabilities (Chart 19). The mix of funding sources that NFCs use for financing their activities depends, to a large extent, on the funding conditions and available sources at their country of residence, e.g. how developed financial markets are.

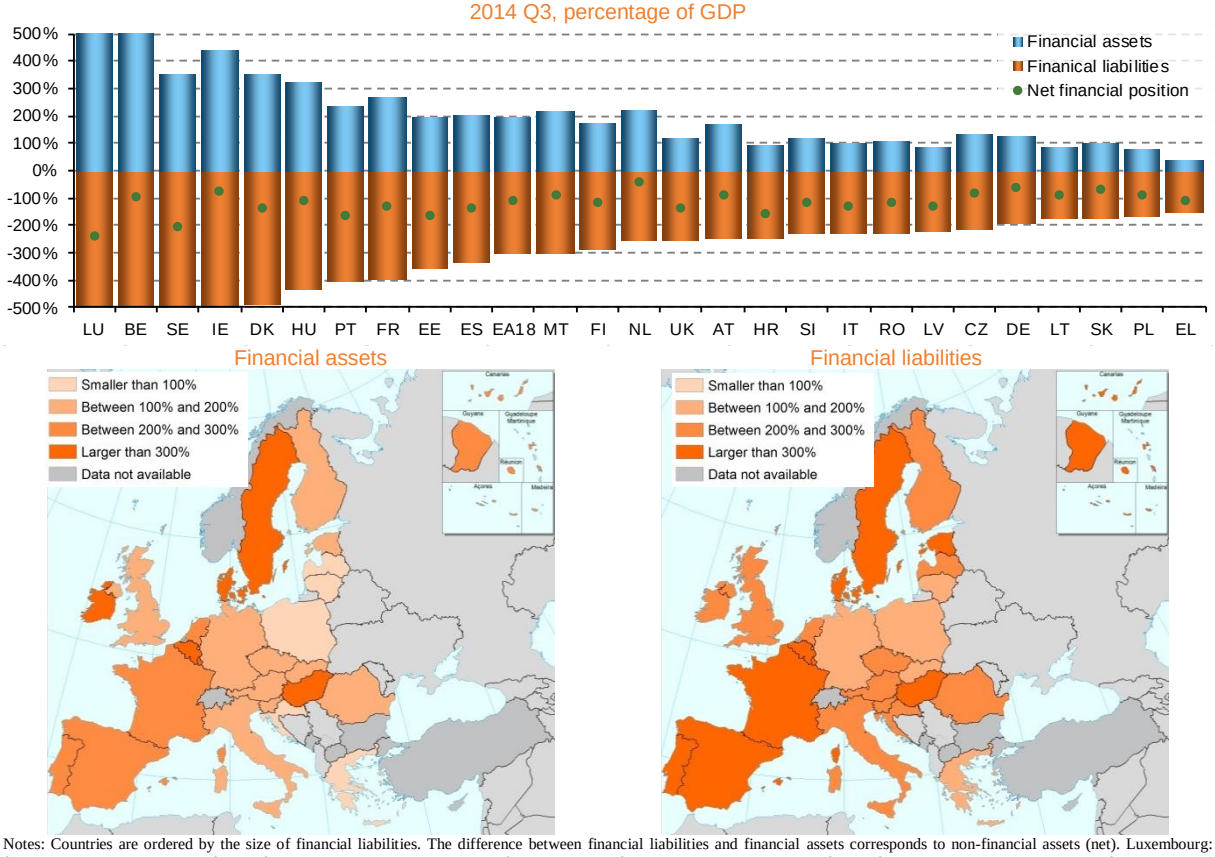
NFCs across countries finance most of their activities with own resources: equity represents, in general, about 50 per cent of firms' liabilities. Western countries are the ones with a larger recourse to markets to obtain that equity (i.e. through the issuance of quoted shares). Indeed, in the UK, the Netherlands, Finland, Ireland, Denmark, Sweden and France[38], companies finance between 15 and 35 per cent of their activities through quoted shares (what represents 70 per cent or more of the respective annual GDP); while, in easter countries, quoted shares represent at most about 5 per cent of total liabilities and at most 20 per cent of annual GDP. Having said that, the use of other forms of equity as a source of funding is significantly larger than quoted shares in the vast majority of countries with the exception of Finland, Ireland, the Netherlands and the UK, where quoted shares have a similar or even larger size than other equity instruments.

All other sources of financing enter in the category of debt financing. An excessive accumulation of debt is sometimes mentioned as one of the underlying causes of the crisis and one factor dragging the recovery in some countries through the problems stemming from excessive leverage and debt overhang[39]. Given the large recourse to equity as a source of funding, NFCs' debt does not represent, typically, more than 50 per cent of liabilities.

[38] Germany should probably be added to this group; however, the breakdown between quoted shares and other equity is not available for Germany on the statistics on Sector Accounts.
[39] For a further discussion on the problem of debt overhang, see Chapter 3.

However, NFCs' debt can be large in proportion to GDP. This is particularly the case in countries like Luxembourg, Ireland, Belgium, Portugal, Sweden and Malta, where NFCs' debt represents between 200 and 500 per cent of the respective annual GDP; Hungary, Spain, Estonia, France, Denmark and Croatia are next in importance (Chart 19). This may be pointing to an excessive size of the NFCs' sector.

Chart 17: **Provision of funding** (financial assets) **and sources of funding** (financial liabilities) **by non-financial corporations**
2014 Q3, percentage of GDP



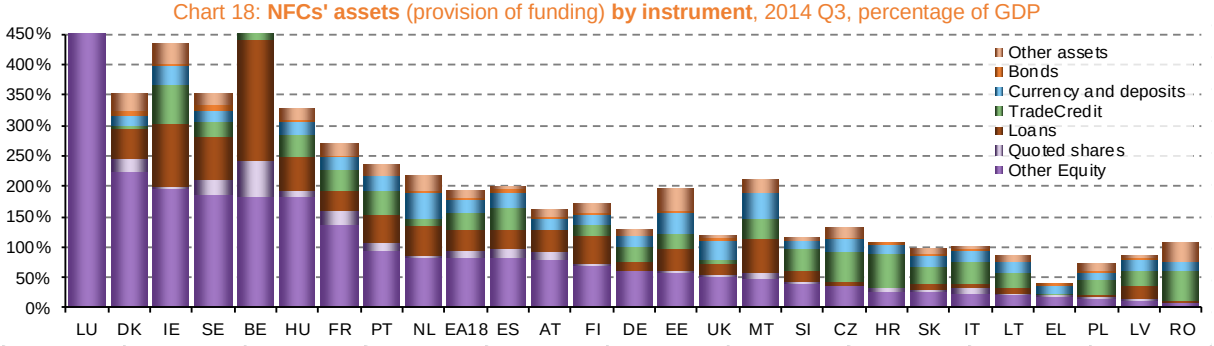
Notes: Countries are ordered by the size of financial liabilities. The difference between financial liabilities and financial assets corresponds to non-financial assets (net). Luxembourg: financial assets = 930 per cent of GDP, financial liabilities = 1,170 per cent of GDP; Belgium: financial assets = 520 per cent of GDP, financial liabilities = 620 per cent of GDP; Sweden: financial liabilities = 560 per cent of GDP. Data for Bulgaria and Cyprus are not available.
Source: ECB, Eurostat and own calculations.

Turning to specific sources of funding, the availability and use of bank loans as a source of funding is constrained by the capacity of the banking sector to intermediate. This depends, in turn, on the availability of deposits in the economy (see Section 3.3.1). In this context, firms in countries with limited availability of households' currency and deposits tend to have a more restricted access to bank loans. Indeed, in Poland, Romania, Slovakia, Lithuania, Czech Republic and Hungary both households' deposits and NFCs' bank loans are not large (they represent about 50 per cent of GDP and less than 25 per cent of GDP, respectively).

NFCs tend to compensate a low recourse to bank loans with other sources of funding, in particular, with trade credit and 'other loans'. For instance, trade credit represents between 15 and 20 per cent of total liabilities in countries like Poland, Romania, Czech Republic, Slovakia and Lithuania, where the recourse to bank loans is limited (bank loans represent less than 25 per cent of annual GDP). As could be expected, trade credit from the perspective of liabilities (trade credit received) tends to mirror trade credit from the perspective of assets (trade credit provided).

Loans other than bank loans, representing between 15 and 25 per cent of liabilities in the majority of countries, are widely used as a source of funding. Some of these loans could be considered as close substitutes for banks loans (e.g. loans from family and friends or loans provided by the government), but some other such loans are rather similar to trade credit (those stemming from a supplier-customer relationship). These loans other than bank loans are used both in eastern and western countries and in countries both with and without a large issuance of quoted shares, e.g. in Ireland, Belgium, Hungary, Croatia, Malta and Finland such loans represent more than 20 per cent of firms' liabilities.

Chart 18: **NFCs' assets** (provision of funding) **by instrument**, 2014 Q3, percentage of GDP



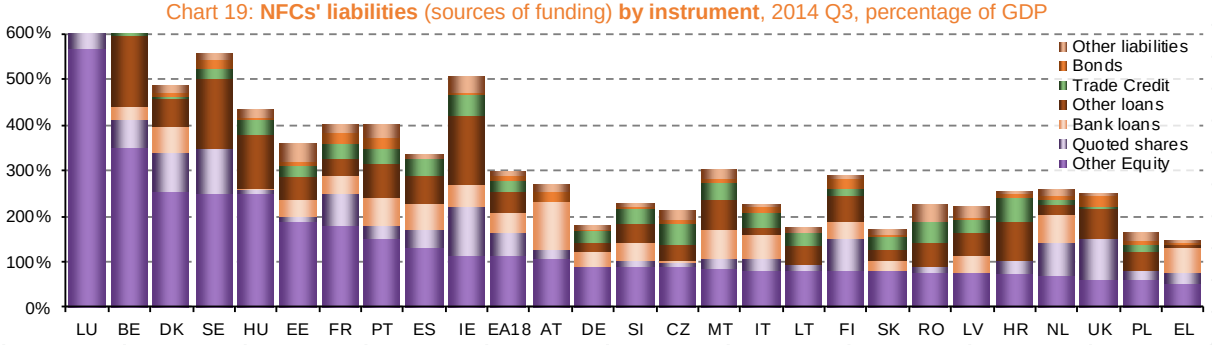
Notes: Trade credit is not available for Austria. For Germany, 'Other equity' includes also quoted shares. Data for Bulgaria and Cyprus are not available. Luxembourg: Other equity = 589%; Quoted shares = 2%; Loans = 220%; Trade credit = 42%; Currency and deposits = 58%; Bonds = 7%; Other assets = 12%. Belgium: Trade credit = 38%; Currency and deposits = 35%; Bonds = 7%; Other assets = 0%.
Source: ECB, Eurostat and own calculations.

It has also been argued, that some of this intra-company loans may be used by large corporations for tax optimisation. In this context, a subsidiary can be established in a country with a more favourable tax regime which would make a loan to the company's main business. A similar goal can be reached by placing deposits and asking for a loan in a foreign country with a more favourable tax regime[40]. Although, it is not possible to estimate the exact amount with current statistics; these operations are probably more significant in the countries with a significantly larger size of 'other loans' (both on the assets and the liabilities side) and of currency and deposits than the average case.

The issuance of bonds in the markets, representing on average less than 4 per cent of liabilities, is a marginal source of financing. It is slightly more significant only in the UK and Austria (about 10 per cent of financial liabilities) followed by Portugal, France and Finland (6 per cent).

Finally, 'other liabilities' are, in general, not significantly used as a source of financing except in a few countries (e.g. they represent about 10 per cent of liaiblities in Romania, Estonia, Latvia, Poland, the Czech Republic and Germany). This category includes items such as taxes due, derivatives, factoring, leasing, etc.

Chart 19: **NFCs' liabilities** (sources of funding) **by instrument**, 2014 Q3, percentage of GDP



Notes: Trade credit is not available for Austria. For Germany, 'Other equity' includes also quoted shares. Data for Bulgaria and Cyprus are not available. Luxembourg: Quoted shares = 139%; Bank loans = 113%; Other loans = 239%; Trade credit = 33%; Bonds = 55%; Other liabilities = 23%. Belgium: Trade credit = 34%; Bonds = 12%; Other liabilities = 0%.
Source: ECB, Eurostat and own calculations.

3.4. Products and instruments' dynamics

The analysis presented throughout Sections 3.1 to 3.3 is based on outstanding volumes of assets and liabilities, which provide a good snapshot of the funding provided and used by the different sectors in the economy at a given moment in time. However, volumes may not offer the best insights to analyse the dynamics of financial instruments for two main reasons. On the one hand, given that volumes represent the cumulative position over a long period of time, latest developments impact only marginally total volumes. On the other hand, volumes can be affected by valuation changes, which may blur or distort the actual increases or decreases in the activities of firms (e.g. the recent monetary decision of the Swiss Central Bank led to an appreciation of almost 30 per cent of the Swiss franc. As a consequence, some loan portfolios in countries like Poland, Croatia or Austria increased in

[40] See, for instance, Bershidsky (2015) and House of Commons (2015).

value without any additional property being purchased. Large swings in the market prices of quoted shares can generate similar effects).

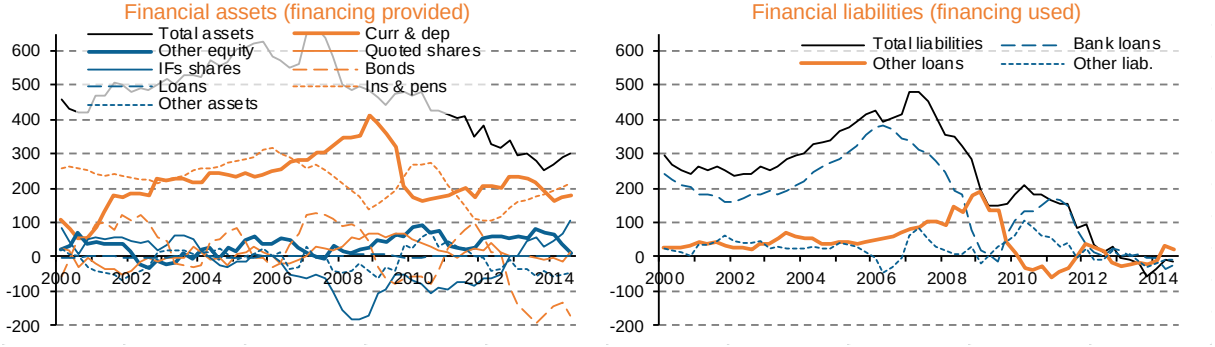
Therefore, this section focuses on the evolution of the different financial instruments and products in terms of net transactions[41]. The analysis is restricted to households and NFCs because the specific situation of financial corporations and governments is widely discussed in Sections 4 and 5[42].

'Fresh' funding provided and used by households

The financial crisis eroded the capacity of households to generate new financing to the rest of the economy. Indeed net annual transactions halved from a peak of € 660 billion in 2007 to about € 320 billion in mid-2012 and mid-2014. Nevertheless, net annual transactions in assets have remained positive through the crisis. This means that households continue to provide a significant amount of financial resources to the rest of the economy (at a path of € 320 billion a year or about 3.5 per cent of euro area GDP).

In terms of particular instruments (Chart 20, left-hand panel), with the outbreak of the crisis, households have 'liquidated' some of their investment products; this is particularly reflected on the series on 'currency and deposits', 'insurance, pensions and standardized guarantee schemes' and 'investment fund shares'. Indeed, the evolution of the series on currency and deposits somehow mirrors the evolution of the other two series indicating that households may have converted some of their holdings into cash (currency and deposits). The liquidation of investment fund shares reversed only since 2013. On the other hand, while the contributions to insurance, pensions and standardized guarantee schemes have remained positive for the household sector as a whole, it seems that many individual households have withdrawn some of these savings and converted them to cash or, at least, reduce their new contributions in the moments of higher financial turmoil (e.g. around 2008-2009 and in 2012).

Chart 20: **Dynamics in households' balance sheet**, net annual transactions (flows), euro area, € billion



Notes: 'Ins & pens': insurance, pensions and standardized guarantee schemes.
Source: ECB, Eurostat and own calculations.

In this context, the series on bonds (probably mainly sovereign bonds) seems to play a similar role to currency and cash and seems to be seen as a safe investment in moments of financial turmoil (flight to safety effect). Indeed, households hoarded bonds around 2008 and 2011 and sold them during the recovery of 2010 and following the improvement in economic conditions observed since early 2013; at the same time, the series on bonds mirrors the evolution of other investment products (e.g. insurance, pensions and standardized guarantee schemes), which are perceived as more profitable but also riskier.

The importance of these swings in net transactions stands out when they are compared against total volumes in the balance sheets of households (see Chart 11). While the volume of insurance, pensions and standardised guarantee schemes (€ 6 600 billion) are almost six times larger than the holdings of bonds (€ 1 100 billion), net transactions in both series are of the same order of magnitude (e.g. around € 100 billion an year around early 2012). Although this cannot be considered as a panic, it provides an indication of the mobility of financial products and their potential volatility.

[41] Net transactions correspond to the difference between increases and decreases in transactions.
[42] Transactions on governments' liabilities are discussed in Section 5 as far as they are mainly constituted by bonds.

Net transactions in 'other equity' have historically been small despite the fact that holdings of equity are one of the main assets of households (€ 4 200 billion or 20 per cent of total assets). This is consistent with the permanent nature of equity. On the other hand, equity is the main source of financing for the majority of firms (see Section 3.3). The increase of net transactions in unquoted equity observed throughout the crisis can be explained as a mean for households to provide financing to their family business when they were confronted with increasing constrains to obtain funding through other means (see below the discussion about NFCs' liabilities). Similarly, households have supported the financing of firms through the purchase of quoted shares throughout 2008-2010 but this trend faded out thereafter.

Turning to the sources of funding used by households as reflected in their financial liabilities (Chart 20, right-hand panel), the financial crisis has triggered a collapse in the access of households to fresh new financing: financial liabilities dropped from a peak of almost € 500 billion net annual transactions in 2007 to zero or even negative net annual transactions[43] from early 2012 onwards. In the initial phases of the crisis, the collapse in bank loans was partly mitigated by the recourse to other types of loans (e.g. loans from family and friends or loans granted by companies); however, they represented only a temporary solution. Since early 2013, the net financing obtained by households has been negative. Besides potential problems in lenders, the limited capacity of some households to access additional sources of financing can be connected with their level of indebtedness and the issue of debt overhang[44]. Price dynamics such as the drop in real estate in a number of countries may also be playing a role.

'Fresh' funding provided and used by non-financial corporations

Net annual transactions for firms are markedly driven by the economic cycle. In terms of net annual transactions, the 2007 boom was of a similar size than the one observed before the bust of the dot com bubble; however, the recovery of 2010 was much milder (see Chart 9). The positive economic developments observed since early 2013 have not translated into an expansion of firms' net annual transaction yet.

Some specific features can be deduced from the evolution of financial assets components (Chart 21, left-hand panel). The series for holdings of bonds and holdings of investment funds series present similar features to the ones of households. In 2008, a flight to security from investment funds to bonds is observed. Thereafter, NFCs seem to have divested their holdings (i.e. assets) in both investment funds and bonds to obtain funding and liquidity. In the period 2004-2007, data show an increasing accumulation of currency and deposits, which may have gone well beyond the needs for transactional purposes. A temporary placement of this excess cash on liquid assets may explain the increasing purchase of quoted shares observed between 2006 and 2008 and the subsequent decline when the inflows of currency and deposits decreased.

The series on 'other assets' is composed mainly of trade credit and advances provided, which are close linked with the turnover of the company and, therefore, the economic cycle. This series provides also an indication of the extent of the boom of the second half of the 2000s and of the impact of the recession. Indeed, the series of net transactions of 'other assets' increased threefold from € 100 billion a year in the mid-2004 to over € 300 billion a year in mid-2007. Thereafter, it collapsed to minus € 200 billion a year by early 2009. Thereafter, the series track the short recovery of 2010 and the second dip of 2012. Despite the positive macroeconomic indicators observed since late 2012, the series on 'other assets' seem to be losing traction in the last few quarters.

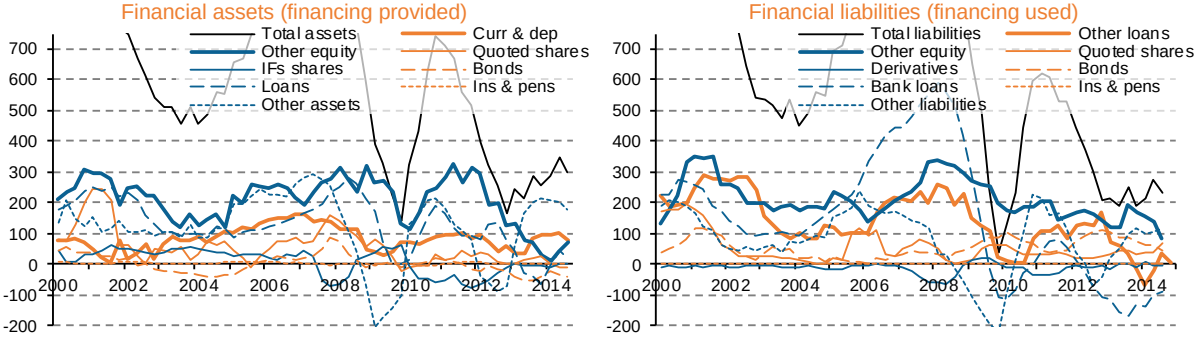
The accumulation of buffers during the boom may also explain the expansion in the loans granted by firms to other economic agents (e.g. payment facilities for customers) observed around 2008. This may have been offered as an alternative to trade credit and is consistent with the shift from bank loans to other loans observed in households' liabilities (see Chart 20, right-hand panel) and with the increase in the net transaction of other loans in the liabilities side of non-financial corporations (see Chart 21, right-hand panel).

The highest value for net annual transactions is observed in the series for equity other than quoted shares. This corresponds mainly to the earnings retained by subsidiaries firms had invested in (recall that the largest financial liability of NFCs is indeed equity other than quoted shares, see Chart 11). This interpretation explains also the

[43] Negative net annual transactions indicate that redemptions are larger than gross new funding.
[44] See Chapter 3 for further details.

decline in 2009 and the recovery of 2011, which follows the business cycle. The collapse in net annual transactions for equity other than quoted shares observed since late 2012 seems to indicate a rather weak outlook.

Chart 21: **Dynamics in NFCs' balance sheet**, net annual transactions (flows), euro area, € billion



Notes: 'Ins & pens': insurance, pension and standardized guarantee schemes.
Source: ECB, Eurostat and own calculations.

Turning to financial liabilities, although the peak of 2001 was similar in size to the one of 2008, a significant shift in the funding mix is patent (Chart 21, right-hand panel). The evolution of overall firms' liabilities seems to be driven, to a large extent, by the activity in bank loans, particularly after 2005. Indeed, an extraordinary expansion in flows of bank loans is observed from about € 100 billion a year in the mid-2000 to almost € 600 billion a year in 2008. During this period, bank loans provided up to 50 per cent of the fresh new financing obtained by non-financial corporations, in spite the fact that bank loans represent only 16 per cent of the NFCs' outstanding liabilities (see Charts 13 and 19). After 2005, flows of bank loans decoupled from the rest of NFCs' balance sheet.

These dynamics seem to indicate that banks played a much more prominent role from the supply side in building the bubble (e.g. by offering loans based on an insufficient credit quality assessment) than firms from the demand side (i.e. historical transactions and data on volume indicate that firms do not necessarily needed to concentrate their funding on bank loans). Moreover, the analysis of NFCs' assets reveals that firms had accumulated cash buffers and, therefore, they did not really need large amounts of credit to finance their normal activities. Therefore, this unprecedented expansion in loans seems to be connected with an excessive easing in the lending standards required by banks to highly risky firms and projects. This interpretation is further reinforced by the subsequent (negative) evolution of transactions on bank loans: the recovery of 2011 was both short and limited in terms of amount; and, thereafter, transactions in bank loans have remained largely negative. An excessive supply of low-quality high-risk lending by credit institutions is consistent with the numerous voices asking for the need of balance sheet repair in the banking sector (e.g. by the EBA, the IMF and the ECB).[45]

Various alternative sources of finance were mobilised to compensate for the decline in bank loans including bonds, quoted shares, other equity and loans other than bank loans. The issuance of bonds has been particularly significant. With a cumulative net issuance of over € 400 billion between 2008 and 2014, non-financial corporations almost doubled their use of bonds as a source of funding from about € 630 billion to over € 1,050 billion (see Section 5.1 for further details). Moreover, listed companies issued significant amount of quoted shares throughout the crisis. However, the main support for financing firms' activities was a continuous inflow of equity other than quoted shares (mainly via retained earnings, but also through injections of fresh new capital). Having said that, a continuous decline in flows of equity other than shares is observed since 2008, probably reflecting an erosion in earnings due to the protracted crisis.

As it has been seen from the assets side, trade credit and other accounts payable (i.e. the series 'other liabilities') are highly influenced by the business cycle. Having said that, a decline in the series is observed already starting in 2006, much earlier than in the corresponding series in assets. This could be interpreted as a signal of a deteriorating

[45] See, for instance, Jassaud and Hesse (2013), IMF (2013), Van den End and de Haan (2014), Praet (2014), ECB (2014) or Enria (2013).

outlook and increasing difficulties to obtained financing by some firms, even if this was initially concealed under easy and cheap access to bank credit[46]. A nascent recovery in this series can be observed since late 2013.

Finally, the series on loans other than bank borrowing are also significant. These loans were an important source of funding during the initial wave of the crisis (in 2008 and 2009) but they declined in 2010, although flows never became negative. Subsequently, firms recovered their recourse to this type of loans, which turned to be, jointly with retained earnings, the main source of fresh financing for firms during the second dip of 2012. However, a significant deterioration in the availability of such loans is observed since early 2013.

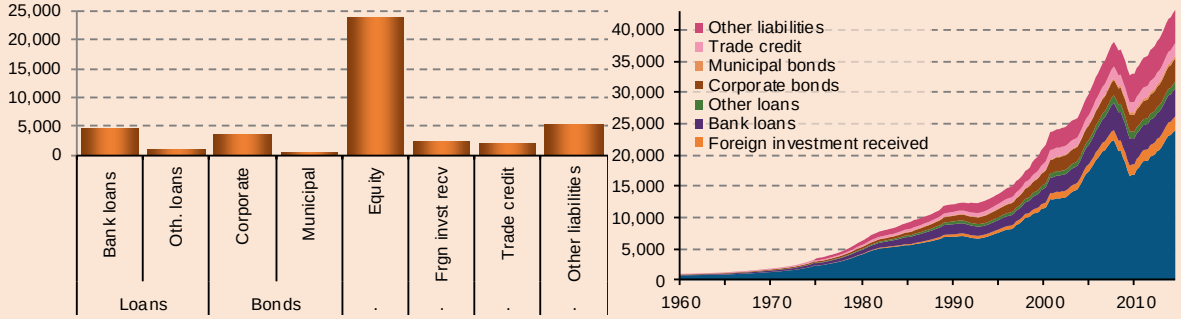
Box B. **Comparisons with the US**

Funding structure

With a balance sheet of $43 200 billion, US firms have a total size representing 250 per cent of GDP, larger, in relative terms, than the one of the euro area (which is below 200 per cent of GDP). American companies finance up to 55 per cent of their activities with own resource, slightly above the 50 per cent of own resources used by their European peers. US firms use a range of other funding sources: bank loans, trade credit, corporate bonds, tax claims, etc. However, the largest source of funding after equity is 'miscellaneous liabilities' for which no further split is available[47].

The combined recourse of firms to the financial sector in the form of bank borrowing and the issuance of bonds represents about 20 per cent of liabilities on both size of the Atlantic. However, US firms recourse more to the issuance of bonds (9 per cent of their liabilities) than European firms (4 per cent) and less to bank loans (10 per cent) than EU firms (15 per cent). These differences seem to be explained by strong historical regulatory restrictions imposed on the activities of American banks. In particular, the Glass-Steagall Act, which imposed the separation of commercial and investment banking; the 'Regulation Q', which imposed interest rate caps on bank deposits; and state restrictions, as the operations of commercial banks were confined to their home states[48].

Chart B3: **Sources of funding used by nonfinancial businesses**, US, outstanding volumes, € billion



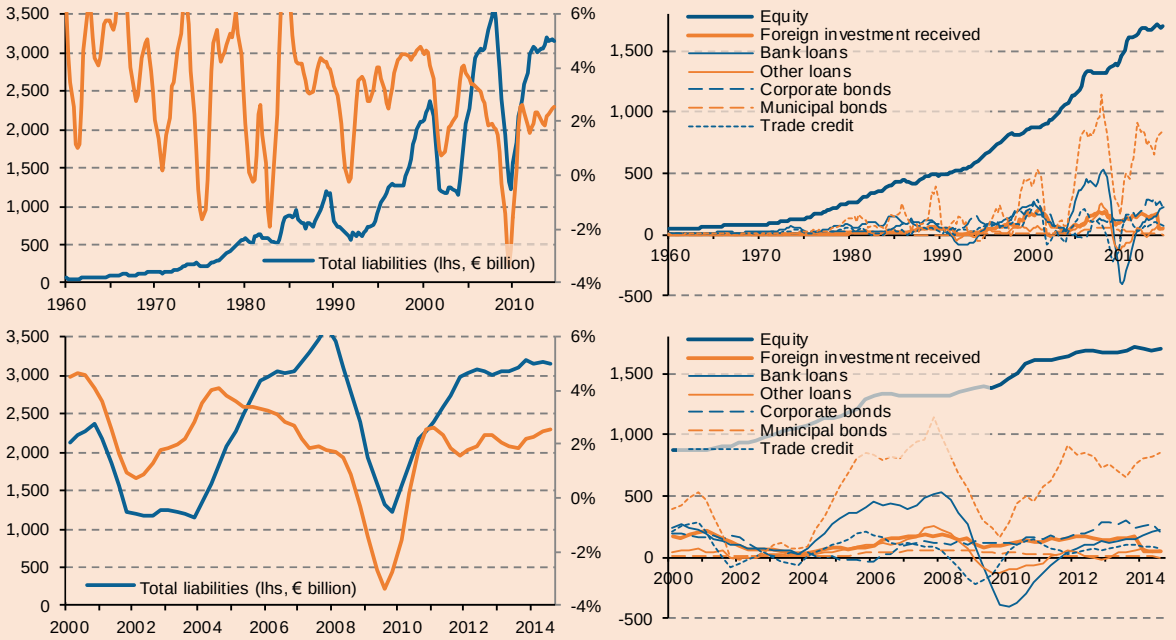
Notes: Data converted to Euro applying the December 2014 exchange rate. Municipal bonds include also municipal loans. Corporate bonds include also commercial paper.
Source: ECB, Federal Reserve and own calculations.

Nevertheless, banks are also very active in financial markets. For instance, while there are about 20 public stock exchanges in the US[49], there are also over 50 'dark pools'[50], which trade securities under opaque rules. US banks control over 70 per cent of the trade of securities[51], not least because most dark pools are located within the large US investment banks. The SEC (2009) proposed to increase the transparency of dark pools; however, they are still somehow been used to exploit some investors, sometimes in combination with some high frequency traders' (HFTs) strategies[52]. In other words, although the American economy seems to have better recovered from the financial crisis than the euro area, one should recall that the large size of financial markets and of shadow banking played a significant role in the great recession of 2008-2009 and, therefore, the American financial structure is not necessarily more stable than the one used by European firms[53].

[46] One should be aware of the ambivalence of trade credit and other advances. An expansion in such sources of financing may be generated by an increase in activities, but liquidity and solvency problems are also translated into increasing (non-performing) debts to suppliers and stakeholders in general (e.g. late payment of salaries).
[47] This category includes asset-based lending such as factoring, which is more widely used in the US than in Europe (see Section 4.4.3).
[48] For further details see Zarutskie, R. (2013), Anderson et al. (2015) or Calomiris and Haber (2014).
[49] See SEC "Exchanges": http://www.sec.gov/divisions/marketreg/mrexchanges.shtml.
[50] See http://en.wikipedia.org/wiki/Dark_liquidity.
[51] See Lewis (2014).
[52] See, for instance the fraud lawsuit filed by New York's Attorney General against Barclays bank (New York Telegraph, 2014). For further discussion about high frequency trading, see last year's review (European Commission, 2014), Chapter 4.
[53] For further discussion, see Wolf (2014).

While there may be some room for rebalancing the weigh between the use of bank loans and bond markets in Europe, the wider picture should not be neglected. In the quest for resolving the funding problems observed in Europe, public authorities and academics should devote some energy to think if the crisis has led to problems on the 'additional' 80 per cent of sources of funding (e.g. has the deterioration in confidence eroded the ability of firms to use trade credit?, are suppliers asking for advanced or immediate payment on delivery?) and, even if problems are not significant, to think about potential ways to boost these other sources of funding. In this context, the take-off of equity flows seems to be an important factor driving the recovery in the US (Chart B4, right-hand panels) and marking the difference with European firms, where equity flows stagnated (Chart 21, right-hand panel).

Chart B4: **Dynamics in non-financial businesses' liabilities**, net annual transactions (flows), US, € billion



Notes: Data converted to Euro applying the December 2014 exchange rate. Municipal bonds include also municipal loans. Corporate bonds include also commercial paper.
Source: ECB, Federal Reserve and own calculations.

Evolution

The expansionary phase is observed in the US in 2004-2006, a bit earlier than in Europe and with lower growth (an average growth 11 per cent a year in the US compare with 13 in Europe). However, the balance sheet of American firms continuously expanded from late 2010 onwards (without a second dip) and at higher rates than in Europe (6 per cent average annual expansion of total liabilities for American firms compared to 4.5 per cent for euro area ones; see also Chart 9).

The balance sheet of American firms seems to be even more pro-cyclical than in the case of European firms and with a wider volatility (Chart B4, left-hand panels). However, sustained equity inflows (originated mainly on retained earnings) in US firms avoided that the trough of total liabilities of 2008-2009 would be deeper than the one of 2000 (as it was the case in Europe, see Chart 9) and a second dip. Differences in demographic dynamics between the US and the EU may be behind the different developments observed in equity flows[54].

Besides the continuous expansion of equity, flows of 'other liabilities' are also very significant and with a highly cyclical behaviour. Similarly to the euro area, bank loans have played a significant role in the boom leading to the recent financial crisis and the subsequent bust. However, contrarily to Europe, American banks started to provide new fresh credit to firms from 2011 onwards.

Similarly to Europe, the evolution of trade credit, advances and other liabilities for American firms shows a highly pro-cyclicality pattern; moreover, increasing issuance of bonds have been used, both in the US and in Europe, to compensate for negative net transactions from other sources of funding.

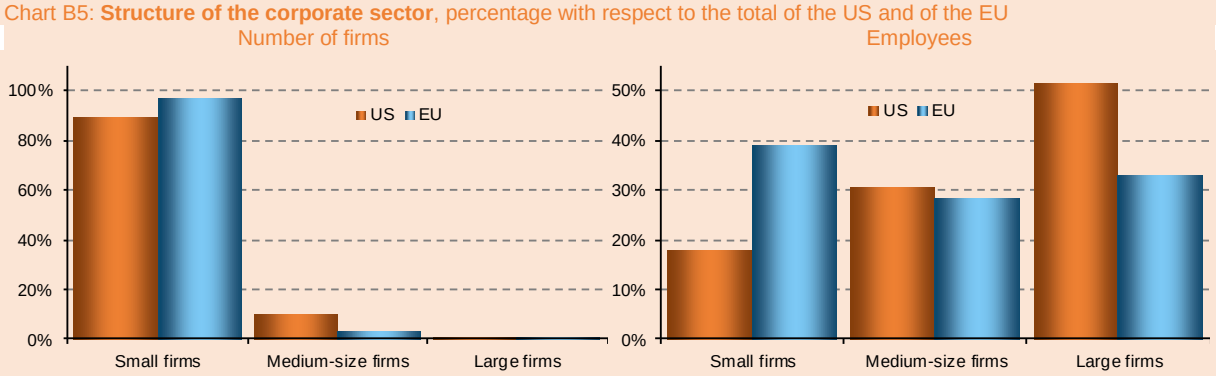
Business structure

In terms of the size of firms, the corporate sector in the EU has a very different structure from the corporate sector in the US. While the relative number of large companies is very similar in both the US and the EU (0.2 per cent and 0.3 per cent,

[54] For further details about demographic dynamics, see Chapter 4 and Piketty (2014).

respectively), this is not the case for the average size of the companies. Large companies in the US are really large. Indeed, in the US, over 50 per cent of the employment is generated by large companies with 500 or more employees; while, in the EU, large companies with 250 or more employees generate only about 30 per cent of the employment. On the other hand, small firms of less than 20 employees provide employment to less than 20 per cent of the population in the US but to almost 40 per cent of the population in the EU (Chart B5).

Chart B5: **Structure of the corporate sector**, percentage with respect to the total of the US and of the EU



Notes: In the EU, holding companies are not included. Companies are classified differently in the US and the EU.
For the US, *'Small firms'* = up to 19 employees; *'Medium-size firms'* = between 20 and 499 employees; *'Large firms'* = Equal or larger than 500 employees.
For the EU, *'Small firms'* = up to 19 employees; *'Medium-size firms'* = between 20 and 249 employees; *'Large firms'* = Equal or larger than 250 employees.
Source: Eurostat, United States Census Bureau and own calculations.

In over 60 years of integration, Europe has largely developed a single market across the EU and the EEA. However, two important structural features linked to different traditions distinguish Europe from the US. On the one hand, the diversity of languages in the EU provides an important value in terms of diversity and culture, but it may also hamper the expansion of firms, particularly across (linguistic) borders. On the other hand, the organisation of urban areas, and thus of societies, is very different in the two sides of the Atlantic. The US had much more flexibility in the urban development that followed the industrial revolutions of the 19th and 20th centuries while land planning in Europe had to accommodate to cities with centuries of years of history. For instance, open pedestrian shopping streets constitute an idiosyncratic characteristic of most EU cities and towns while Americans shop in malls accessible only by car.

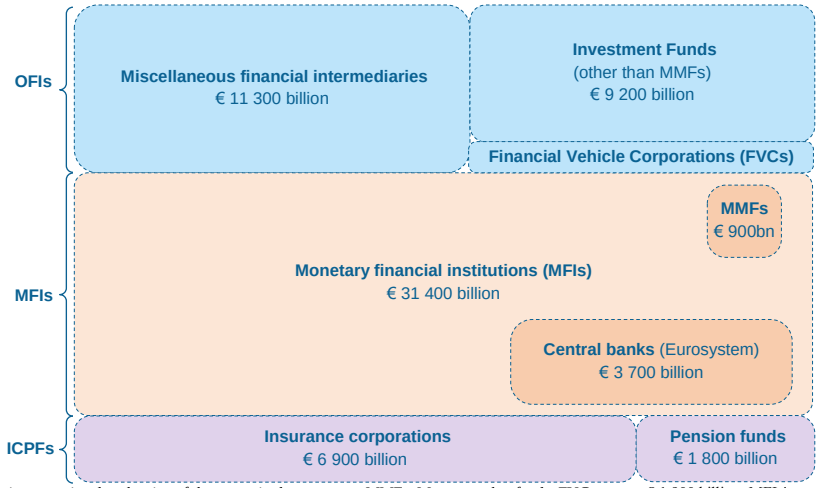
Those structural differences had allowed US companies to grow in size faster than EU peers. These structural differences in the size of firms combined with the historical restrictions in the activities of banks may explain, to a large extent, the slightly larger recourse to the issuance of bonds in the US (9 per cent of NFCs liabilities) than in the EU (5 per cent of NFCs liabilities). However, note that, while a few thousands of companies issue bonds in the market, the bulk of firms (25 million firms in the EU and 5.7 million firms in the US) do not use capital markets to finance their activities.

4. FINANCIAL INTERMEDIATION

Financial institutions intermediate between savers and users of funds (e.g. a bank takes short-term deposits from savers and provides long-term loans to borrowers, in a process termed 'maturity transformation'). In general, financial institutions do not generate net additional financial resources for the economy but just intermediate between other economic agents. Financial institutions also perform other functions, such as creating and managing payment systems, providing market infrastructure (e.g. trading platforms or management of initial public offerings), providing savings facilities for households (e.g. investment funds, insurance or pension funds), participating actively in markets (e.g. through 'prop trading' of bonds and quoted shares), providing liquidity (e.g. factoring) and helping economic actors to manage and insure against risks (e.g. insurance companies and pension funds).

The financial sector can be split in a number of subsectors (Chart 22). An overview of financial intermediation as a whole is given in Section 4.1. A detailed analysis of the three main subsectors is provided in Sections 4.2 to 4.4: monetary financial institutions, insurance corporations and pension funds, and other financial institutions. In addition to the interaction of financial intermediaries with the rest of the economy, there are significant interconnections within the financial sector; the implications for financial integration and stability of these interconnections and of the complexity of the financial sector are briefly discussed in Section 4.5.

Chart 22: **Financial intermediaries and sub-sectors**, total assets, 2014 Q3, euro area



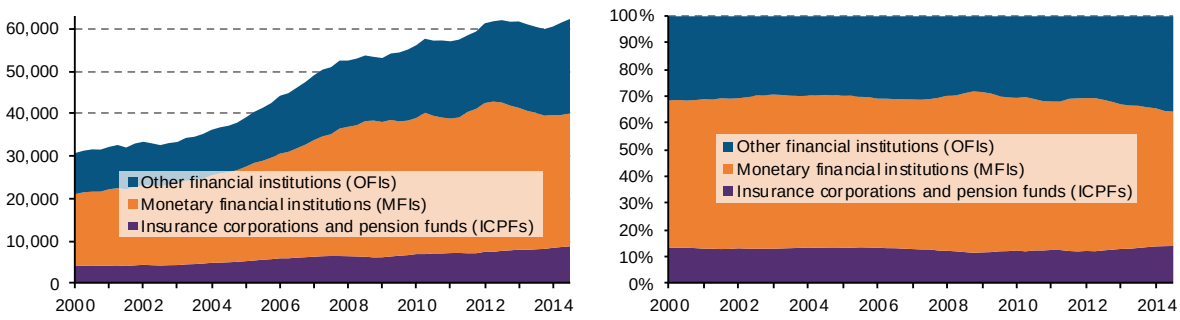
Notes: The surface of each box is proportional to the size of the sector in the euro area. MMFs: Money market funds. FVCs assets: € 1,900 billion; MFIs' government assets: € 2 900 billion; MFIs' government liabilities: € 500 bn. Total size of euro area financial intermediaries: € 62 500 billion; total size of EU financial intermediaries: € 94 400 billion. The chart indicates the values for the euro area; the EU presents a similar distribution among sectors and subsectors.
Source: ECB, Eurostat and own calculations.

4.1. Financial intermediation: an overview

Financial intermediation can be divided into three subsectors: monetary financial institutions (MFIs), insurance corporations and pension funds (ICPFs), and other financial institutions (OFIs). In the third quarter of 2014, MFIs' total assets accounted for about half of the EU financial sector, ICPFs for about 14 per cent and OFIs for about 36 per cent[55]. MFIs can further be split into credit institutions, money market funds and the central bank; OFIs, can be split into investment funds, financial vehicle corporations (FVCs) and miscellaneous financial intermediaries; ICPFs can be split into insurance corporations and pension funds (Chart 22).

The European financial sector doubled in size between the early 2000s and 2012 and then levelled off. This was mainly because of stagnation or even a reduction in the size of MFIs since the onset of the financial crisis; both ICPFs and OFIs kept expanding (Chart 23).

Chart 23: Total assets of **financial intermediaries**, Outstanding amounts, euro area



Notes: Data according to ESA 2010 methodology.
Source: ECB, Eurostat and own calculations.

Country analysis

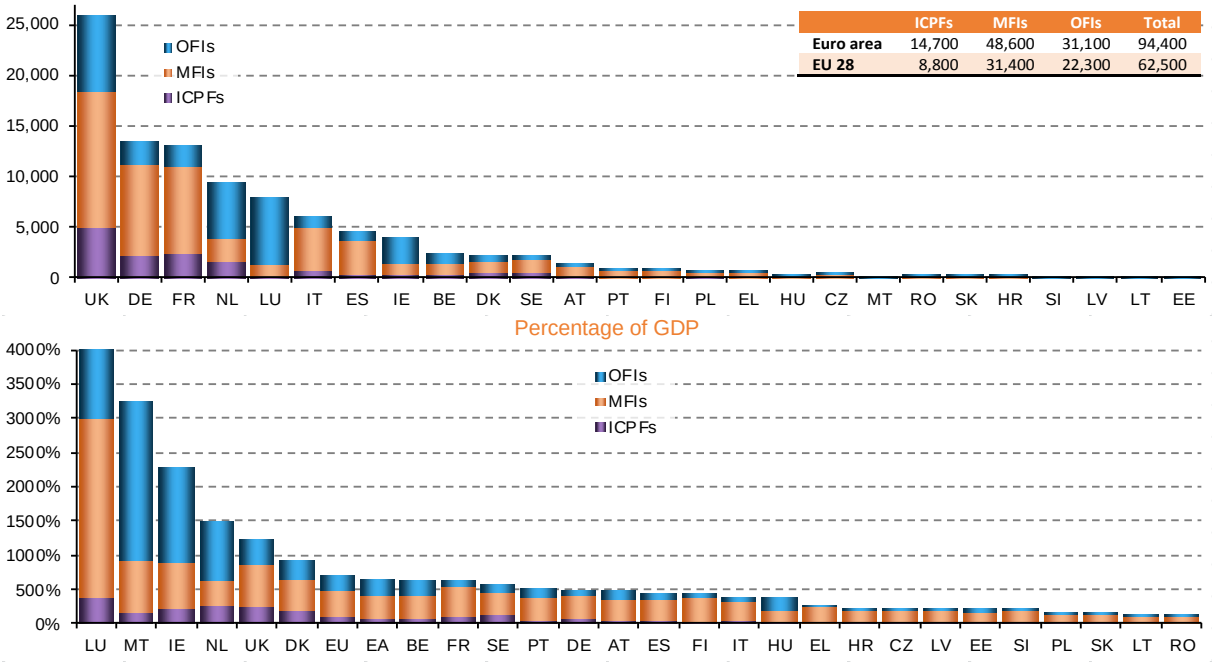
In September 2014, the total balance sheet of EU financial institutions was almost € 100 000 billion, over seven times the annual GDP of the EU. The size of the financial sector varies widely across countries, both in absolute and relative terms.

In absolute terms, the UK has the largest financial sector (27 per cent of the total); in Germany and France, the financial sector is about half the size of that of the UK. The Netherlands' financial sector is larger than that of

[55] See also Section 2 for a comparison with the other sectors of the economy.

Italy or Spain, even though the country is between two and three times smaller. Despite its small size in terms of GDP, Luxembourg's financial sector is the fifth largest[56] (Chart 24, top panel).

Chart 24: **Size and composition of the financial sector**, total assets, 2014 Q3
€ billion



	ICPFs	MFIs	OFIs	Total
Euro area	14,700	48,600	31,100	94,400
EU 28	8,800	31,400	22,300	62,500

Notes: Luxembourg: OFIs = 16 000 per cent of GDP. Data for Cyprus and Bulgaria are not available.
Source: ECB, Office for National Statistics (UK), Eurostat and own calculations.

In relative terms, the countries with the largest financial systems are Luxembourg, Malta and Ireland (at more than 20 times their respective GDP), followed by the Netherlands, the UK and Denmark.[57] On the other hand, in most eastern European countries, the financial sector represents no more than three times GDP.

In terms of composition, in most countries, MFIs account for more than half of the financial sector (Chart 25). Exceptions are Luxembourg, the Netherlands and Malta, where OFIs are the largest sector. In the UK, Germany, Belgium and Hungary, OFIs are also significant. ICPFs tend to be smaller across the board.

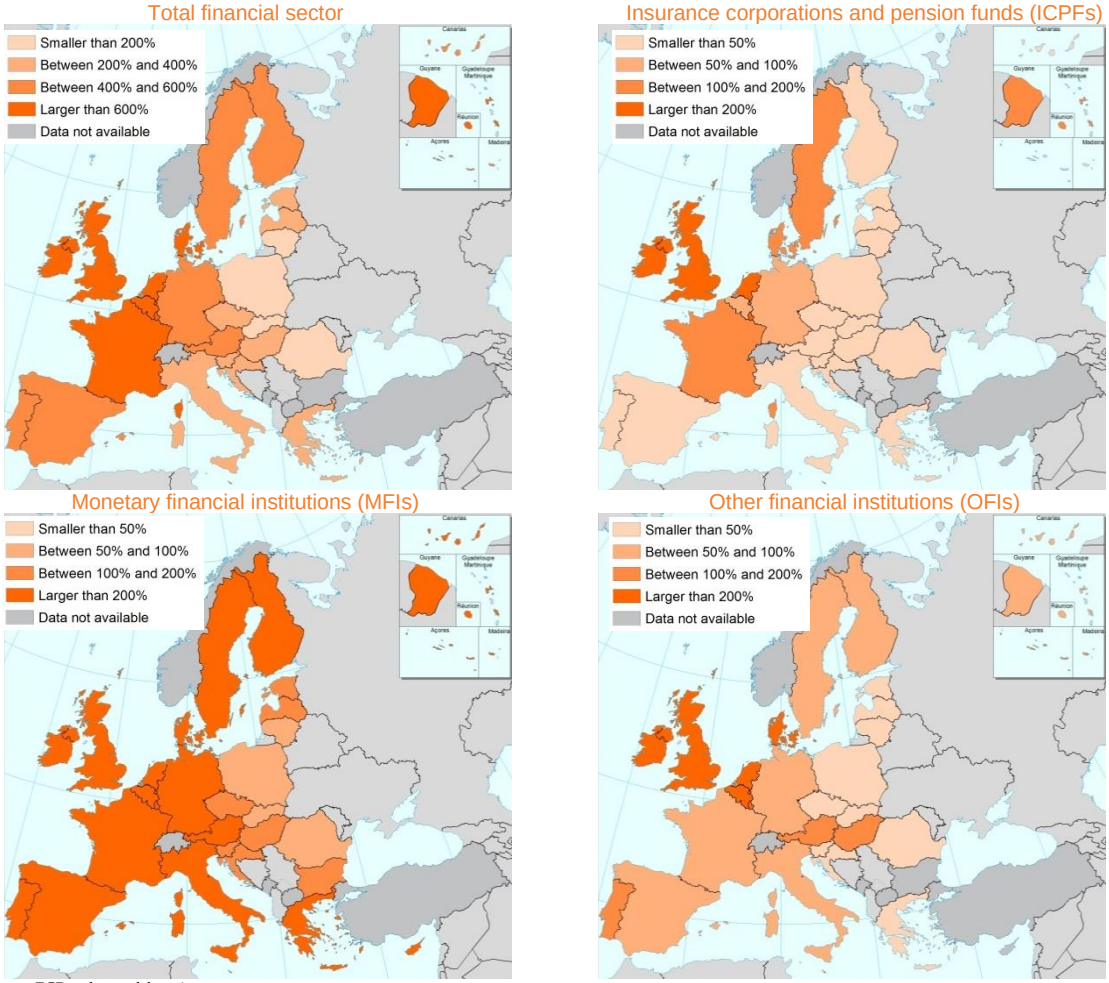
4.2. Credit institutions

Credit institutions (banks), central banks and money market funds are grouped together in the category of 'monetary and financial institutions' (MFIs) because they all issue money. However, they have very different characteristics. This section focuses on banks; money market funds are discussed in more detail in Section 4.4[58].

Most economic financing arises from direct interaction between economic agents. However, it is not always possible to match the needs of savers and investment. So banks provide a service of maturity transformation and intermediation which bridges these needs: traditionally, they take in mostly short-term funds (mainly deposits) from their customers and transform them into long-term lending.[59] The use of short-term liabilities to fund long-term assets, while being critical for the functioning of the economy, leaves banks with an intrinsic weakness. However, this is mitigated by imposing a framework of authorisation, prudential requirements and close supervision. The financial crisis showed that the previous framework had not provided enough safeguards to ensure the stability of the system. Consequently, a series of regulatory reforms were adopted to increase the resilience and stability of the sector.[60]

[56] The GDP of Luxembourg represents about 0.3 per cent of the GDP of the EU.
[57] Data are not available for Cyprus, but it should probably be included among the countries with the largest financial systems, in relative terms.
[58] This chapter does not go into the role of the central bank. For a discussion of the ECB's role in supporting the financial system during the financial crisis, see last year's review (European Commission, 2014a), Section 2.2.2.
[59] Regulation (EU) No 575/2013 defines a credit institution as 'an undertaking the business of which is to take deposits or other repayable funds from the public and to grant credits for its own account' (Article 4(1)(1).
[60] For further details of the regulatory reform, see Section 2.3 in last year's review.

Chart 25: **Size of the financial sector and its components**, percentage of GDP, 2014 Q3



Source: ECB and own elaboration.

Data show that deposits are an important source of financing for banks; however, banks also obtain funds from other sources, e.g. by issuing bonds, quoted shares, other equity, derivatives and other products (Chart 26). Similarly, besides bank loans, credit institutions provide financing to the rest of the economy through a variety of products (e.g. banks are very active in capital markets and their holdings of bonds and equity account for between 20 and 80 per cent of the different market segments).

Financing of the economy vs positions within the financial sector

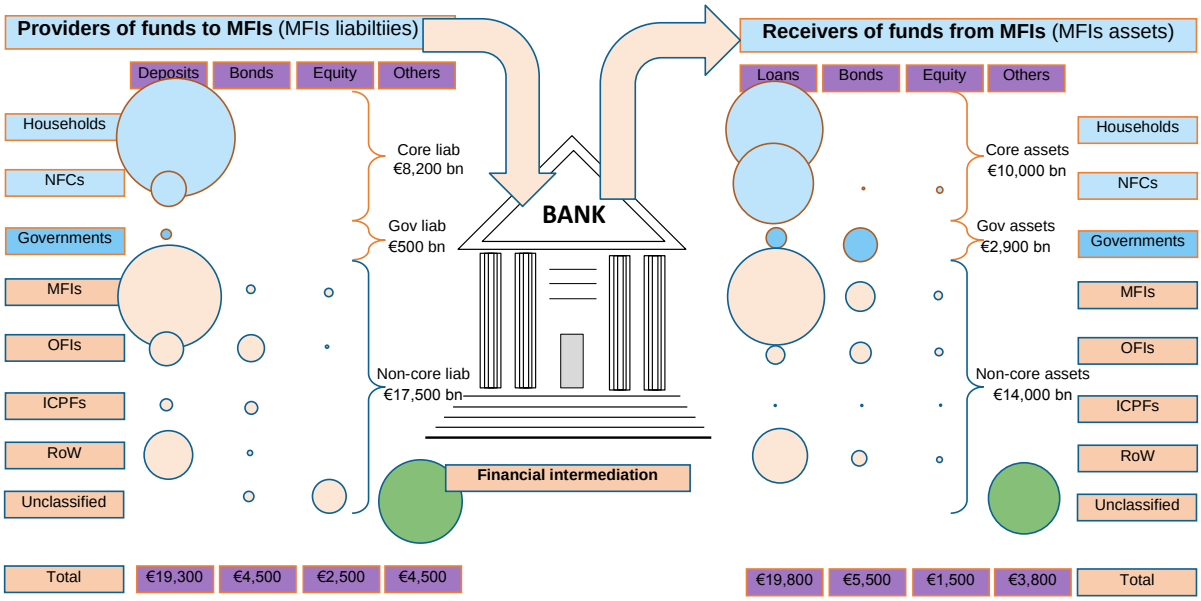
Through intermediation and maturity transformation, banks provide products that meet the specific needs of each customer (in terms of size, maturity and other features) by means of bilateral negotiations that complement the funds that stakeholders have already obtained directly through economic interactions.[61] However, bank funding of the economy also involves significant movements of funds within the financial sector (Chart 26).

Deposits from other banks (interbank lending received) and other financing received by banks from financial institutions have radically different features from deposits received from households and non-financial corporations (NFCs). The former are much less stable than the latter. Similarly, loans granted to households and NFCs typically have long maturities (e.g. up to 30 years or longer for mortgages), unlike loans granted to financial institutions (e.g. interbank lending provided), which typically have a maturity of a few days only. In order to mitigate the vulnerabilities implicit in inter-financial positions and the potential adverse effects on financial stability, the new prudential legislation introduces new requirements for the short-term and medium-

[61] See Sections 5 and 6 for further details.

term liquidity of bank assets (the so-called liquidity coverage ratio, or LCR, and the net stable funding ratio, or NSFR).[62]

Chart 26: **Financial intermediation by MFIs**, Outstanding amounts, euro area, 2014 Q2, € billion



Note: The size of the bubbles is proportional to the amounts.
Source: Own elaboration based on ECB data and on own calculations.

Given these different features of banks' assets and liabilities, depending on the counterparty (the non-financial or the financial sectors), bank balance sheets can be split into core and non-core activities. Core activities would cover the banks' positions vis-à-vis the non-financial sectors (households and non-financial corporations); non-core activities would cover their positions vis-à-vis the financial sector (MFIs, ICPFs and OFIs). The positions vis-à-vis governments, given its mixed features,[63] could also be distinguished.

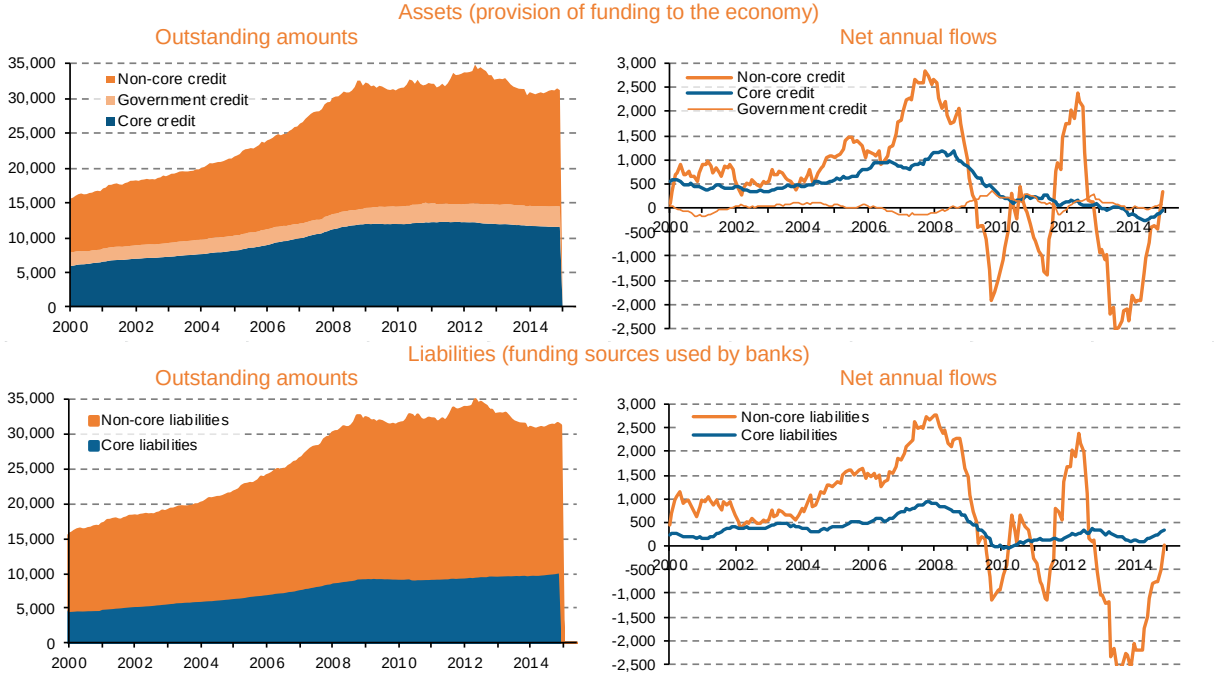
Data show that interaction with the economy (i.e. core activities) accounts for about one third of bank balance sheets while inter-financial positions (non-core activities) account for two thirds (Chart 27, left-hand panels). The data also show how these broad categories are different: during the crisis, the volume of core activities showed very little change, while non-core activities were strikingly volatile.

This volatility was linked to the loss of confidence in the markets and, particularly, in wholesale funding markets as reflected in the evolution of the Euribor-OIS spread (see Chart 8 in Chapter 1). Substantial public intervention was needed both from governments, in the form of guarantees of bank liabilities,[64] and from the central bank, in the form of conventional and unconventional monetary policy measures,[65] to stabilise the financial markets. On these grounds, the volatility observed in non-core activities seems to have been excessive or, at least, to indicate excessive risk-taking on the part of banks.

Although at lower rates than during the boom period, the amounts deposited at banks by households and NFCs increased throughout virtually the whole crisis period (i.e. net annual flows of core liabilities remained positive; see Chart 27, bottom-right panel). On the other hand, new credit provided by banks to the economy (core assets) was very low and even turned negative (Chart 27, top-right panel). It seems therefore, that banks have used the fresh funds obtained from the economy for purposes other than intermediating and providing credit.[66] While (credit) demand factors may have played a role, the dynamics of non-core activities seem to indicate that the fall in the provision of new credit may have also been influenced by the turmoil in inter-financial positions.

[62] For further details about the LCR see Basel Committee on Banking Supervision (2013); for further details about the NSFR see Basel Committee on Banking Supervision (2014a).
[63] Governments bonds are often used by banks as collateral in inter-financial operations such as repos and others.
[64] For further details, see European Commission, 2014d.
[65] For further details, see the Annex to Chapter 1 and last years' report (European Commission, 2014a), Chapter 2.
[66] See also last year's review (European Commission, 2014a), page 46.

Chart 27: **Core vs non-core activities of banks**, euro area MFIs, € billion



Notes: Core assets: credit provided by banks to households and NFCs through loans or the purchase of securities. Government assets: loans to governments and holdings of sovereign bonds. Non-core assets are calculated as the residual factor with respect to total assets. M3 is used as a proxy for core liabilities. Non-core liabilities are calculated as the difference between total assets and M3. Government liabilities are negligible and, therefore, are not shown. Annual flows are computed as the sum of net flows for 12 consecutive months through a rolling window. 'Net' refers to new transactions minus redemptions.
Source: ECB Statistical Data Warehouse and own calculations.

The volatile profile of non-core activities is partly due to the interconnectedness of banks (e.g. see the size of interbank deposits and loans in Chart 26). This implies that tensions in specific institutions could quickly spread to other banks. Similarly, good news and confidence can also quickly spread. On top of that, the banks' interconnections with other financial institutions may have further contributed to the volatility of non-core assets.[67]

Many analysts have pointed out that the origins of the crisis are to be found in excessive risk-taking by banks and the subsequent erosion of confidence in wholesale markets.[68] However, risk-taking can be excessive under many circumstances and does not require the kind of contagion on the liability side which has been observed during recent years. Risk-taking on the asset side is much better understood and easier to monitor via markets, whereas monitoring contagion and interconnectedness requires granular data which are not publicly available.[69]

These dynamics are, to some extent, reflected in the data, particularly the data on net annual flows in non-core activities (Chart 27, right-hand panels). These increased from around € 500 billion a year in the mid-2000s to almost € 3 000 billion a year in 2007-2008. As indicated by the ESRB (2014), excessive credit growth has been identified as a key driver of asset price bubbles and subsequent financial crises, as it is usually founded on excessive risk-taking. Indeed, excessive growth in non-core activities eventually led to their collapse. Inter-financial lenders not only stopped providing increasing amounts of financial resources but they also called back the funding they had previously provided. In 2010, euro area banks asked for € 2 000 billion more in redemptions from other financial institutions than they rolled over or underwrote in new lending; in 2013, net redemptions increased even further (see Chart 27, top-right panel). In this context, so-called shadow banking has

[67] There is extensive literature about the advantages and risks of the wholesale activities of banks and the advantages and disadvantages of narrow banking. See, for instance, Phillips and Roselli (2009) or Kay (2010). The debate is also at the root of proposals for structural reform of the banking system such as those of the Vickers Commission in the UK, the Volker rule in the US and the Liikanen report on the EU and the proposal presented by the European Commission (2014e).
[68] See, for instance, Cœuré (2013), Krugman (2013), Gorton and Metrick (2012), Kay (2010), Varoufakis (2011), Abbassi and Schnabel (2009) or Cochrane (2014).
[69] Improving the data on network connections among financial institutions is the aim of the initiative on Data Gaps promoted by the FSB since 2009. See FSB and IMF (2009).

also played an important role in financial stability dynamics, both at EU and at international level, as has been widely acknowledged.[70]

While the bulk of loans (and core assets in general) provided to the non-financial sectors of the economy were financed by deposits (or core liabilities in general), some credit institutions made recourse to wholesale funding to finance some of their retail activities. Confronted with a withdrawal of funding in those markets, these credit institutions had to fill the gap with retail deposits and central bank funding. These dynamics explain, to a large extent, three phenomena observed throughout the crisis. Firstly, retail loans contracted despite a continuous increase in deposits (see core assets and core liabilities in Chart 27); secondly, extensive recourse to central bank funding did not result in more lending (see Charts A6 and A7 in the Annex to Chapter 1); and thirdly, a deposits or liabilities 'war' was triggered in several Member States which resulted in spill-overs in terms of very different lending rates across countries.

A series of measures have helped to stabilise the situation and to foster confidence among financial institutions: the cleaning up of banks' balance sheets, including increasing improvements in capital positions (see, for instance, Section 5.2 below); the resilience checks and transparency exercises coordinated by the European Banking Authority[71] including the comprehensive assessment made by the European Central Bank (ECB) before it assumed the role of supervision;[72] regulatory reform including the revised capital requirements directive and regulation,[73] the bank recovery and resolution directive[74] and the creation of a banking union with a Single Supervisory Mechanism (SSM) and the Single Resolution Board (SRB);[75] the financial support provided by the ECB;[76] and the positive macroeconomic developments;[77].[78] This is reflected in flows in non-core activities, which recovered to neutral or even positive net annual values by late 2014. However, given the volatility of non-core flows, it is very difficult to predict how the situation will evolve in the future.

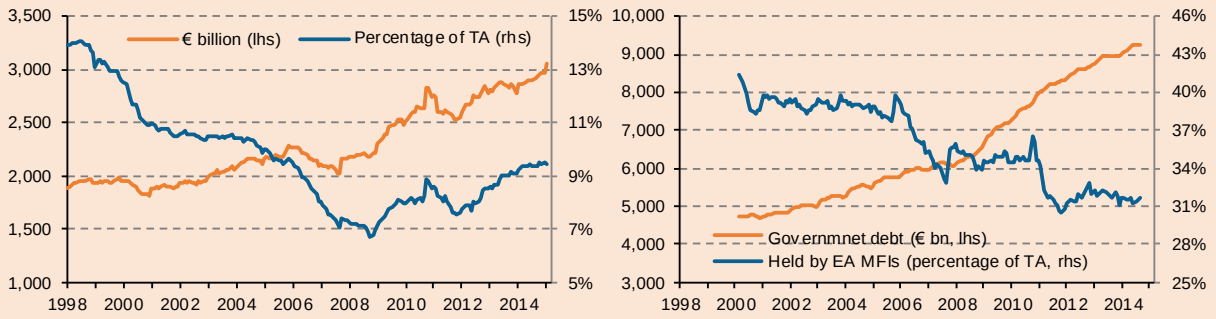
Box C. **Interlinkages between banks and governments**

One recurrent issue during the recent financial crisis was the interconnection between the sovereign and banks. Governments depend on banks to obtain funding and banks depend on their governments for support in the event of a liquidity crunch. In some countries, the ties between banks and their sovereign became very significant. The financial turmoil exacerbated these interconnections and generated a 'doom loop', where countries with deteriorating fiscal positions were unable to support a weakening banking system.[79] In countries like Greece, Ireland, Portugal, Spain and Cyprus, the problems in the banking sector became a major burden on public finances and contributed to an eventual request for financial support from their European partners.[80]

Aggregate figures show how the general government debt of euro area Member States increased throughout the crisis (Chart B6, right-hand panel) and how the exposure of euro area MFIs to euro area governments also increased (Chart B6, left-hand panel). However, the picture is more nuanced in relative terms. Even if the relative size of government exposure increased between 2008 and 2014, the latest available figure (with exposure to the sovereigns standing at 9.5 per cent of total assets) is significantly below the level of the late 90s (almost 15 per cent). On the other hand, the increase in government debt outpaced the increase in government bond debt held by euro area banks. As a result, government dependence on banks for finding financing fell from over 40 per cent in 2000 to about 31 per cent in the latest years. Despite this fall, governments still rely heavily on banks to finance their debt.

[70] For further discussion of shadow banking, see Section 4.5.
[71] See, for instance, EBA (2014b).
[72] See ECB (2014a).
[73] Directive 2013/36/EU and Regulation (EU) No 575/2013.
[74] Directive 2014/59/EU.
[75] Regulation (EU) No 1024/2013 and Regulation (EU) No 806/2014.
[76] See Charts A6 and A7 in the Annex to Chapter 1.
[77] See Chapter 1.
[78] Other initiatives are still being negotiated; e.g. in the field of shadow banking and in structural reform. See, for instance, the Commission (2012a) green paper *Shadow banking*, European Commission (2014e) and Chapters 2 and 3 of last year's review (European Commission, 2014a).
Moreover, most of the initiatives agreed so far are only the first step in the regulatory process and further require a number of so-called 'level 2' legislative acts.
[79] For a detailed analysis of the interconnections between the sovereign and banking systems in a number of EU countries, see Darvas et al. (2015).
[80] For further details about the financial assistance provided to countries under financial stress, see last year's review (European Commission, 2014a), Section 2.2.

Chart B6: **Banks – government dependence**, euro area



Source: ECB Statistical Data Warehouse and own calculations.

The combination of important difficulties to cope with these interlinks in some specific countries with a much more benign situation at the Euro area as a whole was one of the main rationales for the creation of the Banking Union in Europe.

Country analysis[81]

While the financial sector as a whole is twice as big in the UK as it is in France or Germany (see Chart 24), the banking system is similar in size in all three countries (Chart 28, top panel), with the banking systems of Italy, Spain and the Netherlands the next largest. Other EU countries have much smaller banking systems (in absolute terms).

In relative terms, there is a clear divide between the banking systems in western and eastern European countries. Banks in western European countries typically have balance sheets equivalent to between 200 and 400 per cent of the country's GDP, while banks in easter European countries are at around 100 per cent GDP or less. There are two main reasons for this. First, most of eastern European countries had to build their banking systems from scratch after the transition from communist regimes. Therefore, they are still catching up in the process of developing a modern banking system. Second, many banks in eastern countries are subsidiaries or branches of banks in western countries. Subsidiaries and branches focus mainly on retail activities, while investment and wholesale activities are concentrated in the parent companies (situated in western countries), which perform them for the group as a whole.[82] This cross-border ownership of banks is an important source of integration of financial markets within the European Union, but also a source of interdependence among countries.

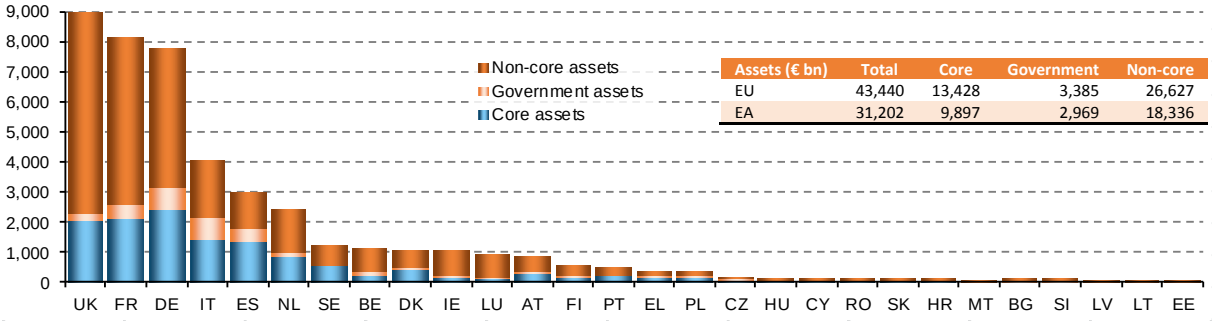
Core assets are typically equivalent to around 100 per cent of GDP (although they are smaller in Eastern countries). Particular features in a few countries explain why their core assets are a much higher proportion of GDP. Firstly, Cyprus, Luxembourg and Malta are countries with very large banking systems. It has been argued that a group of companies can implement a 'tax shield' or 'tax optimisation' strategy through intra-company lending to subsidiaries in countries with low taxation.[83] A similar goal can be achieved through bank intermediation by simultaneously depositing funds and applying for a loan in a financial institution. Data seem to confirm this interpretation: loans provided by banks in these three countries go mainly to non-financial corporations, while in most other countries the majority of loans go to households (i.e. to finance mortgages). On top of that, a much larger proportion of these loans are cross-border than in most other countries.

Secondly, in Denmark, Sweden and, to a lesser extent, in the Netherlands, *perpetual mortgages* are very popular. In such loans, the monthly instalments include only the payment of interest; the reimbursement of capital is not required. These *interest-only mortgages* partly explain the relatively large size of the banking systems (in terms of total assets) in these three countries.

Finally, the relatively large size of core activities in Portugal and Spain might have been driven by the housing bubble or, in general, excessive credit growth leading to increasing leverage for households and firms. On the other hand, this also points to the issue of debt overhang, discussed in Chapter 3.

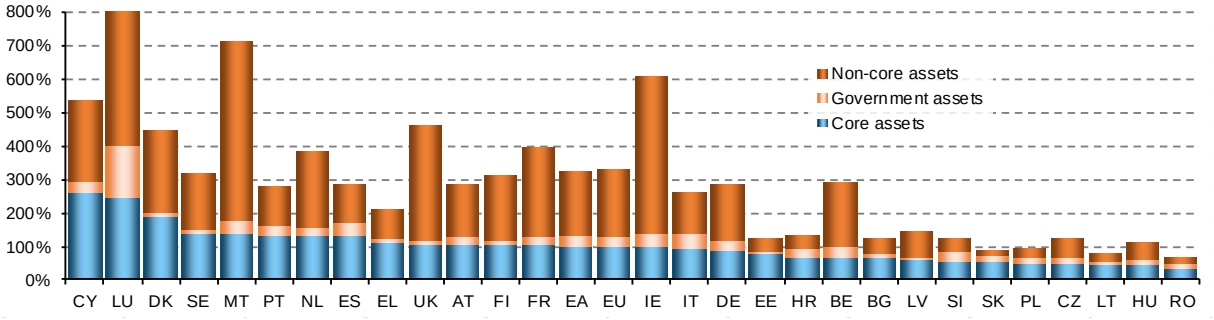
[81] For details on the evolution of core and non-core assets for each one of the 28 Member States, see the Annex to Chapter 1.
[82] For further details about the cross-border ownership and the size of banks, see last year's review (European Commission, 2014a), Section 1.4.5.
[83] See, for instance, Bershidsky (2015) and House of Commons (2015). See also the discussion at the end of Section 3.3.

Chart 28: **Balance sheet of MFIs: size and composition**, December 2014
€ billion



Assets (€ bn)	Total	Core	Government	Non-core
EU	43,440	13,428	3,385	26,627
EA	31,202	9,897	2,969	18,336

Percentage of GDP



Notes: Core assets: credit provided by banks to households and NFCs through loans or the purchase of securities. Government assets: loans to governments and holdings of sovereign bonds. Non-core assets are calculated as the residual factor with respect to total assets. For the UK and Denmark, data on holdings of equity and bonds issued by NFCs were not available. Luxembourg: non-core assets = 1 900 per cent of GDP.
Source: ECB and own calculations.

The great variation in the size of the banking system across countries seems to be driven, to a large extent, by the size of non-core assets. The foundations of the recent financial crisis are closely linked to non-core activities (see discussion above). Indeed, countries whose banking systems had larger non-core assets as a share of GDP were hit harder by the financial crisis. Ireland's request for support from its European partners was linked mainly to the size of its banking system. The UK had the largest public bailouts and the majority of the banking system ended up nationalised. Similarly, governments in Germany, Netherlands, Luxembourg and Belgium had to provide massive support to prevent their banking systems from collapsing.

Banks in most of these countries already reduced the size of their non-core activities throughout the financial crisis in line with movements in the euro area aggregate, particularly in 2013 and 2014.

Box D. **Size of financial institutions: comparison against NFCs**

Background

The interconnectedness and complexity of financial institutions have been recurring topics since the start of the financial crisis because of their implications for financial stability. Firstly, the loose term of *too big to fail* was replaced by a list of *systemically important financial institutions (SIFIs)* by the international Financial Stability Board (FSB), capturing not only the size but also the complexity and interconnection of such companies (see Chapter 1, Section 2.3)[84].

Secondly, significant amounts of taxpayers' money had to be mobilised to bail out some of these SIFIs as a consequence of the substantial losses they incurred during the crisis and because it was deemed impossible to resolve them in an orderly manner under the prevailing framework. European funds had to be pooled together to help countries whose domestic capacity appeared to be insufficient to confront the financial and debt crisis. In this context, a series of temporary instruments were agreed, leading ultimately to the creation of a permanent European stability mechanism (ESM).[85]

Thirdly, legislators embarked on reform to improve bank resolvability with the adoption of the bank recovery and resolution directive.[86] Similarly, a banking union was created to break the connection between banks and the countries from which the

[84] For further information, see, for instance, FSB (2014b) or Masciantonio (2013).
[85] See the *Treaty establishing the European Stability Mechanism*, T/ESM 2012-LT/en 1.
[86] See EP and Council (2014a).

parent companies of banking groups operate. European-wide supervision, resolution, deposit guarantees, rulebooks and backstops are more in line with the cross-border business model and size of banks.[87]

Fourthly, the prospect of bailout created moral hazard, and many SIFIs took excessive risks. New prudential requirements addressed this flaw by imposing additional capital requirements and new minimum requirements for liquidity and leverage.[88] At the same time, the revised requirements encouraged the use of a single rulebook, as national legislation had evolved differently and sometimes became inconsistent between Member States.

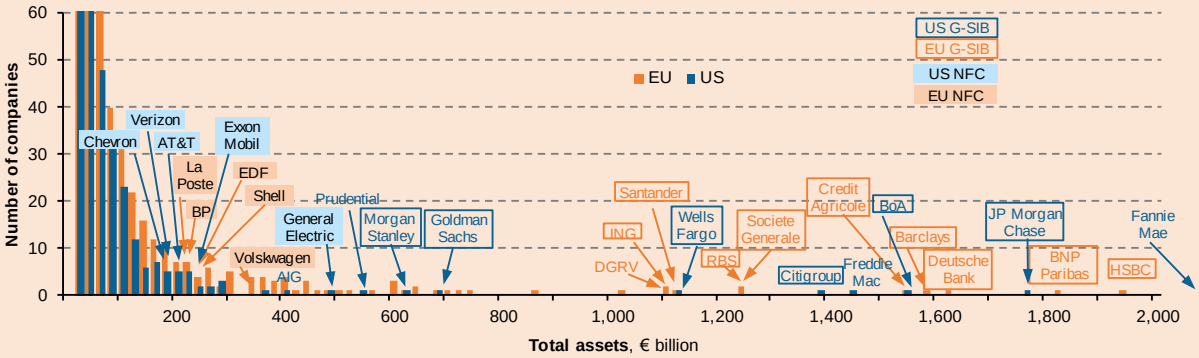
A similar approach to the EU's was followed in the US (mainly enshrined in the Dodd-Frank act)[89] and globally (coordinated through the Financial Stability Board)[90].

Large companies create value and employment but also concentrate power

The size and complexity of financial institutions can be better grasped by comparing them with large non-financial companies. In most Member States, a few large corporations can be considered national flagship companies. In many cases, they form an intrinsic part of their national culture and have significantly contributed to the progress and development of the country. Some examples are Volskwagen, Daimler, BMW, E.ON, Deutsche Telekom, Siemens, RWE, BASF, Bosch, Bayer and Audi in Germany; EDF, Total, GDF Suez, Sanofi, Orange, Renault and Peugeot in France; Shell, BP, Vodafone, GlaxoSmithKline (GSK), Network Rail, National Grid, Tesco and BT in the UK; Enel, Eni, Telecom Italia, Ferrovie, ANAS, Atlantia, Finmeccanica and Fiat in Italy. Similar lists can be made for many other countries. Car producers, telecoms, retail distributors, oil companies, chemical companies, pharmaceuticals, electrical companies, etc. have contributed to the increasing welfare observed throughout the twentieth century and as a source of employment.

At the same time, concerns have been raised about the concentration of power in a few actors which are mainly led by profit maximisation goals and less concerned about potential negative externalities. Competition authorities, at national and European levels, are in charge of preventing large players from abusing a dominant position and potential mergers from significantly impeding competition in the markets. Regulatory measures are there to limit firms' potential negative social and environmental externalities. Moreover, stakeholder pressure has led many of those firms to develop corporate social responsibility.

Chart B7: **Number of companies by total assets**, € billion



Notes: Companies are grouped by segments of € 20 billion of total assets. The top 10 financial companies from the EU and the US are marked with orange and blue text. Banks classified as globally systemically important are framed. The top 5 non-financial companies in the EU and the US are marked with orange and blue shading. All EU companies larger than La Poste (€ 215 billion) are financial companies (except for the ones that are spelled out). All US companies larger than Chevron (€ 185 billion) are financial companies (except for the ones that are spelled out).
Source: Orbis, FSB (2014b) and own calculations.

Banks and financial institutions within large corporations

The strong market position and market power of these big companies is widely acknowledged. Having said that, in terms of total assets, the size of financial companies dwarfs any of those large corporations. With € 320 billion in total assets, Volkswagen is the largest industrial (and non-financial in general) company in Europe. But one would need to merge 5 Volkswagen to match the size of one of the largest banks (e.g. HSBC, BNP Paribas, Deutsche Bank, Barclays or Credit Agricole). Similarly, one would need 10 Microsoft, 10 Apple or between 50 and 100 Siemens, Carrefour, Fiat, Inditex, British Airlines, Air France, etc. (see Chart B7). Any failure of these large financial institutions could have a huge impact, due to their seemingly disproportionate size in terms of total assets.[91] This context explains the need for public authorities to

[87] The banking union covers all euro area countries and any other EU Member State that wish to join. See European Commission (2012b).
[88] See EP and Council (2013a and 2013b).
[89] United States Congress (2010).
[90] See, for instance, FSB (2014c).
[91] In addition to size, these large financial institutions are systemically important because of their interconnections and the potential for disruption of basic financial services (e.g. payment systems). Furthermore, the overall potential exposure of banks is even larger than what is suggested by their total assets because contingent liabilities and some derivatives are reported off-balance sheet.

intervene in the aftermath of the crisis by bailing out some of the systemically important financial institutions, by introducing sovereign backstops and by embarking on a comprehensive regulatory reform agenda to better frame risk-taking in the banking sector, as discussed in the introduction to this box.

The need for such large financial institutions

In light of Chart B7, one might ask what the right size of financial corporations for a robust economic development of the EU would be. The answer could revolve around the value added by these large financial institutions, in contributing to growth, weighed against the risks that they may entail in terms of financial stability. On the one hand, large banks can have economies of scale and can benefit from economies of scope such as diversification. One can argue that banks need to be large because they are exposed to all the other sectors in the economy and any single exposure should not compromise the survival of the bank.[92]

However, large and complex banks are harder to monitor, supervise and manage. Moreover, they can become too big to fail and lead to excessive risk-taking. The financial crisis revealed the potential implications when some of these risks materialise and result in significant loses in terms of economic and social welfare.[93] With average unemployment rates above 10 per cent in the EU and exceeding 20 per cent in some countries (see Chapter 1), the final size of such losses is still difficult to fully quantify. Having said that, the various measures taken throughout the crisis aim to address the shortcoming of the previous framework. More time is still needed to assess whether such measures can be deemed sufficient to properly mitigate the risk to financial stability that such large financial corporations could cause.

