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EFFECTS ANALYSIS (EA) ON THE EUROPEAN DEPOSIT INSURANCE SCHEME (EDIS)

Contents

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EXECUTIVE SUMMARY

On 24 November 2015 the Commission adopted a proposal for a European Deposit Insurance Scheme (EDIS). The Commission considered the 2010 impact assessment, leading to the adoption of the current Deposit Guarantee Scheme Directive (DGSD), as a solid basis for the EDIS proposal with the same 0.8% target level than the current DGSD. This effects analysis complements the impact assessment for the DGSD.

This paper analyses the effects of three options for the set up of deposit insurance within the Banking Union. In addition it analyses the effects of different options on a number of more specific issues in the design of EDIS.

Effects of different options for deposit insurance in the Banking Union

Policy options. Three mandatory approaches have been considered: mandatory reinsurance, mandatory lending and a mutualised fund. The *mandatory reinsurance* model is assessed as a steady-state option on the basis of different levels of distribution of resources between national DGSs and the European reinsurer, plus different caps for uncovered liquidity and losses for the European reinsurer. The *mandatory lending* model requires participating DGSs to provide up to 0.5% of covered deposits to cover the liquidity shortfall. As all loans must be repaid in full by the borrowing DGS, the lending DGS does not incur any loss. The *fully mutualised fund*, which is the steady state under the EDIS proposal, replaces national DGS in providing full liquidity and absorbing any loss. The co-insurance model under the EDIS proposal was not specifically tested, as it is only a variation of the mandatory re-insurance model (with participation from the first euro of loss) and because the EDIS proposal only envisaged it as a transitory stage to a fully mutualised fund.

An EU solution. By analysing stressed scenarios for 99.8% of EU-bank assets, the non-paper shows that, under all three options, pooling risk delivers in every circumstance a significantly stronger deposit guarantee system than a system of purely national schemes with voluntary lending. The expected shortfall of a single scheme is lower than that of multiple national schemes.

The three policy options are tested against three criteria:

1. Risk absorption;
2. Efficiency and cost neutrality; and
3. Limits on moral hazard.

Risk absorption. The mutualised fund (EDIS) performs better than the mandatory re-insurance and lending schemes in all the simulations, both in providing liquidity and absorbing losses. In terms of liquidity, the mutualised fund makes available more funds, as compared to the other options. In terms of loss absorption, the probability of remaining losses after recovery in insolvency/resolution proceedings, implying failure of the DGS itself, is the smallest under the fully mutualised fund, as extraordinary contributions are used to cover losses, as opposed to mandatory lending where national DGSs fully bear the losses, as they receive funds in the form of loans.

Mandatory reinsurance outperforms mandatory lending with respect to liquidity and losses, even when its caps are low and it performs close to the mutualised fund without caps. The fully mutualised fund (EDIS) also offers greater risk diversification (portfolio effects), which minimises the expected losses for the whole financial system in case of an asymmetric shock. Indeed, EDIS requires a risk-based contribution from each participating bank calculated relative all other banks in the Banking Union rather than a risk-based contribution calculated only relative to other banks in the same national banking system.

Moreover, there is strong interconnection between the probabilities of default of all banks within the Banking Union, also across borders. As a consequence, a national DGS cannot be fully insulated from developments in a DGS in another Member State, which is unable to withstand a shock in its local banking system. In a system of single DGSs, this implicit risk would need to be made explicit by obliging banks to pay for it within a two-tier system of risk-based contributions: a bank-level contribution to account for idiosyncratic risks at national level and a contribution at the national banking system level to account for interconnectedness. The mutualised fund solution overcomes this need by raising funds at bank level relative to all other participating banks across the Banking Union, so factoring in cross-border interconnectedness in one single contribution from each participating bank. Due to its loss absorbing capacity, a fully mutualised fund (EDIS) would be in a good position to deal with potential spill over effects among all banks in the Banking Union. A centralised governance of the mutualised fund would also ensure the uniform implementation of the risk-based contribution without the need for a two-tier system of national and supranational contribution rules.

Efficiency and cost neutrality. The mutualised fund and the mandatory reinsurance model with a central body are similar in terms of efficiency and offer a better management of funds than mandatory lending in the collection and during liquidation or resolution. While all options offer a neutral solution in terms of the total cost of the intervention, the mutualised fund offers a more balanced redistribution of losses across banks, which does not penalise banks for their nationality but only for the way they manage their risk exposures.

Moral hazard. The mandatory lending model offers protection against moral hazard because full repayment of loans is required, implying no participation in losses by the lending DGS. However, the different safeguards foreseen for the reinsurance and the mutualised fund model (EDIS) are comparable in terms of reducing moral hazard incentives. Bank level risk-based contributions in EDIS reduce incentives for banks to misbehave. With the creation of the Single Supervisory Mechanism and the Single Resolution Mechanism, the increased centralisation of prudential rule-making and supervision has already significantly reduced monitoring costs and so moral hazard. These safeguards come on top of other 'built-in' features of EDIS, such as the unified governance of funds or the disqualification to the access to coverage in case a Member State violates the principle of sincere cooperation.

The transitional period in the EDIS proposal. This non-paper also discusses the transition from reinsurance, to coinsurance and to a steady-state fully mutualised fund under the EDIS proposal, comparing the alternative phases and assessing the effects on the current funding path. The analysis shows that the loss absorbing capacity of EDIS, compared to a purely national system, strongly increases along the different phases. The analysis also deals with the evolution of the EDIS funds suggesting a funding path where contributions to the fund are spread as evenly as possible over time to avoid potential cliff effects.

Specific issues in the design of EDIS

National options and discretions. The DGSD leaves Member States with a degree of discretion in a number of areas. EDIS would preserve such discretion to the extent it is necessary to accommodate Member States' specificities. However, wide differences in national implementation due to retained discretions could impair depositor confidence and the effectiveness of the internal market. The effect analysis therefore reviews the interaction of the EDIS proposal with national discretions under the DGSD, identifying those which should be retained and indicating how the retained discretions would be managed under EDIS.

Irrevocable Payment Commitments (IPC). The use of irrevocable payment commitments (IPC) are not envisaged in the EDIS proposal. The analysis identifies a number of operational and procedural risks that support this decision.

Temporary High Balances and other options and discretions. The DGSD envisages that the DGSs provide coverage also for temporary high balances (THBs) in an account, as a result of special transactions, such as real estate transactions or insurance claims. The level of protection and time period is left to the discretion of the Member States. The information provided by Member States, together with the exceptional nature of these transactions, suggests that their magnitude is likely to be small compared to the 'regular' deposit claims in case of a pay-out. Therefore, the policy option adopted in the EDIS proposal to cover THBs appears to be correct.

EDIS scope. As regards non-CRR entities, the effects analysis looks at different options in terms of scope concerning non-CRR entities and third country branches. On non CRR-entities, the EDIS proposal would cover all credit institutions affiliated to a participating DGS. On third country branches, the proposal respects the discretion granted by the DGSD to Member States as regards the equivalence test of deposit protection for third country branches. Therefore coverage by EDIS depends on the exercise of such discretion. As regards preventive or alternative measures, these should not be covered by EDIS since they are only used by a very limited number of Member States and are therefore not considered to be core functions to be financed by EDIS. Instead, EDIS funding for preventive and alternative measures would mutualize expenditures for measures that would be exclusively decided by each Member State with no input from the central body (SRB).

Contributions. The principle that bank contributions to DGS should be risk-based is already established by the DGSD. This analysis sets out how this principle could be applied in the EDIS context. Notably, in the reinsurance phase of EDIS, where risks remain largely at the level of the (national) DGS, a bank’s risk profile relative to the its (national) DGS peer group could determine its risk-base. When EDIS becomes a system with shared risks at Banking Union level, starting with co-insurance, an individual bank’s risk-base could be determined relative to all banks in the Banking Union.

1. CONTEXT OF THE EFFECTS ANALYSIS (EA)

On 24 November 2015, the Commission adopted a proposal for a European Deposit Insurance Scheme (EDIS).[1] The proposal builds on the existing Directive on Deposit Guarantee Schemes 2014/49/EU (DGSD), which harmonizes key elements of the current framework for national deposit guarantee schemes (DGS). The DGSD benefited from a comprehensive impact assessment by the European Commission in 2010[2]. That impact assessment already demonstrated that introducing a pan-European deposit guarantee scheme would have a number of advantages compared to the current system; the option of a pan-European scheme was not pursued at that time, but now forms the basis of the EDIS proposal. In addition, the EDIS proposal maintained the current national DGSD target level (0.8% of covered deposits at national level). Therefore, the Commission considered the EDIS proposal to be founded on solid grounds.

During negotiations with the Council on the EDIS proposal, the Commission was invited to supplement the impact assessment for the DGSD with an analysis of the effects of the policy choices included in the proposal.[3] In addition, the ECON rapporteur in her working document of 16 June 2016 invited the Commission to provide an assessment of the impact of the EDIS proposal. In order to facilitate progress in the negotiations, the Commission committed to the Council and European Parliament to prepare such an "effects analysis" by October 2016[4]. The effects analysis, which is presented in the remaining sections of this non-paper, comprises the following elements:

- an outline of the existing framework for national DGS in the European Union;
- the effects of the proposed EDIS proposal compared to alternative policy options; and
- the interaction between national options and discretions under the DGSD and EDIS.

[1] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015PC0586&from=EN
[2] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010SC0834&from=EN
[3] http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-%2F%2FEP%2F%2FNONSGML%2BCOMPARL%2BPE-585.423%2B01%2BDOC%2BPDF%2BV0%2F%2FEN
[4] Letter of Vice-President Dombrovskis and Commissioner Lord Hill to the ECON Chair, Roberto Guatieri, and to the Minister of Finance of Slovakia and President of the ECOFIN Council, Peter Kazimir, dated 14 July 2016.

2. THE EXISTING FRAMEWORK FOR DGS IN THE EUROPEAN UNION

The current DGSD Directive is the starting point for the EDIS proposal, which integrates some of the main features of the Directive. Some of those features present operational challenges for implementing EDIS, but will ultimately produce efficiency gains.

The *scope* of the DGSD requires all credit institutions to join an officially-recognized DGS at national level, with the possibility for institutional protection schemes (IPS) to be recognized as DGS. Depositors at bank branches in another Member State are reimbursed by the DGS in the host Member State, which acts as a "single point of contact" on behalf of the home DGS.

The *level of depositor protection* under the DGSD has been harmonized at €100.000 per depositor, per bank. The repayment deadline must be gradually reduced from 20 working days at present, to 7 working days by 2024 at the latest. During this transitional period, depositors in need may ask for a so-called social pay-out, i.e. a limited amount to cover their costs of living to be paid within 5 working days.

In terms of *depositor information*, the DGSD ensures that depositors are aware of the key aspects of protection of their deposits by DGS. For example, when depositing money in a bank, depositors must countersign a standardised information sheet containing all relevant information about the coverage of the deposit by the relevant DGS. Banks are obliged to provide their account holders with basic information about depositor protection on an annual basis.

Under the DGSD, the target *funding level* for *ex-ante* funds of DGS is 0.8% of their covered deposits. This target level must be reached by 2024. Exceptionally, if the DGS has made cumulative disbursements in excess of 0.8% of covered deposits, Member States may extend the deadline for a maximum of 4 years. This target level is a minimum and Member States can set higher levels for their DGS. On the other hand, the DGSD also allows Member States, after approval by the Commission, to set a lower target level at a minimum of 0.5% of covered deposits if their banking sector is dominated by large banks which are unlikely to be liquidated and to trigger the use of DGS funds, also in view of upcoming MREL/TLAC requirements.

DGS funds should consist, in principle, of cash and low-risk assets. A maximum of 30% of funding can consist of payment commitments. In case ex-ante funding is insufficient, the DGS must immediately collect ex-post contributions from the banking sector. As a last resort, the DGS should have access to alternative funding arrangements such as loans from public or private third parties. There may also be a voluntary mechanism of mutual borrowing between DGS from different EU Member States (to date no such voluntary lending scheme has been agreed). Bank contributions to national DGS must be risk-based, i.e. they must reflect the individual risk profile of the bank concerned. This means that banks with a higher risk profile must contribute more to a national DGS. The European Banking Authority (EBA) has adopted Guidelines for the calculation of such risk-based contributions[5].

As regards the *use of DGS funds*, the DGSD provides two mandatory functions for every DGS:

- A payout function; and
- Participation in resolution.

[5] EBA, Guidelines on methods for calculating contributions to deposit guarantee schemes, 22 September 2015.

The pay-out function[6] is defined by the DGSD as the primary function, if deposits become unavailable and it is the relevant counterfactual when determining the limits of other uses of the DGS.

As regards participation of the DGS in resolution,[7] in accordance with Article 109 of the BRRD, the BRRD provides that a DGS is liable for the amount of losses that covered depositors would have suffered after applying 'bail-in' or other resolution tools if these liabilities had not been protected from such losses. The DGS participates in resolution either in an 'open bank' bail-in scenario or by financing the transfer of deposits to a bridge bank and liquidating the remaining estate.

The DGSD also includes an option for DGS to have two additional functions. Member States may allow DGS to (a) use their financial means so as to prevent failure of an institution under certain conditions; and (b) finance a deposit book transfer and eventually other assets and liabilities in order to preserve the access of depositors to covered deposits, in the context of national insolvency proceedings. The DGSD also leaves discretion for Member States in other areas, for instance to use DGS to cover temporary high balances in depositor accounts and to accept irrevocable payment commitments in funding DGS.

The EDIS proposal builds on and completes these key features of the current DGSD. EDIS's target level is the same (0.8%), bank contributions are risk-based, both deposit pay-outs and resolution interventions are covered by EDIS, and certain national discretions are permitted to reflect Member States specificities. Payment commitments are, however, not included under EDIS, for reasons of operational efficiency: in a pay-out event funds must be quickly accessible and disbursable in order to meet applicable deadlines.

[6] Article 11(1) DGSD
[7] Article 11(2) DGSD

3. EFFECTS ANALYSIS OF THE MAIN POLICY OPTIONS

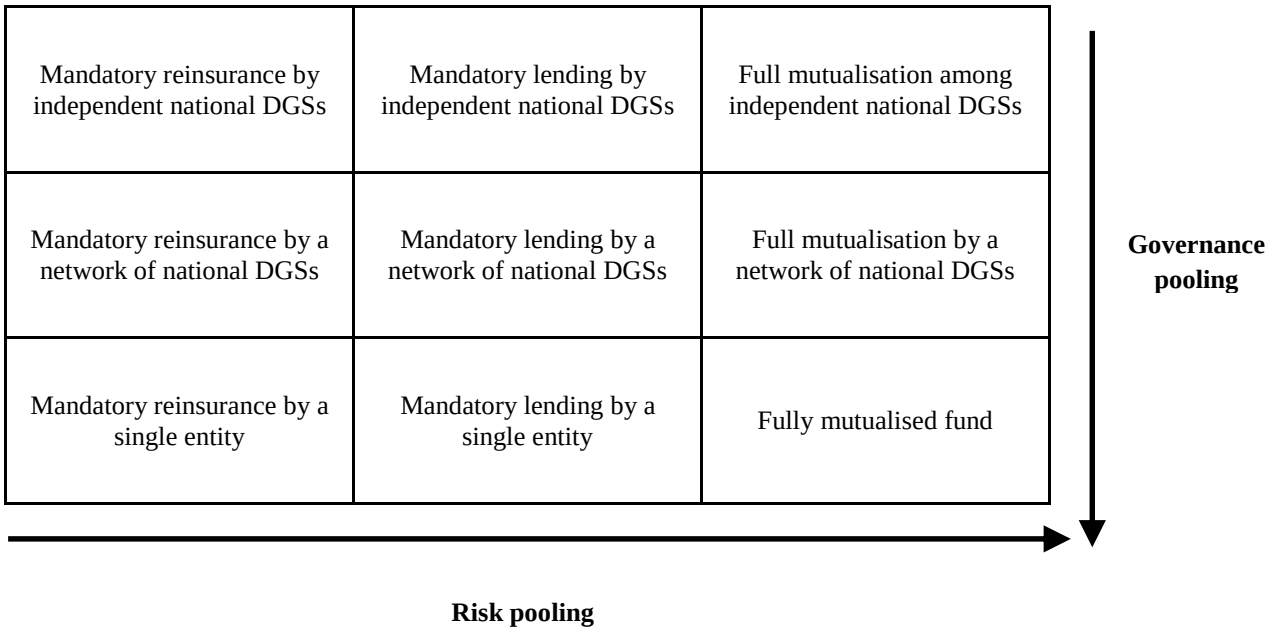
This chapter discusses the policy options on which the EDIS proposal is based, as well as relevant alternatives. Using an empirical analysis of the effects of the proposal, the effects of the EDIS proposal are benchmarked against two main alternative models for a pan-EU approach to DGS in the way options score against key objectives.

3.1. The design of a pan-European deposit insurance scheme

A single deposit insurance scheme is widely considered to be one of the three pillars of the banking union, together with the Single Supervisory Mechanism (SSM) and the Single Resolution Mechanism (SRM). The rationale behind the single deposit scheme is to ensure resilience and further weaken the sovereign-bank nexus. With a purely national DGS, depositor protection can be overwhelmed by large local shock. As explained in chapter 2, the objective of the DGSD was to upgrade the capacity of national DGS to withstand local shocks. The following sections assess whether the measures provided in the DGSD are sufficient and whether a single deposit insurance scheme would enhance depositor protection via scale and diversification benefits.

Designing a single deposit guarantee scheme for the banking union area involves the pooling of *risk* and *governance*. Risk pooling implies the possibility of national DGS sharing losses at a supranational level. Governance pooling implies a degree of mandatory coordination between national DGS at a supranational level in delivering protection to depositors. Figure 1 below shows the list of theoretically available options combining risk pooling and governance pooling. All the possible combinations of risk and governance pooling assume a mandatory contribution by national DGSs or by banks directly. A mechanism of voluntary lending is already in place with the DGSD, but it has never been used so far. A voluntary mechanism of reinsurance might as well be unable to offer (voluntary) protection mechanisms for shocks whose downside risk is a bank run.

Figure 1. Risk vs Governance pooling (all options)



In theory, there are at least nine combinations of risk pooling and governance pooling.

Risk pooling among national DGS can be envisaged along a spectrum ranging from mandatory reinsurance and lending arrangements to full mutualisation. A mandatory reinsurance arrangement among national DGS partially pools risk, but the pooling is contingent on the scale of funding

required by the borrowing DGS and the probability of repayment to the lending DGS. A mandatory lending arrangement also partially pools risk, but requires some minimum level of lending by participating DGSs, irrespective of the scale of funding required and the probability of repayment. A fully mutualised arrangement pools risk fully, implying that any losses incurred by a participating national DGS will be directly covered by the common fund, which will raise funds directly from banks.

Governance pooling among national DGS can be envisaged along a spectrum ranging from separate bilateral arrangements, to arrangements centrally co-ordinated within a network, to unified governance via a single entity. The degree of coordination required among national DGSs gradually increases along this spectrum. A network of DGSs requires a minimum level of coordination through a central body that would coordinate and require action in well-defined areas. National DGSs would still retain control over areas that are not covered by the supranational agreement. Finally, governance via a single entity would shift decision-making powers to a central institution that ensures the smooth functioning of the scheme, using national DGSs as contact points. This option minimises coordination costs in a crisis, when the risk of a bank run is highest. Nevertheless, centralising governance increases the monitoring costs of all agents (national banks and supervisors), which may require specific actions (as discussed in section 3.3)

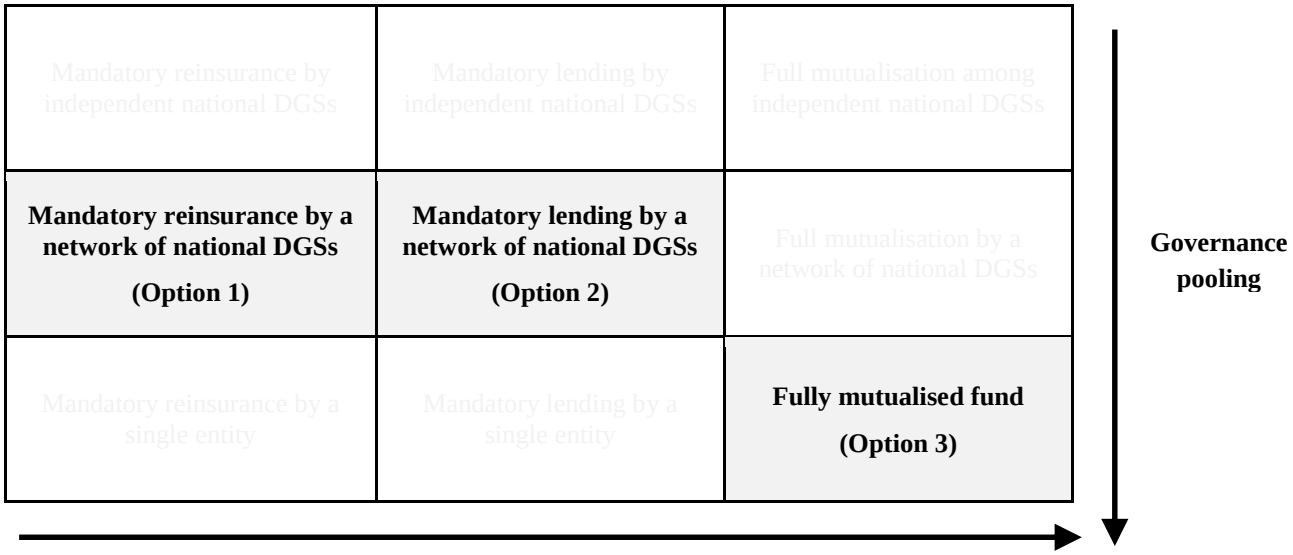
3.2. Policy options for risk and governance pooling

A voluntary lending mechanism among Member States represents the status quo under the DGSD, but it has never been used so far. Of the nine potential combinations of risk pooling and governance pooling in Figure 1, three alternative steady-state arrangements are further assessed in this analysis (see Figure 2):

- A mandatory reinsurance via funding by a network of national DGSs (as in phase 1 of EDIS; Option 1);
- Mandatory lending among Member States via a network of DGS, as proposed by the Commission in the context of DGSD (Option 2).
- Full mutualisation among Member States via a single entity, which is the steady-state arrangement underlying the EDIS proposal (Option 3).

Arrangements based on mandatory reinsurance, mandatory lending or a fully mutualised fund agreed bilaterally among DGSs are not considered further in this analysis because, without some degree of governance coordination through a supranational agreement, none of these arrangements would be feasible in a Banking Union context. For example, the governance of these arrangements when and under what circumstances the mandatory lending takes place and a coordination and enforcement mechanism is necessary and would be very difficult if this would be left to national DGSs. Ultimately, the incentive misalignment created in pooling risk without pooling governance would result in coordination challenges, which would ultimately undermine depositor confidence in the capacity of these arrangements to function effectively in a banking crisis.

Figure 2. Risk vs governance pooling (policy options)



All three models will be compared in the steady state, i.e. as they could exist in the final phase of the EDIS proposal. Note that the EDIS proposal only envisages a fully mutualised fund as a steady state objective. However, for the purposes of this effects analysis, other options have also been considered as steady state outcomes in order to compare and benchmark the outcomes of the available policy options. The co-insurance model, which is one of the phases of the transitional period, is not included, as it was originally designed only for the transition phases and its economic effects are in great deal similar to a mandatory reinsurance model, which is already part of this.

It should be noted that none of the three arrangements envisages a common fiscal backstop, which would be available if EDIS funding (including ex-post contributions by banks) proved insufficient in a crisis. In the absence of a common backstop, the ultimate responsibility for deposit insurance beyond the EDIS funding capacity would lie with the Member State concerned. The pros and cons of providing a common fiscal backstop in terms of enhancing depositor confidence and reinforcing financial stability are not examined in this analysis.

Box 1. ***Liquidity and loss: definitions***

A DGS typically plays two interconnected roles in the context of a bank failure. First, the DGS must immediately pay out for covered deposits. The DGS meets its pay-out commitments with available funds and ex-post contributions in the few days following the crisis. In this role, the DGS is a liquidity provider. Second, the DGS participates as a creditor in the subsequent resolution/insolvency proceedings relating to the failed bank so as to recoup the funding used to cover the pay-out. To the extent that these funds are not fully recovered, the DGS will be required to absorb a loss. The following definitions of liquidity and loss are used throughout the following sections.

Liquidity shortfall (LS) is the amount of covered deposits in the failing bank which exceeds the total available financial means in the DGS (i.e. under the DGSD, available funding plus extraordinary contributions that the DGS can raise within 3 days from the pay-out event).

Uncovered liquidity shortfall (ULS): the amount of covered deposits in the failing bank that cannot be covered either by the DGS through its own available financial means or through additional funding

made available via a supranational arrangement.[8]

Loss retention (LR) is the loss that still needs to be covered after collecting insolvency proceeds and receiving long-term extraordinary contributions from the banks, but before additional the additional funding made available by supranational agreements.

Uncovered loss (UL) is the loss that the national DGS or the Member State has to bear after collecting insolvency proceeds, long-term extraordinary contributions from banks at national level and after receiving additional funding made available via a supranational arrangement (in the case of mandatory re-insurance or a fully mutualised fund) or after supranational funds have been (partially) repaid under a lending arrangement.

Pay-out: the amount of covered deposits that a DGS is required to cover as a consequence of bank failures.

Available Financial Means (AFM): amount of funds at the disposal of a DGS.

Extraordinary Contributions (EC): extraordinary contributions that can be raised by the DGS in need within 1 year.

Recovery rate (R): the amount that can be recovered during insolvency proceedings.

3.2.1. *Mandatory reinsurance*

The arrangement is a form of risk pooling based on a partial re-insurance of the risk that is evaluated at a market price or with a market-like estimation (risk-based contribution) of potential funding provisions to a DGS in need. The model reinsures with its own funds only after a national DGS has depleted its own resources, which are capped at either 0.6% (option 1) or 0.4% (option 2) of national covered deposits, plus an additional 0.5% that can be raised from banks through ex post extraordinary contributions. The pooled funds would be managed by a central body, as it ensures uniform and rapid procedures and governance in the event of a shock.[9]

Compared to other models, the 'reinsurance effect' is defined by restrictions on the use of pooled funds to absorb:

- the liquidity shortfall; and
- the loss retention (see Box 1).

The restriction can take the form of an obligation to deploy funds of the national DGS first and/or the use of additional caps to the use of pooled funds for uncovered liquidity and/or losses (as in the reinsurance model proposed by the Commission for the transition period). In addition, the contribution to the reinsurance body is calculated on the basis of risk of the domestic banking system that contributes via the national DGS.

[8] The concept of "uncovered liquidity" does not mean that the national DGS would become free of its obligations to reimburse depositors according to Art. 8(1) DGSD, instead the DGS would have to obtain alternative funding as required by Art. 10(9) DGSD.

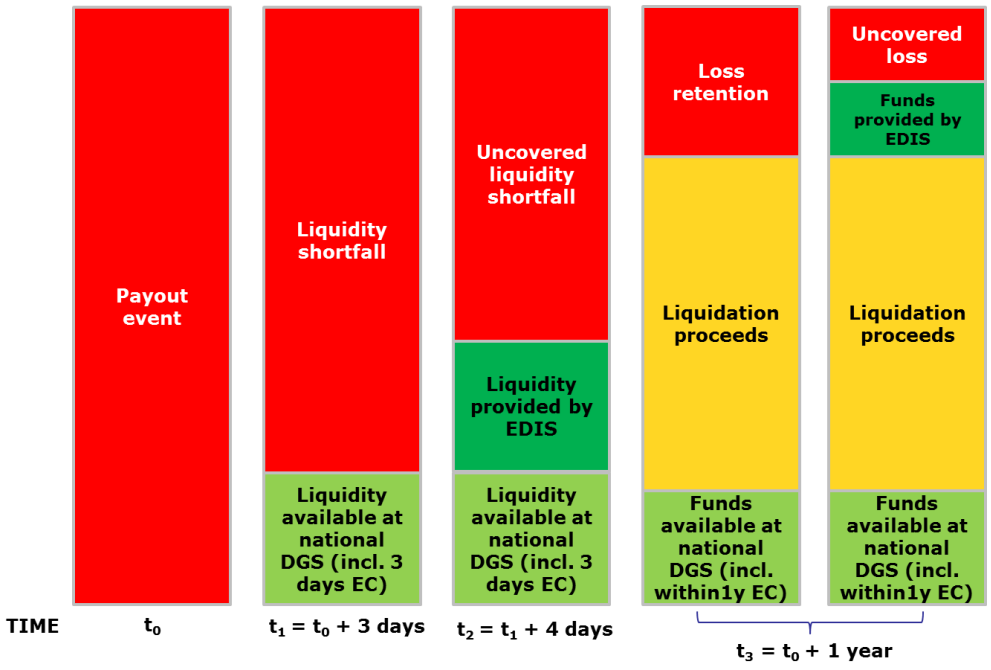
[9] This model could also rely on a system of independent DGS that would allocate their contributions on their own books and make them available upon request. This alternative option (Option 1A), would not be guaranteed to work successfully in practice and would be difficult to manage in a crisis situation, when a liquidity provision is required immediately.

Table 1. Mandatory reinsurance model - Key characteristics

Governance	Risk-based contribution	Total Cap[10]	Ex post contribution	Liquidity shortfall	Excess loss
Supranational agreement	National banking system level	Option 1: 0.2% covered deposits at EU level and 0.6% at national DGSs (plus 0.5% ex post) Option 2: 0.4% covered deposits at EU level, and 0.4% at national DGSs (plus 0.5% ex post)	Collected only by national DGS	Cover set between 20% and 80%	Cover set between 20% and 80%

In practice, Figure 3shows that the 'reinsurance effect' is spread across the liquidity and the loss phases. Reinsurance intervention only comes after the national DGS has absorbed liquidity shortfall and losses, until its own funds have been depleted. Caps on the liquidity shortfall and loss cover are designed to prevent the depletion of the EU fund.

Figure 3. Reinsurance model - Disbursement Phases



3.2.2. *Mandatory lending*

Mandatory lending via a network of DGS is a form of risk pooling that requires a minimum level of funding provision by participating DGS, irrespective of the shock suffered by the national DGS and the probability that the loan will be repaid. Funds are disbursed in the form of loan with a given

[10] The "total cap" in the table describes the funds available in the reinsurance fund and in the national DGSs. In other words, it allocates the amount of 0.8% of covered deposits which have to be collected under Art. 10 DGSD to the national and the European level. Additional caps could be introduced to limited the amount provided by the re-insurance to prevent first mover advantages and. The EDIS proposal contained in the re-insurance phase the caps that the EDIS intervention cannot in any case be higher than 10 times the level of covered deposits of the national DGS in need and 20% of the initial target level of the DIF.

maturity. For the purpose of the analysis, it is assumed that the funds pooled via mandatory lending can go up to 0.5% of total covered deposits.[11] These funds support the resources of national DGSs, which are 0.8% of covered deposits (as already required by the DGSD).

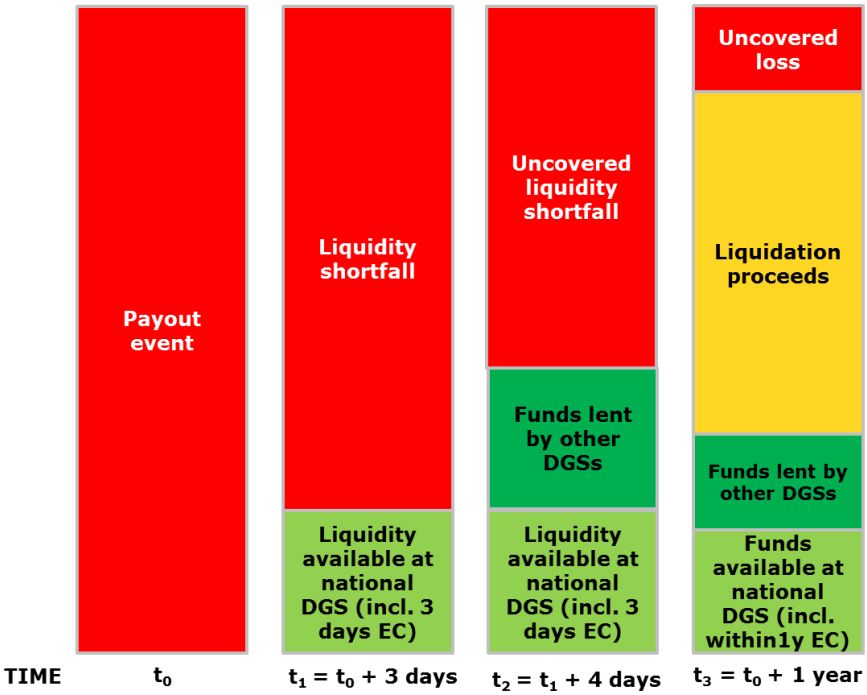
The governance of the funds remains at national level, with procedures for the collection and use of disbursed funds to be implemented by national DGSs. The maximum amount to be disbursed by each national DGS will be quantified on the basis of total covered deposits of the lending DGSs, but raised from banks on the basis of a risk-based contribution calculated on the risk of local banks.

Table 2. Mandatory lending - Key characteristics

Governance	Risk-based contribution	Total cap	Ex post contribution	Liquidity shortfall	Excess loss
Supranational agreement	National banking system level	0.8% at national DGSs and 0.5% of covered deposits through loans by other participating national DGSs	Collected only by national DGS	Cover by other national DGS of up to 0.5% of covered deposits	No coverage

This mandatory lending arrangement is also designed to produce significant disciplinary effects, as it issues funds in the legal form of a loan, although funds must be made available by national DGS without a pre-funding obligation. This arrangement does not cover any uncovered losses of the national DGS, as any loans to other DGS must be fully repaid. Uncovered losses must be addressed by the national DGS (e.g. via extraordinary *ex-post* contributions from banks or alternative funding arrangements).

Figure 4. Mandatory lending model - Disbursement Phases



[11] This was the distribution proposed in the DGSD Commission proposal in 2010 and is also currently in the voluntary lending regime of Art. 12 DGSD.

As a result, the mandatory lending arrangement produces its main effects in the *initial* pay-out phase, as additional resources are made available exclusively to cover an uncovered liquidity shortfall. As the obligation to repay the loans from other DGS takes effect, there is no loss absorption from the arrangement and the risk sharing benefits disappear over time (see Figure 4).

3.2.3. *Fully mutualised fund*

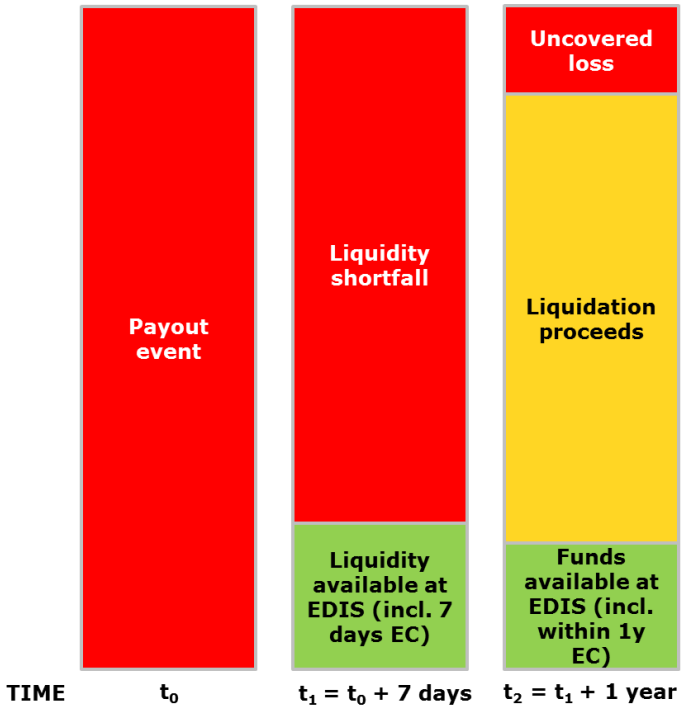
Mutualisation via a single entity is a form of risk pooling, which requires the single entity to assume risk that is equally distributed among participating banks. This is the arrangement underlying the steady-state phase of the EDIS proposal. In the EDIS proposal, the total funds collected (DIF) and made available by the single-entity (the Single Resolution Board, SRB) would be equal to 0.8% of total covered deposits, pre-funded, and 0.5% through ex post extraordinary contributions. The overall cap does not change compared to the other alternatives. The harmonised governance of the procedures for the collection and the use of the funds in liquidation and resolution is the distinguishing aspect of this arrangement. In particular, the SRB would apply one single risk-based contribution formula across the banking union area. This redistributes risk across the participating banks based on their individual risk profile and not on the risk profile of their national banking system. As discussed below, the risk diversification effect is most effective when risk is effectively distributed across all banks according to their *risk* rather than their geographical location and is fully in line with the basic concepts of a Banking Union.

Table 3. Fully mutualised fund - Key characteristics

Governance	Risk-based contribution	Total cap	Ex post contribution	Liquidity shortfall	Excess loss
EU institution	Bank level	0.8% of covered deposits pre-funded, plus 0.5% ex post contributions	Yes	Fully covered with available liquidity	Fully covered with available funds

The fully mutualised fund is designed to provide financial stability through incrementally increasing the risk absorption, i.e. the immediate availability of funds for an uncovered liquidity shortfall and uncovered losses. Harmonised risk-based contributions and unified governance of the funds would also provide disciplinary effects against the moral hazard risk (see section 3.4.4).

Figure 5. Fully mutualised Fund model - Disbursement Phases



3.3. **The incentive structure: moral hazard and risk reduction**

Moral hazard in the context of deposit insurance typically concerns the risk of opportunistic behaviour among banks and depositors in exploiting the implicit state protection of deposits. Among banks, such opportunistic behaviour can take the form of riskier activities, so as to boost profits, leaving governments (taxpayers) at greater risk of having to step in to protect depositors in the event a bank fails. Moral hazard also affects depositors, who can 'free-ride' on the state guarantee to deposit money where they receive a higher interest rate, regardless of a bank's riskiness. The risk of such opportunistic behaviour is associated with deposit insurance protection whether it is a national or a supranational one.[12] To address this form of moral hazard, governments typically enact prudential regulation to strengthen bank capital, use banking supervision to monitor risk-taking behaviours and design resolution mechanisms to provide incentives to banks' management and shareholders to avoid excessive risk.

[12] For an overview of the literature on moral hazard (of banks and depositors) and deposit insurance schemes, among others, please see B. Bernet & S. Walter (2009), "Design, structure and implementation of a modern deposit insurance scheme", SUERF – The European Money and Finance Forum, Vienna. Karas, A., Pyle, W. and Schoors, K. (2013), Deposit Insurance, Banking Crises, and Market Discipline: Evidence from a Natural Experiment on Deposit Flows and Rates. Journal of Money, Credit and Banking, 45: 179–200; C. Calomiris & M. Jaremski (2016), "Deposit Insurance: Theories and Facts", NBER Working Paper, N. 22223, April. There is also a growing stream of academic literature that associates the deposit insurance schemes with damaging moral hazard behaviours in the long-run (A. Demirgüç-Kunt & E. J. Kane (2002), "Deposit Insurance around the Globe: Where Does It Work?", The Journal of Economic Perspectives, Vol. 16, No. 2, pp. 175-195; A. Demirgüç-Kunt & E. Detragiache (2002), "Does deposit insurance increase banking system stability? An empirical investigation", Journal of Monetary Economics, Vol. 49, pp. 1373-1406; D., Anginer, A. Demirguc-Kunt, M. Zhu (2014), "How does deposit insurance affect bank risk? Evidence from the recent crisis", Journal of Banking and Finance, Vol. 48, pp. 312-321). Moreover, in reassessing Diamond & Dybvig's (1983) model, some authors pointed out that demandable debt may not be the optimal contract for banks (see, for this discussion, Calomiris & Jaremski, 2016). Nonetheless, as long as banks rely on demandable debt and depositors ask for deposit-taking services, a deposit insurance scheme typically provide sufficient risk absorption to avoid bank runs in a crisis.

Supranational arrangements for deposit insurance can create an additional source of moral hazard if not accompanied by appropriate safeguards. The 'safety net' provided by these supranational arrangements, beyond national DGS cover, could encourage local banks to assume more risk and encourage local supervisors to be more lenient. In pursuing national policy objectives, Member States could potentially adopt national legislation that creates incentives for increased risks on the balance sheets of financial institutions as the potential costs of a bank failure would be borne by all Member States. The possibility of this source of moral hazard is acknowledged in the EDIS proposal, which builds on and reinforces safeguards that already exist under the DGSD. These safeguards are:

- A uniform coverage level of deposit protection, capped at €100.000 across the European Union, provides the same incentives for all EU depositors to exercise a minimum level of control over banks' behaviours;
- Accessibility to the coverage by the DIF can be prevented if a national DGS "fails to comply" with key provisions of the DGSD or if the relevant administrative authority, or any other relevant authority of the respective Member State have acted in a way that runs counter to the principle of sincere cooperation as laid down in Article 4(3) of the Treaty on European Union;
- Prudential regulation, which sets capital requirements and other requirements to limit banks' risk-taking, are drafted and implemented at EU level;
- In initial (reinsurance) phase, national DGS funding must be fully exhausted before accessing pooled funding which is capped; this provides powerful incentives for national authorities to monitor the risk of domestic banks and so limit the risk of having to use deposit insurance.
- Together with prudential rules, supervisory practices are also increasingly converging at European level, and in particular for the banking union area, the introduction of the Single Supervisory Mechanism (SSM) has taken over prudential supervision of national supervisors (directly for significant banks and indirectly for less significant ones);
- A resolution mechanism, led by the Single Resolution Board, has been established to provide a single framework for resolving banks, coordinating the work of national resolution authorities; such a mechanism ensures that all banks within the Banking Union are subject to the same resolution system, which will provide similar incentives for banks across Member States;
- The BRRD has introduced a preference for DGS claims in the insolvency proceedings and also an MREL requirement to protect this senior class of creditors.
- EDIS envisages that the SRB should be responsible for use of the DIF, so as to define clear procedures for national DGSs and domestic banks to access the EDIS funds in every circumstance;
- Last, but not least, the bank contributions to the DIF will be risk-based and defined in detail by level-2 rules. (Risk-based contributions will be part of a separate effects analysis).

Moreover, it seems highly improbable that a Member State would deliberately decide to damage its own banking sector so as to avail of access to EDIS.

3.4. Comparing the three policy options

The impact of steady-state risk pooling as proposed in EDIS, compared to the *status quo* of 'no-pooling', has already been evaluated in an earlier paper for the AHWG and the empirical analysis is re-presented in Annex 6.5. In particular, the analysis suggests that the proposed steady-state EDIS

consistently outperforms the current system of harmonised coverage levels[13] based on voluntary lending among national DGSs. The pan-European solution has a higher absorption capacity and is better equipped to withstand multiple pay-out events.

Instead, the analysis that follows compares the effects of the three main models identified in previous sections in the steady state.

3.4.1. *Assessing risk absorption via SYMBOL*

This section tests the theoretical framework, developed in the previous section, using the unconsolidated balance sheet data of individual European banks to calculate the probabilities of default through the so-called 'SYMBOL' model (see Annex 6.3 for more details).[14] For each bank in each simulation run, SYMBOL determines whether it fails. A bank failure happens when simulated gross losses exceed the total actual capital. These cases trigger the DGS intervention to reimburse the amount of covered deposits of the failed banks.[15] These basic blocks of the analysis are repeated 100.000 times and results are then aggregated at the EU level. The same set of underlying simulated banks' failures is used to assess the performance of the three insurance schemes.

By simulating a shock on probabilities of default of banks, the model calculates aggregate shortfalls, i.e. losses not covered by national DGSs and by the different European solutions, and compares them between the three models to establish which one minimises the shortfall for the national and EU DGSs. In other words, it estimates the absorption capacity of the three models discussed above, when the area suffers an asymmetric shock.

The performance of the three systems is assessed against two risk absorption dimensions:

a. the ability to cover deposits in the immediate aftermath of a banking crisis (at the payout); and

b. the ability to cover losses in the long-run, i.e. after the liquidation proceeds have been collected.

First, the ability to cover deposits in the immediate aftermath of a banking crisis is measured by the amount of insured deposits that are not covered, given that the funds immediately available are insufficient. The available funds comprise the national DGS pre-funded amount, together with the liquidity made available: i) by the reinsurance scheme or the central body, or ii) by other DGSs in the form of mandatory loans.

Second, the losses that are ultimately borne by the national DGS and the central body in the medium-long term are computed as the difference between the initial pay-out and the funds only available at a later stage, including: i) extraordinary ex-post contributions from banks; ii) amounts recovered from banks' insolvency procedures, and iii) in the case of the re-insurance scheme, the share of uncovered losses taken up by a central body. In this analysis, extraordinary ex-post contributions (EC) are equal

[13] The 2010 impact assessment (p. 32-33, plus annexes 4-6) concludes that the level of coverage should be harmonised and suggests a specific level for that. http://ec.europa.eu/internal_market/bank/docs/guarantee/20100712_ia_en.pdf

[14] Note that Cariboni et al. (2015a) run simulations country by country independently. Instead, we first simulate losses jointly for all EU 28 banks, then distribute them across countries. This simulation approach is the same applied in Cariboni et al (2015b). Please, see Cariboni J., Di Girolamo F., Maccaferri S., Petracco Giudici M. (2015a): Assessing the potential reduction of DGS funds according to Article 10(6) of Directive 2014/49/EU: a simulation approach based on the Commission SYMBOL model, JRC Technical report JRC95181 (forthcoming); and Cariboni J., Petracco Giudici M., Maccaferri S., Hallak I., Pfeiffer P. (2015b): Sustainability Assessment of the European Deposit Insurance Scheme, JRC Science for Policy Report, JRC98207

[15] It would be possible to run the analysis by assuming that the larger banks would be resolved while only the smaller banks would go into insolvency.

to 0.5% of the amount of covered deposits of the relevant Member State. In addition, in this model EC cannot be raised in the short term (few days after the crisis) to repay depositors, but are available in the long term to cover the DGS losses.

As regards the computation of the amounts recovered from banks' insolvency procedures, the recovery rate has been alternatively set equal to i) 90% of the amount of covered deposits of the failing banks (a 30 percentage points increase over the average recovery rate in the EU), and ii) country-specific recovery rates, increased by 30%.[16] The increase over the regular rate of recovery is added to reflect that DGS claims will receive priority in a resolution/insolvency procedure under the BRRD.

3.4.1.1. Mandatory reinsurance

In a mandatory reinsurance system, national DGSs operate alongside an *ex-ante* funded central body (CB). National DGSs are required to reimburse pay-outs and only if there are still uncovered deposits and national funds are fully depleted, the CB intervenes. Five key assumptions underpin the model.

1. Member States have achieved on aggregate the target (0.8% of covered deposits), which is partly allocated to the CB and partly to national DGSs. *Beta* is the share of funds that remains available to the national DGS. The analysis assesses three scenarios: i) beta = 75%, (i.e. 0.2% of covered deposits sit with the CB while 0.6% of covered deposits are available in national DGSs). ii) beta = 50% (0.4% of covered deposits sit with the CB with an equal amount being available at national DGSs) and iii) beta = 25% (0.6% of covered deposits sit with the CB with 0.2% of covered deposits being available at national DGSs).
2. When necessary, the central body intervenes to provide reinsurance liquidity to cover a share (alpha) of liquidity shortfalls. This is a first cap. Alpha may vary over a wide range of values, up to 100%.
3. The total amount that the CB can contribute to is also capped, according to the following formula:

$$Cap = min\left\{z * [\beta * 0.8\%] * \sum_{i \in MS} CovDep_i \,; y * [(1-\beta) * 0.8\%] * \sum_{i \in EU} CovDep_i\right\}$$

   This cap is equal to the smallest of following:

   - On the one hand, it considers the funds available at the national DGS (equal to a share beta of the total target, see above), and multiplied it by a factor z>1.
   - On the other hand, it considers the share of the target available at the aggregate EU-level, multiplied by a factor y<1.

   This cap applies to both the liquidity provided in the short term and the amount of losses borne by the CB in the long term.
4. The DGS can call on banks to supply extraordinary contributions (0.5% of covered deposits) to cover its losses.

In order to compare options, the mandatory reinsurance model is assessed with different caps.

Table 4. *Parameters used for the analysis of mandatory reinsurance*

[16] Country-specific recovery rates used in this analysis are available in the World Bank's *Doing Business 2016 Report*.

β	α	z	y
75%	20%	10	20%
75%	20%	10	80%
75%	80%	10	20%
75%	80%	10	80%
75%	60%	10	60%
75%	100%	10	100%
50%	20%	10	20%
50%	20%	10	80%
50%	80%	10	20%
50%	80%	10	80%
50%	60%	10	60%
50%	100%	10	100%
25%	20%	10	20%
25%	20%	10	80%
25%	80%	10	20%
25%	80%	10	80%
25%	60%	10	60%
25%	100%	10	100%

Note: *β is the share of funds that remains available to the national DGS; α is the share of liquidity shortfall that can be covered by the central body; z and y are two parameters in the formula defining the maximum amount (cap) of the central body's funds that can be used by a single DGS: z is a multiple of a single DGS resources, y is a share of the resources of the central body.*

3.4.1.2. Mandatory lending

Under the mandatory lending approach, whenever a national DGS experiences a liquidity shortfall, the other DGSs are mandated to lend money to the DGS whose available financial means have been depleted. The lending regime is subject to specific conditions:

1. The AFM of each DGS reach the full target, as defined in the DGSD (i.e. 0.8% of the total amount of covered deposits in the relevant MS);
2. The total amount that can be borrowed is capped to 0.5% of the covered deposits of the borrowing DGS;
3. The loan is apportioned among creditor DGSs in proportion to their size;
4. Loans are assumed to be recovered at 100% and for this purpose the borrowing DGS raises the maximum amount of ex-post contributions (0.5% of covered deposits); if the loan received is lower than the ex post contributions residual resources are used to cover the losses of the DGS.

3.4.1.3. Fully mutualised fund

Under this scenario, a single deposit insurance fund at EU-28 level is established. The available financial means are equal to 0.8% of covered deposits in the EU. As there is no external actor providing extra resources, there is no distinction between liquidity shortfall and liquidity retention. The fully mutualised fund can call extraordinary contributions from participating banks (0.5% of covered deposits) to cover its losses.

3.4.1.4. Simulation of pay-outs

The effect analysis has been developed at the individual bank level and results are then aggregated at the EU-level. Bank failures implying a DGS intervention are simulated by the SYMBOL model (see Annex 6.3 for a description). The crisis scenarios have also been generated by the SYMBOL model, which is based on individual bank balance sheet data. In each simulation, each bank either fails or

survives, depending on its initial level of capital and the severity of the crisis. The national DGS is called upon to cover the insured deposits of failed banks. These central premises of the effect analysis are repeated 100.000 times.

The three risk pooling arrangements have been assessed in relation to the level of implied uncovered liquidity shortfall and loss. In particular:

a) Uncovered liquidity shortfall measures the inability of a given scheme to cover deposits in the immediate aftermath of a banking crisis. This concept corresponds to the amount of insured deposits that are in fact not covered in the event of a banking crisis, given that funds are insufficient. The available funds comprise the national DGS pre-funded amount, together with the liquidity made available: i) by the central body in the reinsurance scheme, or ii) by other DGSs in the form of mandatory loans.

b) Losses in the medium-long term, which are ultimately borne by the national DGS and by the central body (in the case of re-insurance), are computed as the difference between the initial payout and the funds only available at a later stage, i.e. i) banks' extraordinary contributions to the DGS and ii) amounts recovered from banks' insolvency procedures.

The data used for the present exercise is as of 2013[17]. The dataset covers a sample of around 3,400 banks from the EU-28, representing 99.86% of EU28 banks' total assets (see Table 5).[18] The analysis focuses on total assets, risk-weighted assets and total capital and/or capital ratios, as well as customer deposits.

Table 5. Sample banks dataset (data from 2013)

Number of banks	Total assets bn€	RWA bn€	Covered deposits bn€	Capital bn€
3,359	38,144	14,635	6,474	1,939

3.4.1.5. Key Results

This section compares the three options as follows:

a) Fully mutualised fund against mandatory lending

b) Fully mutualised fund against mandatory reinsurance

c) Mandatory reinsurance against mandatory lending

In each case, both the short term (uncovered liquidity shortfall) and the medium-long term performance (uncovered loss) are evaluated. The reported charts and figures refer to rather extreme crisis scenarios, involving simulations where at least one of the two compared schemes yields uncovered liquidity shortfall or loss. In less extreme scenarios (some 90% of the simulations), the alternative schemes are obviously equivalent.

All charts presented in this section focus on the worst 1% of simulations (i.e. percentiles from 99th to 100th on the x-axis), corresponding to banking crises of increasing severity. In all charts, the severity of the crisis increases moving from the left to the right.

[17] Data provided by Bankscope, a proprietary database of banks' financial statements produced by Bureau van Dijk.

[18] We use the amount of total assets in the banking sector excluding branches as provided by ECB as reference for the population.

The fully mutualised fund against mandatory lending

Figure 6 shows the distribution of *uncovered liquidity* associated with each SYMBOL simulation. Points on the far right of the curve represent more severe crisis scenarios, and are indeed associated with larger amounts of uncovered liquidity shortfall. The curve representing uncovered liquidity shortfall under mandatory lending (dotted) is always above the curve representing uncovered liquidity shortfall under the mutualised fund (solid). **The conclusion is that in none of the simulations mandatory lending is able to deliver a smaller amount of uncovered liquidity shortfall than a fully mutualised fund.** This is because loans are capped at 0.5% of the covered deposits of the borrowing DGS under mandatory lending, while under fully mutualised fund a larger amount of liquidity is available.

Figure 7 shows the distribution of medium-long term *losses* associated with each SYMBOL simulation. Again, points on the far right of the curve represent more severe crisis scenarios, and are indeed associated with larger losses. The conclusion is that full mutualisation again turns out to be superior to mandatory lending in terms of uncovered losses for national DGS. Indeed, the curve representing uncovered losses under mandatory lending (dotted) is always above the curve representing uncovered losses under full mutualisation (solid). In other words, uncovered losses under full mutualisation are always smaller than under mandatory lending. This is due to the fact that under mandatory lending, extraordinary contributions raised by the DGS and amounts recovered from insolvency procedures are devoted to repay the loans instead of being used to cover the DGS losses.

Figure 6. Aggregate uncovered liquidity shortfall under mandatory lending (dotted line) and fully mutualised fund (solid line), EU28.

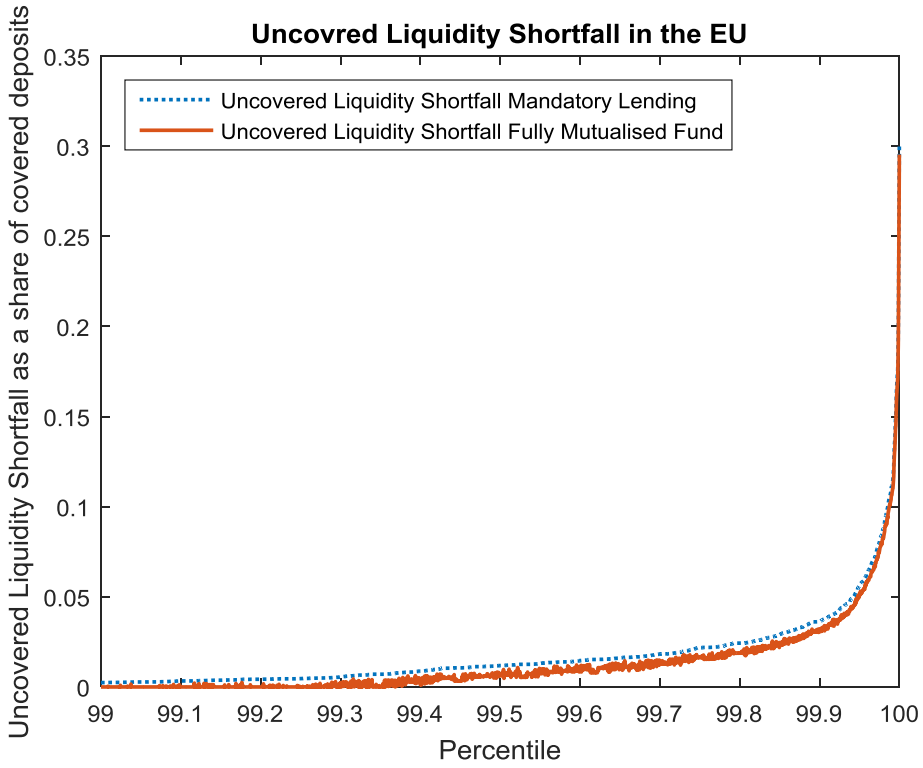
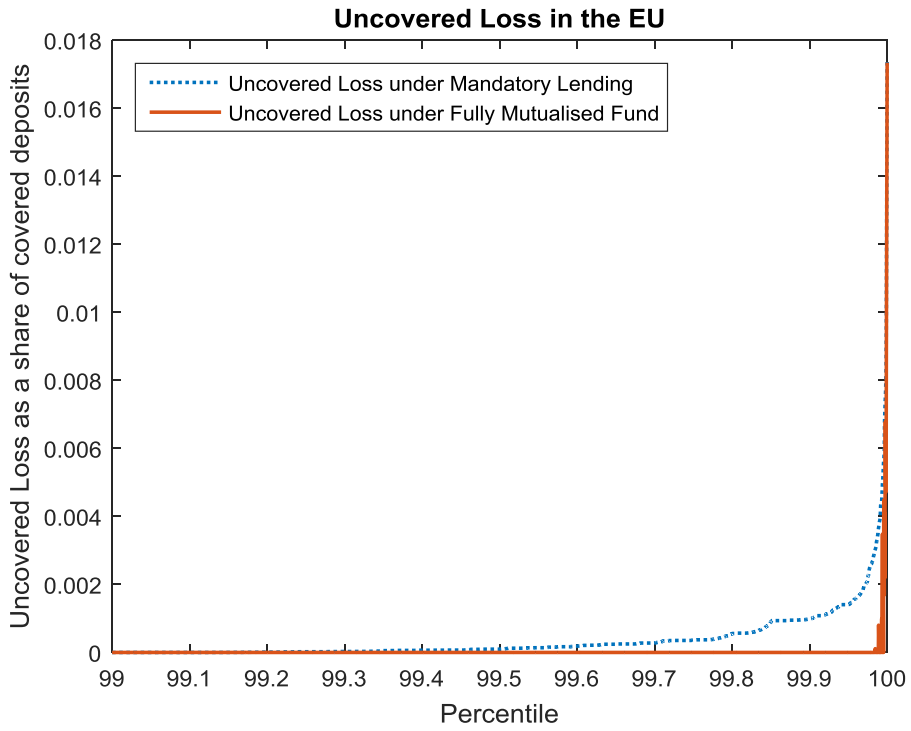


Figure 7: Aggregate uncovered losses under mandatory lending (dotted line) and under fully mutualised fund (solid line), EU28



The fully mutualised fund against mandatory reinsurance

The fully mutualised fund offers greater absorption capacity than mandatory re-insurance for short term uncovered liquidity needs in all the simulations. This is because more funds are available to the national DGS under a fully mutualised fund than under mandatory re-insurance, where various caps are foreseen. For instance, with an example of parameters' combination,[19] Figure 8 shows how the curve associated with the fully mutualised fund (solid) is always below the curve associated with the mandatory re-insurance scheme (dotted). Results shown in Figure 8 hold for other combinations of parameters (see Annex 6.4). It should be noted, however, that when a central body is allowed to cover liquidity shortfalls and losses in full (i.e. *alpha and y*=100%), the performance of the mandatory reinsurance scheme is only slightly inferior to that of a fully mutualised system.

A **fully mutualised fund offers greater absorption capacity than mandatory re-insurance also for medium-long term uncovered losses.** As the amount of losses borne by the central body is capped under mandatory reinsurance, the central body can bear losses until its funds are depleted under the fully mutualised fund. As suggested in Figure 9, the amount of uncovered losses is larger under reinsurance than under full mutualisation in every SYMBOL simulation.

[19] *beta* equals 75%, and *alpha* and *y* are both set at 60%

Figure 8. Aggregate uncovered liquidity under mandatory reinsurance (dotted line) and under fully mutualised fund (solid line), EU28

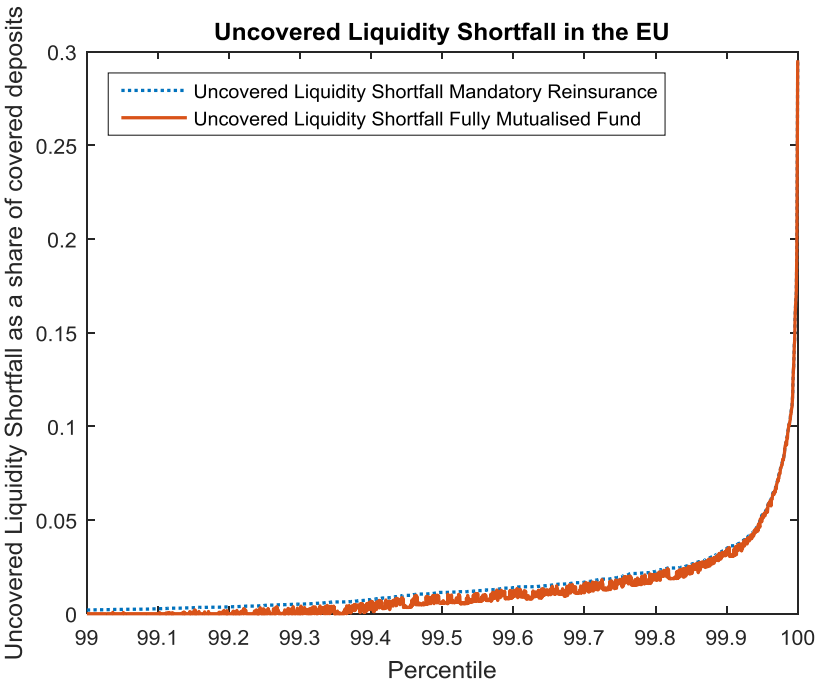
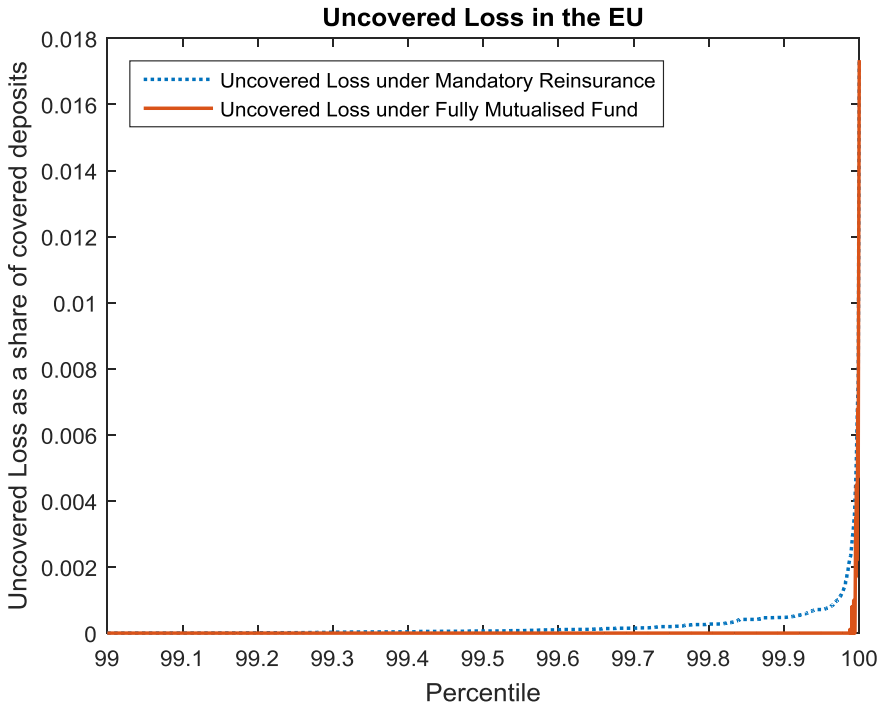


Figure 9. Aggregate uncovered losses under mandatory reinsurance (dotted line) and under fully mutualised fund (solid line), EU28



Mandatory reinsurance against mandatory lending

As regards comparing mandatory reinsurance and mandatory lending, additional statistics are provided. Table 6 shows how the two models perform for in terms of uncovered liquidity shortfall and

uncovered losses. The table reports the share of simulations in which the better arrangement yields lower uncovered liquidity and uncovered losses.

The relative performance of the two schemes with respect to uncovered liquidity shortfall and uncovered losses crucially depends on the parameters underlying the mandatory reinsurance scheme. As expected, parameters with lower caps of available reinsurance funds are associated with a worse performance of the mandatory reinsurance scheme compared to mandatory lending in the short (uncovered liquidity shortfall) and in the long run (uncovered losses). However, when mandatory reinsurance caps are high, the mandatory reinsurance delivers a better coverage than mandatory lending of short term liquidity and long-term loss cover needs.

As regards the combination of the two caps, raising the share of liquidity shortfall that can be re-insured (*alpha*) from 20% to 80%, while keeping *y* (cap on the coverage) at 20%, improves the performance of the reinsurance arrangement so that mandatory reinsurance becomes broadly comparable to mandatory lending. When *y* is set at 80%, raising *alpha* from 20% to 80% makes re-insurance the preferred arrangement over mandatory lending. The above results are valid both under a balanced split of funds between the central body and the national DGS (*beta*=50%) and under an unbalanced split (*beta*=75% or 25%). Analogously to what happens when varying *alpha*, the performance of re-insurance improves under larger *y*. However, even with *y*=80%, *alpha* needs to be set at a larger value for reinsurance to outperform mandatory lending. In general, if either *alpha* or *y* are set too low, no matter how large the other parameter is, mandatory lending will turn out to be preferable under current arrangements.

Moreover, while mandatory reinsurance prevails for higher caps in most of the runs, there are also two cases in which the mandatory reinsurance arrangement is strictly superior to the mandatory lending arrangement, i.e. the latter is outperformed in 100% of the simulations. This occurs if the central body is allocated half (*beta*=50%) or ¾ (*beta*=25%) of the funds, with caps on uncovered liquidity shortfall (*alpha*) and uncovered loss (*y*) at 100% (i.e., full cover).

For long-term uncovered losses, the re-insurance arrangement turns out to be generally preferable for higher caps of loss cover (for *alpha* at least equal to 60% or to 80% in case national DGSs are allocated ¼ of the resources), when the recovery rate is set at 90% for all the countries (see Table 7). This is in line with the fact that increasing the amount of resources available at European level makes the reinsurance arrangement absorb more losses. However, if the simulation uses recovery rates of individual Member States (with an increase of 30% to take into account the new BRRD priority for DGS claims), the mandatory reinsurance arrangement performs better even with higher caps of loss coverage only (see Table 6). This might be due to the fact that banks with more distressed balance sheets tend to be in countries where the legal framework is more uncertain.