Besides the size of individual banks, the financial sector's efficiency and overall contribution to the society improves as it increases in size, but only up to a point where it may become counterproductive.[94]

In addition, there are alternatives to the provision of funding by banks. For example, the distribution of risk and the collection of funding in large amounts was precisely the main motivation for the creation and development of public listed companies starting in the industrial revolution in the nineteenth century. In fact, large companies use a variety of funding sources, with bank loans being relatively small (e.g. Exxon Mobil finances over 50 per cent of its activities from equity). Therefore, bank lending is mainly geared to companies smaller than those large multinational firms and, consequently, such large financial institutions do not seem to be necessary.

On top of that, Section 4.2 shows that a significant share of the balance sheet of banks (and financial institutions) do not involve loans to the real economy but inter-financial positions. If this is already the case for the financial sector as a whole, it is even more so for the large financial institutions.[95,96]

4.3. Insurance corporations and pension funds (ICPFs)

Overview

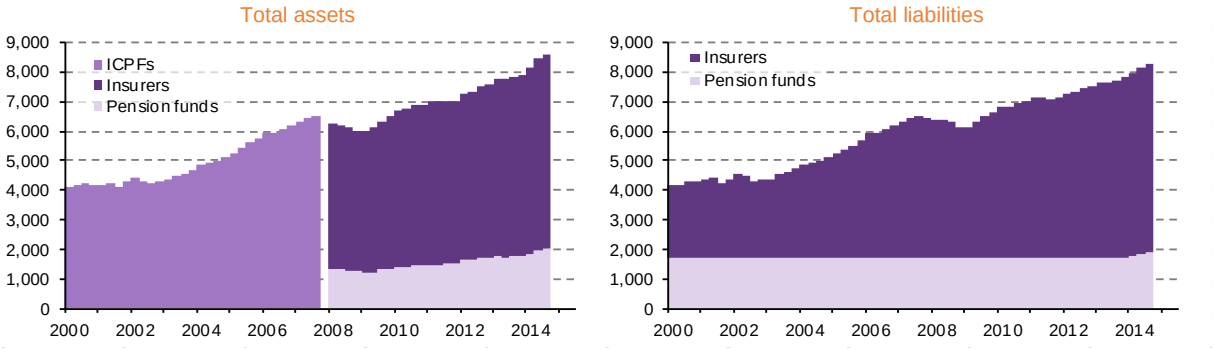
The premium paid to underwrite insurance provides the customer with the right to a large payment in the future if the risk specified in the contract materialises. Similarly, pension funds are built up from 'small' contributions throughout the working life of an employee who receives 'large' payments on reaching retirement age. Although they address different issues, ICPFs share several characteristics, so they are usually computed together within a single sector. Unlike those of other financial intermediaries ICPFs' liabilities have very long maturities; e.g. employees can join a pension fund early in their careers while redemption becomes only due when they reach the age of retirement. This feature puts ICPFs in a comfortable position to provide long-term funding to other sectors of the economy.

Given that business model, ICPFs invest most of their funds in long-term-assets, which are usually held to maturity. However, they also need the flexibility to make large payments when specific events materialise (e.g. insurance against a natural catastrophe or retirement of a contributor to a pension fund); in other words, ICPFs' assets need to be very liquid. So ICPFs invest the bulk of their assets in bonds (mainly financial bonds and

[92] Limiting the size of large exposures is among the new prudential requirements promoted by the Basel Committee on Banking Supervision; see, for instance, BCBS (2014b).
[93] For further discussion of the losses stemming from the financial crisis, see, for instance Wolf (2014).
[94] See, for instance, Pagano (2014) and Wolf (2014).
[95] Indeed, apart from the small financial centres (e.g. Luxembourg, Cyprus and Malta), the countries with banks with relatively large non-core assets are those where SIFIs are headquartered (e.g. France, the UK or Netherlands). See Chart 28. On top of that, large financial institutions tend to have larger off-balance sheet exposures.
[96] For further discussion about competition in the financial sector, see Chapter 5.

government bonds) and investment fund shares (see Chart 11). Therefore, ICPFs are generally a source of long-term financing for financial institutions and for governments.

Chart 29: **Balance sheet of ICPFs**, euro area, € billion



Notes: The breakdown of assets between insurers and pensions funds is only available from 2008 onwards.
Source: ECB Statistical Data Warehouse and own elaboration.

The low yield environment[97] is putting some strain on ICPFs by eroding their margins. The business model of these investors relies on the fact that long-term investments usually provide higher returns than short-term investments. In order to support the financial system, central banks reduced the policy rate to virtually zero. After more than six years of financial crisis, the extremely low rates have been translated throughout the whole term structure of interest rates (see Chart A3 in Chapter 1).

In terms of size, at € 8 800 billion, the balance sheet of euro area ICPFs represented about 90 per cent of GDP in the third quarter of 2014. Insurance corporations (€ 6 900 billion of total assets) are over three times larger than pension funds (€ 1 800 billion). Since 2002, the ICPFs sector has continuously expanded in size, except for a short correction in 2008 (Chart 29).

The expansion of the ICPFs balance sheet seems to be mainly driven by insurers; the balance sheet of pension funds remained stable throughout 2000-2012, particularly on the liabilities side, but started to expand thereafter. The dynamics in pension funds were driven by two main factors. Firstly, in most euro area countries, retirement is financed through pension schemes provided by the public sector, which are usually based on a pay-as-you-go (PAYG) system. The pensions of those in retirement are paid from the contributions of the current workforce, so PAYG pension schemes do not set aside funds to be invested and are not included in the statistics on ICPFs. These systems may have the disadvantage of not providing a pool of funding that can be used to finance long-term projects, but they have the advantage of being protected from the risk of losing their value, as they might have done during the most acute phases of the financial crisis. The second driving factor is demographic: the greater longevity of the population is triggering a re-thinking of retirement systems and how to ensure that they can be financed in a sustainable manner in the future. The increased awareness of this issue may explain the sustained increase in pension funds observed since early 2012. The longevity risk and its implications are further discussed on Chapter 4.

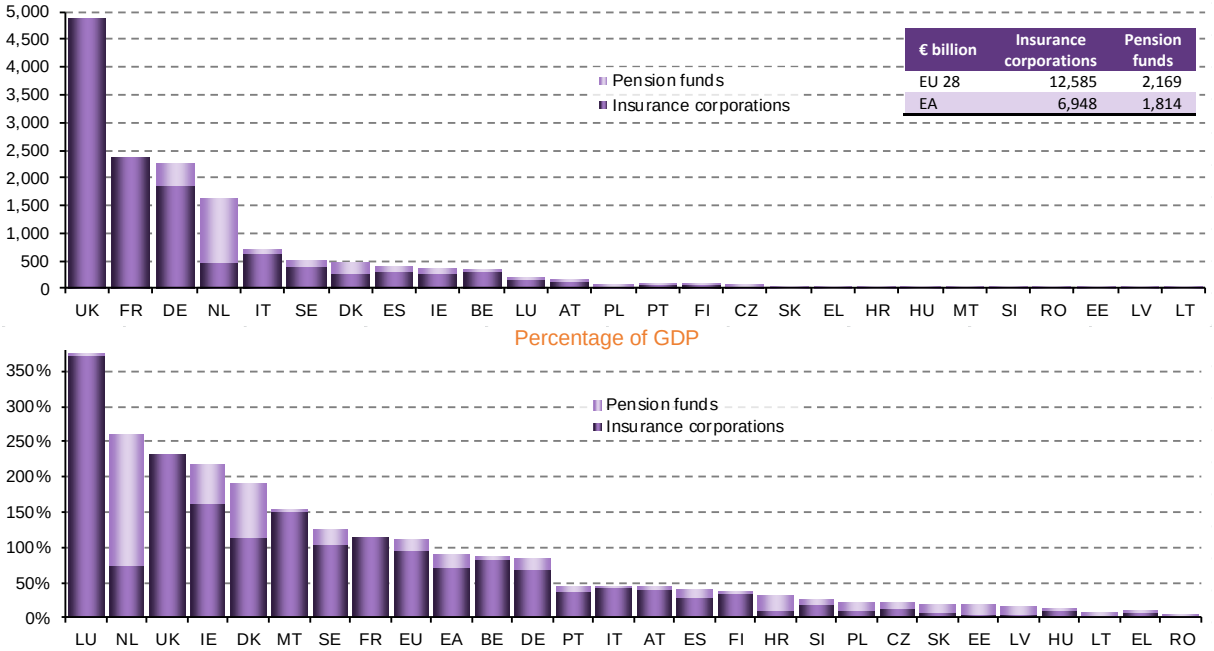
Country analysis

With almost € 5 000 billion in total assets in the their quarter of 2014, the UK has the largest ICPF sector in the EU. It represents 230 per cent of the UK's GDP and 40 per cent of the EU's GDP. France and Germany and the Netherlands are next in importance (Chart 30). In all other countries, the ICPF balance sheet is significantly smaller. Insurers represent the bulk of the ICPF sector; however, pension funds are relatively significant in a few countries (the Netherlands and, to a lesser extent, also in Denmark, Ireland, Sweden or Germany[98]).

As with credit institutions, there is a divide between western and eastern European countries. ICPFs have a much larger size, relative to the respective GDP, in the former than in the latter. This suggest a process where easter European countries are catching up not only in banking but also in terms of the wider financial system.

[97] About the low interest rate environment, see Section 1 and Chapter 1.
[98] France and the UK might be added to this group, however the breakdown between insurance corporations and pension funds is not available.

Chart 30: **Size of insurance corporations and pension funds**, total assets, 2014 Q3
€ billion



€ billion	Insurance corporations	Pension funds
EU 28	12,585	2,169
EA	6,948	1,814

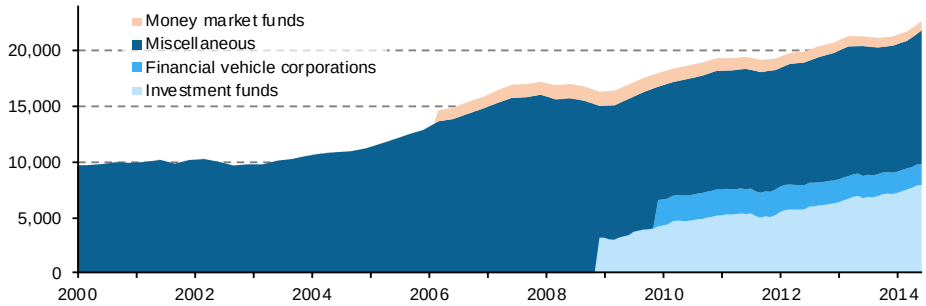
Percentage of GDP

Notes: In the UK and France, *Insurance corporations* include pension funds. Data for Cyprus and Bulgaria are not available.
Source: ECB, Eurostat and own calculations.

4.4. Other financial intermediaries (OFIs)

A variety of financial institutions other than MFIs and ICPFs are grouped together in 'other financial intermediaries' (OFIs). Some of these are investment funds and vehicles, which often provide general services for financial institutions, such as long-term funding, distribution of risk, clearing services and market infrastructure. Many OFIs are captive finance companies: subsidiaries of other companies, whose business is usually geared to providing finance to customers buying the parent company's product. Car manufacturers and electrical firms typically have captive finance companies.

Chart 31: **Balance sheet of 'other financial institutions'**, total assets, euro area, € billion



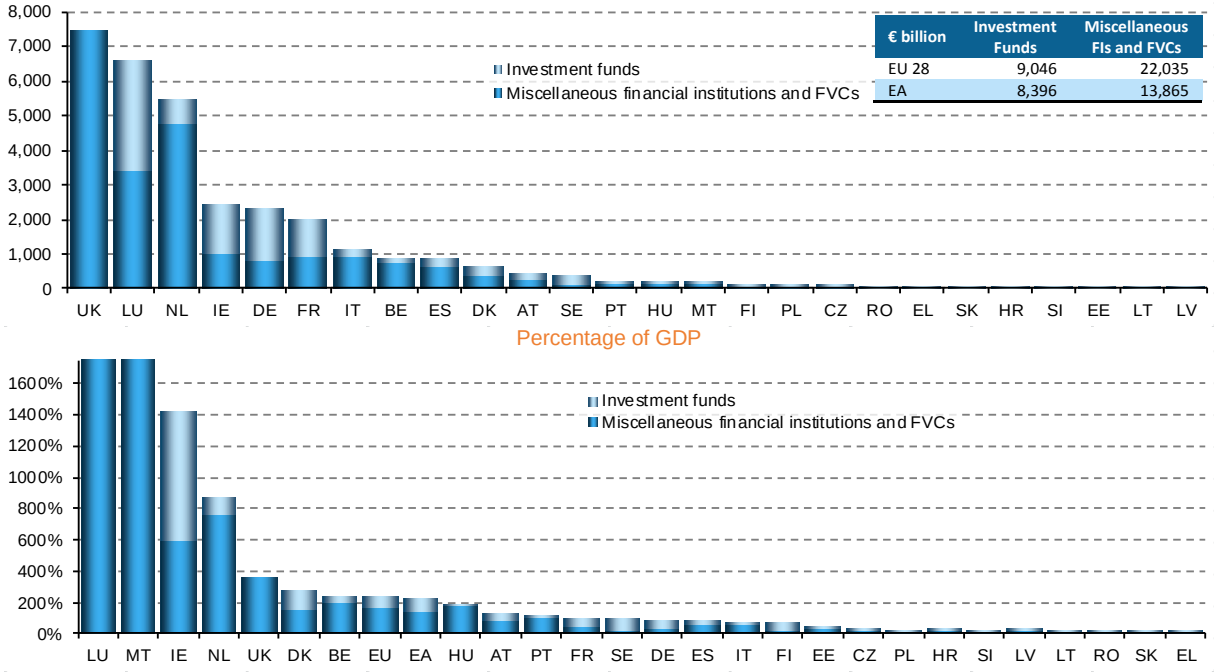
Notes: 'Investment funds' do not include money market funds. Data collection started at different times for the various subsectors; 'Miscellaneous OFIs' include financial vehicle corporations and investment funds before the breakdown was available. Money market funds are included in the chart even if they are usually classed as MFIs.
Source: ECB, Eurostat and own elaboration.

In the first half of 2000s, the total size of OFIs remained stable; however, thereafter OFIs expanded in size to more than double between 2004 and 2014 (Chart 31). Miscellaneous financial institutions represent more than half of OFIs; investment funds (including money market funds) represent 40 per cent of the total; and financial vehicle corporations, 8 per cent.

Country analysis

As in other subsectors, the largest OFIs sector is the UK's. Luxembourg's is also very large, not only in relative terms, but in this case also in absolute terms (Chart 32, top panel). Similarly, the OFI sector in the Netherlands and Ireland is disproportionately large (i.e. larger than those of Germany, France or Italy despite the significantly smaller size of those two countries).

Chart 32: **Size of 'other financial institutions'**, total assets, 2014 Q3



€ billion	Investment Funds	Miscellaneous FIs and FVCs
EU 28	9,046	22,035
EA	8,396	13,865

Notes: 'Investment funds' do not include money market funds. FVCs: financial vehicle corporations. In the UK, the category *Miscellaneous financial institutions and FVCs* includes investment funds. In Luxembourg, *Miscellaneous financial institutions and FVCs* represent 8 200 per cent of GDP; *Investment funds* represent 7 800 per cent of GDP. In Malta, *Miscellaneous financial institutions and FVCs* represent 2 300 per cent of GDP; *Investment funds* represent 70 per cent of GDP. Data for Cyprus and Bulgaria are not available.
Source: ECB, Eurostat and own calculations

Consequently, the OFI sector represents more than 800 per cent of GDP in Luxembourg, Ireland the Netherlands and Malta. In all other countries, OFIs represent around 200 per cent of GDP or less. As was the case for MFIs and ICPFs, the size of OFIs operating from eastern European countries is significantly smaller than for western European countries (Chart 32, bottom panel).

In the majority of countries, the bulk of OFIs consists of miscellaneous financial institutions (including FVCs). However, investment funds are relatively significant in Luxembourg, Ireland, Germany, France, Sweden and, to a lesser extent, Denmark and Austria.[99]

4.4.1. Investment funds[100]

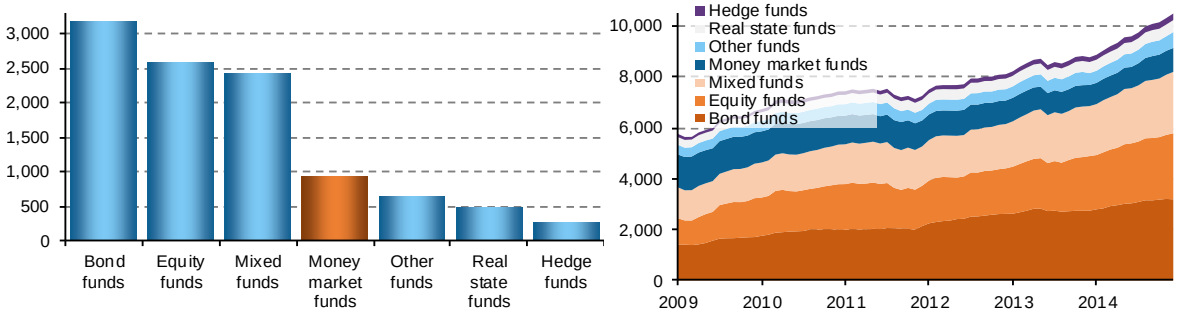
Investment funds allow people to invest money collectively alongside other investors. Investors use investment funds to seek benefits such as economies of scales (and therefore lower transaction costs) and better risk management through asset diversification. The total size of investment funds has significantly expanded in the last few years, particularly since 2012 (Chart 33).

Investment policy: type of instrument

Investment funds are classified according to their investment mandate, which stipulates the type of asset in which the investment portfolio is primarily invested. Bond funds are the most prominent (accounting for 30 per cent of assets), followed by equity funds (25 per cent) and mixed funds (23 per cent); investment funds with other mandates are much smaller. Funds have expanded for all mandates except for money market funds.[101] Note that about 90 per cent of the funds managed by euro area investment funds operate from Luxembourg, Germany, Ireland, France or the Netherlands (see Chart 32 top panel)[102].

[99] Investment funds operating from the UK are probably also significant in size; however, the breakdown is not available.
[100] We analysis in this section all investment funds, including money-market funds.
[101] However, part of the decline in the size of money market funds is explained by a change in the definition. After a transitional period that ended in January 2012, the definition of money market funds was brought into line with the guidelines issued by the CESR (the predecessor of the European Securities Market Authority – ESMA). The change in definition led to a statistical reclassification from money market funds to other investment funds, estimated at € 180 billion (see ECB, 2014b, p. 33).
[102] France, Ireland and Luxembourg account for 96 per cent of the euro area money market funds sector (ECB, 2014b, p. 34).

Chart 33: **Investment funds by investment policy**, total assets, euro area, € billion



Source: ECB and own calculations.

Even taking into account that investment funds invest both in the EU and other countries and in bonds, shares and other products, they account for a very significant proportion of the total size of bond and stock markets. Indeed, in 2014, euro area investment funds had a total balance sheet of over € 10 000 billion (Chart 33), which is more than the total capitalisation of euro area companies (see Chart 59) and similar in size to the total outstanding volume of bonds issued by euro area residents (see Chart 52).

Counterparts: provision of funding to other sectors

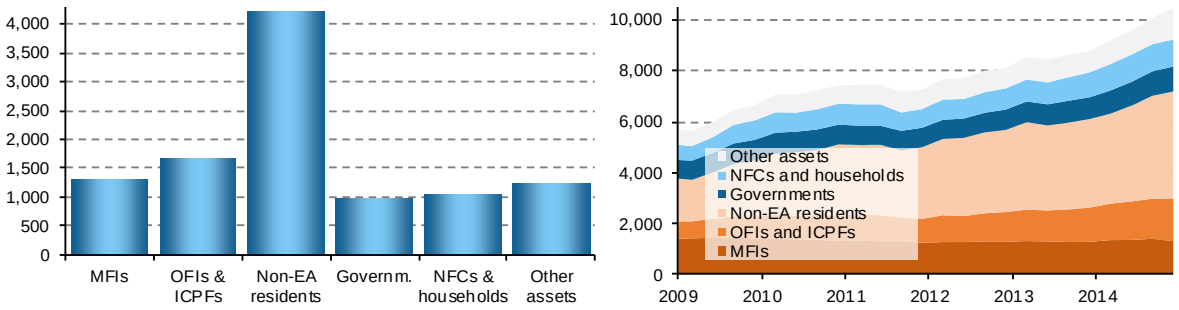
An analysis of counterparts indicates how investment funds contribute to financing the economy and how they are interlinked with other financial institutions (see Chart 34). The bulk of investment funds' resources are invested either cross-border or in the financial sector. This is in line with the high levels of interconnection observed within the financial sector and helps explain the potential destabilising effects linked to 'sudden stops' (see sections 4.2 and 4.5). Over 40 per cent of the assets of euro area investment funds provide financing to economic agents outside the euro area, mainly in the UK, the US[103] and Japan, but also in other countries including emerging economies. This share has significantly expanded since early 2009, when it was below 30 per cent. This increase in investment outside the euro area is partly explained by the erosion in confidence in the aftermath of the financial crisis, but also by the low yield environment and the subsequent search for higher yields by investors.[104]

About € 3 000 billion of investment fund assets provide funding to euro area financial institutions (MFIs, ICPFs and OFIs) either by purchasing bonds and equity or by underwriting loans. Although those funding provided by investment funds represents only about 5 per cent of the total funding of financial institutions, this can be much more significant for specific asset classes; for instance, investment funds hold almost 15 per cent of the bonds issued by MFIs.

The importance of the interconnectedness between investment funds and other financial institutions should be weighed against non-core sources of funding (i.e. sources of funding other than customer loans, in the case of banks, or insurance premiums, in the case of insurances). One should take into account that investment funds are, in general, less 'attached' to their investments than other stakeholders such as households investing in family businesses, or employees (see Section 6). Therefore, a coordinated withdrawal of investment funds from specific investments cannot be discarded as a latent risk that can materialise in moments of deteriorating confidence, as it was observed in 2008-2009. Given the size of the investment funds sector compared to the balance sheet of the different institutional sectors (see Section 2), such a coordinated withdrawal has the potential to provoke or amplify market turmoil. Having said that, so-called 'private equity investors' tend to have long-term relations with their investment, and to channel a significant part through (equity) investment funds[105].

[103] For instance, 40 per cent of non-euro area assets held by bond funds are bonds issued by US residents (ECB, 2014b. p. 37).
[104] About the low interest rate environment, see Section 1 and Chapter 1.
[105] See Section 2.4.3 for further details about private equity investors.

Chart 34: **Investment funds by counterpart**, total assets, euro area, € billion



Notes: Data for all investment funds, including MMFs.
Source: ECB and own calculations.

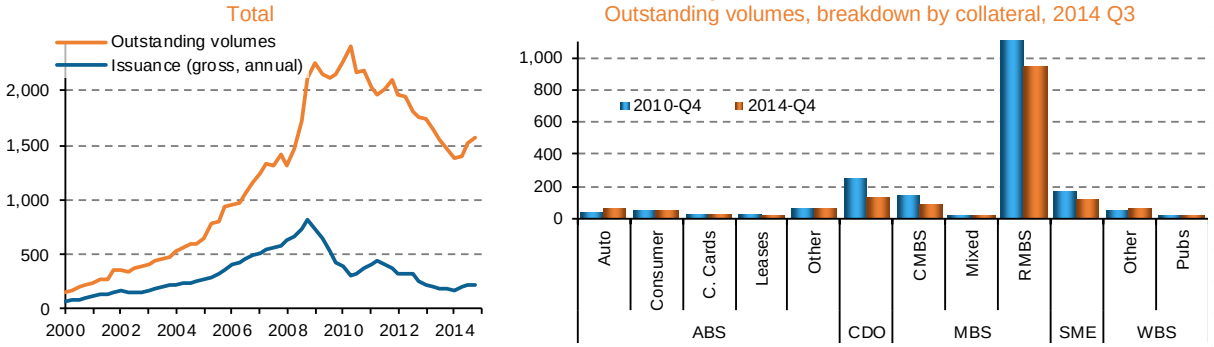
Investment funds are also a notable source of financing for governments: they provide almost € 1 000 billion or 14 per cent of the bonds issued by governments. Similarly, investment funds are also an important source of financing for NFCs as they provide up to € 1,030 billion of funds representing almost 30 per cent of the total volume of bonds issued by NFCs and over 15 per cent of the volume of quoted shares issued by NFCs. Finally, investment funds also invest in non-financial assets, particularly in real estate (included in 'other assets').

Liabilities: source of funding used by investment funds and implications for financial stability

Besides providing funding to other sectors (the assets side of the balance sheet), investment funds need to finance themselves (the liabilities side). The funding structure of investment funds makes them very robust in absorbing losses, but extremely fragile against runs. The bulk of investment funding is equity (typically over 90 per cent). This means that investment funds operate with almost no leverage and, therefore, potential losses arising from problems with the assets are absorbed by the investment funds 'shareholders' and do not further impact other agents (at least not directly).

However, the prominence of so-called 'open-end' funds can be a major source of instability. Once issued, bonds and securities in general can be traded in the secondary market among investors; this is also the case for 'closed-end' funds. However, 'open-end' funds work on a kind of 'continuous primary market': new investors are incorporated into the fund by issuing new shares (and investing the corresponding funds obtained); similarly, the shares of investors who want to leave the fund are redeemed against the assets of the fund. If, in a moment of financial turmoil or for other reasons, a large number of investors want to withdraw from an investment fund, this may trigger fire sales of the fund's assets. Having said that, most UCITs are open-end funds but they do not seem to have been a source of instability.

Chart 35: **Securitisation in Europe**, € billion



Notes: ABS: asset-backed securities; CDO: collaterised debt obligations; MBS: mortgage-backed securities; CMBS: commercial mortgage-backed securities; RMBS: residential mortgage-backed securities; SME: small and medium-sized enterprises; WBS: whole business securitisation. RMBS in 2010-Q4 = € 1,350 billion.
Source: AFME, SIFMA, ECB and own calculations.

4.4.2. Financial vehicle corporations

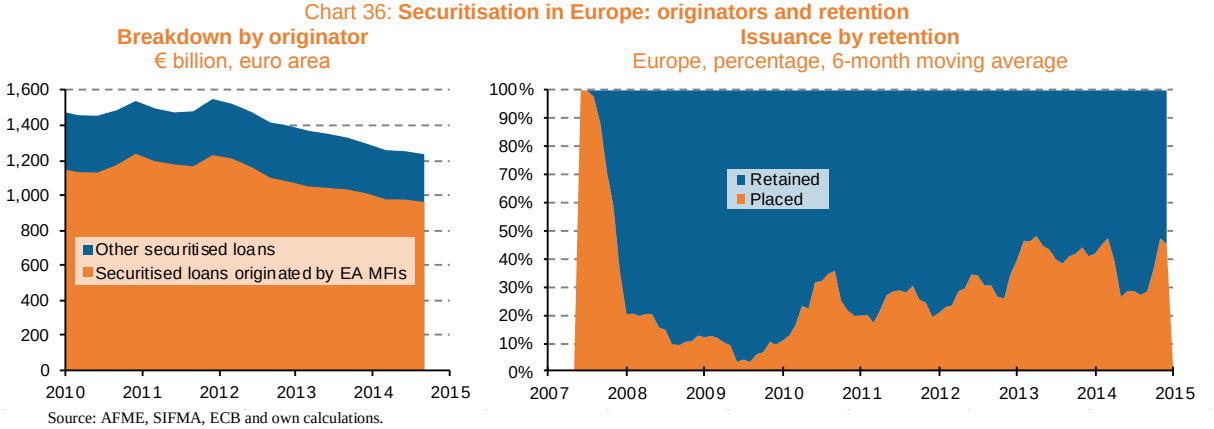
Financial vehicle corporations play an important role in the transforming liquidity and transferring credit risk. They are set up to carry out securitisation: on the one hand, transforming illiquid loans into securities which are marketable or can be pledged to obtain liquidity and, on the other hand, insulating financial vehicule corporations' assets from the originator's risks.

Securitisation has existed for decades, but it mushroomed in the mid-2000s. The volume of securitisation in Europe expanded from less than € 100 billion in early 2000 to a peak of over € 2 400 billion in 2010 and subsequently declined. Gross issuance has followed a similar evolution, although the decline is observed already since 2008. Nevertheless, a change in trend is observed since early 2014 for both outstanding volumes and gross issuance (Chart 35, left-hand panel). Besides markets having regain confidence on securitisation after the shock of the subprime markets, the activation of the ECB's third covered bond purchase programme and asset-back securities purchase programme in late 2014[106] can be mentioned as important drivers of this new trend.

Residential mortgages account for over 60 per cent of the underlying assets for securitisation in Europe (Chart 35, right-hand panel). This implies that securitisation plays an important role in intermediating credit to euro area households. Whether or not the securitisation market should be revived as a way to improve the availability of credit has been debated for some months[107]. One of the outcomes of this debate was that the ECB introduced an asset-backed securities purchase programme in late 2014[108].

Securitisation is closely interlinked with banks as about 80 per cent of it originates from banks (Chart 36, left-hand panel). While securitisation was initially used by the originators to distribute their credit risk, with the outbreak of the crisis, an increasing proportion of new securities were retained by the originators themselves (Chart 36, right-hand panel). Therefore, securitisation (and FVCs) seems to have become more a source of liquidity (e.g. by pledging a covered bond at the central bank) rather than a tool for distributing risk.

Chart 36: **Securitisation in Europe: originators and retention**

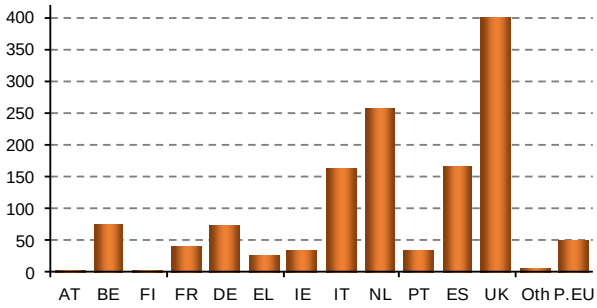


Source: AFME, SIFMA, ECB and own calculations.

Four countries account for more than 70 per cent of all securitisation activities in Europe: the UK, the Netherlands, Spain and Italy (Chart 37). However, the scale of these activities should be judged against the total volume of loans in banks' portfolios. Securitisation represents between 12 per cent (Italy and Spain) and 33 per cent (the Netherlands) of the total loan portfolio of banks in the relevant countries and between 22 per cent (Spain) and 60 per cent (the Netherlands) of loans to households (see the volume of core assets in Chart 28, top panel).

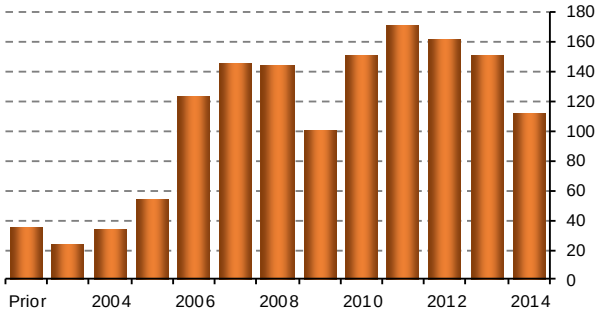
[106] See Chapter 1 including the Charts in its Annex.
[107] See, for instance, BCBS (2014c) and the consultations of the European Commission (2015f) and of the EBA (2014c).
[108] See ECB (2014c).

Chart 37: **Securitisation by country of collateral**
Outstanding amounts, € billion, 2014 Q3



Notes: P.EU: PanEuope (multinational).
Source: AFME and own presentation.

Chart 38: **Securitisation by vintage**
Europe, outstanding amounts, € billion, 2014 Q3



Notes: 2014 includes data up to 2014 Q3 only.
Source: AFME and own presentation.

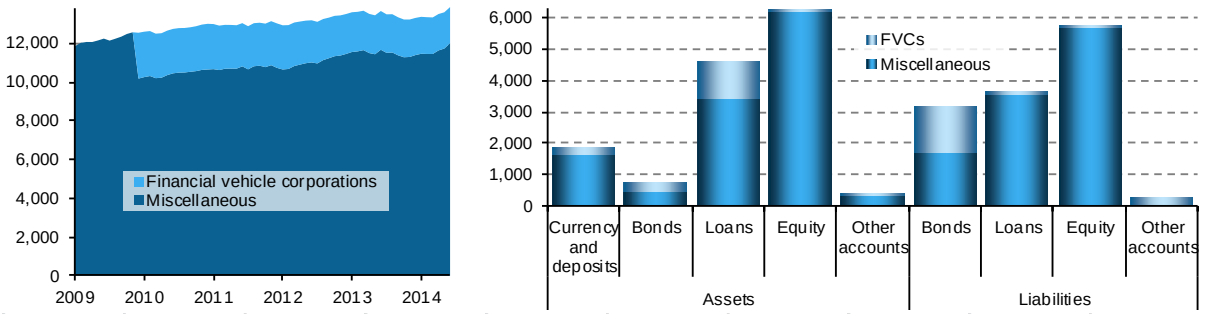
While FVCs operate with extremely high levels of leverage (equity is less than 2 per cent of total assets), risks are mitigated somewhat by the fact that the bulk of the funding comes from securities with long-term maturities. Indeed, Chart 38 shows how the currently outstanding securities were issued spread throughout the period 2006–2014, so securities outstanding in the third quarter of 2014 had an average maturity of at least 5.6 years. This is also reflected in the time lag between the decline in gross issuance and the subsequent contraction in outstanding volumes (Chart 35).

4.4.3. Miscellaneous financial institutions

Financial intermediaries not classified elsewhere (i.e. financial institutions other than MFIs, ICPFs, investment funds or FVCs) can be classified in a category of miscellaneous financial institutions. They are mainly captive financial institutions, which are subsidiaries of other companies or whose operations are restricted within a group (e.g. holding companies or special purpose entities), but also include private equity firms, venture capital companies, leasing and factoring corporations, securities dealers and other miscellaneous financial corporations. Financial auxiliaries, a term which covers insurance brokers, investment advisers and corporations providing infrastructure for financial markets, are also included in this category but their balance sheet size is negligible.

These 'miscellaneous' financial institutions represent over half of the euro area OFIs sector or about 130 per cent of euro area GDP (Chart 39, left-hand panel). The bulk of these miscellaneous financial institutions operate from the UK, Luxembourg or the Netherlands (Chart 32).

Chart 39: **Miscellaneous financial institutions**, outstanding volume, euro area, € billion
Evolution of total assets
Breakdown by instruments, 2014 Q3



Notes: Up to 2010, FVCs were included in miscellaneous financial institutions. For FVCs, loans refer to securitised loans.
Source: ECB, Eurostat and own calculations.

These institutions finance more than half of their activities through equity, 32 per cent from loans and 16 per cent by issuing bonds. They invest the majority of their resources in equity instruments or loans (Chart 39, right-hand panel). These categories (equity and loans) point to two important types of miscellaneous financial institutions: private equity firms and firms engaged in asset-back lending. On top of equity and loans, miscellaneous financial institutions keep a significant amount of funds in the form of liquid currency and

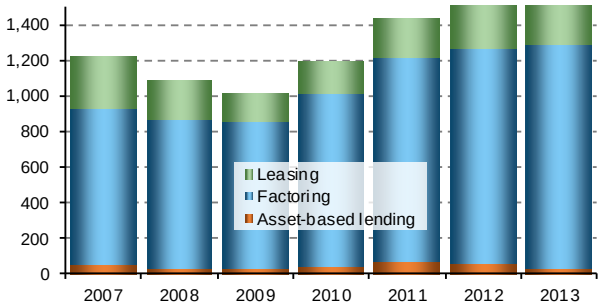
deposits not only for payment needs (e.g. distribution of dividends) but also available to be invested whenever an opportunity arises.

Asset-based finance

Many miscellaneous financial institutions provide financing to non-financial corporations against collateral. In a similar way to financial institutions that use securitisation or pledge securities to obtain liquidity, non-financial corporations can use assets such as accounts receivable, inventories or fixed assets as a guarantee to access credit and liquidity. The use of assets as collateral for obtaining financing is often referred to as asset-based finance and includes the following processes: (1) asset-based lending, (2) factoring, (3) purchase order finance, (4) warehouse receipts, and (5) leasing. In all cases, the credit or liquidity is provided by a financial intermediary based on an assessment of the collateral. The cost usually takes the form of a 'haircut' on the amount of financing provided with respect to the value of the assets used as collateral. Given the specificities and potential uncertainties of some of these collateral assets, costs are often non-negligible. The turnover of asset-based finance in Europe increased beyond € 1 500 billion (Chart 40), which is equivalent to almost half the 'other resources' used by euro area NFCs (Chart 13).

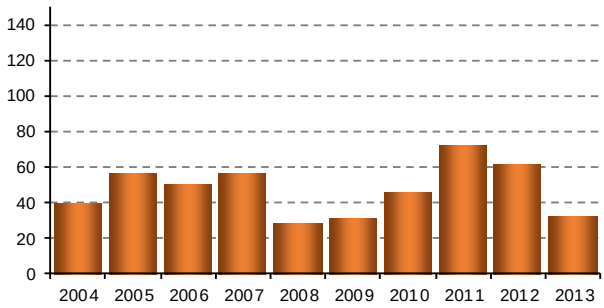
Asset-based finance is particularly advantageous for firms that lack credit history, face temporarily shortfalls or losses, or need to accelerate cash flows in order to seize investment opportunities. Another advantage of this type of financing is that lenders do not require any personal guarantee or share in the entrepreneur's equity. The flexibility of this type of finance generally comes at the expense of higher costs than those of conventional bank loans.

Chart 40: **Asset-based finance turnover**, Europe, € billion



Notes: 2013 includes data only up to September. No data are available for purchase order finance and warehouse receipts. Turnover includes new issuances and refinance.
Source: Thomson Reuters, Factors Chain International and own calculations.

Chart 41: **Asset-based lending turnover**, Europe, € billion



Notes: 2013 includes data only up to September. Turnover includes new issuances and refinance.
Source: Bank of America Merrill Lynch and Thomson Reuters.

Asset-based lending (ABL) designates a broad category of debt financing consisting of lending against the assets of a company. ABL is considered to be a transitional source of financing, aimed at responding to temporary cash flow shortfalls for firms with limited or no access to conventional bank lending. ABL is also suitable for firms seeking to take advantage of growth opportunities. It can also be used in times of transition and restructuring, e.g. in mergers and acquisitions, management buy-ins and buy-outs, or when increased liquidity is needed for a short time (OECD, 2014b).

The amount a firm can borrow depends on the liquidation value of its assets rather than its overall creditworthiness. Four types of asset classes are typically serve as security: accounts receivable, inventory, equipment and real estate. However, intangible asset-based lending has recently emerged as a particular sub-type of ABL in which a loan is secured by a portfolio of intellectual property or other intangible assets.

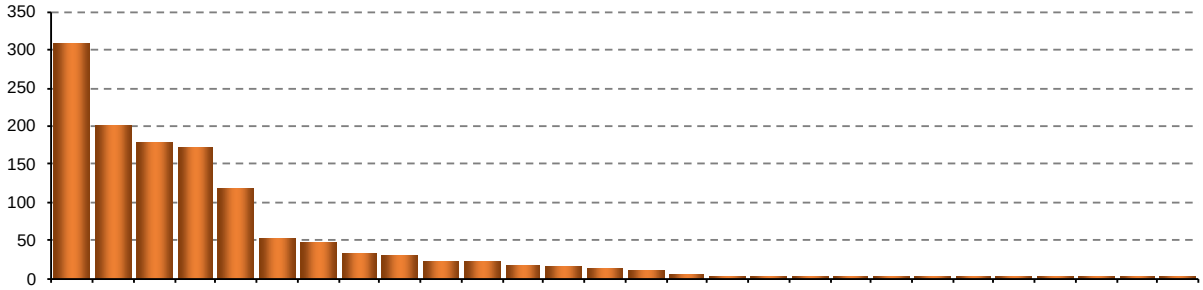
The costs of funds are higher in asset-based lending than in conventional lending and the loan-to-value ratio ranges from 80-85 per cent for accounts receivables to 40 per cent for inventories (OECD, 2014b). However, increasing competition is contributing to bringing lending costs down. Traditional commercial finance companies, hedge funds, private equity funds, pension funds and companies with cash surpluses seeking to diversify their business have recently entered the market as providers of ABL (OECD, 2014b).

ABL was widely used to finance the mergers and acquisitions boom of 2006 and 2007, when the ABL market was characterised by liquidity, intense competition and innovation (with annual turnovers of up to € 60 billion).

Following the collapse of Lehman Brothers in early autumn 2008, both the liquidity and the turnover of ABL fell considerably as ABL lending turned into a more conservative financing mechanism and asset valuations fell, but volumes recovered in 2010-2012 (Chart 41).

In Europe, recourse to ABL is concentrated in a few countries (mainly Denmark, Germany, the Netherlands and the UK); it is much more limited in the rest of the EU. ABL is significantly more developed in the US.

Chart 42: **Factoring turnover**, 2013, € billion



Source: Factors Chain International.

Factoring is a short-term financing mechanism for suppliers in which receivables are transferred from the holder to a 'factor', i.e. the factor buys the right to collect a firm's invoices from its customers. The factor guarantees the contract even if the debtor fails. As a source of working capital funding, factoring is of particular interest to firms with a solid base of customers but high investment in intangible assets which cannot be used as collateral in securing bank loans (OECD, 2014b).

Factoring can also take place across borders ('export' or 'international' factoring), reducing the risk of international sales. It is used as an instrument of *trade finance*, which is often a key tool for helping smaller businesses to become active internationally (OECD, 2014b).

In 2013, the EU factoring and commercial finance industry's total turnover stood at € 1 300 billion,[109] equivalent to almost 10 per cent of the EU's GDP. In most countries, factoring is a source of funding of a size similar to or larger than the volume of bonds issued by non-financial companies (see Chart 42 and 55).

Purchase order finance (POF) consists of working capital advanced to cover part of the production of a good or service for one or more specified customers. As it is intended to support production or distribution, POF is mostly used by producers, distributors, wholesalers or resellers of manufactured products. POF tends to work well for both importers and exporters.

Usually, the same financial firms provide both factoring and POF services. POF is similar to factoring in as far as it is secured by future receipts from customers, but POF relies on orders and future deliverables while factoring is provided against invoices on products already delivered. While trade credit is directly provided by customers or suppliers (e.g. when one books a hotel room online and pays for it three months in advance of the actual trip), the financing obtained through factoring or POF requires the involvement of financial intermediaries.

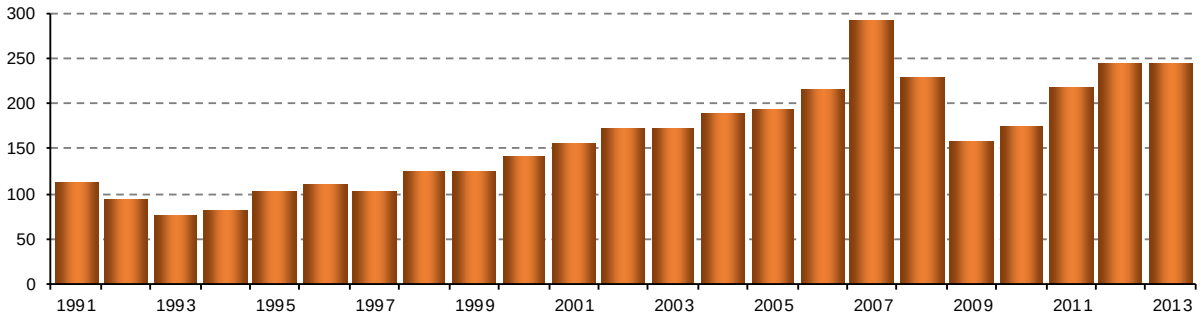
Before granting POF, the financial intermediary assesses a number of criteria including the customer's creditworthiness and the firm's capacity to produce and deliver the product according to the terms of the contract. When the final product is delivered to the end customer, the POF lender is repaid by factoring the invoice (Marks et al., 2009).

Warehouse receipts (WHR) are obtained against commodities or finished goods deposited at a certified warehouse. Warehouses allow products to be stored and sold when price conditions are favourable, rather than solely around harvest periods, when prices are low. In this context, WHR allows producers and commodity traders to obtain liquidity or financing as an alternative to traditional bank loans (e.g. when they lack a credit history or it is difficult to comply with rules on collateral). WHR is particularly suitable for producers and traders of storable agricultural commodities.

[109] Data extracted from the EU Federation for the Factoring and Commercial Finance Industry.

Warehouse receipts financing has proved especially successful in eastern European and central Asian countries, where farms have no loan history and limited potential for supporting their loan requests with sufficient collateral. The EBRD developed a Support Programme for WHR through commercial banks in countries like Bulgaria, Hungary, Slovakia and Ukraine. This EBRD programme has contributed to permanent recovery of the agricultural production in those countries (Jovičić et al., 2014).

Chart 43: **Leasing turnover**, Europe, € billion



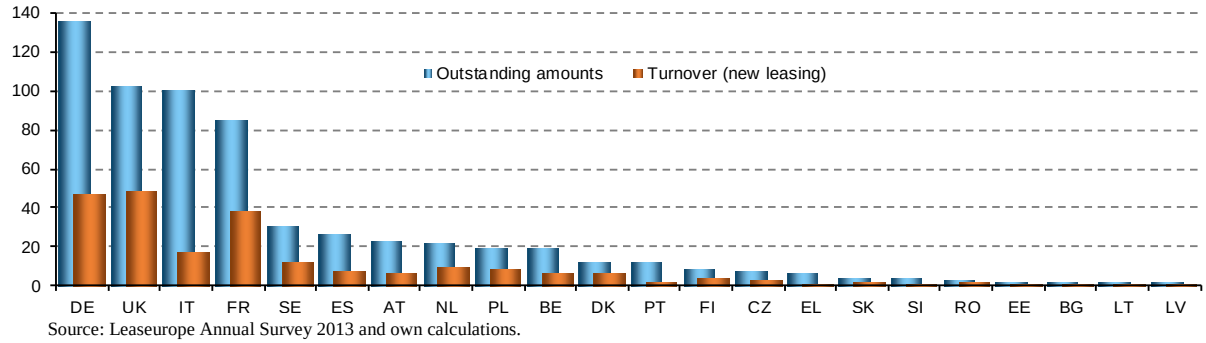
Source: White Clarke global leasing report, Leaseurope Annual Survey 2013, ECB and own calculations.

A ***lease*** is a rental contract, concluded for a fixed term, which is accompanied by the option of purchase when the contract matures. Leasing can be used to finance the purchase of 'long-lived' fixed assets such as equipment, real estate and buildings (a *financial or capital lease*) or relatively 'short-lived' assets such as copiers, automobiles or computers (an *operating lease*). Contrary to common bank loans (e.g. a mortgage), leasing contracts require only a small or no cash down-payment or security deposit and, therefore, allow the firm to finance its fixed assets while preserving its cash resources and credit facilities to meet working capital needs (Gallardo, 1997).

Leasing is a suitable source of funding for new firms in need of working capital which lack the credit history to qualify for conventional bank loans; for cash-constrained firms which can generate cash flows by using the leased asset; and for firms that change their capital assets frequently, as it gives access to equipment at minimal initial cost (OECD, 2014b).

With the outbreak of the crisis, firms' investment needs fell, and so did recourse to leasing. However, by 2012, leasing turnover seemed to be following the pre-crisis trend again (Chart 43). In 2013, outstanding volumes of leasing stood at € 600 billion in the EU (€ 450 billion in the euro area), representing about 15 per cent of 'other sources' of finance used by NFCs (see Chart 13).

Chart 44: **Leasing volumes across countries**, 2013, € billion



Source: Leaseurope Annual Survey 2013 and own calculations.

Almost half of leasing was for passenger cars (46 per cent), followed by commercial vehicles (18 per cent), machinery and industrial equipment (17 per cent), and computers and business machines (7 per cent). The services sector had the highest new leasing volume (46 per cent of total), followed by manufacturing, industry and construction (25 per cent), and households (20 per cent). In 2013, Germany, the UK and France remained the largest European leasing markets, with outstanding volumes between € 80 and € 140 billion and turnover (new leasing) around € 40 billion. Italy had similar outstanding volumes, but new leasing was smaller (Chart 44).

Alternative equity Instruments

Section 3.2 shows that equity represents more than half of the resources used by non-financial corporations to finance their activities. The bulk of this equity is capital provided by the owners of family businesses on start-up, combined with the subsequent generation of value by the business and retained in the company. However, the financial sector and other investors may also be involved in providing equity to finance firms. In particular, 'miscellaneous financial institutions' invest a large share of their assets in equity instruments (see Chart 39). In this context, ***private equity*** refers to investment in the ownership of a company and, therefore, involves sharing the management and business risk, but also the income generated by the company an any proceeds if the company is sold.

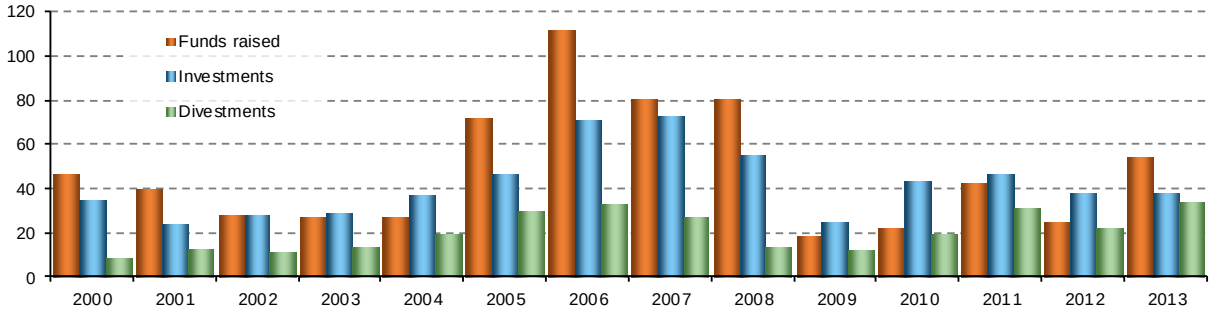
Private equity can be provided by banks, non-financial corporations, institutional investors (e.g. pension funds or asset managers), high net worth individuals (HNWI), governments or individuals. By investing in private equity, banks and NFCs create groups and conglomerates that generate both financial and strategic benefits for their businesses.

Institutional investors and HNWI are more driven by financial returns than by specific synergies or strategic goals. National and regional governments invest in equity as a mean of achieving public policy goals such as boosting growth and employment at local, regional or national level. Some HNWI may also invest their personal capital directly in the firm's equity. These so-called business angels typically invest in seed capital. While some banks and NFCs may have a specific business unit dealing with equity investment, in most cases, equity investment is channelled through equity funds[110,111] (see also Section 4.4.1).

Private equity investment may target either mature businesses, taking the form of development capital or buyouts, or new and early stage companies, where it takes the form of venture capital. Private equity investment typically focuses on firms with high growth potential or on under-performing firms that can be transformed into profitable businesses and subsequently sold. This involves high risk as many projects end up being unviable; however, other projects may become highly profitable not only for the investors but for society in terms of jobs and value creation and of improving living conditions.

European private equity funds[112] have a total of € 560 billion of capital under management on European markets.[113] This is equivalent to about 25 per cent of the capital under management by equity funds (see Chart 33) and it is also of an order of magnitude similar to the total amount of bonds issued by NFCs.

Chart 45: **Private equity activity**, gross annual flows, Europe, € billion



Notes: Data include venture capital. Funds raised: gross increases of liabilities. Investments: use of liquidity to purchase equity. Divestments: liquidation of previous investments.
Source: EVCA 2013 European Private Equity Activity

Private equity was significantly hit by the financial crisis with funds raised dropping from over € 100 billion in 2006 to less than € 20 billion in 2009. However, it has recovered in recent years with fundraising by European private equity investors reaching € 52 billion in 2013 (Chart 45), representing significantly higher activity than in the early 2000s. In order to grasp the significance of these private investors, their activity can be compared with stock markets. In 2013, gross investments by private equity firms (almost € 40 billion) was equivalent to about 50 per cent of the gross issuance of quoted shares (see Chart 52). Except for strategic investment (such as

[110] Unless otherwise indicated, the rest of this section focuses on the private equity invested through funds.
[111] See Cumming, (2009).
[112] Equity funds excluding infrastructure funds, real estate funds, distress debt funds, primary funds-of-funds, and secondary funds-of-funds.
[113] Data extracted from EVCA (2014).

in NFCs), private equity investment firms seek a return through the sale of their stakes: European private equity companies divested € 33 billion in 2013. The € 20 billion of net equity provided by private equity firms in 2013 is equivalent to about 10 per cent of the fresh equity raised by NFCs in 2013 (see Chart 21, right-hand panel).

Chart 46: **Funds raised by region of management,** 2013, € billion

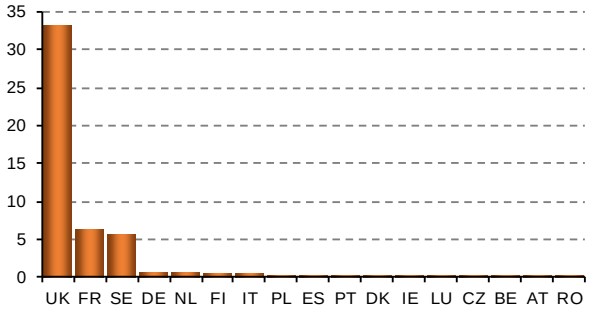
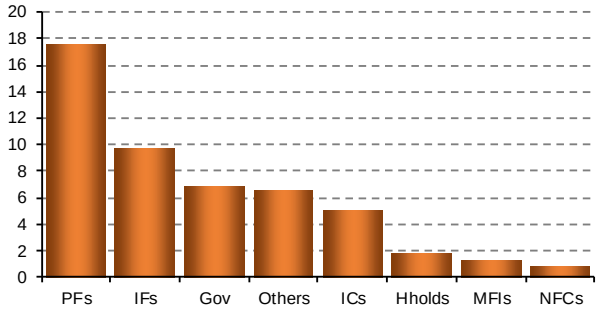


Chart 47: **Funds raised by investor type**, 2013, € billion



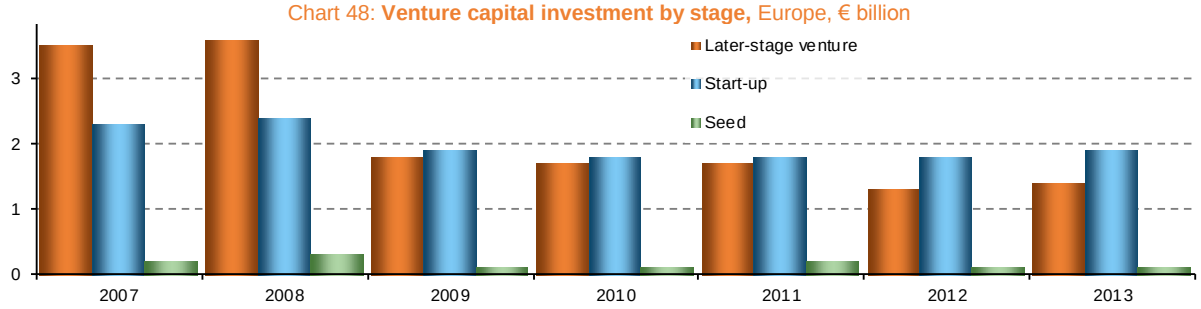
Notes: 'Gov' includes government agencies and sovereign wealth funds. PFs: Pension funds; IFs: Investment funds; Gov: Governments; ICs: Insurance corporations; Hholds: Households; MFIs: Monetary financial institutions; NFCs: Non-financial corporations.
Source: EVCA 2013 European Private Equity Activity.

In 2013, two thirds of EU equity investment came from the UK alone, followed by France and Sweden (Chart 46). On the other hand, almost half of the private equity investors were pension funds or insurance companies (Chart 47). Private equity investment is particularly attractive for ICPFs because it is more suited to their business model of seeking long-term growth and returns than capital markets are (Institutional Investor, 2014). Investment funds and governments are next in importance. Some of the government investment was private investment managed by government agencies which sought to promote economic growth and employment in countries particularly affected by the crisis.

Venture capital refers to equity investment made to launch, develop or expand unlisted companies. Venture capital firms add funding to the capital provided by entrepreneurs to increase the company's value, but generally take only a minority stake so the entrepreneurs still control the company. Venture capital funds are invested with a view to selling them with a high return (an internal rate of return of up to 35 to 40 per cent) fairly quickly once the company has taken off. The exit prospects, i.e. how the venture capitalists will cash out their investment, is therefore critical in the venture capital industry.

About half of venture capital finances companies in their start-up phase; the other half is allocated to companies in a later stage. Little venture capital is seed capital (Chart 48). Venture capital investment is concentrated in a few industries such as the digital economy and biotechnology (OECD, 2014b). Venture capital was not very large before the crisis, and the volume of funding was seriously affected by it.

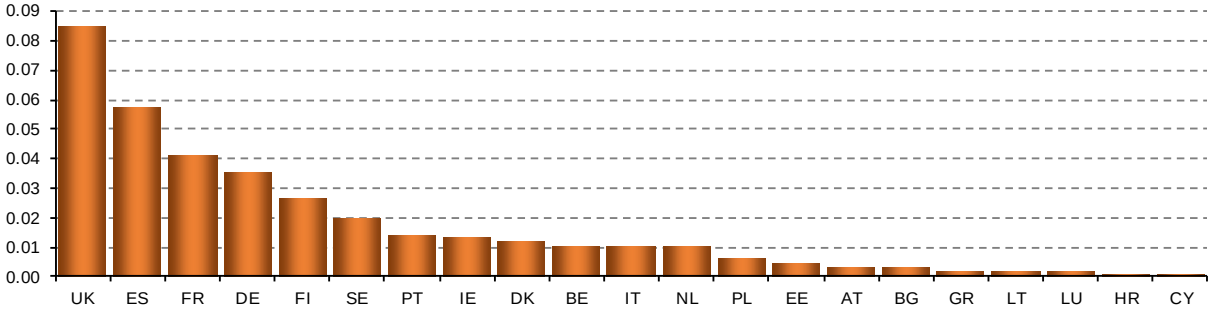
Chart 48: **Venture capital investment by stage,** Europe, € billion



Source: EVCA 2013 European Private Equity Activity

Business angels are individuals who risk part of their capital by investing directly in an enterprise, without relying on institutional intermediaries. In most cases, business angels are active or previously successful entrepreneurs or executive employees whose professional activity has given tehm a high level of experience and an extensive network of contacts. With their know-how, capital and contacts, business angels provide support both at the initial stages of start-ups and to growing young enterprises. Investment takes the form of private transactions and is therefore not subject to public disclosure. Although data may be incomplete, available figures suggest that the amounts spent by business angels remain small (Chart 49).

Chart 49: **Business angel investment**, 2013, € billion

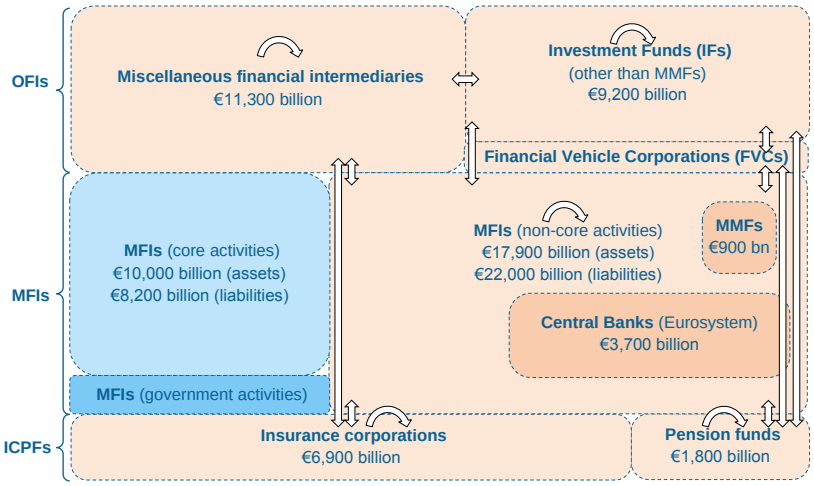


Source: EBAN Statistics Compendium 2014

4.5. Interconnectedness and complexity within the financial sector

The interconnection of different financial institutions can pose a risk of contagion across sectors and countries and generate systemic risk. Section 4 shows how the different components of the financial sectors are interlinked with each other and how banks play a central role: insurance corporations form groups with banks through 'bank/insurance' holding companies; insurance corporations, pension funds and investment funds provide financing to MFIs by buying their securities; financial vehicle corporations channel the securitisation activities of various financial intermediaries (mainly banks), which nevertheless may retain a significant chunk of an issuance; and many of the companies operating in the 'miscellaneous' financial institutions are in fact subsidiaries of credit institutions. The interconnections between the different sectors are illustrated in Chart 50. One consequence of this network is that, although the financial sector can be divided into different subsectors depending either on their economic function or on their legal status, the financial sector should in reality be considered as an 'organism' which operates as a system.

Chart 50: **Interconnections within the financial sector**, euro area, 2014 Q3



Notes: The surface of each box is proportional to the size of the sector in the euro area. FVCs assets: € 1 900 billion; MFIs government assets: € 2 900 billion; MFIs government liabilities: € 500 billion.
Source: ECB, Eurostat and own calculations.

Shadow banking

In recent years, the term 'shadow banking' has been coined to refer to financial intermediation activities outside the regular banking system.[114] In previous subsections, we have seen that the different types of financial intermediaries play specific roles. Increasing attention is paid to shadow banking because financial institutions other than banks are not subject to the same high standards of supervision and prudential requirements as banking activities. This means that, although shadow banking can contribute to the financing of the economy, it can also become a source of systemic risk because of its high levels of leverage, its interconnectedness and its complexity.

[114] For further discussion of shadow banking see, for instance, FSB (2014a), ECB (Luck and Schempp, 2014; Bakk-Simon et al., 2012), the IMF's Global Financial Stability Report – October 2014 (Valckx et al., 2014) and Chapter 3 of last year's review.

Under the national accounts framework, shadow banking would correspond to the combined value of investment funds, money market funds and 'other financial institutions', representing roughly one third of the financial sector. However, a narrower measure of shadow banking has also been proposed, excluding investment funds that are not involved in credit intermediation (i.e. equity funds and real estate funds), financial assets linked to self-securitisation and activities that are prudentially consolidated into a banking group (see FSB, 2014a). According to this narrower view, shadow banking accounts for about one fifth of the total financial sector.

An alternative approach, focusing on the nature of activities rather than the nature of the entities, is also possible. That approach would particularly apply to credit institutions. When a financial corporation receives a banking licence, it is allowed to collect deposits from households and non-financial corporations and to provide loans to them. Although these institutions are classed as credit institutions, they perform many activities other than credit intermediation: brokering, repos, securitisation, derivatives, operations with foreign currency, etc.

The statistics on the balance sheet of MFIs provides some granularity in terms of counterparties and instruments that can be used to split the balance sheet of credit institutions into 'core' and 'non-core' activities (see Section 4.2). Non-core activities are banking activities that could potentially be transferred to the shadow banking sector to avoid the high standards of supervision and prudential requirements imposed on banks. If these non-core banking activities of credit institutions are included, shadow banking may account for a much larger proportion of the financial sector.

In fact, the interconnections go beyond the boundaries of the financial intermediaries. Although considered 'direct financing', bonds and shares issues in the markets are also closely interlinked with financial intermediaries, as markets need a minimum infrastructure to function. The corporations providing the infrastructure for financial markets are classed as OFIs, but other intermediaries such as broker-dealers or investment advisers are also involved in placing securities in the markets. If they are independent, they are classed as financial auxiliaries (within OFIs); however, in most cases, these services are provided by (the non-core activities of) credit institutions.

In addition to interconnection and the latent possibility of contagion, leverage is another potential source of risk. Highly leveraged institutions have a very limited capacity to absorb losses, so deteriorating returns can quickly spill over to their creditors. This Section 4 shows that the different categories of financial institutions work with different levels of leverage. FVCs and credit institutions are the most highly leveraged corporations, as they operate with a very thin layer of equity; at the other end of the spectrum, investment funds are financed with virtually only equity, so their leverage is almost nil. All other financial institutions (e.g. insurance corporations, pension funds or residual financial institutions) are somewhere in between[115].

Complexity

The multiple layers of interconnection between the different institutions lead to a complex system of networks. Increasing attention is being given to representing and understanding the implications of such networks[116]. In this context, the financial system has been compared with a nuclear reactor or an electric grid and a panic episode in the markets with an industrial accident[117].

These systems are 'tightly coupled' like a domino-toppling display. Once a process starts, it is difficult or impossible to stop. Harford (2011) argues that any sufficiently complex, tightly coupled system will fail sooner or later; the answer would be to simplify the system, decouple it, or reduce the consequence of failure. In the case of the financial system, he considers that, rather than making a particular bank less likely to fail, it might be safer to focus on ensuring that one falling bank does not topple other companies.

According to Haldane (2015), modern economic and financial systems can be characterised as complex, adaptative 'system of systems'. Such a system is composed of multiple, interacting layers each a complex system in its own right. In complex systems, the whole behaves very differently than the sum of its parts given dynamic

[115] For a comparison of the levels of equity and, therefore, of leverage across sectors, see Section 3.2.
[116] See, for instance, Castrén and Rancan, (2013), Hautony and Héamz (2014) and Haldane (2015).
[117] See, for instance, Harford (2011).

properties such as amplifying feedback effects. Haldane proposes that the macro-financial system of systems can be split into four layers of complex systems interacting among each other.

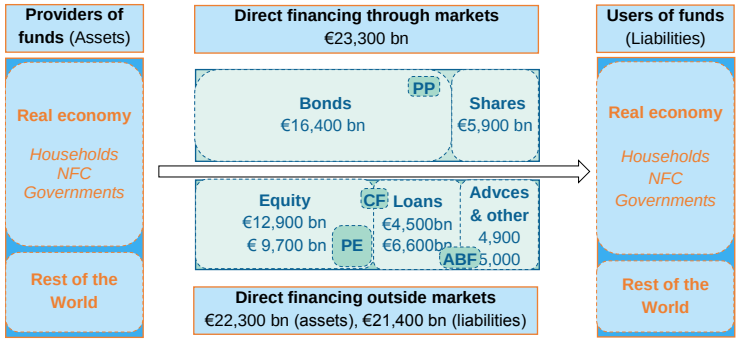
According to Tinbergen's rule, at least as many policy tools as there are complex sub-systems are required if risk is to be monitored and managed effectively in a complex system of systems. The four layers and their policy approaches would be the following. Firstly, the 'micro-prudential' layer of individual firms. Secondly, the 'macro-prudential' layer of the financial system. Thirdly, the 'macro-economic' layer of the national economy, monitored through monetary policy. And fourthly, the 'telescope' layer of the global economic and financial system which is managed through the international financial architecture.

An appropriate policy response requires accurate data and timely mapping of each layer of this system of systems. This chapter aims at contributing to the availability of data and analytical tools; in particular, Sections 2 and 3 focus on the 'macro-economic' layer and Sections 4 to 6 focus on the 'macro-prudential' layer.

5. DIRECT FINANCING THROUGH DEBT AND EQUITY CAPITAL MARKETS

Financing through public bond and equity markets is often labelled 'direct financing' because it occurs through direct exchange of securities between savers/investors and borrowers without the need of a financial intermediary. Economic agents can use organised markets to issue securities in the form of shares or bonds, or tap various other non-intermediated sources of funding such as trade credit and advances, company loans, loans from family and friends, and issues of issuance of equity other than quoted shares (Chart 51).

Chart 51: **Direct financing of the economy**, Outstanding amounts, euro area, 2014 Q3, € billion



Notes: PP: Private placement. CF: Crowdfunding. PE: Private equtiy. ABF: Asset-based finance. Advces & other: Advances and other financing (includes items such as trade credit, advances by different stakeholders, tax claims and similar items). For direct financing outside markets both the figure for assets and the figure for liabilities are provided. The reason for this is that relations are complex because both the rest of the world and the financial sector may also be involved in these operations as a providers or users of funds. Data for the EU as a whole are incomplete, but the relative size of the different subsectors are similar to those of the euro area.
Source: ECB, Eurostat and own calculations.

The focus of this section is on the organised public markets for bonds and quoted shares. In addition, private placements as an alternative route to bond issuance are also discussed. Section 6 discusses direct financing obtained through interaction between 'lenders' and 'borrowers' without recourse to organised markets[118].

Direct financing through debt and equity capital markets: an overview

The main advantage of financial markets is that they allow resources from numerous investors to be pooled. The two main instruments, bonds and (quoted) shares, are standardised products, which means that secondary markets can grow to enable these to be converted into liquidity at any time.

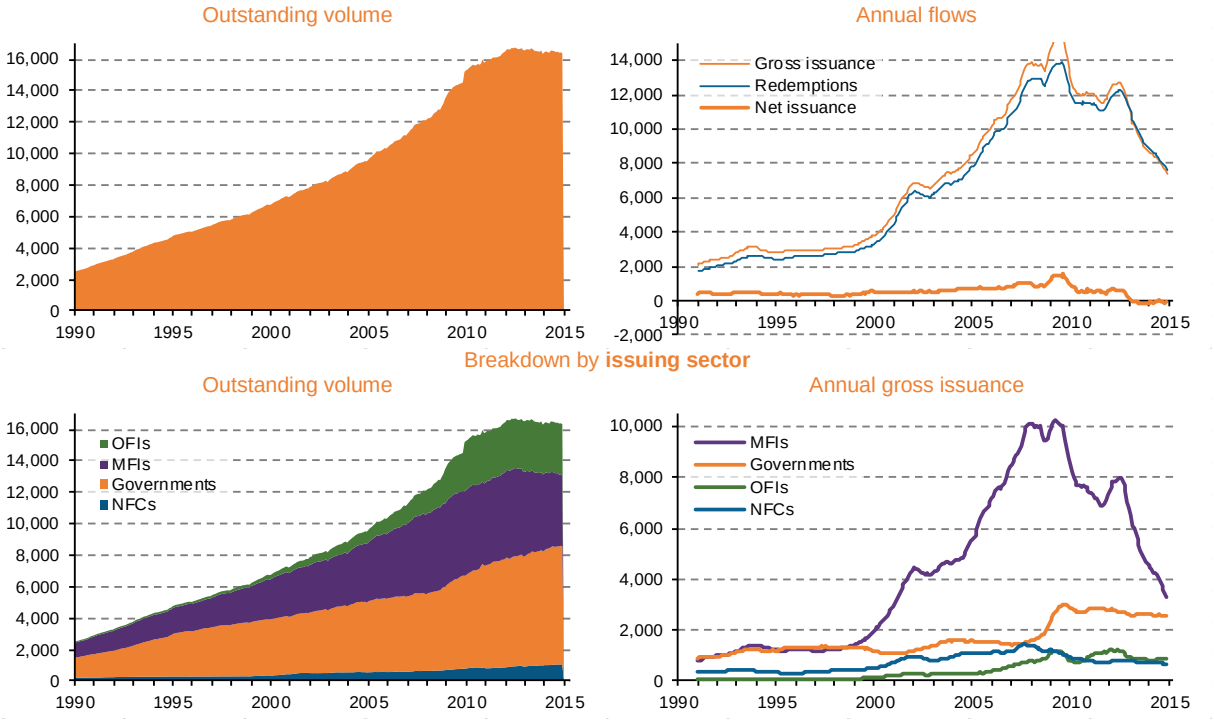
A market authority ensures the issuers seeking finance comply with a series of requirements, sucha as regularly releasing information about their financial situation. The European supervisory authority in charge of ensuring the integrity, transparency, efficiency and orderly functioning of securities markets is the European Securities Market Commission (ESMA), which replaced the former Committee of European Securities Regulators in 2011. ESMA is also responsible for improving investor protection EU-wide. It works very closely with the national competent authorities, which are members of the Board of Supervisors, its highest decision-making body.[119]

[118] Chart 51 includes private equity and asset-based finance. These sources of funding are discussed in Section 4.
[119] For further information, see www.esma.europa.eu.

Besides a market authority, this type of direct financing requires a market infrastructure and financial institutions providing services such as investment advice, market-making and brokering. This can sometimes be offered by credit institutions (e.g. 'dark pools') or by independent institutions of the type classed as 'other financial institutions' (see Section 4).

While capital markets have existed for centuries, they grew rapidly in the 18th and 19th centuries during the industrial revolutions, when large amounts of money were needed to finance infrastructure (mainly railroads and canals) and the construction of large factories. In the last 30 years, markets have been boosted by three factors: (1) electronic settlement and clearing, (2) technological developments and (3) deregulation and harmonisation of rules across Europe. The combination of these developments fostered a quick expansion of capital markets. As Charts 52 and 59 show, between 1990 and 2008, both bond and equity markets multiplied seven-fold.

Chart 52: **Bond markets**, euro area, € billion
euro area **totals**



Notes: Bonds issued by ICPFs are negligible (less than € 50 billion of outstanding volumes, i.e. less than 0.3 per cent of the total) and are therefore not included.
Source: ECB: securities statistics and own calculations.

5.1. Bond markets

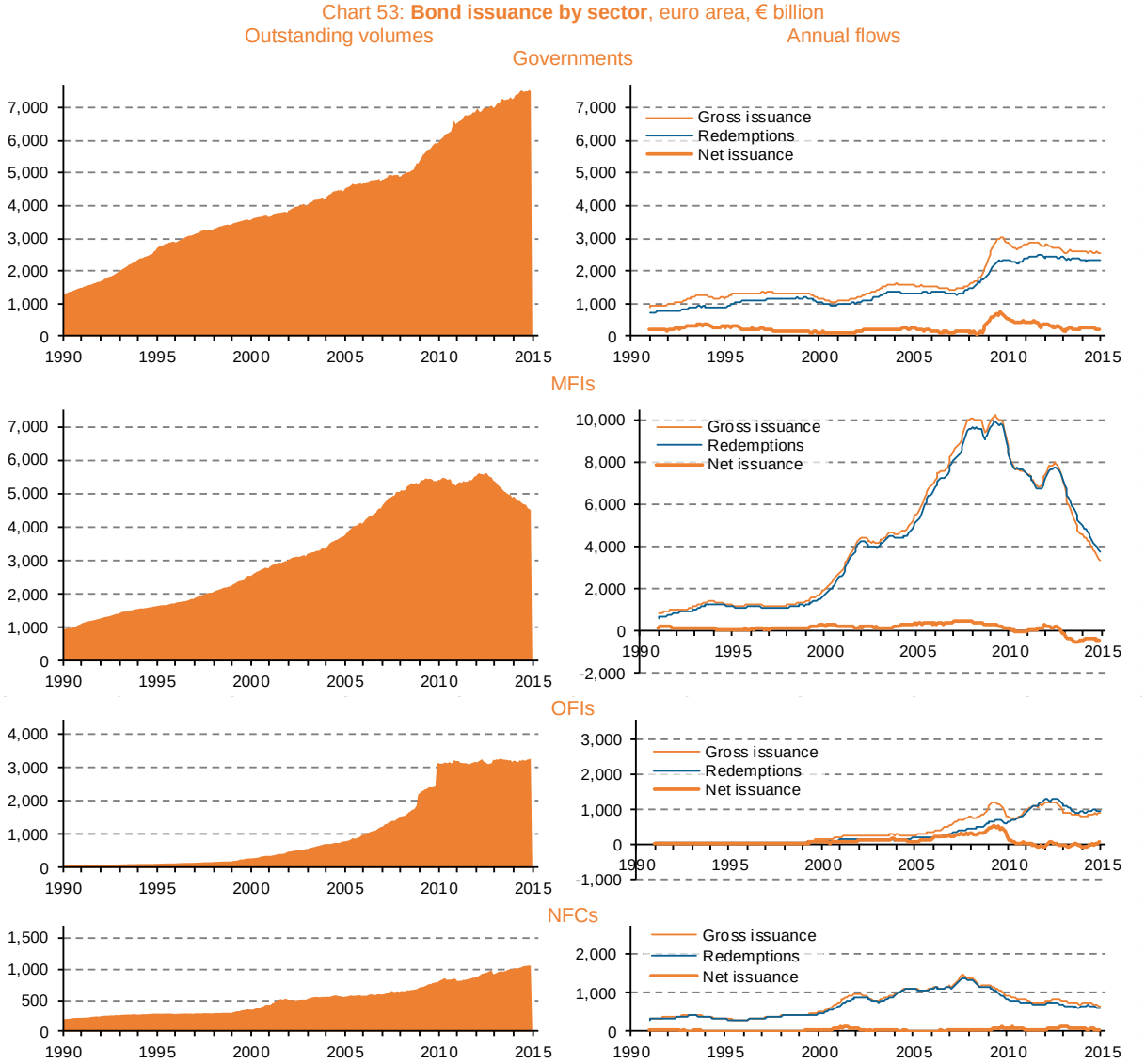
A bond is a debt instrument, i.e. the issuer has to reimburse the principal and pay interest. The need to reimburse the principal at nominal value (i.e. the same amount borrowed) makes bonds very different from shares in two respects. Firstly, fluctuations in bond prices are much more limited than those of shares. However, this can change when a company (or a State) is under stress and investors fear or expect a default. Secondly, bonds need to be rolled over regularly, what implying that they are somehow more liquid than of shares. Indeed, the outstanding volumes of bonds may be similar in size to the annual flows (gross issuance and redemptions). Both volumes and flows, therefore, reflect the liquidity of bond markets.

Bond markets in Europe are sizeable. They expanded steadily at an average of 8 per cent a year over the period 1990-2014. Growth accelerated in the first stages of the crisis, but the total volume has stagnated since early 2013 (Chart 52, top-left panel). By December 2014, the value of euro area bond markets was € 16,400 billion (or 170 per cent of euro area GDP).

The bond market is split between financial corporations (MFIs and OFIs) and governments. Non-financial corporations account for less than 7 per cent of total bonds outstanding. MFIs dominate gross issuances, issuing

over 70 per cent of all euro area bonds during the peak of 2008-2010. This is because the maturity of MFI bonds is much shorter than that of other bonds so therefore, they are issued and rolled over more frequently.[120]

Chart 53: **Bond issuance by sector**, euro area, € billion



Notes: Bonds issued by ICPFs are negligible (less than € 50 billion of outstanding volumes, i.e. less than 0.3 per cent of the total) and are therefore not included in the analysis.
Source: ECB: securities statistics and own calculations.

Throughout the 2000s, annual gross issuances, redemptions and outstanding volume were all similar in size. This,indicates that bonds had an average maturity of about one year. The fall in interest rates and steeper yield curve (see Chapter 1) made it more advantageous to issue bonds with longer maturities. By late 2014, the average implicit maturity of bonds had increased to two years. However, euro area aggregates conceal important differences between sectors, particularly in annual flows and average maturities.

Bond liquidity should be assessed against outstanding volume, which indicates the theoretical maximum size of the market, while flows can be used as a proxy for the actual amounts of bonds that being traded in the primary market.

Sector dynamics

Throughout the crisis, euro area **governments** continuously and significantly increased the volume and flows of bonds issued: outstanding volumes expanded by 50 per cent between 2008 and 2014, achieved through a

[120] Note that, in the financial sector, the term 'corporate bonds' refers to all bonds other than government bonds – in other words, mainly the 48 per cent issued by financial corporations. However, the term is also used sometimes to refer only to the 7 per cent of bonds issued by non-financial corporations. This ambiguity can be misleading.

significant expansion of net flows. Indeed, gross issuance increased significantly in the first stages of the crisis (2008-2010) and have since remained at very high levels compared with historical series. Redemptions followed with a certain lag. Although net annual issuance of bonds by governments has subsequently declined, they remain at relatively high levels (Chart 53).

This evolution of government bonds reflects the different dynamics in the euro area and the EU throughout this period. In the early stages of the crisis, governments had to step in to support financial institutions in difficulties; such bank bailouts were financed by issuing debt.[121] At the same time, economic contraction (or subdued growth) eroded public finances both on the income side (lower amounts of tax collected) and the expenditure side (higher social benefits spending linked, for instance, to unemployment). This situation has largely driven the continuous expansion of the total volume of bonds issued by Euro are governments.

At the same time, two factors constrained the expansion of government bonds and explain the relative reduction in net flows observed from 2011 onwards. First, governments carried out a number of structural reforms to improve their finances.[122] Second, the countries with the most acute financial problems (Greece, Ireland, Portugal and, later on, Cyprus) asked their European partners for support and therefore discontinued or significantly reduced their issuance of new debt in the market[123].

Bonds issued by **MFIs** show a totally different pattern. Their expansion, in terms of outstanding volumes, came to a halt with the outbreak of the crisis and a significant contraction occurred from late 2012, which reflects the process of deleveraging by banks. Indeed, banks face a number of pressures to reduce their balance sheets and leverage levels. When reducing the assets side of the balance sheet, banks need to reduce the liabilities side as well. One way of doing this is to not roll over a (significant) share of the bonds that reach maturity.

On the other hand, a dramatic expansion in annual flows is observed between the mid-2000s and the outbreak of the crisis and a significant drop thereafter. This is probably explained by the rotation of the yield curve. The very flat yield curves of the mid-2000s (see Chapter 1) forced banks to issue with very short maturities to obtain a sufficient margin from maturity transformation. With steeper yield curves and declining yields, banks may use relatively longer-term financing and still obtain a margin.

Bonds issued by **OFIs**, although initially of an order of magnitude lower than the bonds issued by governments and MFIs, significantly expanded in the run-up to the crisis. This mainly reflects the boom in securitisation (see Section 4.4.2). However, outstanding volumes of bonds issued by OFIs have stagnated since late 2009. Therefore, the contraction of FVCs and of securitisation, in general, seems to have been offset by an equivalent expansion by other institutions in the OFIs sector (see Section 4.4.3). The data on flows confirms this: although net annual flows have fluctuated around zero, gross annual flows and annual redemptions have remained at historical heights since 2010.

Finally, **NFC** bonds also followed an specific pattern. Although at much lower levels than any other sector,[124] they expanded significantly both before and during the crisis (Chart 53, bottom panel).. This partially reflects a certain switch from bank financing to bond financing by non-financial corporations (see Section 4.2 for further details about bank loans). Banks were particularly impacted by the crisis; declining central bank rates were translated into (declining) retail loan rates only to a limited extent and varied between countries. On the one hand, large corporations with investment-grade ratings could profit more from the low yield environment by issuing bonds than by recourse to bank credit. On the other hand, the slowdown in economic activity reduced the financing needs of non-financial corporations (because of its effect on demand). See also Box E for further discussion about the features of bonds and issuers.

[121] For an analysis of the capital injected in financial institutions by public authorities, see last year's review (European Commission, 2014a), Chapter 2 and European Commission (2014d).
[122] Countries that breached the Stability and Growth Pact were asked to take measures to restore public finances (see the various pages on economic governance at DG ECFIN webpage, www.ecfin.eu).
[123] Spain also received support from European partners, but this was a partial programme and Spain continued to issue bonds in the markets. For further details about support for European sovereign fiannces, see last year's review (European Commission, 2014a) Chapter 2 and the Commission's page on *Financial assistance on EU Member States* (http://ec.europa.eu/economy_finance/assistance_eu_ms/index_en.htm).
[124] Letting aside the negligible amounts of bonds issued by ICPFs.

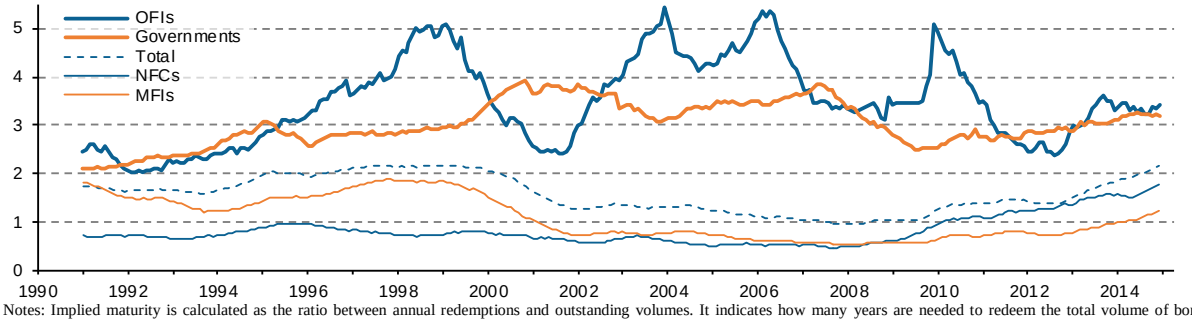
Maturities

The difference in the implied maturity of the bonds issued by the different sectors also suggests they are also different in nature. Issuing bonds is governments' main source of financing other than tax collection (see Chart 13). To ensure their funding is reasonably stable, governments issue bonds with relatively long-term maturities.

At the other end of the scale, bank bonds have the shortest maturities. This is mainly explained by banks' roe in transforming maturities, which means they typically use short-term liabilities to finance long-term assets. In banks' balance sheets, bonds represent about 15 per cent of their liabilities (see Chart 13), so that they can manage them with more flexibility than governments.

Bonds issued by OFIs have also long-term maturities. This is because a large proportion of these bonds stem from FVCs' securitisation and similar activities (see Section 4 for details). The underlying assets have very long maturities (e.g. mortgages may have a maturity of 20 or 30 years), so that even issuing bonds with a maturity of 3 or 4 years entails some kind of maturity transformation.

Chart 54: **Implied maturity of bonds by issuer sector**, bonds outstanding, euro area, years



Notes: Implied maturity is calculated as the ratio between annual redemptions and outstanding volumes. It indicates how many years are needed to redeem the total volume of bonds outstanding assuming that redemptions continue at the same rate as in the year-to-date.
Source: ECB: securities statistics and own calculations.

Bonds are a marginal source of financing for NFCs (bonds represent less than 4 per cent of NFCs' liabilities, see Chart 13). This may explain the relatively short-term nature of these bonds; maybe NFCs use bonds as temporary financing at specific times or when they can obtain advantageous financing conditions (what is usually on the shortest part of the term structure of the yield curve).

After 2009, an increase in the maturity of bonds is observed across sectors. This can be explained by the decreasing interest rates charged on long-term bonds. Indeed, the persistence of close to zero short-term interest rates has also pushed down interest rates for longer terms, as illustrated by the declining yield curve (see Chapter 1).

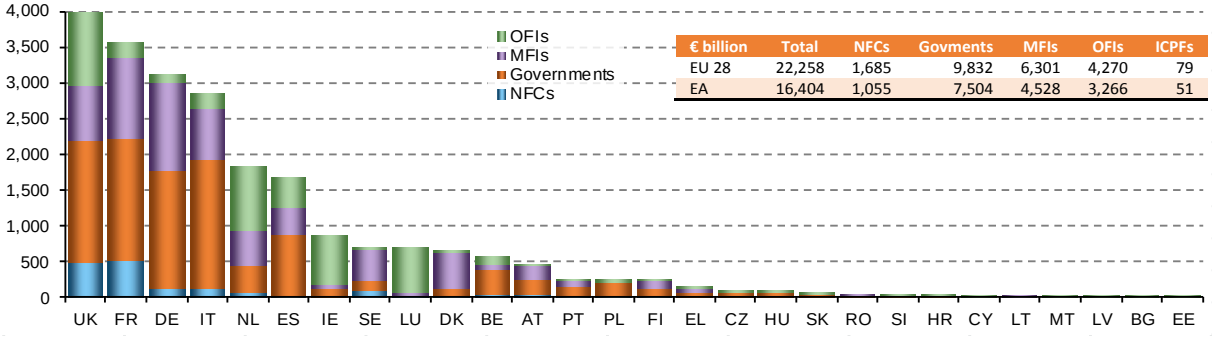
Country analysis

Four countries (the UK, France, Germany and Italy) account for over 60 per cent of bond issuance in the EU; this share goes up to over 75 per cent when the Netherlands and Spain are included, although this concentration stems from the size of those six countries (their combined GDP also represents over 75 per cent of EU GDP).

In most countries, as in the euro area as a whole, the government sector and the financial sector account for most bond issues. Issuance by financial institutions other than banks is particularly significant in Luxembourg, Ireland and the Netherlands in relation to their GDP. Luxembourg and Ireland are known to be attractive to international financial institutions as a point of entry to the EU market. In the Netherlands, pension schemes may boost the figure. By contrast, bond issuance by banks (MFIs) is particularly significant in Denmark, Sweden and Luxembourg. Bear in mind, though, outstanding volumes of bank bonds have fallen since 2011 (see Chart 53).

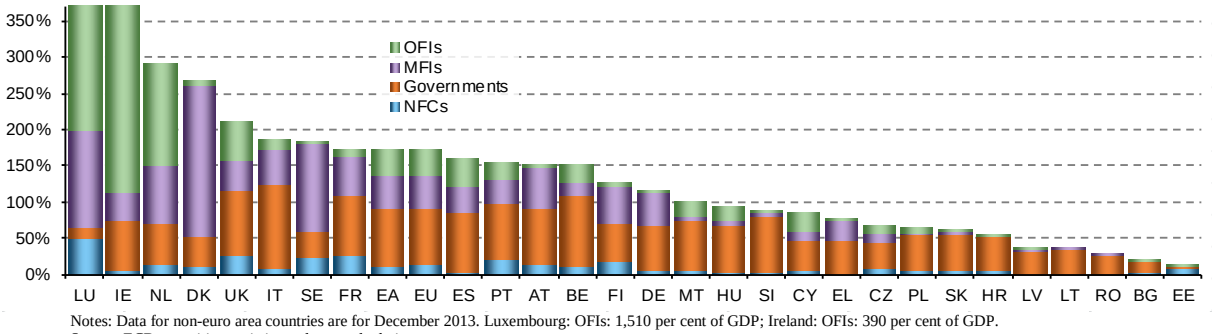
With a few exceptions, bonds issued by NFCs account for about 10 per cent or less of total issuance in each country and 10 per cent of GDP or less.

Chart 55: **Issuance of bonds by country and sector**, bonds outstanding, December 2014
€ billion



€ billion	Total	NFCs	Govments	MFIs	OFIs	ICPFs
EU 28	22,258	1,685	9,832	6,301	4,270	79
EA	16,404	1,055	7,504	4,528	3,266	51

Percentage of GDP

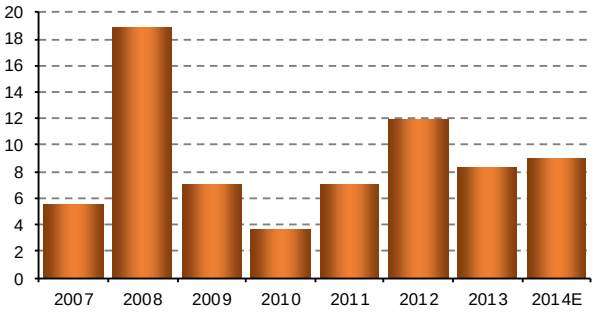


Notes: Data for non-euro area countries are for December 2013. Luxembourg: OFIs: 1,510 per cent of GDP; Ireland: OFIs: 390 per cent of GDP.
Source: ECB: securities statistics and own calculations.

Private placements

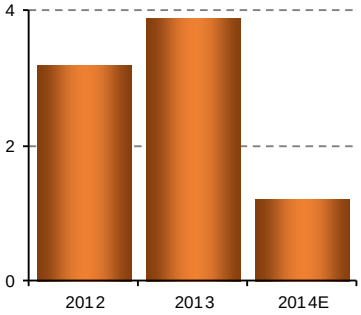
Private placements are used for purposes similar to those of bonds, and often on the same terms and conditions. They usually have medium- to long-term maturities. Such operations can take the form of either bond issues or bank loans,[125] based on ad hoc documentation. Unlike bonds, private placements are usually illiquid instruments, typically held by investors until maturity of the contract or, sometimes, traded over the counter (unlisted). Because the funds are provided by institutional and professional investors, private placements are not subject to some of the information needs and the laws and regulations designed to protect (retail) investors that apply to the issuance of bonds. In this context, they provide a source of funding without the need for a formal credit rating and reporting requirements common for other capital market debt products. On top of the issuer (financial and non-financial firms and public entities) and the institutional investors providing the funds, a banking institution is usually involved in private placements acting as intermediary.

Chart 56: **Schuldschein**, gross issuance, annual, € billion



Note: 2014: expected issuance
Source: IKB Deutsche Industriebank (German Market Outlook 2014)

Chart 57: **Euro PP**, gross issuance, annual, € billion



Note: 2014 expected issuance
Source: C/M/S Bureau Francis Lefebvre

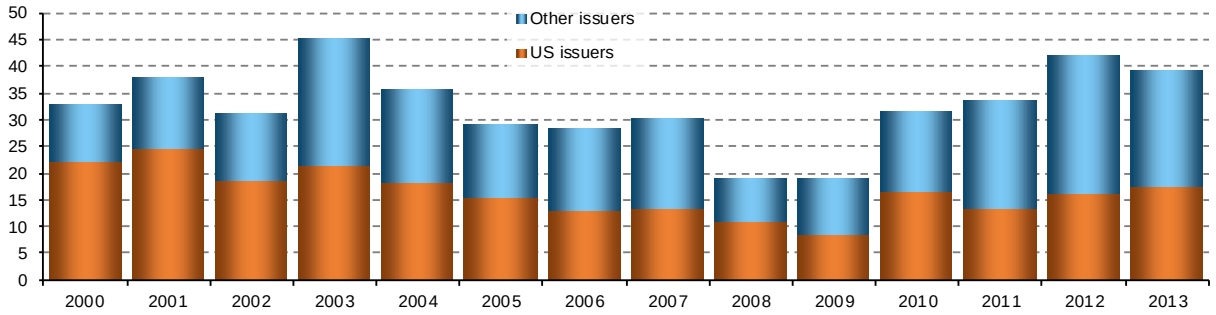
Availability of regulatory frameworks has enhanced the development of private placement markets in some countries, particularly in Germany (*Schuldschein* market[126]), France (*Euro PP*) and the US (OECD, 2014a). While still a nascent market, there is high development potential on private placement markets (White & Case, 2014).

[125] While private placements in the form of loans are constructed as securities for economic purposes, they are not considered securities in legal terms (Koller, 2014).
[126] Schuldschein loans are also known as 'assignable loan agreements', 'debt notes' or 'debenture bonds'.

Annual gross issuance of *Schuldscheine* has ranged between € 6 billion and € 9 billion a year (Chart 36). Schuldscheine are particularly used in moments of higher financial turmoil, when access to other traditional funding sources is more constraint (e.g. 2008 and 2012). Since its creation in 2012, the French *Euro PP* has raised more than € 8 billion[127].

The US private placements market has been in existence longer than the European market, and is used by both US companies and companies from other countries. Annual issuance fluctuates around € 35 billion. US private placements have attracted increasing demand from European companies in the last three years, reflecting the protracted European financial crisis.[128]

Chart 58: **US Private Placements**, gross issuance, annual, € billion



Source: Thomson Reuters, OECD

Box E. **Bonds and bond issuers in the EU and the US: main features**

This box looks at the microstructure of corporate bonds by providing an overview of the main sectors, the maturity structures, the issuance dates, currencies, countries and the main individual issuers. Given the relevance and development of US markets, data for the EU are compared with those of the US.

Background

Financial and non-financial firms have different reason for choosing to issue bonds. In general, NFCs issue bonds to obtain financing from a large pool of investors, so virtually all their bonds are issued openly in the markets to reach as wide a public as possible. Financial corporations, by contrast, may issue bonds purely to obtain funding or for a range of other reasons such as to obtain liquidity (e.g. by issuing a covered bond directly pledged at the central banks), to comply with prudential requirements (e.g. banks need a minimum level of subordinated debt and bail-inable debt), to distribute risk (e.g. through securitisation), to conduct maturity transformation beyond the scope of deposits (e.g. by issuing short-term bonds to finance long-term loans), etc. Consequently, many of the bonds issued by financial corporations do not necessarily pass through the markets (i.e. they can be used in 'repo' operations, they can be securities retained by the originator, they can be directly bought by the central bank, they can be used for securitise financial transactions, etc.). This has two important implications. First, the buyers of such bonds are not a large pool of investors but rather a single market participant, or maybe a handful. Second, information about the features of these bonds is extremely limited and highly opaque.

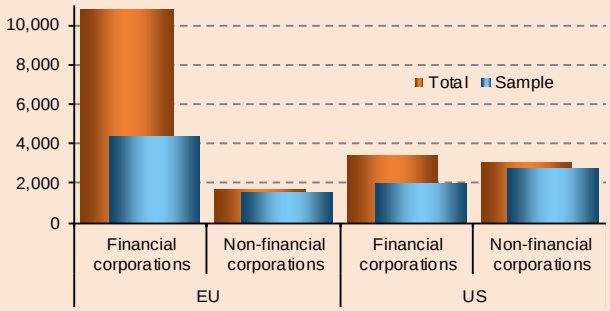
While all these bonds are called 'corporate bonds' (to distinguish them from sovereign bonds), bonds issued by NFCs are very different in kind from those issued by financial corporations. so, in this box we make a distinction between bonds issued by financial corporations and those issued by non-financial corporations where necessary.

Total volumes

In December 2014, the outstanding volume of bonds issued by EU companies (€ 12 400 billion) was twice as large as that of bonds issued by US companies (€ 6 400 billion). In the EU, the bulk of corporate bonds is issued by financial institutions (86 per cent); however, in the US, the distribution is more balanced between financial institutions (53 per cent) and non-financial institutions (47 per cent). Focusing exclusively on NFCs the volume of bonds issued by US companies (€ 3 000 billion) is about twice as large as the volume of bonds issued by EU companies (€ 1 700 billion) (Chart B8).

[127] For further details about private placements in Germany and France, see Linhart (2014) and Sapin and Montebourg (2014).
[128] See New York Life (2013).

Chart B8: **Bonds issued and sample,** outstanding volumes, 2014 December, € billion



Source: Eurostat, ECB, Federal Reserve, Bloomberg and own calculations.

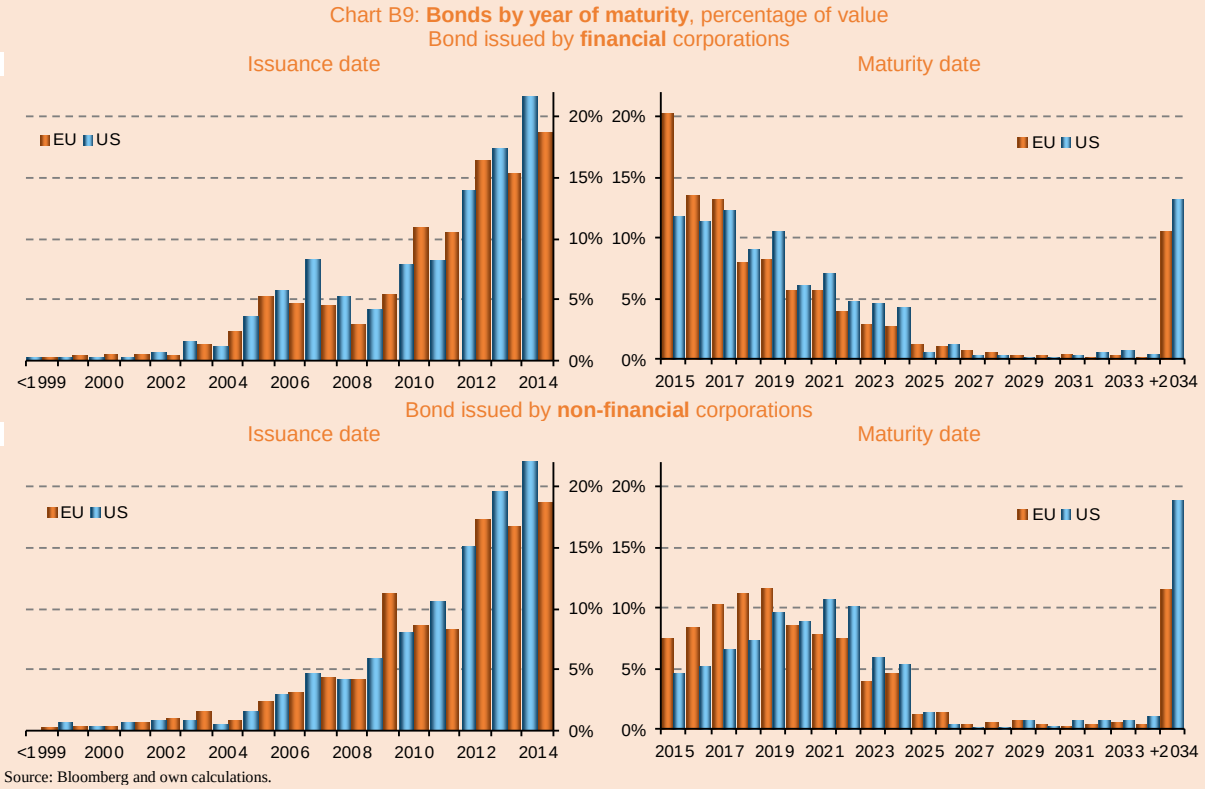
This breakdown is based on a sample extracted from Bloomberg. The sample includes all bonds outstanding in December 2014 worth €0.25 billion or more at issuance (i.e. 10 200 bonds issued by European corporations and € 11,800 bonds issued by US corporations). The total sample (€ 10,500 billion outstanding) represents about 90 per cent of the bonds issued by NFCs and about 50 per cent of the bonds issued by financial corporations (Chart B8).

The lower coverage for financial corporations is not explained by the way the sample was taken, but is indicative of the widespread use of 'non-market' bonds discussed above.

Date of issuance and maturity

Given financial institutions' role in converting short-term into long-term maturities, their maturity profile is more skewed to shorter maturities than the maturity profile of NFCs (Chart B9, right-hand panel), which tend to work with medium-term to long-term maturities (see also Chart 54). Having said that, EU-issued bonds seem, in general, to have shorter maturities than US-issued bonds, both for financial and non-financial firms.

Chart B9: **Bonds by year of maturity**, percentage of value



Source: Bloomberg and own calculations.

Issuer sector and collateral

As stated above, issuance of bonds by the financial sector (including banks, special purpose vehicles and other financial firms) is very significant in both the EU and the US, but more so in the EU (86 per cent of all bonds) than in the US (53 per cent). Industrial companies issue significantly higher amounts of bonds in the US than in the EU. Utilities (electricity, telecoms and gas) and the transport sector issued much smaller amounts (Chart B10).

Chart B10: **Bonds by issuer sector**, percentage of value

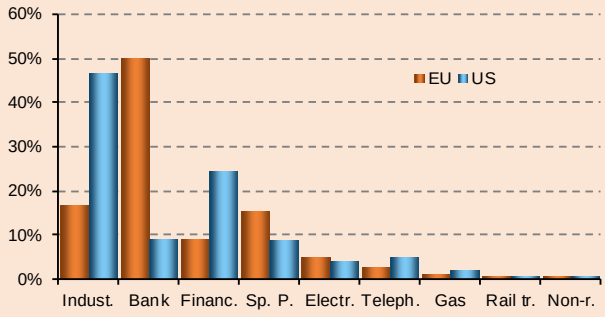
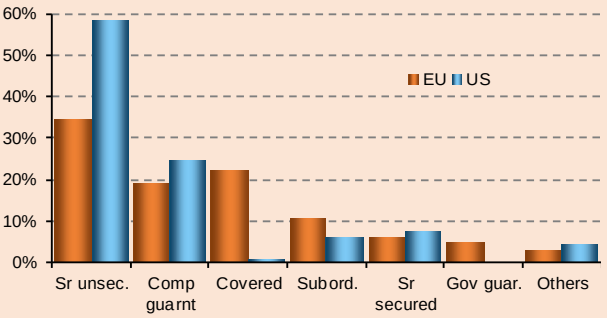


Chart B11: **Bonds by collateral**, percentage of value



Notes: Indust: industrial companies; Financ.: financial companies other than banks and SPVs; Sp. P.: Special purpose vehicles (SPVs); Electr.: electrical companies; Teleph.: Telephone operators; Rail tr: rail transport; Non-r.: transport other than rail.
Source: Bloomberg and own calculations.

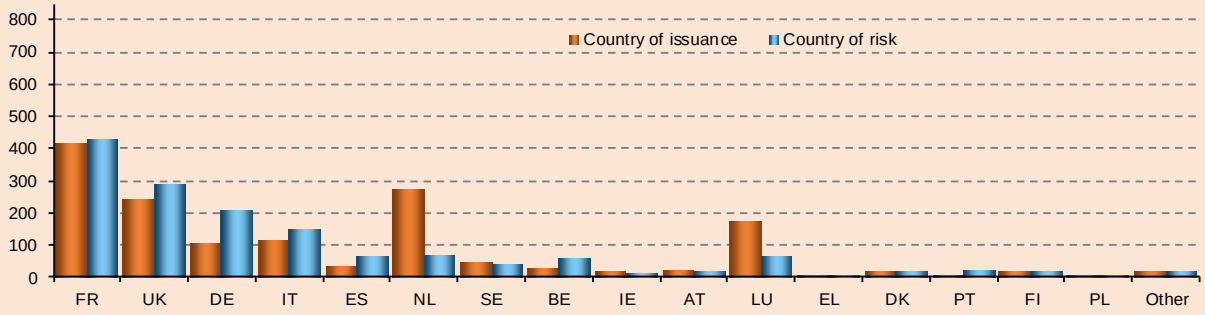
In the US, the majority of bonds have either senior unsecured status or are guaranteed by the company. In the EU, as well as those two categories, covered bonds are significant; this is explained, to a large extent, by the large proportion of bonds issued by banks. The other collateral categories are smaller, but note that in 2014, there was still € 240 billion in bonds issued under government guarantee (Chart B11)[129].

Geographical analysis and international dimension

As seen from the aggregate point of view (Chart 55), six countries (France, the UK, Germany, Italy, Spain and the Netherlands) account for about 80 per cent of all bonds by value.

International firms account for the difference between the distribution of the country of issuance and that of the country of risk. For example, subsidiaries may issue bonds in their host country, or firms may issue in countries where costs are lower or where they have access to investors. Countries like the Netherlands, Ireland and Luxembourg seem to attract a significant volume of bonds issued by firms operating from other EU countries (Chart B12).

Chart B12: **Distribution of bonds by country**, Non-financial corporations, € billion



Source: Bloomberg and own calculations.

About € 400 billion in bonds issued in EU countries were issued by firms operating from other countries. European firms from outside the EU (mainly Switzerland and Norway) issued up to € 190 billion in the EU. Total issuances of bonds in the EU by companies operating from outside Europe was € 180 billion. By contrast, US markets attracted € 340 billion of issuance from foreign companies (€ 170 billion of which were issued by EU corporations) (Chart B13).

Chart B13: **Cross border issuances**, € billion

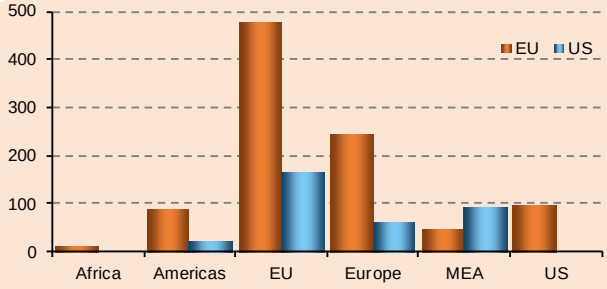
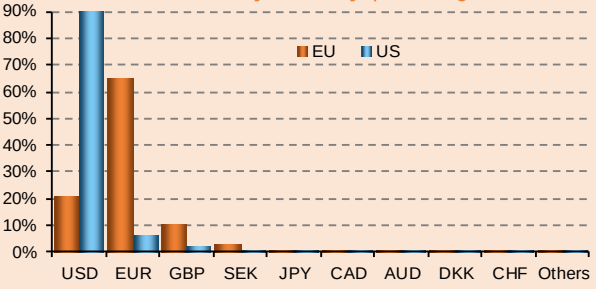


Chart B14: **Bonds by currency**, percentage of value



Notes: The chart plots the bonds issued by companies from Africa, America, the EU, Europe (non-EU), Middle East, Asia and Oceania (MEA) and the US cross border either and EU country or in the US. Cross border is defined as bonds issued in a country different from the country of risk.
Source: Bloomberg and own calculations.

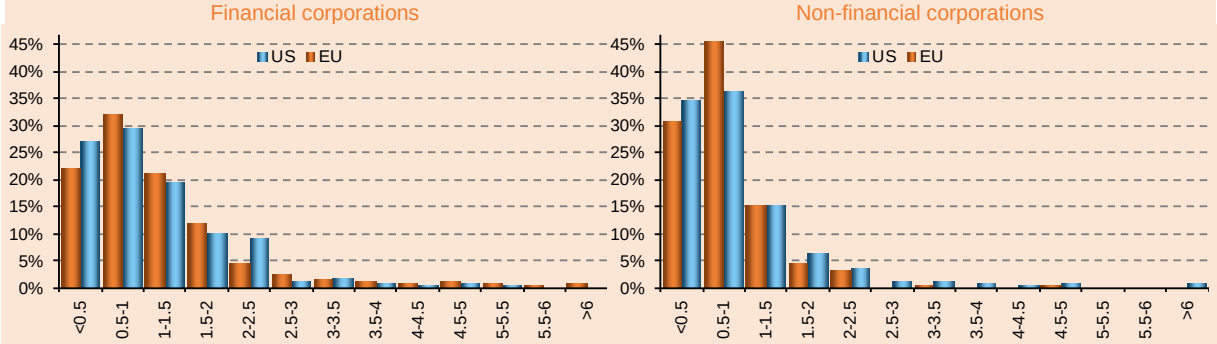
[129] For further details about guaranteed bonds, see European Commission (2014d).

In most cases, the currency of denomination is the local currency in the market where the bond is issued. The USD and the EUR are the main currencies used by US and EU issuer followed by the GBP and the SEK, but with a much lower share (Chart B14).

Issuance size

The great majority of bond issues by non-financial corporations are smaller than € 1 billion (almost 80 per cent in terms of value). For financial corporations, while bond issues smaller than € 1 billion are also predominant, bond issues of between € 1 and € 2.5 billion account for almost 40 per cent in value terms. There are very few bonds issues larger than € 2.5 billion (Chart B15).

Chart B15: **Bonds by issuance size** (€ billion), percentage of value



Note: The sample includes only bonds with a minimum size of €0.25 billion.
Source: Bloomberg and own calculations.

Concentration

The issuance of bonds is highly concentrated, particularly for financial firms (Table B1). The combined volume of bonds outstanding issued by the top 20 EU financial firms in December 2014 represented about 40 per cent of all bonds issued by financial firms (in the sample). Similarly, the top 20 US financial firms accounted altogether for over 60 per cent of all the bonds issued by US financial firms (in the sample). The top 7 firms alone issued 50 per cent of all financial bonds (see Chart A6 in the Annex).

Table B1: **Concentration in bond markets**

Sector	Bonds outstanding (€ billion)				Share of top 20 companies		Number of firms in the sample	
	Full sample		Top 20 companies					
	US	EU	US	EU	US	EU	US	EU
Financials	1,956	4,370	1,207	1,752	61.7%	40.1%	530	746
Non-financials	2,723	1,482	614	546	22.5%	36.8%	1,144	583
Total	**4,679**	**5,853**	**1,820**	**2,298**	**38.9%**	**39.3%**	**1,674**	**1,329**

Source: Bloomberg and own calculations.

Issuance by NFCs was also concentrated in the EU, and to a lesser extent in the US. The top 20 EU non-financial firms issued about 37 per cent of the bonds outstanding issued by non-financials corportions, while top 20 US non-financial firms issued 'only' 23 per cent.

Note that some industrial companies use a financial arm to issue bonds. This is more the case in the US (e.g. General Electric Capital, Ford Credit Europe, and Caterpillar) than in the EU (although Volkswagen, of the top 20 firms).

5.2. Stock markets

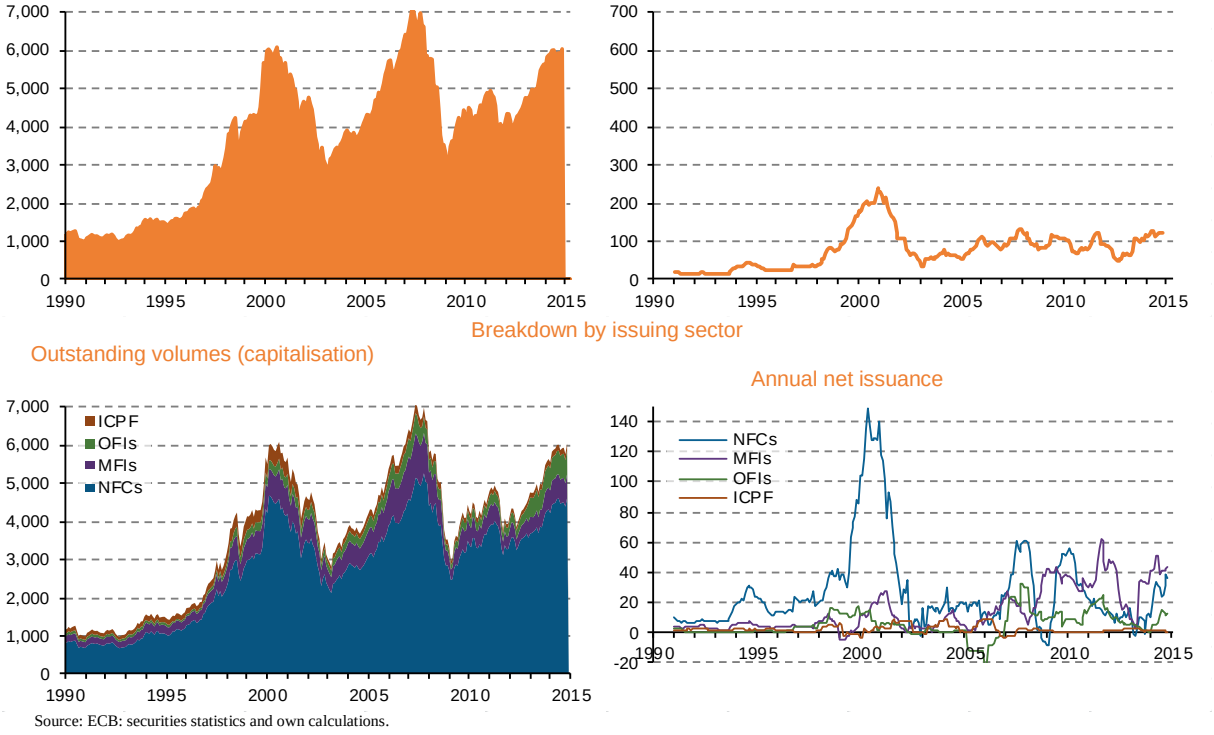
Stocks have very different features from bonds. Equity instruments are, in principle, permanent, so they do not need to be rolled over. Consequently, annual issuance of equity is much smaller than annual issuance of bonds and much smaller than the total outstanding volume of equity. Similarly, redemptions tend to be small. Market capitalisation is significantly affected by price fluctuations, which reflect actual income and losses but also other factors such as the outlook for the firm, investor confidence and other psychological factors.

They are different not only in kind but in size. Euro area equity markets (quoted shares) are three times smaller than bond markets (market capitalisation was € 6 000 billion in December 2014, or 65 per cent of euro area GDP, compared with over € 16 000 billion of outstanding bonds). The bulk of quoted shares are issued by NFCs, while the market capitalisation of banks and other financial institutions is much smaller (Chart 59, bottom-left panel). It appears that NFCs and financial corporations (MFIs and OFIs) have opposite preferences for quoted shares (equity) and bonds. NFCs make extensive use of capital markets, in the form of quoted shares, and much

more limited used of bond markets; while financial corporations use bond markets extensively and issue quoted shares to a much lesser extent (see Section 5.1 and Chart 13).

In this context, there is a debate about how the tax systems in Europe may be promoting debt financing against equity financing by allowing generally the deductibility only of the cost of debt. This is the so-called *debt bias in corporate taxation.*[130] The choice between equity financing and debt financing and the incentives implied by tax systems may in particular apply for companies of a certain size which feature generally a higher creditworthiness and easier access to outside finance, as compared to SMEs. As SMEs have a much less leeway in this regard; this may explain, to some extent, their relatively larger recourse to equity (other than quoted shares) in the non-financial corporate sector. However, the debt bias could particularly affect small innovative companies that rely more on funding from venture capitalists and angle investors. In a recent paper published by the Bank of England, Anderson et al. (2015, p. 10), plea for some caution with respect to the effect of tax regimes on the size of markets. Given the fact that the US has simultaneously the highest effective average corporate tax rates and the largest quoted stock markets in the world, it is not clear that a reduction in the tax advantages of debt financing would necessarily encourage more equity issuance in the EU.

Chart 59: **Equity markets**, euro area, € billion
Totals



Source: ECB: securities statistics and own calculations.

Dynamics and bubbles

Changes in net issuance of quoted shares are particularly relevant to the way the dotcom bubble burst in the early 2000s. Annual net issuance of shares by NFCs (mainly technology companies) skyrocketed to over € 140 billion a year. This went hand in hand with a widespread 'hype' and increasing demand, which multiplied the prices of these stocks and explains, to a large extent, the rise in capitalisation. However, at a certain point, (the 'Minsky moment'[131]) investors realised that this was not sustainable and stopped buying new shares. The artificially high stock prices were corrected and capitalisation went down to € 3 000 billion.

[130] See, for instance, Fatica et al. (2012), Zangari (2014), Langedijk et al. (2014), de Mooij (2011) , Keen and de Mooij (2012), de Mooij et al. (2014) and Cochrane (2014).
[131] The 'Minsky moment' refers to a sudden collapse of assets values following a long period of prosperity and increasing value of invesments.

The financial crisis that started in 2007 shows a similar evolution of capitalisation although the correction was not originated in excessive net flows of equity. The 2007-2008 bubble did not arise in the stock exchange but in credit: net flows of bank loans to households and firms as well as well as net interbank and inter-financial loans increased significantly throughout the early 2000s (see Chart 27 and Chapter 1). The values of net annual flows of loans (€ 400 billion for household loans, € 600 billion for corporate loans and € 3 000 billion for inter-financial loans) and its subsequent reversal are far higher than the values of net annual issuances of quoted shares (€ 140 billion). This may explain, to some extent, why the more recent crisis was more severe and why it took longer to be absorbed. As mentioned in Chapter 1 and given the dynamics observed in Chart 59, it cannot be discarded that equity markets could be affected by a new correction somewhere down the near future.

Another important difference between the dotcom bubble and the financial bubble of 2007-2008 is the availability of capital buffers to accommodate the burst. Non-financial corporations finance up to half of their activities with their own resources (equity) (see Chart 13). This means that they have a large buffer to absorb losses whenever problems arise and that those losses are borne by the investors directly involved in the management of the companies with problems. This allowed problematic balance sheets in the dotcom bubble to be cleaned up quickly without significant contagion to other economic agents.

The buffers available in bank balance sheets (and those of financial institutions in general) are much smaller. Section 4 shows that the balance sheet of the financial sector is as large as the balance sheet of the non-financial sectors of the economy taken together, but the amount of equity available in financial institutions is much more limited.

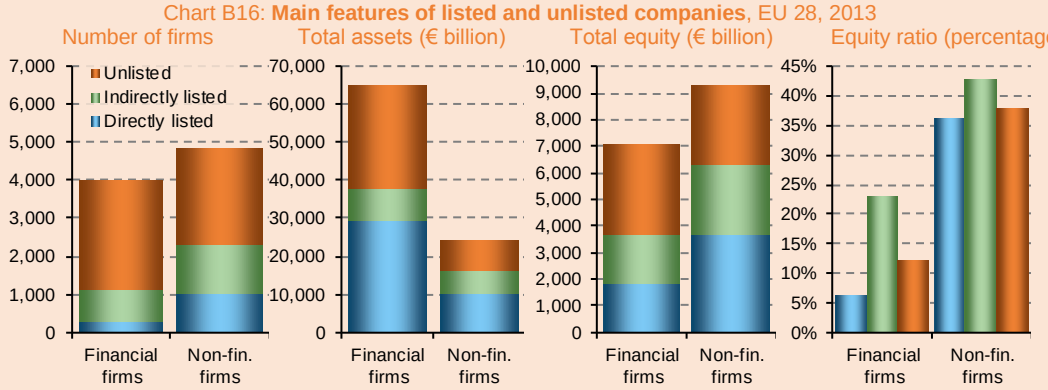
The 2007-2008 credit bubble's much larger size than the 2000-2001 equity bubble and the small amount of equity available in the financial sector to absorb the slump contribute to explain why the current financial crisis has lasted so long. Given the lack of buffers, the excesses cannot be corrected through prices and losses but by issuing new equity. This explains the high levels of issuance of quoted shares, particularly by banks, observed since the outbreak of the crisis (Chart 59). Having said that, public authorities and analysts should certainly take care that a new bubble is not in the making.

While issuance of quoted shares during the crisis was high compared with historical data, it is still considerably lower than that of bonds (see Chart 52) and smaller than the credit boom that drove the bubble.

Box F. **Quoted vs non-quoted companies. Main features**

The aim of this box is to analyse the features of listed companies and to compare them with non-listed companies. In particular, it focuses on the sector of activity, the country of incorporation and the size of the companies. The analysis is based on a sample extracted from the Orbis database containing the largest 10 000 firms in the EU. The companies with access to stock markets has been split into 'directly listed' companies, when the firm itself has issued quoted shares; and 'indirectly listed' companies, when it is the parent company the one who has issued quoted shares. The analysis is done at the highest level of consolidation at EU level, except for the country distributions, where the highest level of consolidation at country level is used.

Chart B16: **Main features of listed and unlisted companies**, EU 28, 2013



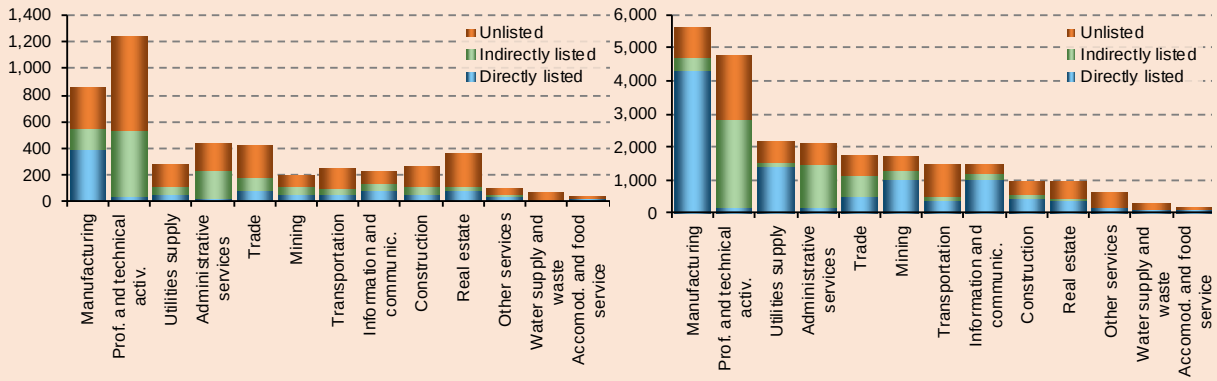
Notes: Analysis based on the 10 000 largest EU companies. For groups only the entity at the highest consolidating level is taken into account. 'Indirectly listed' refers to subsidiaries of listed companies (which have indirect access to equity markets).
Source: Orbis and own calculations.

Sector of activity

A distinction should be made between financial firms and all other firms. Almost half of the largest EU companies are financial firms, but they hold over 70 per cent of total assets of the sample (Chart B11). However, given the lower capital ratios of financial firms, their total equity (i.e. capitalisation for listed companies) is lower than for non-financial firms.

Over 60 per cent of the large EU firms are non-listed, but they hold only about 40 per cent of total assets of the sample. This indicates that listed companies tend to be larger than non-listed companies. Unlisted companies tend to have similar capital levels than directly listed companies, while indirectly listed companies (both for financial and non-financial firms) tend to have larger capital ratios. This indicates that subsidiaries rely heavily on the financing provided by their parent company.

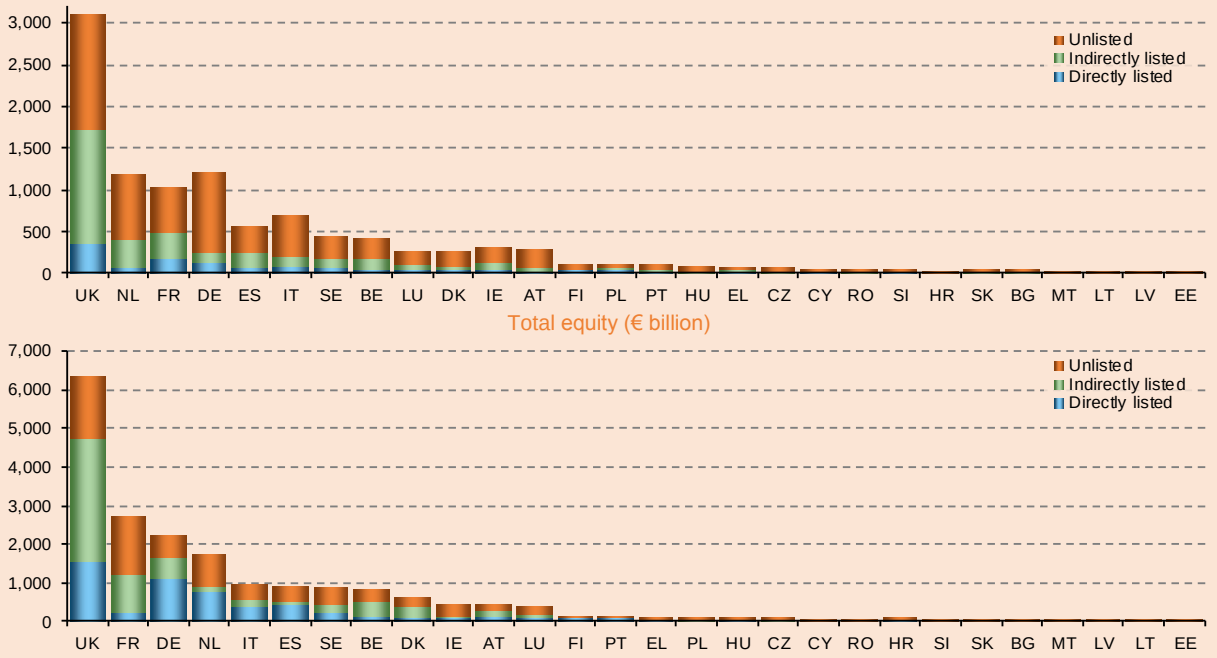
Chart B17: **Listed and unlisted companies by sector of activity**, non-financial firms, EU 28, 2013



Notes: Analysis based on the 10 000 largest EU companies extracted from the Orbis database. For groups only the entity at the highest consolidating level is taken into account. 'Indirectly listed' refers to subsidiaries of listed companies (which have indirect access to equity markets). The combined number of firms in the sectors that are not listed (Public administration and defence, compulsory social security; human health and social work activities; arts, entertainment and recreation; agriculture, forestry and fishing; and education) is lower than 100.
Source: Orbis and own calculations.

Data show that there are both listed and unlisted companies across all sectors. However, manufacturing and the category of professional, scientific and technical activities concentrate almost half of the firms (within non-financial corporations) in terms of both number of companies and total assets (Chart B17).

Chart B18: **Listed and unlisted companies by sector of activity**, non-financial firms, EU 28, 2013



Notes: Analysis based on the 10 000 largest EU companies extracted from the Orbis database. For groups only the entity at the highest consolidating level is taken into account. 'Indirectly listed' refers to subsidiaries of listed companies (which have indirect access to equity markets).
Source: Orbis and own calculations.

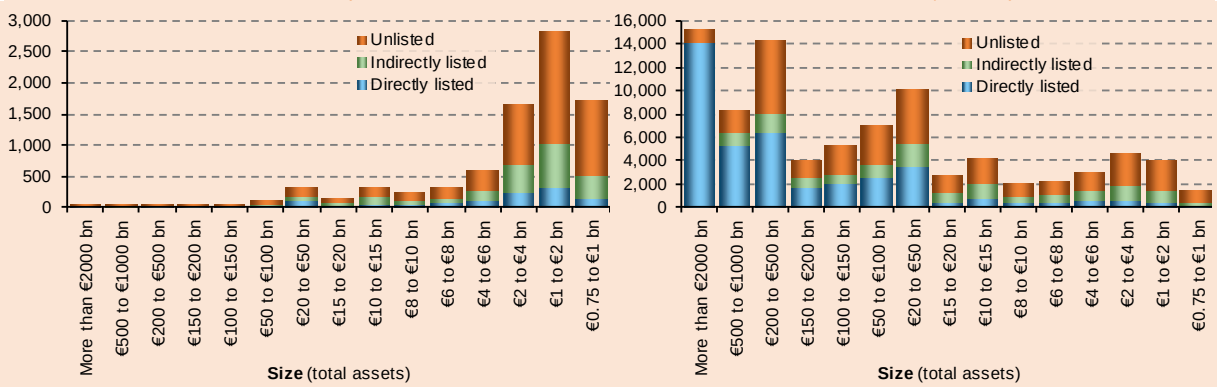
Country

The UK accounts for the largest number of firms and the largest amount of equity. The Netherland, France and Germany follow in importance. In general, unlisted firms are more numerous than listed ones, but the total size of listed firms is larger. Indirect access to markets of subsidiaries through a parent company is very relevant in most of the countries (Chart B18).

Company size

There are listed and unlisted companies across the whole range of company size. However, larger companies in the sample are more likely to be listed (Chart B19).

Chart B19: **Listed and unlisted companies by size**, non-financial firms, EU 28, 2013

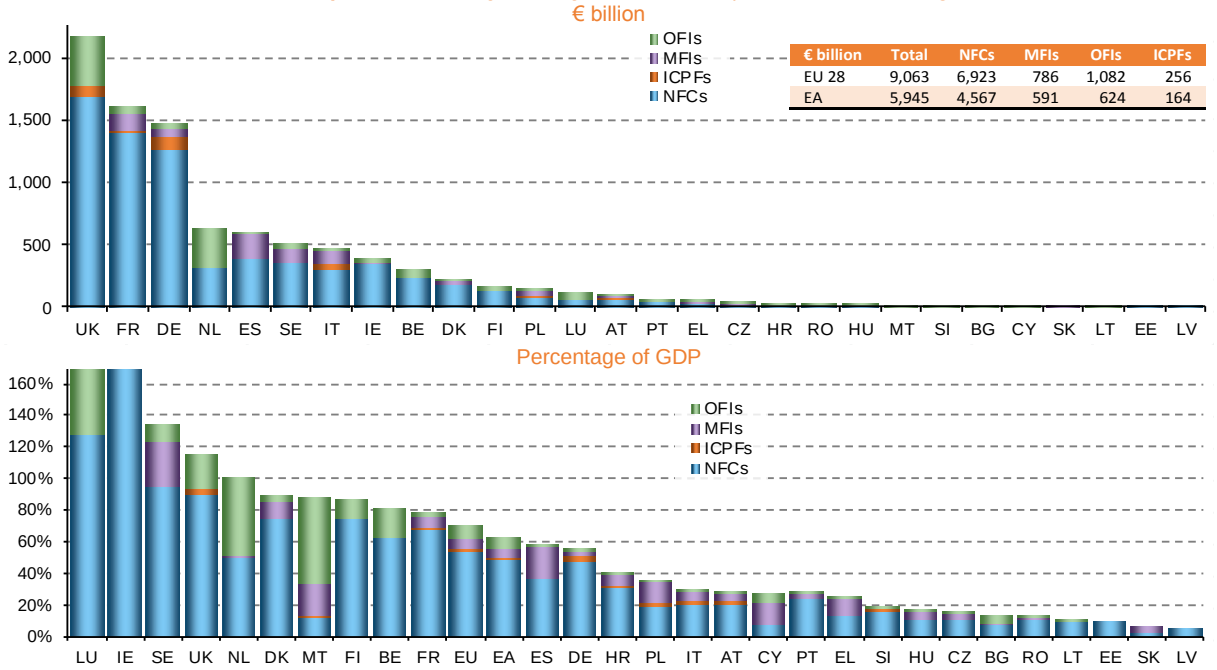


Notes: Analysis based on the 10 000 largest EU companies extracted from the Orbis database. For groups only the entity at the highest consolidating level is taken into account. 'Indirectly listed' refers to subsidiaries of listed companies (which have indirect access to equity markets).
Source: Orbis and own calculations.

Country analysis

The largest stock markets, in absolute terms, are in the UK, Germany and France, where almost 60 per cent of all EU shares were issued (Chart 60). However, the largest markets relative to GDP are those of Luxembourg, Ireland, the UK and the Netherlands. In the majority of countries, most quoted shares were issued by NFCs. In a few countries (Malta, Cyprus, Luxembourg, Netherlands or Bulgaria), OFIs issued a large proportion of quoted shares, and in a few other countries (Sweden, Malta, Spain, Greece or Poland) MFIs are relatively significant.

Chart 60: **Issuance of quoted shares by country and sector**, capitalisation outstanding, December 2014



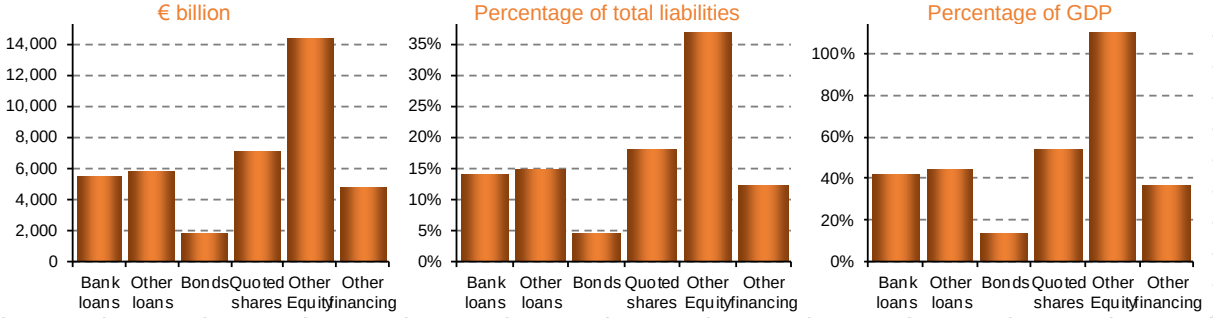
€ billion	Total	NFCs	MFIs	OFIs	ICPFs
EU 28	9,063	6,923	786	1,082	256
EA	5,945	4,567	591	624	164

Notes: Luxembourg: OFIs = 156 per cent of GDP. Shares issued in Luxembourg by MFIs and ICPFs are nil; this indicates that (listed) banks and ICPFs with subsidiaries in Luxembourg issue their shares in their country of origin. Ireland: NFCs: 202 per cent of GDP; MFIs = 13 per cent of GDP; OFIs = 11 per cent of GDP; ICPFs = 0 per cent.
Source: ECB: securities statistics and own calculations.

6. DIRECT FINANCING BEYOND CAPITAL MARKETS

Financial intermediation and capital markets are used to different degrees by the different institutional sectors (e.g. NFCs, governments, households and financial institutions).[132] NFCs, representing the productive branch of the economy, use financial intermediation and capital markets for about one third of their funding (bank loans: 14 per cent; bonds: 4 per cent; quoted shares: 18 per cent) and other sources for the remaining two thirds (Chart 61).

Chart 61: **Sources of financing used by NFCs,** EU 28, financial liabilities, 2014 Q3



Source: European Commission (SWD-2015/13), ECB, Eurostat and own calculations.

Financial authorities both at EU and national level have taken a series of unprecedented measures to stabilise markets and restore confidences (see Section 2.2). In his presentation to the European Council in February 2015, Commission President Jean-Claude Juncker (2015a and 2015b) argues that in order for the EU to deliver the goals set out in the Treaties (particularly inclusive and sustainable growth and high levels of employment), there is a need not only to restore confidence in financial markets but also to rebuild trust among citizens and the broader economy.

In this context, it is critical to understand the implications for confidence, financial stability, growth and jobs stemming from the strain that the financial crisis has put on the economy. An overview of funding from various sources other than capital markets and financial intermediation is given Section 3, so this section focuses on how those other sources of funding for non-financial corporations may affect the smooth functioning of the economy and on how they have been affected by the financial crisis. It also looks at *crowdfunding* as a nascent source of funding.

6.1. The financing mix of non-financial corporations

The funding provided by financial intermediation and capital markets is crucial to improving the capacity of the productive economy to generate growth and jobs. But a number of other stakeholders besides investors are critical to businesses' existence and to economic production in general: employees, customers, input suppliers, public authorities, services providers, educational systems, etc. All these stakeholders interact with firms through economic and financial relationships.

Economic transactions between suppliers and clients, and between companies and employees, imply intrinsic financing resources that can be provided neither by capital markets nor by the financial sector. While they are mostly short-term, they are still critical for a well-functioning economy. These sources of funding arise from the difference between the 'continuous' accrual of economic value and the 'point-in-time' nature of payments and settlement. Wages, trade credit, utilities and tax claims are common examples. Although they entail direct financing between two economic agents, the financial sector can still provide some services linked to these bilateral positions (such as asset-based lending, factoring and leasing, as discussed in Section 4.4.3). These sources of finance are covered by the 'other financing' category and account for 12 per cent of the financing used by NFCs (Chart 61).

Other sources and forms of financing for the economy are intercompany loans, government subsidies, internal funding, and equity provided by family and friends. About half of the financing of NFCs takes the form of equity

[132] See Section 3 for further details.

other than quoted shares. This is usually the initial contributions needed to start a family business and subsequent profits ploughed back into the firm (see Section 3 for further details).

6.2. Interconnections within the economy

Firms and stakeholders are closely interconnected. Significant financial difficulties for one group of stakeholders can have a major impact on the economy: e.g. government and local authorities in financial difficulties will pay their suppliers late, firms under stress will pay their employees late, unemployed people or employees paid late will postpone their spending, etc. The various parts of the economy interact with each other and turmoil can quickly spread throughout the system leading to a vicious circle. One way out of this situation is to build a virtuous circle from a robust foundation.

Europe has been practising economic integration for over 60 years through the 'four freedoms': free movement of goods, services, people and capital. Any economic relations (e.g. trade in goods, provision of services, an employment contract or buying a bond) usually implies a financial relation. The different nature of the four freedoms, particularly in terms of mobility, affects the financial relations arising from economic interactions.

Distance in the economic relationship and debt ranking

There is a clear distinction between equity instruments and debt instruments. Equity investors maintain a very close relationship with the firm: they can scrutinise all the activities of the firm and they participate and are responsible for the day-to-day management of the company. Consequently, they take great interest in the performance of the company as their rewards, in the form of returns, are closely linked to the income from the business. On the other hand, debt investors maintain a distant relationship with the company. They do not participate in its management and they are only interested in the company's performance insofar as it will ensure their investment is repaid with the agreed interest. Most other stakeholders fall between these two positions.

Of the firm's other relationships with various stakeholders, its relationship with its employees is usually one of very close ties, a long-term relationship and mutual trust. In many countries, large firms are legally required to involve employees (through representatives) in important decisions involving the firm. In this context, staff interests are very close to those of shareholders. In companies that take the form of cooperatives, the employees are in fact the shareholders.

Given this framework, whenever a firm is in difficulty, employees may accept some sacrifices (e.g. a delay in the payment of wages for a couple of months) in the hope of contributing to its survival and, therefore, to that of their own job in the long run. The relationship between a firm and its long-term suppliers and customers has similar features. A supplier may agree to be paid later if a customer is facing temporary difficulties, because the supplier is more interested in the continuation of a long-term commercial relationship than in a specific order. However, if such delays go on too long or the amounts are too great, employees and suppliers may suffer financially and this will have knock-on effects (e.g. on their own suppliers or employees).

In other words, salaries and trade credit are, in general, 'subordinated' to other types of debts that are more 'senior'. It is usually said that the mortgage is the last thing one stops paying and, indeed, bank loans are more senior than other types of debt. Debt materialised in the form of bonds is also of the senior type: companies have high incentives to pay their bonds on time, as otherwise all their debt will be downgraded to default by rating agencies and they will be excluded from the markets. However, the same issuer has much more leeway to 'stretch' the payments to suppliers and employees, which are therefore more junior.[133] The rationale behind this ranking is that markets provide the advantage of pooling large amounts of funds from 'anonymous' sources, but this arm's length relationship implies that investors lack an insider's view of the company (although this is partially mitigated by greater transparency requirements for companies issuing in the markets). As compensation, investors receive a senior treatment.

The consequences of these two types of approach are clearly explained by Bolton et al. (2013) for banking. They compare relationship banking (based on long-term relationship between the bank and the customer) with

[133] This ranking refers to the effective priority given to payments by a going concern firm. Debtors may have a different legal rank in bankruptcy proceedings when a company is liquidated.

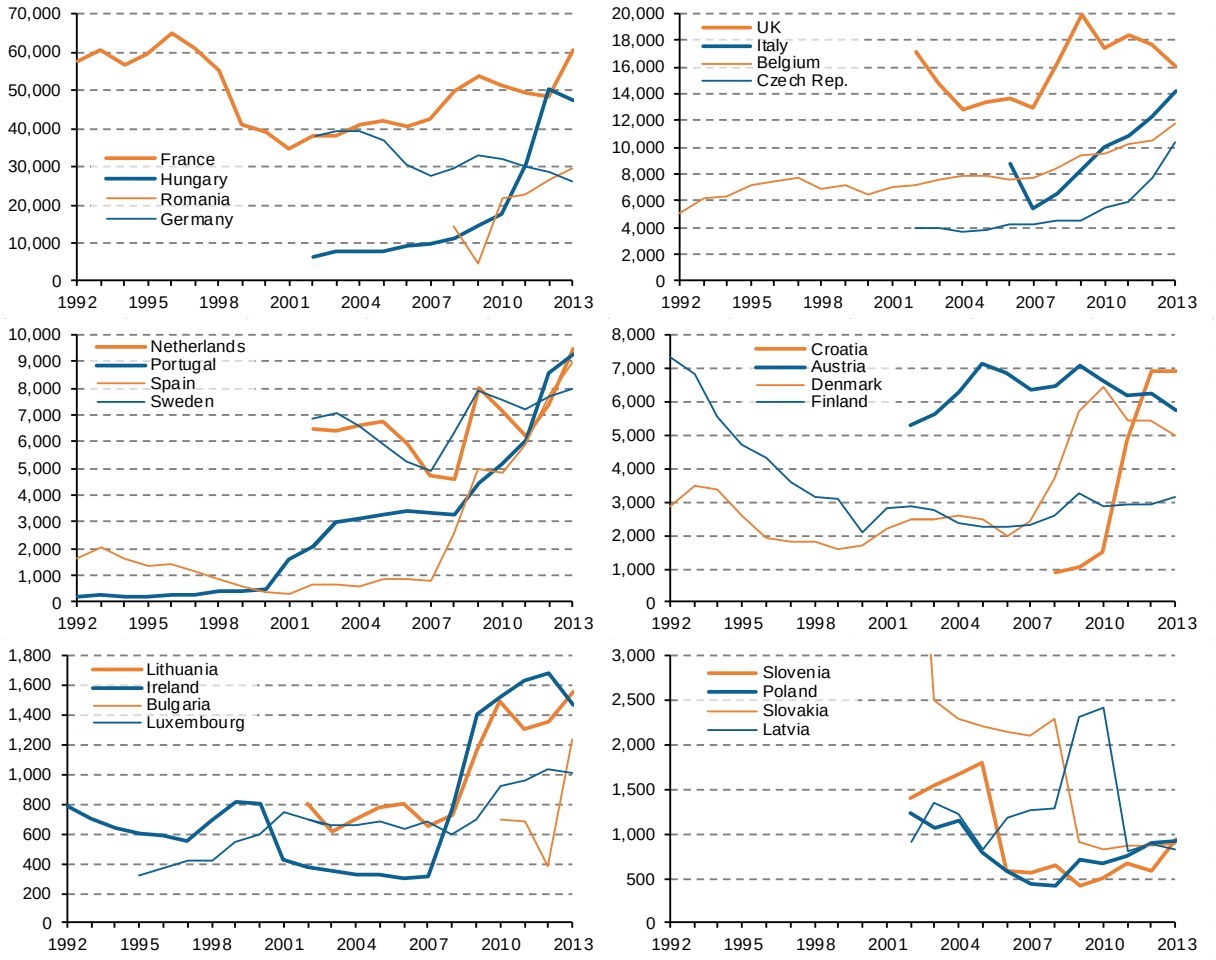
transaction banking (linked to the 'originate-to-distribute' model): *'In our model […], a key result is that relationship-banks charge a higher intermediation spread in normal times, but over continuation-lending at more favourable terms than transaction banks to profitable firms in a crisis'.*

Impact of the crisis on 'junior' stakeholder

Data on the impact of the crisis on all these junior creditors are scarce; however, it is possible to capture the main trends through a series of indirect indicators. For instance, financial investors look at high levels of non-performing loans (NPLs) in banks to assess the robustness of the financial system (see Chart 17 in Chapter 1). These same NPLs implicitly point to the financial strain that debtors are experiencing, especially since bank loans are senior to other claims (so if a company stops paying the bank it means that it has probably already stretched payment to its suppliers and owes pay to its employees).

Another example could be the financial stress experienced by some governments. Public finance was under stress in many European countries and this incontestably impacted junior creditors (e.g. suppliers, workers). Difficulties reached such levels in some Member States that they had to apply for support from European partners,[134] but many other countries were also affected, as reflected in the increasing costs of their debt (see Chart 10 in Chapter 1). Although no government defaulted during the crisis on their bonds (even the private sector involvement in Greece was a voluntary exchange of debt), they stretched payments on other instruments.

Chart 62: **Insolvencies in selected countries**. Number of companies



Notes: The definition of insolvency and the moment of computation (e.g. filing, opening, closing, etc.) may vary across countries.
Source: Credit reform and own elaboration.

The late payment Directive 2011/7/EU established the need to paid suppliers within 60 days. However, given that enforcement of contracts takes at least 300 days (in Lithuania, the best performing country) and costs about

[134] Latvia, Romania, Hungary, Greece, Ireland, Portugal, Spain and Cyprus. For further details, see Chapter 1 and last year's review.

50 per cent of the amounts claimed, compliance with the directive relies on the willingness (or capacity) of firms to abide by those limits.[135]

The junior character of wages appears clearly in the fact that salaries were reduced in many countries (even though these reductions may in some cases have been declared void by constitutional courts). In other words, public employees and suppliers have contributed to (or have borne the cost of) alleviating the burden of the increasing cost of financing in many Member States.

Similarly, many bank borrowers were unable to repay their debts and defaulted on their loans, as reflected in figures for non-performing loans (see Chart 17 in Chapter 1). There is a high probability that a company or a household that has defaulted on a bank loan has also stretched payments to other (more junior) debtors.[136] So one can expect pressure on junior debtors, such as employees or suppliers providing credit through trade credit, to be at least as high as that implicit in the trend in non-performing loans.

Unemployment figures (Chart 2 in Chapter 1) and the number of bankruptcies (Chart 62 and Chart A7 in the Annex) also provide an indirect indication of the pressure on junior debtors . During the most acute phases of the crisis, there were many demonstrations, mainly in the countries most affected by the financial turmoil. In many cases, they were linked to situations where companies confronted with financial difficulties had postponed payment of wages for months before eventually filing for bankruptcy, probably involving large layoffs. Data show how, with the outbreak of the crisis, the number of insolvencies increased significantly in many countries, although they have started to recede.

Second round effects: erosion of confidence and shrinking demand

The financial turmoil put pressure on both senior and junior debtors. On top of the consequences in the long run of this debt overhang (see Chapter 3),[137] there are two important effects in the short run: the erosion of confidence and a negative impact on demand. Many analysts have pointed out how the recent financial crisis has been linked to the erosion of confidence in wholesale markets.[138] With the outbreak of the so-called 'subprime crisis' in 2007, doubts emerged about the actual value of the assets booked by the banks that had bought CDOs and other products linked to the US subprime mortgages. The failure of Lehman Brothers in September 2008 exacerbated and generalised the 'mistrust' mode in the markets (see Chart 27, right-hand panels). Against this collapse in markets, public authorities had to step in with financial support to financial institutions and governments.

The erosion in confidence also spread to junior relationships (e.g. employees, suppliers and customers) as their financial capacity started to be affected when payment delays became prolonged. For instance, in many cases, businesses started to ask for advance payment before delivering supplies to customers. This loss in confidence has affected the economy. It has also turned into a broader malaise, as reflected in the general rise of populist and extremist parties both at national level and in the European Parliament. In economic terms, stretching the financial capacity of junior stakeholders can have a marked negative feedback effect by reducing aggregate demand which can become a vicious circle. What can seem a solution for the difficulties of an isolated company may have devastating consequences at macroeconomic level if this is generalised.

People's general economic 'mood' translates into demand for goods and services. Ordinary citizens who feel the outlook for them and their families is bright are more likely to embark on economic projects. When the outlook is gloomy, they will be more cautious with their spending. One important indicator of the economic mood of the public and consumers is provided by figures for car sales. Cars are long-term assets and need to be replaced after a few years. But when times are hard, replacement can be postponed. Because cars are usually purchased against a loan, trends in car sales tell us about the current economic situation (e.g. access to credit) and economic outlook, from the perspective of both credit institutions and prospective buyers.

[135] For further details about the cost, duration and recovery rate of bankruptcy procedures, see Chapter 3. In this context, the UK government launched a public consultation on *'Late payment. Challenging grossly unfair terms and practices'* in February 2014.
[136] Loans are usually classified as non-performing if they are over 90 days past their due date.
[137] See also Chapter 4, on longevity risk.
[138] See, for instance, Cœuré (2013), Krugman (2013), Gorton and Metrick (2012), Varoufakis (2011), Abbassi and Schnabel (2009) or Cochrane (2014). See also Chart 7 in Chapter 1.

In the recent crisis, car registrations fell by 25 per cent from peak to trough, three times more than in the aftermath of the dotcom crisis, when they fell by 8 per cent (see Chart 3 in Chapter 1). Car registrations fell back to the absolute levels of the crisis of the mid-1990s; however, in 2014 there were more people living in Europe (and needing cars). In addition, after the initial hit of the crisis in the mid-1990s, car registrations started to recover very soon. This did not happen in the recent crisis, when the fall in car registration was prolonged. Car registrations seem to have started to pick up since mid-2013 (more for non-euro area countries than for the euro area), but they still have a long way to go to reach pre-crisis levels.

Retail sales figures give a similar picture (Chart 4 in Chapter 1). Spending, even on basic articles such as food and clothing, fell sharply from a peak in the mid-2000s. Positive macroeconomic indicators (e.g. GDP growth picking up) and improving financial conditions in financial markets (e.g. declining yields) are preconditions for a robust recovery. But overall financial stability will only be restored when junior creditors are not financially stressed.

A number of studies have analysed and discussed the phenomenon of housing bubbles and financial bubbles in general.[139] The main message is that, in the long run, they generate very volatile economic growth, if any, as observed in the developments after the 2007-2008 bubble burst.

Building a robust recovery

In recent years, a debate about increasing inequality and its impact on growth has emerged[140]. Fostering the median citizen's economic capacity could be seen as a solid foundation for the economic system. Data on retail sales show how the standards of living of Europeans have systematically increased since the mid-1990s. The recent financial crisis ended this trend and has even eroded the living conditions of Europeans; however, this retail sales have also picked up again since early 2013 (Chart 4 in Chapter 1).

To tackle the consequences of the crisis on the demand side of the economy, the European Commission proposed setting up a *European Fund for Strategic Investments* (EFSI) in November 2014. The goal of the EFSI is to provide the financing needed to support economic growth based on solid foundations and to contribute to definitively overcoming the crisis. [141]

Although there is some leeway for stretching one component or the other of an economic system, an appropriate balance between all components is essential for the system to function smoothly. One should bear in mind that the economy is ultimately financed by households' savings (see Section 3), while financial institutions and financial markets are just intermediaries and do not provide additional financing resources to the economy in net terms. If households are unable to generate resources and savings, even the most advanced financial sector cannot intermediate or efficiently channel funding to projects in need of investment.

6.3. Crowdfunding

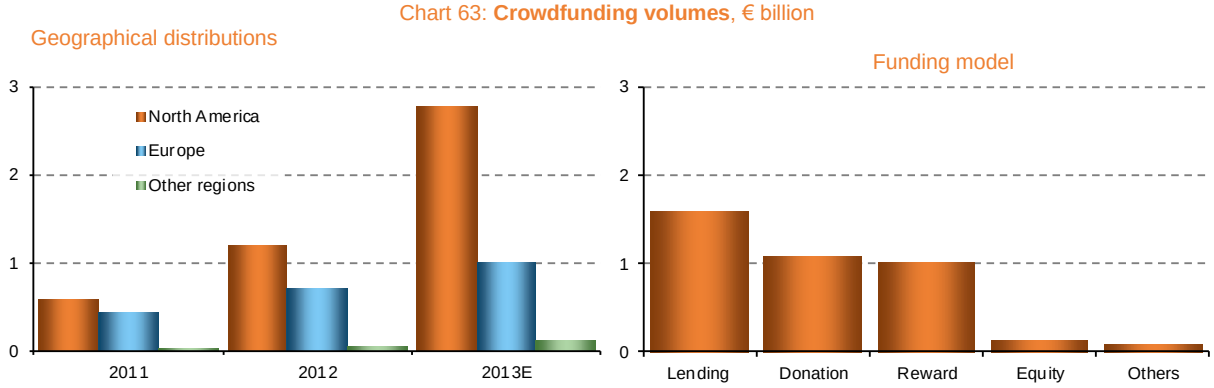
Private pooling of funds for a specific purpose has always existed. Many of us have contributed to a charity or have been involved collecting funds. Information technology has provided a new boost for this source of financing by way of what is usually called crowdfunding. While still a nascent channel, crowdfunding could, in some cases, become an alternative to other traditional funding sources given the constraints and frictions that have emerged as a consequence of the financial crisis. Examples of recourse to crowdfunding could include consumers borrowing relatively small amounts of money to renovate their homes or finance studies, or businesses borrowing to finance some new operations.

Crowdfunding has similarities with organised financial markets: it implies pooling funds from a large number of contributors and it directly connects the source of funds with the final investment. But there are also major differences, particularly in the overall size of the operations. Crowdfunding may involve hundreds or sometimes thousands of euros, while bond and share issues involve millions or even billion of euros. Consequently, there is much less information disclosed and much less supervision by the authorities for crowdfunding projects than for

[139] See for instance Mian and Sufi (2014). See also the discussion in Section 5.2.
[140] See, Frank and Cook, 1996; OECD, 2011 and 2014; Galbraith, 2012; Stiglitz, 2012; Lakner and Milanovic, 2013; and Piketty, 2014.
[141] See Box A for further details.

capital markets. Because they are so small, secondary markets where one contributor could sell on a crowdfunding investment are generally not available.

Chart 63: **Crowdfunding volumes**, € billion



Note: China is not included.
Source: Massolution, SpaceTec Capital Partners.

Crowdfunding initiatives may raise concerns in terms of fraud (by the platform or the project owner), money laundering, project failure (investment risk), investor protection, legal uncertainty, etc. and some countries have started to regulate this kind of activity. In 2014, the Commission (2014b) adopted a communication on crowdfunding which discussed the issues at stakes and whether or not there was a need for further harmonisation or action at European level.

In 2013, financing raised through crowdfunding was estimated at € 1.0 billion in Europe and € 3.0 billion in North America (ESMA, 2014). The UK is by far the largest European market for crowdfunding (€0.8 billion in 2013 and € 2.75 billion in 2014 according to NESTA, 2014). Crowdfunding in China is estimated at € 1.4 billion (IOSCO, 2014). In Europe, over 600 crowdfunding platforms provide the market structure needed to connect contributors with projects.

Crowdfunding can be divided into two broad categories. One is crowd sponsoring, in which donations, rewards and pre-sales models do not entail any financial return to contributors; the other is based on profit-sharing models, or crowd lending, also called peer-to-peer lending (P2P lending), and crowd investing (equity based).

While crowdfunding platforms are generally independent companies, traditional banks and financial firms are recently taking an interest in some crowdfunding segments, either in providing infrastructure or in offering securitisation services[142].

7. CONCLUSIONS

This chapter provides an overview of the structure of the financial sector in the European Union. In particular, it provides a quantitative overview of the role of the financial system in channelling funding across the economy. The analysis presented here deals with questions such as who is providing credit, who is using this credit, in which form the credit is formalised or through which channels financial resources flow. Besides the size of the different institutional sectors (e.g. households, non-financial corporations) in terms of assets and liabilities, the chapter also reviews the preferences of markets participants as reflected in the mix of products they choose to invest in or to use as a source of funding. These customer preferences in the provision and use of funding determine the importance and role that the financial sector, and its different segments, is to play in the European economy.

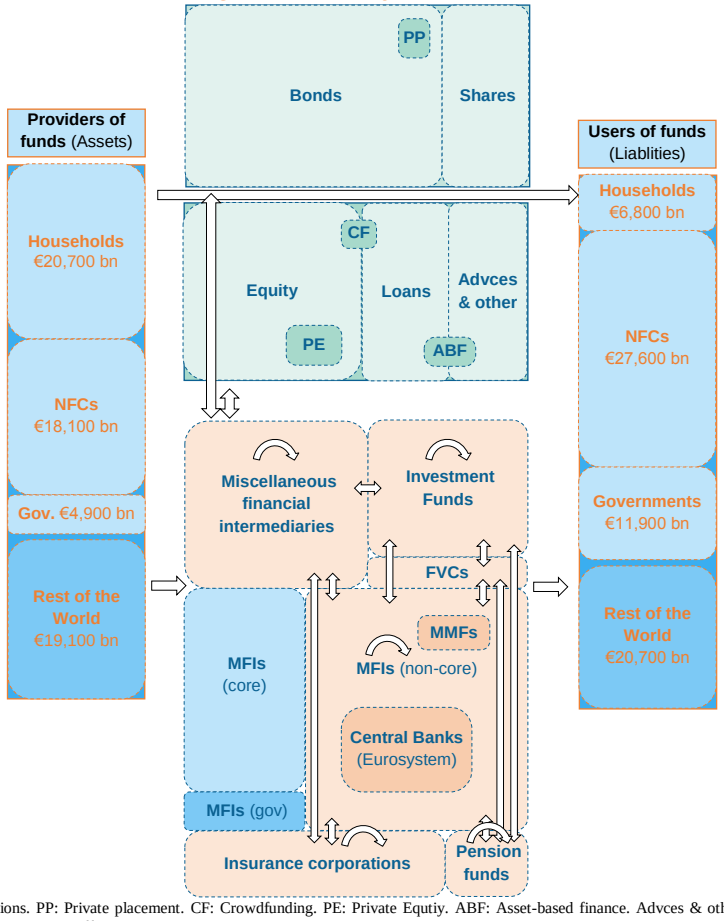
The chapter also analyses the three main channels that the European economy uses for financing its activities, with their respective sub-segments (Chart 44). First, organised markets: issuance of bonds, quoted shares or private placements. Secondly, financing channelled through the direct interaction of a firm with its stakeholders (i.e. customers, local and national authorities, employees, supplier, etc.) in the form of equity, loans or advances.

[142] See Jenkins and Alloway (2015).

Direct financing requires both the providers and the users of funding to have the same preferences and to interact with each other. However, this is not always possible. Consequently, the third channel of financing is provided by financial institutions, which provide an intermediation service by connecting the resources of savers and depositors with those of borrowers and investors and by adapting the features of savings to the needs of investors through what is called maturity transformation. Although financial institutions do not generate net additional financial resources, they play a crucial role in allowing savings generated by the economy to be mobilised so they can be allocated to investment projects[143].

Note that the combined size of funds directly circulating among economic actors or channelled through financial intermediation is actually much larger than the (financial) balance sheet of the non-financial sectors of the economy. This is explained by the operations occurring within the financial sector such as interbank loans, the issuance of shares and bonds by banks or other financial institutions, etc. Once credit within the financial sector is netted out (e.g. interbank credit or the interactions of banks with the shadow banking) these three channels have broadly the same size, providing about one third of the total financing of the economy each.

Chart 64: **Financing of the economy: connections across sectors**



Notes: NFCs: Non-financial corporations. PP: Private placement. CF: Crowdfunding. PE: Private Equtiy. ABF: Asset-based finance. Advces & other: Advances and other financing (it includes items such as trade credit, advances by different stakeholders, tax claims and similar items). FVCs: Financial vehicle corporations. MMFs: Money market funds. MFIs: Monetary financial institutions. MFIs core assets: credit provided by banks to households and NFCs through loans or the purchase of securities. MFIs government assets: loans to governments and holdings of sovereign bonds. MFIs non-core assets are calculated as the residual factor with respect to total assets. Data refer to the balance sheet of euro area institutional sectors as of 2014 Q3.
Source: ECB, Eurostat and own calculations.

The chapter also highlights the high level of interconnection and interaction between the different economic agents which can lead to high levels of complexity and interdependence.

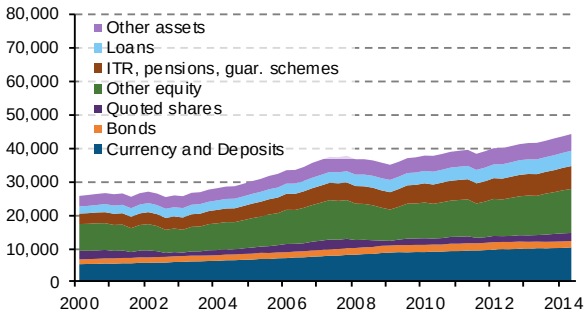
The information gathered and the discussion presented throughout this chapter can be a useful background for a number of Commission policies including the on-going work on developing capital markets union and for the investment plan for Europe.

[143] The financial sector also runs payment systems; however, this is beyond the scope of this chapter, which focuses on financing channels.

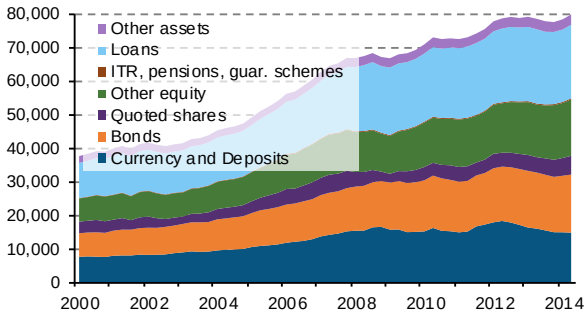
ANNEX: ADDITIONAL CHARTS AND TABLES

Chart A1: **Provision of funds (financial assets)**, breakdown by instrument, euro area economy, € billion

Non-financial sectors



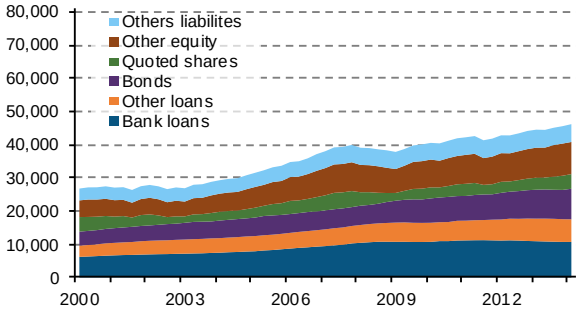
Financial sector (including RoW)



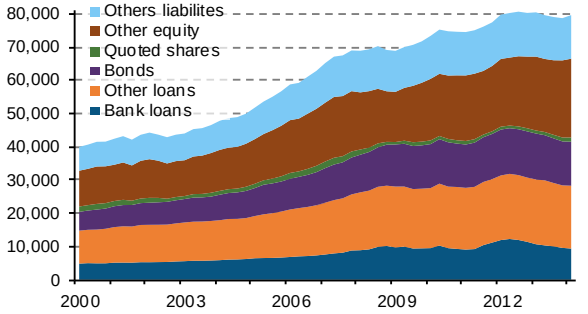
Notes: Real economy includes households, NFCs and governments. The financial sector includes MFIs, OFIs and ICPFs. RoW: Rest of the World; NFCs: Non-financial corporations. ITR: Insurance technical reserves. Non-financial assets (such as buildings, machinery, land, etc.) are not reported. For the financial sector, 'currency and deposits' includes interbank lending provided. Holdings of investment fund shares are included in 'Other equity'.
Source: ECB, Eurostat and own calculations.

Chart A2: **Source of funding** (financial liabilities), euro area, € billion

Non-financial sectors



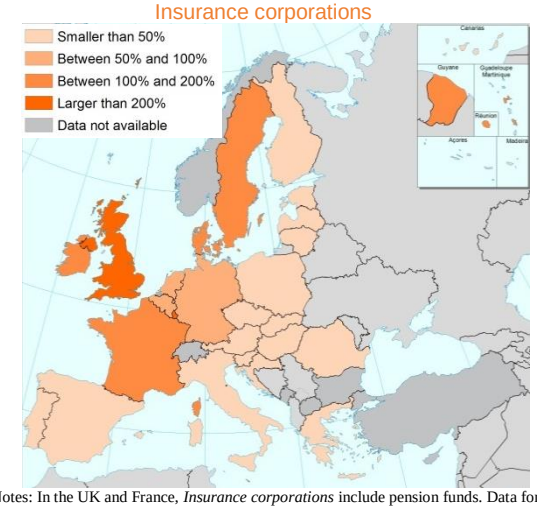
Financial sector (including RoW)



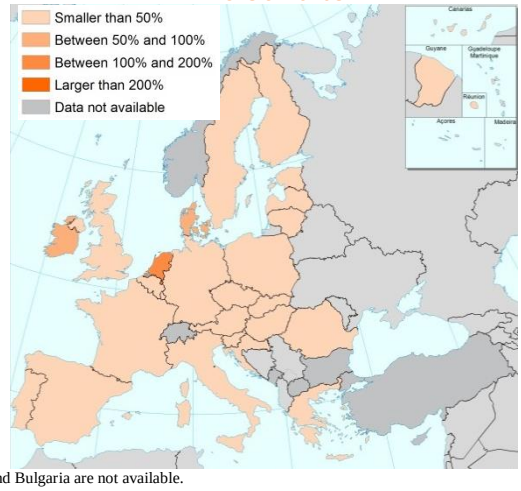
Notes: Real economy includes households, NFCs and governments. The financial sector includes MFIs, OFIs and ICPFs. RoW: Rest of the World; NFCs: Non-financial corporations. Deposits received by banks are included under the category 'Banks loans' (interbank deposits) or 'Other loans' (deposits other than interbank). Investment fund shares and mutual fund shares are included in other equity.
Source: ECB, Eurostat and own calculations.