Table 6. Mandatory reinsurance vs mandatory lending with individual MSs' recovery rate (increased by 30% to factor in the BRRD priority for DGSs' claims)

Re-insurance parametrization		Liquidity		Loss	
		Preferred scheme	Share of simulations in which the preferred scheme outperforms the competitor	Preferred scheme	Share of simulations in which the preferred scheme outperforms the competitor
beta = 75% (0.6% to DGS - 0.2% to CB)	alpha = 20%, y = 20%	ML	68%	R	73%
	alpha = 20%, y = 80%	ML	57%	R	73%
	alpha = 80%, y = 20%	R	52%	R	97%
	alpha = 80%, y = 80%	R	73%	R	97%
	alpha = 60%, y = 60%	R	59%	R	93%
	alpha = 100%, y = 100%	R	98%	R	100%
beta = 50% (0.4% to DGS - 0.4% to CB)	alpha = 20%, y = 20%	ML	74%	R	52%
	alpha = 20%, y = 80%	ML	66%	R	52%
	alpha = 80%, y = 20%	R	50%	R	85%
	alpha = 80%, y = 80%	R	66%	R	85%
	alpha = 60%, y = 60%	R	57%	R	81%
	alpha = 100%, y = 100%	R	100%	R	100%
beta = 25% (0.2% to DGS - 0.6% to CB)	alpha = 20%, y = 20%	ML	82%	ML	65%
	alpha = 20%, y = 80%	ML	77%	ML	65%
	alpha = 80%, y = 20%	ML	62%	R	74%
	alpha = 80%, y = 80%	ML	51%	R	74%
	alpha = 60%, y = 60%	ML	59%	R	66%
	alpha = 100%, y = 100%	R	100%	R	100%

Table 7. Mandatory reinsurance vs mandatory lending with recovery rate = 90%

Re-insurance parametrization		Liquidity		Loss	
		Preferred scheme	Share of simulations in which the preferred scheme outperforms the competitor	Preferred scheme	Share of simulations in which the preferred scheme outperforms the competitor
beta = 75% (0.6% to DGS - 0.2% to CB)	alpha = 20%, y = 20%	ML	68%	ML	55%
	alpha = 20%, y = 80%	ML	57%	ML	55%
	alpha = 80%, y = 20%	R	52%	R	88%
	alpha = 80%, y = 80%	R	73%	R	88%
	alpha = 60%, y = 60%	R	59%	R	84%
	alpha = 100%, y = 100%	R	98%	R	100%
beta = 50% (0.4% to DGS - 0.4% to CB)	alpha = 20%, y = 20%	ML	74%	ML	84%
	alpha = 20%, y = 80%	ML	66%	ML	84%
	alpha = 80%, y = 20%	R	50%	R	73%
	alpha = 80%, y = 80%	R	66%	R	73%
	alpha = 60%, y = 60%	R	57%	R	67%
	alpha = 100%, y = 100%	R	100%	R	100%
beta = 25% (0.2% to DGS - 0.6% to CB)	alpha = 20%, y = 20%	ML	82%	ML	97%
	alpha = 20%, y = 80%	ML	77%	ML	97%
	alpha = 80%, y = 20%	ML	62%	R	55%
	alpha = 80%, y = 80%	ML	51%	R	56%
	alpha = 60%, y = 60%	ML	59%	ML	53%
	alpha = 100%, y = 100%	R	100%	R	100%

It should be noted that if losses are very small, the share borne by the central body under re-insurance may turn out to be lower than the funds initially contributed by the national DGS to the central fund. In line with any insurance mechanism, the insurance premium may turn out to be larger than the payout, if the event triggering coverage is associated with a small enough loss. This is consistent with the fact a European reinsurance mechanism should be most effective for systemic events and should

provide incentives for local banks and regulators not to use it for small interventions, whose necessity for the stability of the financial system can be hardly assessed by the central body.

Finding #1. *The fully mutualised fund offers greater protection than both the mandatory reinsurance and the mandatory lending arrangements in all simulations, both in the short term (uncovered liquidity) and in the medium/long term (uncovered losses). In the short term, the fully mutualised fund makes more funds available, compared to the alternatives.*

Finding #2. *In the medium-long term, the probability of uncovered losses, implying failure of the DGS itself, is the smallest under the fully mutualised fund, as extraordinary contributions are not used to repay loans, as in the case of mandatory lending, but to cover losses. Under re-insurance, the participation of the central body to the losses is capped.*

Finding #3. *As for the comparison between mandatory lending and mandatory reinsurance, mandatory reinsurance is better able to cover liquidity needs in the short term or losses in the medium-long term provided that sufficient re-insurance funds are made available.*

Finding #4. *The performance of mandatory reinsurance depends on the interplay between allocation to the central body and the caps applied to resources made available by the central body to the individual DGSs. Larger allocations from the central body obviously imply larger shares of liquidity and losses which can be centrally covered.*

3.4.2. *Assessing diversification of risks under the three alternative arrangements*

The first part of the following assessment measures the implications for risk diversification in moving from a solution with partial risk sharing (such as reinsurance or mandatory lending) to an environment with full risk sharing (such as full mutualisation). Indeed, as risk sharing grows, there is an increasing risk diversification across the participating Member States. The following formula (developed in Annex 6.1) demonstrates that a mutualised DGS can make full use of risk diversification to minimise the expected losses for bank *i* in country *j* ($p_{ij}.L_{ij}$).

$$\sum_{i=1}^{m_j}\sum_{j=1}^{n} w_i.p_{ij}.L_{ij} \leq \sum_{i=1}^{m_j}\sum_{j=1}^{n} w_j.p_{ij}.L_{ij} \Leftrightarrow E\left(L_{Single}\right) \leq E\left(L_{Multiple}\right)$$

It should be noted that the reinsurance and mandatory lending arrangements assume the collection of contributions from national DGSs, based on the risk profile of banks within their *local* banking systems. Within a mutualised arrangement the contributions of banks are calculated on the basis of their risk profile within the Banking Union. This brings greater diversification of risk because the value of the weighting factor in the reinsurance and mandatory lending models (w_j) is structurally higher than the weighting factor for the single DGS (w_i).

$$w_i = \frac{CD_i}{\sum_{i=1}^{m} CD_i} < w_j = \frac{\sum_{i=1}^{m} CD_{ij}}{\sum_{i=1}^{m}\sum_{j=1}^{n} CD_{ij}}$$

As a result, the expected loss under the single DGS scenario is lower than a scenario involving multiple DGSs (unless the improbable scenario applies in which only one bank participates in each DGS or the probabilities of default across banks are perfectly correlated). The example, developed further in the annex, indicates that the benefits of risk diversification are significant and could halve expected losses at aggregate level.

Finding #5. *A fully mutualised fund offers greater risk diversification (portfolio effects), which minimises the expected losses for the whole financial system in case of an asymmetric shock.*

Finding #6. *Moving from a risk-based contribution calculated on the average risk of the national banking system to a contribution based on the risk of individual banks also offers strong protection against moral hazard and makes risk diversification most effective.*

3.4.3. *Assessing the implications of interconnection among EU banks*

The analysis so far has compared the effects of a mutualised system to a system of national DGS. The losses for each national DGS were simulated on a stand-alone basis for each DGS, i.e. each DGS' risk was regarded as idiosyncratic without consideration of a possible interconnection among probability of default of European banks. The purpose of this section is to assess the degree of interconnectedness among banks, and hence DGS, i.e. whether the failure of a bank in one Member State can cause a spike in the probability of failure of any given bank in another Member State which could impact the use of funds even for 'safer' national DGSs.

To estimate the cross-border interconnection of probabilities of default, the following model estimates the correlation between the Credit Default Swap (CDS) premia (a proxy of probability of default) for a sample of banks in the European Union. This sample collects daily CDS premia (mid-price) on 5 years senior debt of the top 30 EU banking groups and top 2 banks per country for which CDS contracts are actively traded. The table in the annex lists the banks and countries covered by this exercise, as a result of the application of the described criteria. The sample includes 35 banks from 12 European countries.

The analysis is divided into two stages. In the first stage, we regress in panel data context the CDS premium of bank *i* at time *t* on the average CDS spread of all banks except bank *i*:

$$CDSpremium_{i,t} = Const + a_i + b_1 BankAverage_{j,t} + \varepsilon_{i,t}$$

Where $CDSpremium_{i,t}$: the CDS spread of bank *i* at time *t*; a_i: unobserved time-invariant country effect; $BankAverage_{j,t}$: the average CDS spread of all banks except bank *i*.

The results show a strong correlation between the CDS premia of a bank with the average spread for all the other banks in the sample (see Output #1 in Annex). An average increase of 100 basis point in the CDS premium of the other banks in the sample is accompanied by approximately 80 basis points increase in the CDS spread of a given bank.

In the second stage, we add the average CDS spread of all banks in same country except the bank of interest to control for the country-level credit risk:

$$CDSpremium_{i,t} = Const + a_i + b_1.NonDomesticBank_{j,t} + b_2.DomesticBank_{j,t} + u_{i,t}$$

Where $NonDomesticBank_{j,t}$ is the average CDS premia of all banks outside the country where bank *i* is and $DomesticBank_{j,t}$ is the average CDS premia of all banks in the same country as bank *i* except bank *i*. Fixed effects are applied in the estimation, allowing for robust errors, to permit each bank to have a different "base" probability of default due to the idiosyncratic characteristics of the local economy.

The second regression breaks down the correlation, distinguishing the correlation of a given bank with domestic and non-domestic banks. The correlation with non-domestic banks is only 30% less powerful than the correlation with domestic banks (see Output #2 in the Annex).

Overall, the analysis shows that the Banking Union area (and generally the EU) is a system of interconnected banking systems. Concretely, cross-border interconnection appears to have a sizable impact on the CDS premium of each bank. This reflects the likelihood that bank defaults in one

country will have an impact on banks in another country. In other words, even under a system of purely national DGS, risks cannot be isolated nationally.

However, risk-based contributions by individual banks to a national fund do not take into account implicit costs arising from the interconnection between banks in the European Union. Such implicit costs could be taken into account in the mandatory reinsurance and mandatory lending models with an additional contribution based on the size of the banking system. Such size-based criteria would however be contrary to the principle that contributions should be risk-based established by the DGSD. On the contrary, a Banking Union wide scheme would, as demonstrated, offer better protection and thereby reduce the risk of spillovers. Moreover, risk-based contributions would be raised at bank level and directed towards one common fund, indirectly taking into account the interconnectedness among probabilities of default of participating banks.

Finding #7. *There is a strong interconnection between probabilities of default of European banks. In a system of single DGS, this implicit cost would need to be made explicit by obliging banks to pay for it within a two-tier system of risk-based contributions: a bank level one to account for idiosyncratic risks and a national banking system level one to account for interconnectedness. The fully mutualised fund solution overcomes this need by raising funds directly at bank level, so factoring this correlation.*

Finding #8. *The intensity of the interconnection also suggests that a fully mutualised system would reduce the risk of spillovers, thereby making a second tier system of risk-based contributions superfluous.*

3.4.4. *Benchmarking policy options*

Taking stock of the theoretical and empirical analyses, this section benchmarks the three models against the following objectives:

- Risk absorption capacity;
- Moral hazard protection;
- Funding and governance efficiency; and
- Cost neutrality.

For financial stability reasons, the ability of a deposit guarantee scheme to absorb systemic shocks is the most important objective, as it ensures an immediate response to depositors' worries about the solvency of one or multiple banks. The failure to provide an immediate response can trigger a bank run (a self-fulfilling prophecy) and a deeper systemic shock for the financial system. The ability to absorb risk exemplifies the ability to provide a cover of uncovered liquidity shortfall and uncovered losses that is big enough to preserve depositors' confidence and deter them from a bank run.

As discussed in section 3.3, all three models also deal with moral hazard in the form of a sovereign-bank nexus, i.e. when a Member State misuses the funds of the national DGS to protect local banks.[20]

The operational efficiency objective considers two dimensions: funding and governance. Funding efficiency concerns the ability to rapidly collect funds across banks or national DGSs and make use of them in liquidation or resolution. The governance efficiency accounts for the ability of each arrangement to manage coordination and administration costs.

[20] It is well understood that none of the options eliminates in full the sovereign-bank nexus, as the ultimate fiscal backstop stays with the local governments. Nonetheless, the different options provide different levels of contribution to limit the negative effects of this nexus.

Finally, the principle of cost neutrality would respond to the need for proportionality of the mutualised arrangement. This means that a mutualised arrangement should not increase the overall costs for banks and the overall level of contribution for the banks remains the same (at 0.8% of total covered deposits), even though the distribution of the contributions among banks may change due to differences in their risk profile.

3.4.4.1. Risk absorption

Mandatory lending has a very limited risk absorption capacity, due to limited liquidity coverage and the absence of loss cover. The probability to outperform the other two models in terms of risk absorption is low. Mandatory reinsurance offers some level of risk absorption through partial coverage of liquidity shortfall and losses. The reinsurance model with a central body, however, offers a higher reaction speed, which can result in higher absorption capacity in the wake of a banking crisis compared to a mandatory reinsurance or mandatory lending with independent national DGSs.

Finally, while protection against moral hazard is comparable to the mandatory reinsurance model (due to the bank risk-based contribution feature of EDIS), the risk absorption capacity of EDIS is greater than the other models assessed, due to the immediate availability of funds for both uncovered liquidity and losses, as well as for the quick response in the management of crises and the direct accessibility to ex post contributions by banks.

Finding #9. A fully mutualised fund model (*EDIS) offers several tools for a more effective risk absorption and diversification. Reinsurance scores better than mandatory lending, in particular when there are no (or low) caps for the European intervention in liquidity and loss cover, but it is not as effective as a fully mutualised fund model (EDIS).*

3.4.4.2. Moral hazard

Mandatory lending offers protection against moral hazard by making funds available in the form of loans and because there is no coverage of uncovered losses. The reinsurance model offers protection against moral hazard by imposing the first share of uncovered liquidity and losses on the national DGS. The fully mutualised fund model (EDIS) also offers protection against moral hazard through calculation of risk-based contribution at bank level, as well as using a central body to decide on the use of the funds in each crisis/liquidation/resolution situation (in addition to the risk reduction measures discussed in section 3.3).

Finding #10. *The built-in safeguards foreseen for the mandatory reinsurance and the mutualised fund model (EDIS) ensure that both options offer effective protection against moral hazard.*

3.4.4.3. Efficiency (funding and governance)

Mandatory lending offers limited efficiency in the ability to collect and use funds, as it would require national DGS to collect the funds and make them available if triggered (with no separate entity managing these funds). Because assistance would be requested on an ad-hoc basis: in the event of insufficient funds in a DGS creditor DGSs may be hesitate to lend to a requesting DGS even if lending is formally required by law. The reinsurance model with a central body ensuring coordination, and EDIS instead offer a more effective management of funds, both in collection (with pre-funding at EU level) and use (including alternative uses in resolution).

Concerning governance, mandatory lending offers limited or no governance efficiency as decision-making will be at national level. Mandatory reinsurance and a fully mutualised arrangement with a

central body offer a more certain and streamlined decision-making procedure for the collection and use of funds in liquidation and resolution.

Finding #11. *On funding and governance efficiency, a fully mutualised fund model (EDIS) and the reinsurance model with a central body have similar characteristics and perform better than mandatory lending.*

3.4.4.4. Cost neutrality

The principle of cost neutrality applies uniformly across all the three options. None of the options increases or reduces the total amount of resources available in case of bank failure. However, the different temporal phases of European intervention and the distribution of the intervention between national DGSs and the central body redistribute the burden of each model in different ways. For mandatory lending, the domestic banking system will bear the greater part of the burden, irrespective of how risk is distributed across banks. For mandatory reinsurance, the domestic banking system will take on a more moderate amount of costs, as European intervention is capped after the intervention of the local DGS. Full mutualisation, instead, offers a redistribution of losses from the beginning that is equal among banks, based only on their idiosyncratic risk. This solution offers some level of discipline at national level, as local banks that manage risk better will be treated in the same way as similar banks across Europe: their nationality becomes irrelevant.

Finding #12. *While all the options offer a neutral solution in terms of the total cost of intervention, a fully mutualised fund model (EDIS) offers a more balanced redistribution of losses across banks, which does not penalise banks for their nationality but only for the way they manage their risk exposures.*

Table 8. Summary of performance vis-à-vis objectives and constraints

			Efficiency		
	Risk absorption	**Moral hazard**	**Funding**	**Governance**	**Cost neutrality**
Mandatory Reinsurance (Option 1)	- Quick response (central body) - Liquidity and loss cover	- Depletion of national DGSs first	- One funding collection point at EU level - Pre-funding at EU level - Use of funds in liquidation/resolution procedures	- Common decision-making procedures (incl. alternative uses for resolution)	- Total cost neutral - Moderate burden on domestic banks
Mandatory Lending (Option 2)	- Immediate liquidity cover	- Funding structured as a 'loan' - No loss cover	None	- Not efficient	- Total cost neutral - Heavy burden on domestic banks
Fully mutualised fund (EDIS) (Option 3)	- Immediate liquidity & loss cover (equal to the total cap) - Quick response (central body) - Ex post contribution	- Bank level risk assessment (contribution) - Central decision on the use of funds	- One funding collection point at EU level - Pre-funding at EU level - Use of funds in liquidation/resolution procedures	- Common decision-making procedures (incl. alternative uses for resolution)	- Total cost neutral - Equal distribution of burden on EDIS banks

4. THE TRANSITIONAL PERIOD: THE RATIONALE BEHIND THE 'THREE-STAGE APPROACH'

This section gives a short analysis of the three stage approach (re-insurance, co-insurance and full insurance) as proposed in the Commission proposal.

4.1.1. *The transition under the Commission proposal*

As set out in the Commission proposal, EDIS would develop over time and in three phases: starting with the reinsurance phase in 2017, it would evolve into co-insurance from 2020 onwards to finally evolve into a fully mutualised insurance system by 2024. There are two main rationales for a multi-phased approach.

First, given the current differences between Member State DGSs, in particular with regard to their financial means and the capacity of the European Deposit Insurance Fund (DIF), the approach allows a smooth transition towards the steady state. By 2024 the DIF would be gradually built-up over all phases financed by the annual contributions of the banking sector.

Second, the approach aims at avoiding moral hazard and first-mover advantages. For this purpose a number of safeguards have been attached to each phase. For instance, in the reinsurance phase, where these safeguards are very strong, a national DGS is required to bear a first share of the loss. These measures help to protect the financial capacity of the DIF further, in particular in its start-up phase.

Table 9. Main design features of the three stages

	Reinsurance phase (2017 – 2020)	**Co-insurance phase (2020 – 2024)**	**Full insurance Steady state 2024**
Degree of mutualisation	• First share of loss to be borne by DGSs ("loss retention") • Immediate funding support by EDIS up to 20% of the liquidity shortfall (Art. 41a (2) • Loss cover up to 20% of the excess loss (Art. 41a (3)) • Funding/loss cover capped by the lower of i) 20% of EDIF´s initial target level or of ii) 10 times the DGS´s target level (Art. 41a (4))	• EDIS support from the "first euro" following the risk-sharing mechanism under Art 41e. EDIS to take over gradually increasing shares of funding and loss cover (20%/40%/60%/80%) • No loss retention, no further caps	• EDIS to take over 100% of funding and loss cover (full mutualisation)
Evolution of EDIF	• To reach 20% of 4/9 of the sum of DGSs´ minimum target levels by 2020 (Art. 74b (1)) • Ex-ante contributions only	• To reach 100% of the sum of DGSs´ final minimum target levels by 2024 (Art. 74b (2)). • Ex-ante and ex-post contributions	• 100% of final target level reached (= 0.8% of covered deposits) • Ex-ante and ex-post contributions
Calculation of risk-based contributions	• Calculation in relation to the single DGS member banks only	• Calculation in relation to all banks within the EDIS scope	• Calculation in relation to all banks within the EDIS scope

4.1.2. *Analysis of uncovered liquidity and uncovered losses in the transition period via SYMBOL*

The assessment of the reinsurance and coinsurance phases in EDIS is based on the SYMBOL model and follows the same approach described in Section 3.4.1.[21] The model uses the following working hypotheses:

- Extraordinary contributions are set equal to 0 in the short term, but they are assumed to be available in the long term to cover the DGS losses and fixed at 0.5% of the amount of covered deposits of the relevant MS;
- The recovery rate from insolvency procedures is set equal to 60% of the amount of covered deposits of the failing banks;
- The set of parameters tested is summarised in Table 10 and Table 11 for the reinsurance and the co-insurance phases respectively.

Table 10. Parameters used for the analysis of the reinsurance phase

T	$\boldsymbol{\beta(t)}$	$\boldsymbol{\alpha_r}$	z	y
1	80%	20%	10	20%
2	80%	20%	10	20%
3	80%	20%	10	20%
1	80%	40%	10	40%
2	80%	40%	10	40%
3	80%	40%	10	40%

Note: *β is the share of funds that remains available to the national DGS; α is the share of liquidity shortfall that can be covered by EDIS; z and y are two parameters in the formula defining the maximum amount (cap) of EDIS's funds that can be used by a single DGS: z is a multiple of a single DGS resources, y is a share of the resources of EDIS.*

Table 11. Parameters used for the analysis of the coinsurance phase

T	$\boldsymbol{\beta(t)}$	$\boldsymbol{\alpha_c}$
4	64%	20%
5	48%	40%
6	32%	60%
7	16%	80%

Note: *β is the share of funds that remains available to the national DGS; α is the share of liquidity shortfall that can be covered by EDIS; z and y are two parameters in the formula defining the maximum amount (cap) of EDIS's funds that can be used by a single DGS: z is a multiple of a single DGS resources, y is a share of the resources of EDIS.*

4.1.3. *Key results*

Considering the co-insurance phase and going towards full mutualisation, uncovered liquidity and uncovered losses are smaller than under a fully national system, i.e. the performance of EDIS is increasing from the start of co-insurance.

Uncovered liquidity and uncovered losses are similar under the re-insurance phase and under a fully national system.

[21] Details on the empirical analysis are available in Annex 6.6. The phase-in assessment presented in this section is based on Euro Area countries.

As shown in Table 12 and Table 13, the percentage of simulations in which a fully national system is better able to cover liquidity needs and losses is never above 50%, i.e. re-insurance as well as co-insurance are superior independent of the assumed parameters. Re-insurance (as transitional stage), these instances are below always 50%) would have weaknesses in particular as the financial capacity of the EDIS fund is very limited in its start-up phase and because the liquidity and the funding provided by EDIS in the reinsurance phase are strictly capped. The results are analogous both for uncovered liquidity and uncovered losses.

Table 12. Simulated runs where the national system outperforms <u>reinsurance</u> and average size of the uncovered liquidity shortfall or loss covered by national DGS (% of covered deposits)

T	$\beta(t)$	α_r	Z	Y	Liquidity		Loss	
					Share	Average	Share	Average
1	80%	20%	10	20%	48%	0.003%	23%	0.002%
2	80%	20%	10	20%	45%	0.005%	27%	0.003%
3	80%	20%	10	20%	43%	0.006%	27%	0.004%
1	80%	40%	10	40%	14%	0.002%	5%	0.002%
2	80%	40%	10	40%	15%	0.003%	6%	0.002%
3	80%	40%	10	40%	13%	0.004%	10%	0.002%

Table 13. Simulated runs where the national system outperforms <u>coinsurance</u> and average size of the uncovered liquidity shortfall or loss covered by national DGS (% of covered deposits)

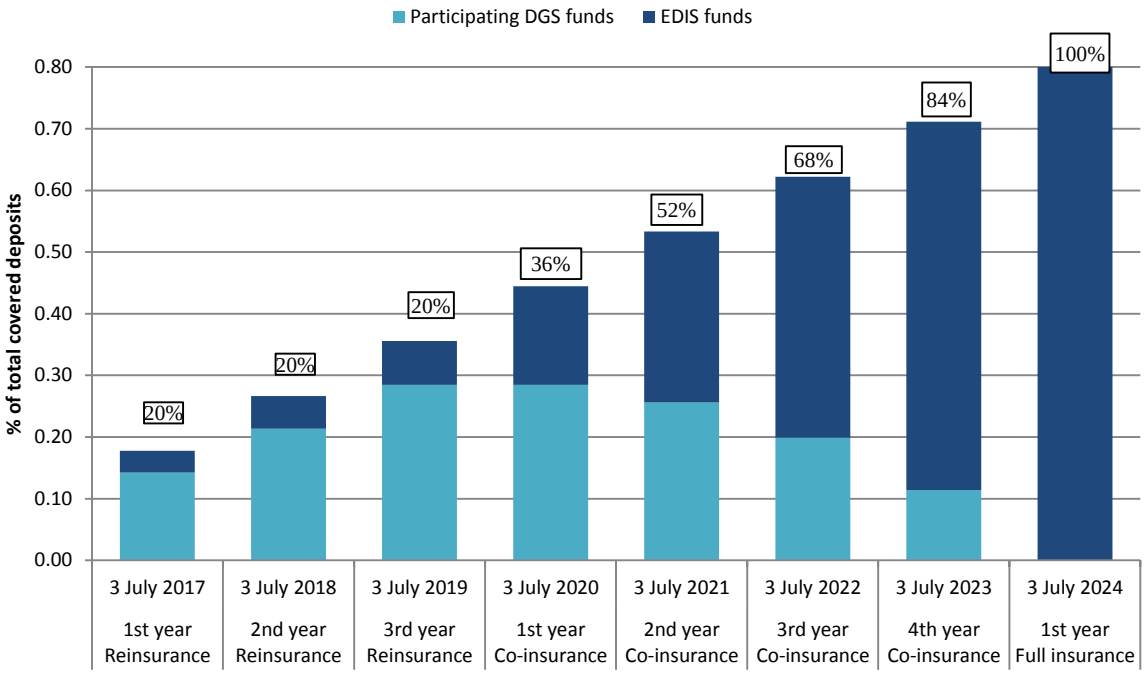
T	$\beta(t)$	α_c	Liquidity		Loss	
			Share	Average	Share	Average
4	64%	20%	23%	0.007%	0%	0.000%
5	48%	40%	14%	0.007%	1%	0.015%
6	32%	60%	10%	0.004%	2%	0.027%
7	16%	80%	7%	0.002%	3%	0.054%

4.1.4. *Funding path*

The proposal envisages that the DIF would reach 0.8% of covered deposits of all credit institutions in the Banking Union by 2024. If EDIS starts in 2017, as proposed by the Commission, over 8 years the banking sector would annually contribute 12.5% of the target amount to EDIS and national schemes combined. National funds will therefore have diminished after EDIS has reached its target level. The funding path therefore also determines the pace at which national funds would diminish.

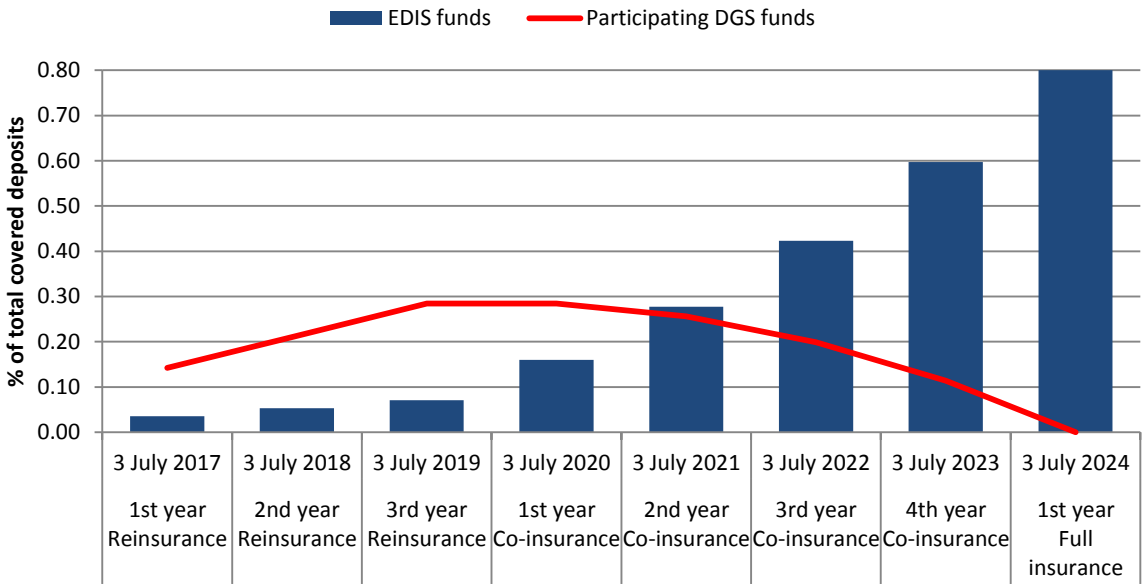
According to Article 74b (3) of the EDIS proposal the contributions to the DIF are spread out as evenly as possible until the respective target is reached. Under co-insurance the funding of the DIF increases in equal steps (see Figure 10).

Figure 10. EDIF build-up with EDIS contributions evenly spread over time (the white boxes denote the share of mutualized funds against all funds collected in a given year)



This approach implies that national funds would decrease relatively smoothly, as can be seen by the solid line in Figure 11.

Figure 11 Evolution of EDIS funds compared to the funds of a participating DGS under approach 1



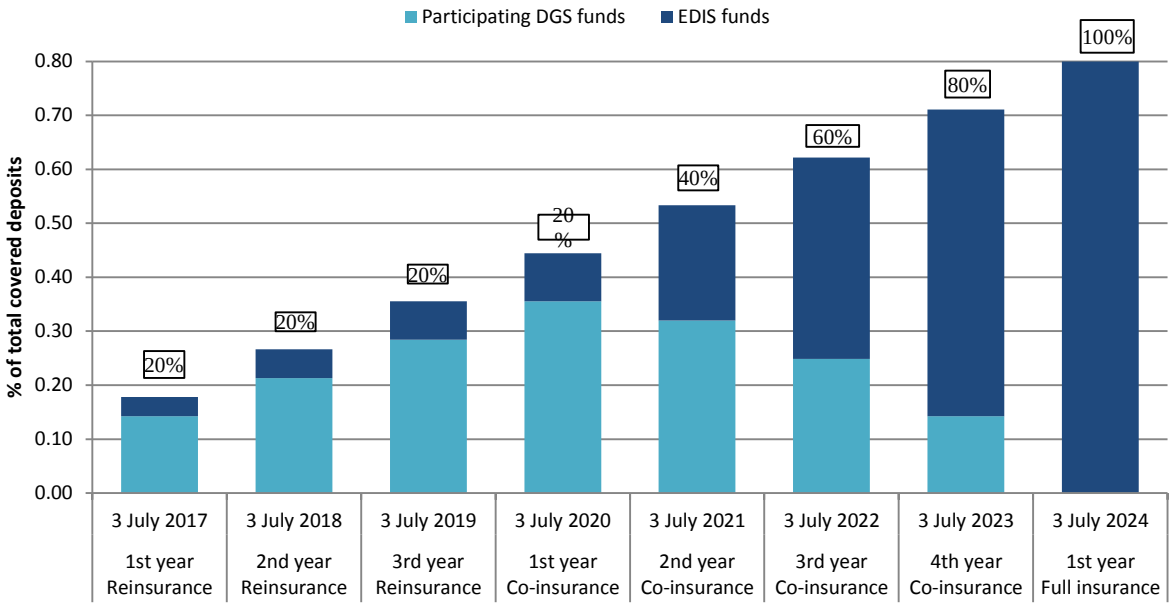
Building up funding through equal steps also implies that the DIF is completed faster than commensurate to its increasing share of risk under co-insurance. EDIS coverage under co-insurance gradually increases in four steps under co-insurance (Art. 41e of the proposal):

- in the first year of co-insurance: 20%;
- in the second year of the co-insurance: 40%;
- in the third year of co-insurance: 60%;
- in the fourth year of co-insurance: 80%.

This may therefore lead to situations where a national DGS may bear a greater share of losses, in comparison to EDIS, than the share of funding it receives from EDIS.

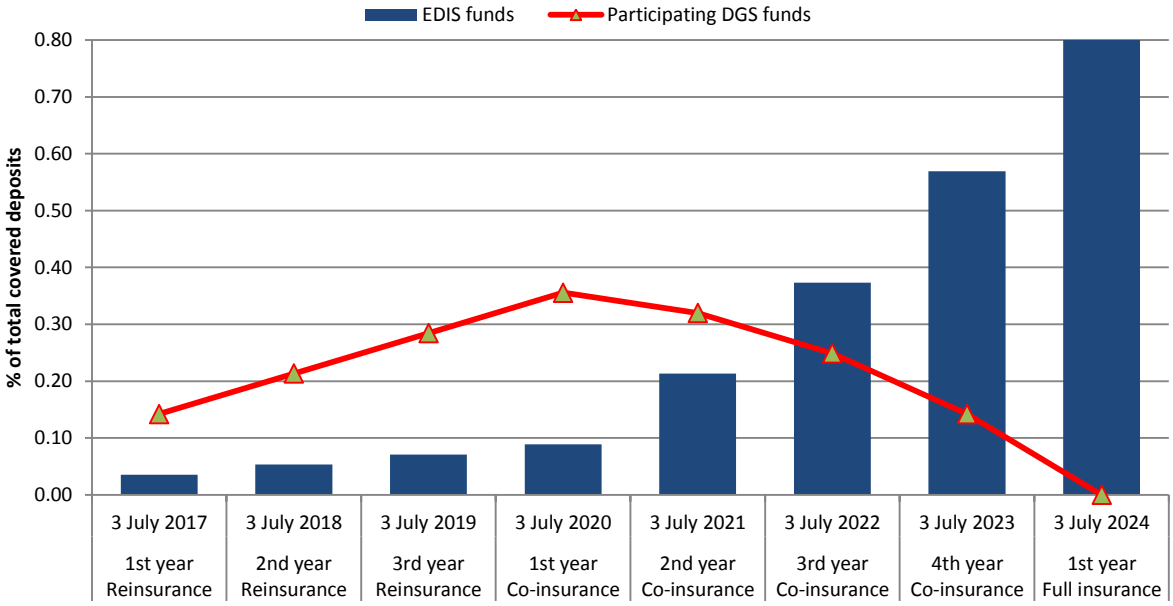
An alternative approach could link EDIS funding strictly to risk mutualisation, which means that funding and mutualisation would increase in equal steps over time (see Figure 12**Error! Reference source not found.**).

Figure 12. Funding and risk mutualisation are synchronised



This approach implies that the shares of funding that national DGS and EDIS receive during co-insurance mirrors their corresponding share of risk. However, it also means that national funds would decrease more sharply and display a 'cliff effect' towards the end of co-insurance, as illustrated by the solid line in Figure 13**Error! Reference source not found.**.

Figure 13. Evolution of EDIS funds compared to the funds of a participating DGS under approach 2



The funding path, according to the EDIS proposal, spreads out contributions to the EDIS fund as evenly as possible, thereby avoiding 'cliff effects', i.e. sharp decrease of national funds towards the end of co-insurance.

5. INTERACTION BETWEEN EDIS AND NATIONAL DISCRETIONS UNDER THE DGSD

The DGSD leaves Member States a degree of discretion for a number of features of deposit insurance, and in particular temporary high balances and irrevocable payment commitments[22]. They were introduced by the Council and the Parliament in the legislative process. EDIS would preserve such discretion to the extent that it is necessary to accommodate Member States' specificities. On the other hand, EDIS provides the framework to eliminate certain differences in national implementation, which could impair depositor confidence and the effectiveness of the internal market. This section reviews the interaction of the EDIS proposal with a selected list of national discretions under the DGSD.

5.1. Irrevocable payment commitments (IPC)

5.1.1. *Issue description*

The current DGSD allows for irrevocable payment commitments (IPC) to be taken into account in reaching the national DGS target level. The DGSD's definition of "available financial means" is "*cash, deposits and low-risk assets which can be liquidated within a period not exceeding that referred to in Article 8(1)*[7 days] *and* ***payment commitments*** *up to the limit set out in Article 10(3)*"[23]. The cap on the amount of available financial means which can be constituted by irrevocable payment commitments is **30%** of "*available financial means raised in accordance with this Article*"[24].

Some Member States still face DGS liabilities linked to the financial crisis, while others did not have pre-funded DGSs. Accordingly, IPCs were included in the EU legal framework during the legislative negotiations with the intention of providing for some flexibility during the transition period until 2024. However, IPCs were required to be collateralised in order to ensure that the DGS could have immediate access to funding if needed, but without the requirement on the part of the credit institutions to provide cash entirely upfront.

5.1.2. *Policy options and comparison*

- Option 1: Not allowing for IPC under EDIS
- Option 2: Allowing for IPC under EDIS with constraints:
    - Option 2a: Allowing for IPC up to 30% of the funds raised by the DGS, as currently provided for in the DGSD
    - Option 2b: Allowing for IPC up to a lower percentage of DGS funds than under the DGSD.

The EDIS proposal does not envisage IPC as part of the available financial means (option 1). The acceptance of IPC in the EDIS context could be regarded as challenging for the following reasons:

i. The EBA Guidelines indicate that the accounting treatment of IPC differs under different accounting standards. Such differences could lead to distortions of the level playing field;

ii. IPC can have pro-cyclical effects;

[22] Further national discretions exist for: deposits held by personal pension schemes and occupational pension schemes of small or medium-sized enterprises and deposits held by held by local authorities with an annual budget of up to EUR 500 000 (Art. 5(2) DGSD).
[23] Article 2(1)(12) DGSD.
[24] Article 10 (3) DGSD.

iii. IPC can increase asset encumbrance and may limit banks' ability to shift from unsecured to secured funding under stressed conditions.

iv. The establishment of an EU-wide operational and risk management framework to manage the acceptance of IPC was deemed difficult and costly.

v. The decision making process under EDIS may involve additional time constrains for a timely 7-day-pay-out.

The first three obstacles are not specific to EDIS, but apply *mutatis mutandis* also to national DGS. Yet, DGS exercise the option to use IPC differently across Member States. In view of these different practices, it is therefore necessary to assess the use of IPC in EDIS with respect to each of the five challenges identified.

i. Accounting treatment of payment commitments

The EBA noted in its Guidelines on IPC that the accounting treatment of these commitments differs dependent on the applicable accounting standards. Under some accounting standards, IPC would be treated fully as a liability, whereas under other standards IPC would remain off-balance sheet. According to the EBA, the effects on the profit and loss account also differ. To the extent that these differences are likely to negatively impact a level playing-field in a multi-DGS context, they are even less justifiable under EDIS. Eventually, this could lead to a situation where bank contributions are determined according to a common methodology, but the effects of IPC profitability could vary substantially depending on the geographical location of the bank. Furthermore, the accounting treatment depends on the analysis made for each individual IPC arrangement. The treatment would, inter alia, depend on (i) the probability of the commitment becoming payable and (ii) the timing and the amount if such an event occurs.

The EBA did not intend to, nor could it, harmonize the accounting treatment via its guidelines. Nevertheless, the EBA proposed a mitigant to preserve a level-playing field, which is that the prudential treatment of IPC should be uniform. In particular, the prudential treatment should reflect the probability that these commitments would be drawn upon.

If payment commitments were allowed under EDIS, it would need to be ensured that a uniform prudential treatment would apply. Also, the circumstances and conditions under which IPC could be drawn would need to be unambiguously defined.

ii. Pro-cyclical effects

The potential pro-cyclicality of IPC has two sources. The first source is closely related to the accounting treatment. If existing commitments have not been accounted for, e.g. via sufficient provisioning, the impact on banks' earnings would only materialize once they are called upon by the DGS. If a DGS calls the IPC in a stress situation, banks' earnings and balance sheets could further deteriorate. A possible mitigant, as described above, would be a uniform prudential treatment, e.g. capital requirements that take into account the likelihood that payment commitments have to be honoured.

A second possible source of pro-cyclicality stems from the fact that IPC are typically secured by a limited set of high-quality collateral (e.g. government bonds). In case of a call on banks in a stress situation, a number of banks may be forced to liquidate the collateral and hence add pressure on market prices. This source of pro-cyclicality may also be manageable. Collateral management systems

exist which allow IPC to generate liquidity without liquidating the pledged securities. For example, the Swiss DGS[25] uses tri-party collateral management arrangements[26]. Under such system it could be possible to use pledged securities to obtain credit in the repo market rather than liquidate the securities.

iii. Asset encumbrance

Asset encumbrance can further create pro-cyclical effects, as it may limit banks' ability to obtain secured funding in times of stressed funding markets.[27] The EBA is intensively monitoring the level of asset encumbrance and will publish an annual report on the subject. In its recent report of June 2016, the EBA confirmed that there has been no indication of a significant increase in the level of asset encumbrance in the previous year, but recommends that supervisors should carefully monitor and investigate funding structures across the EU. If IPC were to be accepted under EDIS, they would need to be covered by this monitoring process.

iv. Establishment of an EU wide operational and risk management framework

For all EDIS member banks to benefit equally from the use of IPC, it would be necessary for eligible collateral to be harmonised and usable across national borders. Furthermore, in operational terms the SRB would be required to manage the risks associated with the acceptance of collateral, including (i) the credit risk of the accepted security, (ii) the market risk of an adverse price movement of the accepted collateral and (iii) the liquidity risk of an adverse price movement. Currently, the SRB has not been required to establish a comprehensive collateral management system and accepts only cash collateral. However, there are examples of such systems, notably the mobilization channels for collateral used within Eurosystem credit operations, as well as the Eurosystem's risk mitigation techniques. Setting up a properly functioning collateral management system on a cross-border basis could facilitate the the use of IPC under EDIS.

v. The decision making process under EDIS may involve additional time constraints for a timely 7-day pay-out.

The decision-making process under EDIS may involve additional time constraints for a timely payout within seven working days. Such constraints would include:

a. the number of days needed, according to the decision-making process under the SRMR for the Board to decide that the conditions for coverage by EDIS have been met, and to determine the amount of funding (Article 41(m) of the proposal), and

b. the time needed for the Board to execute the transfer order to the national DGS, and for the cash to actually reach the latter.

Under the EBA guidelines, a credit institution would have up to two days to make available the cash promised through an IPC. This cash would be made directly available to the DIF. The Board would have to determine, in principle within 24 hours, that the conditions for EDIS coverage are met, and the amount of funding to be provided[28]; the national DGS may ask for a review of the Board decision within further 24 hours, and the Board shall decide within 24 hours more. At this point 3 days have already elapsed. In cases where the declaration of the unavailability of deposits and the notification under Article 41(l) happen at the same time, the 7-day pay out deadline could be compromised.

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[25] esisuisse, http://www.esisuisse.ch/en/home.htm

[26] A product offered by clearing houses to provide collateral management for the collateral supplier for the benefit of the collateral taker.

[27] See ESRB recommendation of 20.12.2012, executive summary. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013Y0425%2801%29&from=EN

[28] Article 41m of the Commission proposal.

Of course, the above constraints would only occur if one assumes that the notification by the DGS to the Board under Article 41(l) takes place together with the declaration of unavailability of deposits by the administrative or judicial authority, which is the pay-out trigger. Although one could argue that the duty to notify according to Article 41(l) only becomes effective after the declaration of unavailability, the board's deliberations according to 41(m) would not need to be delayed given the duty of the national DGS to notify already under Article 41(k) the "expected" pay-out, and then, under Article 41(l), the pay-out "encountered". In addition, it could be argued that the likelihood that the IPC has to be realized is rather low given that this means that a single event or several events would have to consume 70% of the DIF without time for ex-post contributions to be raised. Furthermore, time constraints could be further mitigated if:

- the DGS or designated authority calls the IPC in a cautious manner, namely sufficiently early before a number of pay outs involve a depletion of the fund, looking at the financial scenario and at the likelihood of new pay-out events to arise; the way in which the DGS or designated authority calls on the IPC is, however, neither prescribed nor governed by the current DGSD;
- the level up to which IPC are accepted is lowered, since this would reduce the likelihood to reach the need to tap them.

5.1.3. *Conclusion*

There are a number of risks associated with accepting IPC in an EDIS framework, including operational, management and procedural risks. Those risks could be mitigated. Such mitigants would include: (i) a prudential treatment of payment commitments that takes into account the likelihood that they will be triggered, (ii) clear criteria under which conditions the board may call payment commitments, (iii) a collateral and risk management framework that enables EDIS member banks to use the same type of collateral independent of their geographical location.

When balancing the advantages and disadvantages of including IPCs in an EDIS context, the Commission proposal has taken a conservative approach by excluding the possibility of using IPCs towards the target level of the DIF (policy option 1). Otherwise, the definition of "available financial means" in the proposal[29] mirrors exactly the definition in the DGSD.

5.2. Temporary high balances (THB)

5.2.1. *Issue description*

Under the DGSD, the coverage level for each deposit is up to EUR 100.000. However, pursuant to Article 6 (2) DGSD, Member States must ensure a higher level of coverage for a period of between 3 and 12 months for deposits relating to certain transactions, or serving certain social or other purposes. The deposits in these circumstances are referred to as "temporary high balances (THB)". More specifically, THB under the DGSD relate to the following:

> *"(a) deposits resulting from real estate transactions relating to private residential properties;*
>
> *(b) deposits that serve social purposes laid down in national law and are linked to particular life events of a depositor such as marriage, divorce, retirement, dismissal, redundancy, invalidity or death;*
>
> *(c) deposits that serve purposes laid down in national law and are based on the payment of insurance benefits or compensation for criminal injuries or wrongful conviction."*[30]

[29] Article 3(57) of the Commission proposal.
[30] Article 6(2) DGSD

The exact definition of the events covered varies depending on the national laws. In addition, the exact period of protection for THB, as well as the amount protected, is to be determined by the Member State, taking into account the significance of the protection for depositors and the living conditions in the Member States[31].

The discretions relating to THB in the DGSD are not affected by the EDIS proposal; THB which are covered under the respective national law by the national DGS, would be covered by the DIF under the EDIS proposal[32].

5.2.2. *Policy options and comparison*

- Option 1: THB remain as national options and are covered by EDIS, as per the Commission's proposal
- Option 2: THB are fully harmonized and are covered by EDIS
- Option 3: THB are covered by each national DGS.
- Option 4: THB remain and are covered by EDIS up to a certain harmonized amount[33] and by national DGSs for any amount beyond.

As regards the quantification of the options currently in place in Member States, covered amounts for THB differ widely among Member States. Table 14 provides an overview of some key statistics. For real estate transactions and insurance benefits, the average and median for the EU are relatively close, both around **EUR 500.000**. However, this average/median still conceals a significant divergence in coverage, which ranges from as low as EUR 150.000 to as high as EUR 1.300.000 (or even 'unlimited' for insurance benefits in 2 MS). As for the coverage period, most MS chose either a six month coverage period or a three month coverage period. A coverage period of 12 months only occurred incidentally.

Table 14. Summary statistics for EU

	Real estate transactions	**Social purposes**	**Insurance benefits/compensation**
Average amount	EUR 552.000	EUR 447.000	EUR 546.000
Median amount	EUR 450.000	EUR 250.000	EUR 450.000
Lower quartile amount	EUR 200.000	EUR 150.000	EUR 150.000
Median period	6 months	6 months	6 months

Source: Survey by the Dutch Presidency of the Council – May 2016

Note: in cases where MS indicated that the coverage was unlimited, an amount of € 1.000.000 was selected for the calculations, knowing that this amount does not affect the median. In a few instances it was not clear whether the amount mentioned included or excluded the first € 100.000. The Presidency had to make a judgment call, based on the wording of the response. No such instances significantly affect the statistics.

[31] Recital 26 DGSD

[32] Both in re-insurance and co-insurance, the amount of covered deposits used to calculate the liquidity shortfall of the national DGS only consists of eligible deposits up to the standard coverage level of 100,000 euro or its equivalent in national currency. This does not mean that the proposal excludes temporary high balances from EDIS coverage in those phases. The reason not to refer to them as basis for the calculation of the liquidity shortfall of the national DGS is that temporary high balances are normally not yet known at the time of the payout event, and are therefore disregarded. Indeed in both re-insurance and co-insurance and also in full insurance the loss cover of the national DGS is determined on the basis of the total amount repaid to depositors under Article 8 of the DGSD which includes THB.

[33] This could be set e.g. at EUR 500 000 which emerged as the average of the current national levels (see Dutch Presidency non paper in May 2016).

In order to provide concrete figures on the possible exposure for the DIF covering THB, the Commission addressed targeted data requests on the exposure of national DGSs to THBs in recent pay-out events (percentage of THB of total amount repaid to depositors). Data obtained was limited due to the relatively low number of pay-outs after Member States have incorporated THB into their national framework, and to the fact that THB are typically not known in advance of a pay-out but need to be "claimed" by depositors and verified after a pay-out. Nevertheless, three Member States[34] with recent pay-outs, reported that no claims related to THB had been made. Poland has provided an estimated ratio of THB to total pay-out based on their DGS's analysis covering 8 entities that experienced pay-outs in 2014-2016 (See Table 15).

Table 15. THB estimate.

Entity	Max. THB ratio
Entity 1	3,5%
Entity 2	2,5%
Entity 3	1,8%
Entity 4	0,2%
Entity 5	0,0%
Entity 6	0,1%
Entity 7	0,0%
Entity 8	0,0%

On the basis of Table 15, it could be assumed that, for listed entities, the **estimated** THB ratio could range from 0.0% to 3.5%. However, given the fact that THB were incidental, it should be assumed that the proportion of THB is rather close to zero.

5.2.3. *Conclusion*

The discretions awarded by the DGSD to Member States are not affected by the EDIS proposal. The information provided by Member States, together with the fact that THB are meant to provide cover for exceptional events and for a limited period of time, would suggest that their magnitude is likely to be small compared to the claims of "regular" deposits in case of a pay-out and that the policy option adopted appears to be correct.

5.3. Scope of EDIS

The scope of EDIS determines which entities should be eligible for coverage. According to Art. 2 (2) of the EDIS proposal, the European scheme would apply to all "credit institutions affiliated to a participating DGS". Several Member States have suggested that the scope of EDIS should be more clearly specified, especially with regard to:

[34] DE, LV and HR

- entities that might be covered by national DGSs (e.g. credit unions), but which are not covered by the SRM/SSM/CRR (non-CRR entities) and
- branches established in the territory of a Members State by a credit institution which has its head office outside the European Union (third-country branches).

5.3.1. *Non-CRR entities*

5.3.1.1. *Issue* description

The difference between the scope of EDIS and that of the SRM/SSM/CRR is of relevance. The EDIS proposal defines a wide scope, covering all credit institutions affiliated to a DGS. Therefore, from a formal point of view, EDIS coverage would also be provided to entities that are excluded from applying the CRR/CRD IV rules and not covered by the SSM (non CRR entities). Table 16 provides information on the relevant scope of DGSD, EDIS, SSMR and SRMR.

Table 16. Non-CRR entities in the context of EU legislation

	Scope of DGSD	**EDIS proposal**	**SSM- Regulation**	**SRM - Regulation**
Non-CRR Entities	Yes, to the extent that they are credit institutions. Art. 1 (2) (d) DGSD: applies to "credit institutions affiliated to a DGS"; credit institutions are defined in point (1) of Art. 4(1) CRR	Yes, to the extent that they are credit institutions. Art. 2(2) (b) EDIS proposal: "Credit institutions affiliated to a participating DGS"	No. Art. 1 subpara. 2 SSMR: "The institutions referred to in Article 2(5) of the Directive 2013/36/EU […] are excluded from the supervisory tasks conferred on ECB in accordance with Article 4 of this Regulation.	No. The scope of the BRRD excludes credit unions (see Art. 2 (1) point (2) BRRD); the SRMR builds on the BRRD (as single rulebook) and thus cannot have a wider scope of application than the BRRD. Moreover, the scope is confined to SSM supervised entities only

Concerns may exist as certain entities to be covered by EDIS are not regulated and supervised under the CRR/CRD framework and the SSMR. Potentially lower regulatory and supervisory standards at national level could increase the risk exposure of EDIS. Moreover, any misalignment of the scope would contradict the basic objective behind the Banking Union, ensuring that liability and control is consolidated under the three pillars of the Banking Union. Table 17 provides a summary of information collected from Member States on credit institutions potentially covered by EDIS but outside the CRD/CRR framework and the SSMR.

Table 17. Non CRR entities (mn EUR) [35]

MS	Type	DGS member-ship	SSM	Number of entities	Total Assets held by entities	Total Assets as share of MS' banking sector TA (in %)	Covered Deposits held by entities	Covered Deposits as share of total covered deposits (in %)
AT	Other credit institutions	Yes	No	14	35.466	4,00%	635	0,32%
IE	Credit unions	Yes	No	333	15.399	3,30%	12.631	16,00%
LT	Credit unions/ Central bank	Yes	Yes	1	133	0,55%	0,29	0
	Credit unions	Yes	No	74	656	2,70%	552	5,00%
LV	Credit unions	Yes	No	32	25	0,08%	17	0,22%
NL	Credit unions	No	No	30	10	0,00%	0	0,00%
PT	Savings banks	Yes	No	3	379	0,09	245	0,19%
Non Banking Union Area								
CZ	Credit unions	Yes	No	11	1.196	0,60%	1.004	0,90%
HU	Co-operatives	Yes	No	1	16	0,02%	4,8	0,02%
PL	Credit unions	Yes	No	45	2.769	0,72%	2.557	1,65%
UK	Credit unions	Yes	No	500	3,330	0,04%	2,88	0,23%

Based on Table 17, the following tentative assessment can be made.

- 9 Member States require different types of entities to join a national DGS. The most important category concerns credit unions (7 Member States). However, not all Member States that have credit unions require them to join a national DGS. For example in the Netherlands there is no protection for credit union depositors. In terms of relevance, these entities are not significant because the amount of covered deposits as a share of total covered deposits of the Netherlands banking sector is close to zero. In Spain, credit unions are credit institutions, which fall within the scope of the CRR. Those credit unions are significant for the Spanish banking sector: 10.5% of total banking sector covered deposits are held by 63 credit unions.
- Business operations of these non-CRR entities are limited to local retail customers, and to some extent SMEs and the agricultural sector. These entities may also be important for financial inclusion. They often contribute to the delivery of banking and payment services to the entire population, in particular with regard to disadvantaged or low-income segments of the society.
- In some Member States, significant numbers of non-CRR entities, in particular credit unions, are engaged in business (UK: 500, IE: 333, LT: 75, PL: 45). However, taking into account the share of covered deposits held by those entities at national level, a mixed picture emerges. A significant proportion deposits are held by credit unions in IE (16%), followed by LT (5%) and PL (1.63%). In all other cases, the percentage is below 1%. In conclusion, the question of EDIS coverage therefore appears to be of particular relevance for one Member State (IE).

[35] The information in this table is based on information provided by Member States. LU provided no data. RO informed on credit unions not affiliated to a DGS but not provided further information.

5.3.1.2. Policy options and comparison

Two options can be assessed:

- Option 1: exclude entities not covered by CRR and not supervised by the SSM from EDIS coverage
- Option 2: Include entities not covered by CRR under EDIS. It could be explicitly clarified that all credit institutions, including the ones exempted in Article 2(5) CRDIV in so far as they have been included in the scope of a national DGS would be eligible for coverage by EDIS

Option 1 would be in line with the philosophy of the Banking Union where access to common funds is preconditioned on their supervision within the SSM. On the other hand, their exclusion could lead to an unlevel playing field within a Member State between institutions only covered by the national DGS and those covered by EDIS ('two-tier system'). One possibility could be to apply the CRR framework to such entities as it is already the case in Spain. This could however be challenging for such entities considering their size and limited business operations. Exclusion of these entities would require most of the Member States concerned to maintain separate DGS for a very limited number of entities after the full implementation of EDIS in 2024. (For example, in PT a separate DGS would be required to cover only 3 entities with covered deposits of 245mn EUR.) This raises questions in terms of cost efficiency and effectiveness, with the gap between depositors protected by EDIS and depositors protected by national DGSs reinforcing a two-tier system.

Option 2 would support simplicity and would maintain the level playing field within Member States. All entities affiliated to a DGS would be eligible for EDIS coverage and all depositors could profit from the protection provided in the same way. However, their inclusion raises questions about conceptual consistency with the Banking Union and particularly aligning liability and control. Sub-optimal regulatory and supervisory standards at national level could increase the risk to EDIS.

5.3.1.3. Conclusion

In light of the different pros and cons, the EDIS proposal applies to all credit institutions affiliated to a participating DGS.

5.3.2. *Third-country branches*

5.3.2.1. Issue description

According to Art. 15 (1) DGSD, Member States are required to check whether third-country branches have protection equivalent to that prescribed in the DGSD. They should at least check that depositors benefit from the same coverage level and scope of protection as provided by the DGSD. Although the equivalence test is mandatory, Member States have discretion in deciding whether to oblige the third-country branch to join a national DGS, i.e. a negative equivalence test does not automatically mean that a third-country branch is required to join a national DGS[36]. If a Member State requires a third-country branch to join the national DGS, the branch would be covered by EDIS (Art. 2 (2) of the EDIS proposal). The scope of EDIS does not fully align with the SSM, as national supervisory authorities remain responsible for carrying out tasks not conferred on the ECB, including the supervision of third-countries. To align liability and control, some Member States prefer the exclusion of third-country branches from EDIS support. Table 18 provides an overview on the number of third-country branches in the Members States and their treatment in the context of equivalence test.

[36] Third-country branches not joining a national DGS are obliged to provide all relevant information concerning the guarantee arrangements to their actual or intending depositors (Art. 15 (2), (3) DGSD.

Table 18. Third-country branches and equivalence[37]

	Total number of third-country branches	Not equivalent and covered by the national DGS	Not equivalent and not covered by the national DGS	Equivalent and not covered by the national DGS
AT	**0**	**0**	**0**	**0**
BE	**8**	**8**	**0**	**0**
CY	**15**	**15**	**0**	**0**
DE	**19**	**19**	**0**	**0**
EE	**0**	**0**	**0**	**0**
EL	**4**	**4**	**0**	**0**
ES	**5**	**5**	**0**	**0**
FI	**0**	**0**	**0**	**0**
FR	**20**	**20**	**0**	**0**
IE	**0**	**0**	**0**	**0**
IT	**8**	**4**	**N/A**	**N/A**
LT	**0**	**0**	**0**	**0**
LU	**11**	**11**	**0**	**0**
LV	**0**	**0**	**0**	**0**
MT	**2**	**0**	**2**	**0**
NL	**4**	**0**	**4**	**0**
PT	**1**	**1**	**0**	**0**
SI	**0**	**0**	**0**	**0**
SK	**0**	**0**	**0**	**0**
∑ BU	**97**	**91**	**6**	**0**
Non Banking Union Area				
BG	**1**	**1**	**0**	**0**
CZ	**0**	**0**	**0**	**0**
DK	**0**	**0**	**0**	**0**
HR	**0**	**0**	**0**	**0**
HU	**1**	**1**	**0**	**0**
PL	**0**	**0**	**0**	**0**
RO	**0**	**0**	**0**	**0**
SE	**0**	**0**	**0**	**0**
UK	**50**	**50**	**0**	**0**
∑ Non BU	**52**	**52**	**0**	**0**
∑ EU	**149**	**143**	**6**	**0**

The table shows that a vast majority of the Member States expect third-country branches to join a national DGS. No Member State classifies the protection level as equivalent. However, in two cases, third-country branches are classified as not equivalent but are not required to join a national DGS (Netherlands, Malta). Whereas the amount of deposits as a share of the total banking sector deposits is

[37] The information in this table is based on information provided by Member States. One Member States submitted incomplete data (IT).

very low in the Netherlands (4 branches with a share of only 0.18%). The situation is rather different in Malta (2 branches with a share of 20.7%)[38]. Table 19 provides information on the relevance of third-country branches required to join a national DGS in the Member States concerned.

Table19. Relevant third-country branches – Key statistics[39]

MS	Number	TA held by third-country branches (in mn)	TA as share of MS's consolidated banking sector TA (in %)	Deposits held by the third-country branches (in mn)	Deposits as share of total banking sector deposits (in %)	Covered deposits held by third-country branches (in mn)	Covered deposits as share of total covered deposits (in %)
BE	8	89,026	8.79%	27,886	3.99%	73	0.02%
CY	15	3,166	4.80%	3,029	5,2%	203	0,80%
DE	19	52,045	0.65%	12,564	0.34%	346	0.07%
EL	4	688	0.18%	471	0.17%	96	0.10%
ES	5	5,097	0.14%	1,481	0.07%	159	0.02%
FR	20	40,000	0.50%	8,000	0.50%	200	0.10%
IT	4	2,416	0.07%	1,076	0.05%	N/A	N/A
LU	11	47,550	6.40%	31,582	6,45%	170	0,59%
PT	1	134	0.03%	112	0.05%	22	0.02%
Non-Banking Union area							
BG	1	46	0.10%	31	0.08%	29	0.09%
HU	1	2,399	2.29%	0	0.00%	0	0.00%
UK	50	1,754,456	22.00%	N/A	N/A	4,310	0.34%

The table illustrates that third-country branches (required to join a national DGS) are of high importance in a few Member States, in particular in the UK and BE. However, looking only at the covered deposits a different picture emerges. The amount of covered deposits, as a share of total covered deposits, is below 1% in all Member States. Deposit-taking by these branches is rather concentrated on wholesale depositors in some Member States (see large shares of total deposits in BE, LU).

Since Art. 2 (2) of the EDIS proposal provides that the Regulation should apply to "credit institutions affiliated to a participating DGS", this means that if a Member State required the third-country branch to join the national DGS, the branch would automatically be covered by EDIS. It is recalled that the scope of EDIS does not fully align with the SSM/SRM, as national supervisory authorities remain responsible for carrying out tasks not conferred on the ECB, including, supervising credit institutions from third countries establishing a branch.

Given the exposure for EDIS of covering deposit from third country branches, the options below can be considered.

5.3.2.2. Policy options and comparison

Four options have been considered:

[38] Data on "covered deposits" are not available according to the replies of MT and NL.
[39] The information in this table is based on information provided by Member States..

- Option 1: retain the current approach: Member States continue to apply the equivalence test and decide whether a third-country branch must participate in the national DGS and so be covered by EDIS.
- Option 2: retain the current approach but specify criteria for the equivalence test through a Commission delegated act.
- Option 3: conduct the equivalence test at a central level (SRB or Commission). The central body at European level could then inform the Member State of the outcome of the equivalence test, so that the Member State or competent authority in that Member State would decide based on the outcome of that test to require a third country branch to join a national DGS or not.
- Option 4: same as option 3 but the third country branch would be required to join the DGS in case of non-equivalence, i.e. the outcome of the equivalence test would be binding for the Member State or the competent authority concerned.

Option 1 respects the discretion granted by the DGSD to Member States as regards third country branches. The equivalence test and procedure as well as the final decision would remain at national discretion. Differences in application between Member States cannot be fully excluded.

Based on a set of binding guidelines, Option 2 would contribute to a more harmonized procedure at national level. Indeed, the requirements provided by the DGSD are not very detailed leaving room for different interpretation ("When performing the check provided for in the first subparagraph of this paragraph, Member states shall at least check that depositors benefit from the same coverage level and scope of protection as provided for in this Directive"). Nevertheless, execution as well as decision-making would remain at national level only. Differences between Member States can therefore not be fully excluded.

Option 3 would contribute to a more harmonized procedure when assessing equivalence. The equivalence check would be exercised by a central body at European level supporting a uniform assessment. Potential differences in the assessment between Member States could be widely eliminated. Moreover, to concentrate the assessment at central level might create synergies and accordingly reduce administrative costs. However, it would be not fully effective as to creating a level playing field as the final decision on the DGS membership would remain a discretionary decision of the Member State. Although the vast majority of Member States requires non-equivalent branches to join their respective DGS there are some exemptions: Six branches out of two Member States (MT, NL) are currently classified as non-equivalent and therefore not required to join a national DGS.

Option 4 would eliminate any discretionary power of Member States when it comes to the decision on DGS membership. Assessment as well as decision-making would be de facto executed centrally and may lead to a more harmonized level of protection of depositors across all Euro Area Member States. However, under this option, the underlying criteria of the equivalence test may have to be strengthened to reflect the higher protection provided under EDIS compared to a purely national system. In particular, the specific risk of the third-country branch to EDIS should be part of the equivalence test. Moreover, it should be taken into account that the supervision of third-country branches unlike European credit institutions or subsidiaries of credit institutions, falls in the remit of national competent authorities with no control from the ECB and with a great deal of room for manoeuvre to grant prudential exemptions to third-country branches. The equivalence test would therefore also include the assessment of supervision.

5.3.2.3. *Conclusion*

The EDIS proposal respects the discretion granted by the DGSD to Member States as regards the equivalence test of deposit protection for third country branches.

5.4. EDIS cover in case of alternative and preventive measures

5.4.1. *Issue description*

As explained in Chapter 2, the DGSD provides for two mandatory functions of any DGS regarding the use of funds: a pay-out function and participation of the DGS in resolution. Under the Commission proposal, EDIS support would cover both types of interventions.

Beyond this, the DGSD also includes an option for Member States' to provide for two additional functions of a DGS.

First, Member States may allow DGS to use their financial means in order to prevent failure of an institution subject to certain conditions and safeguards (preventive measures, Art. 11 (3) DGSD). More concretely, if the DGS's financing of the measure constitutes State aid, in particular if the decision to provide funding is formally or informally controlled by the State ("imputable to the state"), the institution in question would be considered failing or likely to fail (Art. 32 (4) BRRD). In such case, if no alternative private sector or supervisory measure could prevent the failure[40], the bank needs to go into insolvency or, if this better achieves the resolution objectives, into resolution (Art. 32 (5) BRRD). In practice, this is means that the use of funds to finance alternative preventive measures without triggering resolution, is often limited to financing by purely private structures, such as institutional protection schemes which have also been entrusted with statutory DGS functions.

Second, Member States may provide for the possibility of their DGS to finance deposit book transfer and eventually other assets and liabilities in order to preserve the access of depositors to covered deposits, in the context of national insolvency proceedings (alternative measures, Art. 11 (6) DGSD). This use of national DGS is subject to the condition that the use of their funds does not exceed the net amount of compensating covered depositors at the credit institution concerned ("least cost principle").

Both the use of the DGS to finance preventive measures as well as the use of the DGS to finance alternative measures remains an option for Member States under the DGSD, but would not be funded under EDIS as per the Commission proposal.

The tables below provide an overview of the Member States which exercise those options.

[40] If the use of a DGS is considered State aid, it could not amount to a "private sector measure" under Article 32(1) (b) BRRD.

Table 20. BU countries [41]

	Incorporated alternative measures as an option into the legislation (Art. 11 (6) DGSD)	**Have used this option in the past**	**Incorporated preventive measures as an option into the legislation (Art. 11 (3) DGSD)**	**Have private DGS (s) which could potentially perform preventive measures**
AT	No	No	Yes	No (not yet)
BE	Yes	No	NO	No
CY	No	No	No	No
DE	Not used		Yes but only for Institutional Protection Schemes which are recognizes as a DGS	
EE	Not used		Not used	
EL	Yes[42]	No	No	No
ES	No	No	Yes. Art. 11(5) Royal Decree-law 16/2011 and articles 10 and 11 Royal Decree 2606/1996.	
FI				
FR	No	No	Yes (and we have used this option in the past)	No [43]
IE	Yes	No	Yes	No
IT	Yes	Yes	Yes	Yes
LT	Option not exercised		Option not exercised	
LU				
LV	No	No	No	No
MT	Yes. Reg 33(6) of the Depositor Compensation	No	Yes. Reg 33(3) of the Depositor Compensation	No

[41] The information in this table is based on information provided by Member States. Blank cases correspond to non-confirmed information.

[42] Please note that the transposition of the provision of Art 11(6) of DGSD in Greek legislation does not provide for transfer of assets and liabilities but is limited to deposit book transfer. It is not meant to be used as an alternative measure but as an additional means for reimbursing depositors. The relevant provision in the Greek legislation is as follows:

"*Alternatively, instead of repayment, the access of depositors to covered deposits may be preserved by deposit book transfer, provided that the cost to TEKE [Hellenic Deposit and Investment Guarantee Fund] does not exceed the net amount it would repay to the depositors of the relevant credit institution.*" - Art 11(10) of law 4370/2016 (Government Gazette A' 37).

[43] France does not have an IPS system. However they refer to the French DGS as established by the law and administered by the participating members who regard the funds as private money collected on banks.

	Scheme Regulations, 2015 (L.N. 383 of 2015)		Scheme Regulations, 2015 (L.N. 383 of 2015)	
NL	No	No	No	No
PT				
Sl	No	No	No	No
SK	No	No	No	No

Table 21. Non-Banking Union area [44]

	Incorporated alternative measures as an option into the legislation (Art. 11 (6) DGSD)	**Have used this option in the past**	**Incorporated preventive measures as an option into the legislation (Art. 11 (3) DGSD)**	**Have private DGS (s) which could potentially perform preventive measures**
BG	No	No	No	No
CZ	No	No	No	No
CZ	No	No	No	No
DK	Yes	Yes		
HR	No	n/a	Yes	No
HU	No	Yes	No	No
PL	No	No	Yes	No[45]
RO	No	No	No	No
SE		Never used		Never used
UK	Yes	Yes (pre-DGSD)	No	No

As suggested by Table 20 and 21, there is:

a. a limited number of Member States have private DGS which could be used for preventative measures under Article 11 (3) of the DGSD (DE, AT).

b. a limited number of Member States use their DGS in order to finance alternative measures under Article 11 (6) of the DSGD (IT, HU, DK); and

The Member States which have availed themselves of the option regarding preventative measures are AT and DE for their Institutional Protection Schemes (IPSs). The savings banks and cooperative banks

[44] The information in this table is based on information provided by Member States. Blank cases correspond to non-confirmed information.

[45] * According to ESA 2010 and statistical classification of the Bank Guarantee Fund (Polish DGS), the Fund is classified in the general government sector (S.13).

in these two Member States operate mutual and contractual 'institutional protection schemes (IPS)' that guarantee the entire liquidity and solvency of their member banks.

5.4.2. *Policy options and comparison*

As it is shown in Table 20 and Table 21, there is a very limited number of countries which use their DGS for preventative or alternative functions. This raises a number of questions as to the pertinence of those functions being covered by EDIS.