Chart A3: **Size of insurance corporations and pension funds**, percentage of GDP, 2014 Q3

Insurance corporations



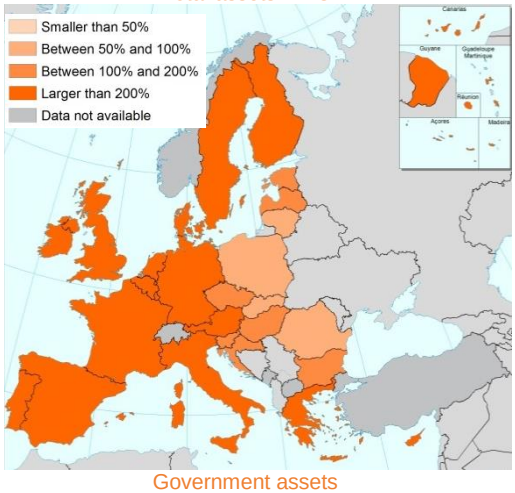
Pension funds



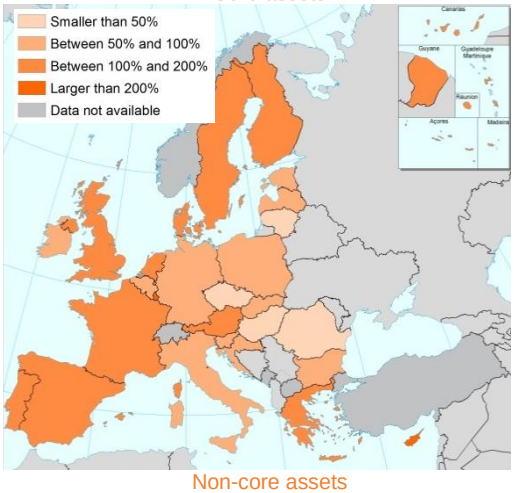
Notes: In the UK and France, *Insurance corporations* include pension funds. Data for Cyprus and Bulgaria are not available.
Source: ECB and own elaboration.

Chart A4: **Size of MFIs and their components**, percentage of GDP, 2014 Q3

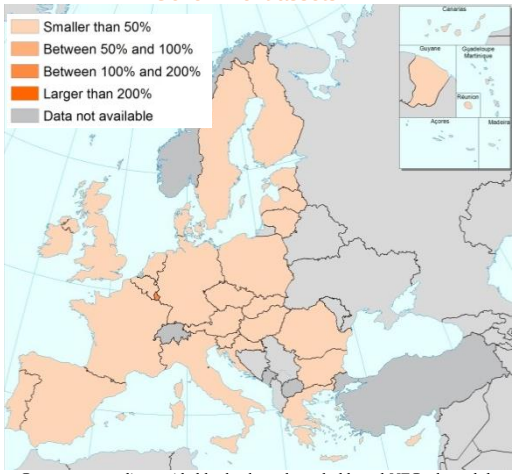
Total assets MFIs



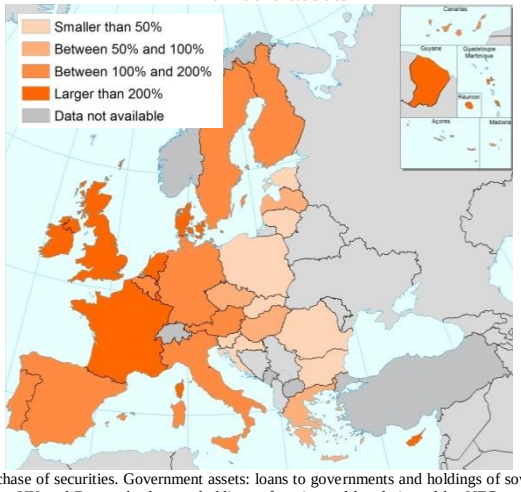
Core assets



Government assets



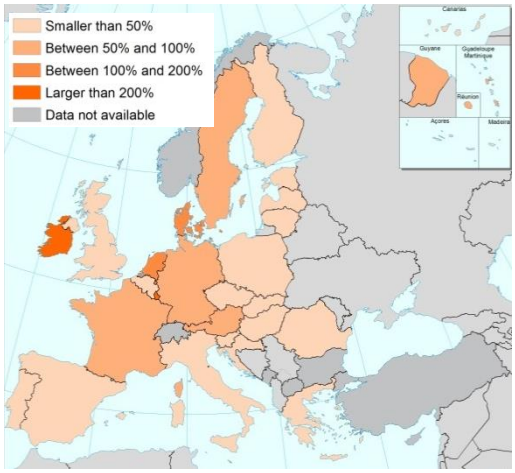
Non-core assets



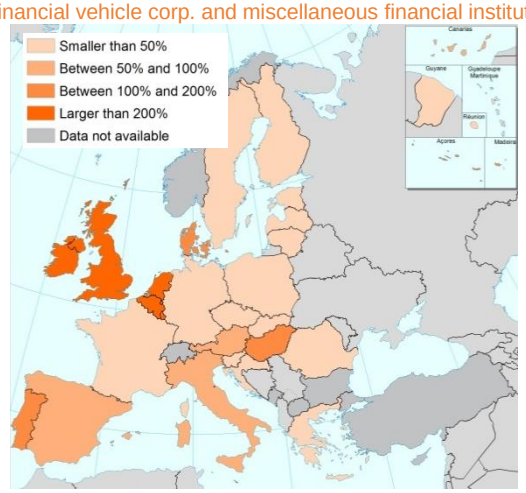
Notes: Core assets: credit provided by banks to households and NFCs through loans or the purchase of securities. Government assets: loans to governments and holdings of sovereign bonds. Non-core assets are calculated as the residual factor with respect to total assets. For the UK and Denmark, data on holdings of equity and bonds issued by NFCs were not available.
Source: ECB and own elaboration.

Chart A5: **Size of other financial institutions**, percentage of GDP, 2014 Q3

Investment funds

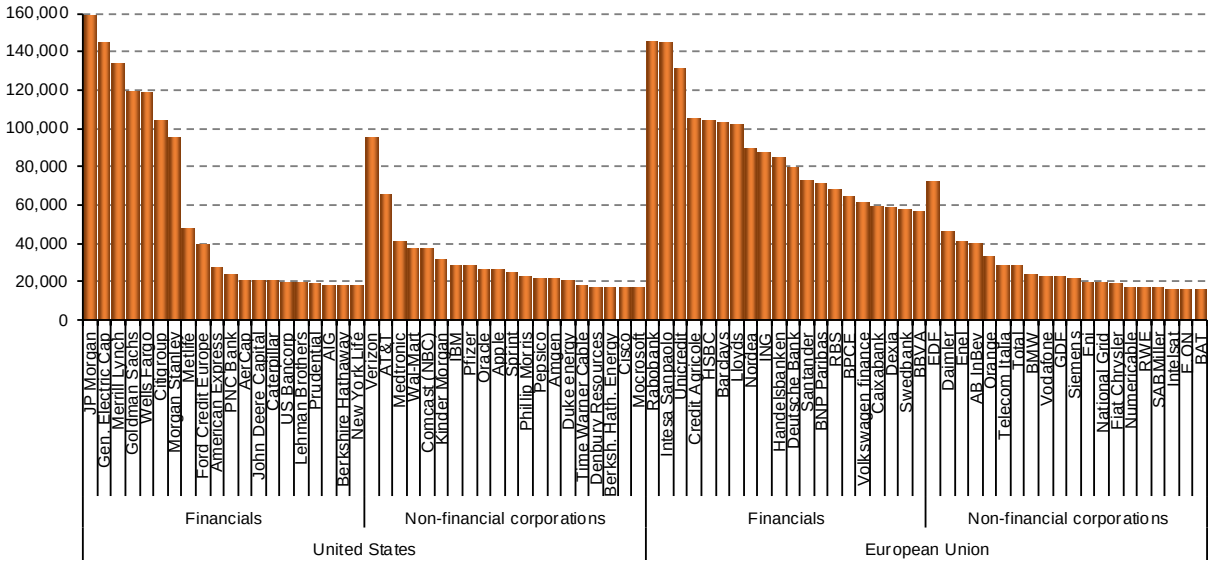


Financial vehicle corp. and miscellaneous financial institutions



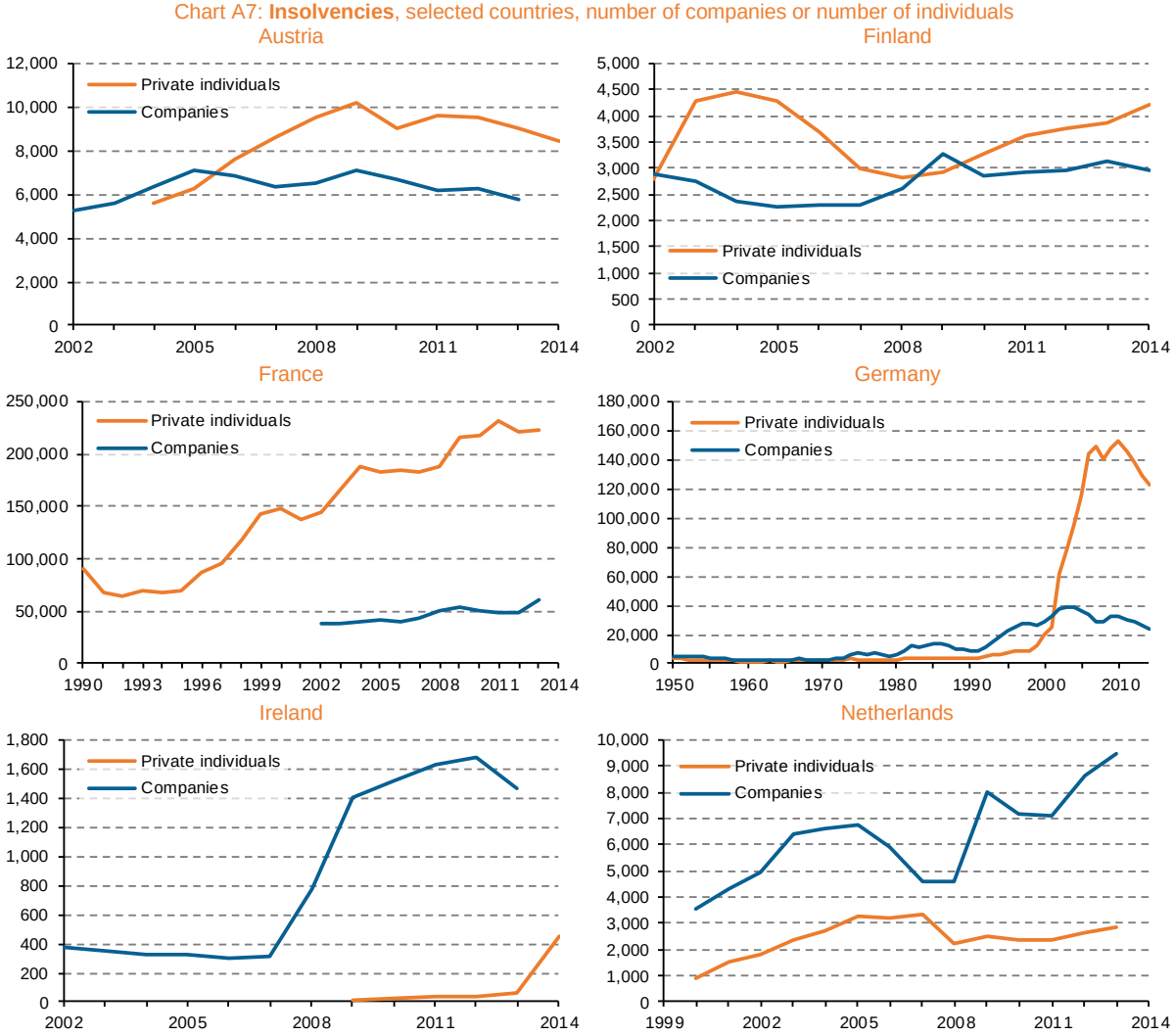
Source: ECB and own elaboration.

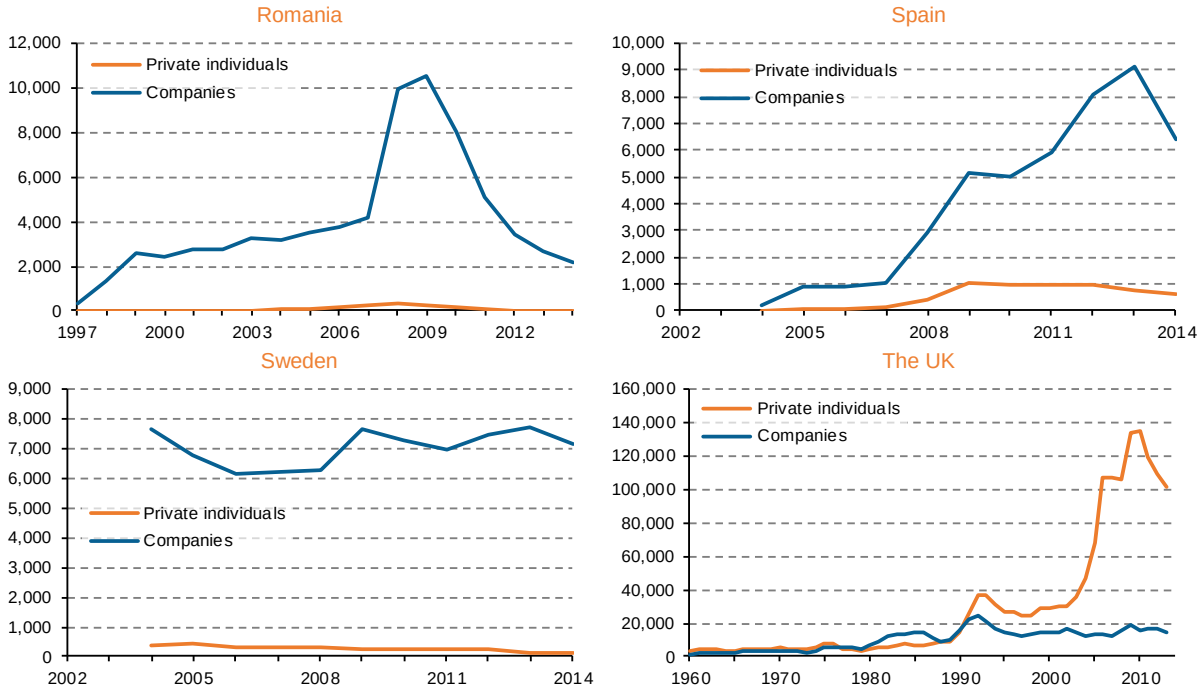
Chart A6: **Larger issuers of bonds**, amount outstanding, December 2014, € billion



Source: Bloomberg and own calculations.

Chart A7: **Insolvencies**, selected countries, number of companies or number of individuals





Notes: Data for the UK include only England and Wales. The definition of insolvency and the moment of computation (e.g. filing, opening, closing, etc.) may vary across countries.
Source: Credit reform, Banque de France, Statistischen Bundesamt, Insolvency Service of Ireland, Statistics Netherlands, National Bank of Romania, Instituto Nacional de Estadística, Growth Analysis (SE), The Insolvency Service (UK) and own elaboration.

References

Abbassi, P. and Schnabel, I. (2009). *Contagion among interbank money markets during the subprime crisis.* Working Paper. Johannes Gutenberg University Mainz.

Abiad, A., Dell'Ariccia, G. and Li, B. (2011). *Creditless Recoveries*. IMF Working Paper No. 11/58. International Monetary Fund.

Anderson, N., Brooke, M., Hume, M. and Kürtösiová, M. (2015). *A European Capital Markets Union: implications for growth and stability*. Financial Stability Paper 33. Bank of England.

Adrian, T. and Shin, H. S. (2010). *The Changing Nature of Financial Intermediation and the Financial Crisis of 2007-09*. Federal Reserve Bank of New York, Staff Report no. 439.

Bakk-Simon, K., Borgioli, S., Celestino Giron, C., Hannah Hempell, H., et al. (2012). *Shadow Banking in the euro area. An overview.* Occassional Paper No. 133. European Central Bank.

Basel Committee on Banking Supervision (2013). *Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools.* Bank of International Settlements.

Basel Committee on Banking Supervision (2014a). *Basel III: the net stable funding ratio.* Bank of International Settlements.

Basel Committee on Banking Supervision (2014b). *Supervisory framework for measuring and controlling large exposures.* Bank of International Settlements.

Basel Committee on Banking Supervision (2014c). *Basel III Document. Revisions to the securitisation framework*.

Bershidsky, L. (2015). *You say debt, I say tax dodging*. Bloomberg View. 11 February.

Bolton, P., Freixas, X., Gambacorta, L., and Mistrulli, P. E. (2013). *Relationship and Transaction Lending in a Crisis.* BIS Working Papers No. 417.

Buttiglione, L., Lane, P. R., Reichlin, L. and Reinhart, V. (eds.). (2014). *Deleveraging? What Deleveraging? The 16th Geneva Reports on the World Economy*. International Center For Monetary and Banking Studies and Centre for Economic Policy Research.

Calomiris, C. W. and Haber, S. H. (2014). *Fragile by Design: The Political Origins of Banking Crises and Scarce Credit*. Princeton University Press.

Castrén, O. and Rancan, M. (2013). *Macro-networks. An application to the Euro area financial accounts*. Working Paper No. 1510. European Central Bank.

Cingano, F. (2014). 'Trends in income inequality and its impact on economic growth'. *OECD Social, Employment and Migration Working Papers, No. 163*. OECD Publishing.

Claessens, S., Kose, M. A. and Terrones, M. E. (2009). *A recovery without credit: Possible, but…* VoxEU. 22 May.

Cochrane, J. H. (2014). 'Toward a run-free financial system.' In Baily, M. N. and Taylor, J. B. (eds.). *Across the Great Divide: New Perspectives on the Financial Crisis*. Hoover Press.

Cœuré, B. (2013). *The implications of bail-in rules for bank activity and stability*. Opening speech at Conference on 'Financing the recovery after the crisis- the roles of bank profitability, stability and regulation'. Bocconi University. Milan. 30 September.

Council of the European Union (2013). *Regulation (EU) No 1024/2013 of 15 October 2013 conferring specific tasks on the European Central Bank concerning policies relating to the prudential supervision of credit institutions*. Official Journal of the European Union, L 287, 29.10.2013, pp. 63-89.

Cumming, D. (2009). *Private Equity: Fund Types, Risks and Returns, and Regulation*. John Wiley and Sons.

Darvas, Z., Hüttl, P., Merler, S., De Sousa, C. and Walsh, T. (2015). *Analysis of developments in EU capital flows in the global context*. Bruegel (European Commission report N° MARKT/2013/50/F).

Deutsche Bundesbank (2014). *Monthly Report, October 2014*.

Enria, A. (2013). *Completing the repair of the EU banking sector* speech at Oliver Wyman Institute Conference 'The emerging structure of the financial services industry'. London. 1 October.

ESMA (2014). *Position Paper. Crowdfunding*. ESMA/2014/SMSG/010

European Banking Authority (2014a). *Risk assessment of the European banking system. December 2014.*

European Banking Authority (2014b). *Results of 2014 EU-wide stress test. Aggregate results. October 2014*.

European Banking Authority (2014c). *EBA Discussion Paper on simple standard and transparent securitisations. Response to the Commission's call for advice of December 2013 related to the merits of, and the potential ways of, promoting a safe and stable securitisation market*. EBA/DP/2014/02.

European Central Bank (2014a). *Aggregate report on the Comprehensive Assessment.* October.

European Central Bank (2014b). *Banking Structure Report.* October.

European Central Bank (2014c). *Decision of 19 November on on the implementation of the asset-backed securities purchase programme*. ECB/2014/45.

European Commission. (2012a). *Green paper on Shadow Banking.* COM(2012) 102 final. 19 March. Brussels.

European Commission. (2012b). *Communication to the European Parliament and the Council. A Roadmap towards a Banking Union.* COM(2012) 210 final. 12 September. Brussels.

European Commission. (2014a). *European Financial Stability and Integration Report (EFSIR). April 2014.* Brussels.

European Commission (2014b). *Communication on unleashing the potential of crowdfunding in the European Union*. COM(2014) 172 final.

European Commission (2014c). *Communication on an Investment Plan for Europe*, COM(2014) 903 final.

European Commission (2014d). *State Aid Scoreboard 2014. Aid in the context of the financial and economic crisis*. DG Competition. http://ec.europa.eu/competition/state_aid/scoreboard/financial_economic_crisis_aid_en.html

European Commission (2014e). *Proposal for a Regulation of the European Parliament and of the Council on structural measures improving the resilience of EU credit institutions*. COM/2014/043 final.

European Commission (2015a). *Green paper. Building a Capital Markets Union.* COM(2015) 63 final.

European Commission (2015b). *Commission Staff Working Document. Initial reflections on the obstacles to the development of deep and integrated EU capital markets.* SWD(2015) 13.

European Commission (2015c). *Consultation document. An EU framework for simple, transparent and standardised securitisation*. 18 February.

European Insurance and Occupational Pensions Authority (EIOPA) (2014a). *Financial Stability Report December 2014*.

European Insurance and Occupational Pensions Authority (EIOPA) (2014b). *Low interest rate environment stock taking exercise 2014.* EIOPA-BoS-14/103.

European Parliament and Council (2013a). *Regulation (EU) No 575/2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012.* Official Journal of the European Union, L 176, 27.6.2013, pp. 1-337.

European Parliament and Council (2013b). *Directive 2013/36/EU on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms.* Official Journal of the European Union, L 176, 27.6.2013, pp. 338-436.

European Parliament and Council (2014a). *Directive 2014/59/EU of 15 May 2014 establishing a framework for the recovery and resolution of credit institutions and investment firms and amending Council Directive 82/891/EEC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC, 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council*. Official Journal of the European Union, L 173, 12.6.2014, pp. 190-348.

European Parliament and Council (2014b). *Regulation (EU) No 806/2014 of 15 July 2014 establishing uniform rules and a uniform procedure for the resolution of credit institutions and certain investment firms in the framework of a Single Resolution Mechanism and a Single Resolution Fund and amending Regulation (EU) No 1093/2010*. Official Journal of the European Union L 225, 30.7.2014, pp. 1-90.

European Private Equity and Venture Capital Association (EVCA) (2014). *EVCA 2013 European Private Equity Activity. Statistics on Fundraising, Investments & Divestments*

European Systemic Risk Board (2014). *Flagship report on macro-prudential policy in the banking sector*.

Fatica, S., Hemmelgarn, T. and Nicodème, G. (2012). *The debt-equity tax bias: consequences and solutions*. Taxud Taxation Papers. Working paper No. 33.

Financial Stability Board and International Monetary Fund (2009): *The Financial Crisis and Information Gaps*. Report to the G-20 Finance Ministers and Central Bank Governors.

Financial Stability Board (2014a): *Global Shadow Banking Monitoring Report 2014*.

Financial Stability Board (2014b): *2014 update of list of global systemically important banks (G-SIBs).*

Financial Stability Board (2014c): *Overview of Progress in the Implementation of the G20 Recommendations for Strengthening Financial Stability. Report of the Financial Stability Board to G20 Leaders*. 14 November.

Frank, R. H. and Cook, P. J. (1996). *The winner-take-all society: Why the few at the top get so much more than the rest of us*. Penguin.

Gallardo, Joselito (1997). *Leasing to Support Small Business and Microenterprises*. The World Bank, Financial Sector Development Department.

Galbraith, J. K. (2012). *Inequality and instability: A study of the world economy just before the Great Crisis*. Oxford University Press.

Gorton, G. and Metrick, A. (2012). Securitized banking and the run on repo. *Journal of Financial Economics, 104(3)*, 425-451.

Haldane, A. G. (2015). *On microscopes and telescopes*. Speech at the Lorentz centre workshop on socio-economic complexity. Leiden, Netherlands. 27 March.

Harford, T. (2011). *What we can learn from a nuclear reactor*. Financial Times, 11 January.

Hautony, G. and Héamz J. C. (2014). *How to measure interconnectedness between banks, insurers and financial conglomerates?* Autorité de Contrôle Prudentiel et de Résolution (France).

House of Commons (2015). *Tax avoidance: the role of large accountancy firms (follow–up)*. Committee of Public Accounts, HC 860.
Institutional Investor (2014). *The Latest Trend for Pension Funds: Private Equity Investment*, December 2014.
International Monetary Fund (2013a). *European Union: Publication of Financial Sector Assessment Program Documentation - Technical Note on European Insurance and Occupational Pensions Authority Assessment*. IMF Country Report No. 13/73. March.
International Monetary Fund (2013b). *European Union. Financial System Stability Assessment*. 22 February.
International Monetary Fund (2014). 'Inequality Seriously Damages Growth'. *IMF Survey Magazine*, 12 April.
IOSCO, Kirby, E. and Worner, S. (2014). *Crowd-funding: An Infant Industry Growing Fast*. Staff Working Paper of the IOSCO Research Department (SWP3/2014)
Jassaud, N. and Hesse, H. (2013). *Balance-sheet repairs in European banks*, VoxEU, 13 April.
Jenkins, P. and Alloway, T. (2015). *Democratising finance: big banks eye peer-to-peer lending push*. Financial Times. 28 January.
Joint Committee (2014). *Joint Committee Report on risks and vulnerabilities in the EU financial system. March 2014.*
Jovičić, D.; Jeremić, L.; Milićević, L. and Zeremski, A. (2014). *Warehouse Receipts Functioning to Reduce Market Risk*, Economics of Agriculture 2/2014.
Juncker, J. C. (2015a). *Preparing for next steps on better economic governance in the euro area. Analytical note*. Informal European Council. 12 February. (Prepared in close cooperation with D. Tusk, J. Dijsselbloem and M. Draghi).
Juncker, J. C. (2015b). *Preparing for next steps on better economic governance in the euro area. Presentation*. Informal European Council. 12 February. (Prepared in close cooperation with D. Tusk, J. Dijsselbloem and M. Draghi).
Kay, J. (2010). Should we have 'narrow banking'? In Adair Turner and others. *The Future of Finance: The LSE Report*. London School of Economics and Political Science.
Keen M. and Mooij, R. de (2012). *Debt, Taxes, and Banks*. IMF WP/12/48, International Monetary Fund.
Koller, R. (2014). *Advanced Schuldschein Guide*, Simmons & Simmons LLP.
Krugman, P. (2013). *End this depression now!* New York: Norton.
Kuehnhausen, F. and Stieber, H. W. (2014). *Determinants of Capital Structure in Non-Financial Companies*. SSRN.
Langedijk, S., Nicodème, G., Pagano, A. and Rossi, A. (2014). *Debt bias in corporate taxation and the costs of banking crises in the EU*. Taxud Taxation Papers. Working paper No. 50.
Lakner, C. and Milanovic, B. (2013). *Global income distribution: from the fall of the Berlin Wall to the great recession*. Policy Research working paper No. WPS 6719. World Bank.
Linhardt, S. (2014). *The Schuldschein – Germany's corporate finance export*. Global Capital. 31 March.
Lewis, M. (2014). *Flash Boys: A Wall Street Revolt*. W. W. Norton & Company. - Praet, P. (2014). *Repairing the bank lending channel: the next steps*. Speech at European Macro Conference organised by Credit Suisse. London. 17 November.
Luck, S and Schempp, P. (2014). *Banks, shadow banking and fragility*. ECB Working Paper No. 1726. European Central Bank.
Marks, K. H.; Robbins, L. E.; Fernandez, G.; Funkhouser, J. P. and Williams, D. L. (2009). *The Handbook of Financing Growth: Strategies, Capital Structure, and M&A Transactions*, John Wiley and Sons.
Masciantonio, S. (2013). *Identifying and tracking global, EU and Eurozone systemically important banks with public data*. Occasional Paper No. 204. Bank of Italy
Mian, A. and Sufi, A. (2014). *House of Debt. How They (and You) Caused the Great Recession, and How We Can Prevent It from Happening Again*. The University of Chicago Press.
Mooij, R. A. (2011). *Tax biases to debt finance: Assessing the problem, finding solutions*. IMF Staff Discussion Note, SDN/11/11.
Mooij De, R., Keen, M. and Orihara, M. (2014). *Taxation, Bank Leverage, and Financial Crises*, in De Mooij R and G. Nicodeme. *Taxation and Regulation of the Financial Sector*. MIT Press.
NESTA, University of Cambridge (2014). *Understanding Alternative Financing. The UK Alternative Finance Industry Report 2014.*
New York Life (2013). *Quarterly Private Placement Newsletter*. April 2013.
New York Telegraph (2014). *Dark pool fraud lawsuit filed against Barclays in US*. 27 June.
OECD (2011). *Divided We Stand: Why Inequality Keeps Rising*.
OECD (2014). 'Does income inequality hurt economic growth? *Focus on Inequality and Growth.* December 2014.
OECD (2014a). *SME debt financing beyond bank lending: The role of securitisation, bonds and private placements*, Draft paper for discussion (DAF/CMF(2014)24), October 2014.
OECD (2014b). *New approaches to SME and entrepreneurship finance: Broadening the range of instruments*, Draft final report, Working Party on SMEs and Entrepreneurship (WPSMEE) (CFE/SME(2013)7/REV2), October 2014.
Ostry, J. D. and Berg, A. (2011). *Inequality and Unsustainable Growth: Two Sides of the Same Coin?* IMF Staff Discussion Note, SDN/11/08.
Ostry, J. D., Berg, A., and Tsangarides, C. G. (2014). *Redistribution, Inequality, and Growth*. IMF Staff Discussion Note, SDN/14/02.
Pagano, M. (Chair) (2014). *Is Europe overbanked?* Advisory Scientific Committee of the ESRB.
Phillips, R. J. and Roselli, A. (2009). *How to Avoid the Next Taxpayer Bailout of the Financial System: The Narrow Banking Proposal*. Networks Financial Institute. Policy Brief 2009-PB-05.
Piketty, T. 2014. *Capital in the Twenty-First Century*. Cambridge, MA: Belknap Press.
Plender, J. (2015). *Draghi QE is stoking bond bubble risk*. Financial Times. 17 March.
Praet, P. (2014). *Repairing the bank lending channel: the next steps*. Speech at European Macro Conference organised by Credit Suisse. London. 17 November.
Sapin, M. and Montebourg, A. (2014). *Lancement de la Charte 'Euro PP'*. Presse Release No. 022/042. 30 April.
Securities and Exchange Commission (2009). *SEC Issues Proposals to Shed Greater Light on Dark Pools*, Press release 2009-223.
Stiglitz, J. (2012). *The price of inequality: How today's divided society endangers our future.* Norton.
Sugawara, N. and Zalduendo, J. (2013). *Credit-less Recoveries. Neither a Rare nor an Insurmountable Challenge.* Policy Research Working Paper No. 6459. The World Bank.
Tanner, C. (2015). *Lessons from Japan for Europe's life firms*. Insurance Net, 19 January.
Teulings, C. (Ed.) and Baldwin, R. (Ed.) (2014). *Secular Stagnation: Facts, Causes and Cures*. VoxEU.
Thompson, C. (2014). *ECB blamed for covered bond shortage*. Financial Times. 8 December.

United States Congress (2010). *The Dodd–Frank Wall Street Reform and Consumer Protection Act*. Pub.L. 111–203, H.R. 4173.

Valckx, N. (Team Leader), Amidzic, G., Arregui, N., Blankenheim, J. et al. (2014). 'Shadow banking around the globe: How large, and how risky?' *Global Financial Stability Report – October 2014*. International Monetary Fund.

Van den End, J. W. and de Haan J. (2014). *Europe's banking problem through the lens of secular stagnation*. VoxEU. 28 March.

Varoufakis, Y. (2011). *The Global Minotaur: America, The True Origins of the Financial Crisis and the Future of the World Economy*. Zed Books.

White & Case (2014). *Private placements: tapping the US market*.

Wolf, M. (2014). *The Shifts and the Shocks: What We've Learned—and Have Still to Learn—from the Financial Crisis*. Penguin Press.

Zangari, E. (2014). *Addressing the debt bias: A comparison between the Belgian and the Italian ACE systems*. Taxud Taxation Papers. Working paper No. 44.

Zarutskie, R. (2013). Competition, financial innovation and commercial bank loan portfolios. *Journal of Financial Intermediation, Vol. 22(3)*, pp. 373–396.

Chapter 3. Special focus on private debt overhang[1]

1. INTRODUCTION

This chapter delves into the private-sector debt overhang problem in the European Union. This problem is particularly relevant for policy purposes, since we cannot understand the length and depth of the crisis and its weak recovery without analysing the role played by debt.[2] The first objective of the chapter is to analyse the empirical evidence in order to make a diagnosis of the magnitude of the problem. The second objective is to use this diagnosis to look at useful policy measures that could alleviate the existing problem and/or avoid the problem in the future.

The chapter focuses on two institutional sectors: households and non-financial corporations. The empirical evidence indicates that an excessive level of debt ('debt overhang') at the corporate and household levels may damage macroeconomic performance in terms of actual growth and growth potential.[3] Nevertheless, the possibility to take on debt is one of the basic features of finance, as it allows an agent to move resources over time, widen its financial possibilities and finance productive investments. However, when a situation of debt overhang arises, the over-indebted agent has no other option than to try to reduce its indebtedness. A firm may be forced to give up profitable investments because of excessive debt. At the household level, debt overhang refers to a situation in which over-indebted households suppress consumption or the supply of labour because of excessive debt.[4] Although the debt overhang problem is specific to each firm and household, when it becomes widespread across the agents in the economy, its economic impact will be felt far beyond the individuals and the firms directly affected. Then, it is extremely relevant for policy makers.

Since debt is the anticipation of future income, which in turn will have to be repaid, debt sustainability is a central concern in finance. In this light, Box A clarifies some relevant definition and measurement issues about indebtedness and its sustainability.

Box A. High indebtedness: definition and measurement

Several publications base their analyses on the financial conditions of the private sector on a narrow definition of indebtedness. Considering the ESA10 classification for sectoral consolidated accounts provided by Eurostat, this narrow definition encompasses F3 and F4 items only (respectively, debt securities and loans). Instead, this chapter relies on a broader definition of indebtedness, including all the external means of financing. Therefore, in this analysis, besides the ESA10 F3 and F4 items, the following items are included into the indebtedness definition: F6 (insurance, pensions and standardised guarantees), F7 (financial derivatives and employee stock options) and F8 (other accounts payable).

Although this choice might limit the comparability with other studies, it can provide a more thorough picture of the private sector funding needs. Indeed, a proper, longer-term assessment of the financing needs of non-financial corporations and households should go beyond debt securities and loans. The inclusion of three more categories into the indebtedness definition necessarily ends up in higher indebtedness levels with respect to other publications, but the developments across time do not show significant differences.

Categories F6 and F7 are relevant for NFCs only, and the latter is almost negligible. Category F6 (insurance, pensions and standardised guarantees) is significant only for a small subset of countries (particularly the UK, Germany, and Italy).[5] Category F8 (accounts payable) is relevant for both NFCs and HHs indebtedness.[6] Concerning the former sector, it is significant for every country in the sample, but ranks higher for NFCs in CEE countries. As regards the latter, it shows a high degree of variability across countries and ranks higher for Cyprus, Malta, the Netherlands and Portugal.

[1] Authors: Boris Augustinov, Sergio Masciantonio and Gundars Ostrovskis.
[2] CEPR (2014).
[3] See, for instance, Brown and Lane (2011), Laeven and Laryea (2009), Laryea (2010).
[4] Olney (1999); Mulligan (2008); Melzer (2012).
[5] Actually, Eurostat consolidated sectoral accounts data for the UK are not available and are estimated relying on non-consolidated data.
[6] The introduction of this liabilities category among the indebtedness definition is not completely non-controversial. Indeed, it encompasses short-term liabilities, often with a recurring nature (e.g. bills). They are typically relevant for cash management purposes and they are usually matched with accounts receivable. However, since they will ultimately have to be repaid, they may add further stress to an over-indebted agent. Therefore, their size appears to be significant to determine the overall indebtedness and the fragility of private agents.

Although there is no consensus in the academic literature on an optimal level of debt in the economy, high debt by itself constitutes a vulnerability as it makes agents more fragile in the face of changes in economic conditions.[7] However, determining whether a certain level of debt is sustainable or 'excessive' is by no means easy, as it ultimately depends on a multiplicity of variables and definitions. This chapter will mainly rely on consolidated debt-to-GDP metrics. Indeed, this is a key metrics to assess debt sustainability, since GDP is a proxy of a country capacity to repay. Since debt-to-GDP ratio also reflects the amount of external funds owed by the chosen sector, it offers a picture of its effects on aggregate demand.[8] However, to broaden the analysis, this chapter will also gain evidence from other indicators. Indeed, short-term developments on the asset side of each agent, or the debt service burden, may be as important in the short-term as the future expected income.

Section 2 briefly analyses the macro-financial background that caused the crisis and the debt overhang problem. Section 3 dissects the main features of household and corporate indebtedness. Data suggest that current levels of private sector indebtedness are still too high in several EU countries and a significant cross-country heterogeneity emerges. Furthermore, debt overhang affected different parts of the population of individual countries in different ways, hitting subsets of population with reduced debt capacity harder and potentially destabilising distributional effects. Section 4 deals with the feedback loop between on the one hand, a weak economic recovery, low inflation and zero interest rates, and on the other hand, the debt overhang. Macroeconomic policy measures taken so far have largely been exhausted, and have not sufficiently mitigated the problem of high indebtedness. Section 5 reviews these macroeconomic policies measures, while also dealing with microeconomic measures that could help resolve the current debt overhang problem. Section 6 takes a longer-term perspective, identifying potential avenues for action that could limit the reappearance of any future problem of this kind once the current debt overhang has been resolved.

2. HISTORICAL BACKGROUND AND MAGNITUDE OF THE PROBLEM

The debt overhang and the financial cycle

In the years preceding the crisis, the growth of indebtedness (as measured by several indicators) of the households (HHs) and non-financial corporations (NFCs) sectors was massive and common to the great majority of advanced economies. One possible explanation relies on the 'financial cycle' concept. This involves self-reinforcing interactions between perceptions of value and risk, attitudes towards risk and financing constraints.[9] Moreover, credit and property prices tend to vary in quite a similar way.[10]

The debt overhang and the housing sector

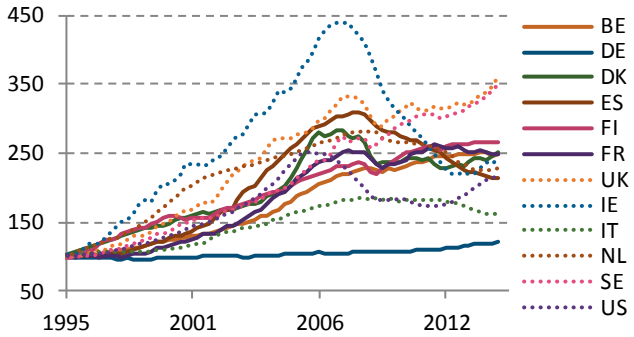
Credit plays an important role in financing the construction and purchase of property. In the expansionary phase of the financial cycle, credit plays a facilitating role, as the relaxing of financing constraints allows more expenditure to take place and assets to be purchased. This increased borrowing and leverage fuel demand, providing self-justifying evidence that income prospects are higher. Property prices in a selected subset of advanced economies had been on a sustained upward trend since the mid-1990s, with Germany being the only notable exception (Chart 1). For the sample of EU countries surveyed, property prices increased on average by about 160 % from Q4-1995, reaching a peak in Q3-2007. The same phenomenon could be observed in the US, where house prices climbed by 67 % nationwide in the eight years preceding the peak in mid-2005.[11]

Jordá, Schularick and Taylor (2014) highlight the increasingly relevant role that real estate, particularly residential real estate, has come to play in advanced economies. According to their calculations, the proportion of mortgage lending relative to total lending in a sample of 17 advanced economies has increased dramatically (from about 40 % during the mid-1980s to 60 % when the crisis started). This shift was associated with a great

[7] ECB (2012).
[8] See EC (2014a), Cuerpo et al. (2013).
[9] See Borio (2014). The financial cycle coexists with the business cycle, however the former has a much lower frequency than the latter. Individual phases also differ between both cycles. The contraction phase of the financial cycle lasts several years, while business cycle recessions generally are much shorter and do not exceed one year.
[10] Drehman et al. (2012).
[11] The volume of house sales increased as well, and housing starts nationwide climbed by 53 % from 1995 to 2005 (Financial Crisis Inquiry Commission, 2011). However, US nationwide average measures give a somewhat more nuanced picture of the developments in its housing market. In fact, the housing bubble was concentrated in some specific states (e.g. California, Florida, Georgia), where the increases in housing prices and starts were sharpest.

boom in household borrowing and in the average loan-to-value ratio of new mortgages. Increased property prices and the belief that the bonanza would have lasted forever fuelled an ever-increasing demand that reinforced the upward trend and the complacency about taking on more debt. The size of mortgages and households indebtedness grew to keep pace with property prices.

Chart 1 – **Property Prices** (base year 100: 1995)



Source: Bank for International Settlements and authors' calculations

General increase in indebtedness…

The EU average debt-to-GDP ratio of the household sector had been on an increasing trend since the mid-1990s for most of the EU countries. The ratio increased on average by 13 percentage points from 1995 to 2003. The trend then accelerated, with an average increase of about 17 percentage points over the following five years. Alternative metrics highlight the same path. The debt-to-financial asset ratio increased on average by three percentage points during years 1995-2003, and by 11 percentage points in years 2003-08[12]. The debt accumulation for the households sector peaked in 2009 for the majority of Member states.

NFCs also accrued extra debt over the same period. Similarly to the household sector, the corporate debt-to-GDP ratio – as defined in Box A – increased on average by about five percentage points during the period 1995-2003. The debt-to-GDP ratio of NFCs started to climb from 2003, showing an average increase of 21 percentage points in 2008. The debt-fuelled demand blurred and inflated the estimates of potential output, leading to misallocation of productive resources.[13] However, the debt-to-asset ratio offers a more nuanced picture.[14] According to this metrics, the corporate sector experienced a deleveraging phase during the late nineties. The increase observed in the debt-to-asset ratio for many countries until 2008 was more restrained than debt-to-GDP developments may suggest. However, the moderate debt-to-asset growth can underestimate the overall growth in indebtedness thanks to a significant upward trend in the market value of corporate assets.

…and its causes

In hindsight, a significant amount of the pre-crisis private-sector borrowing could be considered as not sustainable. However, households and NFCs cannot be held responsible alone for these situation, which resulted from a combination of factors worldwide.

The deregulation of the financial sector – particularly apparent from the early 2000s – paved the way for relaxed credit standards and increased risk-taking by financial institutions. The increased international capital mobility made liquidity more widely available.[15] The Great Moderation further favoured these developments, through a level of interest rates and volatility that remained low by historical standards across many countries for most of the decade before the crisis.[16] The financial sector then played a dominant role in the process of extending the

[12] This metric however has its caveats. The share of financial assets held by households is usually only a fraction of their total assets. The picture, once the real wealth is included, could look very different, but reliable time-series data of this kind are scarcer. Anyway, the increase in the debt-to-financial assets ratio during the years 2003-2008 is particularly significant once the valuation effect is taken into account: the aggregate value of financial assets increased during those years, highlighting an even higher increase in debt.
[13] Borio (2014).
[14] Corporate assets are proxied by the level of corporate financial liabilities (item F) of ESA10 corporate balance sheet data. This proxy is more accurate than only relying on data about corporate financial assets from the same source.
[15] Masciantonio and Tiseno (2013).
[16] Ongena and Peydró (2011).

lower cost of financing to the borrowing sector, allowing a broader access to external financing than ever before.[17] This process went hand in hand with the gradual weakening of credit standards, which led to the expansion of new credit to riskier segments of borrowers. These factors all led to the development of a credit bubble.

These dynamics paved the way for highly asymmetrical developments in the EU, because the level of indebtedness and the macroeconomic conditions varied widely from country to country, and because of the large external imbalances that had built-up in the run-up to the crisis. For example, the average current account deficit of Ireland, Portugal, Spain, Greece and Cyprus increased from 3.8 % of GDP in 2003 to 11.7 % in 2008 and their net investment position worsened.[18] These sustained net financial inflows helped to finance a sustained housing boom in most of these countries.

During the same years, other EU countries (e.g. Germany, Austria, and the Netherlands in the euro area, Denmark and Sweden outside the bloc) experienced continued and sustained current account surpluses, averaging 5 % of GDP in 2008. These countries featured, on average, a slower pace of growth in the debt-to-GDP ratio. These data confirm the view that the excess savings of these countries financed the housing boom and the major leveraging in the peripheral countries of the euro area in the run-up to the crisis.[19]

The crisis

The first signals of a turning point in the financial cycle were experienced in the US, where housing prices stopped growing in the second quarter of 2006. By mid-2005, nearly one quarter of all US borrowers were taking out interest-only loans that allowed them to defer the payment of principal. Then, subprime and other risky mortgages began to default at unexpected rates. The subprime securitization market collapsed and the contagion spread to the broader financial system. The crisis effectively became global with the bankruptcy of Lehman Brothers in September 2008.

Financial institutions faced unprecedented losses. They had to shore up their capital base and were forced to deleverage. This, associated with a sharp increase in risk aversion, produced a widespread credit crunch that triggered a balance sheet recession, in line with a downward trend of the financial cycle.[20] Credit standards became tighter and debt became a binding constraint also for households and companies. Grimmer perspectives on the sustainability of the external position of the peripheral countries of the euro area, provoked a sharp contraction of net capital flows.[21] Asset and property prices started to deflate significantly also in many EU Member States. A severe fragmentation in financing conditions across the euro area followed.

The level of private sector debt across many advanced countries was no longer seen as sustainable, given the tighter financing conditions and the lower potential output. Households and non-financial corporations were forced into a prolonged period of balance sheet repair through deleveraging. Not surprisingly, the number of defaults increased sharply in many Member States. Peripheral countries implemented significant fiscal adjustment. Together, these developments increased the deleveraging pressures on the private sectors of these countries.

The aggregate effort to deleverage was at the root of the subdued growth in demand, only partially offset by a fiscal expansion in some economies. Given the role of leverage in financial crises, an important marker of a complete end to the crisis would be a significant unwinding of excess pre-crisis leverage.[22]

However, macroeconomic variables do not necessarily offer a sufficiently accurate picture of the scale of the problem in different sections of society and of the distribution of the debt overhang problem across the

[17] See FCIC (2011). It should come as no surprise that the financial sector experienced the same leveraging-up as other sectors. The pro-cyclicality of its leverage had been even more apparent than that of NFCs or households (Adrian and Shin, 2011).
[18] A similar pattern, although less pronounced, could be observed for the central and eastern European countries that joined the EU in 2004. Their average current account deficit to GDP ratio increased from 6.6 % in 2003 to 10 % in 2008.
[19] This situation is very similar to that between China and the US, as highlighted in several contributions (see, for instance, Bernanke, 2005).
[20] Koo (2011).
[21] Significantly, the reversal in private capital flows was much larger than the overall reversal, since private outflows were partly substituted by official inflows (Centre for Economic Policy Research, 2014).
[22] Lo and Rogoff (2015); Bornhost and Arranz (2014) also find that the impact of debt on growth in any given sector is worsened when other sectors also hold high debt.

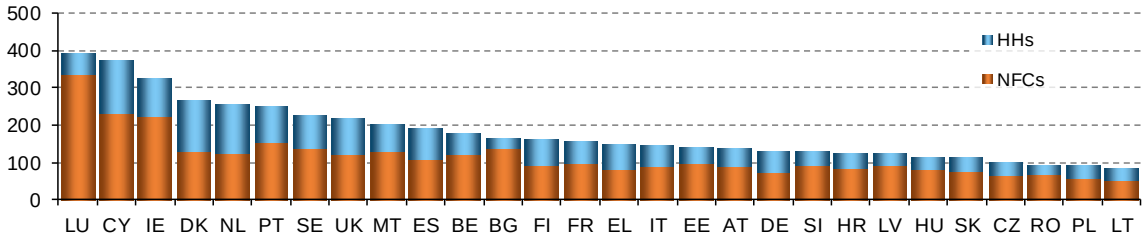
underlying population in each country. A deeper analysis of this kind, presented in the following section, is of paramount importance if we want to fine tune the appropriate policy responses.

3. THE DEBT OVERHANG OF HOUSEHOLDS AND NFCS

The current level of private debt points towards continued vulnerability from a financial stability perspective in the EU. However, the levels and growth rates of households and NFCs debt varied considerably from country to country both before and after the crisis (Chart 2). Indeed, many of the countries that experienced the highest rate of growth of private debt in the pre-crisis years, i.e. Denmark, Greece, Ireland, Portugal, Spain, Sweden, were experiencing a credit boom.

Since 2008, private indebtedness peaked in many countries. Pressures to deleverage were significant, but only a fraction of countries managed to reduce their private sector indebtedness. However, often the extent of the adjustment was a fraction of the pre-crisis increase.[23] In particular the countries that were more successful to deleverage were Spain, the UK and the Baltic countries. Germany is in a unique position having experienced a continued deleveraging that started in the early 2000s. On the contrary, some countries (e.g. Ireland, Greece, and Cyprus) experienced a sustained increase in the indebtedness of their private sector.

Chart 2: **Country breakdown of private sector debt** (debt-to-GDP ratio, percentage points, 2013 data)



Note: debt for NFCs and HHs has been calculated in agreement with the definition reported in Box A.
Source: Eurostat and authors' calculations

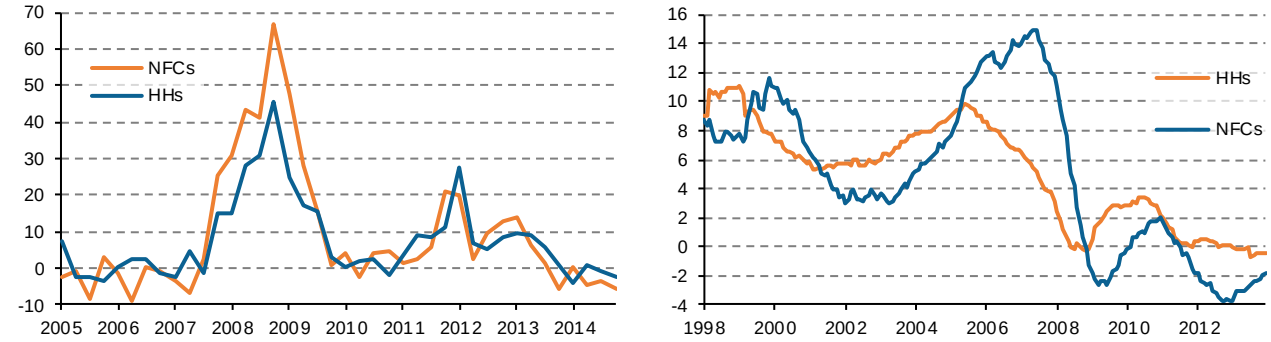
In some countries, deleveraging pressures took the mild form of passive deleveraging, where credit flows to the private sector remained positive, but growing more slowly than the GDP (e.g. Germany, Austria, and Sweden). Sharper pressures (active deleveraging) were sensibly more common across EU countries. The private sector actually refrained from taking on more debt, leading to negative credit flows and to a nominal contraction of balance sheet in Spain, Ireland, Portugal, the Baltic countries. Despite negative credit flows, the deleveraging has been so far unsuccessful in Greece, because of a GDP contraction exceeding that of credit flows.

3.1. Credit expansion and crunch: impact on households and NFCs

Although the households and NFCs sectors were subject to different trends, the increased indebtedness in both sectors developed in an exceptionally accommodative credit environment. In the run-up to the crisis, a wider access to credit was granted to households and NFCs previously barred from it. The sub-groups that benefited most were low-income households and SMEs. These are also the sub-groups that were hardest hit by the crisis and which are suffering more from the high debt. Households and NFCs were both heavily affected by the widespread credit crunch that started in 2007. Banks were forced to deleverage from the unsustainable pre-crisis levels and started to apply more restrictive credit standards to their customers. Moreover, the freeze of the interbank market caused a rapid transmission of higher interest rates to existing floating-rate loans and to new loans.

[23] EC (2014a).

Chart 3 – **Credit in the Eurozone**



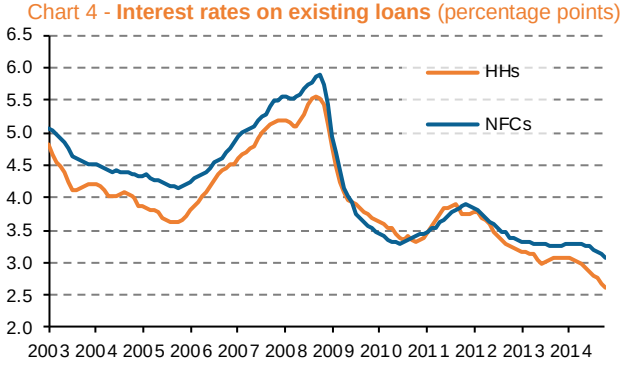
Note: The net tightening of bank credit supply standards is measured by the ECB in the Bank Lending Survey (BLS). It is measured as a percentage and shows the difference between the portion of banks that tightened its credit supply standards during the quarter under review and the portion of banks that eased their credit standards during the same quarter.
Source: ECB data and authors' calculations

The credit crunch was long-lasting. Chart 3 (lhs) shows the net tightening of credit supply standards by banks in the euro area. From mid-2007 there was a sharp net tightening of credit conditions for both sectors. The net tightening decelerated only temporarily from 2009 to 2011. However, with credit supply standards already very tight, a new tightening followed when the sovereign debt crisis hit the euro area. The private sector experienced the first net easing of supply conditions only in the first quarter of 2014. Moreover, the banking sector started a general effort to deleverage. The annual growth rate of loans to the private sector was severely affected (Chart 3, rhs). The pace of growth decelerated starting from mid-2006 for loans to households, bottoming out at zero nominal growth in 2009. Loans to NFCs sharply dropped from a peak of 14 % year-on-year growth into negative territory as of Q3 2008. The subdued recovery that followed was well below its pre-crisis level and soon reversed with the sovereign debt crisis. The growth rate of loans has remained negative since mid-2012 for NFCs, while it turned negative for households in late 2013.

These negative developments in euro area lending dynamics – albeit in presence of a net easing of supply credit standards – are clearly related to the weakness of the private sector, which is not willing or not able to take on more debt. This conclusion is strengthened when analysing the cost conditions on existing loans throughout the crisis (Chart 4). Interest rates declined for both household and NFC loans since the end of 2008, thanks to the massive central bank interventions on official rates. After the peak of the sovereign debt crisis, interest rates continued to decrease, reaching the lowest level at the end of the time-sample. The private sector is in fact refraining from taking on more debt, despite easing supply standards by credit institutions and record-low interest rates, as the deleveraging pressures are still high in many countries.

The next two sub-sections analyse in more depth the financial conditions of households and companies. The aim is to better understand how the debt overhang is unfolding and which are the main obstacles and market failures that make it so enduring.

Chart 4 - **Interest rates on existing loans** (percentage points)



Source: ECB data and authors' calculations

3.2. The non-financial corporation sector

The increase in the average debt-to-GDP ratio for EU NFCs reflects a build-up of debt that occurred through different phases. After the boom and bust of the 'new economy', a period of balance sheet consolidation followed

until 2004, when the ratio started to grow sharply until peaking between 2009 and 2010 in many countries. During the crisis, NFCs made a consistent effort to deleverage, although debt levels did not always decrease. Increases in the debt-to-GDP ratio are mainly explained by weak GDP growth.[24]

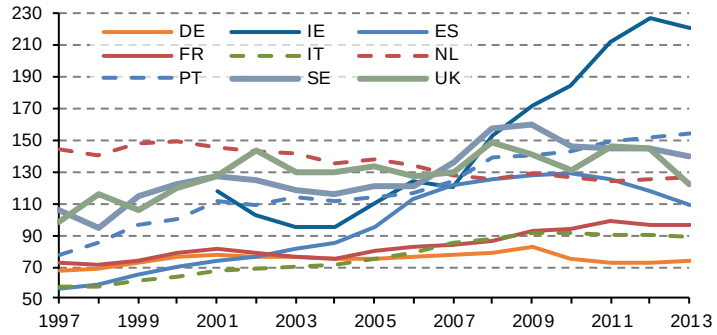
By contrast, the NFC sector in the US was much more successful in its deleveraging process. One of the main reasons behind this difference between the EU and the US is that insolvency frameworks make company restructuring more difficult in the EU.[25] This results in economic resources being locked in for longer periods, not allowing for a swift reallocation once the economic context changes and thereby acting as a general break on economic growth.

Heterogeneity in cross-country developments

The level of corporate indebtedness increased in almost all the EU member states. The accumulation of debt varied sharply across countries and was driven by several factors, including overly optimistic expectations about the long-term growth potential, and favourable lending and financial market conditions.[26] In some countries the build-up of corporate sector leverage was excessive.[27]

The country-breakdown (shown in Chart 5 for a subset of EU countries) highlights part of this great variability. The only countries, where the corporate sector decreased its level of indebtedness in the 2000-13 period (as measured by the debt-to-GDP ratio) are Germany, the Netherlands, Austria and Slovakia. A subgroup of countries shows a more moderate level of indebtedness – as measured by the debt-to-GDP ratio – throughout the sample period (e.g. Germany, Italy, France, Austria and several CEE countries). On the other hand, the UK, the Netherlands, Sweden, Denmark and Luxembourg show higher level of corporate indebtedness. Eventually, the corporate sector in a third subset of countries (e.g. Spain, Portugal, Greece, and Finland) featured the sharpest increase in its indebtedness before the crisis erupted.

Chart 5 – **Corporate indebtedness of selected EU countries** (percentage of GDP)



Note: ESA10 Consolidated data. For the United Kingdom, non-consolidated data had been considered.
Source: Eurostat Financial accounts data and authors' calculations

The debt accumulation peaked between 2008 and 2010 for the majority of member states. However, the speed of adjustment from the pre-crisis peak differed markedly across countries. The fastest corporate deleveraging to date was experienced in Spain, Sweden, the Baltic countries and Luxembourg. However, only a portion of the pre-crisis increase has been reduced and the level of indebtedness of some countries (e.g. Ireland) increased markedly since 2008. At the end of 2013 the indebtedness of five countries was still increasing (Czech Republic, Denmark, Cyprus, Greece and Portugal). In the latter three cases, this increase can be mainly explained as unsuccessful deleveraging: the GDP contraction had more than offset the negative credit flows.

[24] See, for instance, ECB (2012). Other measures of corporate indebtedness fail to capture these simple dynamics. For instance, corporate leverage ratios are generally more volatile than debt-to-income ratios, as they are influenced strongly by valuation effects. From 2009, euro area corporate leverage actually decreased. Its decline mainly captures increases in equity prices. Similarly, the debt to corporate income ratio is hardly significant, since it turned negative for several countries when the crisis hit.
[25] CEPR (2014). The difference between insolvency frameworks makes also difficult to compare data on non-performing loans on banks' balance sheets. Indeed, banks' non-performing loans and provisions for loan losses, together with corporate and household defaults surged from the onset of the crisis in the US, but soon declined. Banks were quicker to clean their balance sheets. In the EU, on the contrary, the number of defaults was lower and banks relied more on forbearance and extend-and-pretend behaviour.
[26] CEPR (2014), Borio (2014), IMF (2012)
[27] ECB (2014b).

Importance of financial development

It is not very easy to compare the different debt levels observed in the different EU economies. Debt capacity and sustainability ultimately depend on the (perceived) ability to generate high enough future streams of income to repay the existing debt. Moreover, financial systems vary widely between EU economies in their development and way of allocating resources. This issue might deserve discussion in its own right, as differences in financial structures could account for a significant part of this variety, granting a higher debt capacity to companies in more developed financial systems.[28] For instance, Ireland, Belgium and Luxembourg are the main hubs for the European headquarters of many non-EU multinationals. Therefore, their high corporate debt levels, given the high number of foreign subsidiaries operating on their soil, might not be a signal of a fragile corporate sector.[29] However, the increases in corporate indebtedness observed in recent years in some of these countries require attention, because just like in the pre-crisis years they can be the signal of growing imbalances.

Sustainability assessments

The sustainability of corporate debt levels can be assessed in several ways. For instance, the widespread decrease in forecasted growth rates of potential GDP for most of the EU countries after the crisis is a signal of reduced long-term sustainability. A way to assess the short-term sustainability is through the analysis of the interest coverage ratio (ICR), which is defined as the ratio between a company's earnings before interest and taxes and its interest payments. According to the IMF (2013a), an ICR below 1 can be defined as a condition of debt overhang. In 2013, many NFCs still had a debt overhang problem, even if the debt service burden generally decreased: the proportion of NFCs in this situation ranged from 45 % to 55 % in the EU's most financially-stressed economies. Moreover, corporate debt overhang in some countries has resulted in a growing stock of non-performing loans, which limit banks' profitability and willingness to provide new credit.[30]

However, debt overhang is a broader concept that goes beyond short-term sustainability and includes solvent firms, which have to forego viable investment projects due to high debt levels. According to European Commission's studies, corporate deleveraging needs could still be significant in several member states (being above 10 % in at least six of them), implying a prolonged period of stress and negative credit flows for their corporate sectors.[31]

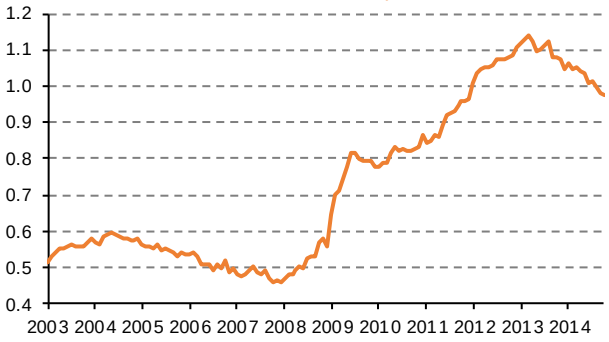
Post-crisis developments

The different post-crisis dynamics of the debt-to-GDP ratio for EU countries have more than one explanation and can help to understand better the debt overhang problem. Indeed, many countries that experienced an increase in the ratio were actually hit by a negative trend in their GDP. This is particularly true for Greece, Cyprus, and Portugal. In absolute levels, the aggregate corporate debt for these countries actually stalled or grew very moderately in nominal terms, compared to the pre-crisis years. These countries, despite their efforts to deleverage, were actually caught in a debt spiral, which may generate even more fragilities in the corporate and financial sectors. In other countries less affected by such a negative trend in their GDP, the NFC sectors were more successful at deleveraging. However, deleveraging has been increasingly active (implying negative credit flows) and efforts to deleverage have increased in 2013.[32] The contribution of negative credit flows became more relevant in that year.

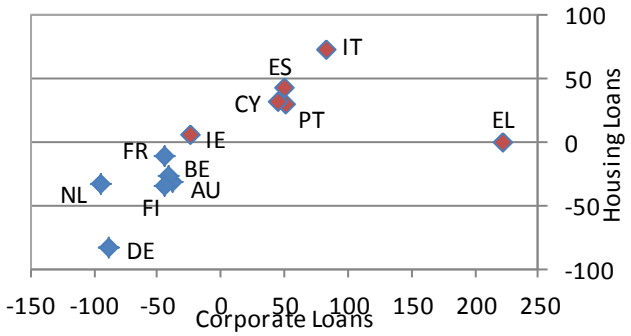
[28] Allen and Gale (2001).
[29] Indeed, looking at other metrics (like the debt-to-asset ratio), this picture appear more blurred. The corporate sector in Luxembourg, Sweden, Belgium, Denmark, the UK and France does not look extremely exposed to high indebtedness. On the contrary, the ratio is quite higher for several CEE and southern European member states. However, this metrics may be less reliable than the debt-to-GDP ratio and should be interpreted with some care.
[30] See ECB (2012) and Lo and Rogoff (2015).
[31] See EC (2014a). Further details on the methodology used to estimate deleveraging needs can be found in Cuerpo et al. (2014).
[32] EC (2014a).

Chart 6 – **Cross-country heterogeneity of credit conditions**

Dispersion of yields on loans to NFCs (standard deviation, euro area countries)



Changes in interest rates on new bank loans (basis points, Dec 2010 – Jan 2013)



Source: ECB, IMF data and authors' elaborations

The strength of the deleveraging pressures also depends on diverging developments in interest rates in the different countries. The debt service burden of euro area non-financial corporations has been on a declining trend since its peak in 2009 (ECB, 2012). However, the subsequent turmoil on sovereign bond markets sharply increased the level of fragmentation of financial market conditions. As shown in Chart 6 lhs, the dispersion of interest rates on existing loans to NFCs increased sharply and was still well above its pre-crisis level at the end of 2014. NFCs in the countries hardest hit by the sovereign debt crisis experienced worse funding conditions (Chart 6 rhs) and tighter credit standards. This certainly had a negative impact on debt sustainability and made the debt overhang a more pressing concern for NFCs in these countries. Even if interest rates and market fragmentation have decreased, the level of interest rates for many NFCs may not be low enough to make new investment attractive, as any profit generated will be absorbed by servicing existing debt. Indeed, the investment rate of NFCs in the EU decreased from 22.6 % in 2007 to 19.3 % in 2013.[33] Therefore, market fragmentation is certainly still an issue, since NFCs that pay higher interest rates find deleveraging harder and reduce investment further.[34] Although higher interest rates increased the deleveraging pressures, they also contributed to pushing some of the countries worst hit by the crisis into a debt trap.

Macroeconomic aggregates for the total non-financial corporate sector mask the reallocation of funds across productive sectors. In some countries and sectors, the accumulation of debt before the crisis was stronger. This was particularly the case for sectors that experienced a credit boom before the crisis, like the construction and real estate sectors. Over-indebted sectors have deleveraged more strongly than less indebted sectors. However, the systemic nature of the debt overhang in some countries (e.g. Spain, Ireland) is underscored by the fact that the deleveraging pressures on the corporate sector are not limited to the sectors that experienced credit booms before the crisis, like the construction and real estate sectors. [35]

Over-indebtedness by company size

Aggregate data may not capture differences between SMEs and large companies. Large companies can more easily tap the corporate bond market and attenuate the impact of the credit crunch.[36] The tightening of credit standards during the financial crisis affected mainly SMEs, which have traditionally been more dependent on bank credit. All of a sudden, SMEs found credit scarcer and more expensive. Moreover, being more dependent on relationship banking (mainly with local domestic banks), SMEs in crisis-hit countries also suffered the most from the fragmentation of the credit market. This led to debt becoming a constraining variable for SMEs in greater proportion than for large companies. Indeed, data from the ECB SAFE survey shows that the most pressing problem for SMEs in Greece, Cyprus, Italy and Spain is actually access to finance, while this concern affects a relatively lower share of SMEs at the EU28 level.

[33] Part of the NFC's deleveraging might originated in the lowered economic growth perspectives, with NFCs reducing their external financing, as they need lower investment in new capital formation.
[34] Coeuré (2014).
[35] See ECB (2014b) and IMF (2013b).
[36] Multinationals are able to go even further, issuing debt abroad through their subsidiaries. This also allowed many of these firms based in the countries hardest hit by the market fragmentation to enjoy lower cost conditions.

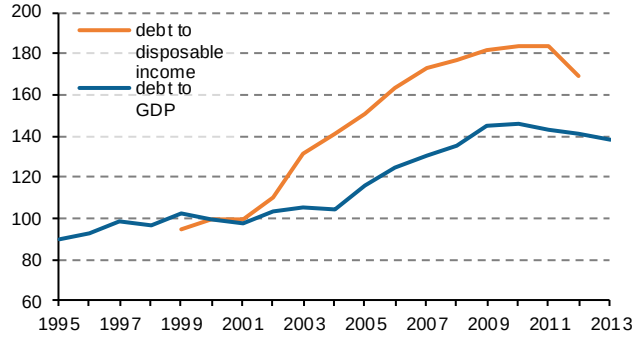
Moreover, a higher percentage of large companies than SMEs in the euro area indicated a decline in their debt-to-asset ratios from 2009 to 2011. SMEs also experienced a considerably higher interest payment burden.[37] It is also important to note that on average SMEs tend to have higher leverage than larger companies and that their leverage was increasing during the crisis. At the same time, the average value added of SMEs compared with that of large decreased between 2007 and 2013. Consequently, the debt sustainability of SMEs across the EU has further fallen compared with to large companies.[38]

These adverse developments for SMEs in many EU countries should be considered carefully, since SMEs constitute 99.8 % of the number of companies and 66.9 % of employment in the EU. The adverse impact of the debt overhang on SMEs can be felt in both employment and economic growth terms. Moreover the fact that the problem is so dispersed over a huge number of companies makes it harder to achieve a solution.[39] The number of EU SMEs changed only marginally between 2008 and 2013. Many of them remained in business despite it not being economically profitable anymore, accounting for a significant share of the increase in corporate indebtedness in the EU. The share of companies with negative value added increased sharply in those years. Moreover growth potential had been substantially lowered by the crisis, reducing the prospective profitability of many companies. The rigidity of insolvency laws in many EU countries could be one of the reasons behind this development, because they reduce the incentives for loss-making companies to be liquidated.

3.3. The household sector

Household debt consists of two components: mortgage debt and non-mortgage debt, which mainly includes non-mortgage loans, credit lines and credit card debt. The bulk of household indebtedness is related to housing finance, while consumer credit, while growing, has still a limited importance in Europe.[40] However, consumer credit, as more volatile and charged with higher interest rates, may substantially impact household consumption at a given moment. Household debt soared in the years leading up to the Great Recession of the previous decade. The indebtedness of the household sector rose more sharply compared with that of the NFC sector, and increased more sharply in the run-up to the crisis.

Chart 7 – **Debt-to-income ratios** (EU average, base year 2000: 100)



Source: OECD, Eurostat Financial accounts data and authors' calculations

Risky pre-crisis developments

In the years that led up to the crisis, many households took advantage of historically low interest rates on mortgage loans (as shown in Chart 4 above), and of more relaxed credit standards. Given the lack of comprehensive historical data, it is difficult to perform a thorough analysis of developments in credit standards on mortgage loans. However, the available empirical evidence allows us to conclude that loan-to-value (LTV)

[37] The higher interest payment burden may reflect a number of causes (e.g. higher riskiness, as reflected by lower rating grades or higher leverage; higher dependence on bank credit, more costly during the credit crunch; lower liquidity).
[38] For this and the following paragraphs, see ECB (2012), IMF (2013b), EC(2013) and EC (2014). A firm's value added is measured as the difference between revenues and costs.
[39] It is worth noting that a significant share of micro-firms are single-person firms and can be assimilated to households (except for the limited-liability feature), therefore for this type of firms the border between corporate and personal insolvency becomes blurred.
[40] According to ECB data (ECB, 2013), over 43 % of euro area households hold debt. The share of households with a mortgage debt is lower than that of households with non-mortgage debt (23.1 % compared with 29.3 %). However, the average amount of mortgage debt is considerably higher (EUR 68,400 per household compared with EUR 5,000) and therefore more significant.

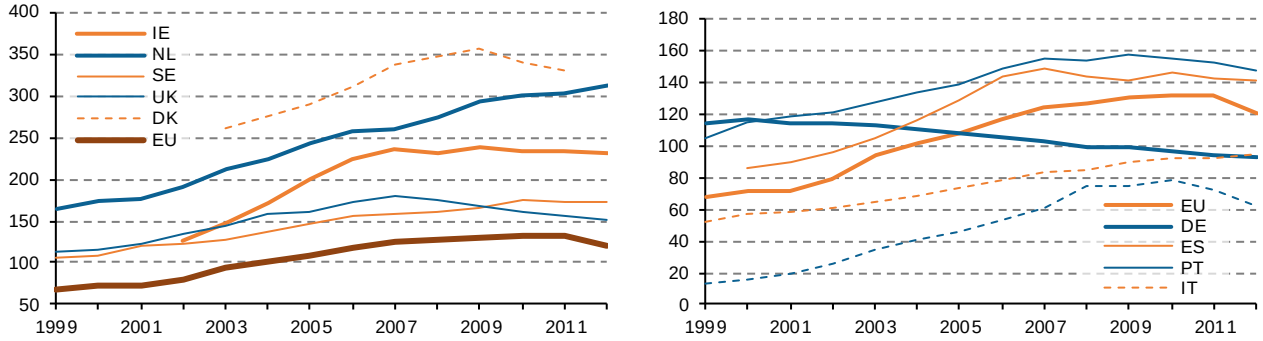
and loan-to-income (LTI) ratios increased steadily in many countries.[41] This allowed many households to take out larger mortgages. Moreover, like in the US, many customers with limited credit guarantees obtained wider access to mortgage loans. The macro effect of this environment was a sustained and continued rise in property prices and in household indebtedness across most of the EU countries, until the crisis broke out. The simultaneous boom in house prices and the stock market meant that the net debt of the average household remained broadly stable, masking households' growing exposure to a sharp fall in asset prices.[42]

As shown in Chart 7, the average EU debt-to-GDP ratio increased until 2009, before starting a mild decrease. However, once this figure is compared with the debt-to-disposable income ratio, which is a much more precise figure of the debt sustainability of the sector (based on OECD data), the increase in indebtedness appears sharper. The ratio, based at 100 in 2000, almost doubled, and passed 180 in 2009. The aggregate level of household indebtedness had reached excessive levels.[43] As the crisis unfolded, house prices started a prolonged and sustained decline. Many households saw their wealth shrink relative to their debt and, with less income and more unemployment, found it harder to meet mortgage payments. In response, the household sector as a whole began its deleveraging from the credit binge in 2009.[44]

Heterogeneity in cross-country developments

Data from different countries (Chart 8) show much variability. The Nordic and Anglo-Saxon countries have the more indebted households' sector. Among the Nordic countries, Denmark has the highest household debt-to-disposable income ratio (310 %) among the world's developed countries (Norway has 200 % and Sweden 170 %). The Netherlands also has a ratio above 300 %. Such levels are well above the EU average and highlight a significant financial fragility of the sector to reversals in financial markets. In Chart 8 rhs, countries with lower levels of debt-to-disposable income are shown. Some of them, like Spain and Hungary experienced a sharp rise in indebtedness. Germany is an outlier since it experienced a continued deleveraging from 2000 onwards.

Chart 8 – **Household debt in selected EU countries** (percentage of disposable income)



Source: Eurostat Financial accounts data and authors' calculations

Post-crisis developments

Once the financial crisis made debt a constraining factor for many households around the EU as of 2009, tentative deleveraging was undertaken by the household sector. However, while some countries (e.g. Spain, Hungary) succeeded in reducing their average debt-to-GDP ratio, others (e.g. Greece) did not manage to do so, with many households caught up in a debt spiral. The extent of deleveraging pressures still runs high in several countries, exceeding 10 % of GDP in at least seven countries (including the Netherlands, Greece, Spain and Ireland).[45]

[41] Building a proper series of these variables is extremely challenging at the moment because they became policy variables only after the crisis as a result of the re-discovery of macro-prudential measures in the policy debate. However a sense of the changes in these variables can be obtained from many sources (see, for instance, Jordá et al., 2014).
[42] IMF (2012)
[43] An alternative and more granular measurement of consumer over-indebtedness could be performed through the assessment of the difficulty of a household to meet commitments, be it due to credit or to the payment of bills (i.e. comparing credit repayments with income). For further reference, see *The Over-indebtedness of European Households*, European Commission 2014, p.21.

[45] For further reference, see EC (2014a).

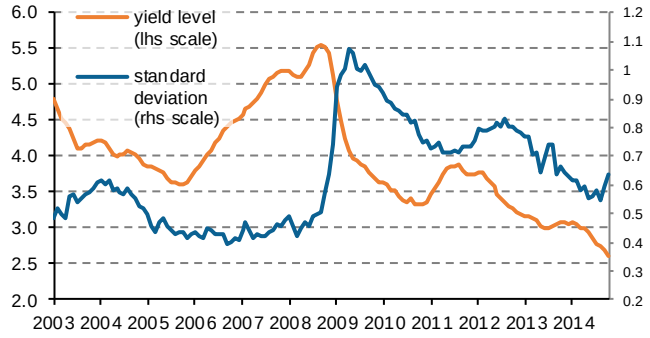
Deleveraging pressures were made worse by the decline in the housing market. The prospect of a prolonged decrease in property prices that affected many countries (e.g. Spain, Ireland, Portugal, and Italy) has been a significant disincentive for households to take on new mortgage loans, leading, on aggregate, to negative credit flows in the housing sector. In this light, aggregate deleveraging resulting from maturing mortgage loans not being substituted by new ones, might not accurately reflect the actual debt sustainability of individual households. In addition, the credit institutions started to restrain their LTV and LTI ratios, contributing to the reduction of mortgage amounts and to aggregate deleveraging.

Box B: **Foreign-currency mortgage loans**

In the run-up to the financial crisis in 2008, some households in central and eastern Europe (CEE) financed their mortgages in Swiss francs, euros and Japanese yen, mainly convinced by the lower interest rates of some foreign-currency mortgage loans compared with the interest rates available in their home currencies. Typically, households do not hold a natural currency hedge and their resources to purchase derivatives for managing exchange risk are reduced (Economic Credit Research Institute, 2011). Therefore, this type of mortgages is highly sensitive to exchange rate fluctuations.

While before the financial crisis this was considered a popular financing method and did not seem to be problematic, many households are faced today with substantial losses due to appreciations in the foreign currency in question. For example, the recent decision by the Swiss National Bank (SNB) to abandon its policy of an exchange rate cap on the Swiss franc is expected to impact significantly on the mortgage loans of households in CEE countries that are indexed in a foreign currency. The Swiss franc jumped as much as 30 % against the euro just after the SNB announcement. Similar spikes were registered against the Polish zloty (40 %), the Croatian kuna (28 %), the Romanian leu (26 %) and the Hungarian forint (20 %)[46].

Chart 9 – **Euro area yields on loans for house purchases**



Source: ECB data and authors' calculations

Impact of interest rates and evolving macroeconomic conditions

A trickier element to analyse is the impact of the variations in interest rates on debt levels (Chart 9 for euro area countries). The pre-crisis increase in interest rates for house purchases was common to every country, as shown by the absence of much difference from country to country. However, the sharp decrease in interest rates, which began in Q4-2008, was not evenly passed on to final borrowers. The spike in the level of volatility from country to country shows that the decrease was immediately enjoyed only in certain euro area countries. Interest rates for mortgages remained considerably higher for many southern European countries. The cross-country heterogeneity decreased only slowly. Therefore, the passing on of lower financing costs to households took considerably more time in southern European countries. This had a twofold effect. First, the incentive to take on new mortgages, especially at variable rates, was lower in the countries with higher interest rates. This may have accelerated the deleveraging process and the downward trend in house prices. Moreover, higher interest rates made the servicing of existing variable rate mortgages more costly, heightening the debt overhang problem. Households in several CEE non-euro area countries also suffered as a result of the popularity of foreign-currency mortgage loans (see Box B). While this type of mortgage loans allowed many households to enjoy lower interest rate payments, it also exposed them to currency risk. In particular, this risk materialised for mortgage loans indexed in Swiss francs, when that currency sharply appreciated.

[46] Bloomberg and own calculations.

Household mortgages in Poland, Croatia and Hungary[47] have been particularly affected by the appreciation of the Swiss franc. It is estimated that 46 % of the total home loans in Poland[48] (approx. EUR 30 billion[49]) are indexed in Swiss francs, while in Croatia the value of such household loans (primarily residential) is around EUR 21.8 billion[50]. Other EU countries (e.g. Romania, the Czech Republic and Austria) were also affected,[51] but the volume of household mortgages indexed in Swiss francs in those countries is much lower.

A final factor is the overall macroeconomic context, which is characterised by falling or negative GDP growth across the EU, higher unemployment and stagnating wages. As a consequence of the adverse developments in the European economy, the disposable income in 2013 was lower than in 2007 for many European countries. This shows that the deleveraging in aggregate household debt has been even more pronounced. Together with higher unemployment, the aggregate household debt capacity was sharply reduced. Some households found it impossible to take out a new loan, while many others found themselves in dire straits over trying to pay back their existing debt. Unemployment rate increases had a particularly strong impact on mortgage debt service ratios in Greece, Spain, Portugal and Cyprus. [52]

Table 1 – **Distributional results of the ECB Household Finance and Consumption Survey (HFCS)**

Median debt to assets ratio – breakdowns

		All	BE	DE	GR	ES	FR	IT	CY	LU	MT	NL	AT	PT	SI	SK	FI
Net wealth	Bottom 20%	108.2	91.5	139.2	89.7	81.6	94.1	80.2	65.9	84.0	19.9	153.1	138.3	96.3	N	50.3	153.0
	90-100%	6.0	2.9	8.3	2.7	5.5	5.9	3.1	3.0	3.7	1.3	13.0	2.2	8.7	N	2.5	5.6

Median debt service to income ratio, households with debt payments – breakdowns

		All	BE	DE	GR	ES	FR	IT	CY	LU	MT	NL	AT	PT	SI	SK	FI
Income	Bottom 20%	26.5	38.5	12.5	35.4	39.6	16.7	30.0	95.9	20.2	N	29.8	14.0	79.5	N	25.6	M
	90-100%	10.0	7.1	8.7	8.4	10.4	14.7	7.9	14.4	11.3	8.5	10.0	2.8	8.6	N	6.9	M

Has negative net wealth - breakdowns (% of households)

		All	BE	DE	GR	ES	FR	IT	CY	LU	MT	NL	AT	PT	SI	SK	FI
Income	Bottom 20%	6.1	5.2	14.7	1.8	2.7	3.8	3.4	4.2	5.7	1.5	13.3	8.9	2.1	0.0	1.7	11.3
	90-100%	2.1	0.7	1.9	0.8	1.9	0.8	0.0	3.1	1.0	0.5	9.0	2.0	0.6	0.2	0.3	4.1

Source: ECB HFCS data and authors' elaboration

ECB data on the percentage of indebted households in distress highlights not only that the situation varied from country to country, but also that the highest proportion of households in distress is mostly found in those countries hardest hit by the crisis (e.g. Greece, Spain, Italy, Cyprus, Portugal), which experienced a combination of higher interest rates with falling wages and employment (ECB, 2014a).

The same might be true for those EU countries that are apparently deleveraging more smoothly but which have higher debt levels (e.g. the Netherlands, Denmark, Sweden, and the UK). Their households could be extremely vulnerable to adverse shocks, such as an increase in interest rates, even if the aggregate impact of a shock would

[47] Hungary used to be one of the countries most exposed to Swiss franc loans. However, in 2014 it fixed the exchange rate for the conversion of household mortgages in euros and Swiss francs at well below current market levels. Thus, the impact on Hungarian households was reduced.
[48] Piotr Skolimowski and Maciej Onoszko, "Eastern European Currencies Dive as Swiss Loan Costs Hurt Banks", Bloomberg, published 15 January 2015.
[49] Henry Foy and Andrew Byrne, "Swiss move hits Polish and Hungarian borrowers", Financial Times, published 15 January 2015.
[50] Bartłomiej Sawicki, "Poland and Croatia most affected by franc spike", published 4 February 2015.
[51] Susan Fenton and Toby Chopra, "Factbox: CEE exposure to Swiss franc lending", Reuters, published 15 January 2015.
[52] ILO (2014) and ECB (2014a).

inevitably depend on the relative proportions of households with existing variable rate mortgages in each country. Although euro area households entered the crisis in a more solid balance sheet position, their net worth deteriorated as a consequence of the protracted weakness of the economy (the euro area entered a second recession in Q3-2011) and conservative fiscal policy. Households from these countries are in a much more vulnerable situation than in 2008.

Distributional dimension of the problem

Specific groups of indebted households are more exposed to debt pressure. The analysis of debt levels across the whole distribution of wealth or income of the household population could add further insight about the spread and intensity of the phenomenon. However, what aggregate data do not capture about deleveraging is that there is a long tail of over-indebted households that find deleveraging particularly hard. To this end, relying on the ECB Household Financing and Consumption Survey (HFCS) is particularly useful. This instrument provides 2010 data related to euro area economies. A summary of the results is presented in Table 1.[53]

Assets, debt and net wealth grow with income as does home ownership: the share of households owning their main residence grows from 47 % for the bottom 20 % of the euro area income distribution to 79.5 % for the highest 10 %. Higher income households have a higher debt capacity in absolute terms, since they can provide higher collateral.

Since higher income is generally associated with higher asset holdings, these households also have an additional cushion against adverse economic shocks. Wealth can come in two forms: non-financial or financial wealth. Both types of wealth are concentrated towards the top fifth of the income distribution. In particular, this subset of households has a disproportionately higher share of financial wealth: the bottom 40 % of euro area households (according to the income distribution) hold only 3.4 % of the total financial assets, compared to 47.6 % held by the highest 10 %. This is interesting, since higher-income households experienced the largest decline in wealth during the 2007-09 financial market downturn. However, this decline affected their debt capacity and funding choices in a limited way, since they could rely on a higher stock of per capita wealth. Moreover, prices of financial assets have at least partially recovered since then in many countries. The same is not true for housing prices. As a result, this diverging development hit lower-income households more heavily.