Three policy options exist:

- Option 1: EDIS would fund also alternative and preventive measures.
- Option 2: EDIS would not fund alternative and preventive measures but discretion remains for Member States to fund them through national DGS (approach in the Commission proposal).
- Option 3: EDIS would support only certain types of alternative measures, e.g. an EDIS contribution limited to a deposit book transfer, but would not be available for a transfer of other assets and liabilities.

Under option 1, the use of the DGS to cover for the costs of alternative and preventive measures would remain an option for the Member States under the DGSD. EDIS coverage in those instances would mutualize expenditures the extent and the type of which would be exclusively decided by each Member State without any input or control by the central body (SRB).

In the case of temporary high balances, another national discretion under the DGSD, the discretion is widely exercised by Member States to different degrees (see section on Temporary high balances (THB)). Therefore, it is possible in that case to explore common grounds of coverage by EDIS on the basis of averages or medians of the amounts currently covered by the DGS of each Member State. This situation differs from the use of EDIS to fund alternative or preventive measures, which is exercised by a very limited number of Member States and where it does not therefore seem possible to explore the same course of action.

Option 2 would still give the Member States the option of including alternative and/or preventive measures in their national systems, but without access to EDIS for such function. In this case, national DGS might find it difficult to fund those interventions if a large portion of their funds is allocated to the central level. In order to allow national DGS to continue funding these measures, it can be argued that it is necessary to reduce contributions of institutions to EDIS whose DGS/IPS finance those functions in view of the fact that exposure of EDIS is reduced. However, such a reduction, in view of risk/based contributions is only possible if it can indeed be shown that the membership in a DGS/IPS with the possibilities of preventive/alternative measures indeed reduces a bank's riskiness.

It has been pointed out that membership in an IPS should be taken as a risk-mitigating factor which would lead to a lower risk-base for these banks. This reflects the main function of an IPS which aims at preventing banks from failing *before* a pay-out event occurs. This important feature is also recognised in the DGSD, which gives Member States the possibility to allow that DGS ex-ante contributions to be used for failure-prevention measures, as long as the available financial means of a DGS do not fall below 25% of the target level. This possibility applies to cases where the IPS is recognised as a DGS (Article 11(3). If banks are members of an IPS, which is separate from a DGS, Member States may decide that these members of an IPS may pay lower contributions to the DGS (Art. 13(1)). While the savings and cooperative banks are covered by EDIS, their specific risk profile could be appropriately reflected under the system of risk-based contributions. When designing a scheme for risk-based contributions for the purpose of EDIS, the effectiveness of IPS in reducing the

risk that EDIS would need to make payments for depositor compensation should be assessed. In particular, their propensity to triggering a DGS requiring pay-outs or resolution contributions would need to be appropriately reflected. If it can be demonstrated that IPS can indeed be an effective risk-mitigation tool also in EDIS, this should be reflected in the calculation method for contributions. This is already reflected to a certain extent in the EBA Guidelines for risk-based contributions.

The EDIS proposal requires the Commission to adopt a delegated act specifying the method for the calculation of the calculations and reflecting the degree of risk incurred by each institution (Art 74c (5) of the Commission proposal (see also below section 5.5 Contributions).

Option 3 would mean EDIS coverage of part of the amount which is allowed to be covered by national DGS under Article 11 (6) of DGSD, namely the costs resulting from the transfer of the deposit book.

Under Article 109 BRRD, it is accepted that DGS could intervene to cover for the amount of losses that covered deposits would have suffered had they not been excluded from bail-in. In resolution this can involve DGS financing a deposit book transfer, for instance, to a bridge bank. Option 3 would mean acknowledging that the cost of a deposit book transfer in both resolution and insolvency would be comparable, as long as the national insolvency proceeding in question involves the same level of loss absorption for capital and other debt holders than resolution under BRRD. In any event, the ultimate cap of EDIS coverage under option 3 would be "the net amount of compensating covered depositors at the credit institution concerned" (Article 11 (6) DGSD in fine).

As regards the use of the DGS to finance alternative measures, the Commission has declared it as being compatible with the State Aid framework in the past, for instance in the case of Banca Romagna Cooperativa[46]. Mirroring the reasoning above on the use of preventative measures, the question could be raised as to possible reduced contributions in as much as financing of those measures with the national DGS would reduce EDIS' exposure. The difference, however, is that use of IPS to finance preventative measures depends on the decision of institutions to pull resources together, whilst coverage of alternative measures by the national DGS is a public national decision which does not involve institutions' decision.

5.4.3. *Conclusion*

As suggested above, since preventative and alternative measures are used by a limited number of Member States, the Commission services did not consider those to be core functions financed by EDIS. Furthermore, since those functions are not clearly defined in advance at EU level, EDIS would have to contribute to interventions that are not clearly identifiable in advance. Against this background, the Commission did not include them EDIS coverage of preventative and alternative functions in the proposal. In any event, Member States would remain free to finance those measures through their national system.

However, in case an agreement could be found what the maximum exposure should be for EDIS and in view of the claim that a deposit book transfer could in fact limit the exposure of EDIS, the issue might have to be revisited in the course of the negotiations.

[46] http://europa.eu/rapid/press-release_STATEMENT-15-5409_en.htm

5.5. Contributions

5.5.1. *Issue description*

The DGSD requires contributions from credit institutions to national DGSs, based on their respective holdings of covered deposits and their specific risk profile (Article 13 (1) DGSD). The likelihood that EDIS may have to mobilise funds to compensate depositors of a failed bank increases with the risk of that bank. Hence, the EDIS proposal envisages in Article 74 (c) to risk-adjust contributions according to banks' risks, thereby continuing the principle already established by the DGSD. The EBA issued a set of guidelines specifying methods to calculate the contributions to DGSs.

Article 74c (5) of the Commision proposal empowers the Commission to adopt two delegated acts in order to specify risk-based methodologies for the calculation of contributions for both the reinsurance phase and the co-insurance phase[47]:

- Under the re-insurance phase, the calculation must be based on the amount of covered deposits and the degree of risk incurred relative to all other credit institutions affiliated to the same participating DGS, i.e. the relative risk of institutions will be determined only at the national level.
- Starting with the co-insurance period, the calculation must be based on the amount of covered deposits and the degree of risk incurred by each credit institution relative to all other credit institutions affiliated to DGSs under EDIS, i.e. the relative risk of institutions will be determined at the Banking Union level.

This approach follows the logic that under re-insurance the larger part of risk is still borne at the national DGS level; this changes under co-insurance with increasing risk mutualisation.

5.5.2. *Policy options and comparison*

The following policy options for determining risk-based contributions to EDIS could be considered:

- Option 1: Retain current approach, i.e. each DGS would calculate risk-based contributions at national level on the basis of the EBA guidelines specifying Article 13 (1) DGSD. There would be no need for further delegated acts. Instead, a certain amount of contributions would be contributed to EDIS based on national-level risk profiles of banks.
- Option 2: Only one delegated act would be adopted prescribing a methodology for calculating contributions at national level only. Thus, the method for calculating risk-based contributions would be harmonised but would be based on national-level risk profiles of banks.
- Option 3: Only one delegated act would be adopted containing provisions for the calculation of contributions based on Banking-Union level risk profiles of banks from the outset of EDIS.
- Option 4: following the proposed two stage approach, i.e. for the re-insurance phase contributions would be calculated based on national-level risk profiles of the banks, whereas from the start of the co-insurance calculation contributions would be based on Banking-Union level risk profiles.

The four options have been tested against three criteria: (i) the complexity of the rules, (ii) the alignment of the risk that banks represent and the magnitude of contributions they have to pay, as well

[47] NB: this part of the analysis covers the approaches of re- and coinsurance as per the Commission proposal, while Chapter 3 refers to different concepts.

as (iii) the implementation costs. The table below summarizes the options compared to a scenario (option 1) where the current system with a calculation method based on the EBA guidelines at national level would be continued under all EDIS phases.

Table 22 Comparison of policy options

	EFFECTIVENESS		**Cost-Efficiency**
Objectives / Policy option	**Complexity of the rules**	**Alignment of banks' risk and contributions**	**Implementation cost for national DGS, EDIS and banks**
Option 1: No policy change	None	None	None
Option 2	-	--	-
Option 3	None	-	None
Option 4	None	++	None

The most disadvantageous option under the criteria is option 2. It would be complex because a delegated act would need to set out a distribution mechanism for contributions at several national levels, which would in aggregate however need to yield a predefined aggregate amount to reach a common target level. This would inevitably imply an iterative process for the calculation with the need for reconciliation between steps. At the same time, banks' contributions would mirror their risk only compared to their national peers. It would however ignore the systemic risk and not reflect banks' relative risk for EDIS.

Option 3 is less complex to implement, but has a comparable disadvantage in the first years of re-insurance regarding the alignment of risk and contributions. While under re-insurance risk would still mainly be borne at the national level, under this option calculations would mirror the relative risk at Banking Union level immediately. This could lead to situations where in aggregate banks in certain markets could pay more to EDIS then their level of protection from EDIS would justify.

Option 4, as included in the EDIS proposal, ensures that banks' contributions mirror the risk they represent at the level where this risk is (mostly) covered, while providing a clear and straightforward methodology suitable for all EDIS phases.

5.5.3. *Conclusion*

The risk-weighting of contributions will change the amount of contributions paid by individual banks, compared to a system where contributions were only determined by a size-related criteria. This is justified because a bank's contributions to deposit insurance should be aligned with the risk that its depositors might need to be compensated by deposit insurance. Throughout the different phases of EDIS, that risk is borne at the national and the Banking Union level to different degrees.

In the reinsurance phase of EDIS, where risks remain largely at the level of the (national) DGS, a bank's risk profile relative to the its (national) DGS peer group should determine its risk-base for the purpose of calculating contributions. When EDIS becomes a system with joint liability at Banking Union level, starting with co-insurance, an individual bank's risk-base should be determined relative to all banks in the Banking Union.

6. ANNEXES

6.1. Modelling expected losses for EDIS vs other risk pooling models

* There are *n* countries with m_j banks in each country. m_j is country dependant.

* The probabilities of failure for the banks in the system can be given by the following matrix:

Country (j) / Bank (i)	1	2	……	n
1	p_{11}	p_{12}	…….	p_{1m}
2	p_{21}	p_{22}	…….	p_{2m}
. . . .	. . .	. . .	. p_{ij} .	. . .
m_j	p_{n11}	p_{n22}	…….	p_{nm}

* The possible losses/costs in the case of failure (the covered deposits) can be given by the following matrix:

Country (j) / Bank (i)	1	2	……	n
1	L_{11}	L_{12}	…….	L_{1n}
2	L_{21}	L_{22}	…….	L_{2n}
. . . .	. . .	. . .	. L_{ij} .	. . .
m_j	L_{m11}	L_{m22}	…….	L_{mn}

1. The case of multiple DGSs:

* The expected loss for each DGS can be given as follows:

$$E(L_i) = \sum_{i=1}^{m_j}\sum_{j=1}^{n} p_{ij}.L_{ij}$$

* The expected loss for the whole system is the weighted average of the expected losses of all the DGSs. The weight assigned for each DGS (w_j) is the proportion of the possible loss for that DGS to the total possible loss of all the DGSs. Hence, the expected loss for the whole system is:

$$E(L_{Multiple}) = \sum_{j=1}^{n} w_j \sum_{i=1}^{m_j}\sum_{j=1}^{n} p_{ij}.L_{ij} = \sum_{i=1}^{m_j}\sum_{j=1}^{n} w_j.p_{ij}.L_{ij}$$

$$w_j = \frac{\sum_{i=1}^{m} CD_{ij}}{\sum_{i=1}^{m}\sum_{j=1}^{n} CD_{ij}}$$

Where CD_j is the level of deposits covered by the national DGS.

2. The case of a single DGS:

* The expected loss for the whole system in this case is the weighted average of the possible losses of all the banks. The weight assigned for each bank (w_i) is the proportion of the possible loss for that bank to the total possible loss of all the banks. In other words, the expected loss for the whole system is:

$$E(L_{Single}) = \sum_{i=1}^{m_j} w_i \sum_{i=1}^{m_j}\sum_{j=1}^{n} p_{ij}.L_{ij} = \sum_{i=1}^{m_j}\sum_{j=1}^{n} w_i.p_{ij}.L_{ij}$$

$$w_i = \frac{CD_i}{\sum_{i=1}^{m} CD_i}$$

Where CD_i is the level of covered deposits per bank.

* Since $w_j \leq w_i$ (the size of covered deposits in one bank in a DGS is smaller than the size of covered deposits in that DGS):

$$\sum_{i=1}^{m_j}\sum_{j=1}^{n} w_i.p_{ij}.L_{ij} \leq \sum_{i=1}^{m_j}\sum_{j=1}^{n} w_j.p_{ij}.L_{ij} \Leftrightarrow E(L_{Single}) \leq E(L_{Multiple})$$

* Generally, the expected loss under the single DGS scenario would be lower than that under the multiple DGSs scenario unless:

- there was only one bank in every DGS.

- the probabilities of default across banks are perfectly positively correlated.

Example:

Assume we have only 2 countries with 3 banks in each country. The probabilities of failure and the covered deposits are given as follows:

Country	Bank	Probability of default	Covered Deposits	w_j	w_i
1	1	0.05	100	0.6	100/300 = 1/3
1	2	0.01	50		50/300 = 1/6
1	3	0.01	30		30/300 = 1/10
2	1	0.02	30	0.4	30/300 = 1/10
2	2	0.01	50		50/300 = 1/6
2	3	0.01	40		40/300 = 2/15

1. Expected loss under multiple DGSs scenario

$$E(L_1) = 0.05(100) + 0.01(50) + 0.01(30) = 5.8$$

$$E(L_2) = 0.02(30) + 0.01(50) + 0.01(40) = 1.5$$

$$w_1 = \frac{100 + 50 + 30}{100 + 50 + 30 + 30 + 50 + 40} = 0.6$$

$$w_2 = \frac{30 + 50 + 40}{100 + 50 + 30 + 30 + 50 + 40} = 0.4$$

$$\boldsymbol{E(L_{Multiple}) = 0.6.(5.8) + 0.4(1.5) = 3.48 + 0.6 = 4.08}$$

2. Expected loss under single DGS scenario

$$w_1 = \frac{100}{100+50+30+30+50+40} = \frac{1}{3} \qquad w_2 = \frac{50}{100+50+30+30+50+40} = \frac{1}{6}$$

$$w_3 = \frac{30}{100+50+30+30+50+40} = \frac{1}{10} \qquad w_4 = \frac{30}{100+50+30+30+50+40} = \frac{1}{10}$$

$$w_5 = \frac{50}{100+50+30+30+50+40} = \frac{1}{6} \qquad w_6 = \frac{40}{100+50+30+30+50+40} = \frac{2}{15}$$

$$E\left(L_{Single}\right) = \frac{1}{3}.(0.05).(100) + \frac{1}{6}.(0.01).(50) + \frac{1}{10}.(0.01).(30) + \frac{1}{10}.(0.02).(30) + \frac{1}{6}.(0.01).(50) + \frac{2}{15}.(0.01).(40) = 1.97$$

6.2. Brief description of the data sample and the simulation exercise in SYMBOL

Sample description

The data used for the present exercise is as of 2013. The data provider is Bankscope, a proprietary database of banks' financial statements produced by Bureau van Dijk. The dataset covers a sample of around 3,400 banks from the EU28, representing 99.86% of EU28 banks' total assets.[48] We focus on total assets, risk-weighted assets and total capital and/or capital ratios, as well as customer deposits. Missing values are imputed through robust statistics (see Cannas et al. (2013)[49]).

Data on the amount of covered deposits held by each bank are not provided by Bankscope. Hence, we resort to alternative sources, namely we make use of statistics at country level elaborated by the JRC (see Cannas et al (2015)[50] for details on the estimation techniques). We estimate the amount of customer deposits held by each bank by computing the ratio of covered deposits over customer deposits at the country level and then applying this proportion the customer deposit figures provided by Bankscope. Table 23 shows aggregated values for some selected variables.

Table 23: 2013 aggregated unconsolidated amount of selected variables for the banks in the sample

	Number of banks	Total assets bn€	RWA bn€	Covered deposits bn€	Capital bn€
2013	3,359	38,144	14,635	6,474	1,939

Data are corrected to reflect the Basel III definitions of capital and risk weighted assets. Corrections are based on the European Banking Authority and the Committee of European Banking Supervisors yearly exercises (Quantitative Impact Study, QIS), assessing and monitoring the impact of the new capital standards on European banks' balance sheet data[51]. In particular, the studies estimate what would be the average correction factor to move from reported capital and risk-weighted assets to a framework compliant with the new rules. For clarity purposes, Table 24 shows the correction factors applied to the 2013 balance sheet data.

Table 24: Correction factors applied to capital and RWA

	G1 banks Tier1 K > 3bn€	**G2 banks** Tier1 K < 3bn€	**G2 banks Medium** 1.5bn€ < Tier1 K < 3bn€	**G2 banks Small** Tier1 K < 1.5bn€
Capital correction	0.8	0.86	0.85	0.87
RWA correction	1.1	1.11	1.12	1.05

[48] We use the amount of total assets in the banking sector excluding branches as provided by ECB as reference for the population.

[49] See Cannas, G., Cariboni, J., Naltsidis, M., Pagano, A., Petracco Giudici, M. (2013). 2012 EU 27 banking sector database and SYMBOL simulations analyses, JRC Scientific and Technical Report JRC 86395.

[50] Cannas G., Cariboni J., Di Girolamo F., Maccaferri S. (2015): Updated estimates of EU total, eligible an covered deposits, JRC technical report JRC97362 (forthcoming)

[51] See European Banking Authority (2014) for 2013 data.

6.3. Brief description of SYMBOL

The Systemic Model of Banking Originated Losses (SYMBOL) model has been developed by JRC in cooperation with members of academia and representatives of DG FISMA. The original article describing the working of the model appeared in the peer-reviewed Journal of Financial Services Research.[52]

The core of the model is the Fundamental Internal Risk Based formula from the Basel III regulatory framework. The Basel III Fundamental Internal Risk Based formula works on the idea that credit assets outcomes fundamentally depend on a single factor.[53] This allows modelling and simulations to be carried out very easily. The formula has two additional useful characteristics in terms of modelling: (a) it uses a very limited number of parameters expressing the riskiness of credit assets and their correlation; (b) it gives comparable results when used on a set of sub-portfolios of assets, each with its own parameters, and then summing up results, or when directly considering the whole portfolio using average parameters values.

The model thus assumes that: (a) the Basel 3 regulatory model for credit risk is correct; (b) banks report risks accurately and in line with this model;[54] (c) all risks in the bank can be represented as a single portfolio of credit risks.[55] It is then possible to use publicly available data on total regulatory capital, risk weighted assets and total assets to obtain parameters representing the average riskiness of each bank's portfolio of assets.[56]

Once parameters are obtained for all banks, a set of loss scenarios are simulated. In each scenario, a number representing a realization of the single risk factor is randomly generated for each bank. To represent the fact that banks all operate in the same economy, the risk factors are correlated between themselves.

Given the realisation of the risk factors and the parameters above, it is possible to obtain from the model a simulated loss for each bank in each loss scenario.[57] These losses can then be applied to bank capital to see which banks "default" (i.e. exhaust or severely deplete regulatory capital) in the simulated scenario. If the policy set-up allows for or any other loss-absorbing or re-capitalization tool (e.g. bail-in) these can also be applied at individual bank level. Losses, interventions of other tools and counts of defaults can then be aggregated across the whole banking sector. Moreover, given that the simulations work at individual bank level, other characteristics of banks subject to "default" can be tracked, such as covered deposits or total assets held.[58]

Given a sufficient number of loss scenario simulations (hundreds of thousands to millions), it is possible to obtain statistical distributions of outcomes for the banking sector as a whole.

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[52] R. De Lisa, S. Zedda, F. Vallascas, F. Campolongo, M. Marchesi; "Modelling Deposit Insurance Scheme Losses in a Basel 2 Framework"; *Journal of Financial Services Research*; December 2011, Volume 40, Issue 3, pp 123-141. First Online November 2010. Please note that at the time of submission the acronym SYMBOL was not yet employed.

[53] In a very simplified way: given the general situation of the economy, each asset will have a certain probability of defaulting. By considering such probabilities of default as the expected loss conditional on the economic situation and summing across assets it is possible to obtain an expected loss of the portfolio conditional on any economic scenario. The capital requirement is then the loss on a particularly adverse scenario. (See also footnote 7).

[54] When this is not the case, we need to rely on self-reported or supervisory assessments of the correction that would be needed when moving from the current system to a Basel III compatible system. It should be noted that the original framework of the model employed Basel II (and not III) compatible data, as this was the regulatory framework of reference at the time.

[55] This does not mean that other risks are not considered, simply that they can be "mapped" in credit risk terms and modelled using the same framework.

[56] Other parameters are fixed at the default levels set in the regulation.

[57] It should be noted that SYMBOL is a "purely static" model. Losses are all realized (or known) at the same point in time for all systems' participants and banks do not dynamically react to events.

[58] It is important to stress that, though the model simulates losses at individual bank level, individual bank results are not deemed to be usable per se.

It is finally possible to use such distribution to estimate the probability of events such as the probability that losses in excess of capital will be above a certain threshold (i.e. the statistical distribution of losses for resolution tools and/or public interventions), or the probability that banks holding more than a certain amount of covered deposits will be in default (i.e. the statistical distribution of intervention needs for the DGS).[59]

SYMBOL simulates the distribution of losses in excess of banks' capital within a banking system (usually a country) by aggregating individual banks' losses. Individual banks' losses are generated via Monte Carlo simulation using the Basel FIRB loss distribution function. This function is based on the Vasicek model (see Vasicek, 2002), which in broad terms extends the Merton model (see Merton, 1974) to a portfolio of borrowers.[60] Simulated losses are based on an estimate of the average default probability of the portfolio of assets of any individual bank, which is derived from data on banks' Minimum Capital Requirements (MCR) and Total Assets (TA).

The model includes also a module for simulating direct contagion between banks, via the interbank lending market. In this case, additional losses due to a contagion mechanism are added on top of the losses generated via Monte Carlo simulation, potentially leading to further bank defaults (see also Step 4 below). The contagion module can be turned off or on depending on the scope of the analysis and details of the simulated scenario.

In addition to bank capital, the model can take into account the existence of a safety net for bank recovery and resolution, where bail-in, DGS, and RF intervene to cover losses exceeding bank capital before they can hit Public Finances.

Estimations are based on the following assumptions:

- SYMBOL approximates all risks as if they were credit risk; no other risk categories (e.g. market, liquidity or counterparty risks) are explicitly considered;
- SYMBOL implicitly assumes that the FIRB formula adequately represents (credit) risks that banks are exposed to;
- Banks in the system are correlated with the same factor (see Step 2 below);

All events happen at the same time, i.e. there is no sequencing in the simulated events, except when contagion between banks is considered.

STEP 1: Estimation of the Implied Obligor Probability of Default of the portfolio of each individual bank.

The main ingredient of the model is the average implied obligor probability of default of a bank. It is a single parameter describing its entire loss distribution. It is obtained by numerical inversion of the Basel IRB formula for credit risk, based on total minimum capital requirements declared in the balance sheet. Individual bank data needed to estimate the implied obligor probability of default are banks' risk-weighted assets and total assets, which can be derived from the balance sheet data. We

[59] Technically, what is obtained is the Value at Risk (VaR), or the loss which should not be exceeded under a certain confidence level. The confidence is given by the probability of observing a realization of the risk factor which is more extreme than the one corresponding to the reference scenario.

[60] The Basel Committee permits banks a choice between two broad methodologies for calculating their capital requirements for credit risk. One alternative, the Standardised Approach, measures credit risk in a standardised manner, supported by external credit assessments. The alternative is the Internal Rating-Based (IRB) approach which allows institutions to use their own internal rating-based measures for key drivers of credit risk as primary inputs to the capital calculation. Institutions using the Foundation IRB (FIRB) approach are allowed to determine the borrowers' probabilities of default while those using the Advanced IRB (AIRB) approach are permitted to rely on own estimates of all risk components related to their borrowers (e.g. loss given default and exposure at default). The Basel FIRB capital requirement formula specified by the Basel Committee for credit risk is the Vasicek model for credit portfolio losses, default values for all parameters except obligors' probabilities of default are provided in the regulatory framework. On the Basel FIRB approach, see Basel Committee on Banking Supervision, 2011.

present a brief overview of the main ingredients below. Benczur et al (2015)[61] offers some additional details and discussion.

For each exposure *l* in the portfolio of bank *i*, the IRB formula derives the corresponding capital requirement $CR_{i,l}$ needed to cover unexpected losses[62] over a time horizon of one year, with a specific confidence level equal to 99.9% (see Figure A1.1):

$$CR_{i,l}(PD_{i,l}) = \left[LGD \cdot N\left(\sqrt{\frac{1}{1-R(PD_{i,l})}}N^{-1}(PD_{i,l}) + \sqrt{\frac{R(PD_{i,l})}{1-R(PD_{i,l})}}N^{-1}(0.999)\right) - PD_{i,l} \cdot LGD\right] \cdot M(PD_{i,l}),$$

where $PD_{i,l}$ is the default probability of exposure *l*, *R* is the correlation among the exposures in the portfolio, defined as

$$R(PD) = 0.12 \cdot \frac{1-e^{-50PD}}{1-e^{-50}} + 0.24 \cdot \left(1 - \frac{1-e^{-50PD}}{1-e^{-50}}\right) - 0.04 \cdot \left(1 - \frac{S-5}{45}\right)$$

with obligor size *S* =50.

Here LGD is the loss given default[63] and $M(PD_{i,l})$ is an adjustment term, defined as

$$M(PD_{i,l}) = \frac{(1 + (M - 2.5) \cdot b_{i,l}) \cdot 1.06}{1 - 1.5 \cdot b_{i,l}}$$

with $b_{i,l} = (0.11856 - 0.05478 \cdot \ln(PD_{i,l}))^2$ and maturity M=2.5. Note that here all parameters are set to their regulatory default values.

The minimum capital requirement of each bank *i* is obtained summing up the capital requirements for all exposures:

$MCR_i = \sum_l CR_{i,l} \cdot A_{i,l}$,

where $A_{i,l}$ is the amount of the exposure *l*.

As there are no available data on banks' exposures towards each obligor, the model estimates the default probability of a single obligor (implied obligor probability of default, IOPD) equivalent to the portfolio of exposures held by each bank by inverting the above formulas. Mathematically speaking, the model computes the IOPD by numerically solving the following equation:

$CR(IOPD_i) \cdot \sum_l A_{i,l} = MCR_i$,

where MCR_i and $\sum_l A_{i,l}$ are respectively the minimum capital requirement, set equal to 8% of the risk-weighted assets, and the total assets of the bank. Note that capital and RWA are QIS-adjusted, as detailed in Annex 6.2.

STEP 2: Simulation of correlated losses for the banks in the system.

Given the estimated IOPD, SYMBOL simulates correlated losses hitting banks via Monte Carlo, using the same IRB formula and imposing a correlation structure among banks.[64] The correlation exists

[61] http://ec.europa.eu/economy_finance/publications/economic_paper/2015/pdf/ecp548_en.pdf

[62] Banks are expected to cover their expected losses on an ongoing basis, e.g. by provisions and write-offs. The unexpected loss, on the contrary, relates to potentially large losses that occur rather seldom. According to this concept, capital would only be needed for absorbing unexpected losses.

[63] Set in Basel regulation equal to 45%.

either as a consequence of the banks' exposure to common borrowers or, more generally, to a particular common factor (for example, the business cycle). In each simulation run n=1,…,N_0, losses for bank *i* are simulated as:

$$L_{n,i} = LGD \cdot N\left[\sqrt{\frac{1}{1-R(IOPD_i)}}N^{-1}(IOPD_i) + \sqrt{\frac{R(IOPD_i)}{1-R(IOPD_i)}}N^{-1}(\alpha_{n,i})\right],$$

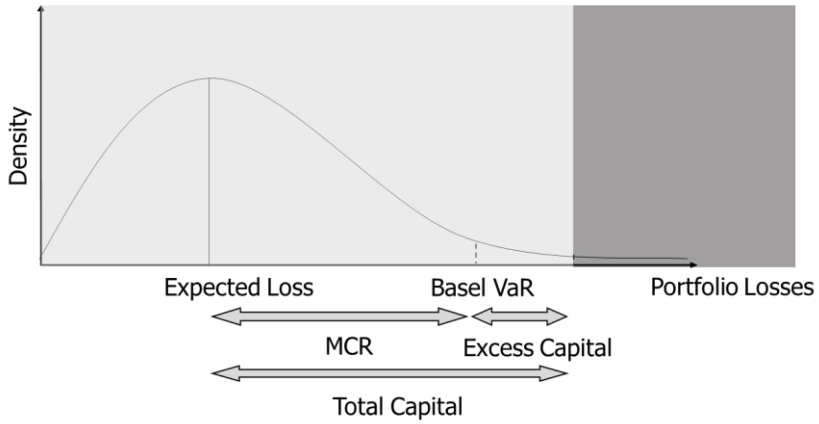
where N is the normal distribution function, and $N^{-1}(\alpha_{n,i})$ are correlated normal random shocks with correlation matrix $\sum$.

STEP 3: Determination of bank failure.

Given the matrix of correlated losses, SYMBOL determines which banks fail. As illustrated in Figure A1.1, a bank failure happens when simulated obligor portfolio losses (L) exceed the sum of the expected losses (EL) and the total actual capital (K) given by the sum of its minimum capital requirements plus the bank's excess capital, if any :

$$\text{Failure} \coloneqq L_{n,i} - EL_i - K_i > 0.$$

Figure A1.1 Individual bank loss probability density function



Notes. MCR: minimum capital requirements. VaR: value-at-risk.

The light grey area in Figure A1.1 represents the region where losses are covered by provisions and total capital, while the dark grey one shows when banks fail under the above definition. It should be noted that the probability density function of losses for an individual bank is skewed to the right, i.e. there is a very small probability of extremely large losses and a high probability of losses that are closer to the average/expected loss. The Basel Value at Risk (VaR) corresponds to a confidence level of 0.1%, i.e. the minimum capital requirement covers losses from the obligors' portfolio with probability 99.9%. This percentile falls in the light grey area, as banks generally hold an excess capital buffer on top of the minimum capital requirements. The actual level of capital hold by each bank *i* determines the failure event.

---

[64] The asset value of each bank's debtors evolves according to $X_{A,k} = \sqrt{R_A}\left(\sqrt{\rho}\beta + \sqrt{1-\rho}\beta_A\right) + \sqrt{1-R_A}Z_{A,k}$. Here $Z_{A,k}$ is the idiosyncratic shock to the debtor, β_A is the bank specific shock, while β is a common component. The parameter ρ controls the degree of commonality in the shocks of two different banks.

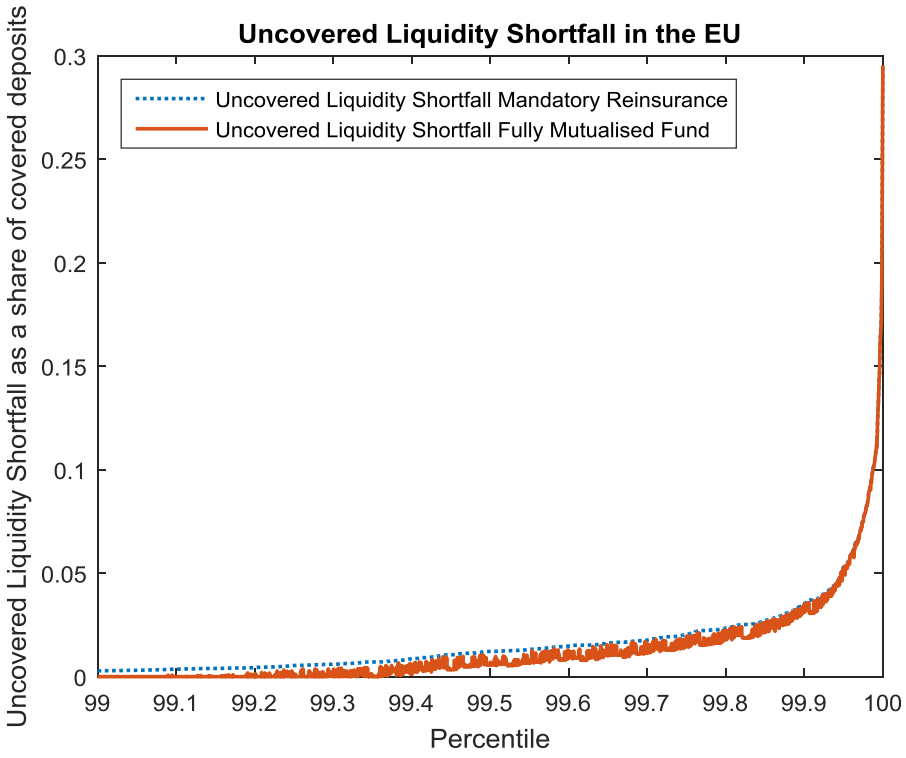
STEP 4: Aggregate distribution of losses for the whole system.