Lower-income households suffered more during the crisis for several additional reasons. When debt is considered as a share of personal wealth or income, lower income households appear to be much more indebted. The median debt-to-asset ratio decreases steadily for higher levels of income and net wealth. If we look at the figures according to the income distribution, the debt-to-asset ratio is 36.2 % for the bottom 20 % and only 15.6 % for the top 10 %.When the net wealth distribution is considered, the debt-to-asset ratio is 108.2 % for the bottom 20 % and 6.0 % for the top 10 %. Moreover, these ratios appear to be highest for the bottom 20 % (both with respect to income and net wealth distributions) in the following countries: Austria, Finland, Germany, and the Netherlands. From aggregate data, these countries did not appear to be particularly affected by the household debt overhang problem. However, distributional data show very clearly that households at the bottom of the income and net wealth distribution in these countries are severely affected by the debt overhang. Households in the bottom 20% have also much higher debt service to income ratio and are therefore much more exposed to over-indebtedness. This result may be a consequence of a wider access to credit obtained by lower income households. Another possible explanation is that the lower-middle income households got asymmetrically more hit by the crisis, and joined the low income household with their legacy debt.

The impact of the crisis on lower-income households has also been magnified by the very low amount of assets they hold. Therefore, it should come as no surprise that households with negative net wealth are concentrated on the lower-income parts of the income distribution. Again, distributional data show that the share of households with negative equity is particularly high in Austria, Finland, Germany, and the Netherlands. Therefore, these four countries are experiencing a significant problem of debt overhang at the tail of their income distributions

[53] The process of imputing, validating and analysing the data for the HFCS is highly complex and time-consuming, and the data lack homogeneity. Moreover, the data draw a picture of household indebtedness before the sovereign debt crisis hit. The survey will be conducted every three years in most participating countries. Data for the second wave of the survey was collected in the second half of 2013 and in 2014. The report for the second wave is expected to be released in 2016.

together with the rest of the sample. This conclusion may be based on very different situations from country to country: for instance, a very high level of household debt in the Netherlands as opposed to lower assets holding by lower-income households in Germany.[54]

Although in peripheral euro area countries the debt overhang problem appears to be more widespread across the income distribution, lower-income households were generally more severely hit. Even if the debt overhang has a different intensity and spread in each country (as can be seen by the proportion of debtors in distress), generally speaking lower-income households tend to show a higher marginal propensity to consume. Therefore, when lower-income households get caught in a debt overhang problem as is the case in many countries, the negative impact on consumption expenditure is actually magnified by their stronger response to wealth shocks.[55] Eurostat data show that final per capita consumption expenditure had decreased between 2008 and 2013 in several countries (e.g. Italy, Spain, Greece, Portugal, Romania, Hungary, etc.).[56] These aggregate data may mask even sharper declines in consumption expenditure for lower-income households.

In contrast with the US households who were able to deleverage more quickly and smoothly, EU households appear to be struggling in many countries. At the macroeconomic level, this is probably a consequence of the double-dip recession experienced following the sovereign debt crisis. At the microeconomic level, this could also be due to the rigidity of insolvency procedures associated with mortgages in many countries. Despite the fact that securitisation made debt restructuring/renegotiation more difficult, the proportion of mortgage delinquencies and restructuring in the US was considerably higher than in the EU. US households caught in a situation of falling house prices, negative equity and high debt to service ratio could benefit from an insolvency framework that allows them to write down their debt more easily.

Inter-generational dimension of the problem

A final issue that needs to be addressed is the inter-generational distribution of the debt overhang effects on the household sector. The ageing and expected shrinkage of the EU's population will have a long-term detrimental impact on household wealth. An ageing society implies weaker demand for assets, in particular housing. Research on the relationship between house prices and demographic variables suggests that demographic factors could dampen house price dynamics by reducing property price growth considerably over the coming decades.[57] Moreover, since younger households are characterised by higher indebtedness and lower asset holdings (that is, lower net wealth), they find themselves more frequently in a debt overhang situation and are expected to stay in this situation for a longer period. Indeed, the proportion of households with negative wealth in the 16-34 subgroup tops 11.5 %, while for the other age subgroups the figure does not exceed 6.2 %.[58] Taking a longer-term perspective, younger households are also more likely to suffer from the macroeconomic impact of an ageing society. This is even truer, once the fact that housing investment is the most significant complement of a pension scheme is taken into consideration. A deeper analysis on the potential impact of longevity risk and of ageing societies on households can be found in Chapter 4 of this Review.

4. CONSEQUENCES

The macroeconomic environment

So far the deleveraging process has proven to be slow and painful in Europe and deleveraging efforts have been successful only in a subset of countries. This is mainly a consequence of the current macroeconomic environment, which is itself partially a consequence of the debt overhang problem. Indeed, when the debt overhang unfolds at the macroeconomic level, its consequences are felt by the whole economy and not only by the indebted individuals or companies.

[54] Another relevant issue in Germany is the very low proportion of households owning their own home in the lowest 20 % of the income distribution (16.3 %, compared with a euro area average of 47 %). For further evidence see the ECB HFCS (2013).
[55] See Ampudia et al. (2014) and Mian et al. (2013). In addition, the consumption loss in 2010 relative to the pre-crisis trend was greater for economies that had a larger rise in the gross household debt-to-income ratio during 2002-06 (IMF, 2012). For additional euro area references see ECB (2014a), for the US, see FCIC (2011).
[56] The Eurostat series considered here is: nama_fcs_c, calculated as euros per inhabitant.
[57] BIS (2014).
[58] For additional data, see ECB (2013).

Currently, the EU economy has on average below-potential aggregate demand, almost no inflation and official interest rates at the zero lower bound in many countries. In addition, the euro area has only recently exited from a double-dip recession. The weakness of the economic recovery can be explained by the difficulty in dealing with some structural factors, like flagging productivity growth in many EU countries, structural external imbalances, and a high level of private debt in many countries.[59]

Low inflation and growth

The severe demand contraction and consequent overcapacity has led to a situation of very low inflation. The result is a substantial slowdown of nominal growth, which interacts perversely with the deleveraging process.[60] Indeed, a positive inflation rate slowly decreases the real value of existing debt, which is generally fixed in nominal terms. Therefore, the low inflation experienced in the euro area and other EU countries (e.g. the UK, Sweden) threatens to aggravate the burden of the debt overhang still besetting government and private economic agents.[61] Low inflation exacerbates the demand compression driven by the debt overhang, as it makes deleveraging more difficult. This could lead to an even higher savings rate, as private and public entities try to reach their desired leverage ratio. The resulting reduction in consumption and investment could weigh on prices, raising the risk of a vicious disinflationary cycle. On the other side of the coin, the higher inflation rate experienced in the UK over the years of the crisis might have contributed to faster deleveraging, with domestic demand starting to react more positively.

This low-growth environment is also accompanied by stagnating nominal and real incomes, which contribute to making deleveraging harder.[62] This 'nominal stagnation' forces households to compress their consumption and NFCs to decrease their investment rate in order to increase the required saving rate to deleverage, as debt cannot be paid back through growing incomes. This behaviour, although completely rational at the individual level, has a negative feedback loop in aggregate terms, forcing demand down further.

Impact of interest rates

The impact of a decrease in interest rates on the debt overhang is generally positive. Lower interest rates can reduce debt service burdens on variable-rate mortgages and on new debt. Lower rates may also provide support to asset prices. In fact, monetary authorities have typically cut interest rates in the wake of the financial crisis, thus reducing the debt service burden on households and companies, although with highly uneven effects across and within countries. However, despite interest rates hitting the zero lower bound and many further unconventional measures that have been taken by central banks, these have proved to be of limited relief for over-indebted households and companies.[63]

At the same time, considering the incentives to private agents, low interest rates may slow the deleveraging process of the private sector. Lower interest rates can have the perverse effect of incentivising borrowers to take on more debt and increasing the phenomenon of 'zombie' lending (the rollover of otherwise non-viable loans).[64] From this perspective, the US non-financial corporate sector is already providing signals of re-leveraging, as some companies have taken advantage of the long period of low interest rates to issue bonds and take on new, or refinance existing obligations. Companies have built up cash buffers, increased dividends, and bought back stock. Many companies in Europe have followed the same path, although to a lesser extent, but the spending on fixed investment has remained quite subdued. Very low interest rates could keep poor-quality borrowers afloat, reducing the pressure for radical restructuring and reform and the incentives to reallocate resources efficiently.[65]

---

[59] Cross-country studies by IMF (2012) and Jordà, Schularick and Taylor (2014) show that the presence of a high level of household debt leads to deeper recessions.
[60] CEPR (2014).
[61] Constancio (2014).
[62] Also the fact that financial institutions in many EU countries are still grappling with cleaning their balance sheets does not make the situation easier.
[63] See Cecioni et al. (2011) and Gambacorta et al. (2014).
[64] See Wolf (2014). Low interest rates could induce "evergreening policies" and postpone necessary adjustments in banks' balance sheets. Given the low cost of delaying foreclosure, very low interest rates may disguise underlying credit weakness, which would encourag banks to 'extend and pretend' that loans of low-quality borrowers will become good (Gambacorta, 2011). This process took place in Japan in the 1990s: banks allowed debtors to roll over loans on which they could afford the near zero interest payments, but not repayments of principal (Caballero, Hoshi and Kashyap, 2008).
[65] BIS (2014).

Although low interest rates may have the immediate effect of reducing the debt service burden, both households and NFCs remain exposed to a normalisation in the level of global interest rates, whilst the high levels of accumulated debt stock makes them vulnerable in the event of a future disruption in international financial markets.[66] Risk perceptions related to this issue are partially at the root of the fact that the financial integration of EU financial and capital markets has come to a halt. Together with the persisting market fragmentation, the vulnerabilities related to the debt overhang increase risks to financial stability.

Impact on consumption and capital formation

Finding a solution to support a smoother and faster deleveraging from excessive indebtedness is therefore of paramount importance, particularly as the debt overhang is making itself felt in subdued levels of consumption and investment. Since debtors tend to be less wealthy than average (with a higher marginal propensity to consume) and since debt concentrates losses on the balance sheet of debtors, the consumption decline is larger for a given decline in aggregate wealth when there is more debt in the economy.[67] The 2012 IMF World Economic Outlook (WEO) shows a larger decline in consumption for countries where the household debt had increased more in the run-up to the crisis. Moreover, considering the distribution of debt and wealth across society, the social costs of the debt overhang for lower-income households may be disproportionately higher than aggregate data would suggest. Moreover, the corporate debt overhang is negatively affecting aggregate capital formation. The proportion of the investment component decreased from 22.6 % of EU GDP in 2007 to 19.3 % in 2013, the decrease being larger in countries most severely affected by the crisis. The ECB (2014b) performed an analysis of the situation for individual companies, which showed that companies with higher levels of debt and higher interest payment ratios reduced their investment more than others during the crisis. The prolonged slump in the gross capital formation may in the end harm the growth potential of the EU economy.

5. THE WAY FORWARD: HOW TO PROCEED?

Among other sources, this section has drawn on work by Y. Liu and C. B. Rosenberg, published in 2013. [68]

5.1. Macroeconomic level

The contraction in economic activity associated with the debt overhang described in Section 4 above can be mitigated by an offsetting macroeconomic policy stimulus. Monetary policy can be used to counter deflationary pressures, which tend to transfer wealth from debtors to creditors. Because the face value of debt is fixed in nominal terms, deflation implies that the borrower has to dedicate more income in real terms to debt servicing. By the same token, inflation would imply a wealth transfer from creditors to debtors. Consequently, monetary policy can lessen the negative effects of a debt-driven recession by preventing deflation. However, monetary policy tends to be much less potent when there is debt overhang in the economy, for reasons explained in Section 4 and below. Moreover, there is the additional challenge of interest rates having reached the zero lower bound, which constrains the use of the conventional interest rate tool and calls for unconventional policy measures.

The quantitative easing (QE) programme started by the ECB in March 2015 is designed to push down the market interest rates further by lifting asset prices. If this leads to mortgage borrowers being able to refinance at a lower cost, it could prove helpful in reducing their debt service burden. However, the most vulnerable households — i.e. those with negative equity mortgages where the value of debt exceeds that of the property securing it — are not able to refinance without bringing in additional cash, which they usually do not have. On the corporate side, the expected further compression in bond yields is likely to favour mainly large companies, which rely more widely on bond markets for their external financing. The effect on SMEs suffering from debt overhang may be limited due to reasons similar to those in the case of over-indebted households: i.e. the inability to refinance. Nevertheless, the announced QE has already depressed the euro exchange rate, which should support euro area exports.

[66] BIS (2014).
[67] Mian et al. (2013).
[68] See Y. Liu and C. B. Rosenberg, "Dealing with Private Debt Distress in the Wake of the European Financial Crisis: A Review of the Economics and Legal Toolbox", IMF Working Paper WP/13/44, February 2013.

Given the limited ability of monetary policy measures to solve the debt overhang problem, a temporary fiscal stimulus could prove helpful. As explained by Koo in 2011, when the private sector is exclusively focused on reducing its debt level in a balance sheet recession, governments can substitute for private consumption and investment, provided that their balances are more robust than those of the private sector. However, this is not always the case in the EU, as public debt rose sharply during the crisis,[69] often as a consequence of massive injections of public resources into the financial sector. Therefore, many governments have had to reduce other types of expenditure to try to compensate for this increase, not to speak of them having little chance to perform a fiscal expansion.

In this context, an alternative fiscal policy avenue worth exploring is what is called 'fiscal devaluation' to shift the tax burden from labour and other productive inputs to consumption. If done properly, this could promote competitiveness and, thus, exports and investment, through a positive impact on output and employment, while having a neutral fiscal impact. Moreover, it could potentially capture some of the tax hitherto lost due to unreported wages. However, the potential to capture lost tax would depend on the ability of economic agents to avoid paying the increased tax. In 2011, the National Bureau of Economic Research (NBER)[70] suggested that fiscal devaluations allow for essentially the same outcomes as active monetary policy at a fixed exchange rate and with free capital flows. In 2012, the IMF[71] estimated that a fiscal devaluation equivalent to 1 % of GDP in a euro area country would generate an immediate increase in net exports of between 0.9 % and 4 % of GDP, losing significance only after 10 years.

At the same time, and as in classical devaluation, any positive stimulus from fiscal devaluation would be diminished if other trading partners engage in similar practices. As a matter of fact, Germany already approved such measures in 2007 and France did the same in 2012.[72] There is also the issue of social security financing, because the budget would have to be somehow compensated for any decrease in social security contributions. Although it should theoretically be possible to use any tax revenue to finance the social security system, this could prove more challenging in practice, since social security contributions have traditionally been earmarked for the specific purpose of financing social security systems. However, a solution could be found, as evidenced by the Danish model where the social security system is mainly financed through income tax revenues.

More broadly, the longer the current debt overhang episode lasts, the more difficult it becomes for the economy to grow out of debt due to the damage done to its long-term growth potential. This is, of course, in addition to well-known medium- to long-term macroeconomic headwinds such as population ageing, the lack of further increases in the number of years in education, growing inequality in the distribution of income and wealth and technological advances. The expected impact of technological advances on the economy is ambiguous, but if it is true that the latest technological advances exert deflationary pressures on the overall economy, then this would make the debt burden even more acute.

Prospects for further macroeconomic stimulus that could sustainably increase debt servicing capacity of households and companies appear slim, because monetary policy has in most countries already eased considerably, while fiscal space to boost government spending or provide tax relief is limited and the potential for further export growth is constrained by weak global outlook.

5.2. Microeconomic level

When macroeconomic policy channels are not sufficiently effective for reducing the debt overhang, potential solutions could be explored at the microeconomic level. BIS (2014) notes that exiting the debt trap requires policies that encourage an orderly reduction of debt through balance sheet repair. Given that the overall economic context makes it very difficult to move forward by growing out of debt, the problem of over-indebted households and companies will not go away unless it is tackled head on. Such a move would help bringing back into the EU economy important productive capacity that is represented by the economic activity of over-indebted

[69] See Reinhart and Rogoff (2011).
[70] E. Farhi, G. Gopinath, and O. Itskhoki, Fiscal Devaluations, NBER Working Paper No. 17662, December 2011, Revised June 2013.
[71] R. de Mooij and M. Keen, 'Fiscal devaluation' and fiscal consolidation: The VAT in troubled times, IMF Working Paper WP/12/85, March 2012.
[72] J.E. Boscá, R. Doménecha, and J. Ferria, 'Fiscal devaluations in EMU', Economic Analysis, BBVA Research Working Papers, Number 12/11, 9 September 2013.

households and companies, and allowing for a rebalancing of resources by speeding up the exit of unproductive companies. Thus, effective private debt resolution mechanisms are required to achieve the full productive capacity of the economy.

The avenues for action to achieve efficient debt resolution outcomes are (in the order of severity): payment enforcement; seizing of assets (e.g. foreclosure in the case of mortgage debt); and insolvency. Payment enforcement is usually problematic in the debt overhang case, as the latter term is used precisely to imply that the borrower is no longer capable of servicing the loan. Although foreclosure can be applied, it can only offer a partial solution in cases where the value of debt considerably exceeds the value of the property pledged. In situations that involve highly distressed households or companies with no other alternative ways of becoming economically productive, as in the case of debt overhang, the only way out may be through insolvency proceedings. Whereas foreclosure may or may not imply some debt relief, depending on the value of the seized asset and the legal framework[73], insolvency usually does[74]. When it comes to the debt overhang situations, there is evidence that debt relief is associated with an increase in both the income and employment probability of households.[75] Moreover, debt relief holds the potential to stimulate consumption, since debtors generally have a higher marginal propensity to consume than creditors[76]. Recent research also finds that households with less income and higher leverage tend to have higher marginal propensity to consume.[77] To avoid moral hazard, debt resolution mechanisms should be designed in such a way, so as to ensure that insolvency is declared only as a last resort measure.

Reforms to facilitate private sector debt restructuring are not without cost: they require time, effort and budgetary resources. There is also a political cost, as the reforms may be resisted by vested interests of individual creditors and debtors. Following financial crises, countries tend to become more politically polarised and this may result in legislative stalemate[78]. Nevertheless, once indebtedness has reached levels that impede overall macroeconomic performance, there is an economic case to renegotiate debt contracts.[79] The link between private debt levels and economic performance depends on country-specific circumstances, such as the elasticity between net private liabilities and consumption or investment. In the current situation, the IMF has argued for taking action sooner rather than later based on two considerations. First, the initial crisis containment phase is arguably over. In the immediate post-crisis situation of an uncertain macroeconomic path, falling asset prices and frozen credit markets, it is difficult to judge individual debtors' viability.[80] As the environment starts to become relatively more stable, debtors' viability is easier to assess and the potential benefits of restructuring their debt become more tangible. Secondly, alternative policy options appear largely exhausted, as explained above.

Objectives of debt restructuring

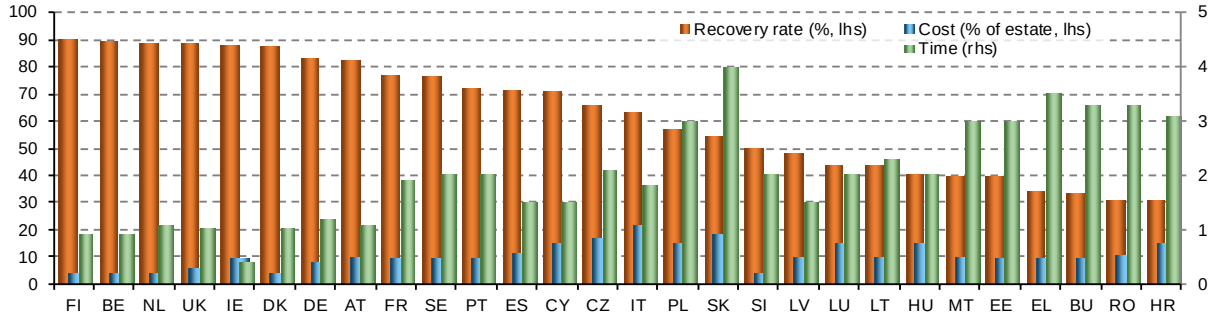
The counterpart to the debt overhang situation of households and non-financial corporations usually takes the form of non-performing loans (NPLs) on EU banks' balance sheets. NPLs have risen sharply in many countries since the crisis. Historically, high NPL levels have declined after a crisis, following a pick-up in the economy and inflation. As explained in Sections 3 and 4 though, these macroeconomic conditions are not present this time

[73] The US system involves non-recourse mortgages in many States, whereby the debtor is not liable for repayment of the residual liability after foreclosure. In the EU, full-recourse financing has traditionally applied, whereby the debtor remains liable for any residual liability after foreclosure.
[74] In 2010, 1.5 million Americans filed for over $450 billion in debt relief through the bankruptcy system. American households now receive more resources through bankruptcy than from temporary assistance for needy families and state unemployment insurance programmes combined. See L. Lefgren, F. McIntyre and M. Miller, "Chapter 7 or 13: Are Client or Lawyer Interests Paramount?", the B.E. Journal of Economic Policy and Analysis (Advances), 2010, 10(1): Article 82.
[75] See W. Dobbie and J. Song, 'Debt relief and debtor outcomes: measuring the effects of consumer bankruptcy protection' (working paper, Harvard University, May 2013).
[76] Prominent economists (e.g. I. Fisher, M. King, J. Tobin) have argued that a higher marginal propensity to consume for debtors versus creditors explains why elevated private debt burdens are associated with economic downturns.
[77] See A. Mian, K. Rao and A. Sufi, "Household balance sheets, consumption and the economic slump", The Quarterly Journal of Economics (2013), Oxford University Press.
[78] For example, see A. Mian, A. Sufi and F. Trebbi, "Resolving debt overhang: political constraints in the aftermath of financial crises", NBER Working Paper 17831, February 2012.
[79] See T. Philippon, 'The macroeconomics of debt overhang', Paper presented at the 10th Jacques Polak Annual Research Conference, Washington, DC, November 5-6, 2009.
[80] See T. Laryea, 'Approaches to corporate debt restructuring in the Wake of the financial crisis', IMF Staff Position Note, SPN/10/02, 26 January 2010.

round. The surge in NPL ratios has required banks to increase provisions and build capital, potentially constraining new lending.

Private debt restructuring usually involves some burden sharing between debtors (households and corporates) and creditors (usually banks). As a consequence, the size of any potential for private debt relief cannot be seen in isolation from the health of the banking sector, which is still in the midst of a post-crisis deleveraging phase. This implies the need to take into account banks' loss-absorption capacity and to complement it by measures to safeguard financial stability. The private sector debt restructuring process should aim to maximise recovery rates and minimise the time and cost involved in debt restructuring. There are major differences across the EU with respect to the time and cost of corporate insolvency proceedings. As can be seen in Fig. 5.1 below, the longer the insolvency procedure, the lower usually is the recovery rate.

Chart 10 - **Time and cost of corporate insolvency proceedings in EU Member States**



Source: World Bank Doing Business 2014

In select systemic cases, the public sector may also share some of the cost and impose across-the-board solutions. The bar for across-the-board government action (as opposed to a case-by-case approach) is typically set high, as any interference in the market mechanism necessarily causes distortions and is often associated with additional budgetary outlays. Therefore, government intervention is only justified if the debt problem is systemic in the sense that speedy resolution using the usual legal tools is no longer possible. Except for such systemic cases, however, the role of the public sector has been confined to implementing legal and institutional reforms that encourage timely market-based restructuring (including the removal of tax and regulatory obstacles).[81]

Public policy in support of debt restructuring

Many EU countries have been undertaking reforms to speed up debt restructurings, relying primarily on a market-based approach. These reforms generally include the following elements:

- improving the legal framework to support effective and efficient enforcement of creditor claims;
- facilitating out-of-court debt restructuring by issuing guidelines or establishing a legally binding framework; and
- implementing an information strategy to raise public awareness of the restructuring tools.

In a few cases, the authorities have resorted to temporary direct government intervention to deal with household over-indebtedness[82]. The reforms have also been complemented by measures to strengthen banks' capacity to manage distressed loans. Banks have incentives to keep financing insolvent companies simply to avoid the need to recognise losses. As a result, as explained in Section 4, banks deciding not to foreclose on debtors can negatively affect the wider economy, even though this may seem perfectly rational from their individual point of view.

At the EU level, issues related to the private debt overhang are also analysed as part of the European Semester process. Among other things, the most recent euro area report[83] recognises that the remaining deleveraging needs by companies and households are in excess of 30% of GDP in several economies. The social situation in the euro

[81] idem
[82] This has been the case in the UK, Latvia, Hungary, and Croatia.
[83] See http://ec.europa.eu/europe2020/pdf/csr2015/cr2015_euroarea_en.pdf for more details.

area has not significantly improved and banks' balance sheets remain under pressure from high levels of NPLs. As part of the European Semester 2015 process, the Commission has proposed country-specific recommendations relating to the debt overhang problem and NPLs for a dozen of EU Member States.

5.3. The non-financial corporation sector

Corporate insolvency reforms

Corporate insolvency reforms undertaken in the wake of the recent financial crisis have focused on supporting the early rescue of viable companies. Recognising the importance of insolvency law in tackling the economic consequences of over-indebtedness, several European countries have introduced fast track court approval procedures (e.g. Latvia and Portugal) and pre-negotiated restructuring plans that bind minority creditors (e.g. Italy). Facilitating rehabilitation has been at the centre of the reform efforts in several countries. For example, the Baltic states and Romania have encouraged debtors to file for insolvency in the early stage of their financial difficulties. Estonia, Germany and Latvia have allowed flexibility in the use of restructuring tools, such as debt to equity swaps. Estonia, Germany, Italy, Latvia, Portugal, Romania and Spain have simplified procedures to facilitate creditor action on restructuring plans, and Latvia has accorded priority repayment status to creditors that provide new financing. Insolvency reforms also aim at streamlining liquidation procedures to speed up the exit of non-viable companies and thus help to maximise value for all interested parties.

At the same time, the effectiveness of these reforms depends on an adequate institutional framework that implements the law in a transparent, predictable and consistent manner. While petitions to participate in the improved rehabilitation proceedings may have increased, the judiciary process and institutions may not be able to handle the increasing insolvency cases resulting from the crisis due to an overloaded court system, lengthy and costly judicial process and a lack of well-trained and competent judges and insolvency administrators.

Out-of-court and hybrid restructuring procedures

Out-of-court restructuring may provide a speedy and cost-effective alternative to formal insolvency procedures. It involves restructuring of the business and finances of debtors in financial difficulty without resorting to a full intervention by the courts. A few countries (e.g. Latvia, Romania and Portugal) have recently issued non-binding guidelines on out-of-court corporate debt restructuring, seeking to avoid the costs and delays that are typically associated with the formal insolvency process. However, achieving effective out-of-court restructuring requires adequate incentives for creditors and debtors to participate in the restructuring. In this respect, it is critical to have in place an effective insolvency law that provides clear benchmarks to incentivise debtors and creditors to reach a restructuring agreement. Hybrid procedures, which combine elements of out-of-court and court procedures, present the advantage of reducing costs and length of the restructuring process, while at the same time ensuring stay of enforcement actions and cram down of dissenting creditors.

In addition, some countries have put in place a regulatory framework requiring financial institutions to write down the value of distressed debt. For example, Latvia and Romania have removed tax disincentives for debt write-downs or transfers of a distressed loan to a third party, Portugal has encouraged its tax and social security administrations to participate in debt restructurings in accordance with clearly defined rules and Latvia has streamlined and expedited foreclosure procedures to induce debtors to participate in negotiations. The IMF evidence to date suggests that these initiatives to facilitate out-of-court restructuring have generally been successful[84]. However, the full benefits of these initiatives will only be evident once market participants and other stakeholders become familiar with the new framework and more experience is gained with its application.

5.4. The household sector

Personal insolvency regimes

A number of EU countries (e.g. Ireland, Estonia, Italy, Latvia, Lithuania and Poland) have introduced or refined personal insolvency regimes to achieve orderly resolution of the debt overhang, e.g. by shortening the discharge

[84] For example, a 2010 survey by the Latvian Ministry of Justice noted that the nonbinding guidelines on out-of-court corporate debt restructuring were used in 90% of all out-of-court cases. For more details, see the "Report of the working group on NPLs in Central, Eastern and Southeastern Europe" by the European Bank Coordination Initiative, March 2012.

period. However, these countries have faced a number of challenges due to the following reasons. First, the design of personal insolvency legislation is inevitably driven by social policy considerations, including the goal to reinvigorate individual productive potential in the mainstream economy and to reduce the social costs of leaving debtors in a state of perpetual debt distress. Second, the legislation needs to avoid moral hazard by keeping an appropriate balance between maintaining credit discipline and giving financially-responsible debtors a fresh start. Third, the design of the legislation needs to take into account institutional infrastructure that is critical to its predictable and transparent implementation, including the availability and quality of judges and trustees, administrative capacity, accounting, and valuation systems.

Faced with wide-scale household mortgage distress in the aftermath of the recent crisis and the bursting of the real estate bubble, some EU countries (e.g. Greece, Spain and Portugal) have introduced special legislation to address unsustainable residential mortgage debt burdens on households, while limiting adverse effects on banks' balance sheets and minimising moral hazard. All of these regimes provide for strict eligibility criteria, but they differ in several respects. First, some regimes allow financing institutions to opt in, while in others it is mandatory. Second, subject to certain conditions and as a last resort, mortgage debtors under some regimes are allowed to transfer the mortgaged property deed to the bank (or a government agency) and obtain (at least partial) cancellation of the mortgage debt.

Out-of-court settlement for private insolvency

A number of countries have also adopted measures to facilitate out-of-court settlement for distressed mortgages, e.g. in the form of voluntary guidelines or codes of conduct that provide guidance on mortgage restructurings for borrowers in financial distress (e.g. Ireland, Latvia, Estonia and Portugal). To reduce the burden on the court system, the personal insolvency law recently adopted by the Irish Parliament introduces three non-judicial debt settlement procedures for household debt, including a personal insolvency arrangement for settlement of secured debt up to EUR 3 million and unsecured debt (no limit) over six to seven years. The effectiveness of these approaches in tackling mortgage distress remains to be seen.

A few countries have looked beyond improvement of the legal framework and resorted to direct government intervention. Measures have included the imposition of a temporary moratorium on foreclosure (e.g. Greece and Hungary), and conversion of foreign currency-denominated debt into local currency (e.g. Hungary, see Box B in this chapter). Some countries have adopted a government support scheme (e.g. Latvia and Hungary) and/or set up an asset management company (e.g. Hungary and Spain).

6. FUTURE: AVOIDING NEW DEBT BUILD-UP

Among other sources, this section has drawn on work by R. Dobbs, S. Lund, J. Woetzel and M. Mutafchieva, published in 2015.[85]

Putting any potential solutions to the current debt overhang aside, one should seek to reduce the probability of a debt overhang reoccurring after the current episode is resolved. To start with, better data collection and monitoring is required to bring systemic risk measurement as close to real time as possible. This would enable the supervisory authorities to steer the credit cycle more effectively. Borrowers frequently underestimate the downside risks of debt and overestimate both the potential increase in value in their assets and their ability to repay, especially at the peak of the business cycle. The challenge is to protect the economy from the inevitable bad judgments of some borrowers (and lenders) without unduly limiting the flow of debt to sustain healthy economic growth.

Macroprudential policies

Macroprudential policies can help achieve this goal. For example, loan-to-value (LTV) ratios in mortgage lending are a direct measure of leverage: a high ratio at the outset increases the probability that a household will end up with negative equity. Stricter lending standards in some cases may also be warranted. Countercyclical macroprudential measures have the potential to tame the credit cycle, contributing to financial stability. Overall, assessment based on a broad range of indicators is warranted.

[85] See R. Dobbs, S. Lund, J. Woetzel, and M. Mutafchieva, 'Debt and (not much) deleveraging', McKinsey Global Institute, February 2015.

In 2014, many EU Member States actively pursued macroprudential policy, some using the trough of the financial cycle to introduce measures that may have a greater impact once the cycle turns. The primary objective of a large majority of measures was to prevent and mitigate excessive credit growth and leverage, especially in mortgage lending. The most frequently used instruments were higher risk weights and LTV caps, often in combination with affordability requirements.[86]

Improved product design and processes for private debt restructuring

EU countries mainly use full recourse mortgages, where lenders can seize assets other than the property securing the mortgage, including the future income of the borrower. This may act as a disincentive for out-of-work households to re-enter the labour market, given that a large proportion of their new income would have to be dedicated to servicing their existing mortgage debt. Eliminating the debt hanging over an individual's income prospects gives that person strong incentives to find a job. In this way, non-recourse loans can lessen the severity of a recession and support recovery by enabling households to re-establish themselves in less expensive housing and to resume normal consumption. There is evidence that household deleveraging occurs fastest in countries with non-recourse mortgages, such as the US.

In theory, non-recourse mortgages may encourage borrowers to take on more debt, given that they can walk away from it, if need be. Moreover, borrowers can choose to default once the value of their property falls below the amount of the mortgage even if they can still afford to repay loans. However, there is little evidence that this is the case in practice: for instance, only 13.9% of US mortgage defaults in the recent recession were 'strategic'. Moreover, to counter the incentive to borrow too much, non-recourse mortgages can be combined with conservative limits on LTV ratios and countercyclical macroprudential rules to dampen new lending during credit booms.

At the same time, treatment of mortgage defaults often seems to depend more on what happens in practice rather than on contractual requirements. For example, Ireland achieved an even larger reduction in household debt relative to income than the US by pursuing a broad programme of loan restructurings, despite having recourse mortgages.[87] These restructurings have helped Irish households deleverage to more sustainable levels of debt. However, such large-scale mortgage restructurings are difficult to execute efficiently, since they require both the agreement of lenders and a significant investment to review requests. This becomes even less feasible once the mortgages have been securitised. In Ireland, securing lender cooperation was less of a challenge only because the government had become a major shareholder in all three of the country's largest banks.

Beside these tested contract forms, there have recently been many other innovative ideas on specific contract forms in mortgage lending. They all have one thing in common: introducing more risk-sharing. Better risk-sharing features of household debt can make repayment more flexible when borrower circumstances or economic conditions change, thus avoiding the costly option of default altogether.

Debt servicing insurance

One approach is to incentivise borrowers or lenders to take out debt servicing insurance, which exists in the case of consumer loans in some countries. In mortgage lending, insurance for repayment of the outstanding amount in the eventuality of the borrower's death is also well established. This could be the most straightforward solution.. Eventually, additional macroprudential policy measures could be applied in those cases where loan agreements do not benefit from such insurance.

More flexibility in debt contracts

Another possibility that is discussed would be to introduce some flexibility into the debt contracts themselves, making automatic reversible adjustments in repayment schedules contingent upon specific events, such as a job loss or indicators of economic recession and rising unemployment, as proposed by R. J. Shiller.[88] His

[86] See https://www.esrb.europa.eu/mppa/html/index.en.html for more details.
[87] As of June 2014, 102 000 mortgages (13% of the total) had been restructured through a variety of mechanisms, including temporary suspension of repayments, interest-only loans, maturity extensions, and principal reduction.
[88] In such mortgages, changes in the monthly payment (and in the mortgage balance) could be triggered by events such as significant changes in home prices, job loss or recession. Payments would revert to the original level when conditions improve. The continuous workout mortgage would reduce the need for borrowers to exercise the costly option of default to alleviate debt and would guarantee lenders a stream of continuous payments, while sharing the underlying risk with the borrower. The automatic adjustment mechanisms of the mortgage would

'continuous workout mortgages,' are structured to adapt to changing conditions over the course of a loan to keep payments at a level that the borrower can afford. There are precedents for this kind of flexibility in other types of debt contracts, such as student loans, where payments are capped at a certain percentage of the borrower's income, so that payments rise and fall along with incomes. Such flexibility would have implications in those cases where mortgages are securitised, but the overall effect of such a mechanism could still be less disruptive than a total cessation of payments and default.

Risk-sharing as part of debt contracts

The third, and most radical, approach proposed so far is to introduce an 'equity-like' element of risk-sharing into debt contracts. A. Mian and A. Sufi have proposed 'shared responsibility' mortgages, in which both lenders and borrowers face the upside and downside of fluctuating real estate prices.[89] The underlying logic makes sense from the macroeconomic point of view, since a more equal sharing of losses between debtors and creditors could be more easily absorbed at the aggregate level than when losses are exclusively put on debtors' shoulders. Even so, there would be formidable challenges to implementing such risk-sharing features in mortgage contracts.

Interest rates on such loans would need to be higher than on conventional mortgages to compensate for the additional risk borne by the lender. In addition, the risk would probably also be reflected in higher regulatory risk weights for such type of loans. If borrowers were offered a choice, they would probably choose the less costly standard mortgage, preferring to take on the risk of falling prices themselves. As for the banks, it stays an open question whether they would be interested in providing such financial products. Each investor has a different risk profile and there must be a reason why banks predominantly grant loans instead of investing in equity. At the same time, products with such risk-sharing features could perhaps be supplied by other financial market participants. In any case, such contracts would be more difficult to securitise, given the potentially higher frequency of losses. .

Expeditious corporate bankruptcy system

As mentioned in Section 5, a clear, consistent, and expeditious bankruptcy system for corporate debt is essential to enable businesses to restructure and move ahead. Efficient business bankruptcy processes are important not only in helping reduce leverage in the private sector, but also because they can increase market efficiency by removing inefficient competitors. In addition, they can promote innovation by giving entrepreneurs an opportunity to recover quickly from failure. However, the deleveraging of companies is not only about reducing debt, but also about raising equity. Up to the crisis, financial integration was mainly based on cross-border debt flows. Now, a more balanced financial integration approach is required, including measures to make it easier for SMEs to access equity markets and to improve the risk-sharing mechanisms in infrastructure investment projects.

Removal of public subsidies to debt instruments

Finally, the bias of public tax subsidies towards debt is also a problem. Not only do they skew the incentives in favour of debt instruments in general terms, but they also motivate companies to engage in elaborate cross-border schemes to minimise their tax bill. The tax incentives for real estate investment generally include tax deductibility of mortgage interest and preferential treatment of capital gains on residential properties. However, the major role of real estate bubbles in financial crises highlights the negative externalities associated with mortgage borrowing. The mix of incentives provided for residential housing should be reconsidered and balanced against other needs, such as investments in infrastructure, education, research and development, which would enhance the long-term productive capacity of the economy.

The corporate tax incentives in favour of debt should also be reconsidered to create a level playing field between debt and equity financing. For instance, the corporate tax rules often make interest payments deductible, while

---

also avoid costly negotiations between borrowers and lenders. See R J. Shiller et al., 'Continuous workout mortgages', NBER working paper number 17007, May 2011.

[89] If home prices in the surrounding community decline below the purchase price of the home, the borrower's payment is reduced by a similar percentage. When prices recover, the payments revert to the original rate and the lender is entitled to 5% of the capital gain when the borrower sells. By automatically adjusting loan payments during tough economic conditions, foreclosure can be avoided. See A. Mian and A. Sufi, 'House of Debt: How they (and you) caused the Great Recession, and how we can prevent it from happening again', University of Chicago Press, 2014.

the cost of equity is not. Removing this debt bias could possibly shift the capital structure of firms more towards equity instruments. This can be achieved either by removing the tax deductibility of interest payments or by introducing the deductibility of the cost of equity The latter may encourage companies to pay dividends rather than pursue share buybacks (often financed with new debt) to boost their stock prices. When implementing such a reform, however, one may need to ensure that the overall fiscal package is revenue-neutral.

References

Adrian, Tobias and Hyun Song Shin, 2011, 'Financial Intermediary Balance Sheet Management', *Federal Reserve Bank of New York Staff Reports*, No 532.

Allen, Franklin and Douglas Gale, 2001, 'Comparing Financial Systems', *MIT Press.*

Ampudia, Miguel, Hans Van Vlokhoven and Dawid Łukasz Żochowski, 2014, ' Financial fragility of euro area households', *ECB Working Paper Series*, No 1737, October 15 2014.

Avdjiev, Stefan, Robert N. McCauley, Patrick McGuire, 2012, 'Rapid credit growth and international credit: challenges for Asia', *BIS Working Papers*, No 377, April 2012.

Bernanke, Ben, 2005, 'The global saving glut and the US current account deficit', Speech given at the Sandridge Lecture, Virginia Association of Economics, Richmond, Virginia, 10 March 2005.

Cecioni, Martina, Giuseppe Ferrero and Alessandro Secchi, 2011, 'Unconventional monetary policy in theory and in practice', *Bank of Italy Occasional Paper Series*, No 102, September 2011.

Bank for International Settlements (BIS), 2014, *84th Annual Report*, June 2014.

Borio, Claudio, 2014, 'The financial cycle and macroeconomics: What have we learnt?', *Journal of Banking and Finance*, Vol. 45, August 2014, pp. 182-198.

Borio, Claudio, Robert N. McCauley and Patrick McGuire, 2011, 'Global Credit and Domestic Credit Booms', *BIS Quarterly Review*, September 2011, pp. 43–57.

Bornhost, Fabian and Marta Ruiz Arranz, 2014, 'Growth and the importance of sequencing debt reductions across sectors', in *Jobs and Growth: Supporting the European Recovery*, International Monetary Fund, January 2014.

Brown, Martin and Philip R. Lane, 2011, 'Debt Overhang in Emerging Europe?', *World Bank Policy Research Working Paper Series*, No 5784.

Caballero, Ricardo J., Takeo Hoshi and Anil K. Kashyap, 2008, 'Zombie Lending and Depressed Restructuring in Japan', *American Economic Review*, forthcoming.

Cœuré, Benoît, 2014, 'Credit and Investment in the European Recovery', Speech at IMF/Banka Slovenije high-level seminar on '*Reinvigorating Credit Growth in Central, Eastern and Southern European Economies*', Portorož, 26 September 2014.

Constâncio, Vítor, 2014, 'Growing out of the crisis: is fixing finance enough?', *Speech at the Annual Hyman P. Minsky Conference on the State of the US and World Economies*, Washington DC, 10 April 2014.

Cuerpo, Carlos, Inês Drumond, Julia Lendvai, Peter Pontuch and Rafal Raciborski, 2013, 'Indebtedness, Deleveraging Dynamics and Macroeconomic Adjustment', Economic Papers 477, April 2013.

Drehmann, Mathias, Claudio Borio and Kostas Tsatsaronis, 2012, 'Characterising the financial cycle: don't lose sight of the medium term!', *BIS Working Papers*, No 380, June 2012.

European Central Bank (ECB), 2012, 'Corporate indebtedness in the euro area', *ECB Monthly Bulletin*, February 2012, pp. 87-103.

European Central Bank (ECB), 2013, 'The Eurosystem Household Finance and Consumption Survey', *ECB Statistics Paper Series*, No 2, April 2013.

European Central Bank (ECB), 2014a, 'The financial vulnerability of euro area households', *ECB Monthly Bulletin*, November 2014, pp. 79-90.

European Central Bank (ECB), 2014b, 'Deleveraging patterns in the euro area corporate sector', *ECB Monthly Bulletin*, February 2014, pp. 97-114.

European Commission (EC), 2013, *Annual Report on European SMEs 2012/2013*, October 2013.

European Commission (EC), 2014, *Annual Report on European SMEs 2013/2014*, October 2014.

European Commission (EC), 2014, *The Over-indebtedness of European Households*, 2014

European Commission (EC), 2014a, *Quarterly Report on the Euro Area*, Vol. 13, No. 3, October 2014

Fenton, Susan and Toby Chopra, 2015, 'Factbox: CEE exposure to Swiss franc lending', Reuters, published 15 January 2015, http://www.reuters.com/article/2015/01/15/us-swiss-snb-cee-factbox-idUSKBN0KO1U420150115.

Financial Crisis Inquiry Commission (FCIC), 2011, 'The Financial Crisis Inquiry Report', *Official US Government Edition*, Washington DC, January 2011.

Fiorante, Angelo, 2011, 'Foreign currency indebtedness: a potential systemic risk in emerging Europe', *ECRI Commentary* No 8, 5 December 2011.

Foy, Henry and Andrew Byrne, 2015, 'Swiss move hits Polish and Hungarian borrowers', *Financial Times*, published 15 January 2015, http://www.ft.com/intl/cms/s/0/96f187a4-9cd2-11e4-adf3-00144feabdc0.html?ftcamp=crm/email/2015116/nbe/EuropeBusiness/product&siteedition=intl#axzz3OaejxKef.

Gambacorta, Leonardo, 2011, 'The risk of low interest rates', *Ensayos sobre Política Económica*, Vol. 29, Núm. 64, pp. 14-31.

Gambacorta, Leonardo, Boris Hofman and Gert Peersman, 2014, 'The effectiveness of unconventional monetary policy at the zero lower bound: a cross-country analysis', *Journal of Money, Credit and Banking*, Vol. 46, Issue 4, pp. 615-642, June 2014.

International Labour Organisation (ILO), 2014, *Global Wage Report 2014/2015*, December 2014.

International Monetary Fund (IMF), 2013a, *Global Financial Stability Report*, April 2013.

International Monetary Fund (IMF), 2013b, *Global Financial Stability Report*, October 2013.

International Monetary Fund (IMF), 2012, *World Economic Outlook*, October 2012.

Jordà, Òscar, Moritz Schularick and Alan M. Taylor, 2014, 'The Great Mortgaging: Housing Finance, Crises, and Business Cycles', *NBER Working Paper*, No 20501, September 2014.

Koo, Richard C., 2011, 'The world in balance sheet recession: causes, cure, and politics', *Real-World Economics Review*, issue no. 58.

Laeven, Luc, and Thomas Laryea, 2009, 'Principles of Household Debt Restructuring', *IMF Staff Position Note*, No 09/15, June 2009.

Lane, Philip R., 2013, 'Capital flows in the euro area', *European Economy Economic Paper*, No 497.

Lane, Philip R., and Gian Maria Milesi-Ferretti, 2011, 'The cross-country incidence of the global crisis', *IMF Economic Review*, 59(1), pp. 77-110.

Laryea, Thomas, 2010, 'Approaches to corporate debt restructuring in the wake of financial crises', *IMF Staff Discussion Note*, No 10/02
Lo, Stephanie and Kenneth Rogoff, 2015, 'Secular stagnation, debt overhang and other rationales for sluggish growth, six years on', *BIS Working Papers* No 482, January 2015.
Masciantonio, Sergio, and Andrea Tiseno, 2013, 'The rise and fall of universal banking: ups and downs of a sample of large and complex financial institutions since the late '90s', *Journal of Advanced Studies in Finance*, pp. 5-31, July 2013.
Melzer, Brian, 2012, 'Mortgage debt overhang: reduced investment by homeowners with negative equity', mimeo, *Kellogg School of Management Working Paper*, Northwestern University.
Mian, Atif, Kamalesh Rao and Amir Sufi, 2013, 'Household balance sheets, consumption, and the economic slump', *The Quarterly Journal of Economics* (2013), pp. 1-40.
Mian, Atif, and Amir Sufi, 2014, 'House of Debt: how they (and you) caused the Great Recession, and how we can prevent it from happening again', *University of Chicago Press.*
Mulligan, Casey B., 2008, 'A depressing scenario: mortgage debt becomes unemployment insurance', *NBER Working Paper*, No 14514.
Olney, Martha L., 1999, 'Avoiding Default: The role of credit in the consumption collapse of 1930', *Quarterly Journal of Economics*, 114(1), pp. 319-335.
Ongena, Steven and José-Luis Peydrò, 2011, 'Loose monetary policy and excessive credit and liquidity risk-taking by banks', in '*The Future of Banking*', edited by Thorsten Beck.
Praet, Peter, 2014, 'Monetary policy and balance sheet adjustment', *Speech at ECB Forum on Central Banking*, Sintra, 27 May 2014.
Reinhart, Carmen M., and Kenneth S. Rogoff, 2011, 'A Decade of Debt', *NBER Working Paper* No 16827, issued in February 2011.
Sawicki , Bartłomiej, 2015, 'Poland and Croatia most affected by franc spike', published 4 February 2015, http://visegradplus.org/poland-croatia-affected-franc-spike/.
Skolimowski, Piotr and Maciej Onoszko, 2015, 'Eastern European currencies dive as Swiss loan costs hurt banks', Bloomberg, published 15 January 2015, http://www.bloomberg.com/news/articles/2015-01-15/polish-banks-zloty-slump-as-swiss-franc-mortgages-get-expensive.
Wolf, Martin, 2014, 'We are trapped in a cycle of credit booms', *Financial Times*, 7 October 2014.

Chapter 4. Special focus on longevity risk[1]

1. INTRODUCTION

Concerns over fiscal sustainability and a shift from defined benefits to defined contribution schemes in pension provision have contributed to transfer risk, including longevity risk, to households. While this shift began before the recent financial crisis, it has gained further momentum as a result of it. Households faced with increased longevity risk have to increase their supplementary pension provisioning. Consequently, individually saved personal pension products (excluding statutory or occupational pensions) are becoming more important. However, private households cannot always successfully assume or mitigate such risks. Therefore, these risks could once again find themselves, in one way or another, on the government's balance sheet as an implicit liability on the government.

Significant under-hedged or under-insured individual risk represents both a short-term and long-term risk for society as a whole. That large individual risks can have macroeconomic implications[2] became very clear during the crisis. Risks to housing equity were clearly evident in the US and a number of Member States, which in turn triggered severe balance sheet recessions, partly resulting in significant over-indebtedness.[3] This observation provides the starting point for a discussion on how *financial integration* relates to *risk-sharing technologies* for private households *and markets* to lay off such risks — including for insurers, reinsurers and institutional investors such as pension funds.

Global and regional risk-sharing opportunities rise and fall with the degree of global and regional financial integration.[4] Neither intermediated risk sharing, by means of the balance sheets of banks, insurers, reinsurers or institutional investors, nor the more direct risk-sharing technologies can be implemented effectively without free movement of capital. This is acknowledged in the note of President Juncker,[5] which also highlights a possible increased role for *new private risk-sharing technologies* to promote overall financial stability, in addition to existing intermediated and mainly debt-financed forms of financial integration, which had contributed infamously to a propagation of risk during the sovereign debt crisis.

In spite of the many innovations of transforming and transferring risk *within* the financial sector, many *large individual risks* remain under-insured. The available level of insurance is inadequate (or sometimes non-existent), or the coverage is too expensive. This description of the situation before the crisis[6] is still valid today.[7]

Financial integration and innovation can be positive for financial stability to the extent that they reduce society's collective exposure to these large individual risks. This special focus discusses some of these risks from the perspective of the *balance sheet* of both the household and the government, which has to manage at least part of the residual, unhedged risk. In short, providing households with better access to global and regional risk-sharing technologies can reduce the implicit liabilities of governments acting as *insurer of last resort*.

This special focus numerates four large risks facing individuals:

i. macro risks to the value (equity) stored in people's homes;

ii. macro risks to educational status;

---

[1] Authors: Harald Stieber and Saskia van Ewijk. This chapter has benefited from discussions at a technical workshop on longevity risk and disruptive life-income cycles, held in DG FISMA on 11 December 2014.

[2] In their analytical note to the informal European Council of 12 February 2015, President Juncker, in close cooperation with the three presidents Tusk, Dijsselbloem and Draghi, asked the question: 'How could private risk-sharing through financial markets in the euro area be enhanced to ensure a better absorption of asymmetric shocks?'.

[3] See Chapter 3.

[4] Stiglitz (2010) provides a more critical assessment, but does not look at individual household balance sheets.

[5] On page 7, it states (bold in the original): '(…) we need to address remaining barriers to investment and the free movement of capital and **make capital market integration a political priority**, including by considering issues like taxation, insolvency and company law. A well-integrated financial system in the EU, as a result of a Capital Markets Union, can make a monetary union more resilient against shocks by providing an element of private risk-sharing, and more efficient when it comes to generating jobs, growth and investment.'.

[6] Groome et al (2006).

[7] More than 20 years ago, Robert Shiller observed in his book '*Macro Markets'* that many large individual risks should be insurable at very little cost if only risk-sharing opportunities were fully exploited, be it at the level of a local housing community, or at the national, regional, or global level. He called it 'democratising finance'.

iii. risks to health status; and

iv. longevity risk, i.e. the risk of living much longer than expected without having the necessary financial means to maintain one's quality of life.

The most difficult of the four appears to be *longevity risk.* Its liability for a household is partly offset by items on the asset side in the form of pensions, health and long-term care entitlements, and explicit and implicit government guarantees. In the end, longevity risk cannot be *fully* addressed by either financial retail products or financial markets, and the government will always have to assume a certain amount of extreme longevity (tail) risk.

All types of large household risks could benefit from increased divisibility of the household's asset side. If assets and liabilities can be matched better, the overall balance sheet becomes more flexible, including during insolvency proceedings.[8] Ideally, the latter should help to contain tail risks that cannot be shared among individuals or hedged in financial markets; this feature of *bankruptcy* -effectively becoming part of society's risk management toolkit- is not ensured in all cases, even in those Member States where private insolvency regimes exist.[9]

1.1. The single market dimension of international risk sharing

A stronger single market in retail finance products would help strengthen risk-sharing opportunities. Greater availability of financial products and services, not only in domestic markets but also cross-border, can be expected to have a positive impact on risk-sharing opportunities with respect to shocks, whether they are specific to a household as the final consumer of such products and services, to a local area, or to a Member State. In last year's review,[10] in a review of broad indicators for financial integration, the Commission presented estimated degrees of consumption risk sharing[11] across Member States. These estimates pointed towards a decrease in international risk sharing in the EU since 2007. The present special focus extends this discussion.

A situation where individuals have access to risk-sharing technologies at the regional and global level is one aspect of having a high degree of financial integration.[12] The EU's free movement of capital is an integral part of this picture. Capital account restrictions could limit existing and possible future risk-sharing opportunities at the regional or global level. Ideally, macro-prudential policies and personal insolvency schemes can be designed in a way that complements risk-sharing opportunities, e.g. by capping housing market volatility and levels of household indebtedness.

The analysis is presented as follows. In section two, a model of the private household's risk management problem is proposed with a focus on large risks facing the individual. Section three then discusses two of these risks, starting with a general assessment of their importance, followed by a discussion of existing risk-sharing mechanisms, and finally an overview of proposals made in the literature for complementing existing mechanisms. Section four concludes.

Thematically, this discussion is linked to ongoing work in other international organisations. The IMF *Data Gaps Initiative* has recognised that better policies (e.g. in a financial stability context) are often limited by measurement issues and the availability and quality of data necessary to design and evaluate such policies. The OECD's *Inclusive Growth* project is investigating how existing forms of financial intermediation interact with the income distribution of households, finding that lower-income households have a less than proportionate access to financial risk-sharing technologies. As a result, the latter can amplify other inequalities,[13] such as access to housing, or to starting a business. Finally, the European Insurance and Occupational Pensions Authority is currently analysing why pan-European personal pension products are not taking off; it will deliver an *advice* to the Commission in June 2015 on the possible introduction of a pan-European pension product or '29th' regime.[14]

[8] See the discussion of debt overhang in the same volume.
[9] See Kilborn et al (2013) for an international overview of personal insolvency schemes, and London Economics (2012) for a more EU-focused discussion.
[10] European Commission (2014).
[11] Consumption risk sharing as proposed separately in Cochrane (1991) and Mace (1991).
[12] This view is close to Robert Shiller's call for a democratisation of finance as expressed in Kroszner et al. (2011), and Shiller (2012).
[13] Korinek and Kreamer (2013).
[14] In a similar vein, the European Commission's CMU Green Paper states: 'On personal pensions, providers are subject to a number of different pieces of EU legislation. This raises the question of whether the introduction of a standardised product, for example through a pan-

2. DEMOCRATISING FINANCE

There is an extensive literature on international risk sharing. However, throughout this literature, the actors or institutional units that engage in risk-sharing activities are typically national economies or large (multinational) corporations, including financial institutions.[15] One reason for this restricted view is data availability: national economies are comprehensively modelled within the national accounting framework using an international standard that ensures a high degree of cross-country comparability. Individual financial institutions — at least the ones listed on a stock exchange — publish regular and detailed accounts about their investment decisions from which degrees of risk sharing can be derived. Another reason is that countries (national jurisdictions) and corporations represent legally enforceable pools of risks and profits.

Until recently, we knew little about the underlying evolution of risk as reflected in the balance sheets and income and expenditure flows of individual households in the EU. A systematic analysis and comparison of private households' balance sheet data has begun only recently with the launch of the Eurosystem's Household Finance and Consumption Survey. Also, financial transaction statistics are now being compiled more systematically (on a securities-by-securities basis) and in a more comprehensive manner as regards reporting units. As a result, the EU will over the coming years gradually close an important data gap compared with the US, and it will be possible to monitor financial stocks and financial transactions. In the end, additional statistics will enable a better, more detailed understanding of the financial system.

2.1. The risk-managing problem of the individual

Even before the recent crisis, a growing need for a broader set of risk management tools was widely acknowledged in the literature[16] and in international policy fora.[17] In light of demographic developments, there have been increasing calls for a more proactive risk management approach[18] by governments towards risks on households' balance sheets, and on the government guarantees, implicit or explicit, attached to those risks.

Table 1: **A not-so-simple balance sheet of the private household**

Assets		Liabilities	
Educational status	(12-18k)	Student loans	
Health status	(50-150k)	Net present value of private health spending	
Real estate assets	**(200k; 64.4%)**	Mortgages	(68.4k; 23.1%)
Other non-financial assets Financial assets	11.4k	Financial liabilities other than mortgages	(5k; 29.3%)
Financial and non-financial guarantees and entitlements (pension, healthcare and long-term care)		Tax and social security liabilities **Residual longevity risk**	
		Household net worth	

Explanations of values in parenthesis: the indicated range for educational status is a ballpark figure for per capita expenditure for tertiary education; health status: ballpark figure for median real capital stock per worker; real estate assets: EUR 200 000 is the conditional median value of real estate assets where 64.4 % of all households have real estate assets; other non-financial assets includes, for example, motor vehicles; financial assets: EUR 11 400 is the conditional median of financial assets in the form of any of the following: deposits (sight and saving accounts), mutual funds, bonds, shares, money owed to the household, value of voluntary pension plans and whole life insurance policies of household members and other financial assets items, including private non-self-employment businesses, assets in managed accounts and other types of financial assets; mortgages: EUR 68 400 is the conditional median value of outstanding mortgage debt, where 23.1 % of households have mortgage debt; financial liabilities other than mortgages: 29.3 % of all households have non-mortgage debt with a conditional median value of EUR 5 000 (student loans shown as a separate category here are included in this figure); Source: First wave of the Eurosystem's Household Finance and Consumption Survey, authors' calculations.

Households' balance sheets are a major source of risk. Table 1 highlights a few important concepts. In this balance sheet view, households can only consume as long as they have *positive net worth*. Indeed, consumption can be understood as a dividend stream out of household net worth.[19] On the household's asset side, we have replaced the net present value of net household income (typically used in the literature) with the intangible assets that determine the household's capacity to generate any income in the first place: educational status and health status.[20] We can therefore re-write the asset side of the household as containing the following elements:

European or '29th' regime, removing obstacles to cross-border access could potentially strengthen the single market in personal pension provision. Any changes would need to ensure an effective degree of consumer protection, whilst at the same time improving coverage and take up and appropriate security of savings.'.

[15] See Schoenmaker (2013).

[16] Draghi et al. (2004) and literature cited there, including Tirole (2002). Gray et al (2010) model the household balance-sheet risk as contingent claims on other sectors and stress the non-linearity feature of such cross-sectoral linkages. See also Merton et al. (2013).

[17] Visco (2005, 2006).

[18] Groome et al. (2006).

[19] Gray, Merton, and Bodie (2006, 2007).

[20] This representation is also in line with a production function approach with labour enhancing technological process.

educational status, health status, real estate assets, other non-financial assets, financial assets, and financial and non-financial guarantees and entitlements, such as pensions, healthcare and long-term care entitlements. Where possible, we mention some orders of magnitude in brackets. In the case of health status, we derive a ballpark figure based on per capita spending on tertiary education in Member States. The ballpark figure for health capital is even rougher given the wide disparities in capital stocks throughout the EU. The range indicates the human capital stock implicit in regional capital intensities in the EU. In contrast, the figure for real estate wealth is a statistic from the Household Finance and Consumption Survey.

The household balance sheet shows the importance of large individual risks. From a macro-financial stability point of view, these are more important than risks attached to individual *financial* assets. The latter receive high and growing attention from the banking industry under the heading of 'private banking' and from asset managers in the investment and pension fund industry. It is certainly worthwhile to explore — but beyond the scope of this chapter — how these industries could help, in a more holistic approach, to better manage *non-financial assets* in a way that goes beyond the current consumer protection and financial product transparency and safety regulations.

The liability side only partly matches the asset side, giving rise to various forms of mismatch, including maturity mismatch, and asymmetric valuation risk.[21] Maturity mismatch and asymmetric valuation risks on the asset and liability side both contribute to an increased risk of experiencing negative net worth at some point during the household's life cycle. On the household's liability side, we find more or less matching entries:

- Student loans are either an explicit loan to pay for tuition, or consumer loans to pay for living expenses during higher education: so far, this category does not, in general, have a macroeconomic dimension in the great majority of Member States.
- Net present value of private health spending is a highly income-elastic category, which can be expected to capture a very large part of materialising longevity risk; we are not aware of even a ballpark figure for this risk.[22]
- Mortgages are so far the household liability that most closely matches an asset and therefore provides a starting point for a more granular analysis of household financial risk; we report the median value for households having such mortgages, which is the case for 23.1% of those covered in the Household Finance and Consumption Survey.
- Financial liabilities other than mortgages represent a rather modest value for the median household, but concern a large group of households (29.3%); also, the distribution of these liabilities matters. This category will also contribute to financing educational and health status and could become much more important over the coming years.
- Finally, tax and social security liabilities and any residual longevity risk provide direct links to the government's balance sheet and risk management problem.

Protecting the asset side of this balance sheet serves to protect household net worth, i.e. household consumption, and demand for products and services in the economy as a whole. As a consequence, better managing the largest household risk directly affects future growth and employment.

However, using its balance sheet more extensively, the household will also *incur* additional risk. Additional risk can arise from valuation effects (housing equity), or the broader macro-environment (low-yield environment affecting the rate of return of longer-term savings and insurance products). Hence, the success of a household's use of its balance sheet for risk management will not only depend on its capacity to expand its size, but also on a number of other factors that are linked to financial product design, and the actual structure of risk-sharing arrangements. This includes how they allocate risk under different scenarios, and the interplay of risk-sharing

[21] One could easily complicate this discussion further by including household liabilities in foreign currencies; see the provisions of the Mortgage Credit Directive in this context.
[22] See Michaelson, A., J. Mulholland (2014) for ballpark figures of longevity risk in current market-based funding schemes, e.g. private pensions; they can be thought of as very conservative lower bands compared with unexpected additional future private spending on health.

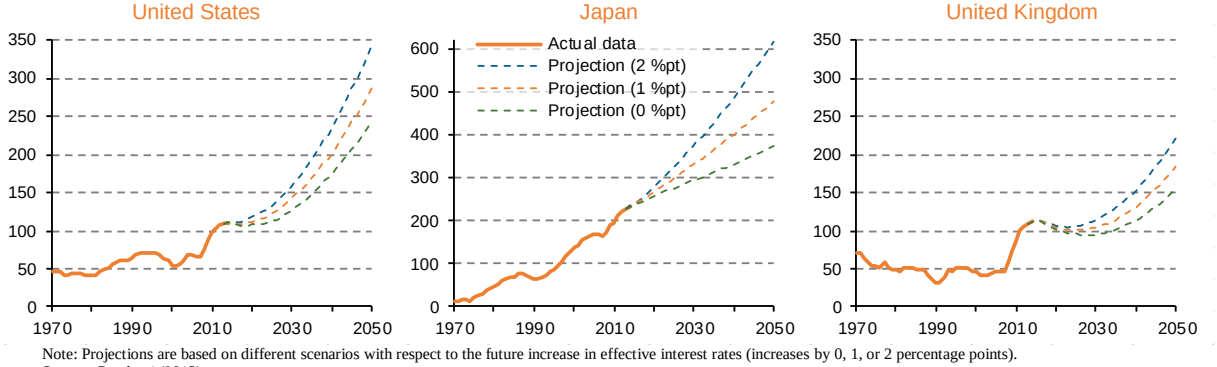
arrangements with bankruptcy rules. In some cases, directly pricing these risks in financial markets could be an important complement to the existing savings and insurance products that today dominate many households' portfolios.

The size of household balance sheets increases with financial development. Recent empirical work,[23] including a large international panel covering 38 European economies, provides evidence along these lines:

- mortgage markets are deeper in countries with low *inflation* (levels and volatility);
- the *depth* of mortgage markets is positively correlated with *creditor rights* and *ease of contract enforcement* (both features of the judicial system directly affecting the expected liquidation value of housing collateral); and
- mortgage finance grows with income per capita (i.e. economic development) across countries, but even more strongly within countries.

Mortgages have features of a luxury good, similar to private health insurance. In terms of capital market characteristics, the countries with developed mortgage-bond markets also have the highest depth of mortgages. However, this may also reflect fiscal and regulatory features specific to these countries, in particular fiscal incentives built into private pension savings schemes.[24]

Chart 1: **General government debt projections** including projected increases in age related spending, percentage of GDP



Note: Projections are based on different scenarios with respect to the future increase in effective interest rates (increases by 0, 1, or 2 percentage points).
Source: Cecchetti (2013)

2.2. The risk-managing problem of the government

The balance sheet of the household already hints at the problem for the government as a global risk manager. On the one hand, the government wants to limit its exposure to household risk (in particular, longevity risk) by putting caps (eligibility criteria, outright numerical caps, etc.) on the numerous financial and non-financial guarantees it provides to citizens. On the other hand, it must keep track of the evolution of households' net worth so as to not allow private consumption possibilities to fall to a level that is self-defeating.[25]

The risk management problem of a government is considerably simpler in its structure. It is sometimes described as a debt management problem (this may have contributed to a degree of neglect in managing public assets where such assets exist). This is not a bad description as long as the definition of debt is sufficiently comprehensive. Chart 1 shows how strongly debt dynamics change once age-related spending is taken into account: debt trajectories become unsustainable in three major economies with highly developed financial systems. The following stylized fact illustrates the ageing dynamics driving this: by 2050, the group aged 60-79

[23] See Badev et al (2014).
[24] A case study of the Danish households' balance sheets is a valuable illustration: see Møller Christensen et al (2012).
[25] See the description in Lindert (2004) as to how, even during its most liberal phases, the British government has regular introduced minimum income floors (in Britain known as 'Poor Laws') to avoid the self-defeating situation where a substantial part of the population can no longer take part in regular economic life. We cannot judge if the motivation was a proper macroeconomic one, or if well-off classes present in the legislature were more afraid of social unrest. In the late 1960s, the US took this debate a step further: a project for a work-free basic income was clearly based at least partly on macroeconomic considerations where it was deemed useful to protect consumer spending in an increasingly specialised monetary economy. While its pure version failed to get a majority in both houses of Congress, a scaled-down version was enacted in the form of a family-earned income tax credit in the early 1970s. Somewhat curiously, European governments, instead of making the income tax schedule more progressive on the lower end, often preferred outright monetary and non-monetary (in-kind) transfers based on detailed and costly to administer eligibility criteria.

years is projected to double in size to 1.6 billion. A substantial part of the increase in old households concerns economies with highly developed financial systems.

As in the case of the household, a balance sheet representation is helpful (Table 2). The government's simplified balance sheet can be represented as follows: on the asset side, it contains the net fiscal asset (present value of the sum of future primary balances, i.e. revenues minus expenditures), and other public assets (including foreign currency reserves, other financial assets, and physical assets). On its liability side, the government has financial and non-financial guarantees, foreign currency debt, local currency debt, and base money.[26]

Table 2: **A simplified balance sheet of the government**

Assets	Liabilities
Net fiscal asset	Spending obligations
Other public assets	Foreign currency debt
	Local currency debt
	Base money
	Financial and non-financial guarantees

Note: Government here includes the central bank; Source: authors' elaboration

This chapter notes different approaches among Member States, also reflecting different levels of development of local financial markets. As also discussed in Chapter 2, the Nordic countries and the UK exhibit a larger household balance sheet reflecting a more active use of the financial system to manage longer-term risks (e.g. pensions). As stressed by recent empirical work, better access to mortgage finance and longer-term risk insurance tools allows households to more actively manage income risk, mainly between periods of high current income and periods of either lower income or higher than expected expenditure, for example, because of materialising health risks or long-term care needs. As recently stressed by the OECD, fiscal policies obviously have a role to play here. As long as the link with household income and risks to educational and health status, and housing equity, is strong and direct, a progressive taxation schedule can be a great cushion.[27] But this link is not equally strong over the life cycle of the household and, during old age, it may simply break down altogether.[28]

As a result of the crisis, risk sharing in international consumption in the EU has fallen.[29] But the risk management capacity of national economies has fallen more generally as a consequence of the exhaustion or discontinuation of several buffers that previously existed:

- a favourable demographic development limited long-term risks (spending obligations);
- inflation can no longer adjust government liabilities in local currency; and
- debt, both in foreign and local currency, can no longer be used to shift spending pressures from the present into the future.

There is a diminishing capacity to take long-term (ageing-related) risks onto the balance sheet of the government.[30] This has become an almost automatic reaction. As in the case of the three buffers mentioned- and which are no longer available- any further risk materialising on the government's balance sheet almost immediately appears on the household's balance sheet, either as higher taxes or a haircut on household assets. The government can no longer provide any inter-temporal smoothing of the consumption of households, which automatically increases the pressure to use distributional policies (with immediate effect) more actively.

2.3. Risk sharing on the balance sheet of intermediaries

Risk sharing in the single market can be undertaken by households holding an optimally diversified portfolio of equity and debt securities. Households may choose to diversify through financial retail products (banking and

[26] Obviously, in this view, it can be seen immediately that a government that cannot manage its base money or its local currency debt loses two immediate risk management channels.
[27] See Holter et al. (2014).
[28] The discussion of fiscal policies is beyond the scope of this special focus.
[29] As has been documented in European Commission (2014), *European Financial Stability and Integration*, SWD(2014) 170, 28.4.2014; this section borrows from Chapter 7 and the material referenced there.
[30] As observed already by Visco (2005) and Draghi et al (2004).

insurance products) where the actual investment decision is left to the financial institution. Even if the portfolio bought by the household this way was identical, the household will regularly task a financial operator to manage such a portfolio. The finance literature shows, at best, mixed results for the efficiency of such management by a third party. Typically, active (wealth) management cannot outperform the market, and the lack of achieving at least the market return has to be added to any direct costs (e.g. management fees) borne by the household.[31]

The recent crisis has highlighted that intermediation creates its own categories of risk, e.g. through pro-cyclical investment behaviour by intermediaries. Depending on the level at which risk sharing takes place, there can be implications for the possible and achievable degree of risk sharing (from a social welfare perspective). However, there can also be ramifications for financial stability. If, for example, risk-sharing mechanisms — at the national level on the one hand, and at the level of financial intermediaries on the other — exhibit different patterns of pro-cyclicality, the location of risk sharing could either amplify cycles or help dampen such cycles. A working group at the Bank of England[32] found anecdotal evidence for *pro-cyclical* investment behaviour[33] by insurers,[34] and more mixed results for pension funds. However, a strong structural shift away from equity towards fixed income investment is observed over a 15-year period, partly in response to *increasing longevity risks*. On this structural shift, the working group notes that 'Because equity does a better job than debt of sharing risk between borrowers and lenders, (…) (this) may leave the system as a whole with poorer risk sharing (…)'.

Households faced with increased longevity risk will have to increase their supplementary pension provisioning. As a result, personal pension products (individually saved, distinct from statutory or occupational pensions) are becoming more important. A recent discussion paper from the Bank of England has highlighted links between accounting rules (marked to market) and the investment behaviour of pension funds and insurers, and possible limits on the risk-sharing capacity of intermediaries as an unintended consequence of regulations and standards that aim at market transparency and market integrity.[35] The European Insurance and Occupational Pensions Authority is now analysing why pan-European personal pension products are not taking off and will deliver an advice to the Commission in June 2015 on the possible introduction of a pan-European pension product or '29th' regime.

3. TWO MAJOR AND INTERCONNECTED RISKS FACING PRIVATE HOUSEHOLDS

This section highlights two major types of financial risk that private households face throughout their lives, and that are interconnected: risks attached to housing equity and longevity risk. They are interconnected on the balance sheet of the household as owner-occupied housing remains a major vehicle to protect the balance sheet in old age. However, in both cases private households could benefit from gaining access to better risk-sharing technologies. Each risk is first discussed in more detail. Secondly, existing risk management and risk-sharing technologies are listed. Finally, possible additional risk management and risk-sharing opportunities, as discussed in the finance literature, are highlighted.

3.1. Housing equity

> *'Although we certainly cannot rule out home price declines, especially in some local markets, these declines, were they to occur, likely would not have substantial macroeconomic implications.'*
> *Alan Greenspan, 2005 testimony to the US Senate*

[31] A recent study commissioned by the Financial Service User Group has confirmed this stylised fact which is well documented in the finance literature on fund management.
[32] See Bank of England (2014).
[33] The working group has used two concepts of pro-cyclicality. First, in the short term, as the tendency to invest in a way that exacerbates market movements and contributes to asset price volatility, which can in turn contribute to asset price feedback loops. Asset price volatility has the potential to affect participants across financial markets, and to have longer-term macroeconomic effects. Second, in the medium term, as a tendency to invest in line with asset price and economic cycles, so that willingness to bear risk diminishes in periods of stress and increases in upturns. A tendency by insurance companies and pension funds to invest pro-cyclically in the medium term might deepen the troughs and exaggerate the peaks of asset prices during economic cycles in a way that is potentially detrimental to financial stability and long-term economic growth.
[34] On the other hand, Schoenmaker (2013) finds that *geographical* diversification of risks has held up well during the crisis on the balance sheet of the insurance sector.
[35] Bank of England (2014).

The crisis has highlighted the central role of housing finance in a financially developed market society. Housing finance increased in importance with rising income per capita. Buying a home represents the biggest single financial undertaking for most private households in their lifetime (see Table 1). Public pensions are in an almost continuous state of restructuring. If pension entitlements, which we regularly refer to as contingent liabilities, were debt contracts (IOUs) traded on a market exchange, most pension reforms would constitute a credit event (default), or debt restructuring. Consequently, the need to protect standards of living at later stages of life becomes ever more prominent.

Housing equity continues to be a long-term savings vehicle that is acceptable to many private households. With national pension systems under pressure, there is growing interest in financial retail products for equity release and decumulation[36] of pension savings to provide additional income for old-age households.

However, from a financial stability point of view, a more active use of equity release would require a much better hedging of macro-risks, such as large changes in the market value of homes, to begin with.

Macro-prudential policies can play an important role. The absence of market-based insurance against risk contained in house price developments points to incomplete or missing markets for such risks, partly owing to *measurement issues*, inadequate legal and regulatory frameworks, screening and monitoring issues, and moral hazard problems. After the recent crisis, we care much more about the financial stability implications of any particular solution to these issues. The very fact that housing equity is regularly leveraged, relatively illiquid and exposed to local price fluctuations exposes owner-occupiers to important wealth and savings volatility.[37]

Better financial retail products as well as more complete financial markets to address shocks to housing equity

Given the significance of mortgage finance in our societies, and given the fact that, based on our best estimates, this part of finance will become even more important with ageing societies, ***the question as to how best to organise the entire system of mortgage finance is a pressing one.*** Certainly, in an ideal situation, one would like to ensure (an optimal combination of) sufficient choice between different forms of housing finance (also through effective competition between providers) to cater for different individual needs on the one hand, and a high level of consumer protection through safe and transparent financial products, on the other.

The link to financial stability is clearly identified in the EU's Mortgage Credit Directive, which states that a deeper EU market for mortgage debt contracts requires 'flexible and reliable markets'.[38] This includes legal certainty about all phases of mortgage credit arrangements, and close monitoring of the residential property market itself to avoid the situation where housing finance leads to a debt-driven amplification of cycles in the property market with the potential of propagation of risk across the financial sector as a whole.

Given the prominence of housing finance for the development of deep capital markets, we have also become increasingly aware of insolvency regimes as a possible market barrier. Concretely, debt instruments, and any derived financial products including mortgage-backed securities, do not achieve the same market valuation under different insolvency regimes because of differences in default probabilities and recovery values. It is an important question to be answered in the context of a Capital Markets Union if there is a need to harmonise insolvency regimes, e.g. to allow an EU-wide, deep market in residential mortgage-backed securities. Incentivising the transfer of retirement savings through capital markets could benefit the producing economy by means of a virtuous cycle of higher savings, higher investments, higher output capacity, and creation of additional wealth.

Retail finance

With mortgages, cross-border mobility is hindered by differing fiscal treatments, but also by a change in recovery values depending on the personal insolvency regime. An avenue to address this could lie in taking a proposal put forward by Posner and Zingales[39] for the case of the US and adapting it to the situation of intra-EU mobility. The insolvency regime is attached to the mortgage contract and can therefore 'travel' with the

[36] Decumulation is mentioned for the sake of completeness but is not further discussed.
[37] See Groome et al (2006).
[38] Article 26 of the EU Mortgage Credit Directive.
[39] Posner, Eric, and Luigi Zingales. 'The housing crisis and bankruptcy reform: the prepackaged chapter 13 approach.' (2009).

mortgage holder without creating legal uncertainty for the lender. Obviously, the problem of extra-territoriality would have to be addressed in an appropriate manner in this case.

Markets

New risk transfer markets for risks attached to housing equity were proposed more than two decades ago.[40] These proposals have been refined over the years. As discussed in this section, government action is required to address measurement and standardisation issues that arise in this context. But it may even be necessary to require households to hedge at least part of their risk in such markets because there is clear evidence that households — otherwise left exposed to such risks — would not reach the optimal amount of risk sharing/transfer.[41]

Insolvency schemes

Until now, the active use of their balance sheet for financial risk management purposes has remained, to a large extent, a privilege of high-income households. As shown in international empirical studies and in the analysis of data coming out of the first wave of the new Household Finance and Consumption Survey,[42] financial flexibility strongly correlates with household income. The latter in turn correlates with employment status, which we have argued reflects differences in educational and health status. Will any possible improvements on the side of products and markets only accrue to the well-off in this case?

If insolvency schemes remain as they are, this outcome is indeed very likely to persist. The problem is that households face insolvency proceedings with an asset side that cannot be divided. Unlike firms, they cannot structure assets and match particular assets with particular liabilities. This does not provide a lot of flexibility when one of the assets suffers a (negative) shock. On the other side, outstanding liabilities will regularly be nominally fixed (full lack of downward flexibility — widely known from labour market economics where wage claims are liabilities of the firm — is not sufficiently critiqued when it comes to a household's liability side where these liabilities are the assets of (financial) firms). After a shock to its asset side that is often multi-dimensional, e.g. a severe illness followed by a change in employment and the ensuing shock to educational status, the household becomes a bad risk and may lose its financial flexibility exactly when it is most needed (unless all these risks were successfully hedged). On its liability side, secured debt will be collected, including enforcement of the collateral. In addressing any unsecured debt, the household may become subject to insolvency proceedings. However, in insolvency, all remaining assets can be liquidated before any remaining debt is cancelled. At the end of the procedure, the household is still facing the full consequences of the (unhedged) shock to its asset side, but has lost all financial flexibility on its liability side.

There are a few exceptions to this rule. Under Chapter 13 of the US Federal Bankruptcy code, the household's home equity benefits from at least partial protection as long as certain conditions are met. However, there are remaining weaknesses to which we can add specific concerns in the single market. As pointed out by Posner and Zingales (2009), Chapter 13 (and similar proceedings in EU Member States) *make the degree of protection of home equity contingent on the structure of the household's liability side*.

It is not easy to devise a scheme for partial debt relief that can avoid moral hazard in the presence of valuation shocks (as after the burst of a housing bubble). In the example used by Posner and Zingales, a less leveraged family experiencing negative equity after the burst of a (local) housing bubble is worse off compared with a maximum leveraged family that had financed the house at the maximum possible loan-to-income or loan-to-value ratios.

From a macro-prudential point of view, one would not want to create such an incentive structure. In addition, this moral hazard could be exploited disproportionately by high-income households and such schemes would add to the already empirically observed bias of the financial system to favour high-income households at the expense of society as a whole.

[40] See Case et al (1992), Cocco (2000) and Shiller (2003).
[41] The discussion of the exact mix of behavioural constraints is beyond the scope of this chapter; it is sufficient to note here that sub-optimality here applies in this case both at the level of the individual (homeowner) and the level of society as a whole.
[42] Denk and Cazenave-Lacroutz (2015).

Insolvency schemes could be designed more rigorously as a stop-loss option for each type of liability individually. A possible solution strategy would require going one step further than US Chapter 13. While unsecured debt could be written off relatively easily with positive impacts, for its correct pricing by financial intermediaries, any form of debt contract matching a tangible or intangible household asset should include sufficient information on loss and recovery value to enable the screening and pricing of its risk, its monitoring and the establishment of its recovery value. In the case of intangible assets such as educational status and health status, there are two possibilities. Either it is possible to create a financial market asset that at least partly represents the intangible asset and which can be liquidated, or there is an insurance policy providing at least partial insurance based on an index value of the intangible asset. However, the two options do not provide the same risk transfer possibilities in liquidation: the financial market instrument can be transferred and liquidated under various circumstances, whereas the insurance contract is written on the name of the person and only pays out if the insured risk materialises.

3.2. Longevity risk

How to increase the financial resilience of households confronted with longevity risk is a question with important macro-financial implications.[43] Any unhedged, uninsured residual longevity risk will eventually materialise on the balance sheet of the government, the insurer of last resort. Longevity risk raises important challenges for the design of financial products, for the correct measurement of risk and the sharing of such information, and for the design of markets where such risk can be hedged.

Product design

There is a common understanding that there is no simple solution. Annuity products have become unattractive because of falling returns in the low-yield environment. Also, retail products have been criticised for being opaque, not consumer-friendly. It has also been observed that there is a communication gap with consumers who should be helped to better understand the difference between insurance and investment products.

An early wave of retail products[44] using financial derivatives to hedge long-term financial risk at the level of the private household exposed major weaknesses where products did not sufficiently focus on consumer protection.[45] Regaining the trust in financial risk management instruments will be delicate. It will require a carefully chosen mix of financial education on the side of consumers and advisers (e.g. along the lines of the Mortgage Credit Directive), and the highest standards in the area of financial benchmarks and official statistics, integrity of market infrastructure, and as much certainty as possible about financial accounting standards. Certainly, one should hope that politicians understand that changing tax rules every four or five years in an area where the planning horizon is 40, 50 or 60 years (OECD) will make it very difficult to arrive at viable market-based solutions.

Measurement and sharing of data

Measurement gaps play an important role when explaining the lack of risk-sharing technologies. If risk sharing is also to take place at a supranational or even global level, measurement gaps will have to be closed. Furthermore, the sharing of data needs to be ensured as a necessary condition for the existence of adequate financial instruments and markets where such instruments can be traded.

Measurement can require, at least in some instances, a role for the government where common standards cannot be established or enforced on a voluntary basis by market participants. Standards required for measurement often have a public good character, or they create a positive externality where costs accrue to some while benefits

[43] International Monetary Fund (2012).
[44] Examples, including from UK (retail products using interest rate swaps, etc.), have been highlighted in the work of the Financial Services User Group.
[45] Under the slogan 'humanising finance', Robert Shiller urged to fully embrace the findings of behavioural finance especially when designing financial retail products. The presence of 'framing effects' means that individuals cannot correctly appreciate the risk-payoff structure of a retail product. Unfortunately, some financial retailers have exploited these effects to rip off consumers. Today, regulatory authorities such as the Financial Conduct Authority in the UK build their consumer protection policy around concepts established and tested in behavioural finance. In addition to Shiller, researchers Reinhard Selten and Daniel Kahneman have delivered important insights based on laboratory experiments.

accrue to many. A failure to capture the benefits by those who bear the costs will then result in no standards emerging and a lack of markets.