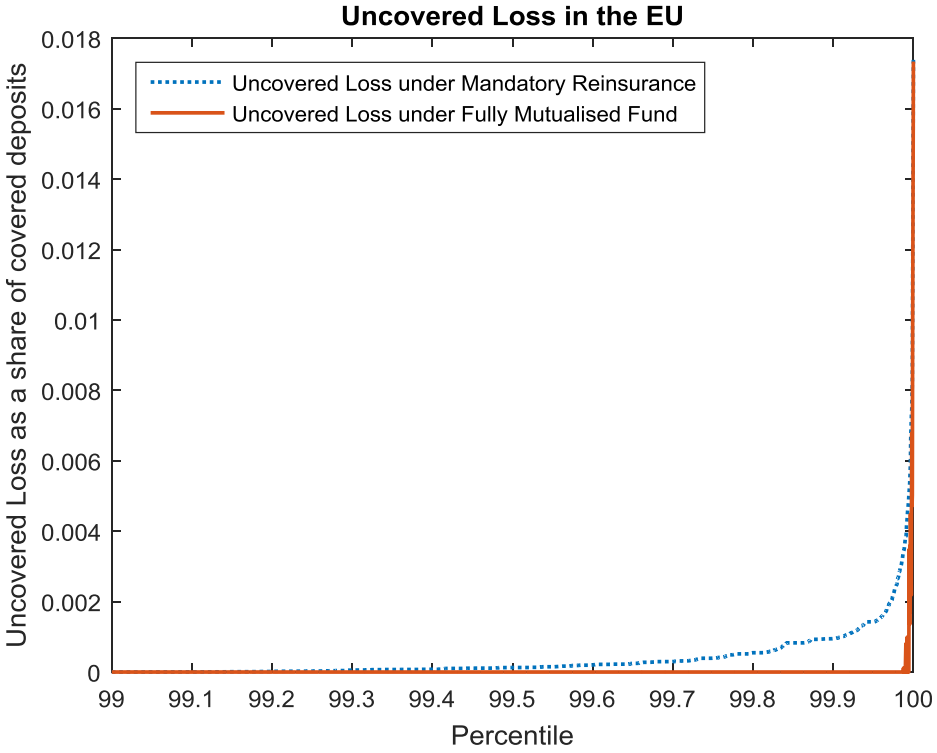
Aggregate losses are obtained by summing losses in excess of capital of all distressed banks in the system in each simulation run

6.4. Outputs on payout analysis via SYMBOL

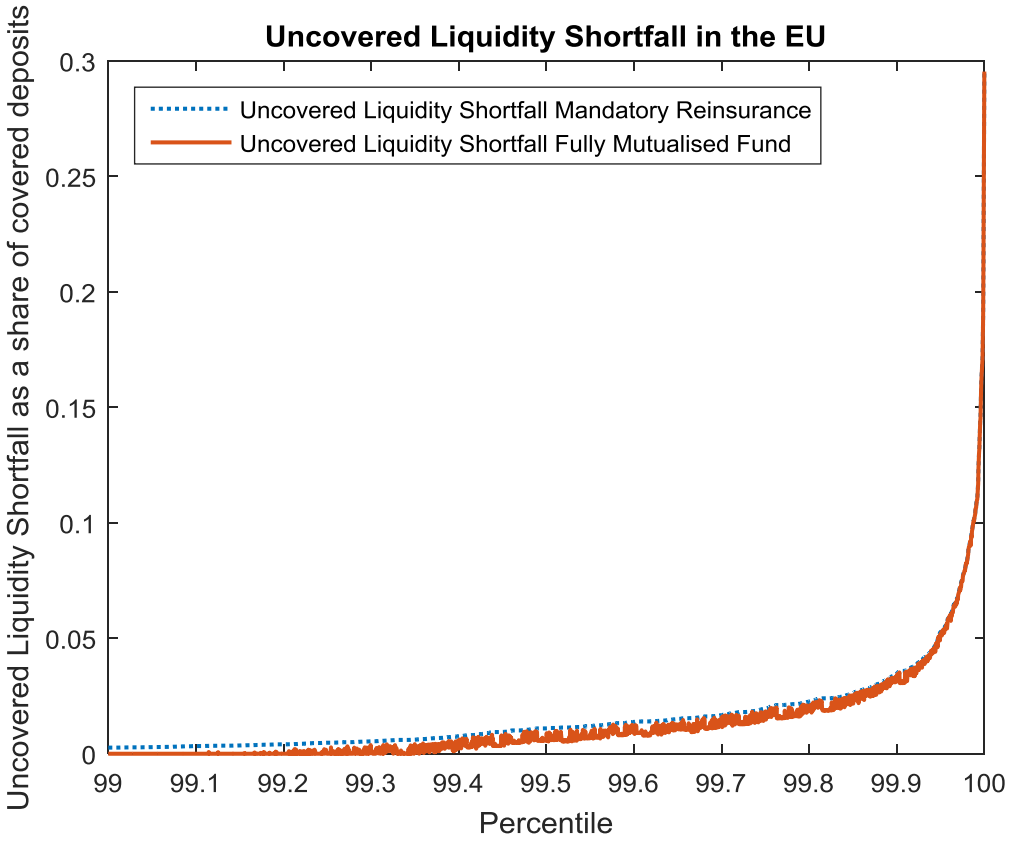
Uncovered Liquidity Shortfall and Uncovered Losses under mandatory reinsurance and mutualised fund (different parameters)