Market design

Markets have remained highly incomplete. In addition to the uncertainties surrounding future mortality and life expectancy, markets are still not adequately equipped to handle inflation risk, macroeconomic risk (as reflected in national and regional GDP), or risk specific to local housing markets, the materialisation of which continues to produce large shifts in the value of local housing equity. Such incompleteness of markets has important financial stability implications. Until these are addressed and markets are made more complete, the markets will retain their dangerous potential to amplify and propagate rather than diversify and contain risks, especially those attached to housing finance.

Housing finance needs democratisation while avoiding new sub-prime crises. Given the particular role for housing equity to protect against poverty in later stages of life, there is an important policy challenge as to how the potential of housing finance can be democratised while avoiding the errors of the past, where housing finance was the main source of risk both for individuals and for society as a whole.[46] Macro-prudential policies can, in the best case, limit the amplitude of swings in local housing markets. However, they are second-best policies. They are difficult to implement owing to the need to correctly identify the relevant market, both geographically and in terms of market segments. A first-best policy would consist in hedging risks continuously. Furthermore, some markets will not be liquid in all states of the world when left to private (market-making) initiative alone. The question arises if in some cases there is a need for a 'market-maker of last resort'[47] to complement the lender of last resort and financier of last resort functions already carried out by monetary and fiscal authorities, respectively.

A decade ago, the Visco group contemplated new markets and instruments for longevity risk, including so-called longevity bonds. It is useful to recall the policy conclusions reached back then. The group found that:

i. given the increasing influence of capital flows related to retirement savings, governments could facilitate the development and expansion of capital markets for undersupplied financial instruments for retirement savings and the provision of pension benefits, including through non-discriminatory tax rules;

ii. regulatory and supervisory developments should aim to influence and support the trend towards more rigorous risk management, greater transparency, and better governance of private pension funds, including by ensuring consistency between funding and prudential requirements and accounting standards; and

iii. as long-term risks were increasingly shifted to individual households, protection of pension beneficiaries, financial education and financial advice would all need to be strengthened.

Behind this proposal stood the observation that existing markets had time horizons that were too short, and that very long-term instruments for hedging longevity risk were lacking.[48] Pension funds, asset managers and (re)insurers would be the natural users of such financial instruments.

Recent reports by the OECD and the Joint Forum provide insight into the management of longevity risk by financial institutions and discuss the role of markets in hedging this risk. In December 2014, the OECD completed a study on mortality assumptions and longevity risk and the implications for pension funds and annuity providers. The results show that a failure to account for future improvements in mortality can expose pension funds and annuity providers to an expected shortfall in provisions of well over 10 % of their liabilities.

Based on its findings, the OECD report recommends that the regulatory framework must ensure that pension funds and annuity providers have the right information and incentives to manage longevity risk. Thus, regulation should require that the mortality tables they use are up-to-date, include the expected future improvements in mortality, and are based on the mortality experience of the relevant population. Currently, the requirements regarding mortality

[46] As stressed in the Visco group's report, and as reiterated by Shiller in every book since Macro Markets, current financial markets for hedging longevity risk remain incomplete.
[47] Cecchetti (2013), page 6.
[48] See Swiss Re Europe (2012) for a recent overview.

tables vary in different countries. Some countries impose minimum requirements on the assumptions and data used in measuring mortality through regulation. In other countries, industry bodies play a role in setting standards, to which institutions adhere in practice. The OECD recommends that clear guidelines be put in place everywhere. It also sees a role for governments in improving the public availability of mortality data through its statistical institutes. Finally, accounting standards should ensure appropriate valuation of longevity instruments.

In addition, in order to ensure that pension funds and annuity providers can continue to provide longevity protection to individuals, there could be a case for active government intervention to help the development of the market for longevity risk transfers. A well-functioning longevity risk transfer market would allow the transfer of risk from those who hold it to those that are better able to handle its financial consequences. This could be (re)insurers, capital market participants and even private companies that might benefit from unexpected increases in longevity (such as providers of long-term care and health care).[49] As such, a well-developed market could promote financial stability.

To kick-start the market, governments could develop reliable longevity indices to provide a price reference, bring over-the-counter standardised transactions to exchanges or electronic trading platforms where they are cleared centrally, and issue longevity-indexed bonds.[50] Additional standardisation and transparency in the market can help capital market investors in supplying longevity protection, but the measurement of residual risk when using index-based longevity hedges will remain a problem for pension funds and annuity providers. This is where better data availability comes in. Previous attempts at issuing such longevity bonds by the European Investment Bank and the World Bank have been unsuccessful.[51] Unless tied to rising retirement ages, the issuance of longevity bonds would expose governments to additional longevity risk. There are reasons why the growth and deepening of the longevity risk transfer market may be desirable, such as unburdening the balance sheets of pension funds and increasing the industry's ability to take on longevity risk from individuals. Nevertheless, a shift from the corporate sector to a limited number of (re)insurers, with global interconnections, may also increase systemic risk, as the Joint Forum report rightly points out. Considering the pros and cons of jump-starting the market through government-issued longevity bonds, the Joint Forum and the IMF conclude that it is not clear that the advantages outweigh the costs, noting that estimates of net gains are difficult to provide.[52]

Longevity risk is a residual risk that can be mitigated by better protecting the asset side of individuals. It helps to distinguish how the household's risk management relates to longevity risk:

(i) The government will prefer households to hedge the educational risk. This should improve the household's likelihood to remain productive, perhaps beyond statutory retirement age, and — if there is a link with life satisfaction — the household could also make lesser use of health care entitlements.

(ii) The government will prefer households to hedge home equity risk. This will reduce the need for income support in whatever form, including at old age.

Hence, on the management of both educational risk and housing equity risk, incentives appear well aligned. The difficult part is health risk: the government will prefer, under present circumstances, that households hedge their health risk, but only up to a point.

Governments therefore have an interest to lay off this risk to a third party, say an insurance company, which in turn transfers some of the risk to a reinsurance company. The reinsurance company in turn would be interested in a market where such risks can be hedged. There seems to be an understanding among experts that, beyond a certain point of life expectancy, no financial intermediary and no market can manage the longevity tail-risk at reasonable costs. Currently, this cut-off point seems to lie around the 90-year mark. Beyond this point, the government has to assume its function as insurer of last resort.

However, this may not be the end of risk-sharing opportunities. In the US — where at least high-income households use their balance sheet more actively, but a similar case can also be made for some Member States,

[49] International Monetary Fund (2012).
[50] OECD (2014).
[51] Biffis and Blake (2014), Zelenko (2014).
[52] International Monetary Fund (2012), Bank for International Settlements (2013).

such as Denmark, the Netherlands and the UK — better insurance of housing equity could help to address longevity risk as well, since households seem to be quite aware of the longevity problem. In one scenario, the housing equity is liquidated and transformed into lifelong membership in a managed long-term care community. How this will work out in the longer term remains to be seen. However, it is obvious that there must be important returns to scale to be realised in a large long-term care community where infrastructure can be optimised around the needs of (very old) seniors. Intermediate solution strategies that emphasise short distances and use of information technologies will allow some economies as well.

4. CONCLUSIONS

In this special focus chapter, we have screened large individual risks, analysing two of them in more detail from a financial services and markets perspective:

(i) the risk of not being able to realise the (expected) internal rate of return of higher education, or any specialised form of education more generally;

(ii) the risk of suffering important shocks to one's health status;

(iii) the risk to lose equity in one's home; and finally

(iv) longevity risk, i.e. the risk of living much longer than initially expected without having the necessary financial means to organise the longer lifetime successfully.

Providing households[53] with better access to global risk-sharing technologies could substantially reduce the implicit liabilities of governments acting as a financier of last resort. In this sense, financial integration would have direct (beneficial) consequences for financial stability. Indeed, instead of assuming the risk of financial intermediaries in the form of both explicit government guarantees and implicit subsidies, much of the risk sharing of individuals could take place through the asset side of private balance sheets (similar to equity-based risk sharing, this would be largely anti-cyclical and beneficial for macro-financial stability).

The chapter notes different approaches among Member States, also reflecting different levels of development in local financial markets. However, all four large-risk categories would benefit from an increased divisibility of the household's asset side, such that assets and liabilities can be better matched, and the overall size of the balance sheet becomes more flexible, including in bankruptcy. Ideally, the latter should help to contain tail-risks that cannot be shared or hedged; this role of bankruptcy is not ensured in all Member States where private insolvency regimes exist.

Longevity risk was already very high on the policy agenda before the financial crisis. However, the increase in debt levels and the pressure on public finances has made it even more urgent to address the issues identified by the Visco group in 2005. Households faced with increased longevity risk will have to increase their supplementary pension provisioning. In such a scenario, personal pension products (individually saved, excluding statutory or occupational pensions) are becoming more important. The European Insurance and Occupational Pensions Authority is now analysing why pan-European personal pension products are not taking off and will deliver an advice to the Commission in June 2015 on the possible introduction of a pan-European pension product or '29th' regime.

Overall, this special focus recalls that many of the largest individual risks remain uninsured, or the available level of insurance is inadequate, or available forms of insurance coverage are too costly. More than 20 years ago, Shiller made the observation in *Macro Markets* that many large individual risks should be insurable at very little cost if only risk-sharing opportunities (at the global level) were fully exploited. For this process, he coined the expression 'democratising finance'. As of today, many risk-sharing and transferring technologies have not yet found their way from their uses within the financial sector to a more democratic use where they could help manage some of the largest individual risks. Nevertheless, in part in response to the crisis, regulators and legislators, and supervisors and consumer representatives now have a much better understanding of the potential and risks of financial technology compared with a decade ago.

[53] This category includes single proprietor businesses, i.e. over 70 % of EU SMEs.

References

Badev, Anton, Beck, Thorsten, Vado, Ligia, Walley, Simon (2014) 'Housing Finance Across Countries: New Data and Analysis' World Bank, Washington, DC. https://openknowledge.worldbank.org/handle/10986/16821.

Bank of England (2014) 'Procyclicality and structural trends in investment allocation by insurance companies and pension funds. A Discussion Paper by the Bank of England and the Procyclicality Working Group, July 2014.

Bank for International Settlements (2013). Joint Forum. 'Longevity Risk Transfer Markets: Market Structure, Growth Drivers and Impediments, and Potential Risks.' Basel Committee on Banking Supervision.

Biffis, Enrico, and David Blake (2014), 'Keeping some skin in the game: How to start a capital market in longevity risk transfers', *North American Actuarial Journal* 18(1), pp. 14-21.

Case Jr, Karl E., Robert J. Shiller, and Allan N. Weiss. 'Index-based futures and options markets in real estate.' The Journal of Portfolio Management 19.2 (1993): 83-92.

Case, K. E., Quigley, J. M., & Shiller, R. J. (2013). Wealth effects revisited: 1975-2012 (No. w18667). National Bureau of Economic Research.

Cecchetti, Stephen G. (2013) Five years in the tower. Remarks prepared for the 12th BIS Annual Conference, Lucerne, Switzerland, 20-21 June 2013, Bank for International Settlements.

Cochrane, John H. 'A simple test of consumption insurance.' Journal of political economy (1991): 957-976.

Denk, Oliver, and Alexandre Cazenave-Lacroutz (2015) Household Finance and Income Inequality in the Euro Area, OECD, mimeo.

Draghi, Mario, Franceso Giavazzi, and R. Merton (2004) 'Transparency.' Risk Management and International Financial Fragility, Geneva Reports on the World Economy (2004).

European Commission (2014), *European Financial Stability and Integration*, SWD(2014) 170, 28.4.2014.

Gray, D.F., R.C. Merton, and Z. Bodie (2006) 'A New Framework for Analysing and Managing Macrofinancial Risks of an Economy.' Harvard Business School Working Paper 07-026.

Gray, D.F., R.C. Merton, and Z. Bodie (2007) 'Contingent Claims Approach to Measuring and Managing Sovereign Credit Risk.' *Journal of Investment Management*, vol. 5, no. 4 (Fourth Quarter):5–28.

Groome, T., Blancher, N., Haas, F. P., & Kiff, J. (2006). The limits of market-based risk transfer and implications for managing systemic risks. IMF Working Paper WP/06/217, September 2006.

Holter, H, Krueger, D and Stepanchuk, S. (2014) 'How Does Tax Progressivity and Household Heterogeneity Affect Laffer Curves?'. London, Centre for Economic Policy Research.

International Monetary Fund (2012). 'The Financial Impact of Longevity Risk.' In Global Financial Stability Report—The Quest for Lasting Stability, Chapter 4, April.

Kilborn, Jason J., Charles D. Booth, Johanna Niemi, Iain D. C. Ramsay (2013) The World Bank, Insolvency and Creditor/Debtor Regimes Task Force, Working Group on the Treatment of the Insolvency of Natural Persons, Report on the Treatment of the Insolvency of Natural Persons.

Korinek, Anton, and Jonathan Kreamer (2013) The redistributive effects of financial deregulation, NBER Working Paper 19572, National Bureau of Economic Research, Cambridge, MA, October.

Kroszner, Randall S., Robert J. Shiller (2011) Reforming U.S. Financial Markets. Reflections Before and Beyond Dodd-Frank, The MIT Press.

Lindert, P. H. (2004). Growing public: Volume 1, the story: Social spending and economic growth since the eighteenth century (Vol. 1). Cambridge University Press.

London Economics (2012), Study on means to protect consumers in financial difficulty: Personal bankruptcy, datio in solutum of mortgages, and restrictions on debt collection abusive practices, Final Report Contract № MARKT/2011/023/B2/ST/FC, December.

Mace B (1991) Full Insurance in the Presence of Aggregate Uncertainty, Journal of Political Economy 99: 928-956.

Merton, Robert C., Monica Billio, Mila Getmansky, Dale Gray, Andrew W. Lo, Loriana Pelizzon (2013) On a New Approach for Analysing and Managing Macrofinancial Risks, *Financial Analysts Journal* **69**(2), CFA Institute.

Michaelson, A., J. Mulholland (2014), Strategy for Increasing the Global Capacity for Longevity Risk Transfer: Developing Transactions That Attract Capital Market Investors, The Journal of Alternative Investments, Summer, pp.18-27.

Møller Christensen, Anders, Asger Lau Andersen, Martin Oksbjerg, Nick Fabrin Nielsen, Ri Kaarup and Sigrid Alexandra Koob, The wealth and debt of Danish families, Monetary Review 2012 2nd Quarter — Part 2, Danmarks Nationalbank.

OECD (2014), 'Mortality Assumptions and Longevity Risk: Implications for pension funds and annuity providers', December, OECD, Paris.

Posner, Eric A., and Luigi Zingales (2009) 'A loan modification approach to the housing crisis.' American Law and Economics Review: ahp019.

Schoenmaker, Dirk (2013) Post-Crisis Reversal in Banking and Insurance Integration: An Empirical Survey, European Economy, Economic Papers 496, April 2013.

Shiller, R.J. (1994) 'Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks.', Oxford University Press.

Shiller, R. J., Wojakowski, R. M., Ebrahim, M. S., & Shackleton, M. B. (2013). Mitigating Financial Fragility with Continuous Workout Mortgages. Journal of Economic Behavior & Organisation 85, pp. 269-285.

Shiller, Robert J. (2004) Radical Financial Innovation, Cowles Foundation Discussion Paper no. 1461, April.

Shiller, Robert J. (2012) Finance and the Good Society, Princeton University Press.

Stiglitz, Joseph E. (2010) Risk and Global Economic Architecture: Why Full Financial Integration May Be Undesirable, *American Economic Review: Papers & Proceedings* **100** (May 2010): 388-392.

Swiss Re Europe (2012) 'A Mature Market: Building a Capital Market for Longevity Risk 2012.' Swiss Re Europe research.

Tirole, Jean (2002) *Financial Crisis, Liquidity, and the International Monetary System*, Vol. 6., Princeton, Princeton University Press.

Visco, I. (2006) Longevity Risk and Financial Markets, SUERF keynote address.

Visco. I. (chair) (2005) Ageing and pension system reform: implications for financial markets and economic policies. Report to the Deputies of the Group of Ten.

Yellen, Janet L. (2014), Perspectives on Inequality and Opportunity from the Survey of Consumer Finances, Remarks at the Conference on Economic Opportunity and Inequality, Federal Reserve Bank of Boston, Boston, Massachusetts, 17 October 2014.

Zelenko, Ivan (2014), 'Longevity risk and the stability of retirement systems: The Chilean longevity bond case', *The Journal of Alternative Investments* 17(1), pp. 35-54.

Chapter 5: Special focus on competition and regulation in the financial system[1]

1. INTRODUCTION

Conventional wisdom sees both competition and regulation as having a beneficial effect on the overall functioning of the financial system and for the end-users of financial services and society at large. Effective competition should give rise to lower financial intermediation costs, the exit of inefficient players, optimal asset allocation, better and more varied financial services, and greater incentives for financial institutions and markets to innovate. Financial regulation should ensure a well-functioning, stable, safe and trustworthy Europe-wide financial system.

Seven or eight years since the onset of the financial crisis, the size, complexity, leverage, interconnectedness and concentration of the European banking sector is improving gradually, but the crisis has dampened competitive forces. Banks under stress have received unprecedented amounts of State aid preventing exit in several cases, entry of new banks and business models has been limited to date, and the largest banks have benefited from significant implicit and distortive 'too-big-to-fail' (TBTF) subsidies (IMF (2014)). In addition, EU banks have tended to retrench and focus their activities on national markets rather than offering services at pan-European level. Finally, according to some scholars, competition and regulation do not seem to have unlocked important efficiency gains in the finance industry.[2]

On the upside, the authorities' extraordinary crisis management interventions have been successful in avoiding another Great Depression and restoring confidence in and stability of the financial system as a whole. Moreover, EU State-aid control has played an important role in ensuring that explicit bail-outs of financial institutions respect common rules across EU Member States (see also Box A). And an ambitious, comprehensive and internationally coordinated reform agenda for the banking sector has been pursued and largely completed in record time (European Commission (2014a)). Such major overhaul of financial regulation was needed to address the root problems underlying the crisis and deal with the unintended consequences of *ad hoc* crisis management. At EU level alone, more than 40 acts, running to several hundreds of pages of primary ('level 1') legislation, have been introduced over the past five years in an effort to address shortcomings in the regulation of financial markets.[3]

Given its level and scope, however, the impact of this public intervention on the competitive landscape should not be underestimated. Moreover, a stream of post-crisis misconduct cases is revealing oligopolistic market structures in some of the most important financial markets. The banking sector has evolved, according to 2006-14 Edelman Trust Barometers, from being one of the most, to one of the least, trustworthy and respected sectors.[4] The number of complaints filed against bank behaviour has risen sharply in the last couple of years. Scandals such as the manipulation of the London InterBank Offer Rate (Libor), foreign exchange (FX) markets, credit default swap (CDS) markets, (the aiding and abetting of) tax evasion and money laundering, front-running, the mis-selling of mortgages, etc., and the failure to dismiss or penalise the managers responsible, suggest that the culture, ethics and integrity of large financial institutions still needs to be improved, despite the considerable public-sector intervention to stabilise the financial system. Competition and self-regulation do not

---

1 Authors: Miguel de la Mano, Stan Maes and Dimitrios Magos. We are grateful to our DG Competition colleagues Guillaume Adamczyk and Bernhard Windisch and to our ECB colleague Hannah Hempell for providing Box contributions (Boxes A and B on EU State-aid control and recent Bank Lending Survey evidence, respectively).

2 Despite computerisation, specialisation, sophisticated risk management and mega banking mergers leading to claimed economies of scale, the finance industry is reported to be no more productive than it was in the early 20th century. Philippon (2014) reports that the unit cost of intermediation, i.e. the sum total of wages and profits taken by the US financial services industry, remains close to 2% over time. He claims that there have been no productivity gains in finance in the past 130 years and that this finding contrasts with the vast productivity gains in many retail consumer industries.

3 In the years ahead, hundreds of legislative acts ('level 2' legislation) will need to be adopted to operationalise and ensure the effectiveness of the 'level 1' legislation.

4 Similarly, *Special Eurobarometer 398* reports that almost two thirds of EU citizens have lower confidence in the financial industry and in their own national authorities (including regulatory bodies) following the financial and economic crisis. Three quarters consider that banks should be restricted in terms of how they invest the deposits they receive and they would welcome tougher supervision and making the banks and their management directly responsible for all losses (including unlimited liability).

seem to be delivering a radically different business model in which banks always serve their customers at minimum social cost.

This chapter discusses the interaction between competition and regulation in the financial system, with an emphasis on the banking sector. It argues that financial regulation and competition policy are certainly necessary if the financial system is to function properly, but that competitive pressure can deliver real benefits only in the context of well-established and appropriate regulation. Risks and dangers in banking arise primarily from a regulatory framework that is not adapted to the market structure. Prior to the crisis, large financial institutions became 'TBTF' because the authorities did not have suitable means to resolve them. Similarly, competition may result in herding and increased leverage and fragility in the absence of macro-prudential tools to counter asset price and credit booms. Experience from the crisis has led to reform attempts in the areas of resolution, especially of systemically important financial institutions, and macro-prudential regulation. This chapter argues that a regulatory framework that sets the wrong incentives, rather than market structure or competition, can actually drive systemic fragility. One lesson from the crisis is that competition enforcers and financial regulators may need to take concerted action to be jointly as effective as they could be.

Section 2 starts by describing the historical pendulum swings in financial sector competition policy and regulation and by recalling the basic justifications for government intervention in the financial system, through financial regulation, competition enforcement or in other forms. Special attention is devoted to the systemic importance of the banking sector and the perceived trade-off between competition and stability.[5] Section 3 reviews the literature on gauging how well financial markets are functioning and how policy makers try to measure competition and systemic risk. Section 4 reviews several recent cases of TBTF misconduct behaviour and draws attention to the root causes of competition and regulatory concerns in the financial sector. Section 5 draws conclusions and recommends closer cooperation and concerted action between financial regulators and competition enforcers to make financial markets work better.

2. FINANCIAL MARKET REGULATION AND COMPETITION ENFORCEMENT

2.1. Historical pendulum swings

Over history, we can discern large pendulum swings in the official approach to regulation and competition in the financial system (particularly banking), rooted in perceived trade-offs between competition, stability and integrity.

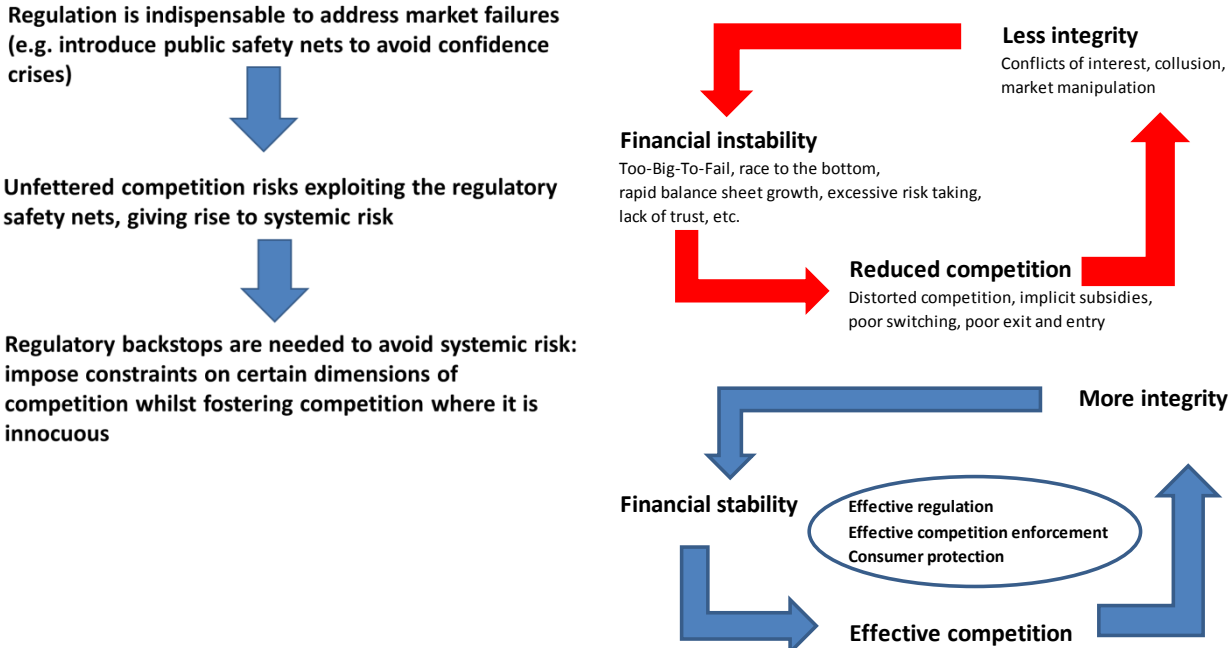
In the decades following the Great Depression, i.e. between the 1930s and the 1970s, banking benefited from public safety-nets such as deposit insurance and 'lender of last resort' facilities. Efforts to curtail the resultant moral hazard and excessive risk-taking incentives made it one of the most regulated sectors in the economy. Competition was thought to be detrimental to stability, as it led banks to take more risks and could exacerbate the depositors' coordination problem, making them more susceptible to bank runs. The watchwords were regulation, stability, intervention and weak enforcement of competition rules.

From the 1980s, there was a shift from tight regulation to liberalisation, based on the belief that competition enhances productive and allocative efficiency and introduces superior dynamic incentives. The buzzwords were deregulation, liberalisation, less intervention and less stability. A commonly held view of the second period is that banks have faced increased competition on both sides of their balance sheets, from financial markets and the development of disintermediation and financial innovation (e.g. shadow banking). However, returns on equity have been relatively high by historical standards and entry and exit have been at best modest, suggesting that competition may not be working as well as it could.

[5] We focus primarily on the banking sector because the effects and stability-competition-integrity trade-offs seem particularly pronounced there. We consider the financial system more broadly where appropriate, given the competition and regulation interactions between banking and non-banking (e.g. shadow banking) and given also that other financial entities and markets may have systemic relevance. The role of the overall financial system is to support the real economy by helping households and firms to manage their risks, by providing and managing an efficient and reliable payment system, and by efficiently channelling savings and capital into long-term investments (financial intermediation). Banks play a central role in the financial system and are special and different from non-financial firms and most other financial institutions, mainly due to their 'systemic importance' and the fact that they operate in markets that are prone to market failure. Bank balance sheets differ from those of non-financial firms in terms of size, complexity, leverage (i.e. paradoxically thin shock absorbers) and interconnectedness.

Reinhart and Rogoff (2008) illustrate that the first period was indeed characterised by relative financial stability and that there have been significantly more bank failures and crises in the second. In hindsight, a vicious circle, or 'doom loop', emerged in the decades before the financial crisis: TBTF gave rise to an unstable financial system, excessive risk-taking and distortions of competition. This period was characterised by aggressive balance-sheet expansion by TBTF banks – EU banks' balance sheets in 2014 exceeded 300 % of EU GDP (a sharp increase on the level in previous decades). Furthermore, the shift from relationship-oriented to more transaction-oriented banking nurtured a culture that exacerbated conflicts of interests and allowed large financial institutions to collude and manipulate oligopolistic financial markets, in turn giving rise to a sapping of confidence and financial stability (see section 4). In hindsight, there was no coherent approach to competition and regulation, nor a strategy to tackle problems or concerns.

Chart 1: **Interplay between regulation and competition in the financial sector**



A vicious circle emerged in the decades preceding the financial crisis, whereby financial stability, competition and market integrity came to have a mutually destructive effect on each other (see **Chart 1**). Competition among TBTF banks amplified a 'doom loop' whereby they expanded their balance sheets and took excessive risks, thus in turn attracting greater implicit subsidies that artificially promoted even more balance-sheet expansion and excessive risk-taking. In a way, the State unintentionally and implicitly subsidised TBTF banks. Competition is distorted not only across sectors, but also within the banking sector, between large and small banks and across banks of the same size across different Member States (see European Commission (2014b)).

2.2. Financial regulation should correct market and government failures

Market failures

If and when markets work properly, they are the best source of dynamism, prosperity and progress. Under certain circumstances, however, markets fail or become dysfunctional.

'Market failure' describes a situation where the market, based on private actors and left to its own devices, does not provide a good or service efficiently. It could, for example, provide too much or too little of a product or service at a price that is too low or too high, from the point of view of society at large. This happens when the private benefits (or costs) of market transactions are not equal to the benefits (or costs) to the public or society, e.g. when private transactions produce pollution, systemic risk or innovation (known as 'externalities').

The financial system is particularly susceptible to market failures. They arise from (negative) externalities, informational asymmetries, coordination failures, the (partial) absence of market forces, or market power.

Without government intervention to correct for market failures, the financial system would produce inefficient outcomes and become dysfunctional.[6]

Certain financial markets are prone to coordination failures and require regulatory intervention in the form of public benchmarks (as a coordination device) in order to function normally. If left to the market, benchmark setting may lead to suboptimal outcomes for society at large and may allow market participants to extract rents from consumers.

Liquidity or information about creditworthiness represent 'public' or 'credence' goods, whose production, when left to private players, may result in an underproduction of information or market abuses to the detriment of customers.

Market failures are particularly pervasive in the banking sector. Healthy banks can fail due to depositor runs, causing severe economic pain (hasty termination of productive investments and recall of loans at a loss). In addition, bank runs or confidence crises may give rise to negative externalities for the bank's competitors and the overall economy. Importantly, while in non-financial markets the exit of a firm typically benefits its competitors (as surviving firms may increase their revenues and profits), negative externalities and contagion effects mean that the failure of a bank is likely to weaken its competitors. Contagion involves an initial shock becoming a systemic event and is therefore at the heart of a systemic crisis.[7]

In general, the root justifications for government intervention in the financial system are:

(i) to correct for market failures, thus keeping markets efficient and stable (e.g. by introducing deposit guarantee schemes to avoid coordination failures and confidence crises or guarding against abuse of market power through competition policy enforcement);

(ii) to create and enforce 'rules of the game', thus ensuring the integrity of the system (e.g. by introducing market abuse legislation);

(iii) to protect taxpayers' interests when public money is spent or put at risk (e.g. by enforcing State-aid controls); and

(iv) to redistribute income and achieve other political objectives through taxes and subsidies (e.g. on the basis of industrial or social policy).

Government intervention can take different forms, therefore, including taxation, subsidies, regulation, competition enforcement or the setting-up of public institutions (e.g. central banks or deposit insurance).

Government failures and their unintended side-effects

Even if the underlying justification is sound, government intervention may give rise to **unintended consequences**. Regulatory failures may distort the competitive process and generate systemic risk, to give two important examples, and should be avoided or rectified. Deposit insurance and 'lender of last resort' facilities may help to avoid costly bank runs, but also incentivise excessive risk-taking or moral hazard[8] and may even create systemic risk. Banks will be incentivised to artificially expand on the back of the public safety nets and thereby exploit the public safety nets so as to become too big to fail. The incentives from the public safety net coverage justify prudential financial regulation and supervision, and a need to curtail the banks' incentives of

[6] Improving risk-management systems internally is very important, but even with state-of-the-art systems some risks cannot be measured and internalised. Relying on banks' own risk-management systems is not enough: they will never fully manage individual banks' large but rare risks or 'tail' risks (because of TBTF and limited liability) nor incorporate the impact of banks' actions on the stability of the system.

[7] Contagion can be direct or indirect. Direct contagion arises because financial institutions are financially exposed to each other, through the payment system and/or other types of position, such as interbank loans, derivatives, repurchase agreements, etc. Indirect contagion can arise through two main channels. First, markets may assume that direct contagion effects exist, even when this is not the case (information channel). Second, if one institution is affected by financial problems, markets may expect other institutions in the same business to be hit by the same problems, which in turn can lead to them suffering shocks (common risk channel). Also, government support that prevents the costly exit of a failed bank may benefit the bank's competitors. This is just one illustration of the special nature of competition in the banking sector, especially in times of crisis.

[8] Moral hazard refers to the problem of government guarantees and deposit insurance schemes inducing beneficiaries (bank shareholders, bank managers) to take excessive risks, because they reap the full benefits if the risks pay off, but the guarantor foots the bill if they do not.

becoming ever more systemically important. In sum, the unintended consequences of government intervention may require a new round of government intervention in the form of financial regulation and supervision (e.g. 'taxing' systemic risk through higher capital requirements).

Regulatory intervention may also be **inadequate**. For example, the (Pillar I) Basel II minimum capital requirements took no account of liquidity risk and systemic risk considerations. Arrangements that are initially targeted and effective may be **circumvented** and hence become ineffective over time or even unintentionally become a **barrier to entry**. Following the crisis, renewed attention has been paid to assessing this latter effect. The Dutch Authority for Consumers and Markets (2014) analyses barriers to entry to the Dutch retail banking sector and makes a number of recommendations relating to the financial regulation of banks, e.g. that laws and regulations be made simpler and more predictable, in particular for smaller banks. It argues that prudential laws and regulations should be geared more to the risk a bank poses for financial stability and the economy as a whole, and calls for an evaluation of the bank licensing system.[9]

Avoiding the above government failures and unintended consequences is challenging for a number of reasons:

- key goals of regulation, such as financial stability, market integrity, effective competition and efficiency, are not directly observable, let alone quantifiable (see also section 3 below). They can often be assessed only indirectly and through relative and rough orders of magnitude as regards negative or positive effects;
- good regulation is not just about laying down the right rules, but also creating the right risk culture and incentives, appropriate governance and oversight, and understanding the limitations of analytical models and the (un)certainty of estimates; and
- financial markets are constantly innovating and institutions are constantly adapting to new rules. Much of the complexity of regulation stems from this ongoing adaptation once rules are implemented. Rules or procedures that look appealing on paper often turn out to be less effective once in place. As soon as a rule, be it simple or complex, becomes binding, it will cause changes in financial institutions' risk management that will make it less binding and less effective in practice.[10]

Any regulation will have repercussions for the allocation of market power in the financial sector, so can itself result in competition distortions that in turn threaten market stability and impact the economy. Regulatory intervention needs to be evaluated on an ongoing basis through *ex post* reviews and enforcement must be monitored closely. In the absence of a clear mandate to review and adapt legislation (such as that given to central banks), the regulatory framework may become increasingly complex, ineffective and in the worst instances interfere with the functioning of the market and act as an entry barrier.

2.3. The perceived trade-off between competition and stability

The literature on the impact of competition on financial stability is ambiguous. On the one hand, there are theories suggesting that greater competition can breed financial instability. This **traditional view** is referred to as the 'charter' or 'franchise' view. According to this school of thought, a more competitive banking sector results in a less stable financial system, because lower profits mean that banks have less of a buffer against unexpected losses and hence greater incentives for excessive risk-taking (in a context of limited liability). Competition erodes bank franchise values and encourages banks to make big bets and search for profit by taking risks, as they have little to lose if their bets turn sour. Alternatively, a bank that enjoys significant market power has more to lose by engaging in more risky activities, as it has an incentive to safeguard the discounted value of its profits (Marcus (1984), Keeley (1990)).

[9] The Dutch Authority for Consumers and Markets concludes that, due to its scope, complexity and frequent changes, the overall package of laws and regulations constitutes a barrier to entry into the banking sector. It also deems that prudential laws and regulations (including the supervision thereof) are disproportionately burdensome for smaller institutions, resulting in a cost disadvantage for entrants that are of no systemic importance.

[10] This effect is sometimes referred to as Goodhart's Law.

More competition also reduces the informational rents that banks can extract from borrower relationships (as customers will switch more easily) and dampen banks' incentives to screen borrowers properly, leading to riskier borrower portfolios and greater fragility (Allen and Gale (2000, 2004)).

In addition, competition results in smaller and less diversified banks, thus reducing economies of scope and scale, while large banks in concentrated banking systems can have more diversified portfolios (Diamond (1984), Allen (1990)).

Finally, the large number of banks to be supervised increases the supervisory burden, endangering their effectiveness.

An **alternative, diametrically opposed view** is that competition can be a source of greater market stability. Boyd and De Nicolo (2005) build on and refine the franchise view by contending that competition lowers interest rates, the borrower's associated moral hazard and hence overall risk. Concentrated banking systems imply market power. Banks with greater market power are able to charge margins and therefore higher interest rates. The higher interest rates result in greater risk-taking by borrowers or attract riskier borrowers (adverse selection) and hence lead to greater fragility.

This school of thought would also argue that any negative effect of competition on stability can be counteracted. Even if competition leads to higher risk-taking, banks can and should increase their equity capital to compensate (Berger *et al.* (2009)).

Others argue that the moral hazard question is more pertinent in the context of low levels of competition and public safety-nets. Large banks in concentrated banking systems will tend to receive bigger subsidies through implicit TBTF policies that intensify risk-taking incentives and hence increase banking system fragility. The failure of a large bank could have a major impact on the continuity of the financial system and involve a high risk of contagion. Therefore concentrated banks are likely to be associated with greater implicit subsidies, which could in turn lead them to engage in ever-increasing levels of risk-taking. This mechanism results in a positive link between concentration and systemic fragility.

Also, large banks are more difficult to supervise and regulate, and subject to a greater risk of regulatory and supervisory 'capture'. Size is positively correlated with complexity, interdependency and (possibly) supervisory capture. In addition, diversification can have negative implications for systemic stability if banks become too interconnected and start looking too much alike (Wagner (2008)).

In addition to any direct impact that it may have on risk-taking, competition can bring other key benefits in the form of gains in productive and dynamic efficiency,[11] which can form the link between competition and bank stability. More efficient banks are more stable (Berger and DeYoung (1997)) and competition tends to trigger a reallocation of profits to more efficient firms (Olley and Pakes (1996)), ensuring 'Darwinian selection'.

In sum, the **theoretical literature** produces ambiguous and inconclusive predictions. Some argue that intermediate levels of competition are optimal for financial stability. Introducing competition in monopolistic systems initially increases stability as borrowers become safer, but high competition becomes destabilising due to the charter value effect (Matutes and Vives (2000), Martinez-Mier and Repullo (2010) and Ratnovski (2013)).

The **empirical literature** is also rather ambiguous on the relationship between bank risk-taking, stability and competition. Inferences may vary depending on whether the financial crisis is part of the data sample. Jimenez *et al.* (2013) find that greater market power decreases bank risk-taking and Beck *et al.* (2007) find that concentrated banking systems are more stable. In contrast, De Nicolo *et al.* (2004) find that more concentrated banking systems are more likely to experience crises. Schaeck *et al.* (2009) find that competition, measured by Panzar and Rosse H-statistics (see section 3.1), reduces the likelihood of a crisis and Schaeck and Čihák (2013) show that limiting banking competition hampers banks' financial stability. Zigraiova and Havranek (2015) survey 31 empirical studies published between 2003 and 2014 and find that the choice of data, regional coverage,

[11] More generally, there is an inverse U relationship between competition and dynamic and productive efficiency, whereby extreme levels of competition or monopoly power are associated with low efficiency (see Motta (2004).

estimation methodology, definition of variables, and control variables all influence reported coefficients and that overall there is no evidence of a robust relationship between competition and stability.

Despite the ambiguous relation between stability and competition, it seems there is overwhelming empirical evidence that competition enhances efficiency in banking.[12] Stiroh and Strahan (2003) find that deregulation in the United States in the 1980s spurred a shift in market share from less efficient to more efficient banks. Carlson and Mitchener (2006) find that the expansion of bank branching in the USA increased competition in the 1920s by weeding out inefficient banks, which made the banking system more stable. Evanoff and Ors (2008) consider that the greatest benefit from increased competition following new entry relates to the cost efficiency of incumbent banks. Dell'Ariccia and Marquez (2004) and Degryse and Ongena (2007) suggest that banks' response to more competition is to invest in activities that allow them to get to know their borrowers better, as this information makes them less prone to price competition (relationship-oriented as opposed to transaction-oriented banking). Competition is hence of crucial importance for greater allocative and productive efficiency and thus has clear benefits for the economy. Empirical evidence suggests that it can promote efficiency without necessarily undermining financial stability.

According to this literature, competition can bring important benefits to the financial sector and should not be sacrificed for fear of financial instability. What is needed is a regulatory framework that ensures that private incentives are aligned with the public interest and curtails the build-up of systemic risk. There is evidence suggesting that a poor institutional environment and inappropriate regulation in the liberalisation process exacerbate financial fragility (Demirgüç-Kunt and Detragiache (1998)). According to this view, the State should design policies that guarantee market contestability and create a market-friendly informational and institutional framework.

The German *Monopolkommission* (2014) advocates the primacy of competition, since it disperses market power and thus inherently tends to stabilise the system, 'as long as deficient regulation does not channel competition in a way that leads to risk accumulations that put the financial system at risk'. It is concerned that there is too little (or, as it sees it, no) debate as to the suitable harmonisation of stability and competition aspects of financial market regulation, even though measures are adopted that will have a deep impact on the financial sector.

The interplay between financial stability and competition policy becomes even more important in times of crisis. In bad times, stability in banking is of paramount concern and government intervention becomes a necessity. If systemic risk materialises and markets are on the brink of collapse, the market power of individual market participants no longer plays a role – the clear short-term priority is to stabilise the system. The primary objective of policy makers in such times is arguably to ensure financial stability, which may mean that competition is considered to be of secondary importance. In crises, competition authorities may get surprisingly close to taking on the role of prudential authorities, because concerns about systemic stability may outweigh concerns about competition. In times of crisis, the task of the authorities is to devise intervention that minimises long-term distortions of competition. Bank supervisors' and regulators' superior knowledge of the state of the financial system calls for more cooperation between them and competition enforcement authorities. Governments have to strike a balance between appropriate regulatory oversight and continued reliance on competition principles. The OECD (2009) considers that 'competition policy considerations should play an important role not only in financial sector bailouts but also in its subsequent recovery'.

In the recent crisis, governments ran to the banks' rescue and were constrained only by EU State-aid rules. EU State-aid rules have been an important coordination and disciplinary device (see **Box A**). State intervention can have an impact on banking competition and potentially on future banking stability. Adequate crisis management and resolution frameworks are critical to avoid distorting risk-taking incentives and jeopardising long-term financial stability and the competitive level playing-field.

This interplay is also important in the area of merger control. Indeed, in the course of the crisis, national merger control was temporarily set aside in certain instances by some Member States for financial stability reasons and mergers went ahead against the explicit advice of the relevant competition authorities (e.g. Lloyds and HBOS).

[12] Across industries, the major benefit of competition is greater efficiency. There is consensus that competition increases industry productivity through a process of entry and exit (Motta (2004)).

In these cases, national authorities considered that these mergers would create more stability by enhancing bank profitability, although there is an on-going debate among policy makers[13]. However, a number of objections can be raised to these mergers:

- banks' and the banking sector's concentration ratios and returns on equity were high and rising pre-crisis, so the problem does not seem to be that 'excessive' competition in the run-up to the crisis eroded bank franchise values and encouraged excessive risk-taking;
- the largest banking groups had already been growing fastest in the run-up to the crisis. It is true that medium-sized banks such as Northern Rock, the Spanish *cajas* and the *Landesbanken* had expanded aggressively and in unsustainable ways, but their spectacular failure conceals the fact that the biggest banks had expanded the most. Overall, the aggressive aggregate balance-sheet growth in the EU financial sector, from 175% of EU GDP to 350% in 2012, was entirely thanks to the 20 or so largest banks;[14]
- in crisis time, State aid to TBTF banks may be less distortive than allowing mergers on financial stability grounds, as it is not easy to curtail the duration and extent of monopoly rents from such mergers; and
- Davies and Tracey (2014) find that economies of scale and scope are likely to be exhausted at levels below those of the merging banks, once TBTF-funding cost advantages are taken into account.

The genuine net benefits of mergers to the merged entities are unclear and in any case not immediate; what we can be sure of is that creating even bigger, interconnected and complex banks is tantamount to sowing the seeds of the next crisis. Market failures and excessive risk-taking are best addressed through regulation, rather than monopoly rents and anti-competitive mergers.

Box A. **EU State-aid control by the Commission: assessing viability and financial stability**

Around 30% of the entire European banking sector has been restructured under EU State aid rules. Between 2007 and 2014, the Commission took more than 450 State aid decisions, determining the restructuring or orderly resolution of 112 European banking institutions.[15] The Commission reviewed State aid granted to some of Europe's biggest financial institutions. Out of the top 20 European banks, the Commission approved aid to 12 banks, of which six were subsequently restructured, five received aid through approved aid schemes, and one was orderly liquidated.

Table A1: **State aid to the EU financial sector**

Total EU	2008	2009	2010	2011	2012	2013	Total	%EU28 2013 GDP
1. Recapitalisations	118 834	90 691	93 451	34 990	90 826	20 469	448 161	3,4%
2. Asset relief interventions	9 800	79 516	53 967	-	35 425	9 530	188 238	1,4%
sub-total (1 + 2)	128 634	170 208	147 418	34 990	126 251	29 999	**636 399**	**4,88%**
3. Outstanding Guarantees	400 392	835 838	799 825	588 953	492 124	352 302	**ns**	**2,7%**
3.a) Guarantees triggered	-	-	450	1 581	15	1 086	3 131	0,02%
3.b) guarantees fees paid	714	6 710	9 240	9 088	7 192	5 218	38 163	0,3%
4. Liquidity measures other than guarantees	22 193	70 146	62 628	60 581	44 283	34 551	**ns**	**0,3%**
sub-total (3 + 4)	422 585	905 984	862 453	649 534	536 407	386 852	**ns**	**3,0%**

Source: European Commission, Eurostat

1. Big numbers at stake

Since the beginning of the European financial crisis, EU countries have provided EUR 671 billion in capital and repayable loans and EUR 1288 billion in guarantees to financial institutions in distress, subject to EU State aid rules.

[13] Article 20.4 of the EU Merger regulation provides the possibility for Member States to invoke prudential rules to protect legitimate interests in merger controls of banks, whereby stability concerns would take primacy over competition concerns. Note that, recently, the Dutch central bank (DNB) recently stated by means of one of its directors that it will plead at the Single Resolution Board (SRB) for a "resolution test" for bank merger clearances, i.e. banks will need to prove that they can be resolved at least as swiftly after the merger than before the merger.

[14] A simple counterfactual analysis reveals that the aggregate size of the EU banking sector would not have grown as a percentage of GDP if the top 20 banks' balance sheets had grown in line with GDP growth in previous decades (ESRB (2014)).

[15] Figures date from December 2014.

2. Viability requirements under State aid rules

2.1. Three main pillars

The Commission's assessment of bank restructuring plans under the State aid crisis rules is built on three pillars :

i - Restore long-term viability without further need for State support in the future, by restoring sustainable profitability and reducing risk; if this proves not possible, consider an orderly winding-down;
ii - Minimise the use of taxpayers' money, through appropriate burden-sharing measures, including aid remuneration and contributions by the bank, shareholders and junior creditors;
iii - Limit distortions of competition through proportionate remedies. Giving State aid to a particular bank can distort competition, as it gives the bank an advantage over its competitors.

2.2. Restoring long-term viability is key

Throughout the crisis, the Commission has stressed the importance of financial stability when implementing State aid rules. Especially at the beginning of the crisis, exceptional market conditions made it necessary to ensure that conditions attached to State aid to systemic banks would not create disturbances in the financial markets. These conditions have been progressively adapted and tightened in order to reflect changing market conditions and the evolving nature of the crisis.

Restoring viability is a fundamental element of assessing banks in need of State support. Maintaining unviable banks on the market would further impair the financial system and monetary transmission mechanisms, and create a medium- to long-term risk to financial stability. It would also distort competition by crowding out viable banks capable of lending capital to the real economy. When a bank is assessed as unviable and unable to be turned around on the basis of a credible restructuring plan, it can receive liquidation aid in order wind down in an orderly fashion.

2.3. What does long-term viability mean?

According to the Restructuring Communication, 'long-term viability is achieved when a bank is able to cover all its costs including depreciation and financial charges and provide an appropriate return on equity, taking into account the risk profile of the bank. ' In order to minimise costs to the taxpayer, it is essential to ensure that State aid is appropriately remunerated and eventually recovered by the State. To achieve this, banks must have the ability to generate a sustainable income and an appropriate return on equity.

The Commission examines a large number of elements in order to assess whether the bank will be able to generate sustainable income and manage costs and risks. The Commission conducts a fundamental review of the bank’s business model and identifies the root causes of the bank's problems, finds the best path to an improved or new business model, and produces a technical feasibility assessment and a stress scenario to ensure that the bank can withstand shocks. The Commission also examines the quality of the bank's risk and credit management, and looks at the bank's funding strategy and the development of its solvency position. Last but not least, the Commission reviews the overall governance structure as well as the appropriateness of remuneration and incentive structures.

The restructuring plan needs to demonstrate on the basis of all these elements that the bank can return to sustainable profitability within five years. The key elements of the new business model are laid down in legally binding commitments in a Commission decision approving State aid endorsing the restructuring plan. The proper implementation of the restructuring plan and commitments contained in it is subsequently monitored by trustees, acting as the Commission's 'eyes and ears'.

Chart A1: **Operating income to total assets**

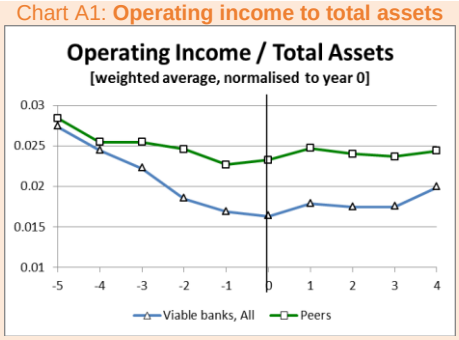


Chart A2: **Cost to income ratio**

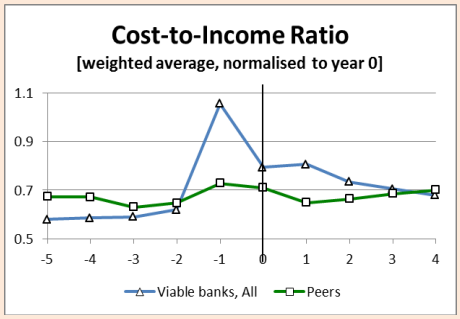


Chart A3: **Risk Weighed Assets to total Assets**

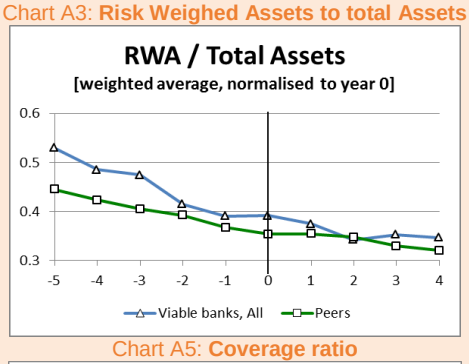


Chart A4: **Non-Performing Loan ratio**

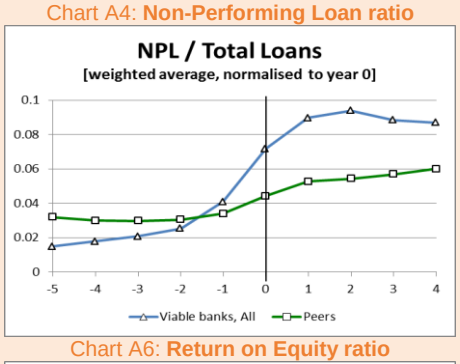


Chart A5: **Coverage ratio**

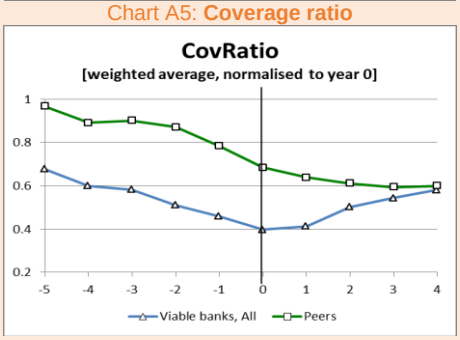


Chart A6: **Return on Equity ratio**

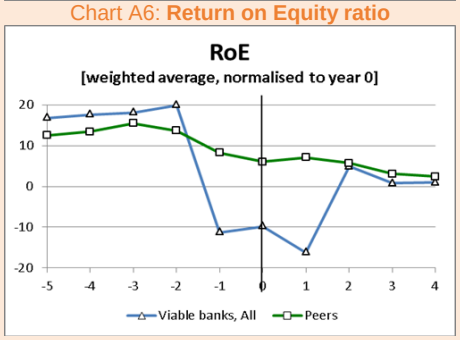


Chart A7: **Loan to deposits ratio**

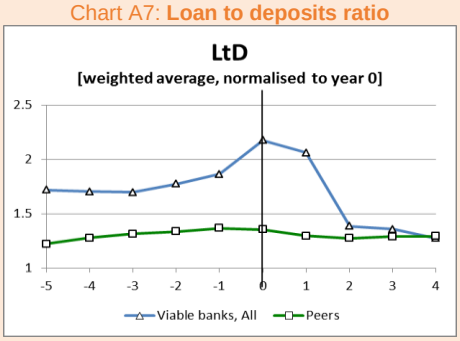
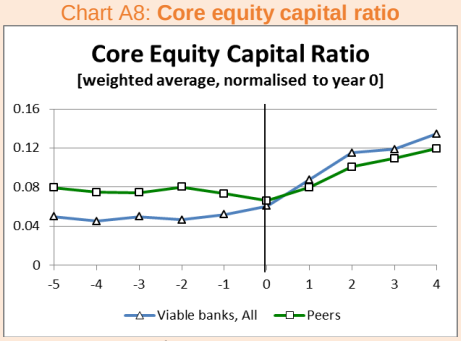


Chart A8: **Core equity capital ratio**



Source: European Commission (2015), 'State aid to European banks: returning to viability', Competition State aid brief, February; http://ec.europa.eu/competition/publications/csb/csb2015_001_en.pdf

3. Financial institutions under State aid control are progressively returning to viability

Empirical evidence (European Commission (2015)) suggests that financial institutions under restructuring plans are progressively returning to long term viability. Supported and restructured banks are showing significant improvement in operational and risk indicators, and in funding and solvency positions. However, the recovery is a time-consuming process. It is only towards the end of the restructuring period that the performance of restructured banks converges towards the values of banks that did not receive aid.

Results from the recent asset quality review and stress test conducted by the ECB on the main European banks confirm these findings. Most banks under State aid control successfully passed the test confirming their solvency. Ten banks under State aid restructuring that failed the exercise are only in the first couple of years of restructuring plan implementation. If the Single Supervisory Mechanism accepts all capital-generating actions implemented in 2014, only two of these banks will have a net capital shortfall, and one has announced recourse to private measures to fill the gap.

3. HOW TO ASSESS IF MARKETS ARE FUNCTIONING PROPERLY?

To assess properly whether financial markets are working well, one needs to be able to measure the degree of competition and the degree of systemic risk created through the competitive process in a less-than-perfectly regulated environment.

3.1. Measuring static and dynamic competition in the financial system

How do financial institutions compete? What are their competitive strategies? How informative are market structure indicators? Are there trade-offs between competition and safety/stability? How should one assess and measure competition in modern financial markets?

Assessing competition in the financial system and banking sector is relatively complex, due to a number of unique characteristics (Claessens (2009)):

- the 'production function' for financial services is relatively opaque;
- the impact of regulation on competition may be significant without being easily observable (standardised versus internal-ratings-based approach to risk weights, implicit TBTF subsidies, quality of supervision, etc.);
- the impact on systemic stability of competition and business decisions (e.g. offering high deposit rates to attract customers, offering high loan-to-value (LTV) ratios to attract borrowers, etc.) is not obvious;
- the scalability of modern banking implies a greater challenge and greater data volatility; and
- it is relatively rare for comparable data to be retrieved in the area of banking, as compared with other sectors.

Moreover, the bail-out and subsequent reform agenda is likely to have a profound impact on the functioning of financial markets. The detailed aspects of several key reforms are being implemented and phased in only gradually and decisions are still outstanding on a number of important reforms (e.g. structural reform of major financial institutions). The effects of the reforms (e.g. as regards the reduced probability of a systemic crisis) are often difficult to quantify or even estimate with any reasonable precision. Some (e.g. preventing market abuses such as the manipulation of interest-rate benchmarks or the FX markets) will not be observable for many years, if ever. The benefits of reforms (e.g. a better banking culture) may be spread out (over time and across the taxpaying population) and medium-term, whilst the costs may be borne by specific, well organised stakeholders, typically in the short term. The impact on stability, efficiency, integrity and competition needs to be measured at the level of the system as a whole, i.e. from the viewpoint of the end-users, rather than at the level of the regulated entities or sector.

As a result of these complexities, there is no general consensus on how to measure reliably whether competition works adequately in the financial system. Different metrics have been proposed and reported; these break down into three main approaches:

- The most popular set of competition metrics to date are **market structure measures**. These are relatively simple metrics, such as concentration ratios (CRs) or Herfindahl-Hirschman indices (HHIs). A CR(k) reflects the sum of the (number k) largest banks in the relevant market.[16] HHIs reflect the sum of the market shares of all banks in a market, each weighted by market share. These metrics are based on the structure-conduct-performance (SCP) paradigm, which was dominant in industrial organisation between 1950 and 1970 and posited that market structure influences firms' conduct and market performance. (i.e. greater concentration leads to firms behaving less competitively, as it facilitates collusive agreements in areas such as pricing, choice of technology, entry barriers, etc.; in turn, the firms' behaviour influences market performance, as it gives rise to more market power and less social efficiency).

[16] These kinds of market share metrics presuppose the definition and identification of a 'relevant market'.

The problems with market structure metrics are not only practical (having to delineate a relevant market), but also theoretical in nature:

- market structure may not always be exogenous or given, but may be influenced by firms' conduct. The efficiency of a particular firm may give rise to a concentrated market, for example;
- high concentration and market power in innovation-rich industries may be necessary to compensate firms for their innovation and investment and do not necessarily imply reduced efficiency;
- the contestability theory suggests that market structure may be irrelevant when markets are fully contestable, in the sense that an oligopoly or even a monopolist may demonstrate highly competitive behaviour, as long as there are no entry and exit barriers and incumbents are subject to the threat of potential competition; and
- market structure measures do not take account of factual competition issues, such as switching costs, barriers to entry, proximity of banks, number of bank relationships, pass-through of cost decreases, etc., which may be useful signals as to the degree of competition in a given environment.

- A second set of competition metrics provides information about **pass-through rates, or the extent to which output prices respond to changes in input prices**. The underlying idea is that the extent of the response can be shown to depend on competition. Output prices respond one-to-one to changes in input prices in fully competitive markets, but only partially in an oligopolistic or monopolistic setting. Following this line of thinking, researchers have formulated and regressed a gross interest revenue function per bank as a function of input prices and control variables, yielding elasticity estimates. The sum of the estimated elasticities of bank interest revenues with respect to the set of input prices (Panzar-Rosse H-statistics (Panzar and Rosse (1987)) is deemed informative of the competitiveness of the market.

  Alternatively, researchers have tried to estimate the ability of banks to price their services and products above marginal costs. The ratio of price to marginal cost should be equal to unity in perfect competition and increases with the degree of imperfection, which will depend on the substitutability of banks' services and products, their share of the relevant market and the existence of entry or growth barriers. This is the idea underlying estimated Lerner indices.

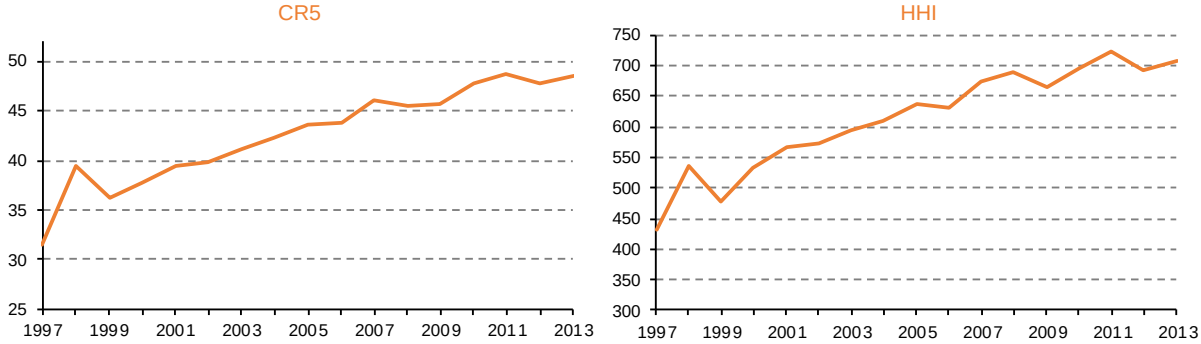
  An important problem with these metrics is that estimates do not seem to be very robust across studies and time.

- A third set of competition metrics provides information about **factual competition issues, notably the contestability of the sector**. This involves estimating the impact of switching behaviour and switching costs, the launch of new products or new entrants or barriers to entry, formal and informal barriers to entry for domestic and foreign banks, activity restrictions or other regulatory requirements, the proximity of banks and number of bank relationships, etc. Case studies, events and anecdotes may also help to illustrate the degree of effective competition and the (mal)functioning of the market. The OECD publishes overall indices that summarise regulatory barriers to competition across countries.

A review of the empirical literature produces **surprisingly little robust and conclusive evidence** as to whether current EU financial markets are competitive. It is difficult to find a report that assesses competition in the EU financial system, let alone a recent one. The most recent pan-European retail banking sector inquiry (European Commission (2007)) was limited in scope and is already dated. Despite the profound changes taking place in the financial system following the crisis and the authorities' response, it is difficult to find even basic estimates of competition that go beyond 2010. Where such estimates exist, evidence is often quite rudimentary and limited to basic market structure metrics (e.g. CRs or HHIs for aggregates such as total assets) or metrics of profitability and margins.

Below, we provide high-level and basic data on the evolution of market structure measures and metrics reflecting pass-through rates. These data relate to the EU banking sector as a whole and therefore reflect only general trends in terms of consolidation and market power. They neither focus on specific markets nor capture the EU financial system as a whole.

Chart 2: **Market concentration**, EU banking sector (1997-2013)

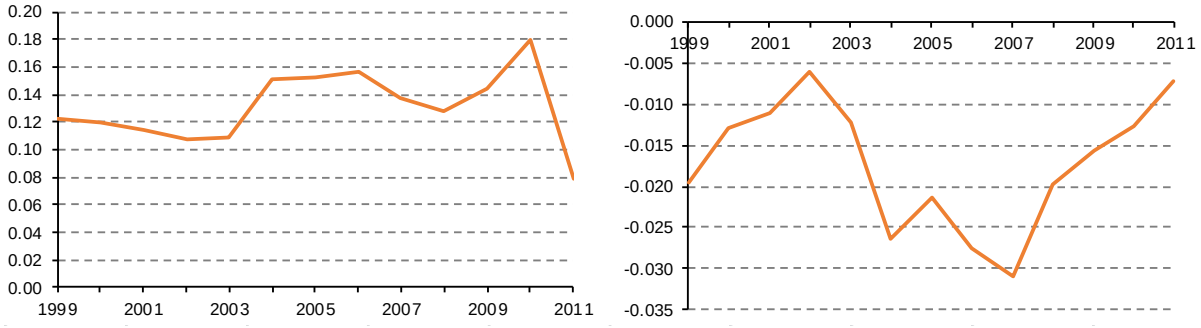


Notes: Aggregation of country data has been weighed by the size the respective banking sector in terms of total assets.
Source: ECB and own calculations.

Chart 2 focuses on market structure measures and shows how the CR5 concentration ratio (the combined market share of the five largest banks per Member State) and HHI evolved in the EU banking sector between 1997 and 2013. An almost uninterrupted rise can be observed in both cases. The aggregate weighted EU banking sector CR rose from approximately 35 % at the end of the 1990s to 48 % in 2013. Similarly, the HHI of the EU banking sector increased from around 500 to over 700.

In both cases, the trend is not reversed or even changed in the crisis period. Of course, significant differences exist across Member States. For example, CRs in Germany are relatively low (31 % in 2013), although they increased significantly over the period (from 17 % in 1997). At the other extreme, the 2013 (post-consolidation) CR in the Greek banking sector was 94 %. Other countries (e.g. Finland and the Netherlands) also have CRs exceeding 80 %.

Chart 3: **Pass-through rates**, EU banking sector (1999-2011)



Notes: Aggregation of country data has been weighed by the size the respective banking sector in terms of total assets.
Source: World Bank data, Bankscope, ECB and own calculations.

Chart 3 presents metrics that reflect pass-through rates in the EU banking sector between 1999 and 2011. The Lerner index[17] shows that bank profitability was relatively and consistently high in the run-up to the crisis. In 2011, the index drops significantly, reflecting reduced profitability, but remains close to the levels of the late 1990s and early 2000s. The evolution of the Boone indicator[18] is harder to interpret, but points to a decrease in competitive pressures after 2007.

[17] The Lerner index, a measure of market power in the banking market, is defined as the difference between output prices and marginal costs (relative to prices). Prices are calculated as total bank revenue over assets, while marginal costs are obtained from an estimated translog cost function with respect to output. Higher Lerner index values indicate less bank competition. Lerner index estimations follow the methodology described in Demirgüç-Kunt and Martínez Pería (2010).

[18] The Boone indicator is a measure of degree of competition, calculated as the elasticity of profits to marginal costs. To obtain the elasticity, the log of profits (measured by return on assets) is regressed on the log of marginal costs. The estimated coefficient (computed from the first derivative of a translog cost function) is the elasticity. The rationale behind the indicator is that higher profits are achieved

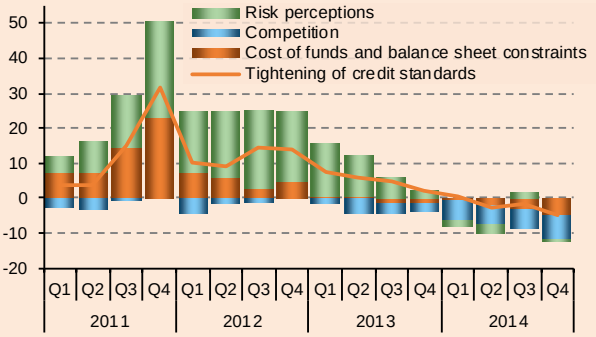
ECB Bank Lending Survey evidence sheds further light on how competition affects bank loan conditions in the euro area. Recent survey findings are discussed in **Box B**.

Box B. Evidence on gradually resurging competitive pressures in euro area bank lending

Assessing short-term changes in competitive pressures in the banking system is challenging given that comprehensive estimates on banks' market power typically become available with a lag of at least two to three years. Nevertheless, survey evidence is available that can provide timely information on competitive pressures in bank lending. The Eurosystem's bank lending survey (BLS) is a very valuable source in this respect. Recent information suggests that, despite the ongoing process of consolidation in the banking industry, there was a gradual pick-up in competitive pressures in the euro area bank lending market in 2014, facilitating a more efficient allocation of loans as well as a smoother transmission of monetary policy to the real economy.

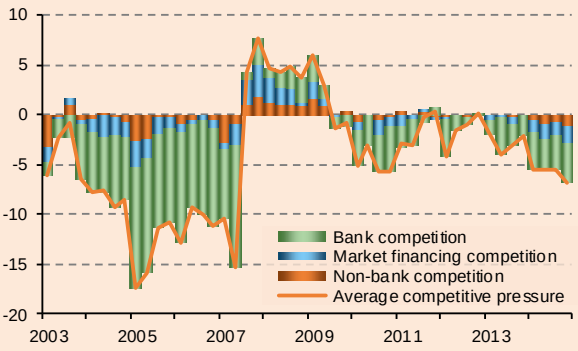
A more general assessment of the development of competition in the euro area banking industry in 2014 is complicated by the fact that the respective indicators are typically only available with a significant time lag. This lag is due to the comprehensive econometric work that is required to construct such indicators and to the lagged availability of annual individual bank balance sheet data. That being said, survey evidence may offer a useful tool for obtaining early information on competitive pressures in the banking industry. More specifically, the Eurosystem's bank lending survey (BLS) provides timely indications of changes in lending conditions directly or indirectly related to the development of competitive pressures. These indications should not be taken as an overall measure of the degree of competition in the banking sector, but may nevertheless provide useful information on changes in competitive pressures and how these changes may be influencing bank lending behaviour.

Chart B1: **Factors contributing to a tightening of credit standards,** loans to enterprises, Euro area, average net percentages per category



Notes: Negative values indicate an easing of credit standards. 'Cost of funds and balance sheet constraints' is calculated as the unweighted average of 'capital position', 'access to market financing' and 'liquidity position'; 'risk perception' as the unweighted average of 'expectations regarding economic activity', 'industry-specific risk' and 'risk on collateral demanded'; and 'competition' as the unweighted average of 'bank competition', 'non-bank competition' and 'competition by market financing'. Net percentages are defined as the difference between the share of banks reporting that credit standards have been tightened as a result of the factor in question and the share of banks reporting that they have been eased.
Source: ECB.

Chart B2: **Evidence on competitive pressures**, bank lending to enterprises, Euro area, average net percentages



Notes: The chart shows changes in competitive pressures contributing to changes in credit standards (negative values indicating an easing and positive values a tightening of credit standards). 'Average competitive pressure' represents the unweighted average of the net percentages for the three sub-components of competition ('bank competition', 'non-bank competition' and 'competition by market financing'), with the respective contributions of the sub-components displayed in the stacked bars. For the definition of 'net percentages' see the notes to Chart B1.
Sources: Eurosystem bank lending survey (BLS), ECB.

Based on the survey evidence, Chart B1 shows that, at least since the beginning of 2013, competitive pressures have been making an increasing contribution to an easing of credit standards for loans to enterprises by euro area banks.[19] These results suggest that competitive pressures, along with a decline in banks' risk perceptions and cost of funds and balance sheet constraints, were an important contributor to the latest easing in euro area banks' credit standards.

Looking further back, as displayed in Chart B2, the period preceding the financial crisis was marked by an increase in competitive pressures among banks in terms of lending, starting in 2003 and becoming most pronounced in the period between 2005 and mid-2007. The financial crisis interrupted this trend and appears to have led to a substantial reduction in competitive pressures in lending. Following the peak of the financial crisis, some resurging competitive pressures were first temporarily noticeable in 2010 and only started to develop again in the aftermath of the sovereign debt crisis – coinciding

by more efficient banks. Hence, the more negative the Boone indicator, the higher the degree of competition, because the effect of reallocation is stronger. Estimations of the Boone indicator in this database follow the methodology used by Schaeck and Čihák (2010), modified so as to use marginal instead of average costs. Regional estimates of the Boone indicator pool the bank data by regions (for more information, see Hay and Liu (1997), Boone (2001) and Boone *et al.* (2005)).

19 For a copy of the Eurosystem's bank lending survey questionnaire, see http://www.ecb.europa.eu/stats/money/surveys/lend/html/index.en.html

with the announcement of Outright Monetary Transactions (OMTs) by the ECB – and particularly in the course of 2014. This becomes visible when tracking the increasing contribution of competition to an easing (when values are in negative territory) of credit standards for loans to firms. The most recent survey evidence suggests that, despite the further increase in market concentration, competitive pressures in euro area bank lending markets have re-emerged, facilitating a more efficient allocation of loans as well as a smoother transmission of monetary policy to the real economy. This is likely to be linked to the restructuring and recapitalisation of banks, the ongoing, though slow, economic recovery and, in particular, the strong improvement in banks' funding conditions seen since the 2012 OMT announcement and largely as a consequence of the range of monetary policy measures undertaken by the Eurosystem in 2013 and 2014.

The survey evidence further suggests that competitive pressures in lending relate mainly to the activity of other banks and less to competition from market sources of finance or from non-bank financial intermediaries. Nevertheless, the relative importance of market-based financing for the development of overall competitive pressures in bank lending to euro area enterprises has been increasing since the beginning of the financial crisis (see Chart B2). This is also in line with quantitative evidence on the increasing importance of market financing as an additional external source of euro area firms' financing following the financial crisis.[20]

3.2. Measuring stability and systemic risk in the financial system

Markets do not function well and are unstable if they create systemic risk when left to their own devices, because such risk is by definition not internalised by the various private-sector participants in their interactions. It is hence important to be able to measure, assess, regulate and mitigate systemic risk, as a proxy for financial stability. This is arguably the key lesson to be learned from the build-up to the financial system crisis that materialised in September 2008. Do financial markets generate systemic risk? How can systemic risk be measured? Is there a link between competition and systemic risk in the banking sector?

'Systemic risk' is not to be confused with 'systematic risk' – the distinction is critical for both measurement and interpretation. Unlike the former, the latter is well studied and supported by extensive modelling and measurement.

'Systematic risks' are macroeconomic or aggregate risks that cannot be avoided through diversification. According to standard financial market models such as the capital asset pricing model (CAPM), investors exposed to systematic risks require compensation, because there is no simple insurance scheme whereby exposure to them can be averaged out. This compensation is typically expressed as an upward risk adjustment to expected returns.

'Systemic risk' is a different concept. It refers to risks of breakdown or major dysfunction in financial markets. The potential for such risks justifies financial market monitoring, intervention or regulation. Research on systemic risk aims to provide guidance on the consequences of alternative policies and help anticipate possible breakdowns in financial markets.

However, the formal definition of systemic risk is much less clear than that of systematic risk. The literature suggests three possible notions of systemic risk:

i. systemic risk as a modern-day equivalent of a bank run triggered by liquidity (or solvency) concerns; measurement of the risk could be an essential input to the role of central banks as 'lenders of last resort' to prevent the failure of large, or groups of, financial institutions;

ii. systemic risk as the vulnerability of a financial network in which adverse consequences of internal shocks can spread and even grow; here the measurement challenge is to identify when a financial network is potentially vulnerable and the nature of the disruptions that can trigger a problem; and

iii. a third notion including the potential insolvency of a major player in or component of the financial system.

[20] For further details on the BLS and its results, see the comprehensive quarterly report: http://www.ecb.europa.eu/stats/pdf/blssurvey_201501.pdf?7a1bddab03050b0b033cc26a03eef16c

Systemic risk is therefore basically a mixed bag of scenarios taken as justifying intervention in financial markets on the basis of macro-prudential policies. A key policy lesson from the 2008 financial crisis is to improve external monitoring, intervention and regulation to reduce systemic risk.

There is now a rich and comprehensive literature dealing with the measurement of systemic risk. Again, however, there is still no general consensus on how it should be measured and assessed. Measures can be divided broadly into two categories:

- macro-prudential measures that aim to measure the systemic risk of the entire system; and
- micro-prudential measures that aim to identify the contributions of individual financial institutions to overall systemic risk.

Well-known micro-prudential measures are CoVaR (Adrian and Brunnermeier (2011)), marginal expected shortfall (Acharya *et al.* (2010)), SRISK (Acharya *et al.* (2012)) and Granger-causality networks (Billio *et al.* (2012)). Some researchers argue that these lack transparency and may not be the best tool for identifying and regulating systemically important financial institutions (Haldane (2012), Drehmann and Tarashev (2011)).

Modelling systemic risk is particularly challenging, given that it is a tail-risk event triggering non-linearities and endogenous risk (because of financial institutions' and markets' responses) and because of the importance of government intervention to prevent, manage and resolve systemic crisis (role of macro-prudential policy, political economy considerations, etc.).

4. TBTF RELATED COMPETITION AND REGULATORY CONCERNS

> *'The scale of misconduct in some financial institutions has risen to a level that has the potential to create systemic risks. Fundamentally, it threatens to undermine trust in financial institutions and markets, thereby limiting some of the hard-won benefits of the initial reforms…. Enforcement must remain a credible deterrent to misconduct and the FSB will consider the extent to which enhanced co-operation between conduct supervisors and greater consistency in the application of conduct regulations across jurisdictions can improve its effectiveness.*
>
> *In addition, the FSB will consider reforms to reduce the likelihood of misconduct, including by:*
>
> *• assessing reforms to risk governance, compensation structures and benchmarks and, where appropriate, proposing additional measures in these areas;*
>
> *• considering ways to improve market structure, standards of practice and incentives for good conduct in financial markets more broadly.*
>
> *This full and challenging agenda is necessary to building a global financial system that is not just safe, simple and fair, but also diverse, trusted and open.'*

(Mark Carney, Governor of the Bank of England and chair of the G20 Financial Stability Board — letter to G20 finance ministers and central bank governors, 4 February 2015)

4.1. Adverse effects on competition, efficiency, market integrity and systemic risk

TBTF is arguably the most significant challenge ever confronted by regulators and competition authorities.

In hindsight, the concept of TBTF gave rise to excessive risk-taking, competition distortions and unduly/artificially aggressive balance-sheet expansion, which in turn led to conflicts of interests, large financial institutions colluding in and manipulating oligopolistic financial markets, and ultimately a loss of confidence and stability in the financial system. Competition enforcers typically either assumed that regulators would take care of market failure problems and manipulation, or saw the circumvention of regulation as not warranting enforcement measures. Similarly, regulators assumed that enforcers would address problems of market

concentration and lack of entry and exit. The absence of an overall concerted competition and regulatory strategy to tackle the underlying TBTF problem simply allowed it to fester.

The TBTF problem basically stemmed from the fundamental shift, from the 1980s onwards, from the traditional relationship-oriented model of banking (ROM) towards the transaction-oriented model (TOM). This changed the rules of the game:

- transactions with customers were no longer largely win-win and long-term, but sometimes win-lose and short-term;
- banks no longer had an incentive to perform their monitoring and information-producing role properly (previously, they prospered when the customers prospered and *vice versa*), but tended more and more to rely on hard information and trading based on private information (if need be against the interests of their clients) rather than collecting soft information; and
- the scalability of banking activities increased dramatically, with a corresponding increase in profitability, leverage and systemic risk.
- Bank corporate structure and hence also bank crisis management became relatively complex.

All in all, the shift from ROM to TOM brought the TBTF problem to a head.

Why did this shift from ROM to TOM take place? The answer is threefold:

- ➢ because it became technically possible to shift, thanks to breakthroughs in financial innovation and technology, such as securitisation and CDS;
- ➢ because banks had the incentive to switch and public safety-nets largely muffled market discipline; and
- ➢ because regulators and competition enforcers allowed it to happen. Underlying this benign stance was the belief that TOM was good for both economic growth and stability; it was seen as allowing:
  - the spreading of credit risk away from highly leveraged balance sheets towards individuals and institutions better able and willing to bear such risk;
  - better risk management;
  - more transparency on the fundamental value of loan portfolios;
  - greater liquidity; and
  - more flexibility in risk-return trade-offs.

The financial crisis has shattered this benign view. TOM has disappointed the authorities. The pre-crisis growth that it allowed proved unsustainable and fuelled asset bubbles, the bursting of which gave rise to hardship. TOM allowed risks to be concentrated on bank balance sheets rather than being dispersed to those better able to bear them. It also gave rise to greater interconnectedness. It led banks to neglect their primary role of producing information and monitoring borrowers. All in all, TOM gave rise to a deep distrust towards banks, whose interests were shown to be no longer aligned with their customers'.

The banks themselves had a number of incentives to switch to TOM:

i. it allowed them significantly to increase their profitability;

ii. limited liability means that volatility is desirable for shareholders, bank managers and significant risk-takers. The asymmetric pay-off structure provides the incentive to take the excessive risks involved in TOM; and

TOM was actively promoted by regulatory risk weights that in hindsight proved to be too low and neglected the systemic risk that it created.

4.2. Case studies of TBTF misconduct behaviour

After banks received unprecedented aid from taxpayers in the months following the bankruptcy of Lehman Brothers, a number of scandals surfaced in which the largest banking groups were documented as having played an important role. These scandals illustrate that financial markets are still not working properly. Big financial players engaged, either alone or in a coordinated way, in a series of market manipulation activities. This behaviour was made possible by a combination of factors: poorly managed conflicts of interests, loopholes in the legislative framework, weak market design and oversight, and market concentration.

According to certain barometers (e.g. the Edelman Trust Barometer), the financial sector has evolved from being one of the most trustworthy and respected sectors before the crisis towards one of the least trustworthy and respected sectors today. The number of complaints filed against bank behaviour has increased sharply in the last couple of years, despite the considerable public-sector intervention that was necessary to stabilise the financial system. Scandals, such as the manipulation of Libor, FX, CDS, (the aiding and abetting of) tax evasion and money laundering, front-running, the mis-selling of mortgages, etc., and the failure to dismiss or penalise the managers responsible, suggest that the culture, ethics and integrity of large financial institutions still need to be improved and that reform efforts face a big challenge. The narrative according to which the current state of affairs is the result of the actions of isolated rogue traders or a few bad actors in certain firms does not square with the facts (number and scale of scandals).

In this section, we briefly explain three headline-making scandals, involving the manipulation by large banks of:

- Libor money market rates;
- foreign exchange (FX) markets; and
- commodity markets.

Such scandals have been blamed for eroding what little remained of public trust and confidence in banks. However, the complete list of scandals is much longer. For example, Conor (2014) has assembled information from around the world on antitrust investigations relating to price fixing by banking cartels or multilateral market manipulation cases. His work identifies more than 400 cases of large banks being involved in more than 60 separate illegal practices. Most of the 60 largest banks across the world have been involved in collusion investigations. Virtually all top banking groups in Australia, Japan, Switzerland, the UK and the United States have been involved in price-fixing cartels since 1990. Some scandals concern individual operators and are therefore not subject to antitrust scrutiny but rather market manipulation legislation.

What are the root causes of these scandals?

- Several financial markets are characterised by an oligopolistic market structure. For example, only seven to 18 banks were submitting, and hence determining, Libor rates and 70 % of the global spot-market volume for foreign currency exchange (FX) was controlled by just seven banking groups. In addition, the combination of a TBTF environment and the small number of large banks in various markets is prone to conflicts of interests and collusion. Very often, the same TBTF banks seem to play an important role. TBTF has led to these banks being ‘too big to fine’. Unprecedented fines have been imposed, but even prime ministers have raised concerns that excessive fines would jeopardise the viability of the banks and therefore the stability of the financial sector at large. In sum, the nexus of concentrated markets and the importance of TBTF banks fosters cartel-type activities. Connor (2014) argues that one of the reasons for the increase in the number of cartels detected in the past five to 10 years is the repeal of the Glass Steagall Act, following which large commercial banks have become complex conglomerates with insurmountable governance and management issues;
- Another root cause behind the behaviour of the large banking groups is likely to have been the switch from ROM to TOM (see above) and the mixing of traditional lending with trading activities. This shift increases the likelihood of conflict of interests, as it also means that bankers’ and customers’ interests are no longer aligned, but sometimes in conflict (positive-sum game of ROM versus zero-sum game of TOM). The shift to TOM also leads to a change in the culture of the banks. The focus on the short term

has invited institutional corruption (Salter (2013)). The President of the New York Federal Reserve Bank, William Dudley, has claimed that '[t]here is evidence of deep-seated cultural and ethical failures at many large financial institutions'.

The Kay Report (2012), which examines equity markets in the UK, notes that since the onset of the latest financial crises there has been a broad erosion of trust in financial intermediaries and in the financial system as a whole. This is seen as the long-term consequence of the systematic and deliberate replacement of a culture based on relationships by one based on trading, increasingly characterised by anonymity, and the behaviours that arise as a result.[21]

The President of the Federal Deposit Insurance Corporation (FDIC) Thomas Hoenig has stated in 2012 that '[g]iven this record, it is alarming that CEOs of some financial firms fail to grasp why they are trusted so little nor appreciate the reputational damage they caused their industry. They acknowledge very little offence in taking a public subsidy and squandering it in a series of actions that place billions of taxpayer dollars at risk. They fail to appreciate how in so many ways it seems that the game is fixed in favour of a privileged few. The public is aware that there seems to be no accounting for the enormous damage inflicted on our economy. In reaction to these events, new laws were passed and new regulations were written. The regulations are extensive, and the regulatory burden is significant. The result is thousands of pages of instructions meant to control nearly every aspect of a bank's operations with the expectation that future crises will be far less disruptive or costly. I suggest that despite hundreds of added regulations, the incentives facilitating the excesses leading to the crisis remain largely unchanged. The reason is that the fundamental cause of the problem has not been fixed. The government safety-net has actually expanded to more firms. It protects firms engaged in the payments system, intermediation process, asset management, and broker-dealer activities. In addition and despite the Volcker rule, the safety-net will continue to cover most elements'.