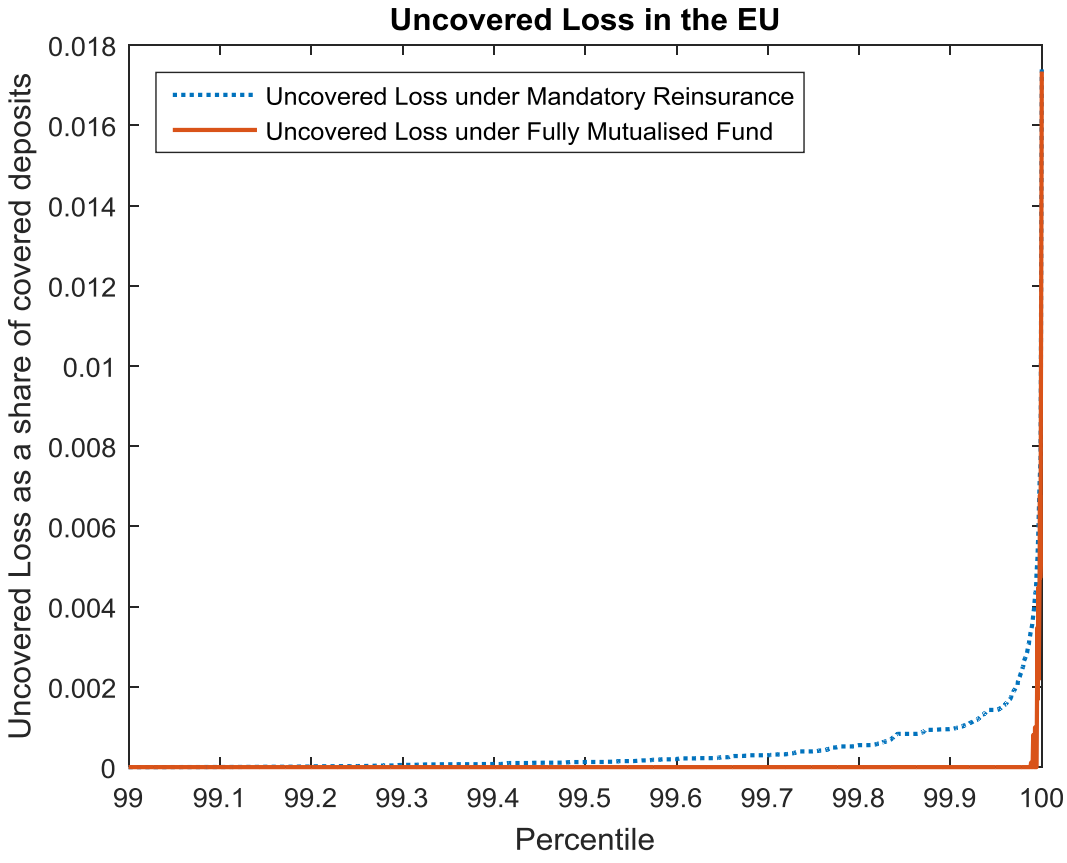
Beta = 75%, alpha = 20%, y = 20%



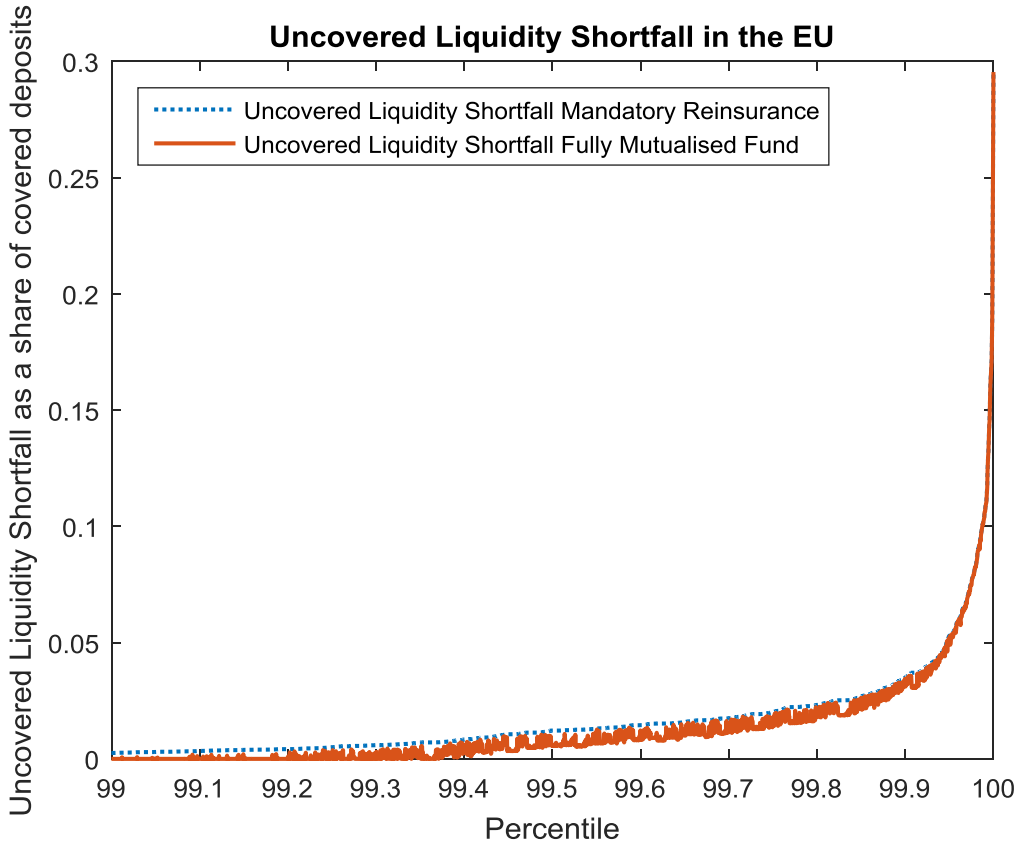


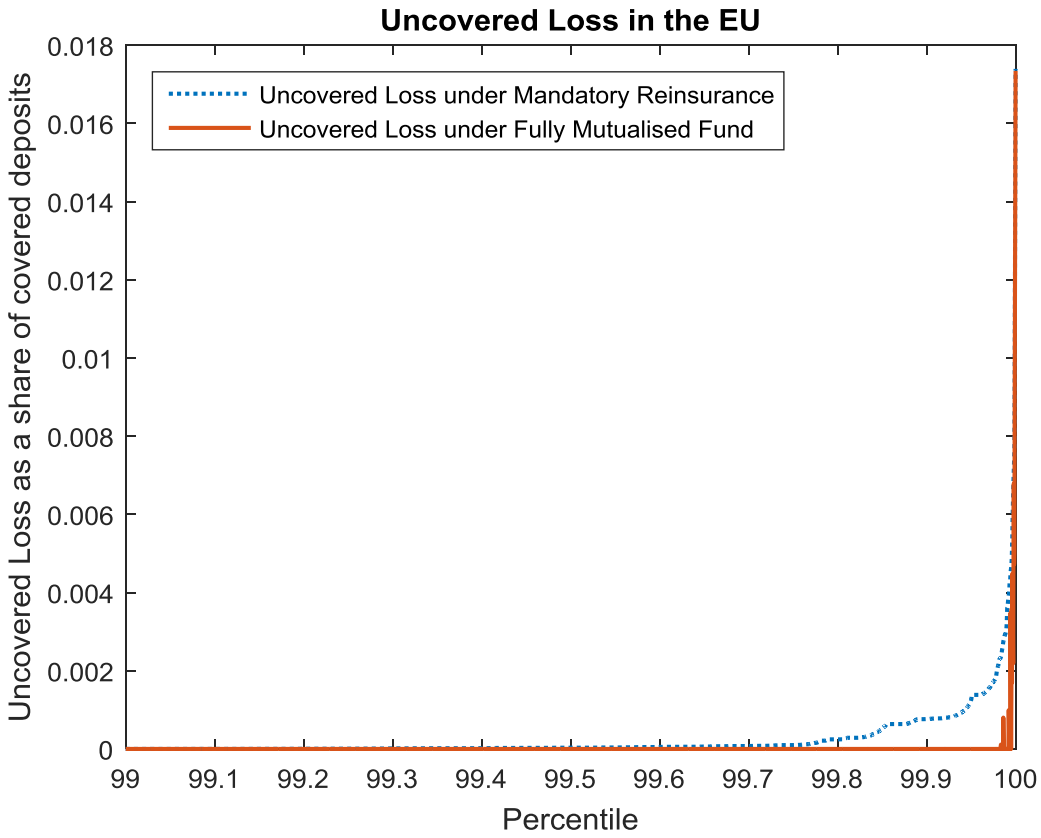
Beta = 75%, alpha = 20%, y = 80%



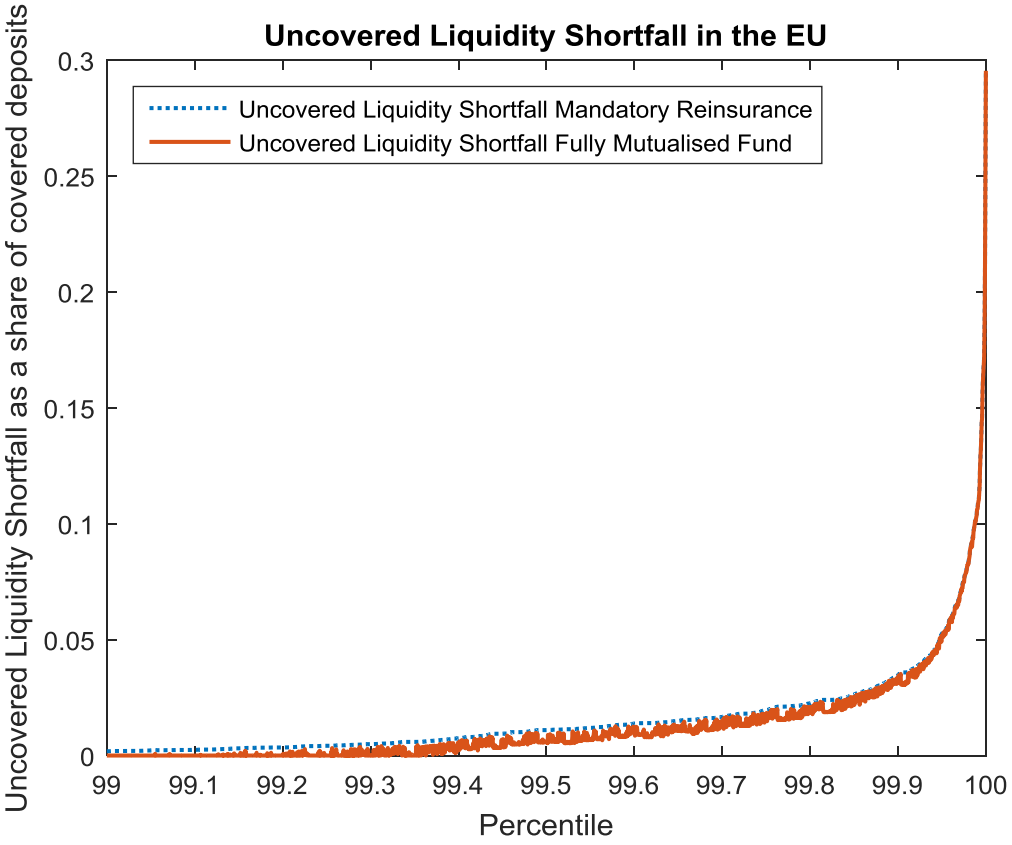


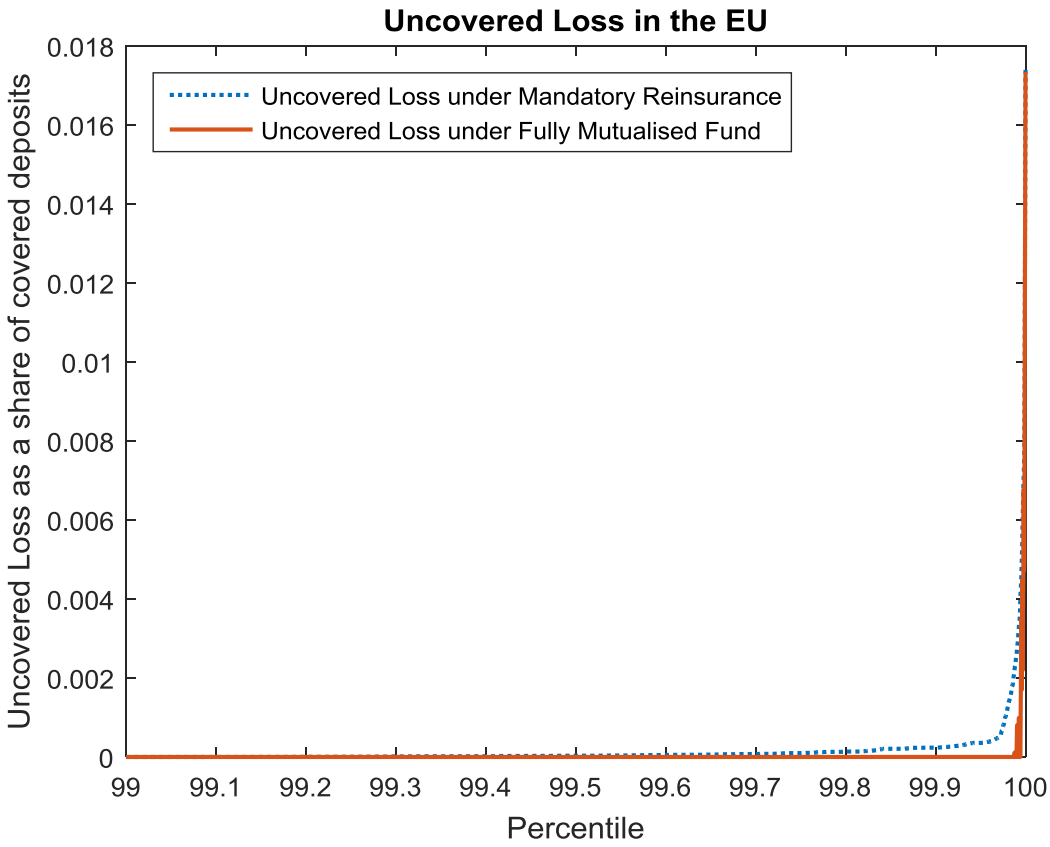
Beta = 75%, alpha = 80%, y = 20%



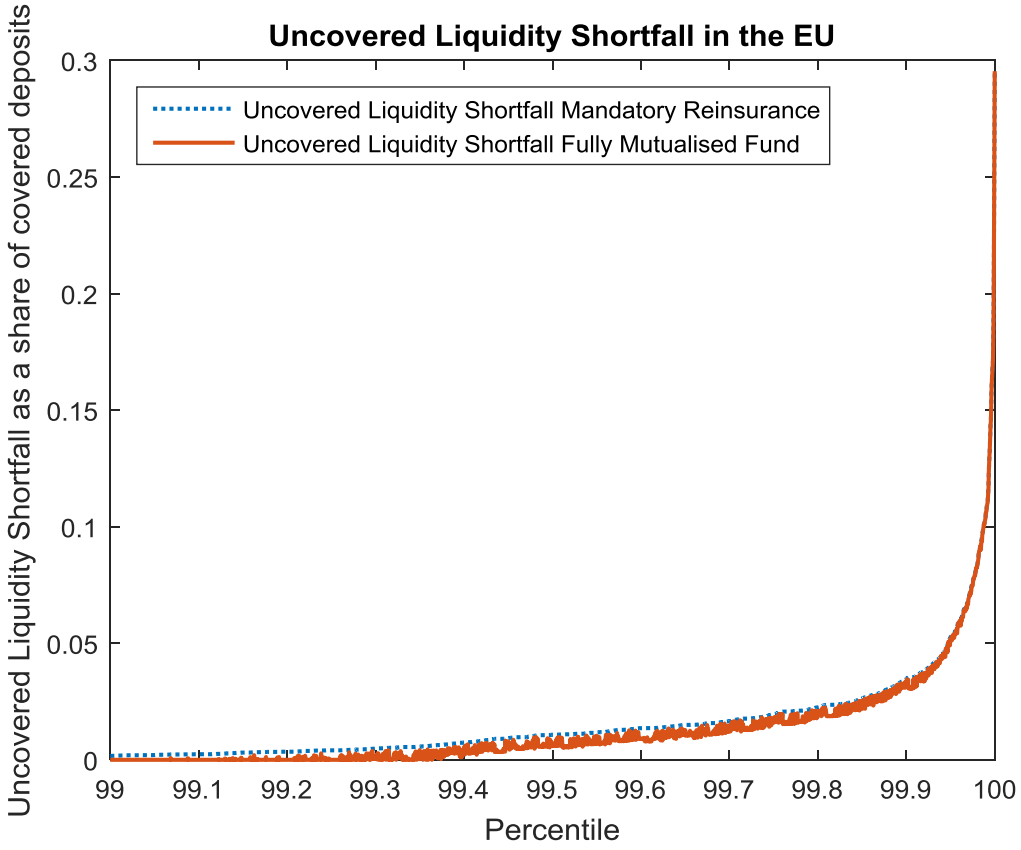


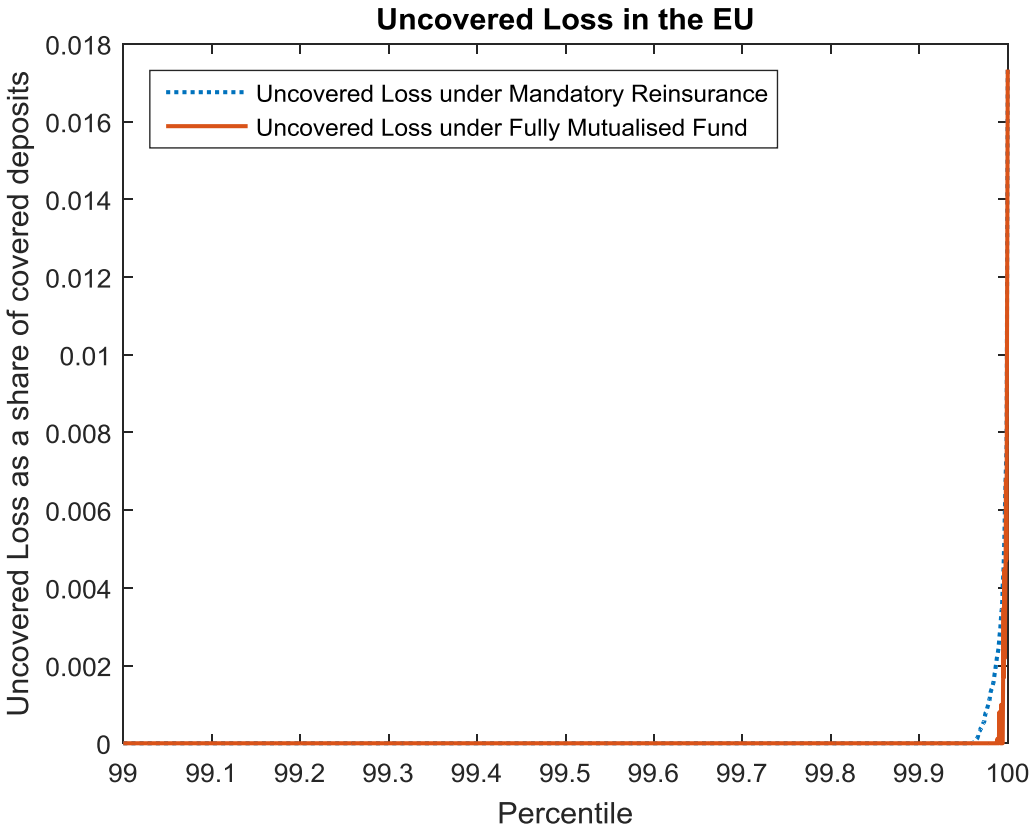
Beta = 75%, alpha = 80%, y = 80%



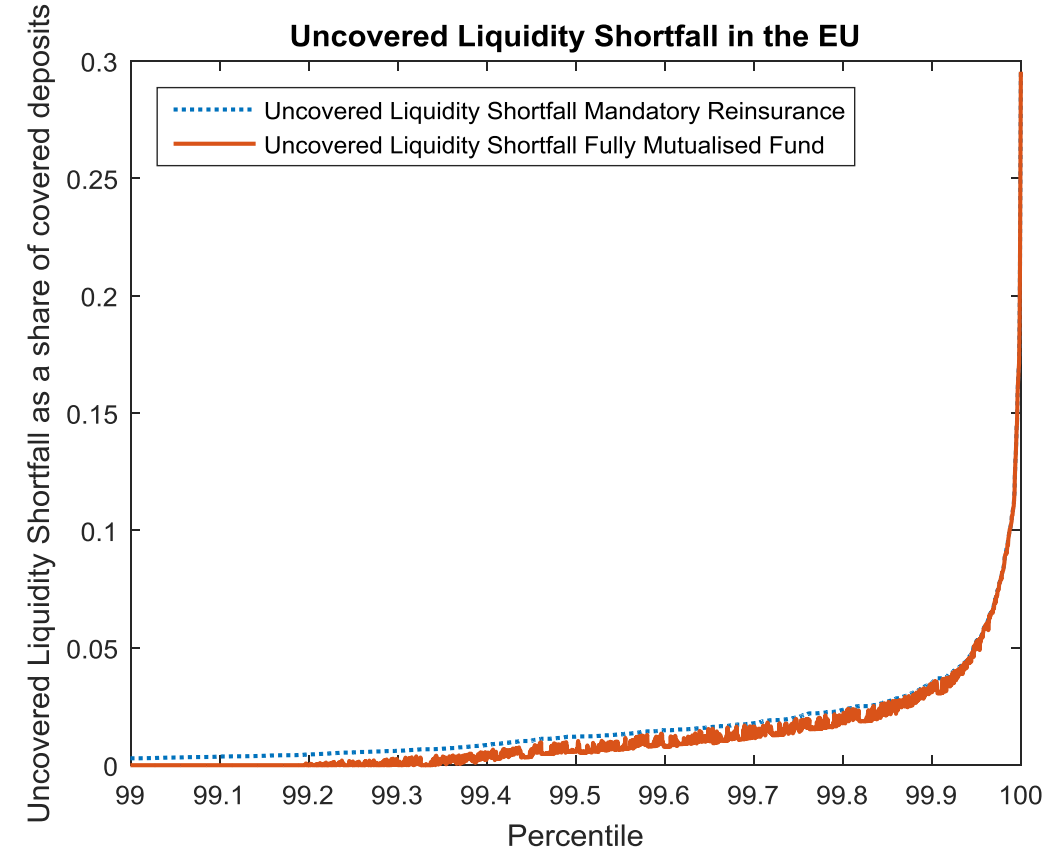


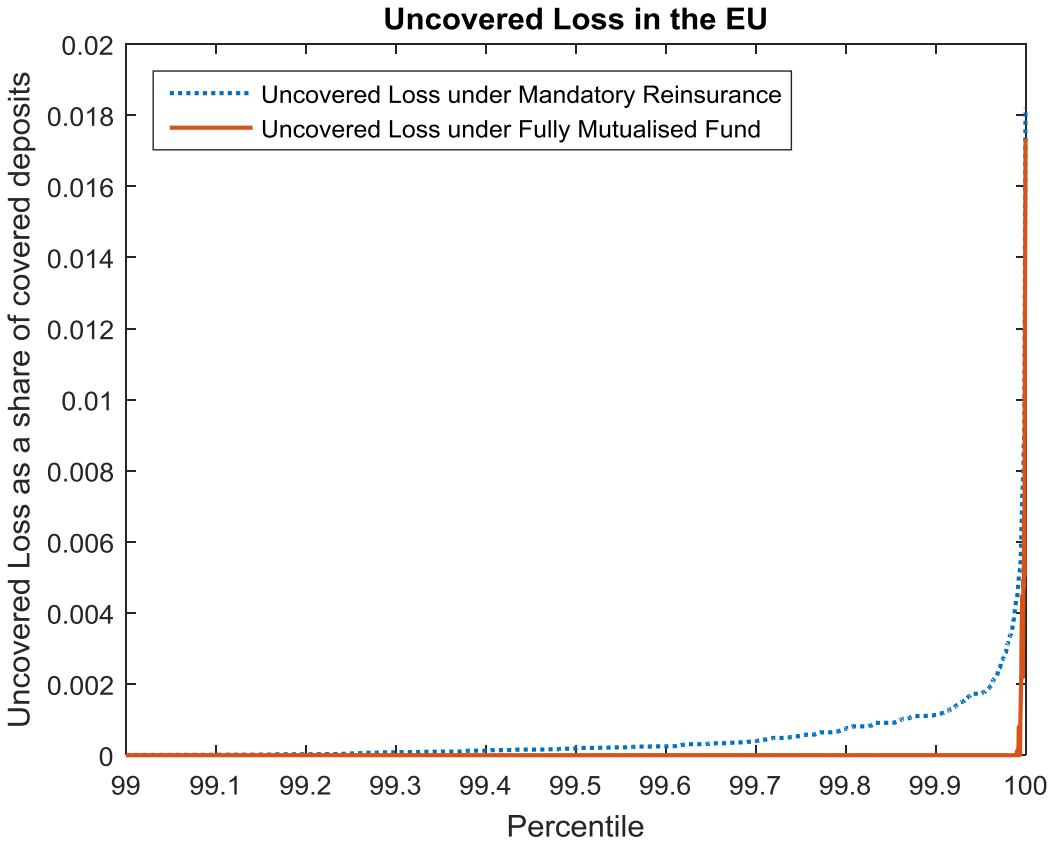
Beta = 75%, alpha = 100%, y = 100%



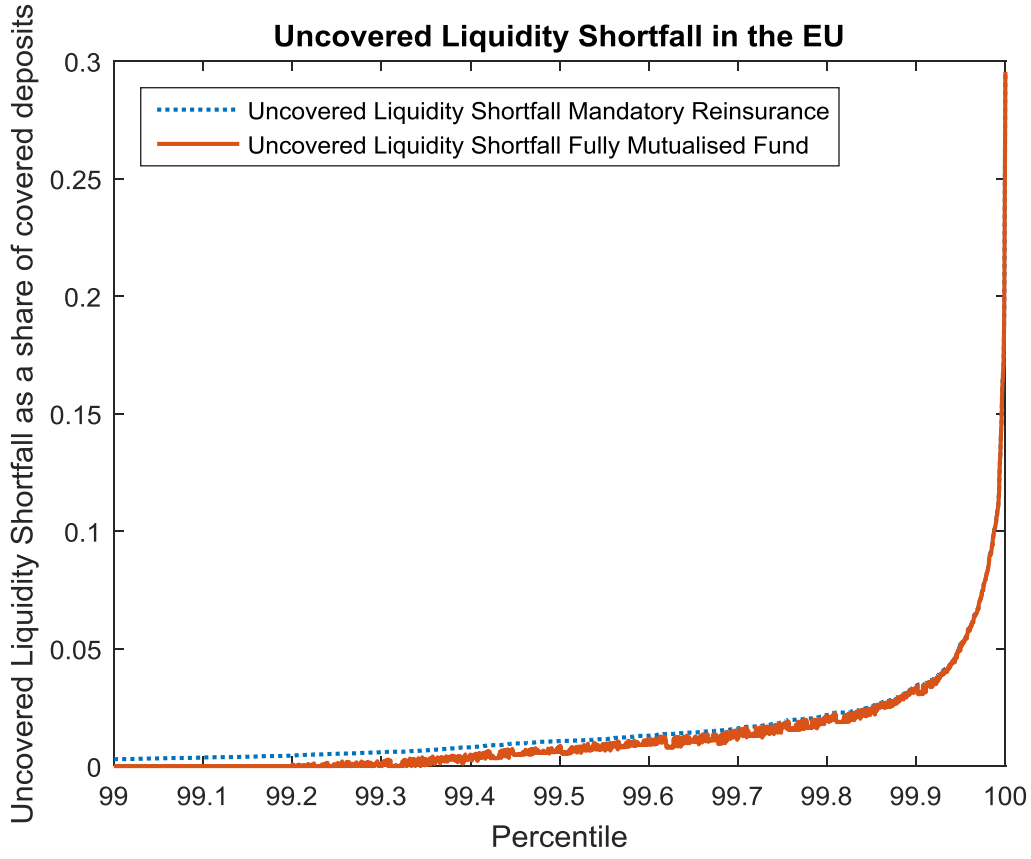


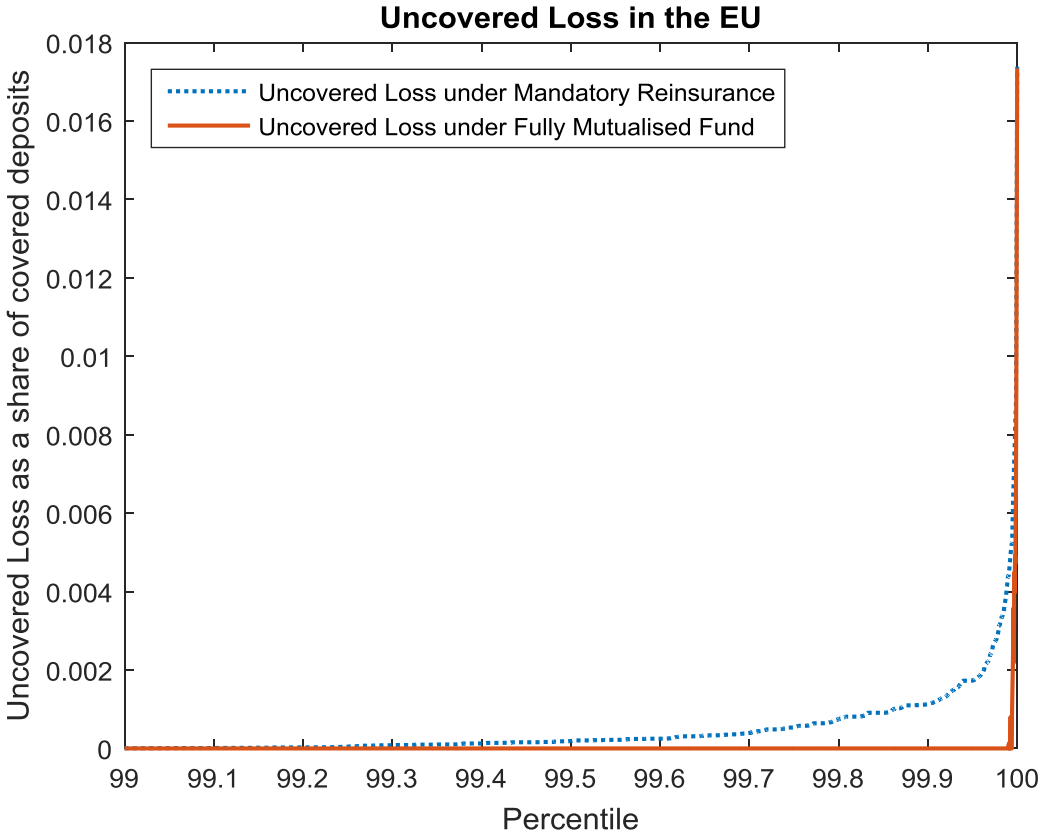
Beta = 50%, alpha = 20%, y = 20%



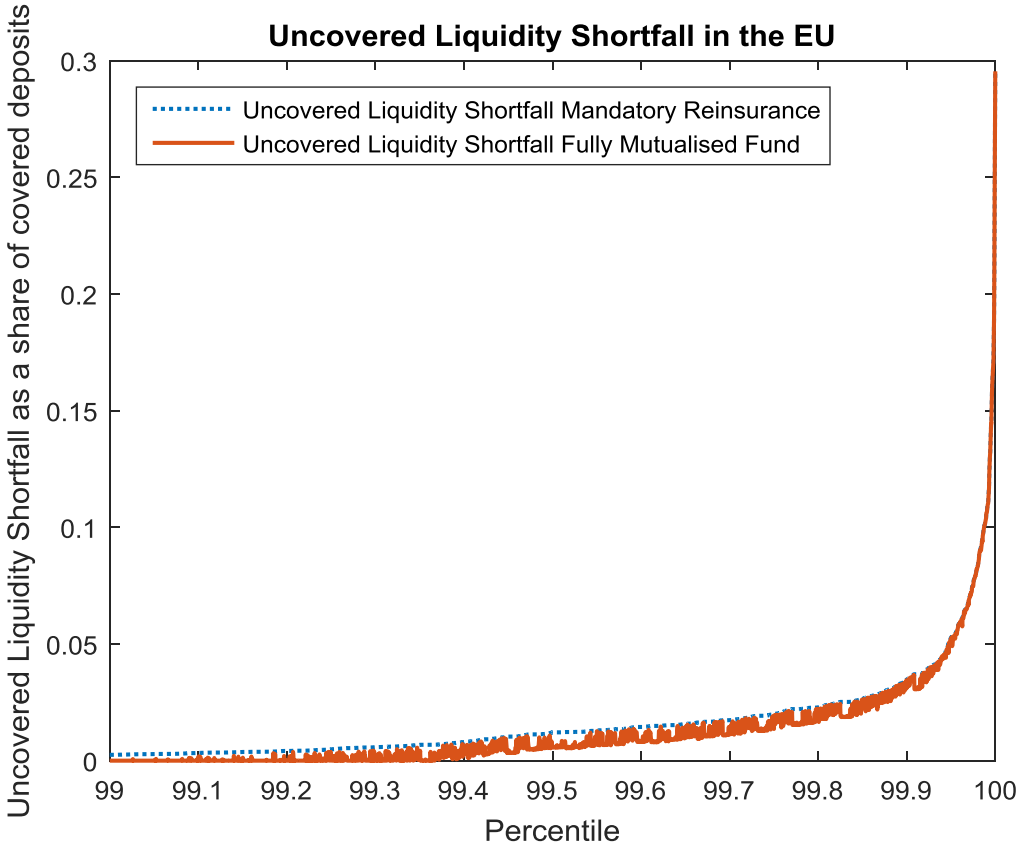


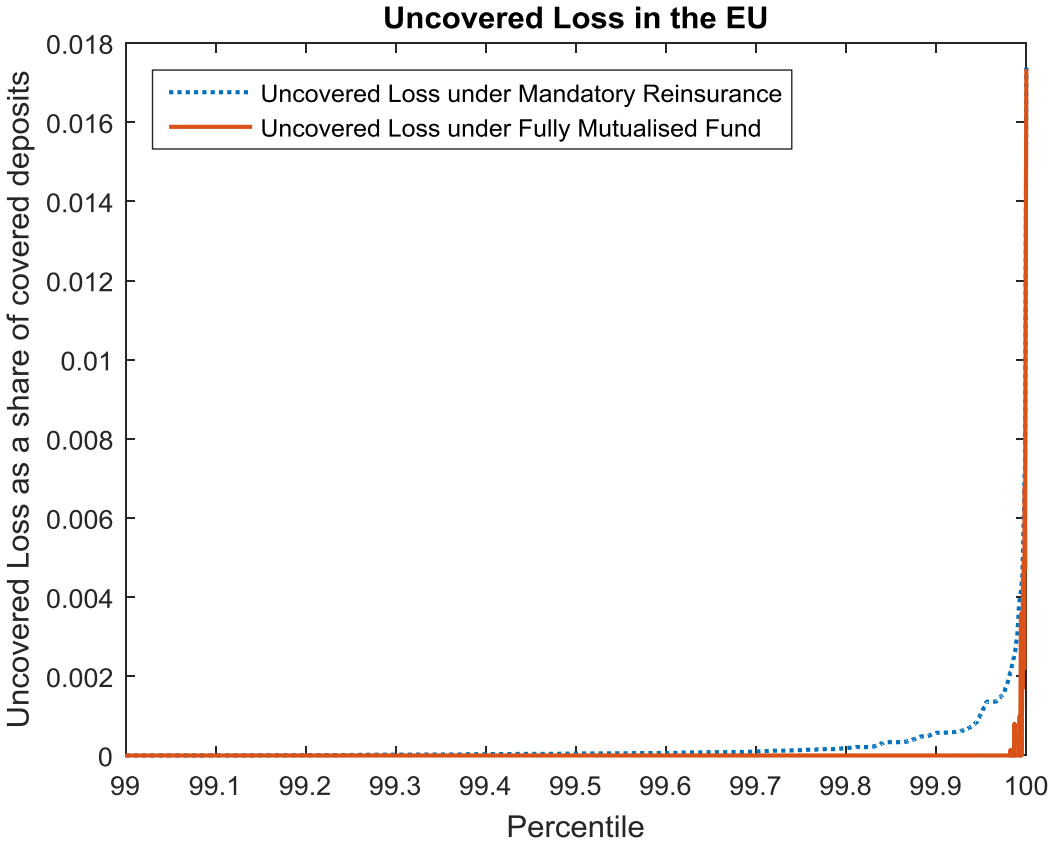
Beta = 50%, alpha = 20%, y = 80%



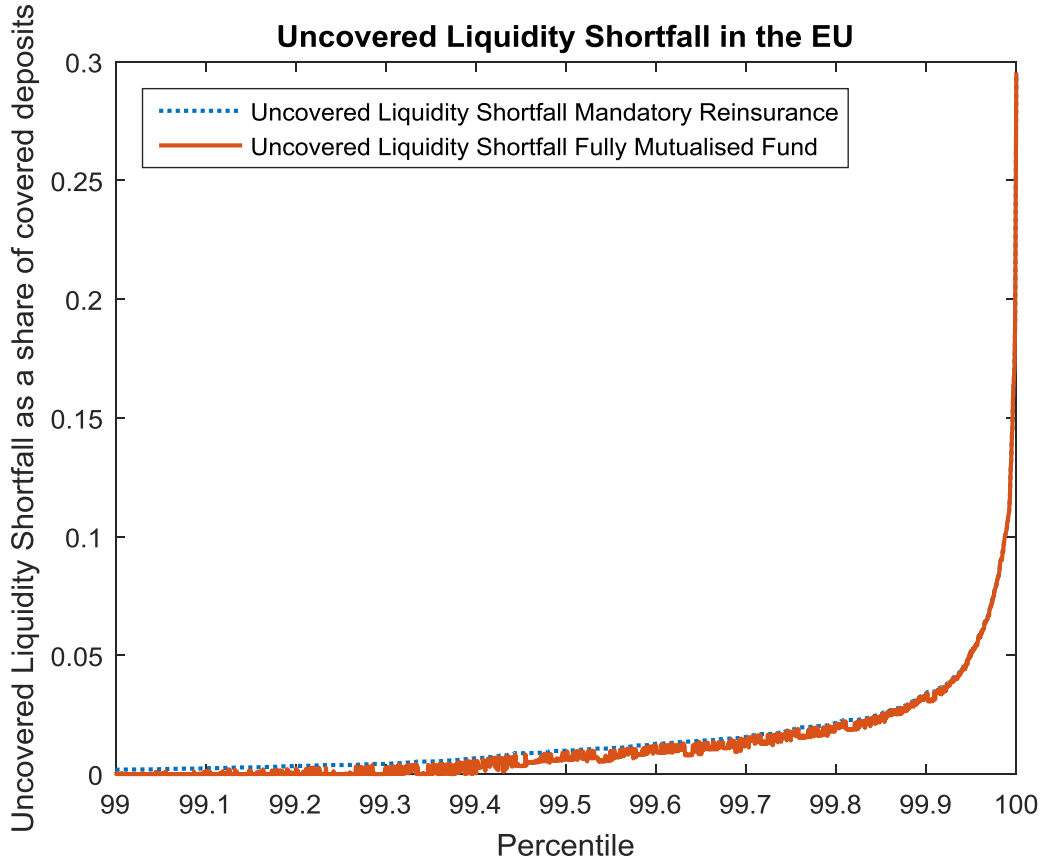


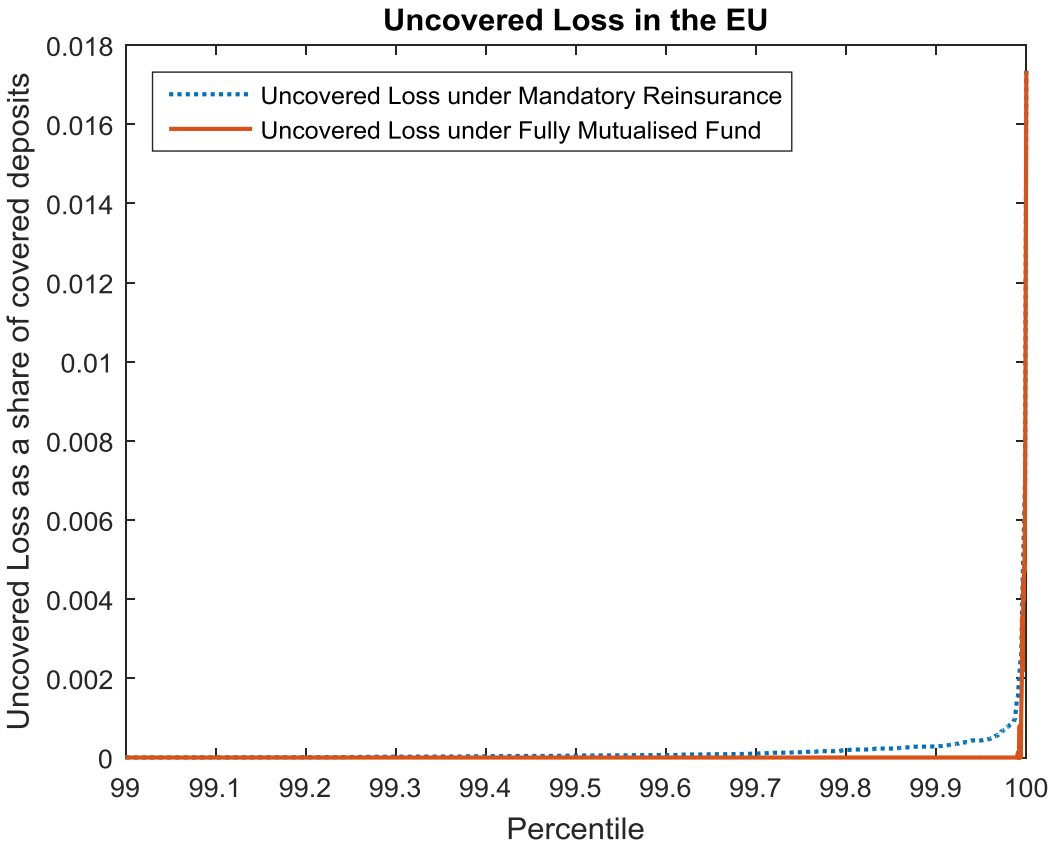
Beta = 50%, alpha = 80%, y = 20%



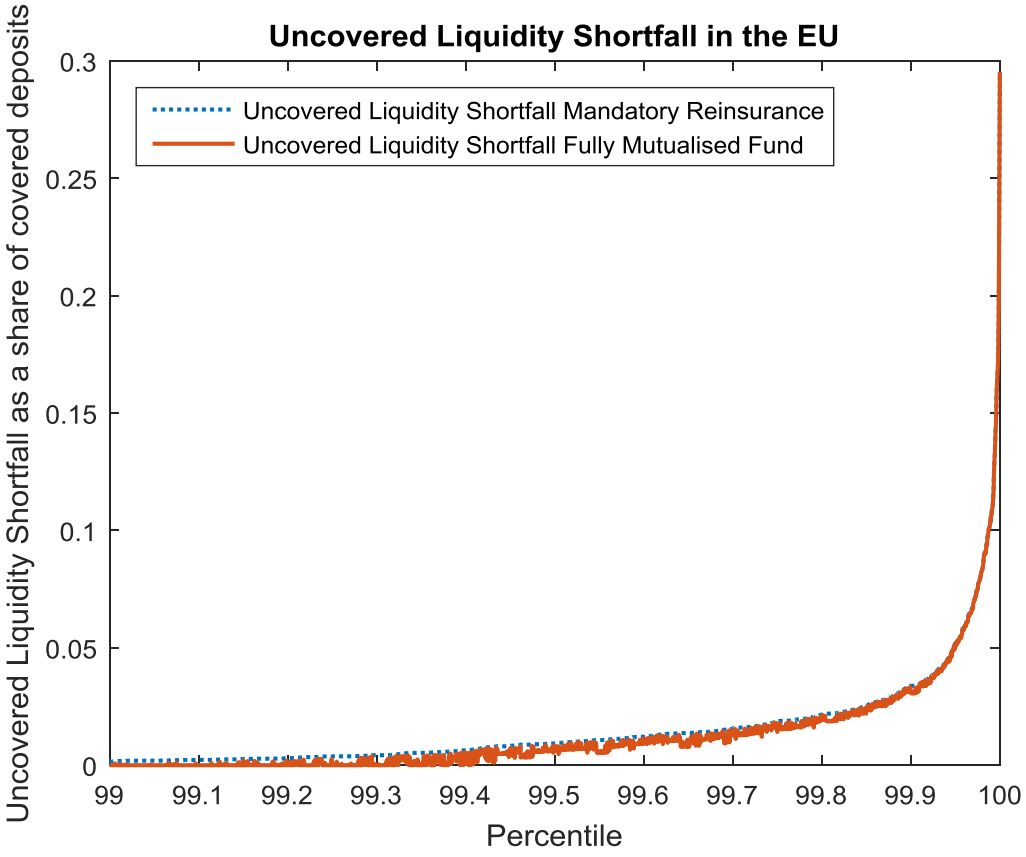


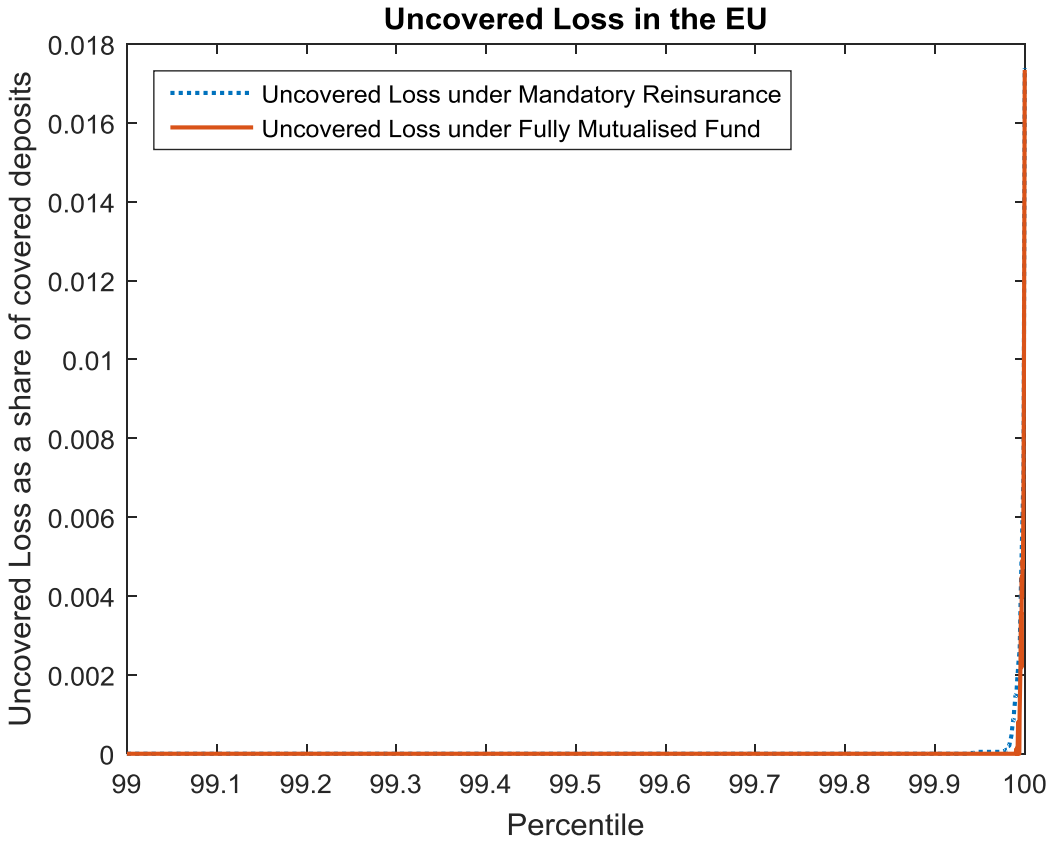
Beta = 50%, alpha = 80%, y = 80%



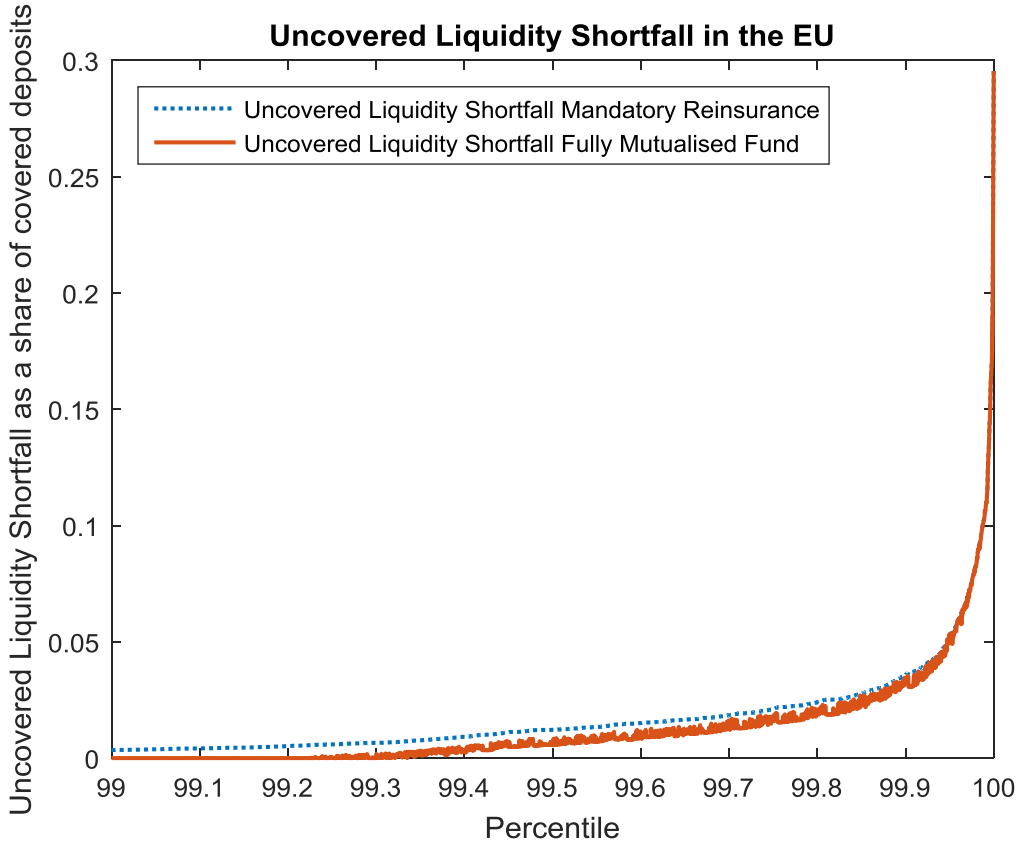


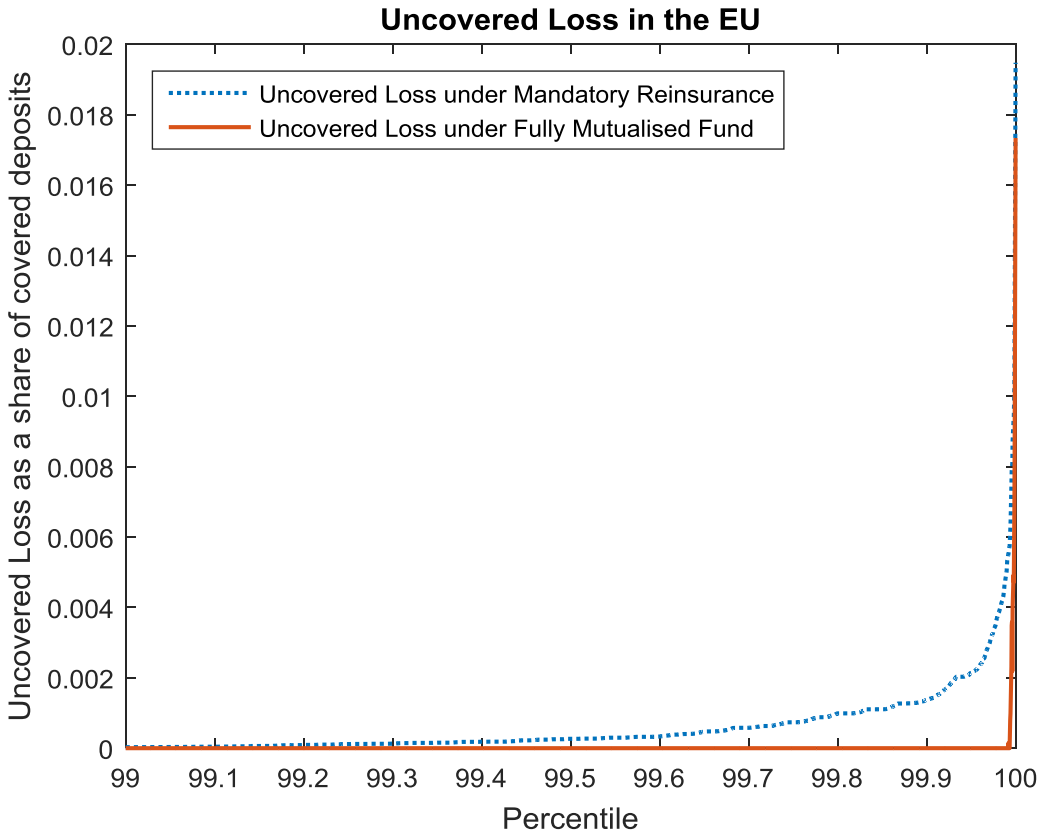
Beta = 50%, alpha = 100%, y = 100%



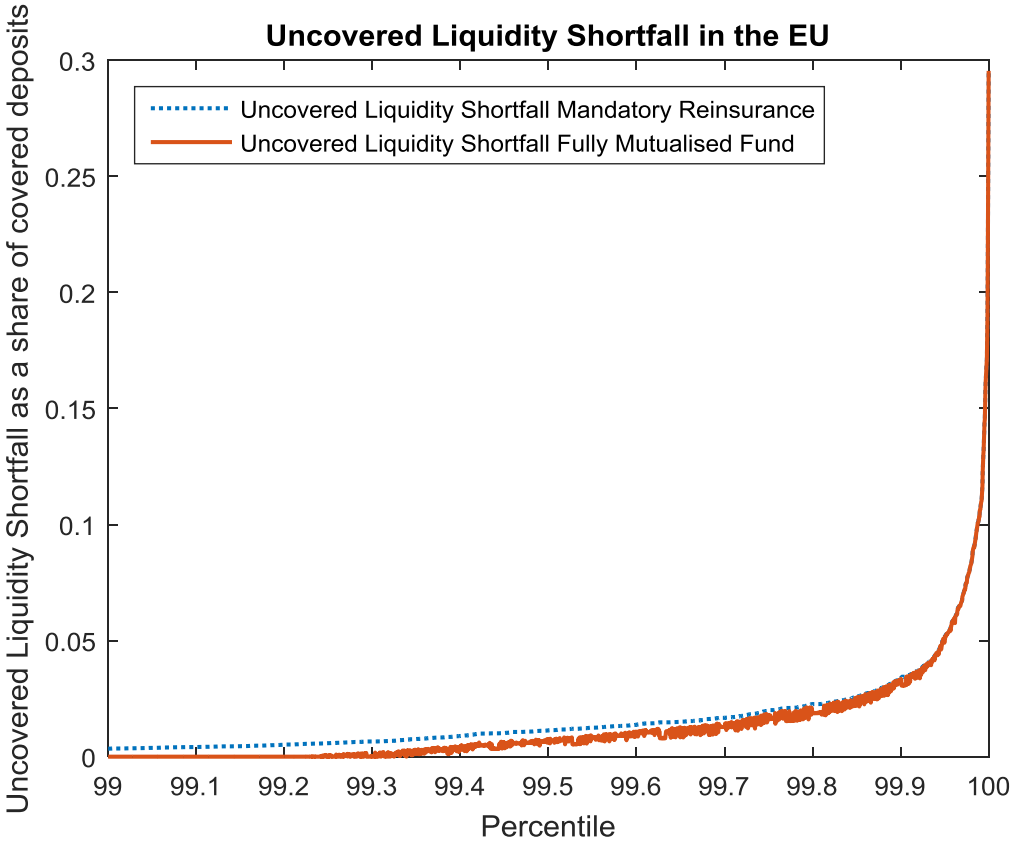


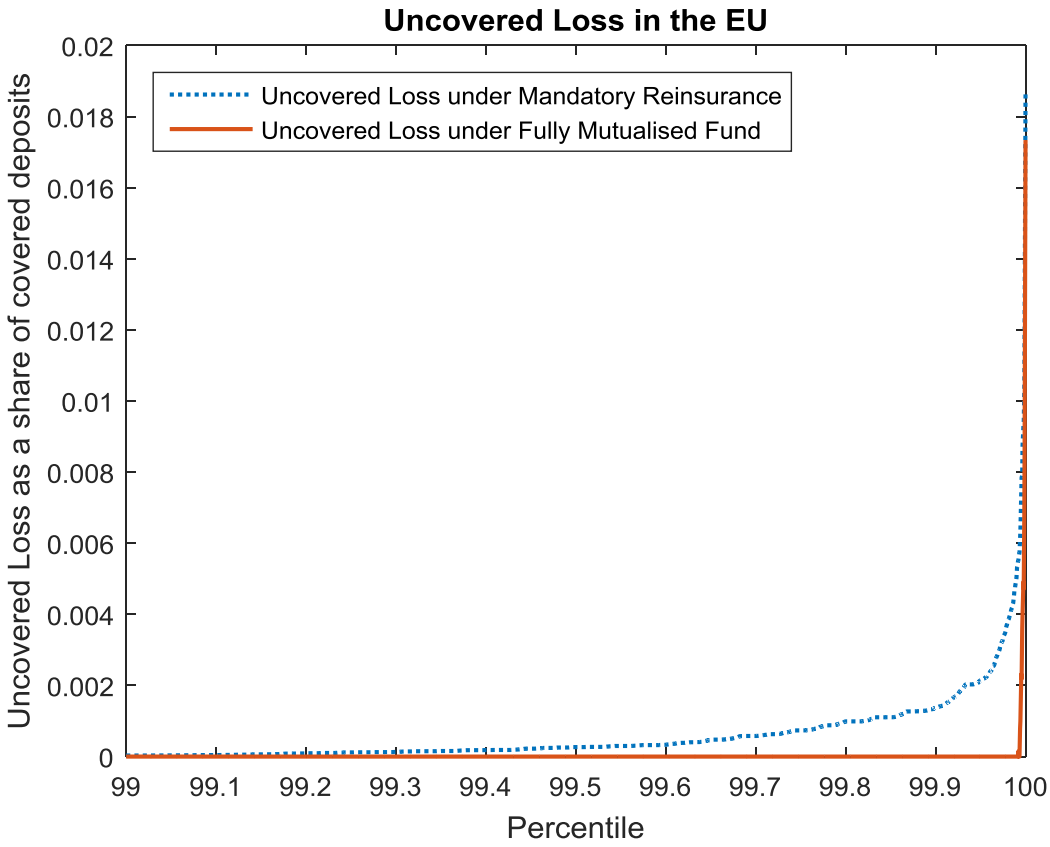
Beta = 25%, alpha = 20%, y = 20%



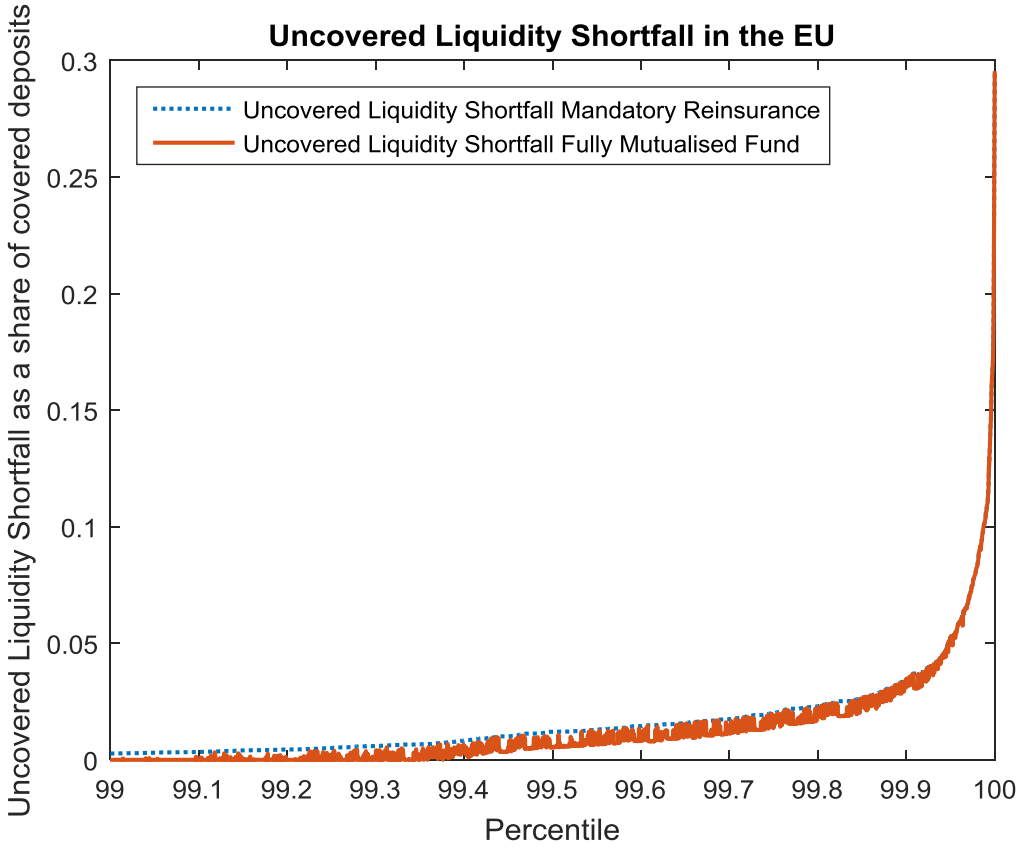


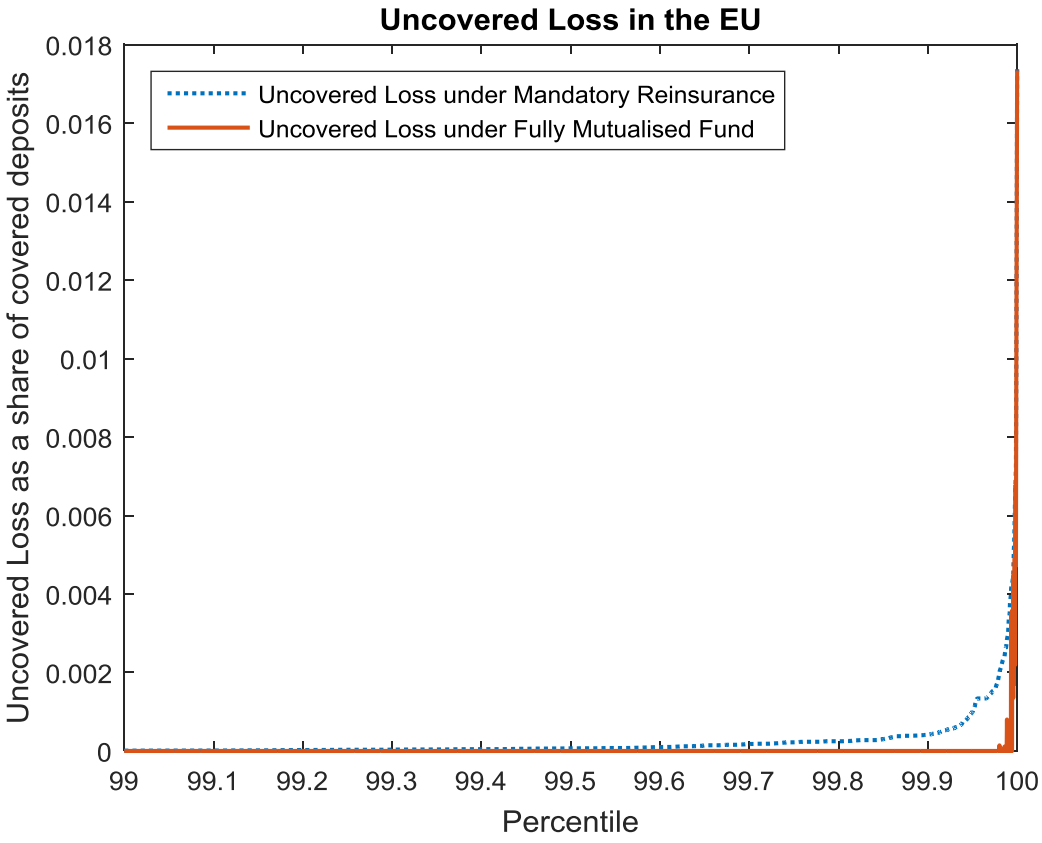
Beta = 25%, alpha = 20%, y = 80%



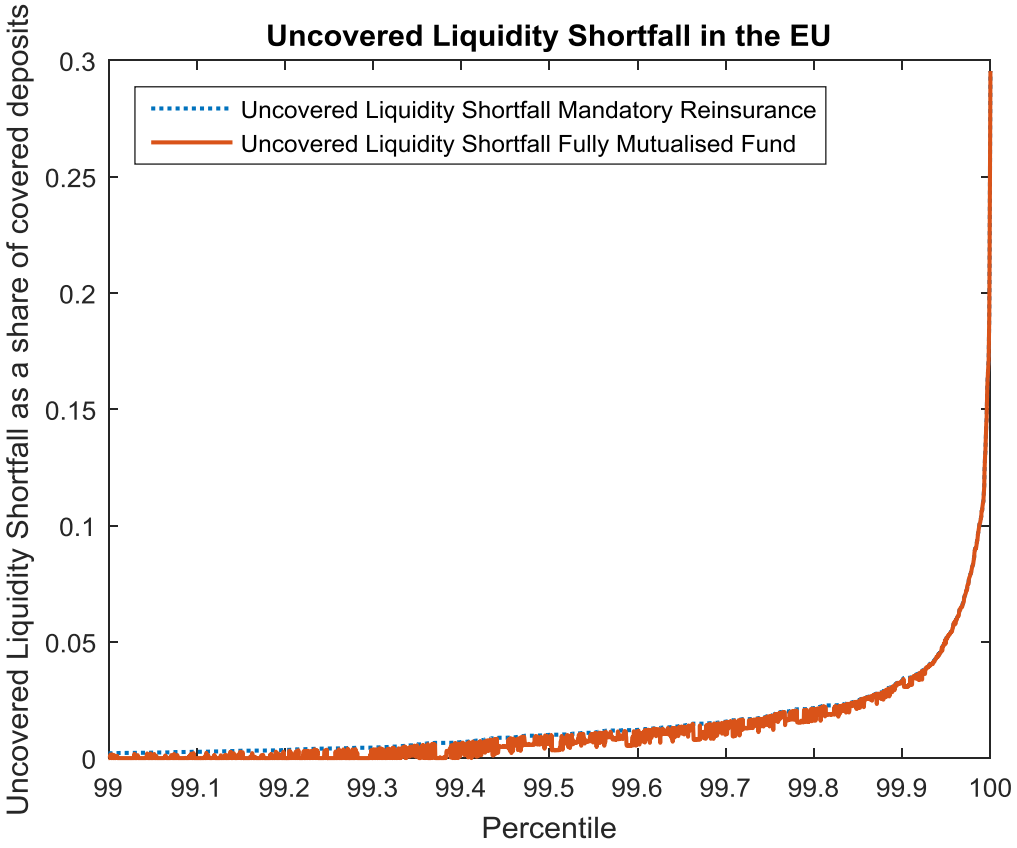


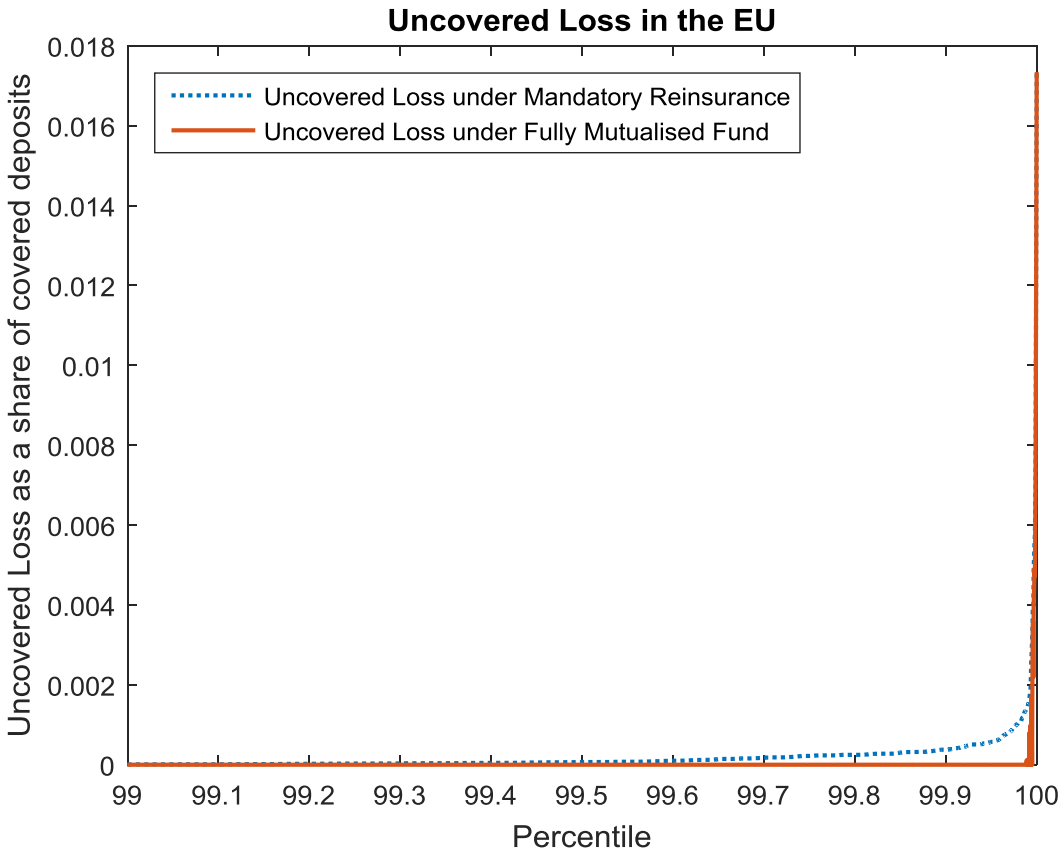
Beta = 25%, alpha = 80%, y = 20%



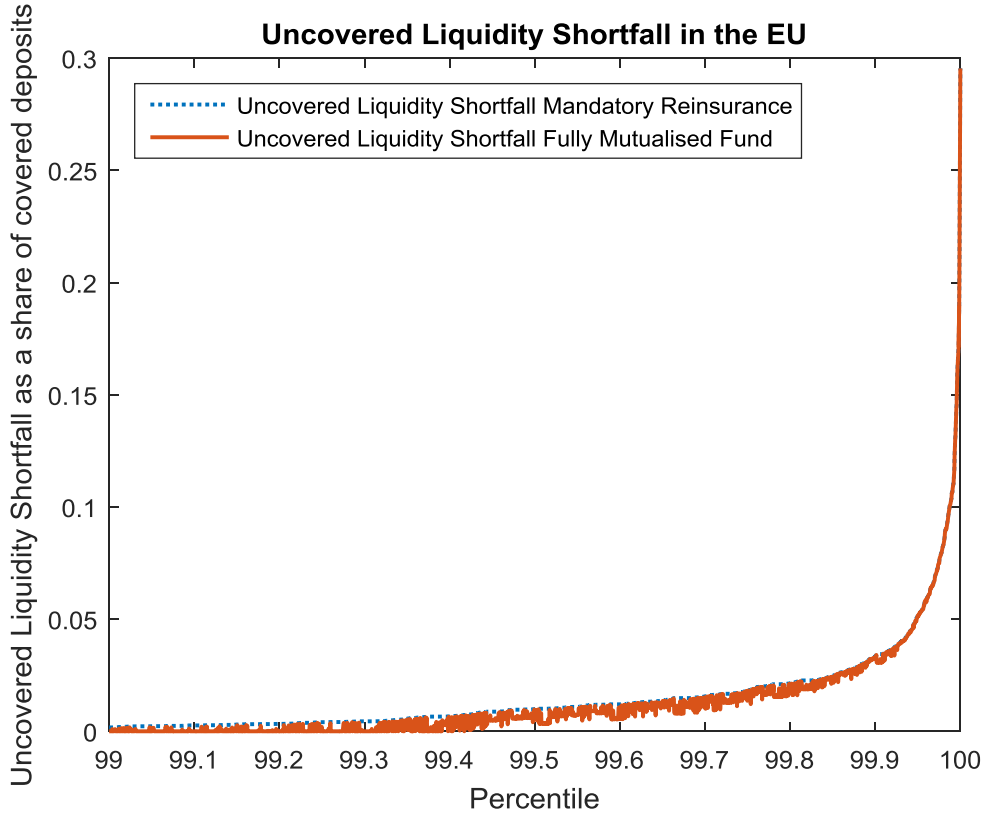


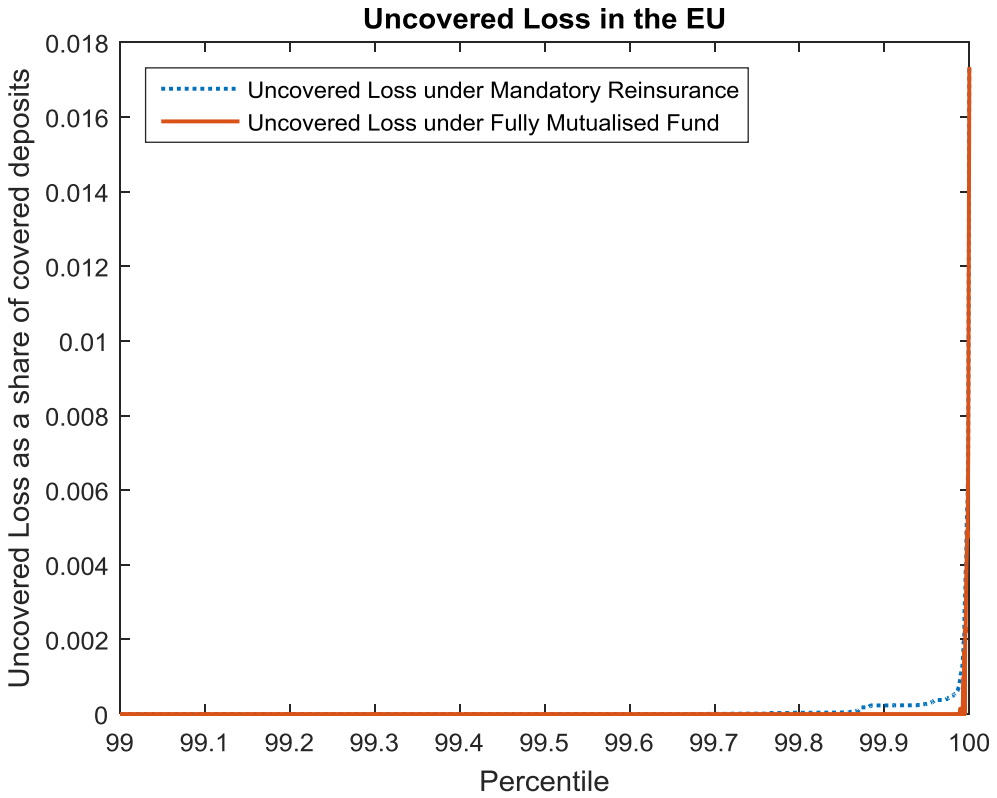
Beta = 25%, alpha = 80%, y = 80%





Beta = 25%, alpha = 100%, y = 100%


Uncovered Liquidity Shortfall in the EU
Uncovered Liquidity Shortfall Mandatory Reinsurance
Uncovered Liquidity Shortfall Fully Mutualised Fund
Uncovered Liquidity Shortfall as a share of covered deposits
0.3
0.25
0.2
0.15
0.1
0.05
0
99
99.1
99.2
99.3
99.4
99.5
99.6
99.7
99.8
99.9
100
Percentile


Uncovered Loss in the EU
Uncovered Loss under Mandatory Reinsurance
Uncovered Loss under Fully Mutualised Fund
Uncovered Loss as a share of covered deposits
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
99
99.1
99.2
99.3
99.4
99.5
99.6
99.7
99.8
99.9
100
Percentile

6.5. Outputs on the effectiveness of a fully-mutualised EDIS relative to national-level DGS, via SYMBOL

Introduction

The Commission has argued that EDIS is needed because national DGS could be vulnerable to large local shocks.[65] Compared to the current set-up of national DGS, EDIS would enhance the level of protection for depositors. The Commission's main hypothesis is that by pooling resources in a single insurance fund, EDIS could cope with larger pay-out events and may thus increase the level of depositor confidence. The analysis presented in this Annex uses data on insured bank deposits in all MS and assesses how the DGS' payout capacity would change by moving from the current system to EDIS. The purpose of this analysis is to test whether the Commission's reasoning for proposing EDIS can be supported by data.

Overview of insured deposits and national DGS in place in the EU

Table 25 indicates the amount of total deposits and covered deposits for all Member States in 2013 and 2014. Most data has been directly provided by DGS, which participated in a survey conducted by the Commission's Joint Research Centre (JRC). Where unavailable, deposits have been estimated using data from the ECB and Eurostat. These data are relevant as the DGS Directive 2014 requires 'covered deposits' to be covered by national schemes (up to 0.8%) by 2024.

Table 25: Total amount of total and estimated covered deposits

	2013		2014	
	Total deposits 000 €	Covered deposits 000 €	Total deposits 000€	Covered deposits 000 €
EU	14,545,767,827	6,922,442,436	15,064,079,488	7,284,486,567

Definitions:

DEPOSIT: Any deposit as defined in Article 1(1) of Directive 94/19/EC[66], excluding those deposits left out from any repayment by virtue of Article 2[67].

LEVEL OF COVERAGE: Level of protection granted in the event of deposits being unavailable under your national law.

ELIGIBLE DEPOSITS (or PROTECTED or INSURED): Deposits repayable by the guarantee scheme under your national law, before the level of coverage is applied.

COVERED DEPOSITS (or GUARANTEED or REIMBURSABLE or REPAYABLE): Deposits obtained from eligible deposits when applying the level of coverage provided for in your national legislation.

There are 38 DGS in the EU (end 2014). Most are ex ante funded via annual contributions paid by banks, while 11 in 6 countries are ex-post funded. As of 2015, all of these DGS are required to build up financial means using ex-ante contributions. The currently available financial means reported by DGSs differ. In some cases, the available means are reported as zero, either because the reporting DGS

[65] See http://europa.eu/rapid/press-release_MEMO-15-6153_en.htm?locale=en

[66] "Deposit" shall mean any credit balance which results from funds left in an account or from temporary situations deriving from normal banking transactions and which a credit institution must repay under the legal and contractual conditions applicable, and any debt evidenced by a certificate issued by a credit institution.

[67] The following shall be excluded from any repayment by guarantee schemes:

a) subject to Article 8 (3), **deposits made by other credit institutions** on their own behalf and for their own account,
b) all instruments which would fall within the definition of 'own funds' in Article 2 of Council Directive 89/299/EEC of 17 April 1989 on the **own funds of credit institutions**,
c) deposits arising out of transactions in connection with which there has been a criminal conviction for money laundering as defined in Article 1 of Council Directive 91/308/EEC of 10 June 1991 on prevention of the use of the financial system for the purpose of money laundering.

has so far only collected ex-post contributions or because no data were available for the observation period. Any reported data on available means are confidential and so cannot be presented in this working document. However, it can be indicated that the size of DGS funds reaches an average value of 1% and a median of 0.7% of covered deposits.

Two implications can be drawn from the available data on the financial means of national DGS:

- First, in order to be effective, EDIS will need to provide liquidity support in its initial phase. Otherwise, national DGS will still depend almost entirely on national alternative funding means in the event of large local shocks.
- Second, in the interest of fairness, EDIS must be designed in a way that avoids disproportionate advantages for national-level schemes, which have not yet started collecting ex-ante contributions. Also, any disincentives to collect such contributions in the future must be avoided. At the same time, DGSs which have collected funds, over and above the 0.8% of covered deposits required by the DGS Directive should not face a disadvantage from being fully compliant or "over-compliant" with the Directive.

These considerations are mirrored in the re-insurance approach, under which EDIS works primarily as a liquidity backstop in case national funds are not sufficient to cover pay-out events. In addition, EDIS sets out a mandatory funding path to ensure funds are built-up at the same pace everywhere.

Capacity for pay-outs: national DGS versus EDIS

This section analyses the effectiveness of a fully-mutualised EDIS relative to national-level DGS in the event of simulated pay-out events. The analysis begins by comparing the target funding levels (i.e. 0.8% of covered deposits) of national-level DGS and EDIS with the amount of covered deposits held by individual banks in the Banking Union so as to understand their respective capacity to cope with any pay-out. The analysis continues by simulating potential pay-out events affecting the national-level DGS and assessing the average size of the simulated pay-outs which would exceed the available funds in a national DGS.

The simulations presented in this section are based on the same sample presented in Annex 6.2. The following analysis makes a distinction between significant and non-significant banks. Significant banks in the Banking Union are entities belonging to groups falling under SSM supervision. They are thus selected on the basis of the list of significant banks published by the SSM.

- Significant banks headquartered outside of the Banking Union meet similar criteria as set by the ECB (Article 6(4) of SSM Regulation). As the Commission services do not have data on cross border activities and there is no available information on whether a bank has fulfilled the direct public finance assistance criterion, only the other criteria have been applied at the highest group level of consolidation, i.e. size criterion: total assets (TA) > 30billion €; economic importance criterion: total assets > 20% GDP and total assets >5 billion €; top three: three largest banks in a Member State (MS) in terms of total assets.
- The remaining banks are assumed to be non-significant and so enter insolvency and trigger DGS intervention in case of distress.

On the basis of the above categorisations, Table 26 indicates for each Member State the number of banks in the sample (column 2), the number of 'significant' banks (column 3), and the number of 'non-significant' banks (column 4). It should be noted that the results presented in the next sections should be interpreted with some caution when the number of banks in a country (or in sub-samples) is lower than 10. The same remark applies, albeit to a lesser extent, whenever the number of banks is slightly higher (10 to 15). This does not affect simulation results at aggregated level (like in Figure 14).

Table 26: Categorisation of selected banks by Member State in sample

	Number of banks	Number of significant banks	Number of non-significant banks
AT	169	84	85
BE	34	15	19
BG	17	9	8
CY	9	5	4
CZ	24	14	10
DE	1586	54	1532
DK	82	11	71
EE	3	1	2
ES	84	34	50
FI	29	6	23
FR	252	180	72
GR	7	4	3
HR	28	10	18
HU	17	3	14
IE	15	11	4
IT	540	72	468
LT	8	3	5
LU	44	27	17
LV	13	2	11
MT	9	3	6
NL	31	11	20
PL	33	18	15
PT	22	11	11
RO	18	10	8
SE	75	14	61
SI	19	9	10
SK	11	5	6
UK	180	50	130
EU	**3,359**	**676**	**2,683**

Source: JRC elaborations, ECB

Capacity to meet a single pay-out

In this section, the capacity of national-level DGS funds to absorb pay-outs for a single bank failure is assessed relative to that of EDIS. For each Member State, the estimated amount of covered deposits held by each bank is compared to the target funding level of the national-level DGS and the target funding level of a fully-mutualised EDIS. Table 26 presents selected statistics for all EU Member States. The table indicates the corresponding shares of those banks in the sample of banks (columns A and B); the corresponding shares of those banks in terms of assets (columns C and D); the corresponding share of those banks in terms of covered deposits (columns E and F) and the increase in the amount of covered deposits when moving from the national DGS to EDIS as a share of the Member State's GDP, Banking Union and EU GDP (columns G, H and I). Values are expressed as averages and percentiles of the distribution across all Member States.