Libor case

The London InterBank Offer Rate (Libor) is an important interest rate, representing the primary benchmark for short-term interest rates globally. Money market rates are used as a benchmark to set payments on as much as USD 800 trillion worth of financial instruments (i.e. approximately USD 120 000 worth of contracts per human being on the planet), ranging from complex interest-rate derivatives to simple mortgages. For example, the interest rate on a mortgage or a car loan may be set to Libor plus a few percentage points. Interest rate swaps may compare a fixed interest rate with Libor (in principle a variable interest rate). Libor therefore affects the global flow of money day-to-day.

Libor is set each day on the basis of what large global banks operating in London financial markets report or estimate to be their cost of borrowing in the money market. The banks report or quote to the British Bankers Association (BBA, a private trade association) the rate they expect to pay to get deposits in interbank markets.[22]

A high quote reflects a risk premium, so banks tend to underestimate their bids, especially in periods of financial distress. On 16 April 2008, the *Wall Street Journal* published a controversial article suggesting that some banks might have reported understated borrowing costs for Libor during the 2008 credit crunch and this may have misled others about their financial position.[23] Libor remained unchanged for months, until the day before the

[21] The report examines the equity market, which is assumed to be relatively competitive and stable, and illustrates that even in these markets market/regulatory failures can be identified (notably the short-termist incentive structure for middlemen in equity markets). The report makes a number of recommendations, in particular concerning pay structure, to address the underlying conflict of interests, arguing that executives' bonuses should be locked until retirement to encourage them to focus more on long-term performance.

[22] Libor is actually a set of money market indices. There are 150 Libor rates, as banks provide their own estimates for borrowing in 10 currencies for 15 different money market maturities (from overnight to a year). Individual rates are based on daily submissions from a panel of the largest, most active banks (between seven and 18 banks depending on the rate) and set by computing the interquartile mean of the quotes, i.e. the top and bottom 25 % are first eliminated and then the average of the rest is computed (e.g. if 16 banks submit quotes, the four highest and four lowest are discarded and the average of the remaining eight quotes is computed). Banking associations establish similar indices for other money markets located elsewhere, e.g. Euribor for continental Europe and Tibor for Tokyo.

[23] Authorities initially contradicted the *Wall Street Journal* article, claiming there was no evidence of manipulation. In its March 2008 *Quarterly Review*, the Bank for International Settlements stated that 'available data do not support the hypothesis that contributor banks manipulated their quotes to profit from positions based on fixings'. In October 2008, the International Monetary Fund published its regular *Global Financial Stability Review*, which also found that '[a]lthough the integrity of the US dollar Libor-fixing process has been questioned by some market participants and the financial press, it appears that US dollar Libor remains an accurate measure of a typical

financial turmoil started in 2008. At the same time, other interest rates (e.g. the Eurodollar bid rate) and the CDS spreads increased.

Investigations revealed that senior management had sometimes directed the quote submitters 'to keep their heads below the parapet'. The investigation also unearthed manipulation, notably in relation to trading, which seems not to have been directed by senior management. With trading, unlike with reputation, overstating is as likely as understating.

It has been claimed that manipulation was facilitated by market design. Submitted quotes are based on an estimate of banks' borrowing costs and do not have to reflect the prices at which they have actually lent to or borrowed from each other (i.e. quotes are not based on actual transaction data). Libor is based on bank estimates and is therefore, by construction, open to manipulation, as banks are able collectively to manipulate the indices. A single bank may be able to affect the indices, but not as effectively, as the final rate depends on the submissions of all banks in the panel.[24] As the underlying notional amounts of the derivatives are of significant value even a manipulation of the indices of minimal size can have significant effects.

As well as being able to manipulate the indices, banks may also be willing to do so, for at least two reasons:

- a high quote indicates that the bank is borrowing at a higher rate and thus reflects a higher risk premium. Particularly in times of crisis, banks prefer to understate their true borrowing costs and there is evidence of them doing so during the financial crisis (Murphy (2012));
- banks are subject to a direct conflict of interests arising from their trading activities with clients, e.g. when an agent is serving two or more interests and has the ability and incentive to favour one (possibly its own) at the expense of another. For example, banks have been sued by home-owners for having conspired against their borrowers.[25] Some traders are alleged to have falsely and artificially increased Libor on the first day of the month, so as to increase borrowers' mortgage rates (which are sometimes linked to Libor of the first day of the month) and their own net revenues and profits. A trader may engage in this behaviour unilaterally or seek to recruit traders in other banks to act in a concerted manner.

The Libor case underlines the importance of cooperation between supervisory, regulatory and competition authorities worldwide.

FX case

A second large-scale scandal has been the foreign exchange (FX) scandal, based on alleged market abuse. According to the UK's Financial Conduct Authority (FCA), banks can be accused of manipulating FX benchmarks between 2008 and late 2013, i.e. after the Libor scandal had erupted and banks were under investigation.

With a daily turnover of EUR 3.5 trillion, the FX market is the largest in the financial system and affects the value of trillions of funds, derivatives and financial products. Nevertheless, FX markets have been among the least regulated and lack specific rules to combat insider trading. Business is not conducted in a regulated market, like an exchange, and there were no obligations to report to public authorities. Trading activity was difficult to monitor, as most of it took place in over-the-counter markets. Currencies trade around the globe and around the clock, without a 'market close' as for exchanges. Instead, data providers take periodic snapshots, e.g. in the one-minute window at 4 pm London time, when traders are observed for the widely followed WM/Reuters benchmarks and bid and offer rates from the order-matching systems, and actual trades executed and median bid and offer rates from the benchmark rate are captured. For 21 major currencies,[26] this is the most important fixing,

creditworthy bank's marginal cost of unsecured US dollar term funding'. The BBA claimed that Libor continued to be reliable even in times of financial crisis.

[24] Whether unilateral conduct would have the effect of changing the effective Libor rate also depends on the other banks' submissions. For example, if the bank's quote is always in the top or bottom 25 %, there would be no effect (see Murphy (2012) for a discussion on this).

[25] In another example, a bank may either have an interest in a high Libor fixing, when as counterparty to the derivatives contract, it receives an amount calculated on the basis of the benchmark, or in a low fixing, when as counterparty to the derivatives contract, it needs to pay an amount calculated on the basis of the benchmark.

[26] Rates for less widely traded currencies are based on quotes during a two-minute window.

as it covers roughly 1-2 % of the day's global currency trading. Some companies seek to time their transactions to coincide with this fix, e.g. index funds that track the market may use currency benchmark rates to keep their returns in line with the indices. Some companies and investors ask banks to process transactions at the fix price and use the fixes to measure their foreign currency assets and liabilities for accounting purposes.

The main difference between Libor rates and currency rates is that the latter are set on the basis of actual trades, unlike the estimated (borrowing) rates that banks submit to the Libor administrators. In principle, therefore, there should be less scope for manipulation. However, the predictability of the daily fix means that the system is open to abuse. The allegation is that traders game the one-minute fixing window to produce a daily benchmark rate that benefits their other positions – a practice known as 'banging the close'. The 4 pm benchmark determines how much profit dealers make on the positions they have taken in the previous hour. It is possible that, because traders receive clients' orders in advance of the close and some discuss orders with counterparts at other firms, banks have an insight into the future direction of rates[27] and could trade ahead of their clients in order to profit from the fix. This would allow them to maximise profits on their clients' orders and sometimes make their own additional bets.

The specificity of the alleged FX manipulation is that it concerns trading, i.e. bankers do not manipulate the benchmark using their own discretion, as in the Libor case, but by front-running client orders – hence the alleged conflict of interests. In addition, traders, who in theory should be competing with each other, appear instead to cooperate, as illustrated by text messages and chat rooms known as 'the cartel' and 'the bandits club'. The concentrated market structure also facilitates coordination, given that the colluding partners would need to constitute a significant part of the market to be in a position to influence the fix. According to a Euromoney FX survey, in 2014 the top five banks still had a market share of over 60 %. Traders from various banks make a rush of transactions for funds at the 4 pm close. This leads to a surge in trading volume at the fix, which (if coordinated) could influence the fix rate. Traders have had both an ability and incentive to manipulate the market.

The FX case has demonstrated that widespread scandals can arise in markets that appear simple, transparent and based on observable transactions. It has been possible 'to manipulate markets under cover of daylight' (Field (2014)).

Commodities case

Several cases involving large banks' commodity (gold, silver and crude oil) activities have also come under the scrutiny of antitrust and regulatory authorities. The US Commodity Futures Trading Commission (CFTC) focuses on the unregulated London silver fix and gold fix markets. Twice a day, telephone conference calls are held to set the world cash (or spot) price of silver and gold. The high concentration in the market (three banks are involved in the former and five in the latter — a system in place since 1919) has put banks in a position to influence the benchmarks. The European Commission is investigating the Platt's oil benchmark.

The commodity-related activities of large banks also serve to illustrate the problem of conflicts of interests. A lengthy US Senate report on banks' involvement in commodity activities explains in great detail how three large Wall Street banks (Goldman Sachs, Morgan Stanley and JPMorgan Chase) created harm in the physical market for commodities. They used their commodity activities to gain access to commercially valuable non-public information that could be used to the benefit of their financial trading activities (insider trading). At times, physical commodity activities were used so as (potentially) to manipulate or influence commodity prices (through electricity bidding strategies[28] or 'merry-go-round' trades).[29] The three banks' physical commodity activities exposed them to multiple risks normally absent from banking, including operational, environmental and catastrophic event risks. None of them was adequately prepared for potential losses from a catastrophic

[27] See http://www.bloomberg.com/news/2013-08-27/currency-spikes-at-4-p-m-in-london-provide-rigging-clues.html.

[28] JPMorgan has settled charges with the Federal Energy Regulatory Commission in the United States for using manipulative bidding practices to obtain excessive electricity payments.

[29] 'Merry-go-round' trades are deals that have little purpose other than moving a commodity between warehouses to influence how much customers paid for storage and associated financial products. For example, Goldman Sachs has been accused of paying cash incentives to move aluminium from one warehouse to another, essentially blocking warehouse exits in the meantime. These transactions lengthened the queue for other metal owners seeking to exit the warehouses, thus restricting supplies and increasing the price.

event affecting its physical commodity activities, as they had failed to allocate sufficient capital and insurance (as compared with other institutions).

The report considers that these activities introduce new systemic risks into the US financial system, where taxpayers could be forced to step in with financial support to avoid the banks' collapse. This exacerbates the TBTF problem and creates distortions in the market place, as banks' access to the explicit and implicit safety-net also gives them an unfair competitive advantage over non-banks. The report recommends reaffirming the separation of banking from commerce and clearly limiting a financial holding company's physical commodity activities to no more than 5 % of its Tier 1 capital.

4.3. The response of public authorities to the scandals

The reaction of the authorities to these scandals has been twofold:

- fines have been imposed in cases of collusion or market abuse, as a deterrent; and
- regulation has been revised or updated to ensure that problems relating to conflicts of interests and insider trading are addressed sufficiently.

Fines and settlements

Following the above (and other) scandals, regulators and competition authorities imposed significant fines and settlements on banks. Often, in order to avoid lengthy procedures and ensure financial stability, given that the fines and private damages in the event of conviction would have been enormous, the banks and government bodies reached a settlement. From various sources that aggregate the settlements to be paid, it seems that, since 2009, banks have settled for more than USD 180 billion with US, EU and Swiss authorities. Credit Suisse (2014) considers that the 10 largest European banks will have total litigation losses of more than USD 100 billion (including estimated future losses). The FX scandal and claims relating to mis-selling and US mortgages constitute the largest categories.

The large unexpected fines, in combination with still-low leverage ratios of TBTF banks,[30] raise the issue of financial stability. The fines may bring the banks down and give rise to further government support, which in turn exacerbates the TBTF problem. Some have argued that big financial institutions are 'too big to prosecute' and 'too big to jail'. Eric Holder, the US Attorney General has admitted in 2013 'I am concerned that the size of some of these institutions becomes so large that it does become difficult for us to prosecute them when we are hit with indications that if you do prosecute, if you do bring a criminal charge, it will have a negative impact on the national economy, perhaps even the world economy'. This concern is not only raised in the United States. Andrew Bailey, chief executive of the UK's Prudential Regulation Authority, has also admitted that the largest banks have become too big to prosecute because of the impact criminal charges would have on confidence in them.[31]

The regulatory response in the EU

A further issue highlighted by these scandals is the role of regulatory and supervisory bodies. In the Libor case, for example, Barclays has argued that the UK regulator knew about the situation and was complacent. Financial supervisors may in some cases have a short-term incentive to maintain financial stability, even at the cost of markets not operating transparently. In the FX scandal, regulators have often been accused of turning a blind eye (Fields (2014)). Such incentives call for clear rules on market design to avoid market abuses and collusion.

Several regulatory initiatives have been launched to address the conflict of interests problem:

- The established legislative framework on market abuse, which addresses market manipulation and insider trading, has been amended and revamped.

[30] ESRB (2014) illustrates that the leverage ratios of the largest EU banks do not exceed 4 % in the second quarter of 2013.

[31] In January 2014, the US Department of Justice (DOJ) imposed a criminal fine of USD 50 million on RBS Securities Japan. Several commentators note that, had the parent been subject to a criminal fine, it would have closed down in the US market, thereby increasing concentration (Connor (2014)). Even the former head of the DOJ Criminal Division said that 'our goal here is not to destroy a major financial institution'. Criminal charges could have led to its exit from the market and caused collateral damage to employees and in terms of market concentration (Patterson (2013)).

Amendments to the Market Abuse Regulation/Market Abuse Directive (MAR/MAD) criminal sanctions framework clarify that any manipulation of benchmarks, including Libor and FX, is clearly and unequivocally illegal and subject to administrative or criminal sanctions.[32] Also, the new MAR recognises the interconnection of spot and commodity derivatives markets.

Like competition policy, however, this framework deals with the conduct of market participants and hence remains an *ex post* tool, albeit with a deterrent effect.

- Because several scandals arose due to poor market design and poorly regulated benchmarks, the European Commission has tabled a proposal on the design and use of benchmarks; this covers issues of governance of benchmarks, provision structure and methodology.

  The problem is that setting benchmarks often involves making an assessment on the basis of underlying data (i.e. there is a degree of discretion). The objective has been to design a regulatory framework that restores market confidence by establishing robust, reliable, representative and fit-for-purpose benchmarks that are immune to manipulation and would therefore prevent abuses *ex ante* rather than providing a mechanism for sanctions *ex post.*

- In January 2014, the Commission proposed structural reform of the largest EU banks (*inter alia*) to address conflicts of interests between trading and traditional core banking activities.[33]

  The economic literature identifies conflicts of interests as one of the main diseconomies of scope (see Annex 9 to the Commission's impact assessment on the proposal (2014)). A large literature has studied conflicts of interests arising in universal banking across different areas of activity such as proprietary and underwriting activities, for example. Fecht *et al.* (2013) report empirical evidence from the German banking sector that proprietary trading can negatively affect retail customers, who are sold stocks that underperform as compared with other stocks in the bank's proprietary portfolio and in the households' portfolios. Customer portfolio performance is also significantly worse in banks that engage in proprietary trading.

- Another approach to realigning incentives and preventing excessive risk-taking is to provide the right incentives in bank executives' pay structure. The Capital Requirements Directive IV (CRD IV) introduced a number of changes to banks' remuneration and governance structure, but one of the most controversial is a requirement that the variable component of material risk-takers' total remuneration should not exceed 100 %, or under certain conditions 200 %, of the fixed component.

  Some claim that bonuses are good in that they realign managers' incentives with shareholders'. However, others claim that such high pay incentives lead bank staff to engage in too much risk from the shareholders' perspective. Also, it can be argued that shareholders (as they have only limited liability and in anticipation of TBTF) will be willing to take more risk than banks' overall creditors (including bond holders) and the public at large, including taxpayers, would consider optimal.

- Other provisions of CRD IV concern enhanced risk management governance, more diversified board composition and enhanced transparency; and

- There have also been specific responses to individual scandals.[34]

5. CONCLUSIONS

This chapter argues that regulation is needed, not only to correct for market and regulatory failures, but also to ensure that competition in the markets does not lead to a sharp build-up of systemic risk and the promotion of TBTF banks.

[32] This was not included in the European Commission's original (October 2011) proposal for revised market abuse rules, but added on 25 July 2012. Criminal charges have been brought in the United States, with 13 traders charged in relation to the Libor case. Some are likely to receive severe sentences (up to 30 years' imprisonment for each count).

[33] European Commission (2014a) lists and discusses several other legislative measures that aim to increase transparency and integrity in the markets including the MIFiD II package, EMIR, etc.

[34] e.g. the Wheatley Review in the UK proposes finding a new Libor administrator, bringing Libor under UK regulatory oversight and creating a criminal offence of knowingly or deliberately making false statements relating to benchmark-setting.

Competition in banking is not dangerous *per se*. It is the regulatory framework in which banks operate and which sets their risk-taking incentives that drives the stability or fragility of banking. The regulatory framework should be evaluated on an ongoing basis, however, to ensure that it addresses market failures sufficiently and provides a stable system within which banks can compete on merit and without building up systemic risk.

The financial crisis has shown that imperfect and distorted competition, stemming, for example, from high concentration or implicit TBTF subsidies, severely impairs the functioning of financial markets, limits their efficiency and makes the financial system unstable and corrupt. Competition enforcement therefore goes hand in hand with sound regulation. Likewise, the intended impact of regulatory reforms may not materialise unless competition policy takes into account the new regulatory environment and complements regulatory measures with timely (including preventive) enforcement action.

The main challenge is to maintain competition in the market to the benefit of the economy, while at the same time creating a regulatory framework that minimises its possible negative impact on stability. Such a framework will include:

- ✓ additional capital charges for bank size, complexity and systemic importance;
- ✓ macro-prudential regulations that take into account the interaction between financial institutions; and
- ✓ (most critically) a resolution framework whereby even the largest financial institutions can be resolved, thus reducing the perverse incentives stemming from TBTF status.

Structural banking reform may complement the above reforms by ensuring the effectiveness of the overall reform agenda (European Commission (2013)).

The recent financial crisis and the authorities' necessary but potentially distortive short-term and medium-term responses (bail-outs, extraordinary central bank support, regulatory overhaul, etc.) may illustrate the need for an in-depth and wide-ranging financial markets inquiry at EU level, in which competition enforcers, financial regulators and consumer protection agencies work closely together.

To assess whether markets are working adequately, financial regulation and competition enforcement within the financial system need to be more closely coordinated, because competition cannot be effective (i.e. fully achieve efficiency and innovation benefits) if the rules allow some market participants to exploit or circumvent them or if regulation itself becomes a barrier to entry. At the same time, financial regulation will fall short of achieving its objectives of stability and efficiency without competition enforcement that prevents (individual or collective) market abuse and mergers that could, in some specific circumstances, exacerbate the TBTF issue.[35] Cooperation between financial regulators and competition policy enforcers needs to be strengthened at EU level. Systematic exchanges of information, expertise and staff are needed.[36]

References

Acharya, V., L. Pedersen, T. Philippon, M. Richardson (2010), 'Measuring systemic risk', Federal Reserve Bank of Cleveland Working Paper 10-02.

Acharya, V., R. Engle, M. Richardson (2012), 'Capital shortfall: A new approach to ranking and regulating systemic risks', *American Economic Review*, 102, 3, pp. 59-64.

Adrian, T. and M. Brunnermeier (2011), 'CoVaR', Federal Reserve Bank of New York Working Paper.

Allen, F. (1990), 'The market for information and the origin of financial intermediation', *Journal of Financial Intermediation*, 1, pp. 3-30.

Allen, F. and D. Gale (2000), 'Financial Contagion', *Journal of Political Economy*, 108, pp. 1-33.

Allen, F. and D. Gale (2000), *Comparing financial systems*, Cambridge, MA: MIT Press.

Allen, F. and D. Gale (2004), 'Competition and financial stability', *Journal of Money, Credit, and Banking*, 36, 3, pp. 433-480.

Berger, A.N. and R. DeYoung (1997), 'Problem Loans and Cost Efficiency in Commercial Banks.' *Journal of Banking and Finance*, 21, pp. 849-870.

Berger, A.N., L. Klapper and R. Turk-Ariss (2009), 'Bank Competition and Financial Stability', World Bank mimeo.

Billio, M., M. Getmansky, A. Lo, L. Pelizzon (2012), 'Econometric measures of connectedness and systemic risk in the finance and insurance sectors', *Journal of Financial Economics*, 104, pp. 535-559.

Boone, J. (2001), 'Intensity of competition and the incentive to innovate', *International Journal of Industrial Organization*, 19, pp. 705–726.

Boone J., R. Griffith, and R. Harrison (2005), 'Measuring Competition', Advanced Institute of Management Research Paper No. 022.

Boyd, J.H., and De Nicoló, G. (2005), 'The theory of bank risk-taking and competition revisited', *Journal of Finance*, 60, pp. 1329-343.

[35] The Commission's mandate and that of national competition authorities - under merger control - is defined as protecting consumers. Therefore, merger control cannot address financial stability concerns arising from TBTF.

[36] Of course, confidential and competitively sensitive information must be protected.

Carlson, M. and K. J. Mitchener (2006), 'Branch banking, bank competition, and financial stability', Journal of Money, Credit and Banking, 38, 5, pp. 1293-1328.
Claessens, S. (2009), 'Competition in the financial sector: Overview of competition policies', IMF WP 45.
Connor, J. M. (2014), 'Big bad banks: Bid rigging and multilateral market manipulation', working paper.
Credit Suisse (2014), 'Litigation – more risk, less return', Equity Research Europe, Multinational Banks, 4 June.
Davies, R. and B. Tracey (2014), 'Too big to be efficient? The impact of implicit subsidies on estimates of social economies for banks', *Journal of Money, Credit and Banking*, Vol. 46, Issue 1, pp. 219-253.
Degryse, H. and T. Ongena (2008), 'Competition and regulation in the banking sector: Empirical evidence on the sources of bank rents', in Anjar V. Thakor, and Arnoud Boot, Eds. *Handbook of Financial Intermediation and Banking*, Elsevier, Amsterdam, 483-554.
Dell' Ariccia, G. and R. Marquez (2004), 'Information and bank credit allocation', *Journal of Financial Economics*, 72, 1, pp. 185-214.
Demirgüç-Kunt, A and E. Detragiache (1998), 'Financial Liberalisation and Financial Fragility', IMF Working Papers 98/83, International Monetary Fund.
Demirgüç-Kunt, A. and M. S. Martinez-Peria (2010), 'A framework for analyzing competition in the banking sector: An application to the case of Jordan', World Bank Policy Research Working Paper, No. 5499.
Detragiache, E. (2001), 'Bank fragility and international capital mobility', *Review of International Economics*, 9, 4, pp. 673-687.
Diamond, D. (1984), 'Financial intermediation and delegated monitoring', *Review of Economic Studies*, Vol. 51, No. 3, pp. 393-414.
Drehmann, M. and N. Tarashev (2011), 'Systemic importance: some simple indicators', BIS *Quarterly Review*, March.
ESRB (2014), 'Is Europe overbanked?', Reports of the Advisory Scientific Committee, No. 4.
European Commission (2007), 'Report on the retail banking sector inquiry', Staff Working Document, SWD(2007) 106.
European Commission (2013), 'Structural reform in the EU banking sector: Motivation, scope and consequences', Chapter 3 of the European Financial Stability and Integration Report 2012, April.
European Commission (2014a), 'Economic Review of the financial regulation agenda', Staff Working Document, SWD(2014) 158 final.
European Commission (2014b), 'Impact Assessment on Proposal on banking structural reform', SWD(2014) 30
European Commission (2015), 'State aid to European banks: returning to viability', Competition State aid brief , February.
Evanoff, D. and E. Ors (2008), 'The competitive dynamics of geographic deregulation in banking: Implications for productive efficiency', *Journal of Money, Credit and Banking*, 40, 5, pp. 897-928.
Fecht, F., A. Hackethal, A. and Y. Karabulut (2013), 'Is proprietary trading detrimental to retail investors?', Deutsche Bundesbank discussion paper No 42.
German Monopolkommission (2014), 'Biennial Report XX: A competitive order for the financial markets', Chapter VI deals with competition in the financial markets, 9 July 2014.
Haldane, A. (2012), 'The dog and the Frisbee', speech, Bank of England.
Hansen, L.P. (2013), 'Challenges in Identifying and Measuring Systemic Risk', University of Chicago and the NBER.
Hay, D.A. and G.S. Liu (1997), 'The Efficiency of Firms: What Difference Does Competition Make?', *The Economic Journal*, 107, 442, pp 597-617.
Holló, D., M. Kremer, and M. Lo Duca (2012), 'CISS – A composite indicator of systemic stress in the financial system', ECB WP No. 1426, March.
IMF (2014), 'Global Financial Stability Report: How big is the implicit subsidy for banks seen as too-important-to-fail?', Chapter 3, April.
Jimenez, G., J. Lopez and J. Saurina (2013), 'How does competition impact Bank Risk-Taking?', *Journal of Financial Stability*, 9, 2, pp. 185-195.
Kay, J. (2014), 'The Kay Review of UK Equity Markets and Long-Term Decision-Making: Final Report'.
Keeley, M.C. (1990), 'Deposit insurance, risk and market power in banking', *American Economic Review*, 80, pp. 1183-200.
Marcus, A.J. (1984), 'Deregulation and bank financial policy', *Journal of Banking and Finance*, 8, pp. 557-565.
Martinez-Miera, D. and R. Repullo (2010), 'Does competition reduce the risk of bank failure?', *Review of Financial Studies*, 23, 10, pp. 3638-3664.
Motta, M. (2004), 'Competition Policy. Theory and Practice', Cambridge University Press.
Murphy, K. J. (2012), 'Executive compensation: Where we are, and how we got there', Marshall School of Business Working Paper No. FBE 07.12.
Olley, S.G. and A. Pakes (1996), 'The dynamics of productivity in the telecommunications equipment industry', *Econometrica*, 64, pp. 1263-1297.
Patterson, M. (2013), 'Who Is Responsible for LIBOR Rate-Fixing? A blog on the Harvard Law School Forum on Corporate Governance and Financial Regulation. Ratnovski, L. (2013), 'Competition policy for modern banks', IMF Working Paper No. 126.
Philippon, T. (2014), 'Has the U.S. Finance Industry Become Less Efficient? On the Theory and Measurement of Financial Intermediation', Stern School of Business, New York University Working Paper.
Ratnovski, L. (2013), 'Competition policy for modern banks', IMF Working Paper WP 13/126.
Reinhart, C. and K. Rogoff (2008), 'This time is different: A panoramic view of eight centuries of financial crises', NBER Working Paper No. 13882.
Schaeck, K. and M. Cihak (2007), 'Banking competition and capital ratios', IMF Working Paper 07/216.
Schaeck, K. and M. Cihak (2010), 'Competition, efficiency, and soundness in banking: An industrial organization perspective', CentER Discussion Paper; Vol. 2010-68S. Tilburg: Finance.
Schaeck, K. and M. Cihak (2013), 'Competition, efficiency, and stability in banking', Financial Management, 43, 1, pp. 215-241.
Schaeck, K., M. Cihak, and S. Wolfe (2006), 'Are more competitive banking systems more stable?', IMF Working Paper 06/143.
Stiroh, K. and P. Strahan (2003), 'Competitive dynamics of deregulation: Evidence from U.S. banking', *Journal of Money, Credit and Banking*, 35, 5, pp. 801-828.
The Netherlands Authority for Consumers and Markets (2014), 'Barriers to entry into the Dutch retail banking sector', Monitor Financial Sector, June.
Wagner, W. (2008), 'Diversification at Financial Institutions and Systemic Crises', Tilburg University, mimeo.
Wolf, M. (2014), *The Shifts and the Shocks: What we've learned –and have still to learn- from the financial crisis*, Penguin Books.
Zigraiova, D. and T. Havranek (2015), 'Bank competition and financial stability: Much ado about nothing?', William Davidson Institute Working Paper Number 1087.

Chapter 6. Special focus on cyber security risks in the financial sector[1]

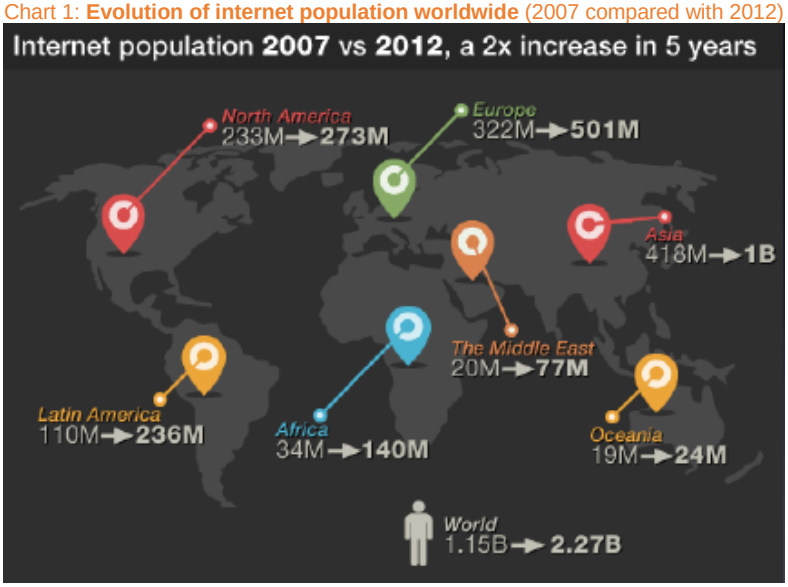
1. INTRODUCTION

This chapter discusses cyber security-associated risks and costs, and the challenges they pose to the financial sector, and gives an overview of existing regulatory requirements for financial services that are relevant to cyber security.

The financial services sector is one of the most targeted industries for malicious attacks. The modern financial system is digital and depends heavily on network infrastructure. Financial institutions carry out a number of critical functions such as managing payment and settlement systems. Moreover, they hold sensitive customer information and customer deposits. New sophisticated technologies for trading platforms, data warehouses and internet banking pose challenges for cyber security. The interconnectedness between market participants and financial institutions makes the financial sector vulnerable to disruptions from cyber-attacks. These may pose a serious threat to individual market participants, and can also affect the stability and integrity of the financial system as a whole. Therefore, cyber security risk has a systemic risk component.

It is well known that the revolution in digital technology has accelerated business possibilities and expansion due to the way information is collected, processed, stored and shared in globally interconnected digital platforms. According to a report by the University of Massachusetts 70% of households and 94% of firms that have more than nine employees are nowadays online and there has been immense growth in the use of social media and mobile devices (Nagurney 2014). In 2012, there were more than 2.25 billion internet users worldwide, a figure twice as high as in 2007 (Chart 1, Nagurney, 2014).

Chart 1: **Evolution of internet population worldwide** (2007 compared with 2012)



Source: Nagurney, 2014, University of Massachusetts

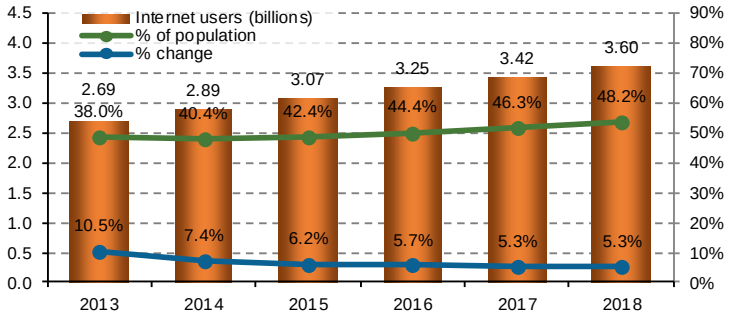
In 2015, the number of people with internet access is expected to exceed 3 billion, with an average 40% penetration rate among the world population (**Chart 2**, eMarketer, 2014). Looking forward, by 2018 almost 3.6 billion people, i.e. half of the world's population, will be connected to the internet or the mobile internet (Mahajan, 2014).

In addition to business and personal services, electronic management is increasingly used for countries' critical infrastructure and public services. However, these new opportunities come at a cost and with risks from malicious attacks. Whatever the motive behind them (whether crime, espionage or hacktivism), these attacks

[1] Authors: Boris Augustinov and Denada Prifti with the support of Peter Kerstens, Raluca Maran and Adrien Rorive.

cause losses in financial assets, intellectual property, confidence and reputation, and can even harm the security of nations.

Chart 2: **Forecast for internet population worldwide** (2013 – 2018)



Source: eMarketer, 2014

This chapter starts with a short description of the cyber environment (section 2), then presents some of the tools and techniques used in different cyber-attacks. Section 3 explains in more detail the cyber-risks for business in general, by giving some concrete examples of the most severe cyber-attacks in recent years, and shows the positive effects for the economy stemming from the new cyber-security industry. Section 4 focuses on financial services, by first giving some 'facts' on cyber-attacks and the associated damage to the financial industry, followed by some insights into the governance and management of cyber-risk in financial institutions, based on existing research and discussions with the industry (retail banks). Finally, section 5 describes important international initiatives, focusing on the existing regulatory requirements for financial services relevant to cyber security and EU attempts to set up a cyber security framework.

2. THE CYBER ENVIRONMENT

2.1. What is the cyber environment?

The cyber environment (alternatively called cyberspace) refers usually not only to everything related to information technology (IT), but especially to digitalisation and the virtual world. Clark et al (2014) characterise the cyber environment or cyberspace as 'a virtual container of all data, signals and transactions that different actors — either individual, firms or public institutions — share and exchange in the local and wide area networks'

Cyberspace itself lacks governance and control. Cyberspace is 'created, maintained, owned, and operated by public, private and government stakeholders that exist across the globe, and is subject to changes in technology, architectures, processes and expertise' (NAPSNet, 2013).[2] It exceeds geographical borders and can be accessed by other nations, public private firms and public institutional bodies, as well as opponents, in different ways and to different degrees. Due to these characteristics and the vulnerability of networks and computer systems, cyberspace faces a diversity of threats from different actors from inside the country or from abroad, and with different motives.

The Research Center of Cyber Intelligence and Information Security (CIS) at Sapienza University in Rome defines **cyber threat** or cyber-attack as an action by individuals, states or organisations aimed at 'damaging or interfering with the proper functioning of the systems or networks' that violates the integrity and confidentiality of data and the information contained (CIS Sapienza 2013, box V, p.9). **Cybercrime** is one type of cyber threat. It covers all activities with criminal purposes. This includes among other (but not only) fraud, identity theft and the stealing of information or intellectual property. However, what is considered as crime varies from one national jurisdiction to another. **Cyber espionage** is another type of cybercrime. This is the 'wrongful acquisition of sensitive property or classified data or information' (CIS Sapienza 2013, box V, p.9), while **cyber terrorism** is an 'ideologically motivated action aimed at influencing a country or an international organisation' (CIS Sapienza 2013, box V, p.9).

[2] See (NAPSNet 2013) http://nautilus.org/napsnet/napsnet-special-reports/threats-to-cyberspace-and-responses/.

Cyber threats pose major challenges because they involve advanced digital technology, have a cross-border nature and are not easy to counter, as the actors, means, motivation, objectives and attack techniques are always changing (CIS Sapienza, 2013).

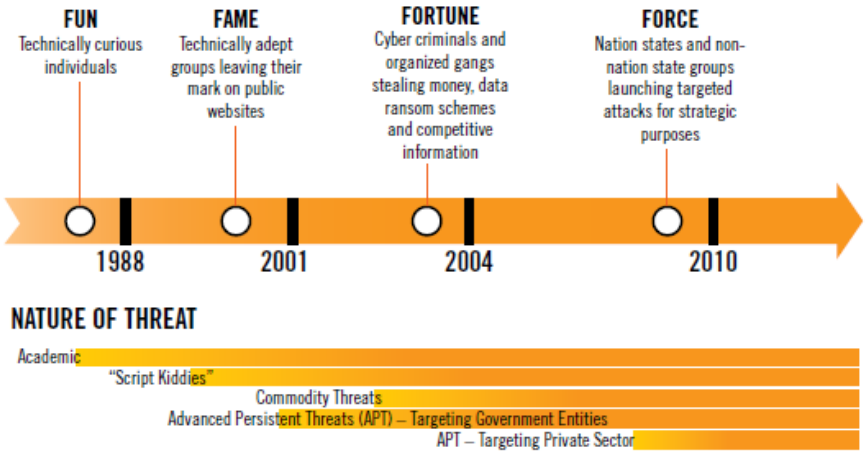
In order to respond to all of the different kinds of cyber threat mentioned above, the term *cyber security* is used to describe a 'collection of tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, training, best practices, assurance and technologies that can be used to protect the cyber environment and organisation and user's assets' (United Nation (2008), p.2).

2.2. Developments in the cyber environment

This section looks at the history of cyber-attacks over the last 30 years. A good description of the development of cyber-attacks can be found in the 'Cyber risk — a global systemic threat' report issued by The Depository Trust & Clearing Corporation (DTCC) in October 2014. According to this report, cyber-attacks and defensive measures against them have evolved in four phases (**Chart 3**, DTCC, 2014), each representing major changes in the objectives of cyber-attackers.

Phase 1 (the so-called 'fun' phase) started with an attack on networked computers by a worm called 'Morris', which was released in November 1988. The worm featured self-replicating code that exploited vulnerabilities in the 'Sendmail' email server software. The attack was largely motivated by the intellectual curiosity of its author, who wanted to see whether such an attack was possible (DTCC, 2014). The worm caused delays and overcrowding across large portions of the network. At that time it was not a common practice for networks to be protected by firewalls. Nowadays using firewalls is seen as an industry standard among cyber defenders worldwide.

Chart 3: **Development of cyber-attacks**



Source: DTCC, 2014.

Phase 2 (the so-called 'fame' phase) of cyber threats was associated with the increased use of email in the late 1990s. With this came an escalation in widespread attacks using computer viruses and worms, culminating in a large-scale attack in 2001 by two self-propagating worms. The first, known as 'Code Red', appeared in July 2001. The second, known as 'NIMDA,' was released a week after the 11 September attacks (DTCC, 2014). Both spread rapidly by exploiting vulnerabilities in commonly used web server software and operating systems. Although the authors carried out the attacks to basically gain notoriety and fame, the damage due to disruptions in commercial networks was significant.

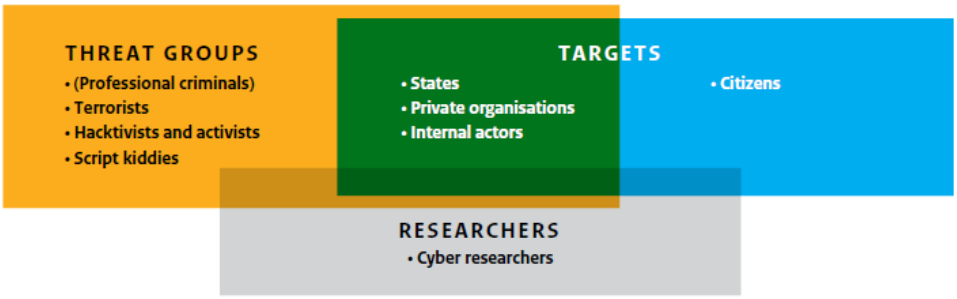
Phase 3 (the so-called 'fortune' phase) started around 2004, in a time when so-called '*phishing*' began to appear in larger-scale campaigns. The idea behind this technique is to use tricks to find out passwords or credit card numbers that allow attackers to make money from them. Usually these activities fall under fraud. In response to 'phishing', defenders have increasingly used sophisticated IT tools for stronger authentication and risk-based decision systems for transactions, as well as sharing information about these threats with their peers. This collective effort has helped to establish cyber security as a key area within the financial services industry which continues to strengthen the industry's resilience to cyber-attacks today.

Phase 4 (the so-called 'force' phase) began in 2007 and 2008 with the distributed denial of service (DDoS) attacks launched against Georgia and Estonia. This phase escalated in 2010 with 'Stuxnet', a destructive cyber-attack against uranium refining efforts in Iran. According to public sources, Stuxnet damaged almost one-fifth of Iran's nuclear centrifuges.[3] Also during this phase, financial institutions started to become the target of cyber espionage actions, widely known as advanced persistent threats (APTs) (DTCC, 2014). In this case an unauthorised third party accesses the network and stays undetected within the network for a relatively long period of time. The focus is on stealing data. The APT attacks target not only critical sectors in the private sector, such as manufacturing and the financial industry, but also the public sector, e.g. national defence.

2.3. Actors in the cyber environment

It is often difficult to say with certainty what type of actor is behind a specific cyber-attack. A good description of the different types of actors in the cyber environment can be found in the 'Cyber Security Assessment Netherlands' report for 2012 to 2014. Larger and more complicated cyber-attacks involve numerous parties that use a wider set of tools. They target businesses and government organisations around the world and also consumers' personal information, as shown in **Chart 4.**

Chart 4: **Threat groups and targets in the cyber environment**



Source: Cyber Security Assessment Netherlands, 2012.

The borders between the different categories are often fuzzy or overlapping (**Chart 4**). A **state** may be both a target and an attacker, motivated by geopolitics, its economic position or political reasons, such as intimidating dissident or opposition groups that oppose the government.

Professional criminals are mainly motivated by financial gain and the internet is an attractive environment for achieving this (e.g. through internet banking fraud). **Citizens** are vulnerable because of their dependence on computers and internet services, combined with their low security awareness and limited knowledge of security issues. Another significant threat for citizens comes from attacks that result in a breach of their privacy (Cyber Security Assessment Netherland, 2012-2014).

Hacktivists are individuals or groups that are capable of conducting cyber breaches for ideological reasons. They primarily focus on the publication of data stolen through hacking and DDoS attacks. **'Script kiddies'** are hackers who have reasonable, but not in-depth knowledge of information security and use techniques and tools developed by others. They are often motivated by desire for a challenge and have little awareness of the consequences of their actions (Cyber Security Assessment Netherland, 2012-2014).

A **private organisation** may be an attacker, but it may also become the victim of other attackers and thus become a target in its own right. As targets, private organisations face various types of threats, from professional criminals or hacktivists, and espionage by states and other private organisations. As attackers, private organisations may use the internet to gain information about their competitors. In practice, the line between legitimate analysis (profiling) of competitors and corporate espionage is not always clear. The information may vary from low-sensitive information, such as price lists for products, to highly sensitive information such as secret recipes (Cyber Security Assessment Netherland, 2012-2014).

Internal actors are members of the company (e.g. employees) who could pose significant threats and cause significant damage, if their intentions are malicious. A **cyber researcher** is a special actor focused on improving

[3] http://en.wikipedia.org/wiki/Stuxnet.

digital resilience. Cyber researchers are motivated by a desire to improve IT security in companies and government institutions, or even in society as a whole. However, sometimes the actions of cyber researchers have indirect consequences that make them part of a threat group. Cyber researchers' test tools and research findings could be re-used by groups with less honourable intentions. Cyber researchers themselves may also become targets when attackers want to obtain research data and information about vulnerabilities from them (Cyber Security Assessment Netherland, 2012-2014).

Different actors may collaborate and learn from each other's knowledge and methods. For example, many people learned from Stuxnet, a highly complex cyber-attack, by studying it in detail (Cyber Security Assessment Netherland, 2013). This is one way in which knowhow on cyber-attacks is propagated.

2.4. Techniques in the cyber environment

It is obvious that the rapid developments in IT and the digitalisation of services expand the possibilities of cyber criminals, as they have a wider range of tools at their disposal to execute cyber-attacks. To illustrate the diversity of the attacks and the challenges they pose, this section will describe very briefly some of the techniques used in cyber-attacks. These include DDoSs, Trojan malware, spambots, phishing and vishing (the telephone equivalent of phishing). We cannot provide an exhaustive description, as there may be other techniques for carrying out cyber-attacks that are not widely known to the public.

Distributed denial of service (DDoS) is a program that compromises several computers and uses them for targeted cyber-attacks. It uses what are called '**botnets'** in order to overwhelm a targeted website or application with internet traffic, blocking access to it by other users. Botnets are basically a group of 'compromised' computers that are remotely controlled by the attacker. A compromised computer — an individual bot — is connected to the internet, usually with an 'always-on' broadband connection, running software clandestinely introduced by the attacker Clark et al., 2014, box 3.1). Other computers can be compromised automatically, rapidly expanding the size of the botnet. Cyber criminals can control networks of compromised computers through botnets, in this way protecting their anonymity. Access to sensitive information can be done through the use of botnets. They can also disrupt some critical national infrastructures.

On the other hand, in contrast to a botnet that stays undetected in a network and steals information, a **spambot** is another technique that uses automated computer programs to help send spam e-mails. It might for example create fake accounts and send spam using them in order to crack personal passwords or credentials. This threat is not be underestimated. Companies have observed that this kind of spam is getting increasingly difficult to detect as not only are the emails well-written but the sender address is often 'spoofed' to make it appear as though it has come from a familiar contact, thus making it appear even more legitimate (BBA, 2014).

Trojan malware is another serious threat. This is a technique where the credentials of individuals or firms are filtered from compromised IT systems and usually used for fraud. According to the British Bankers' Association / BBA (2014), some of the biggest concerns in 2013/2014 were different variants of a Trojan called Zeus. The code source of Zeus, first detected in 2011, has been available in different variants for sale in criminal internet forums many times since then.

Malware can apparently be deployed more efficiently through the use of 'exploit kits'. Exploit kits are tools to automate the process of identifying weaknesses in victims' web browsers and plugins (particularly java and adobe plugins), so that malware can be installed (BBA, 2014). Less sophisticated channels (e.g. email, online advertising and social media) can be also used to deliver malware via compromised attachments or hyperlinks to compromised websites.

When introduced into a computer system or network, malware can work in a number of different ways. It can be programmed to activate itself either immediately or at a later stage when a specific condition is met. This means that most of the time the malware lies dormant in the system without doing any harm. However, as soon as a specific condition is met, the program activates itself and starts destroying or corrupting data and/or disabling system defences (Clark et al., 2014). The program may then also delete itself, leaving behind little or no trace at all. However, some malware remains even after a computer is scanned using cleaning software or reinstalled the operating system (Clark et al., 2014).

Other malware attacks like 'vishing' and 'phishing'[4] are increasingly associated with social media. 'V**ishing**' or 'voice phishing' is the criminal practice of using the telephone to gain access to the public's private personal and financial information for financial gain. '**Phishing**' is where criminals attempt to acquire more sensitive information such as credit card numbers and passwords by posing as trustworthy entities in an electronic communication, including social media. When they have stolen data, fraudsters can produce better phishing emails that imitate communications from social media or public authorities.

3. CYBER RISK IN COMPANIES

Cyber-attacks can cause significant losses of business intelligence and intellectual property, drive up the cost of security, disrupt workflow and damage a company's reputation. Information on data security breaches is not comprehensive because organisations have economic incentives not to reveal such information.

Research conducted by the World Economic Forum (2014) suggests that companies are struggling to carry out cyber risk management; highly visible breaches are occurring with growing regularity. We will discuss below the risks associated with cyber-attacks in companies and the problems companies face in trying to deal with such attacks. Short descriptions of three major cyber-attacks in the private (non-financial) sector and the damage they caused are provided in text boxes. The final part of this section will discuss the positive side effects for the economy and the new jobs being created thanks to the rapid growth of cyber security companies.

One of the problems faced by companies when dealing with cyber-attacks is that a company's response may be **fragmented**. The authors of cyber-attacks have a global reach, and so threat mitigation strategies need to work from a global perspective. In reality, a company's cyber responsibilities are often allocated to different departments and not centrally managed, making it hard for them not only to understand and prioritise threats, but also to respond to them (BBA, 2014)

The second problem stems from the **interconnectedness of business channels and the supply chain** (for example, a large company has several suppliers or has outsourced some of its operations to third parties). Successful attacks on smaller companies or third parties in the supply chain can significantly affect a larger market player and spread damage throughout the entire business sector (BBA, 2014). Vendors and suppliers are of course vital parts of any successful business, but making their IT systems secure brings its own costs and risks. In 2013, the US retailer Target was hit by one of the biggest data breaches in the industry's history. The data breach cost the company an estimated $ 148 million (PGI, 2014). This example and two other cyber-attacks on non-financial companies are described in more detail in **Box A**.

Box A. **Major cyber-attacks in non-financial companies**

Target

Nature:	Infiltration
Procedure:	In the days prior to Thanksgiving 2013, malware was installed in Target's security and payments system. The hackers accessed Target's payment network through its heating and ventilation systems vendor. The malware was designed to steal every credit card used at the company's 1 797 US stores. At the critical moment, when Christmas gifts had been scanned and bagged and the cashier asked for a swipe, the malware would step in, capture the shopper's credit card number, and store it on a Target server commandeered by the hackers.[5]
Damage:	Target said that up to **40 million** customers' credit and debit card information had been stolen from people who shopped in stores between 27 November and 15 December. Subsequently, the company reported that a new group of **70 million** customers — some of whom might also have had their card data stolen — had had their personal information compromised as well.[6]

[4] See http://en.wikipedia.org/wiki/Voice_phishing.

[5] Michael Riley, Ben Elgin, Dune Lawrence and Carol Matlack, 'Missed alarms and 40 million stolen credit card numbers: how Target blew it', *Bloomberg*, published 13 March 2014. http://www.bloomberg.com/bw/articles/2014-03-13/target-missed-alarms-in-epic-hack-of-credit-card-data.

[6] Jia Lynn Yang and Amrita Jayakumar, 'Target says up to 70 million more customers were hit by December data breach', *The Washington Post*, published 10 January 2014. http://www.washingtonpost.com/business/economy/target-says-70-

Motive:	Building up dossiers on individuals, either to impersonate victims or lure them into giving up more sensitive information.[7]
	Nortel Networks Ltd
Nature:	Infiltration
Procedure:	Using seven passwords stolen from top Nortel executives, the hackers infiltrated Nortel's computers at least as far back as 2000 and downloaded technical papers, research and development reports, business plans, employee emails and other documents.[8]
Damage:	Given the enormous amount of information stolen using spyware and viruses for information gathering, the damage was incalculable.[9]
Motives:	Industrial espionage. This is a means of gaining access to the targeted company's business plans. Unfair business practices such as this can subsequently bring the targeted company down.[10]
	February 2014 data breach
Nature:	Spamming and phishing
Procedure:	Massive theft of credentials, including user names, email addresses and passwords. The email addresses were from major providers (i.e. AOL, Google, Microsoft and Yahoo) and almost all Fortune 500 companies and non-profit organisations.[11]
Damage:	It is estimated that around **360 million** records were stolen in separate attacks, including one that yielded around **105 million** records, making the 'February 2014' attack the biggest single credential attack known to date.[12] In addition to the 360 million credentials, the criminals have been selling **1.25 billion**[13] email addresses.[14]
Motives:	The stolen user names and passwords could give access to online bank accounts and to the corporate networks. The sale of email addresses by hackers would also be of interest to spammers.[15]

The **reputation risk** related to a cyber-attack might be very significant and so many of the threats are not made public. The costs of public disclosure may have an impact on the financial markets (e.g. on a company's stock prices and credit rating, including a possible rise in the cost of capital for companies who report being attacked). According to the Centre for Strategic and International Studies (CSIS) companies reporting major attacks suffer drops in stock value of between 1 % and 5 %. Some of these companies may even lose everything due to the attacks (CSIS, 2014). Even companies that are privately owned and not traded on public securities markets may be adversely affected by the consequences of a successful cyber-attack when banks and other lenders judge them to be more risky than previously estimated. Moreover, the negative publicity from a company's security breaches may cause customers to lose **confidence**, in some instances giving a competitive advantage to its rivals. In

million-customers-were-hit-by-dec-data-breach-more-than-first-reported/2014/01/10/0ada1026-79fe-11e3-8963-b4b654bcc9b2_story.html.

[7] Jia Lynn Yang and Amrita Jayakumar, 'Target says up to 70 million more customers were hit by December data breach', The Washington Post, published 10 January 2014. Available at: http://www.washingtonpost.com/business/economy/target-says-70-million-customers-were-hit-by-dec-data-breach-more-than-first-reported/2014/01/10/0ada1026-79fe-11e3-8963-b4b654bcc9b2_story.html.

[8] Siobhan Gorman, 'Chinese hackers suspected in long-term Nortel breach', *The Wall Street Journal*, published 14 February 2012. http://www.wsj.com/articles/SB10001424052970203363504577187502201577054.

[9] Pierluigi Paganini, 'Nortel, from industrial espionage to bankruptcy', Security Affairs, published 14 February 2012. http://securityaffairs.co/wordpress/2583/intelligence/nortel-from-industrial-espionage-to-bankruptcy.html.

[10] Jameson Berkow, 'Nortel hacked to pieces', *Financial Post*, published 25 February 2012. Available at: http://business.financialpost.com/2012/02/25/nortel-hacked-to-pieces/?__lsa=55fd-254f.

[11] Jim Finkle, '360 million newly stolen credentials on the black market: cyber security firm', Reuters, published 25 February 2014. http://www.reuters.com/article/2014/02/25/us-cybercrime-databreach-idUSBREA1O20S20140225.

[12] NBC News with Reuters, 'Big data breach: 360 million newly stolen credentials for sale', *CNBC*, published 26 February 2014. http://www.cnbc.com/id/101448340#.

[13] Taking into account an internet population of 2.89 billion users as of 2014 (see **Chart 2**), it follows that more than 43 % of active email addresses have been sold on the black market.

[14] Jim Finkle, '360 million newly stolen credentials on the black market: cyber security firm', *Reuters*, published 25 February 2014. http://www.reuters.com/article/2014/02/25/us-cybercrime-databreach-idUSBREA1O20S20140225.

[15] Jim Finkle, '360 million newly stolen credentials on the black market: cyber security firm', Reuters, published 25 February 2014. http://www.reuters.com/article/2014/02/25/us-cybercrime-databreach-idUSBREA1O20S20140225.

addition, if an organisation reports a security breach, its investors, customers, or other stakeholders may take it to court to seek compensation. Last but not least, a public announcement of a cyber-attack may signal to hackers that an organisation's cyber defences are weak and could encourage further attacks (Watkins, 2014).

Damage to businesses can even be a threat to the **whole economy**. This is particularly true when critical infrastructures and major market players suffer severe attacks, as was the case with the February 2014 attack against the leading email providers (see **Box A**).

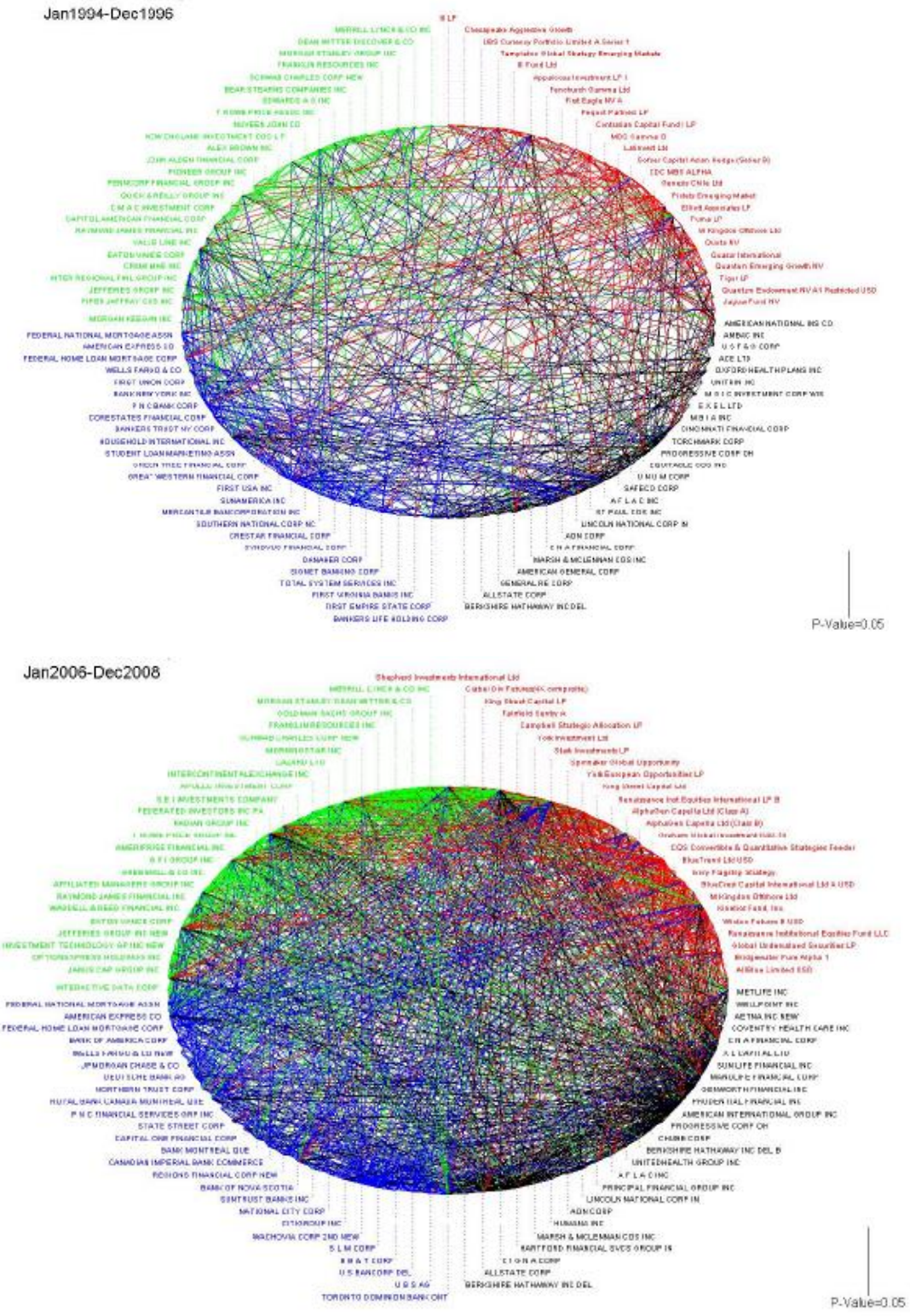
One way to protect against damages from cyber-attacks and the associated regulatory fees is using cyber-insurance. Cyber-insurance gives first-party coverage of theft and fraud, business interruption and computer data loss and restoration, as well as third party coverage of litigation and regulatory issues. The demand for cyber-insurance is rapidly increasing, as the number of cyber-attacks and related damages mount. The US market grew fast, reaching $1 billion of gross written premium in 2013 and it was expected to double in 2014 (InfoSec, 2014).[16] In Europe the cyber-insurance market is relatively small, with $150 million gross written premium in 2013, but was expected to grow by 50% to 100% in the following year (InfoSec, 2014). One positive effect of cyber insurance is that it imposes high requirements to the company's security, (detailed vulnerability assessment and security plans, training of employees etc.) forcing the company to periodically review its practices and systems in detail.

Due to the increase in cyber-attacks and the security needs of companies, not only has the demand for cyber-insures increased, but the business of cyber security firms is also flourishing. The **market capitalisation** of certain security firms hit new highs in the last two years. For example, the network security provider FireEye, after a $304 million initial public offering (IPO) in 2013, now has a market capitalisation approximately 21 times higher, at $6.36 billion in April 2015 (Bloomberg[17]). Similarly, company firewall specialist Palo Alto Networks has increased its market capitalisation (mostly through new shares) 45 times compared to the IPO in 2012, when it raised $260 million (Bloomberg[18]).

Venture capital investment in companies that provide cyber security software, solutions and services has strongly increased, especially in the US. In the first half year of 2014, venture capitalists invested $894 million in US cyber security start-ups, which is as much as the amount invested in the whole of 2013 in the US ($900 million).[19] Venture capital investment in cyber security firms is also accelerating in Europe. For example, C5 Capital, based in London, launched in 2014 the first European cyber security-focused fund of $125 million[20] and Index Ventures created a €400 million fund to invest in technology start-ups in Europe, Israel and the US.[21] According to press, security **start-ups** hit $2.3bn in funding in 2014, an increase of more than 30% compared to the previous year. For comparison, in 2010 the total annual funding for start-ups in cyber security was less than $1bn.[22]

[16] Statistical data is collected by Marsh & McLennan Companies, see also http://resources.infosecinstitute.com/cyber-insurance/.
[17] Picker, L. (2013) 'FireEye raises more than planned in $304 million IPO', Bloomberg Business, http://www.bloomberg.com/news/articles/2013-09-20/fireeye-raises-more-than-planned-in-304-million-ipo.
[18] Robertson, J. (2012) 'Palo Alto raises $260.4 million, pricing IPO above range', Bloomberg Business: http://www.bloomberg.com/news/articles/2012-07-19/palo-alto-raises-260-4-million-pricing-ipo-above-range.
[19] Basich, Z. (2014): 'The Daily Startup: venture funding soars for cyber security startups', WSJ: http://blogs.wsj.com/venturecapital/2014/08/06/the-daily-startup-venture-funding-soars-for-cybersecurity-startups/.
[20] Kuchler, H. 'Europe's first cyber security-focused fund to launch'. Financial Times: http://www.ft.com/intl/cms/s/0/1acb22e0-f63b-11e3-a038-00144feabdc0.html%3Fsiteedition%3Dintl%23axzz3BEnvSPzQ?siteedition=intl.
[21] Butcher, M. (2014): 'Index Ventures raises new $550m early-stage fund for Europe, the US and Israel', http://techcrunch.com/2014/06/10/index-ventures-raises-new-550 m-early-stage-fund-for-europe-us-israel-aims-for-the-big-league/.
[22] Kuchler, H. (2015): 'Cyber security funding tops $1bn after high-profile attacks', Financial Times, http://www.ft.com/intl/cms/s/0/5cfcbcbc-e692-11e4-afb7-00144feab7de.html#axzz3XqJfQYCw.

Chart 5: **Connectivity and vulnerability** (US entities)
January 1994 — December 1996 compared with January 2006 — December 2008



Note: The green lines correspond to brokers, the red lines to hedge funds, the black lines to insurers and the blue lines to banks.
Source: Nagurney 2014, University of Massachusetts.

Mergers and acquisitions have also increased quickly in the cyber security industry. 2014 was rich in mergers and acquisitions of cyber security firms. For example, FireEye purchased Mandiant for approximately $ 1.0 billion and Cisco Systems acquired Sourcefire for about $ 2.7 billion.[23]

In recent years, cyber security has become a top priority in the financial industry and cyber risk is attracting more attention from the financial professionals. In the next section, cyber risk in financial services is discussed.

4. CYBER RISK IN FINANCIAL SERVICES

Financial institutions carry out critical functions, such as payment and settlement, manage deposits from their customers and hold sensitive customer information. This makes financial institutions, especially the large ones, an attractive target for cyber-attacks. In addition, financial services are entirely digital. Most transactions amount to nothing more than exchanging code and debiting and crediting accounts, with the only record of the transaction being an electronic record. If that record's integrity is affected, so is the entire transaction.

Given the high degree of interconnectedness between actors and markets, cyber-attacks affect financial institutions and markets well beyond national borders. **Chart 5** below shows how interconnectedness between financial institutions has drastically increased in the past decade, making them highly vulnerable to disruption and contagion.

When individual attacks spread throughout the system, they become a serious threat to financial market stability and to the economy as a whole.

Although financial companies (mostly banks) were among the first to be targeted by early cybercriminals, today cyber threats are by no means confined to the financial institutions, as they now also threaten critical market infrastructures, such as exchanges (see the examples in section 4.1 below). Cyber-attacks in financial market infrastructure could harm significantly the economy through the loss of credit and liquidity in the marketplace and the loss of confidence in the operational effectiveness of that marketplace. Given the high degree of interconnectedness between a number of systems and markets, the latter scenario would have a domino effect, damaging other critical infrastructure.

There is no doubt that technological progress in financial services has played a crucial role in making the system work efficiently, enabling greater automation of processes, higher processing power, improved risk management and a wider product range available on online platforms. This benefits business and retail customers.

The other side of the coin is that efficient systems are less stable, i.e. systems that have no redundant IT infrastructure in data and process would suffer higher losses and costs resulting from cyber-attacks than otherwise. This is especially a critical point for market infrastructure. That is why DTTC (2014) urge the development of highly redundant IT infrastructure with near real-time data replication. Financial institutions and infrastructures have to manage the trade-off between the efficiency of their systems, on the one hand, and stability, on the other. This depends on the management's risk appetite and the risk strategy of the firm.

The rise in the frequency and scope of cyber-attacks can be attributed to several factors. For example, unfriendly nation states seek to gather intelligence or intellectual property data, and organised crime groups and cyber criminals breach systems motivated by monetary gains. As the cost of the technology used decreases, the barriers to entry to cybercrime are lowered. This makes it easier and cheaper for criminals to commit cyber fraud. In addition, a growing black market dealing in breached data is further encouraging wrongdoers (Cuomo and Lawsky, 2014).

4.1. Facts and figures in financial services

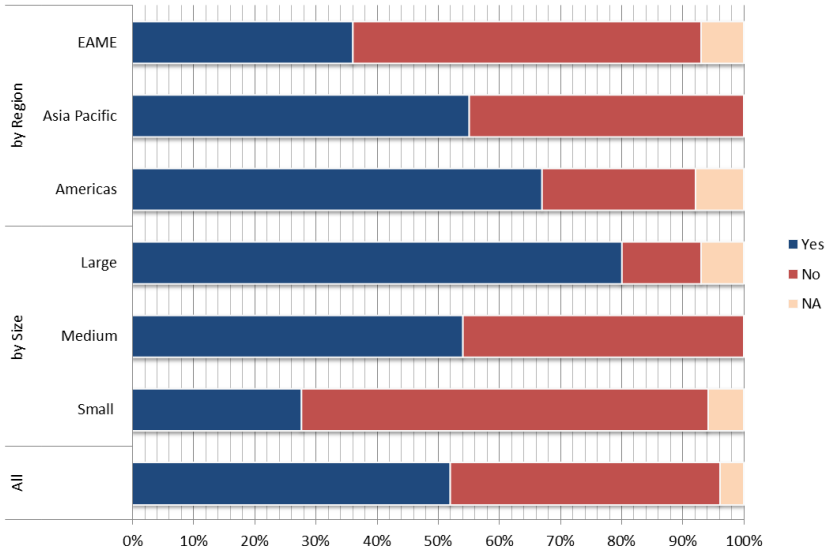
'Every minute, of every hour, of every day, a major financial institution is under attack' (Wilson H., 2013).[24] However, many of the cyber-attacks are not made known to the public. If published, they might have detrimental effects, because the financial industry is founded on trust and confidence.

[23] Kuchler, H. (2014): 'Investors flock to cyber security start-ups', Financial Times, http://www.ft.com/intl/cms/s/0/1acb22e0-f63b-11e3-a038-00144feabdc0.html%3Fsiteedition%3Dintl%23axzz3BEnvSPzQ?siteedition=intl.

As there are no definitive statistics publicly available, this section provides figures gathered from different sources on cyber-attacks on the financial industry:

- In February 2015, the Carbanak hacker group (also known as Anunak) was discovered to have attacked about 100 banks, other financial institutions and online payment systems in around 30 countries, managing to steal up to $1 billion. The code was so sophisticated that it was able to increase the amount of money in a bank customer's account and then steal the 'made-up funds'. In this way, the victim would not detect the missing funds and report it to the bank (Fox-Brewster, 2015).
- Kaspersky Lab (2014) and B2B International reported from a worldwide survey that 93% of financial services companies experienced various cyber-attacks in one year, from April 2013 to May 2014.

Chart 6: **Cyber-attacks in global securities exchanges**
Question: Has your organisation suffered a cyber-attack in the last year?



Source: IOSCO 2013.

- The International Organisation of Securities Commissions (IOSCO) and the World Federation of Exchanges Office (WFE) surveyed 46 global securities exchanges in 2013 and found that about 53% of the respondents had experienced a cyber-attack (**Chart 6**, IOSCO, 2013).
- The cyber-attack named 'Operation High Roller'[25] that was discovered in 2012, tapped around $2.5 billion from bank accounts in the US, Europe and Latin America (Kelley, 2012). According to the press, the malware was able to automatically find a customer's highest value account and then transfer money to a prepaid debit card, from where it could be removed quickly and anonymously. The code could even change the bank statements of targeted customers in order to hide the theft.
- In April 2013, hackers managed to disrupt the Dow Jones Industrial Average index and force it to drop by more than 100 points within three minutes. This caused a temporarily loss of around $130 billion of market value in the US stock markets. The attackers did this by taking control over the Associated Press's twitter account and issuing a false news alert that there had been an attack on the White House (DTCC, 2014).

Box B below gives an example of the infiltration of a major financial institution and provides details on the 2010 NASDAQ infiltration case.

[24] Harry Wilson (2013): 'Every minute of every day, a bank is under cyber-attack', Daily Telegraph, http://www.telegraph.co.uk/finance/newsbysector/banksandfinance/10359563/Every-minute-of-every-day-a-bank-is-under-cyber-attack.html.

[25] 'Operation High Roller' combines 'an insider level of understanding of banking transaction systems with both commercial and custom malicious code' without human participation, see: http://www.businessinsider.com/operation-high-roller-2012-6#ixzz3XgKYj9oD.

Box B. **Example of a cyber-attack in a big bank**

Case: JP MORGAN CHASE

Quick facts

Nature: Infiltration

Duration: Two months unnoticed, two more months to fix it. Total: at least four months.

Procedure: Infiltration of a peripheral website dedicated to sponsored events (JP Morgan Corporate Challenge), before moving on to the main servers of the company. Hackers moved data from the main server to their own server.

Damage: 76 million households and 7 million businesses accounts were compromised, leading to the theft of their non-financial personal information (phone numbers, emails, home addresses).

Detection: Two months after the breach, a security vendor (Hold Security Inc.) detected the data extraction. JP Morgan first asked the peripheral website Corporate Challenge to go offline to stop the infiltration and isolated a suspect address. A search in JP Morgan's main servers found the address there as well, proving that the infiltration had also reached the bank's main system.[26]

Origin: Uncertain. This assumption is based on analysis of the trove of stolen data in which JP Morgan customer info was stored.[27]

Motives: Uncertain. Personal data can be sold on the black market (financial gain).

Response: JP Morgan stated it would double its yearly cyber security spending by 2015 (from $ 250 million to $ 500 million).[28] Some sources also report that JP Morgan was planning to hire 1 000 specialised technicians and offer training.

Description

The hackers gained entrance to JP Morgan's main system through an outside vendor, Corporate Challenge, which organised charitable events only accessible to the bank's staff. The website appears to have been poorly secured, which allowed the hackers to steal its security certificate. This enabled the hackers to pose as the legitimate administrator of Corporate Challenge and monitor and retrieve customer credentials. The certificate was stolen in March 2014, which meant that the undetected infiltration period lasted up to four months.[29]

Equipped with such important data, the hackers were able to discreetly infiltrate JP Morgan's main system and start transferring its customers' data onto their own server. The hackers' server contained stolen data from approximately 23 000 other breached websites.

The link between Corporate Challenge and JP Morgan's own network was confirmed when the IP addresses the hackers' used on the Corporate Challenge website were also found in JP Morgan's network logs.

Hackers are able to make money out of the stolen data by selling it on the black market. Such personal information is valuable for 'phishing' activities.

The following **Box C** gives an example of an infiltration of a securities exchange that may have been carried out for espionage purposes.

[26] Danny Yadron and Emily Glazer, 'J.P. Morgan found hackers through breach of road-race website', *The Wall Street Journal*, published 31 October 2014. http://online.wsj.com/articles/j-p-morgan-found-hackers-after-finding-breach-of-race-website-1414766443.

[27] Matthew Goldstein and Nicole Perlroth, 'Luck played role in discovery of data breach at JP Morgan affecting millions', *The New York Times*, published 31 October 2014. http://dealbook.nytimes.com/2014/10/31/discovery-of-jpmorgan-cyberattack-aided-by-company-that-runs-race-website-for-bank/?_r=0.

[28] Hugh Son and Madeline McMahon, 'Dimon see cyber security spending doubling after hack', *Bloomberg*, 10 October 2014. http://www.bloomberg.com/news/2014-10-10/dimon-sees-jpmorgan-doubling-250-million-cybersecurity-budget.html.

[29] http://dealbook.nytimes.com/2014/10/31/discovery-of-jpmorgan-cyberattack-aided-by-company-that-runs-race-website-for-bank/?_r=0.

Box C. Example of a cyber-attack in a market infrastructure

Case: 2010 NASDAQ INFILTRATION CASE

Quick facts

Nature: Highly sophisticated infiltration

Duration: More than a year[30]

Procedure: Custom-made malware (enabled hackers to steal data, spy on the system and disrupt it).[31]

Damage: Monitoring of NASDAQ's Directors Desk. Potential damage: strong disruptive power.

Detection: NASDAQ detected suspicious files during a routine security scan. The company called in the FBI and forensic firms to confirm the breach.[32]

Origin: Russian

Motives: Uncertain. Potentially geopolitical (e.g. cloning western networks).

Response: The US House Financial Services Committee launched a review of the safety of the country's financial infrastructure in February 2011.

Description

The case is still under investigation (the NSA, FBI, and CIA have all been involved at different stages). The infiltration took place on NASDAQ's Directors Desk, a special network where board members of over 230 companies exchange confidential information. Though there was no evidence of exfiltration of documents, hackers were able to monitor all activity in the system.

The malware was extremely sophisticated. In addition to invisible monitoring, it gave hackers the ability to extract documents and even 'blow up' the whole network using highly disruptive coding. Further proof of the malware's sophistication came from the hackers' use of two zero-day vulnerabilities. These are flaws unknown to developers and are exploited by hackers until the developer becomes aware of it. At that stage, developers rush to correct the gap, in principle having 'zero days' to fix them. The system remains exposed until there is a patch (Symantec[33]). This indicates that the hackers had extremely thorough knowledge of the system.[34]

Given the amount of confidential information they had access to, the hackers could have done some very profitable trading on the market. However, no trace of such trades was found, raising questions on the motives for such a complex infiltration. Some have argued that the hackers' goal was to analyse and clone exchange practices in western countries in order to develop a Russian financial hub.[35] This theory is supported by the fact that at the same time the Russian Government was attempting to build an efficient network to promote as an alternative to the European and American network.

4.2. Governance and management of cyber-risks in financial institutions

In many countries, risk appetite, strategy and ultimate limits are seen as the responsibility of the board for both financial and non-financial corporation. But in reality, board discussions in general do no deal sufficiently with technology risk. This was the finding of a survey of directors and senior executives from the world's biggest firms across various sectors, conducted in 2012 by Carnegie Mellon.[36] 57% of respondents said that boards are not undertaking important steps to manage reputational and financial risks resulting from cyber-attacks.

[30] Peter Svensson, 'Hackers infiltrate Nasdaq service that handles firms' confidential communications', The Washington Post, 6 February 2011. http://www.washingtonpost.com/wp-dyn/content/article/2011/02/05/AR2011020503723.html.

[31] Jose Pagliery, 'Russian hackers placed 'digital bomb' in Nasdaq — Report', CNN Money, 17 July 2014. http://money.cnn.com/2014/07/17/technology/security/nasdaq-hack/.

[32] Melanie Rodier, 'Nasdaq hack attack raises new security concerns for financial industry', Wall Street and Technology, 7 February 2011. http://www.wallstreetandtech.com/risk-management/nasdaq-hack-attack-raises-new-security-concerns-for-financial-industry/d/d-id/1264493?.

[33] Symantec, 'What is a Zero-Day Vulnerability?', http://www.pctools.com/security-news/zero-day-vulnerability/

[34] Michael Riley, 'How Russian hackers stole the Nasdaq', Bloomberg BusinessWeek, 17 July 2014. http://www.businessweek.com/articles/2014-07-17/how-russian-hackers-stole-the-nasdaq#p1.

[35] Michael Riley, 'How Russian hackers stole the Nasdaq', *op. cit.*

[36] CyLab surveyed 108 board members or senior executives from the list of Forbes Global 2000 companies (50% board members, 50% executives). 75% of the respondents were from critical infrastructure companies (13% in energy and utility, 33% in financial sector, 2% in healthcare, 15% were industrials and 12% IT and telecommunication companies). In terms of geographical distribution: 40% of the surveyed companies were from the US, 30% from Europe, 19% from Asia and the remaining companies from the rest of the world.

Although the risk management has a prominent focus, the linkages between the IT risks and the enterprise risks are in general not well understood. With respect to financial services companies, which accounted for 1/3 of the sample, the survey *'confirmed the belief among security experts that, overall, the financial sector has better privacy and security practices than other industry sectors*' (CyLab, 2012, p. 6). The reason might be that the financial services sector depends highly on confidence and reputation, so that security has priority. Moreover, the financial services industry is more regulated and supervised than others, so that stricter internal controls and procedures make it possible to better detect and handle malicious attacks.

For financial services, cyber-crime is ranked second among the top 5 economic crime types experienced by the financial sector, after asset misappropriation (internal fraud due to misuse or theft of assets belonging to a company) (see also Global Economic Crime Survey, PWC 2014[37]). One interesting aspect is that internal fraud in this sector is mainly caused by newcomers / junior staff. One reason for this might be that the complexity of (trading) products that require financial engineering makes them more difficult to control for both controllers and external auditors.

Financial service firms, especially banks, have multiple business lines spread among different territories, with a number of functions outsourced to some external suppliers,[38] therefore management responsibility for IT risk is often fragmented. Moreover, many financial services firms do not have a dedicated Chief Information Officer. Responsibilities for cyber security usually involve the Chief Operating Officer and Chief Risk Officer, in some cases also the Chief Financial Officer. The fragmentation in responsibilities and handling of incidents within the firm causes gaps in IT security policies and procedures, so some financial institutions have hired cyber security 'czars'[39] with specific responsibility for cyber security (see also Elliott and Saka, 2010).

One big challenge that many financial institutions face is that they operate through a collection of several operating systems in different areas (front-, middle- and back-office) that entails several reconciliation processes. Some of the programs are commercial — ready-to-use systems — while others are custom-made. Moreover, several old legacy systems from former mergers are still in use, and the internal systems require a lot of effort and investment to protect.

In terms of risk management, cyber security breaches are measured as part of operational risk. Data on internal and external losses go into risk models for operational risk to measure unexpected losses, either through the standardised method or advanced measurement approaches (AMA).[40] Internal losses comes from internal breaches / incidents (which are usually IT-related problems, as over 90 % of the processes in banks are IT-related) that are systematically captured and processed.

External breaches (which also include cyber-attacks) in a traditional retail bank that has different distribution channels and online payments are predominantly 'phishing' (in some small cases also scamming).[41] According to the banks, phishing usually presents as a set of many small incidents (known as 'high frequency, low impact incidents') that may add up to a larger amount of damage altogether. In the (Basel II) operational risk categories, these incidents are captured under 'external fraud'.[42] In terms of risk management processes, there is usually a weekly report on incidents and damage (including cyber-security damage) sent to the executive board for information, discussion and potential action.

Retail banks continually invest in their infrastructure to protect against new kinds of phishing and other kinds of cyber-attacks. This is a continuous process that is based on different factors, such as the number of attacks in the past, and the damage from them, but also to attacks and damage reported by their peers. Certain cyber-attacks,

[37] The 2014 Global Economic Crime Survey survey comprises 1 330 responses from the financial services sector across 79 different countries worldwide.
[38] According to the IBM Business Services Outsourcing in Banking and Financial Services: 2013 Market Report, some of the most prominent areas for outsourcing are: mortgage market, credit card business, partly mobile banking and payments. http://www-935.ibm.com/services/multimedia/rs-1302-banking-financial-services-2013-market-report.pdf.
[39] The term 'czar' is a popular usage referring to high-level government officials who oversee a particular policy. It is commonly used in the United States and the United Kingdom, http://en.wikipedia.org/wiki/Czar_%28political_term%29.
[40] AMA refers to the internal model of a bank that is used to measure operational risk.
[41] Source: discussions with leading European retail banks.
[42] External fraud includes theft of information, damages from hacking, third-party theft and forgery, (http://en.wikipedia.org/wiki/Operational_risk#Basel_II_seven_event_type_categories).

depending on their frequency and the related losses, are internally classified as business cases and special attention and a budget for the development of security measures is devoted to them. However, until now banks have not seen cyber-attacks as the biggest part of operational risk. Legal risk, which increased in significance especially during the crisis, makes up the bulk of operational risk in banks.

The budget allocated for handling cyber-attacks is not only related to the outputs of the operational risk models. This is only a fraction of it. The budget also takes into account other factors, including the outputs of the IT department and of the business side of the bank.

Banks expect malicious cyber-attacks to increase, because of rapid digitalisation (see also **Chart 2**). And, with digitalisation, the variety of upcoming services, such as payment by smartphone, expose banks much more to cyber-attacks than before. These days, smartphones have more the function of small computers than phones, which makes them vulnerable to attacks.

Protecting against cyber-attacks requires not only sophisticated technology and specialised staff, but — most importantly — increased awareness among employees of potential cyber-risks, through training and communication programmes. This of course also demands commitment from the top-management of the financial institution.

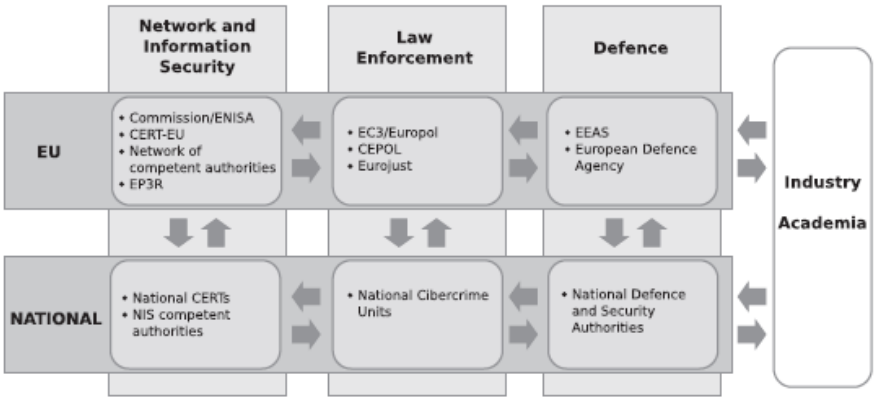
5. WORK IN INTERNATIONAL ORGANISATIONS AND REGULATORY BODIES

5.1. Institutional set-up in the European Union

The institutional set-up in the European Union (EU) is a combination of responsibilities at both national and European level. National competent authorities are the first line of defence in maintaining a good level of security within their territory, but they cooperate cross-border on risks and security breaches that extend beyond their national boundaries. **Chart 7** shows a number of organisations involved in cyber security issues at different levels.

The European Network and Information Security Agency (ENISA), established in 2004, assists the European Commission, the Member States and the business community to address, respond to and prevent network and information security (NIS) problems. The EU computer emergency response team (CERT-EU) is responsible for the security of the IT systems of EU agencies and institutions. In March 2009, the European Commission established the European public-private partnership for resilience (EP3R) to encourage sharing of NIS-related information between interested parties in the public and private sectors at European level. EP3R is now subsumed into the NIS Platform.

Chart 7: **Interacting organisations at national and EU level**



Source: CIS Sapienza, 2013.

On law enforcement, the European Cyber Crime Centre (EC3) was established in 2013 as part of Europol to serve as the centre of operations for the fight against cybercrime in Europe. Europol/EC3 works closely with Eurojust to improve its capability in fighting cybercrime.

The main agency responsible for cyber defence at EU level is the European Defence Agency (EDA).

5.2. Policy work at EU level on a cyber security area

The European Commission has proposed a network and information security ('NIS') directive[43] to ensure a 'high common level of network and information security (NIS) across the EU'. The previous regulatory framework required only that telecommunication companies report serious NIS incidents and take risk management steps. But several specific infrastructure and service providers are particularly vulnerable, given that they are highly dependent on an accurately functioning network and information systems. These sectors include 'banking, stock exchanges, energy generation, transmission and distribution, transport (air, rail, maritime), health, internet services and public administrations' (EC, 2013a, p.4). The objectives of the proposed directive are as follows:

- All Member States would be required 'to ensure that they have in place a minimum level of national capabilities by establishing competent authorities for NIS, setting up Computer Emergency Response Teams (CERTs), and adopting national NIS strategies and national NIS cooperation plans' (EC, 2013a, p.4).
- The national competent authorities should 'cooperate within a network enabling secure and effective coordination, including coordinated information exchange as well as detection and response at EU level' (EC, 2013a, p.4).
- Taking the Framework Directive for electronic communications as a model, the proposal 'aims to ensure that a culture of risk management develops and that information is shared between the private and public sectors. Companies in the specific critical sectors and public administrations should assess the risks they face and adopt appropriate and proportionate measures to ensure NIS' (EC, 2013a, p.4).

The European Parliament adopted a report on the NIS directive in March 2014 and the final text is expected to be agreed in 2015. The implementation deadline is expected to be in early 2017.

5.3. Financial services regulatory requirements relevant to cyber security

Though not adopted with current cyber-security concerns in mind, EU financial regulation already has a considerable number of requirements that are relevant from a cyber-security perspective.

The **Central Securities Depositories (CSD) Regulation** (Article 45) states the need for CSDs to apply appropriate IT tools in order to identify, monitor and manage sources of operational risk, both internal and external (i.e. from other CSDs and other market infrastructures), and to minimise their impact through appropriate tools. In addition, CSDs must plan and carry out a programme of tests of the arrangements under Article 45 and inform the competent and relevant authorities without delay of any operational incidents stemming from such risks (EC, 2014c).

Both the **European Markets Infrastructure Regulation (EMIR)** and the Commission Delegated Regulation 153/2013 (Article 9) contain provisions on the need for central counterparties (CCPs) to maintain adequate IT systems for dealing with the complexity of services provided and to ensure high standards of security and confidentiality of the information they hold. EMIR also contains provisions on trade repositories; Article 79 requires trade repositories to ensure the continuity of their business by setting up backup facilities (EC, 2012).

Operational risk[44] requirements for financial institutions in the **Capital Requirements Regulation** and the **Capital Requirements Directive** (**CRR/CRD IV**) are relevant to IT-related risks. Article 85 of the CRDIV (relevant to the basic indicators approach, mostly used by smaller banks) requires institutions to implement policies on, evaluate and manage operational risk exposure. Financial institutions also need to have contingency plans that ensure continuity of their business and limit losses in case of severe disruptions. Articles 4 and 321 to 325 of the CRR set out the measures that financial institutions have to take and also the capital they need to hold in order to cover operational risk, including risks related to cyber-attacks (EC, 2013c and 2013d).

[43] See http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013PC0048&from=EN.

[44] Operational risk means 'the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events', and includes legal risk. http://en.wikipedia.org/wiki/Operational_risk#Basel_II_seven_event_type_categories.

Article 16 of the **Markets in Financial Instruments Directive (MiFID)** requires investment firms to 'have sound administrative and accounting procedures, internal control mechanisms, effective procedures for risk assessment, effective control and safeguard arrangements for information processing systems' (EC, 2014b). Under Article 47, Member States must require the regulated market to be adequately equipped to manage the risks to which it is exposed and to mitigate those risks, including systems disruptions (EC, 2014b).

The **Solvency II Directive** contains provisions on the specification of the operational risk module of the standard formula. Article 107 of Solvency II sets out capital requirements for operational risk for insurance and reinsurance undertakings, which also includes risks from IT incidents and cyber-attacks (EC, 2009a).

The **proposal for a payment services directive II (PSD II)** contains relevant provisions that address cyber security at two levels. The first addresses security management within the payment services provider (Article 5), while the second deals with incident reporting to competent authorities, in case of major operational or security incidents (Articles 85/86) (EC, 2013e).

The **Credit Rating Agencies Regulation (CRA III)** stipulates, in Article 6(4), that credit rating agencies must have sound procedures, internal control mechanisms and safeguard arrangements for information processing systems. It also contains provisions on infringements by the credit rating agency, including failure to effectively check or safeguard the above (EC, 2009b).

While not specific to the financial sector or IT-related risks, the **Accounting Directive** (Article 20) stipulates that the corporate governance statement that listed undertakings draft must contain a description of internal control and risk management systems for the financial reporting process (EC, 2013f).

5.4. Cyber security initiatives at international level

In 2001 the Council of Europe's Cybercrime Convention (known as the 'Budapest Convention') represented the first attempt to harmonise the legal framework for fighting cybercrime. The convention defined crimes (e.g. illegal access, system and data interference) and set out rules on jurisdiction and criminal investigation measures. It was one of the few Council of Europe initiatives that was also signed and ratified by non-member states, including the USA, Japan and Canada (Graux, H., 2013).

The United Nations (UN) has passed two resolutions, one criminalising the misuse of information technology and another clearly stating that international law also applies to cyberspace. The North Atlantic Treaty Organisation (NATO) has also promoted cyber security harmonisation among its members. In 2011, NATO introduced a policy and action plan, which paves the way for the alliance to strengthen defence efforts (Watkins, 2014). Finally, in April 2015, the Interpol Global Complex for Innovation (IGCI) will be operational in Singapore, which will facilitate cooperation on cybercrime beyond national borders.[45]

In February 2015 the US government announced the creation of a new federal agency, the Cyber Threat Intelligence Integration Centre (CTIIC), which will allow existing agencies and private sector to combine their efforts in a coordinated manner to address cyber-attacks. CTIIC will coordinate and centralise data collection related to cyber-attacks.[46]

In 2012, the House of Representatives in the US passed the Cyber Intelligence Sharing and Protection Act (CISPA), which was then stopped in the US Senate. The bill's initial objective was to ensure the security of networks and help the US government investigate cyber-attacks, through US government cooperation with technology and manufacturing companies.[47] In January 2015 it was reintroduced and is pending.

Some important initiatives in other countries are the new Australian Cyber Security Centre (ACSC), which became operational in November 2014).[48] The Association of Southeast Asian Nations (ASEAN) countries, following the initiative of Japan, committed in September 2013 to take concrete measures to promote

[45] Ministry of Foreign Affairs, Singapore, 'Channel News Asia: Interpol Global Complex for Innovation to open April 2015', 4 November 2014, http://www.mfa.gov.sg/content/mfa/media_centre/singapore_headlines/2014/201411/headlines_20141104.html.
[46] Warren Strobel, 'The US is establishing a new cyber security agency', Business Insider, 10 February 2015, http://uk.businessinsider.com/the-us-is-establishing-a-new-cybersecurity-agency-2015-2?r=US.
[47] See http://en.wikipedia.org/wiki/Cyber_Intelligence_Sharing_and_Protection_Act.
[48] See http://www.asd.gov.au/infosec/acsc.htm.

cooperation, and to share data and information in the areas of cyber security strategies, including critical infrastructure.[49] In May 2013, India released its National Cyber Security Policy, which seeks to protect both the private and public infrastructures from cyber-attacks.[50]

6. CONCLUSIONS

Rapid digitalisation has accelerated the number of cyber-attacks and the related risks are not only of great concern to corporations and strategic sectors, but are also a threat to national security. Financial services are at the heart of these events, because financial institutions hold deposits for corporations and households and process transactions and payments worldwide in real time.

It is acknowledged amongst professionals in the financial industry that it has become impossible to prevent attacks. Cyber threats are continuously evolving and have become complex. It requires sophisticated advanced technology measures to counteract them. This in turn, costs money and time. But, this is only one side of the coin. As the weakest link in the security chain is human, it is paramount to increase awareness of employees and management on the importance of cyber security. Education on security is vital; development of a cyber security strategy and formal internal policies within the company remain key.

The risks arising from cyber-attacks are not limited to individual entities. The highly interconnected players and market infrastructures in the financial system enable cyber-attacks to swiftly spread to other markets and participants and cause contagion throughout the system, becoming a threat to financial stability.

Not only is it therefore a matter for individual nations to have the appropriate policies to strengthen cyber-security and protect their citizens, companies, economy and, more generally, society from cyber threats, but it is paramount to promote close cooperation and take harmonised action at EU and — if possible — at international level, in order to be successful in the long term.

References

Adelson, I., Ahmed, M. Z., Coyne, V., Lim, H., Jia, Z., Paisley, L. C. and Truong, K. (2014), 'US-China cyber security cooperation', Columbia School of International and Public Affairs.

Bailey, T., Del Miglio, A. and Richter, W. (2014), 'The rising strategic risks of cyberattacks', McKinsey Quarterly.

The British Bankers' Association (BBA), 'The cyber threat to banking. A global industry challenge'.

Cashell, B., Jackson, W. D., Jickling, M., Webel, B. (2004), 'The Economic impact of cyber-attacks', CRS Report for Congress.

Clark, D., Berson, T., and Herbert, S. L. (2014), 'At the nexus of cyber security and public policy: some basic concepts and issues', The National Academies Press.

Centre for Strategic and International Studies / CSIS (2014), 'Net losses: estimating the global cost of cybercrime. Economic impact of cybercrime II'.

CIS Sapienza (2013), '2013 Italian Cyber Security Report', Research Center of Cyber Intelligence and Information Security, 'Sapienza' Universita di Roma.

Cuomo, A. M. and Lawsky, B. M. (2014), Report on cybersecurity in the banking sector, New York State Department of Financial Services.

Deloitte Centre for Financial Services (2014), 'Transforming cyber security — New approaches for an evolving threat landscape'.

Department of Defence Strategy for Operating in Cyberspace, July 2011.

DTCC (2014), 'Cyber Risk — A global systemic threat. A white paper to the industry on systemic risk'.

Elliott, T., Saka, Y. (2010), 'Rebuilding confidence in financial services through robust cyber security strategies, Accenture.

European Commission (2009a), 'Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II)'

European Commission (2009b), 'Regulation (EC) No 1060/2009 of the European Parliament and of the Council of 16 September 2009 on credit rating agencies'

European Commission (2012), 'Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories'

European Commission (2013a), 'Proposal for a Directive of the European Parliament and of the Council Concerning measures to ensure a high level of network and information security across the Union', Commission Staff Working Document.

European Commission (2013b), 'Cyber security Strategy of the European Union: An open, safe and secure cyberspace', Joint Communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.

European Commission (2013c), 'Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012'

European Commission (2013d), 'Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC'

[49] See communication of September 2013, http://www.asean.org/images/Statement/final_joint_statement%20asean-japan%20 ministerial%20policy%20 meeting.pdf.

[50] See http://deity.gov.in/content/national-cyber-security-policy-2013-1.

European Commission (2013e), 'Proposal for a Directive of the European Parliament and of the Council on payment services in the internal market and amending Directives 2002/65/EC, 2013/36/EU and 2009/110/EC and repealing Directive 2007/64/EC'
European Commission (2013f), 'Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC'
European Commission (2014a), 'The future of Cyber security or A tale on the evolution of trust and security in a world intermediated by digital technologies'.
European Commission (2014b), 'Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU'
European Commission (2014c), 'Regulation (EU) No 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories and amending Directives 98/26/EC and 2014/65/EU and Regulation (EU) No 236/2012'
European Union Agency for Network and Information Security (ENISA), Annual Report 2013.
ENISA (2014), Press Release, EU cyber security agency ENISA calls for secure e-banking and e-payments: non-replicable, single-use credentials for e-identities are needed in the financial sector.
eMarketer (2014), 'Internet to hit 3 billion users in 2015', http://www.emarketer.com/Article/Internet-Hit-3-Billion-Users-2015/1011602
Ernst & Young (2013), 'Addressing cyber security as a human problem', Bank Governance Leadership Network.
Federal Financial Institutions Examination Council (2014), 'Executive leadership of cybersecurity. What today's CEO needs to know about the threats they don't see'.
Financial Times (2013), 'Secrecy hampers battle for web', FT Special Report.
FIS (2013), 'Cybersecurity reverse stress test'.
Fox-Brewster T. (2015), 'Staples hackers made up to $1 billion in bank raids, Kaspersky claims', Forbes, http://www.forbes.com/sites/thomasbrewster/2015/02/16/staples-hackers-made-one-billion-dollars/
Gregg, J. (2013), 'Financial industry is serious about cybersecurity', Bloomberg.
Gracie, A. (2014), 'Managing cyber risk — the global banking perspective', British Bankers' Association Cyber Conference, London.
Gurney, A. (2014), 'Cyber security and Financial Services', INFORMS Conference on Business Analytics & Operations Research, Boston, Massachusetts.
Hamilton, B. A. (2013), Press Release, Booz Allen announces Top 10 financial services cyber risk trends for 2013.
HP (2014), 'Cyber crime is wreaking havoc. The financial services sector must be prepared'.
IBM (2013), 'Business Services Outsourcing in Banking and Financial Services: 2013 Market Report', http://www-935.ibm.com/services/multimedia/rs-1302-banking-financial-services-2013-market-report.pdf
Ibrahim, M. (2014), 'Demystifying cyber risk — evolving regulatory expectations', SEACEN Cyber Security Summit 2014.
InfoSec (2014), 'Cyber Insurance' published in http://resources.infosecinstitute.com/cyber-insurance/
IOSCO (2013), 'Cyber-crime, securities markets and systemic risk', Joint Staff Working Paper of the IOSCO research Department and World Federation of Exchanges.
Joint Committee of the European Supervisory Authorities (2014), 'Joint Committee report on risks and vulnerabilities in the EU financial system'.
Kaspersky Lab (2014), 'Global IT security risks 2014 — Online financial fraud prevention'.
Kelley M. B. (2012), 'Operation High Roller: this massive cyberattack has siphoned as much as $2.5 billion from world banks', Business Insider, http://www.businessinsider.com/operation-high-roller-2012-6#ixzz3XgLUEpix
Marsh & McLennan Companies (2015), 'Protecting America from cyber-attacks: the importance of information sharing', Testimony of Peter J. Beshar, Executive Vice President and General Counsel Marsh & McLennan Companies before the United States Senate Committee on Homeland Security & Governmental Affairs.
Mahajan, A. C. (2014), '3.6 billion active internet users worldwide by 2018 with nearly 50% penetration', http://dazeinfo.com/2014/11/26/india-overtake-us-second-largest-internet-user-base-2015-half-world-internet-access-2018-emarketer/
Munich Re (2013), 'The threat from cyberspace', Insurance solutions for industry, Issue 1/2013.
Nagurney, A. (2014), 'Cyber security and financial services' Isenberg School of Management, University of Massachusetts.
NAPSNet (2013), 'Threats to cyberspace and responses', Nautilus Institute, http://nautilus.org/napsnet/napsnet-special-reports/threats-to-cyberspace-and-responses/
National Audit Office (2013), 'The UK cyber security strategy: Landscape review'.
National Cyber Security Centre (2012), Cyber Security Assessment Netherlands.
National Cyber Security Centre (2013), Cyber Security Assessment Netherlands.
Norton (2013), '2013 Norton Report'.
Pandey, P. and Snekkenes, E. A. (2014), 'Using prediction markets to hedge information security risks', Springer International Publishing Switzerland, pp. 129-145.
Ponemon Institute (2014), '2014 Global Report on the Cost of Cybercrime', Ponemon Institute Research Report. http://h20195.www2.hp.com/v2/getpdf.aspx/4AA5-5207ENW.pdf?ver=1.0
Protection Group International (PGI), 2014, 'Costs of a cyberdata breach', http://pgitl.com/costs-cyber-data-breach/
PwC (2014), 'Threats to the financial services sector', Financial services sector analysis of PwC's 2014 Global Economic Crime Survey.
PwC (2014), 'Managing cyber risk in an interconnected world. Key findings from the Global State of Information Security Survey 2015'.
PwC and Infosecurity Europe (2014), '2014 Information Security Breaches Survey'.
Reback, S. and Costello, T. (2014), 'Finance in the cyber crosshairs', Bloomberg.
Reich, P. C. (2008), 'Chapter I — Cybercrime, Cybersecurity, and Financial Institutions Worldwide', IGI Global.
Snow, G. M. (2011), 'Threats to the financial sector', Federal Bureau of Investigation.
Symantec, 'What is a Zero-Day Vulnerability?', http://www.pctools.com/security-news/zero-day-vulnerability/
The New Economy (2013), 'The 1 trillion dollar war'.
Trend Micro (2014), 'The invisible becomes visible. Trend Micro Security Predictions for 2015 and Beyond'.
United Nation (2008), 'Overview of cybersecurity', ITU Recommendation ITU-T X.1205', ITU-T, p.2, Geneva.
Watkins, W. (2014), 'The impact of cyber attacks on the private sector, Briefing Paper 3/2014.
World Economic Forum (2014), 'Risk and responsibility in a hyper-connected world', in cooperation with McKinsey & Company.

Chapter 7. Special focus on SME credit information in the EU[1]

1. INTRODUCTION

The Commission's communication on the long-term financing of the European economy[2] included the announcement of a mapping exercise on the availability of credit information on small and medium-sized enterprises (SMEs) across Europe. Chapter 7 outlines the findings of this exercise and the rationale behind it, along with a number of policy initiatives that could benefit the capital markets union[3] agenda.

SMEs face a structural hurdle when accessing finance - the lack of adequate, comparable, reliable, and readily available information. Information on SMEs is usually held by banks, and is difficult for non-bank finance providers to access. The lack of availability of credit information is a barrier to entry in the market for SME financing. The lack of information also makes it harder for finance providers other than banks to properly assess an SME.

To help SMEs access finance, it is important to increase SMEs' visibility to potential finance providers and ensure that those have greater access to credit information on SMEs so they can better assess their creditworthiness. This would significantly improve the efficiency (and, if carried-out across borders, the integration) of SME funding markets. It would also increase competition and help diversify the funding options open to SMEs by helping alternative finance providers (e.g. supply chain finance, asset-based finance, peer-to-peer lending, private equity) make informed decisions.

Chapter 5 of the European Financial Stability Integration Report 2013 (on EU's SME credit assessment industry) identified significant differences between Member States in terms of the degree of information available and the disclosure culture. The structure of national legislation was identified as a major barrier to cross-country credit flows, because foreign credit assessment firms must rely on the national firm's assessment and cannot fully compare it with its own assessment. One consequence arising from the heterogeneous information is competitive disadvantages of SMEs on access to finance among MS.

To address this situation, a thorough analysis of the current situation of the credit information disclosure across MS in the EU is necessary, i.e. a mapping exercise on data availability.

This Chapter 7 explains the rationale behind the mapping exercise, presents its findings and concludes with some general principles upon which future policy on improving credit information data for SMEs could be based. The chapter is structured as follows:

- **Section 2** presents some facts on SME lending.
- **Section 3** shows how serious the information problems are, based on the findings of studies carried out recently by the Commission.
- **Section 4** explains the mapping exercise, the methodology used and the results obtained.
- **Section 5** describes the differences between the EU and the US, based on interviews with market participants.
- **Section 6** describes the experience of BI & Scoring firms in the EU single market.
- **Section 7** suggests possible follow-up policy initiatives.

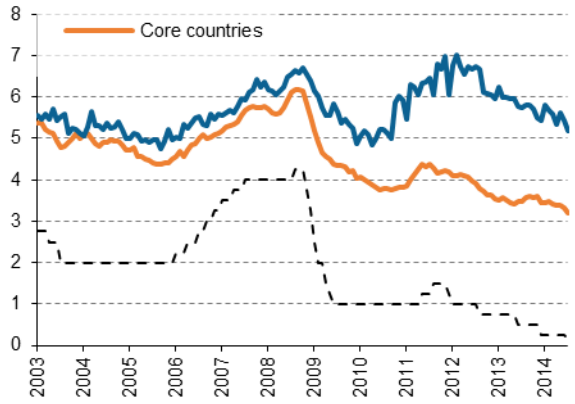
2. FACTS

Banks are the biggest lenders to SMEs, as they hold the most detailed credit information on SMEs necessary to assess their creditworthiness. Bank loans and other advances accounted for 85% of total non-financial corporate

[1] Authors: This chapter was written by Denada Prifti and Ana Maria Sanchez Infante (DG FISMA) and benefited from the respondents to the mapping survey listed in Annex 2.
[2] SWD/2014/0105 final, 27 March 2014
[3] Green Paper 'Building a Capital Markets Union', COM(2015) 63 final, 18 February 2015.

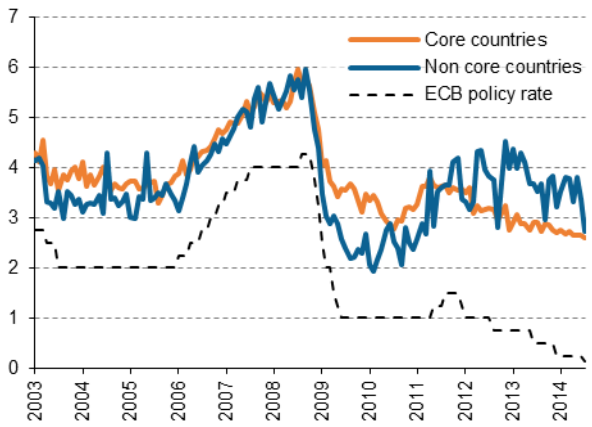
debt outstanding in the euro area and in the UK in 2011, whereas non-financial corporate bonds accounted for only 15% (Llewellyn, 2012). This is not the case across all Organisation for Economic Cooperation and Development (OECD) economies: in the United States the proportion is 53% to 47%[4]. The European Central Bank (ECB) lending survey for July-November 2014 also reveals that bank-related products are the main sources of finance for SMEs in the euro area SMEs - 61% of SMEs surveyed considered bank loans to be an important source of funding, while 53% included bank overdrafts. Other commonly used forms of financing were leasing (45% of SMEs) and trade credit (31%). Market-based sources of finance and factoring, were reported less often as relevant instruments. 24% of SMEs said internal funds were an important alternative source of finance.

Chart 1: **Loans to NFCs**, less than €1 million



Notes: NFC: Non-financial corporations
Source: ECB.

Chart 2: **Loans to NFCs,** over €1 million



Notes: NFC: Non-financial corporations
Source: ECB.

Interest rates for smaller loans (of less than €1m) are 2% to 3% higher than for larger loans (**Chart 1**). The higher interest rate spread is a result of SMEs' lower creditworthiness - which is determined by the availability and quality of information about them.

The financial crisis has made it harder for SMEs to access funding, as different sources of short- and long-term financing have been affected by endogenous liquidity and solvency problems in the EU banking sector. Higher interest rate spreads reflect not only creditworthiness, but also perceived sovereign risk. While in July 2006 (prior to the financial crisis) the lending spread between the core EU countries (which include Germany, France, Belgium and the Netherlands) and the peripheral countries (which include Greece, Italy, Portugal and Spain) was only 50 basis points (bp), in July 2014 it was at 200bp. The spread was far higher for smaller companies than for larger ones (**Chart 2**). Better credit information affects not only the lending process and interest rates on loans, but it is also very important for capital markets. For instance, differences in the types of information available could hamper the securitisation of loans to SMEs, or the burden associated to providing investors with the necessary information could increase the costs of going public for SMEs.

SMEs need up-to-date information on the creditworthiness of their clients / debtors, not only to fund businesses, but also to ensure the working capital is available in the supply chain. Suppliers can offer longer payment periods or a loan to their business partners, depending on the debtor's creditworthiness. Mainly owing to the crisis, SMEs have experienced a twofold squeeze - firstly, demand for their products has fallen due to economic downturn, and secondly, they are faced with longer collection periods, which have even doubled to up to six months or more (EFSIR 2012), in spite of the European late payment directive[5]. Longer collection periods increase SMEs' needs for liquidity and working capital[6], and this is aggravated by a possible downturn in turnover owing to the crisis. Last but not least, many SMEs face insolvency, owing in part, to their short-term liquidity needs to keep their business running. To finance working capital, most SMEs rely on internal financing, and/or short-term credit from suppliers, and/or some specialised financial products such as factoring. Some

[4] The US is also commonly cited as having a 70:30 split between corporate bonds and bank loans in total nonfinancial debt outstanding. This is due to the exclusion of the farm and small-unincorporated sectors of the economy. Using the broader definition gives the 47:53 split quoted in the text. (AFME, 'Financing European growth: a new model', 2012.)
[5] European Late Payment Directive 2011/7/EU.
[6] Working capital represents operating liquidity available to business.

SMEs resort to a direct loan from banks or other financial institutions in order to finance their working capital needs.

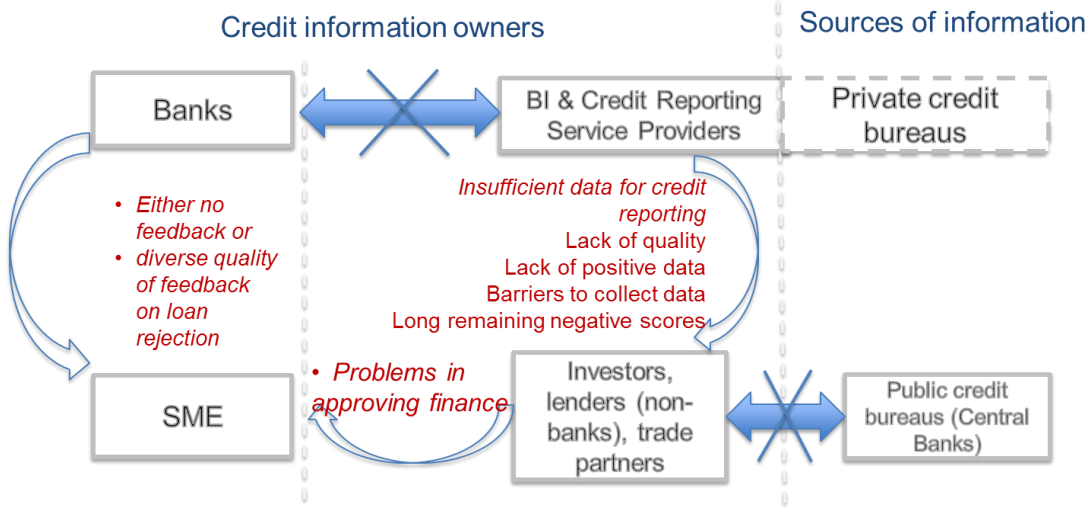
The World Bank's 'Doing Business 2013' report emphasises the crucial role that credit information plays in the exchange of goods and services. In particular, the World Bank's enterprise survey shows that in most European countries about 55%-70% of working capital and new investments are financed through internal sources (retained earnings), 20-28% through bank loans and 12-25% through alternative sources of finance, especially trade credit and leasing (World Bank, 2013).

3. WHAT ARE THE PROBLEMS?

Information problems start with **insufficient and inappropriate data**, e.g. around 25% of all companies in a country (approx. 700 000 firms on average per Member State) and around 75% of self-employed companies (1.5m to 1.8m firms on average per Member State) are not assessed. Added to this are differences in the **breadth and depth of credit information between MS** and **barriers to collecting data (**see **Chart 3)**. The structure of national legal frameworks not only influences the domestic market, but was also identified as a major obstacle to cross-country credit flow, because a foreign credit assessment firm has to rely on the national firm's assessment and cannot fully compare it with its own assessment on a like for like basis (see the European Financial Stability Integration Report 2013, Chapter 5). In addition, there are differences in the interpretation and implementation of data protection regulations and different requirements for SMEs to file annual accounts as pointed out in a recent survey by the Association of Consumer Credit Information Suppliers (ACCIS) (2014).

Another information problem is the **lack of transparency on banks' feedback** to SMEs on their creditworthiness, making it harder for them to access finance. The smaller the company, the more likely it is that its credit application could be declined by a financial institution[7] (Centre for Strategy and Evaluation Services, 2014). In addition, the **bank feedback varies in quality**, depending on the bank and the country. Under Article 431(4) of Regulation (EU) No 575/2013 (the EU Capital Requirement Regulation), SMEs can ask for written feedback when they apply for a bank loan. But very little has been done in practice to actually implement it[8].

Chart 3: **Problems on credit information**



Source: European Commission

Other studies have highlighted the **inadequate business information available for listed SMEs** (European Competitiveness and Sustainable Industrial Policy Consortium, 2013, study for DG GROW, formerly DG ENTR). It is hardly possible to cover the costs of good research because of the little trading on smaller companies. The number of listed SMEs has fallen in recent years. This development can be partly explained by the low number of entrants, but mainly a result of companies deciding to de-list and go private.

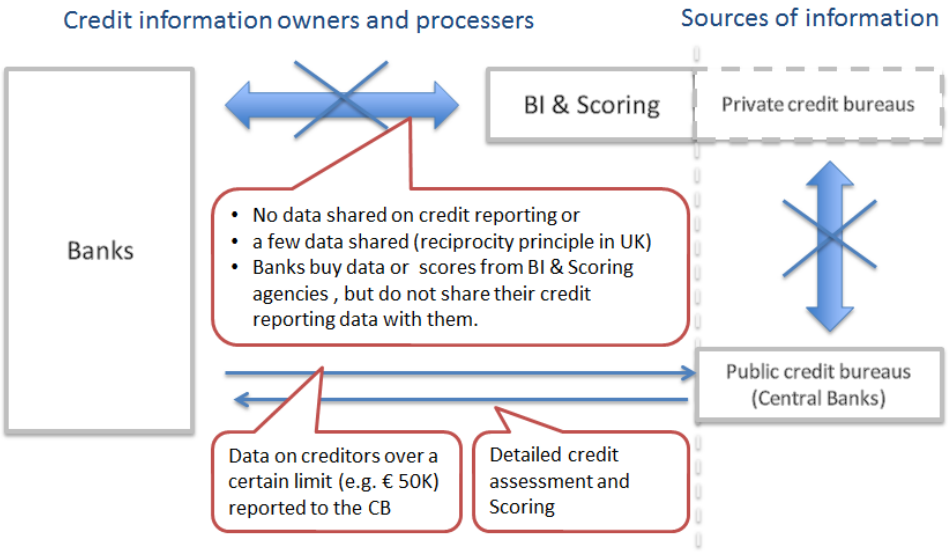
[7] This was the evidence of a study that DG GROW (former DG ENTR) conducted together with the Centre for Strategy and Evaluation Services (CSES) on 'Evaluation of Market Practices and Policies on SME Rating' in 2013/2014.
[8] http://europa.eu/rapid/press-release_IP-14-433_en.htm

An additional problem is **enduring negative information** that leads to a bad score (default or near default) with a bankrupt entrepreneur after discharge. A recent study by Ecorys (2014) for DG GROW 'Bankruptcy and second order chance for honest bankrupt entrepreneurs' shows that individual entrepreneurs are burdened with negative information long after a bankruptcy or litigation procedure has ended. In some countries, such as Luxembourg, the information is never removed.

Chart 3 visualises the flow of credit information between several stakeholders and the information barriers they encounter.

Chart 4 illustrates data sharing between banks and BI & Scoring firms. It shows that data sharing by banks with other market participants is limited, and varies between Member States. Banks and central banks only share SME data in a 'closed' communication.

Chart 4: **Data sharing**



Source: European Commission

4. MAPPING EXERCISE

This section presents the findings of the mapping exercise carried out by DG MARKT[9] in September/October 2014. Mapping the current data landscape used to assess the creditworthiness of SMEs in each Member State helps to provide an overview of the current situation. For this purpose, a set of key variables, especially those that are necessary for credit reporting was identified, drawing on input from external stakeholders (in both the public and private sector) and different institutions, such as the World Bank (2014).

DG MARKT presented the key data elements necessary for assessing a company's creditworthiness and for evaluating it at an informal EFC meeting in June 2014. All Member States supported the Commission's initiative and considered it an important step towards understanding the problems linked to missing or inadequate information.

4.1. Methodology

The survey with the set of variables was sent to BI & Scoring firms in 28 Member States in September 2014. The aim was to find out whether credit information on SMEs is available to interested credit information firms outside banks. 26 Member States responded.

We talked to various national authorities (ministries of finance and economic affairs) about their current and planned national initiatives. We also consulted several departments within the European Commission. These included DG JUST (to clarify data protection issues); DG GROW and departments working on the business registers interconnection system (BRIS) and the mortgage directive.

[9] Since 1 November 2014, DG MARKT changed into DG FISMA. It applies to all the note.

Box A. **Information required for comprehensive credit reporting and assessment**

Company basic data
Identification data (e.g. tax registration number), date of establishment, company address, telephone number.

Company activity
Information on sectors in which the company is active, its structure in domestic and foreign markets (e.g. subsidiaries, branches), shareholders, and the company's market (clients) and suppliers.

Legal structure
Legal structure of the firm, which is usually obtained from a public authority, such as Handelsregister in Germany or Companies House in the UK.

Executives
The chief executive officer, common directorship, antecedents (where relevant), other personnel or key managers, representation on other boards, personal and professional data, adverse (negative) information and credit information on directors.

Credit reporting data
Lending and credit behaviour information (loans and credit lines, monthly instalments and non-performing loans and related amounts).

B2B
Information on commercial credit and payment behaviour and outstanding payments.

Public record filing
Information recorded in lawsuits, court actions, collections, outstanding payments from government agencies, bankruptcies and payment behaviour of SMEs with government agencies (e.g. tax, fees).

Annual accounts
Balance sheet and profit and loss data; delays on publication, off-balance sheet items, consolidated disclosure, approved / audited annual accounts, and number of employees.

Micro-firm information
Turnover, financial burden, number of employees, immovable properties and properties valuation, mortgage on the property.

4.2. Set of variables

The raw data used to assess the creditworthiness of SMEs include basic company information, company activity and legal structure, information on credit history, annual accounts and other financial information which evaluates repayment capacity, and information (negative and positive) on a company's willingness to repay its debt. Data on executives and public record filing are also fed into the credit assessment. For the assessment of micro-firms that are not limited liability and do not produce annual reports, (including also start-ups, innovative companies, etc.), some other key indicators (turnover, number of employees etc.) and personal credit information on the owners are used to assess the company.

Box A shows the key information used to assess the creditworthiness of the company. A detailed breakdown of the variables is provided in Table 1 (first column).

The table of variables was sent to BI & Scoring firms in 28 Member States, as well as the Banque de France, the National Bank of Belgium, the National Bank of Romania and the Central Bank of Slovenia. The companies/institutions were asked to reply whether the data were available to them (publicly or privately). In some countries there was more than one respondent. In BE, CZ, EL and FR there were two respondents, while for IT and the UK three BI & Scoring firms replied. The following section summarises the findings. Details on each Member State can be found in Annex 1. The names of respondents are listed in Annex 2.

4.3. Findings of the mapping exercise

The mapping results are graphically illustrated in Table 1 and can be summarised as the following:

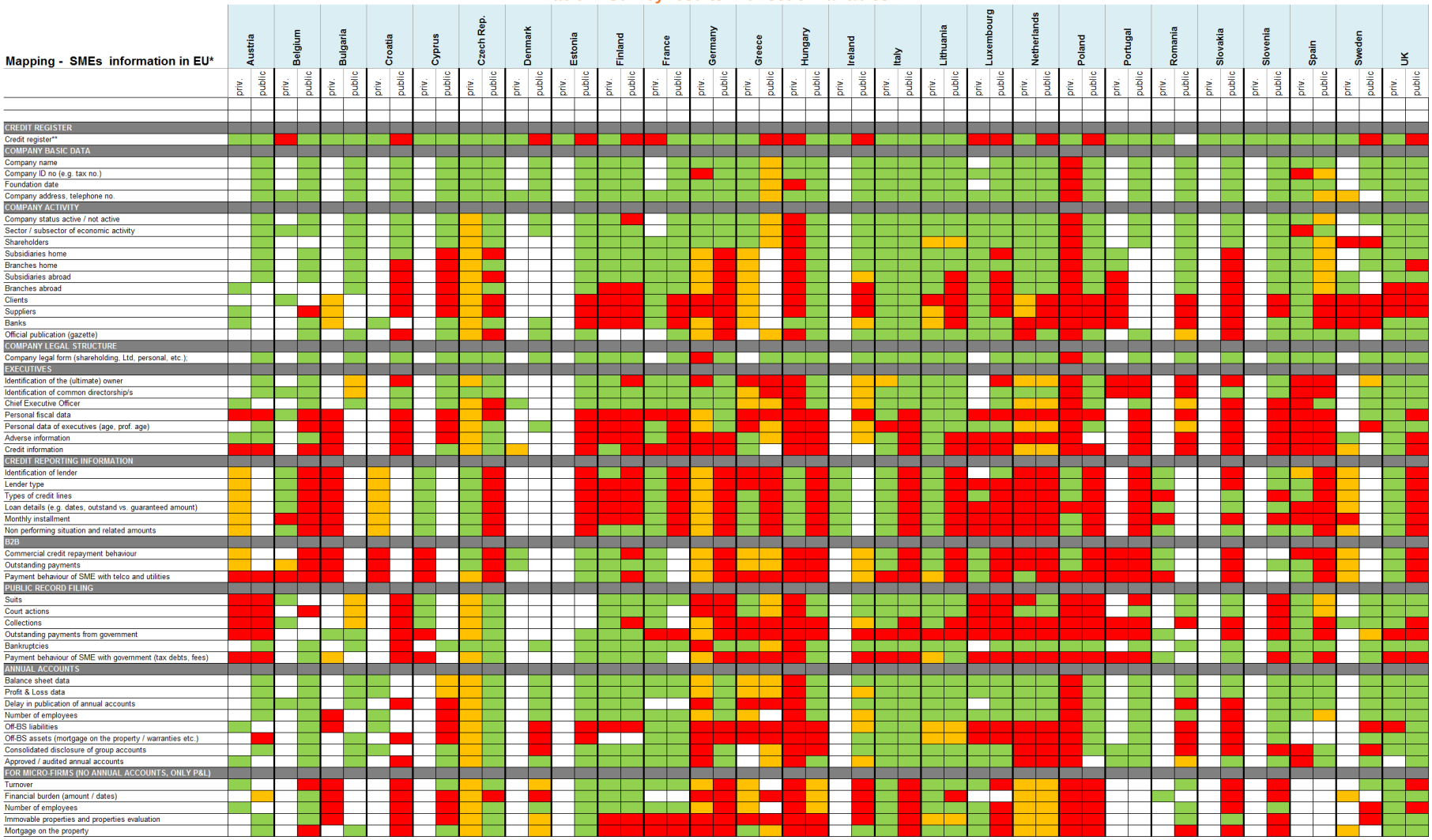
– **Credit Registers** are available in most countries, except in Luxembourg where there is no credit register at all and 11 other countries (CY, DK, EE, EL, FI, HR, IE, NL, PL, SE and UK) in which there are no public credit registers.

- **Basic Company Data** are available in all Member States, with some limited access to data in ES and SE. However, data regarding the **Company Activity** are very different in the availability and disclosure. 11 Member States (AT, BE, BG, CZ, EL, FR, HU, IT, LT, LU and SI) have (almost) full disclosure and others (CY, DK, FI, HR, PT or SK) disclose very little data.
- There is full disclosure of **Company Legal Structure**, whether publically and/or privately.
- The results for information on company **Executives** are mixed. Personal data on executives, such as their credit behaviour or fiscal information, are generally not available, with a few exceptions (CZ, IT, LT, SE and UK). This could be because of data protection law. 13 Member States (BG, CY, DK, EE, ES, FI, HR, HU, LU, PL, PT, RO, SK or SI) have very little or no data available on executives available.
- **Credit Reporting** – there is little or no loan level data available in six countries (BG, DK, EE, FI, LU, NL and PT); negative data (non-performing loans) are available in most Member States except BG, DK, EE, LU, NL and PT.
- Data on **B2B relationships** are usually privately available, but not in some countries (BE, BG, CY, HR, HU, NL, PT and SK). 14 Member States do not provide information on the payment behaviour of SMEs with regard to telecommunications and utility providers (AT, BE, BG, CY, DK, EL, HR, HU, IT, PL, PT, RO, SK and SI).
- With regards to **Public Record Filing**: lawsuit and court actions are available, except in eight countries (AT, DE, EE, HR, LU, PL, RO and SI), and information on the business relationship with government agencies is not available in 14 Member States (AT, CY, DK, EL, ES, IE, HR, IT, LU, NL, PL, PT, SI, UK).
- **Annual Accounts** are well covered across Member States. However, off-balance sheet liabilities and assets, and consolidated group accounts are not always available.
- For **Micro-firms,** turnover data are almost always available, sometimes with restricted access, and in some countries they are linked to personal data.

From the mapping table, the UK, Italy, but also Lithuania appear to have a very good data coverage. However, data availability, particularly with regard to loan history, is limited in Bulgaria, Estonia, Spain, Finland, Luxembourg, the Netherlands and Portugal.

In conclusion, there is in general a good coverage in the basic company data and company activity. Also data on annual accounts are in almost all Member States available. However, the availability of loan level data and payments history that is necessary to assess credit repayment willingness and capability of an SME is quite different between Member States. In some countries, data are not available at all and in some others only negative data exist.

Table 1: **Survey results with set of variables**



Note: red stands for not available, green for available and yellow for only partially available

The 'Credit Register' column refers to the ownership of the Credit Register, whether it is a public institution or a private company.

The 'Public' column means that data are available and disclosed to everybody (independently if one has to pay or not), while the 'Private' column means that data are disclosed only to closed user groups.

4.4. Case study UK: Best practice in credit information data

The UK is one of the most competitive markets in terms of credit information. The private sector is well established and competitive. It shares and provides both personal and commercial credit information. There are six private credit bureaus, multiple resellers and other smaller market players. They collect credit information from a number of public and proprietary sources and use this information to provide analytical and data services to their customers. The three largest credit bureaus providing personal credit information are Experian, Equifax and Callcredit. Experian, Equifax and Creditsafe are also important providers of commercial credit data. Dun & Bradstreet (D&B), with headquarters in the US, is another major provider of commercial credit data. D&B also provides networked services with respect to credit scoring and credit information on cross-border clients (e.g. if a German company needs information of a Spanish firm). However, this is a closed network. The information is provided only to members that pay an annual fee.

Data are shared among the 'closed user groups' operating within the credit bureaus that govern, using the principles of reciprocity, access to data sourced from credit accounts. These groups prevent non-financial lenders, such as trade creditors, and indirect financial creditors, including investors in securitisations, from accessing data provided by direct financial lenders, such as banks. There are also closed user groups around specific financial products, such as business current accounts, which restrict the sharing of information on those products to just those lenders offering those products.

Data subjects, whether individuals or businesses, can access information held about them in credit bureaus databases for verification purposes and information sourced publicly is generally available to all their customers. However, access to credit data obtained from proprietary sources is currently governed by the principles of reciprocity. These principles are determined by the Steering Committee on Reciprocity, made up of credit industry trade associations, credit industry bodies and credit bureaus. The principles ensure that companies seeking to access shared data from credit bureaus receive credit performance information of the same type that they contribute and that companies contribute all the data that they have available. So for example, if a lender only contributes negative credit information (i.e. that relating to defaults or other adverse credit events) they will only be able to access negative credit information from the credit bureaus.

Box B. Current initiatives in the UK to improve credit information

There are currently four initiatives underway in the UK in order to improve access to credit data on SMEs and micro-firms:

1. Legislation on SME data sharing

The UK Government has taken legislation (the small business, enterprise and employment bill 2014–15) through the House of Commons and House of Lords. It will require banks to share (with permission) data on their SME customers with designated private credit bureaus. The legislation will also require those bureaus to provide access to that data to any finance provider that has the SMEs permission. The data will be set out in legislation but they will mainly cover payment performance (positive and negative), default data on loans, business current accounts and credit cards. It will also cover business current account turnover data.

Currently a lack of SME credit information can act as a barrier to market entry. The policy intention is to improve the data available and open up access to the data that is shared, ensuring a level playing field for alternative finance providers and new entrants, increasing diversity of supply in the SME lending market.

Next steps: Following agreement by both Houses on the text of the Bill it received Royal Assent on 26 March 2015. The Bill is now an Act of Parliament (law) and implementation could be achieved in Q3/Q4 2015.

2. Bank of England consultation on a central credit register

The Bank of England (BoE) is also consulting on what benefits could be realised from a UK central credit register. They launched the discussion paper 'Should the availability of UK credit data be improved' in May 2014, asking for comments and views by the 29 August 2014. This complements the above measure initiated by the UK Government and asks what would be the incremental benefits, over and above the Government's proposals, of such a register in the UK. Three key incremental benefits are highlighted in the paper: securitisation, trade credit and access to public data. The paper also asks how, if a credit register were seen as desirable, it could be best delivered through, for example, the existing infrastructure provided through private credit registers. On 28 November 2014, the BoE published a summary of feedback received from its discussion paper,

concluding that the majority of respondents supported the improvement of the existing reporting infrastructure. The BoE is therefore currently working with market participants and other parts of the government on the following priorities:

Improving access to credit data for trade credit providers

BoE agrees with respondents that substantial benefits could be delivered for financing of SMEs through business-to-business lending or trade credit (delayed payment for goods and services provided), if providers of trade credit were able to benefit from the information credit bureaus receive from mainstream credit providers. Currently trade creditor's access is prohibited by the principles of reciprocity which govern access to data shared by mainstream credit providers (banks), telecommunication and utility companies.

→ BoE is exploring, together with the credit referencing industry, the costs and benefits of using these data to calculate the credit scores and credit limits offered to trade credit providers.

Use credit data to support market-based financing for SMEs

BoE agrees with respondents on that greater investor access to credit information (e.g. default data by loan type or sector) would support market-based financing, including via securitisation, for SMEs.

→ BoE will work with the British business banks and industry to draft a list of information requirements that would help investors to improve their understanding of the SME asset class and consider investment opportunities. In a second step, BoE will work with the banks and the credit bureaus to explore whether this information can be made available through the existing credit reporting infrastructure.

Improving access to information from publicly owned sources

BoE supports the replies which recommended investigating further with HMRC the latter's VAT register initiative (releasing basic information from the VAT register - see point 4 below); the government's proposal to establish a public beneficial owners database for companies, containing information on the ultimate owners of companies, and sharing and publishing export data, relating to exporters and the goods they export. Other sources of information mentioned were: HMRC's tax registers (business tax liability / payment performance) and business rates information.

The BoE clearly states that if cooperation with the industry does not succeed, it will work with the government to explore further legislation to realise the benefits of improved information sharing. And only then it could consider whether a central credit register would offer a better way to deliver the benefits.

3. HM Treasury, Autumn Statement (December) 2014:

The UK Treasury recently released its plan on sharing SME credit data for those banks that cover the majority of the credit business (Royal Bank of Scotland, Barclays, Lloyds Banking Group, HSBC, Santander, Clydesdale and Yorkshire Banks, Bank of Ireland, Allied Irish Bank, and Danske Bank) under proposals in the small business, enterprise and employment bill 2014-15. These banks will be required to share SME credit data with other lenders through credit bureaus and share information on SMEs which have been refused finance.

4. HMRC - use of non-financial VAT registration data in trade credit scoring

In July 2013, HMRC published the consultation document 'Sharing and publishing data for public benefit'. This included proposals for possible controlled release of non-financial VAT registration data to qualified parties (including credit bureaus) for specific purposes, such as credit scoring.

VAT registration data are economically valuable because it offers the only comprehensive register of UK businesses over the GBP 81,000 per year turnover VAT registration threshold, as well as, those who register voluntarily. It is a unique source of data on unincorporated businesses, on which there are few public data sources. Matching VAT registration data with other information sources (e.g. Companies House, customer, court or bank data) would increase the amount and improve the accuracy of this data. This is likely to improve the quality of business-related services such as credit evaluation, for example. Potential users include credit bureaus, banks and other financial services providers.

Next steps: the measures are being taken forward in the small business, enterprise and employment bill.

5. DIFFERENCES BETWEEN THE EU AND THE US

Interviews with the biggest market players in the credit information business in the US, namely D&B and Equifax, were conducted, in order to understand the differences, if any, in their business models with regards to the EU; the importance of credit information for the credit supply of SMEs in the US and, finally, if there were any factors other than credit information which affect SMEs' access to finance in the US. One of the interviewees praised the developments happening in Europe with regards to the setting up of networks and/or

strategic arrangements and partnerships in order to overcome difficulties in cross-border credit information data gathering/sharing.

BI & Scoring firms in the US compared to Europe – differences, if any, between business models

In the US there is no central credit register. Each state has its own rules and laws about which information is held publicly. Basic data on companies are held in business registers at state level. There is no centralised business register. Therefore credit information companies need to collect data from 50 States, from the Secretary of State's office which usually registers businesses and non-profit organizations. As each state can determine the type of data to file, the amount of data is significantly different between states. The data held are very basic, in most of the cases they contain only the company address and tax number. Annual accounts, for example that are available in public registers in Europe in every Member State, are not available in the US.

BI & Scoring firms in the US have a similar structure to those in the UK, as they are only private, and cover consumer and/or business information. It is also based on a reciprocity model and the acquisition of information.

In the US there is more data sharing happening, e.g. of private consumer information, than there is in the EU. Telecommunications bills are the only exception – these data are not shared by BI & Scoring firms in the US.

On the business information side of the business, D&B is the top specialist information provider. It has effectively established the industry standard, the 'D-U-N-S Number', which is very widely used. This is a unique nine-digit identification number for each physical location of a business. D-U-N-S number assignment is free of charge for all businesses required to register with the US Federal government for contracts or grants. Equifax and Experian are active on both, the business information and consumer side of the industry. TransUnion is only active on the consumer side.

The US market is consolidated among a few strong 'national' players: Equifax, Experian and TransUnion on the consumer side of the business. The business information side of the industry is highly concentrated, with D&B as the biggest player, followed by Experian and then Equifax which only entered that market five years ago. Creditsafe entered the market in 2012. But, the US market is also fragmented with local credit bureaus which are only present in certain states. Those smaller players provide data to the national players.

BI & Scoring firms collect credit obligation information from thousands of businesses nationwide. These businesses are typically the suppliers or lenders with which a company has existing financial relationships. They also collect legal filings from the various local, county and state courts across the US. Company background information is collected from a variety of independent and/or affiliated firms. For example, a local credit bureau in Georgia provides Equifax, its affiliate, with data.

But, BI & Scoring firms in the US also struggle to identify or obtaining information on micro-firms, start-ups, etc. Lending decisions in relation to these types of businesses should be supported on consumer data of the owner(s) of the business, not the business itself where either no information is available or not sufficient business history.

One of the two companies interviewed felt that the US needed to give small companies more help to access to finance. The only government supported initiative, the 'US Small Business Administration' (www.sba.gov), created in 1953 as an independent agency to 'aid, counsel, assist and protect the interests of small business concerns', was not felt to be sufficient as it tends to provide more information than assistance.

Do private solutions on credit information play an important role on credit supply of SMEs in the US?

According to the interviewees, the US has a 'laisser-faire' attitude towards BI & Scoring firms. It relies on the data they collect and the reports, scores, etc. they publish to support SMEs in accessing finance. The US government's attitude is that the industry will develop solutions to overcome the data information gaps, i.e. a market-driven solution. By contrast, in Europe, the public sector is much more involved in helping SMEs access finance, both at national and at EU level.

Some initiatives by BI & Scoring firms in the US:

– Equifax offers business solutions for SMEs (see http://www.equifax.com/business/small-business), indirectly helping lenders provide funding to SMEs.

– Scoring (whether for businesses or sectors) is more developed in the US, than in Europe, but has also been around longer than it has in Europe (where historical developments differ widely according to the Member State concerned).

Are there other factors in the US that can overcome information problems?

BI & Scoring firms in the US are more oriented towards trade credit information. They use trade data rather than bank loan data to generate scores. On the contrary, Europe lacks detailed trade credit data. In the US more use is made of trade credit than bank loans because the asset finance market (e.g. invoice discounting, factoring, etc.) is more mature. Alternative financing of SMEs is stronger than in EU.

In conclusion, publicly available information in the US is relatively basic and more heterogeneous than in the EU. In terms of privately available data and credit information the US market seems very competitive. However, market participants confirmed that in terms of market depth, the UK is more developed than the US.

6. EXPERIENCE WITH THE EU SINGLE MARKET

In order to overcome the heterogeneity in data gathering in the EU market, BI & Scoring firms have adopted two main approaches: (i) network building, and (ii) establishing strategic partnerships:

– **Networks:** several BI & Scoring providers in Europe have formed networks in order to exchange information in an integrated way, using explicit identification data for each company. Scores – which usually differ between BI & Scoring providers in different countries – are mapped. This means network members receive information on a specific company from all member countries which they can then compare on a like-for-like basis. There are currently two large networks in Europe, BigNet (Business Information Group Network, which includes major commercial bureaus) and D&B (Dun and Bradstreet Worldwide Network).

– **Strategic arrangements and partnerships:** for respondents that have not joined a network, strategic partnerships with similar entities operating in foreign markets are essential and remain the way forward to expand their business in the future. However, in doing so, they still encounter numerous difficulties. An example would be the Federation of Business Information Services (FEBIS), a trade industry group comprised of 80 full members involved in providing both business & consumer credit reports, that works to further develop and enhance the industry in a collaboratively way. In particular, they aim to increase the flow of credit and finance to SMEs.

One of the interviewees praised these private-sector initiatives in the EU which have been established and working for some time. He also said that although they had been very successful, they were not well publicised.

Companies such as Equifax or D&B have been acquiring local players in order to establish an international network independently. There is also the franchise model used by D&B, for example, where a local private credit bureau can franchise the D&B business exchange model.

7. CONCLUSIONS

This current lack of standardised credit information on SMEs has been addressed in the Commission's Investment Plan[1] and in the CMU Green Paper[2] and has been identified as one of the five priorities for action in the short term.

The findings of the mapping exercise show that it is important to improve the availability and sharing of credit information which is necessary for assessing the creditworthiness of SMEs. A minimum set of common, comparable data that is equally accessible by all interested parties is important to widening the investor base for SMEs, increasing competition and fostering the efficiency and integration of SME funding markets.

[1] COM(2014) 903 final
[2] COM(2015) 63 final

This is relevant for a wide range of stakeholders including BI & Scoring firms, credit registries, banks, investors, SMEs, and public institutions.

The 'Doing Business 2015' report by the World Bank emphasises the importance of the existence of registration institutions (registries) for companies getting credit, particularly, effective systems for secured transactions and credit bureaus/registries can improve access to finance for SMEs. Collateral registries enable potential creditors or buyers to uncover any existing liens over property and allow them to register their own security interests, establishing priority over other creditors in case of the debtor's default. In addition, credit bureaus/registries reduce information asymmetries making it easier to access finance. It also improves the borrower behaviour and reduces interest rates.

Any potential policy initiative would need to take into consideration the following principles:

- It should not place an additional administrative burden on SMEs.
- The minimum dataset should build on existing models and infrastructure, such as, among others, the work done by the ECB (AnaCredit project started in 2009) on loan level data on non-financial corporates across banks in the euro area, which is used for central bank purposes only. The ECB set of variables is not sufficient to create credit reports for SMEs, but contains useful standardised definitions of loan-level data which could provide a starting point.
- It should take into account the role an appropriate reciprocity model could play (where both parties benefit from data sharing) which is already standard practice in some countries.
- It should facilitate access to 'positive information (i.e. on the regularity of payments) in addition to negative information (non-payments) on the creditworthiness of SMEs. This is not the case today in some Member States.
- For micro-firms, where there is a more significant gap in credit information, data on a company's owner should be combined with company data. This considerably improves the credit assessment and related score, thus lowering the cost of credit. However, data protection concerns would have to be addressed.
- The design should facilitate cross-border lending, through sharing cross-border credit information via the existing networks/platforms of BI & Scoring companies.
- It should seek to facilitate market entry in business information.
- It should not counteract existing initiatives and legislation.
- The dataset should be designed with the needs of an identified user base in mind and clearly demonstrate how it meets their needs.
- The initiative should also balance the potentially conflicting interests and objectives of all market participants. It is therefore necessary to consider the extent to which public action should substitute or otherwise 'nudge' market-led solutions to the market failures in this area.

ANNEX 1: SUMMARIES OF MAPPING RESULTS FOR EACH MEMBER STATE[3]

AUSTRIA

Austria has two public credit registries, its central bank (Österreichische Nationalbank) and Kreditschutzverband von 1870, and various private credit bureaus. Clients of KSV, namely banks, insurance and leasing companies, exchange positive and negative information. It has also a fraud database.

Austria has a fairly broad availability and disclosure of the different sets of variables. *Company basic data* (publicly from Companies' House and the Chamber of Commerce), *credit reporting information* (privately, and only from the company itself, and from balance sheets, if available), *B2B* (privately, mostly from suppliers) –except payment behaviour with telecommunications providers & utilities-,[4] *annual accounts* (only limited and joint stock exchanges) –except off-BS assets-, and data of *micro-firms* (turnover and number of employees are coming from the company itself) –except financial burden if the data are not coming from the cadastral register- are available. Some data on *executives* are not available, such as, personal fiscal data and credit information (except for banks) and none of the *public record filings* are available, with the only exception of bankruptcies which are available from courts.

BELGIUM

Belgium has one public credit register which is Banque Nationale de Belgique (BNB), its central bank, which is only open to financial institutions and not to private business information companies.

Company basic data are available publicly (Crossroad Bank of Enterprises - Official journal - Central Bank). Data on *company activity*, *company legal structure*, and *annual accounts* are also available publicly with the exception of data on clients which are privately held (by VAT administration but not published publicly). On the contrary, data on suppliers, shareholders and branches abroad, are not available at all. Data on P&L for *micro-firms* are available publicly, with the exception of turnover and data on mortgage on the property. *Credit reporting data* are only privately available with the exception of data on monthly instalments. Data on *B2B* only include private information regarding outstanding payments provided by business information companies and their private agreements with companies. Data regarding *executives* are however more heterogeneous in terms of disclosure with data lacking on personal data of executives and their credit information. The remaining data are publicly and/or privately available through the central bank, official journal, NSSO, Crossroad Bank of Enterprises, and Federal Public Service Finances.

BULGARIA

Bulgaria has only the central bank as public credit register and two private credit bureaus (Creditinfo and Experian).

All the data sets for *company basic data*, *company activity (*with some limitations in clients, suppliers and banks*) and legal structure* are mostly publicly available. Data about clients, suppliers and banks are privately available. With regards to *executives* the information about the CEO is publicly available, but the rest of variables are accessible with limited access or not at all, such as personal fiscal data, personal data of executives, adverse and credit information. Neither *credit reporting information*, nor *B2B* data are available at all. With regards to *public record filing* and specifically to the data sets suits, court actions and collections, a unified identification code of the company and/or the Personal ID number of the person is necessary in order to look for that type of information. *Annual accounts* data are publicly available, except of number of employees and off-BS liabilities. With regards to *micro-firms*, only data on mortgage on the property is publicly available.

CROATIA

In Croatia there is no public credit register. The private credit bureau HROK was founded by 20 Croatian banks under the auspices of the country's banking association.

[3] Information sources are the surveys 'TemplateMapping_September 2014_MS' sent out in September 2014, complemented by Jentzsch, Nicola. 'Financial privacy: an international comparison of credit reporting systems. Berlin', Springer Verlag, 2007. Print.

[4] KSV noted that they answered out of their best knowledge about Austria, without knowing what other companies practices were, above all regarding payment information from telecommunications providers & utilities.

The total *company basic data, legal structure* and some of the *company activity* data are available in the public business register, except of the information regarding banks which is available at the central bank and private data base company providers. There are no data available on branches home, subsidiaries and branches abroad, clients and suppliers. Croatia has no official publication (gazette). Regarding *executives* the only information available through public business registers is common directorship(s) and the CEO. In relation to the *credit reporting information* data, they are all available through the credit bureau, HROK, but the written consent of the client (individuals and businesses) is required. Users of this credit register, i.e. banks, leasing and credit card companies and other financial institutions can only see the type of lender. The name of the lender is published only in the credit reports companies can buy for their own purpose. *B2B, public record filing* and information about *micro-firms* are not available at all. With regards to *annual accounts*, they are available through Croatia's national annual accounts registry and private data base company providers, with the exception of data about delay in publication of annual accounts, off-BS assets and if the accounts are audited or not. The latter are not available at all.

CYPRUS

Cyprus has two private credit bureaus and one public credit register (central credit register) under the Central Bank of Cyprus.

Company basic data and *company legal structure* are publicly available (through the Companies Register), while *credit reporting information* is only privately available, namely through credit institutions. On the contrary, *B2B* data are lacking entirely. For *company activity* only data for company status, sector, shareholder, banks, and official publication are available. For *executives* all information is privately available with the exception of personal fiscal data, data of executives, and adverse information. With regards to *public record filing*, outstanding payments from governments and payment behaviour of SME with government are not at all available. In *annual accounts,* P&L and balance sheet are only available for public quoted companies. On the contrary, for all the companies is publicly available data on consolidated disclosure of group accounts and approved/audited annual accounts. The only obtainable information for *micro-firms* is turnover, and mortgage on the property.

CZECH REPUBLIC

The Czech Republic has two private credit bureaus together with their central bank. Their data are available to its users only via the reciprocity principle. The former ones, CRIF and Solus, hold negative and positive data.

All the data sets (*company basic data, company activity, legal structure, executives, credit reporting information, B2B, public record filing, annual accounts* and *micro-firms*), are either publicly or privately available, but with some limitations. For example, *company activity* data are found in commercial registers and in private databases. In the case of shareholder information, the latter might only disclose information for some types of companies, such as limited liability companies, or in special situations (public limited companies with only one shareholder). On the contrary, private databases might go into more details. With regards to branches (home or abroad), commercial registers have only officially registered branches and private databases might go into further detail. The same happens for information regarding *executives* (available through commercial register and private databases), *public record filing* (available through public bodies although cumbersome, or sometimes in private databases), *annual accounts* (available in an unstructured format through the commercial register and only if the company provides the information, or through private databases that sell them formatted) and *micro-firms (most of the times only collected on demand and in the case of property, available in the real estate register).*

With regards to *credit reporting information* it is privately available based on the reciprocity principle.

DENMARK

Denmark has no public credit register, but private credit bureaus. Credit bureaus only register negative information compiled from their clients and the Danish Official Gazette. The exchange of information is voluntary.

In Denmark there are no data on *credit reporting information*. *Company basic data* and their *legal structure* are entirely publicly available at the central business register. *Annual accounts* data are provided publicly through the central business register, with the exception of data on off-BS liabilities, off-BS assets, and consolidated disclosure of group accounts. Information on *B2B* and on *micro-firms* is available, privately and publicly, with the exception of payment behaviour of SME with telecommunications providers and utilities, and financial burden, respectively. In the case of information about property, access to the information is gained via an electronic citizen ID. There is almost no information available on company activity (only about company status, sector, banks and official publication), *executives* (only on personal data of executives and sometimes on credit information through commercial credit registers) and *public record filing* (only on bankruptcies).

ESTONIA

In Estonia there is no public credit register at the national bank. It has many companies in the private sector active in the collection of data. Estonian Credit Register was established by Estonian banks in 2001 and it is administered by private company Krediidiinfo; it contains delayed payments for companies and private persons. Krediidiinfo belongs to the Experian Group since 2006.

Company basic data, their *legal structure*, *B2B and micro-firms* information are entirely available (commercial register, private credit register or land register). *Company activity* information is missing data on clients, suppliers and banks. *Executives* are also missing information on fiscal data, personal data, adverse and credit information. *Annual accounts*, on the other hand, are lacking data on off-BS liabilities and off-BS assets. There are no *credit reporting information* data. They need to be filled out by banks.

FINLAND

Finland has two private credit bureaus.

They have the complete set of information on *company basic data*, *company legal structure*, *B2B* and *public record filing*. *Annual accounts* and *micro-firms* provide information with a few exceptions such as off-BS liabilities, off-BS assets, on the one hand, and immovable properties and mortgage on the property, on the other hand. With regards to *company activity* and *executives* almost half of the information is provided. Lastly, when looking at *credit reporting information* only data regarding identification of lender (available at the private credit bureaus) and non-performing situation (available at courts) are provided, leaving the other data unaccounted for.

FRANCE

Banque de France is public and the only credit register in France. But only credit institutions, credit insurers, 'intermediaries' in crowdfunding (and probably soon insurance companies, mutual insurance companies and provident institutions investing in loans under conditions provided for by their respective legislation) have access to it. Scoring entities (SMEs are usually not rated by rating agencies), active in the B2B credit and the supply chain industry, cannot access the information from the Banque de France.

Company basic and *company activity data* are available (privately and publicly) with some exceptions, being them, branches abroad, clients and suppliers. The data could only be obtained by contacting the company/SME directly. Regarding the *executive* data, no information is available on personal fiscal data (due to personal data protection law in France), adverse information and credit information if regarding the executive. Data on outstanding payments from government (in the public record filing section), and immovable properties/valuation and mortgage on property (in the micro-firms section) are also not obtainable through any source.

GERMANY

There is only one public credit register in Germany in the Bundesbank and a number of private credit bureaus (9).[5]

Germany has no data at all on *credit reporting information*. Within the other sections, the following data are not available: clients and suppliers (*company activity* section); adverse information and credit information (*executives* section); suits and court actions (*public record filing* section); off-BS liabilities and off-BS assets

[5] See Annex III of DG GROW (former DG ENTR): 'Bankruptcy and second chance for honest bankrupt entrepreneurs. Draft final report' by Ecorys. Rotterdam, 31st July 2014

(*annual accounts* section) and finally the financial burden, immovable properties/valuation and mortgage on property (*micro-firms* sections). The available data are either public coming from the commercial office and register, for example, and/or privately available, through databases of the credit bureaus themselves or directly from the company.

GREECE

Greece has one private credit bureau, the company called Tiresias. The Central Bank of Greece does not assume any role as credit registry.

With limitations regarding the availability of data, Greece discloses the complete set of variables in the following sections: *company basic data*, *company activity and company legal structure*. Within *company basic data* only data for limited liability and public limited companies are publicly available (through official gazette, national registrar and ministry of finance). Other type of companies are available on the web of the Ministry of Finance but not to credit bureaus. With regards to *company activity data*, the privately available information (subsidiaries, branches, clients, suppliers and banks) is partially provided through inter-company networks or commercial associations (from a small number of companies and/or sole traders). The publicly available information such as company status and sector, for example, is provided on the web of the Ministry of Finance but, once again, not to credit bureaus. With regards to the shareholders, they are only available for limited liability and public limited companies in the official gazette.

Data regarding *executives* are not available on ultimate owner and personal fiscal data. Regarding personal data on executives they are only available when their companies are limited liability and public limited companies. *Credit reporting information* is only privately available and only to the financial sector, with the exception of information on identification of lender and lender type which are not available at all. *B2B* is lacking some data such as payment behaviour of SME with telecommunications providers and utilities, while other information is both publicly and privately available, through inter-company networks or commercial associations. Data on *public record filing* are publicly available from courts/registries for suits, court actions and bankruptcies. The private credit bureau Tiresias collects this type of information and provides the data centrally and electronically to its clients. *Annual accounts* are also lacking information, for example data on delay in publication of annual accounts, off-BS liabilities and off-BS assets. Data on balance sheet and P&L are only available for limited liability and public limited companies. Data on *micro-firms* is privately available (with some limitations) with the exception of immovable properties.

HUNGARY

There is only one public credit register (Central Credit Information System - CCIS) in Hungary. CCIS is developed and managed by BISZ Plc and maintained by GIRO Plc. BISZ Plc is owned by GIRO Plc and GIRO's owner is the central bank.

Hungary discloses the following sections, whether publicly and/or privately: *company basic data*, *company activity*, *company legal structure and credit reporting information*. For the last one, financial institutions provide the information to the CCIS. With regards to the *executives*, Hungary does not make available the following information: personal fiscal data, personal data on executives, adverse and credit information. There is no data at all regarding *B2B*. And with regards to *public record filing* data on collections and outstanding payments to government are lacking availability. In annual accounts data on off-BS liabilities, off-BS assets and consolidated group accounts are also not available. On *micro-firms*, there is no disclosure on data regarding immovable properties and mortgage on the property.

IRELAND

The Irish Credit Bureau Ltd is owned by Irish banks and finance companies and maintains register of credit agreements, mainly from individuals but includes SMEs, as well. A public central credit register of credit to individuals and SMEs is currently at inception stage and is expected by 2016/17.

Ireland has disclosure, with some limitations, of the sections *company basic data*, *legal structure*, *credit reporting information*, *B2B* and *annual accounts*. *B2B*, for example, are provided through loading payment

ledgers from suppliers. With regards to *company activity data* on branches abroad, clients and suppliers are not available. The other data, such as, subsidiaries abroad and banks, are available thanks to the investigation undertaken by the credit bureau. Personal fiscal data and credit information on *executives* are not available. Regarding the *public record filing*, Ireland does not make information available on outstanding payments from government and payment behaviour of SME with government. With regards to *annual accounts*, only companies in excess of €8.8 million are required to file P&L data in Ireland. This means that ca. 10-15% of companies are required to file in the public register, out of which ca. 5-10% are SMEs. On the contrary, more than 90% have to file balance sheet data. On the *micro-firm* section, Ireland only publishes data regarding mortgage on the property.

ITALY

Italy has four private credit bureaus, in addition to their central bank and its central credit register. The latter registers bank loans and inform participants about the aggregate indebtedness.

Company basic and *company activity data* are available (privately and publicly) with some exceptions, being them, clients, suppliers and banks. With regards to the *executives* there are no data at all regarding the personal data of the executives. There is another category within the *public record filing* where there are no data available, neither public, nor private, and which are outstanding payments to government and vice versa, payment behaviour of SME towards the government.

All variables of *annual accounts* are available through both sources, private and public. Regarding the *credit reporting information*, data on *B2B* (except payments behaviours with telecommunications providers & utilities for which no objectively representative data are available) and *micro-firms* only private sources are available. In the first two cases, there are the credit bureaus or B2B payment databases that have that information and in the last case, it is the Italian Chambers of Commerce and it is only mandatory for companies who have to provide their balance sheet.

LITHUANIA

Lithuania is together with the UK one of the most open countries in terms of information availability. There are up to five private credit bureaus in Lithuania, in addition to their central bank which manages the Loan Risk Database. Commercial banks are required to provide information to the central bank to be able to receive data in return and in general, there is a reporting requirement for supervision purposes. Banks share positive and negative information also through private credit bureaus.

Company basic, company activity and executives data are all available with the exception of information about clients. With regards to the shareholder information there are legal restrictions to access the information on the register for legal entities and shareholder register. *Credit reporting information* and *B2B* information is available only through private sources, i.e. credit bureaus. On the other hand, *public record filing, annual accounts* and information on *micro-firms* are available through public and private sources, being the exception, outstanding payments from government, for which no information is obtainable.

LUXEMBOURG

Luxembourg has neither a public credit register nor a private credit bureau.

Company basic, company activity data and *legal structure* are available either publicly through the trade register, or privately, through the company itself. Some data on the *executives* are not available at all: identification of the owner, personal fiscal data, adverse and credit information. The same applies for *credit reporting information*. Only information on the *identification of lender* and *type of credit lines* are available. With regards to *B2B* disclosure, data on commercial credit repayment behaviour and outstanding payments are available gathered through suppliers/debt collection files (only privately available). Payment behaviour of SMEs with telecommunications providers and utilities are neither publicly, nor privately available. The same happens with *public record filing*, with the exception of bankruptcies. *Annual accounts* are available, except data on off-BS liabilities and assets. Finally, for *micro-firms*, no data at all are available on financial burden and mortgage on property.

THE NETHERLANDS

Netherlands has no public credit register, but accounts 13 private credit bureaus.[6]

Company basic data, (with limited data on clients and suppliers) information on *micro-firms* (with limited information on all the data) and *company legal structure* are available, both publicly and privately. Information regarding *company activity* and *executives* is also largely available, with the exception of data on banks, personal fiscal data, and adverse information which is missing. Data on *public record filing* and *annual accounts* is lacking half of the variables, specifically data on collections, outstanding payments from government, payment behaviour of SME with government, off-BS liabilities, off-BS assets, consolidated group accounts, and audited annual accounts unobtainable. There are furthermore no publicly nor privately information regarding *credit reporting* or *B2B*.

POLAND

Poland has no public credit register at the central bank. However, there is private sector activity in the country. For example, BIK (Biuro Informacji Kredytowej S.A.) owned by different banks collects positive and negative information. Banks are required, once they contribute data, to share that information.

Information with regards to *company basic data*, *legal structure*, *credit reporting information* (with the exception of loan details) and *annual accounts* (with the exception if they are audited or no) is available. Data on *company activity* in relation to their clients, suppliers and banks are not available. With regards to *executives* no information is available on personal fiscal data, nor adverse information or credit information. On *B2B* no data are available on payment behaviour of SME with telecommunications providers and utilities. In Poland, there are neither publicly, nor privately available data on *public record filings* (with the exception of bankruptcies) and *micro-firms*. On the latter some information is available in the Central Registration and Information on Economic Activity, mainly name, company's seat, owners, and company activity. Entrepreneurs, on the contrary, are registered in the National Court Register. There is information on outstanding tax and tariff duties, arrears towards the social insurance contribution, creditors and value of outstanding debt are available. Additionally, Poland has a Register of Insolvent Debtors (RDN) constituting a supplemental repository of knowledge on natural persons being in debt.

PORTUGAL

Portugal's central bank has registered credits. It is part of the supervisory functions of the bank and contains information on credit extended by participants to individuals and organisations. The data from the central bank is shared only with banks. The private sector is fairly competitive market with five private credit bureaus.[7]

Company basic data, company legal structure, and annual accounts data are all available. Information on *micro-firms* is not available at all. Half of the data on *company activity* are available, but data on subsidiaries and branches abroad, clients, suppliers, and banks are missing. There is furthermore no information provided at all for *credit reporting information* and *B2B*, while data are largely lacking for *executives* and *public record filing* with only information provided regarding CEOs, court actions and bankruptcies. For micro-companies the data are very spare.

ROMANIA

Romania has a central credit register which is held by the National Bank of Romania.

Information on *company basic data* and its *legal structure* is available from the National Trade Register Office (NTRO) and the Ministry of Public Finance (MPF). Partial data on *executives* is available from NTRO, more specifically the names of authorised persons such as directors, administrators or board members, but also their date of birth. With regard to the other sections, data disclosure is quite heterogeneous. On the *company activity* category, data are available with some exceptions (clients, suppliers and banks), whereas on the *credit reporting information* side, there is no accessible information on types of credit lines and monthly instalments. Furthermore, in *B2B* there is no payment behaviour of SME with telecommunications providers and utilities

[6] See Annex III of DG GROW: 'Bankruptcy and second chance for honest bankrupt entrepreneurs. Draft final report' by Ecorys. Rotterdam, 31st July 2014
[7] See Annex III of DG GROW: "Bankruptcy and second chance for honest bankrupt entrepreneurs. Draft final report" by Ecorys. Rotterdam, 31st July 2014

available. With respect to *public record filing*, Ministry of Justice and/or NTRO provide information on suits, bankruptcies and court actions. Moreover, there is no data available about the delay in publication of the annual accounts, nor about the off-BS liabilities and off-Balance Sheet assets, or consolidated group accounts. With regards to *micro-firms*, the only information not available is on mortgage on the property.

SLOVAKIA

There is one public credit register, Register of Bank Loans and Guarantees (only information on legal persons and natural persons/entrepreneurs[8]) which belongs to the National Bank of Slovakia. There are three private credit bureaus.[9]

A complete data section is only available in *company basic data* and its *legal structure*. In all the other sections there are always some data missing. In *company activity* only data on company status, sector and shareholders are available; in *executives*, on common directorships; in *credit reporting information*, on types of credit lines, monthly instalment and non-performing situation; in *public record filing*, data on suits, court actions, bankruptcies and payment behaviour of SMES with government are disclosed; in *annual accounts*, on balance sheet, P&L and audited accounts are available and finally, on *micro-firms*, data on immovable properties. There are no data at all on *B2B*.

SLOVENIA

The public credit register has been set up in 1994 at the Slovenian central bank with an additional credit bureau called SISBON which only covers natural persons. There are some private credit bureaus in Slovenia, such as Bisnode, that collect and process the information of SMEs.

Company basic, company activity and legal structure data are available, with the exception of the information about clients and suppliers. Data on *executives* are only available about the ultimate owner and common directorships. With regards to *credit reporting information* data on the type of credit and monthly instalments are not disclosed. The rest of information is held by the central Bank (Bank of Slovenia), but only if the lender is a Slovenian bank. With regards to *B2B* and *public record filing* only information about outstanding payments and bankruptcies, respectively, is available. Information on *annual accounts* is all available with the exception if the accounts are consolidated or not. Regarding *micro-firms* only data on number of employees are available.

SPAIN

Spain has three private credit bureaus together with the credit register in the central bank. The data from the central bank is shared only with the banks.

For *company basic, company activity, legal structure, B2B, and public record filing* data are available, whether public and/or privately, although with some limitations. *Company activity* data such as company status, shareholders, subsidiaries (home, abroad) and branches (home, abroad), are not always available. *Annual accounts* information is partially available, excluding data on off-BS liabilities and off-BS assets. Information regarding *executives* and *credit reporting information* is not available at all, as this information is normally not used in credit reports, or in credit bureaus, with the exception of information about lender (type) which is sometimes available.

SWEDEN

Sweden has 12 private credit bureaus approved by data protection, of which 5-6 are active. It has no public credit register.

Company basic data, company legal structure, public record filing are all available. *Annual accounts* information is furthermore all available with the exception of off-BS liabilities and consolidated group accounts. About half of the variables are available for *company activity* where information regarding sector / subsector of economic activity, shareholders, clients, suppliers and banks is not accounted for. Information regarding *executives* is largely available, lacking data on personal data. Data on ultimate owner and credit information is

[8] Natural persons which are not entrepreneurs are excluded from the register.
[9] See Annex III of DG GROW: 'Bankruptcy and second chance for honest bankrupt entrepreneurs. Draft final report' by Ecorys. Rotterdam, 31st July 2014

only available for sole traders. Data on *micro-firms* are equally available, although mainly privately, and with lack of information regarding number of employees, and immovable properties. All data for *credit reporting information* and *B2B* data are available with the exception of data on monthly instalments. But in the first case, the information is only provided for sole traders, and in the second case, it is provided by a limited number of companies.

THE UK

In the UK there are six private credit bureaus, multiple resellers and other smaller market players. There is no public credit register in the UK, but the private sector is quite competitive, with a developed infrastructure for data collecting and sharing in closed user group (e.g. bank/credit reference agencies) based on reciprocity principle.

Company basic data including the identification of common directorships is publicly available, filed with Companies House. But, on the contrary, what companies do not disclose is information regarding their clients and suppliers considered highly confidential. Basic information on *executives* is held by consumer credit bureaus (Experian, Equifax and Call Credit) and is disclosed to their members. In some cases companies may disclose information also with respect to subsidiaries abroad that is also publicly filed in Companies House.

Information on loans, types of credit, limits and overdraft are shared by banks in closed groups. This means that credit information firms are able to storage the data for own purposes and use it (e.g. Equifax 'Insight' and Experian 'CAIS'), but they are not allowed to disclose or give the information further. Personal credit information on executives is not made available, neither outstanding payments from government and payment behaviour of the SME towards the government.

The *annual accounts* data and off-balance sheet items are publicly available for all limited companies through Companies House. However, micro-companies and sole traders have no obligation to register. As result, considerably less data are made available for micro-firms compared to the limited liabilities companies. Turnover for micro-companies is not available. It is approximately derived from the balance sheet data and other collected information.

ANNEX 2: COMPANIES AND INSTITUTIONS CONTACTED FOR THE MAPPING SURVEY

Country	Company/Institution
Austria	**KSV1870 Information** www.ksv.at
Belgium	**National Bank of Belgium** www.nbb.be
	Euro DB – part of Roularta Media Group www.b-information.be
Bulgaria	**BCRA – CREDIT RATING AGENCY** www.bcra-bg.com
Croatia	**Hrvatski registar obveza po kreditima** www.hrok.hr
Cyprus	**Artemis Bank Information Systems** www.artemis.com.cy
Czech Republic	**CRIF — Czech Credit Bureau** www.crif.cz
	Solus www.solus.cz/en
Denmark	**Bisnode** www.bisnode.com
Estonia	**Krediidiinfo (an Experian Company)** www.krediidiinfo.ee

Finland	**Suomen Asiakastieto** www.asiakastieto.fi
France	**Banque de France** www.banque-france.fr
	Ellisphere www.ellisphere.com
Germany	**Verband der Vereine Creditreform** www.creditreform.de
Greece	**Tiresias** www.tiresias.gr
	Icap Group www.icap.gr
Hungary	**BISZ** www.bisz.hu
Ireland	**Experian Ireland** www.experian.ie
Italy	**Experian Italy** www.experian.it
	Cerved Group www.cervedgroup.com
	CRIF www.crif.it
Lithuania	**Creditinfo Lithuania** www.creditinfo.lt
Luxembourg	**Creditreform Luxembourg** www.creditreform.lu
Netherlands	**Experian Nederland** www.experian.nl
Poland	**Biuro Informacji Kredytowej** www.bik.pl
Portugal	**Informa D&B** www.informadb.pt
Romania	**National Bank of Romania** www.bnro.ro
Slovakia	**Solus** www.solus.sk
	SID Slovensko www.sidslovensko.sk
Slovenia	**Central Bank of Slovenia** www.bsi.si/en
Spain	**Informa D&B** www.informa.es
Sweden	**UC Group** www.uc.se
United Kingdom	**Creditsafe Business Solutions** www2.creditsafeuk.com
	Equifax www.equifax.co.uk
	Experian www.experian.co.uk

References

ACCIS (2014), 'Membership survey of national SME information market 2014', May 2014.

ACCIS, ECRI (2011), 'The European Credit Information Landscape. An analysis of a survey of credit bureaus in Europe', January 2011.

AFME (2012), 'Financing European growth: a new model. Essays and discussion from a Brussels symposium'.

Bank of England (2014), 'Summary of feedback received on the Bank of England's May 2014 Discussion Paper on UK credit data Paper', November 2014.

Bank of England (2014), 'Should the availability of UK credit data be improved? A Discussion Paper', May 2014.

ECB (2014), 'Survey on the access to finance of enterprises in the euro Area', April-September 2014.

ECORYS (2014), 'Bankruptcy and second chance for honest bankrupt entrepreneurs', Rotterdam, July 2014.

ECSIP (2013), 'Improving the market performance of business information services regarding listed SMEs', September 2013.

EFSIR 2012, 'SME's credit assessment industry, contribution to stability and growth', April 2013.

EU COM(2014) 168, 'Communication on Long-Term Financing of the European Economy', http://ec.europa.eu/finance/general-policy/financing-growth/long-term/index_en.htm#maincontentSec2

EU COM 95/46/EC, Data Protection Directive, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31995L0046:en:HTML

HM Revenue & Customs/BIS, 'Report on Use of Non-Financial VAT Registration Data in Trade Credit Scoring', June 2014.

HM Revenue & Customs, 'Sharing and Publishing Data for Public Benefit. Summary of Responses', December 2013.

Jentzsch, Nicola (2007), 'Financial Privacy: An International Comparison of Credit Reporting Systems (Second Edition)', Springer, November 2007.

Llewellyn (2012), 'Financing European growth: the challenges for markets, policy makers and investors', August 2012.

L. Hill (2014), 'Capital Markets Union – finance serving the economy', speech 6 November 2014, http://europa.eu/rapid/press-release_SPEECH-14-1460_en.htm

Stiglitz, Joseph E., and Weiss, Andrew Murray, 1981, 'Credit Rationing in Markets with Imperfect Information', American Economic Review 71 (3): 393–410.

Stiglitz, Joseph E., 2002, 'Information Economics and Paradigm Change', The American Economic Review 92 (3): 460–501.

World Bank (2013, 2014, 2015), various editions of 'Doing Business Report'.

World Bank (2014), 'Facilitating SME financing through improved Credit Reporting', March 2014.

World Bank (2011), 'General Principles for Credit Scoring', September 2011.

Printed by OIB