The conclusion from Table 26 is clear. EDIS is considerably less likely to fall short of pay outs than a national DGS.

The reasons are twofold: (a) an individual bank is relatively smaller at the European level than at national level; and (b) the absolute amount of the EDIS target funding level is significantly larger than any of the individual national DGS. In terms of GDP per Member State, the average increase in covered deposits reimbursed by the EDIS is around 28% while the median is roughly 27% of the GDP.

Table 27: Capacity to absorb single bank pay-outs: national DGS versus EDIS

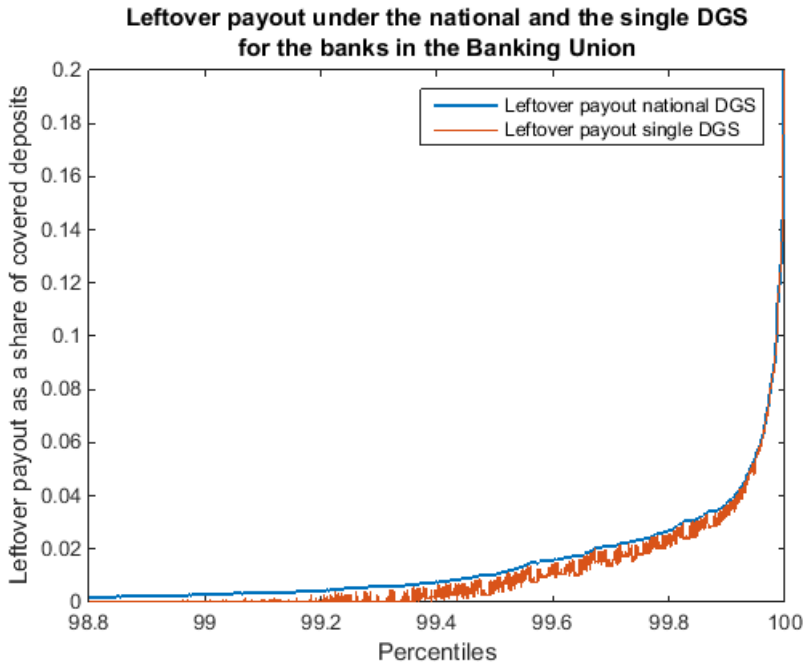
	A	B	C	D	E	F	G	H	I
	Share of banks below the national DGS target	**Share of banks below the EDIS target**	**Share of total assets of banks below the national DGS target**	**Share of total assets of banks below the EDIS target**	**Share of covered deposits of banks below the national DGS**	**Share of covered deposits of banks below the single DGS (if applicable)**	**Increased amount of covered deposits when moving to EDIS Share of MS GDP**	**Increased amount of covered deposits when moving to EDIS Share of Euro area GDP**	**Increased amount of covered deposits when moving to EDIS Share of EU28 GDP**
Ave-rage	48.3%	98.8%	13.5%	83.3%	7.9%	82.9%	28.6%	0.719%	0.530%
Q1	12.2%	99.4%	0.7%	62.3%	0.8%	63.1%	26.7%	0.548%	0.093%
Q2	46.3%	100.0%	6.4%	100.0%	3.1%	100.0%	15.6%	0.126%	0.404%
Q3	82.0%	100.0%	28.0%	100.0%	6.8%	100.0%	44.8%	1.012%	0.747%

Capacity to meet multiple pay-outs

As a second step in the analysis, the capacity of national-level DGS and EDIS – again at target funding levels – to cover multiple successive pay-outs can be analysed. Results in this section are based on the simulation of multiple DGS pay-outs using the SYMBOL model and applying the approach developed by Cariboni et al (2015).[68] In the analysis, the aggregated pay-out not covered (i.e. shortfall) by each national DGS is calculated for each bank in the Banking Union, when each national DGS is assumed to reimburse the shortfalls of the banks in its own country. This aggregated variable is then compared with the corresponding shortfall in the case of a fully-mutualised EDIS. The difference between the two estimated shortfalls provides an insight into the increased loss-absorption capacity implied by EDIS.

Figure 14 shows the distribution of the aggregated shortfall by the national DGS (blue line) and the corresponding shortfall for EDIS (orange line). It can be noted that the shortfall under a fully integrated EDIS is always smaller than the shortfall under a national-level DGS system and one can also observe, on the left part of the figure, a large number of cases where EDIS can fully absorb pay-outs where the national DGS cannot. These results demonstrate that, in all the cases where national-level DGS cannot fully cover simulated pay-outs, EDIS can further absorb 80% of the pay-outs on average. The results also show that, while national DGS cannot fully cover pay-outs in 2.5% of the cases, this share decreases to 0.7% when EDIS is in place.

Figure 14: Amount of uncovered payouts when national DGS are in place and only EDIS is in place



The conclusion of this analysis is again clear.

A system with joint financial means and joint liability, such as EDIS, would operate more efficiently, i.e. providing a higher level of protection than that based on national Deposit Guarantee Schemes.

[68] See Cariboni J., Di Girolamo F., Maccaferri S., Petracco Giudici M. (2015): Assessing the potential reduction of DGS funds according to Article 10(6) of Directive 2014/49/EU: a simulation approach based on the Commission SYMBOL model, JRC Technical report JRC95181 (forthcoming). Note that in th paper simulations are run country by country independently. For this analysis, losses are firstly simulated jointly for all EU 28 banks and then distributed losses across country.

Conclusion

The short stylised analysis presented in this Annex demonstrates that EDIS will improve deposit insurance cover for banks in all participating Member States, without changing the overall level of funding. This is achieved by pooling the ex-ante contributions in one fund that could absorb larger shocks than any of the national DGS could.

6.6. Outputs on payout analysis on the transitional period via SYMBOL

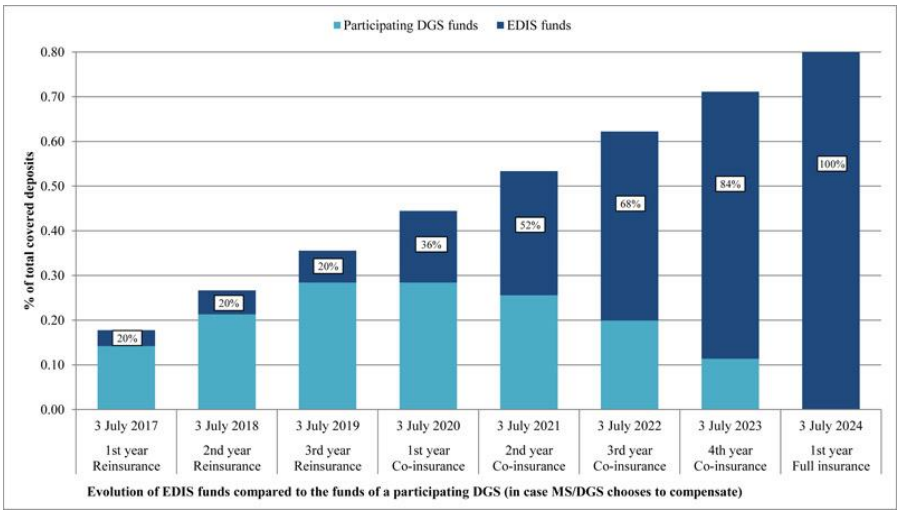
The phase-in procedure where EDIS will gradually complement existing national schemes is expected to last 7 years and it is divided into two phases, namely reinsurance and co-insurance. Over the whole transition period, the AFM at the disposal of a given national DGS are a share $\beta(t)$ of the target fund collected up to time *t*, while the complementary share is transferred to the EDIS. Technically:

$$AFM^{DGS} = \beta(t) \cdot target(t)$$

$$AFM^{EDIS} = (1 - \beta(t)) \cdot target(t)$$

where $\beta(t)$ and *target(t)* are defined according to Figure 15 ($\beta(t)$ corresponds to the light blue part and *target(t)* is the overall height of the bars).

Figure 15: Evolution of EDIS funds compared to the funds of a participating DGS



Source: DG FISMA, http://ec.europa.eu/finance/general-policy/docs/banking-union/european-deposit-insurance-scheme/151124-graph_en.pdf

Reinsurance phase

During this phase, the first function of the European reinsurance scheme is to cover a share α_r of the amount which remains uncovered by the national DGS (liquidity shortfall). In formulas (for simplicity we suppress the reference to the time *t*):

$$Liq\ shortfall^{DGS} = Covered\ deposits^{DGS} - AFM^{DGS} - SC^{DGS}$$

$$Reinsurance_{liquidity} = \alpha_r \cdot Liq\ shortfall^{DGS}$$

$$Liq\ retention^{DGS} = (1 - \alpha_r) \cdot Liq\ shortfall^{DGS}$$

In other words, the national DGS, using its AFM and raising short-term extraordinary contributions (SC), is called upon to reimburse the covered deposits of the distressed banks. What is left is partially transferred to the EDIS, which uses the funds at its disposal to cover such shortfall.

$$Liq\ retention^{EDIS} = \sum_i Reinsurance_{liquidity}^{DGS_i} - AFM^{EDIS}$$

The remaining part, i.e. the amount of deposits that neither the national DGS nor EDIS is able to cover, is called *uncovered liquidity shortfall.*

Failing banks enter an insolvency procedure, which lasts much longer than the few days in which liquidity needs to be provided to reimburse covered deposits. During this phase, national DGSs and the EDIS are treated as senior creditors and may recover an amount *R*. Moreover, the DGS can call

long-term extraordinary contributions (*LEC*). *R* and *LEC* can be used to cover the liquidity shortfall. The amount of deposits that remains uncovered after recovery and LEC is called *excess loss*:

$$ExcLoss^{DGS} = Liq\ shortfall^{DGS} - R - LEC^{DGS}$$

The second function of the European reinsurance scheme is to cover a share α_r of the excess loss:

$$Reinsurance_{loss} = \alpha_r \cdot ExcLoss^{DGS}$$

$$Loss\ retention^{DGS} = (1 - \alpha_r) \cdot ExcLoss^{DGS}$$

$$Loss\ retention^{EDIS} = \sum_i Reinsurance_{loss}{}^{DGS_i} - AFM^{EDIS}$$

Over time the reinsurance scheme would have constant coverage, i.e. α_r is time-independent.

Both the short-term funding provided by EDIS ($Reinsurance_{liquidity}$) and the amount of losses which is in the end borne by EDIS ($Reinsurance_{Loss}$) are capped according to the following formulas:

$$Cap_{liquidity} = min\left\{z * 0.8\% * \sum_{i \in C} CovDep_i\,; y * 20\% * \frac{(t+1)}{9} * 0.8\% * \sum_{i \in EuroArea} CovDep_i\right\}$$

$$Cap_{losses} = min\left\{z * 0.8\% * \sum_{i \in C} CovDep_i\,; y * 20\% * \frac{(t+1)}{9} * 0.8\% * \sum_{i \in EuroArea} CovDep_i\right\}$$

where *C* is the country where the shortfall occurs and *t*=1,2,3 (*t*=1 corresponding to 2017 and *t*=3 corresponding to 2020).

Co-insurance phase

In the co-insurance regime, the EDIS contributes a share α_c to each pay-out starting from the first Euro. This share increases over time (e.g., linearly rising from 20% to 100% over five years). At the same time, AFM of the national DGS shrink over time, as funds are increasingly transferred to the EDIS (see Figure 15).

$$Coinsurance_{liquidity} = \alpha_c \cdot Covered\ Deposits^{DGS}$$

$$Liq\ retention^{DGS} = (1 - \alpha_c) \cdot Covered\ Deposits^{DGS} - AFM^{DGS} - SC^{DGS}$$

$$Liq\ retention^{EDIS} = \alpha_c \cdot \sum_i Covered\ Deposits^{DGS_i} - AFM^{EDIS}$$

The excess loss remaining once the insolvency procedure is over and long-term ex-post contributions have been called is computed as follows:

$$Coinsurance_{loss} = \alpha_c \cdot (Covered\ Deposits^{DGS} - R)$$

$$Loss\ retention^{DGS} = (1 - \alpha_c) \cdot (Covered\ Deposits^{DGS} - R) - AFM^{DGS} - LEC^{DGS}$$

$$Loss\ retention^{EDIS} = \alpha_c \cdot \sum_i (Covered\ Deposits^{DGS_i} - R) - AFM^{EDIS}$$

.

Sample description

The results presented in Section 4.1.2 are based on end-of-year unconsolidated banks' balance sheet data gathered through Bankscope. The dataset covers a sample of around 2,900 Euro Area banks as of 2013. Missing values are imputed through robust statistics (see Cannas et al. (2013)). Table 28 shows aggregated values for some selected variables.

Table 28. Sample banks dataset (data from 2013)

Number of banks	Total assets bn€	RWA bn€	Covered deposits bn€	Capital bn€
2,885	25,267	9,505	4,774	1,627

Data are corrected to reflect the Basel III definitions of capital and risk weighted assets, as described in Annex 6.2

The key input data necessary to run SYMBOL are the following:

- Total assets;
- Risk-weighted assets;
- Total capital and/or capital ratios.
- Covered deposits.

The amount of covered deposits by bank is not available in Bankscope, hence we derive it for each bank based on statistics at the country level and bank-level data on customer deposits. In particular, we estimate the amount of covered deposits for each bank by applying the ratio of covered deposits over customer deposits at the country level to the customer deposits held by each bank.

6.7. List of European banking groups in the CDS premia analysis

	Bank	Country
1	HSBC	United Kingdom
2	Barclays	United Kingdom
3	Lloyds Bank	United Kingdom
4	Nomura Europe Holdings	United Kingdom
5	RBS	United Kingdom
6	Standard Chartered Bank	United Kingdom
7	Credit Agricole	France
8	BNP Paribas	France
9	Societe Generale	France
10	Credit Mutuel (BFCM)	France
11	Group BPCE	France
12	Deutsche Bank	Germany
13	Commerzbank	Germany
14	Deutsche Zentral-Genossenschaftsbank AG	Germany
15	Volksbanken Raiffeisenbanken Genossenschaftlichen FinanzGruppe	Germany
16	Banco Santander	Spain
17	BBVA	Spain
18	ING Group	The Netherlands
19	Rabobank	The Netherlands
20	ABN AMRO	The Netherlands
21	Intesa Sanpaolo	Italy
22	Unicredit	Italy
23	Nordea Bank	Sweden
24	Svenska Handlesbanken	Sweden
25	Swedbank AB	Sweden
26	Erste Group	Austria
27	Raiffeisen Zentralbank	Austria
28	KBC Bank	Belgium
29	Dexia Group	Belgium
30	National Bank of Greece	Greece
31	Piraeus Bank	Greece
32	Allied Irish Banks	Ireland
33	Governor and Company of the Bank of Ireland	Ireland
34	BCPN (Banco Comercial Portugal)	Portugal
35	Caixa Geral de Depositos SA	Portugal

6.8. Outputs of the CDS spread analysis

Summary Table #1

Variable	Obs	Mean	Std. Dev.	Min	Max
BankCode	66,535	18	10.09958	1	35
CDSpremium	66,534	229.8621	348.9482	0	6534.469
BankAverage	66,500	250.8894	126.9252	88.84676	626.7734
DomesticBa~e	64,886	242.3198	347.1989	38.85499	6534.469
NonDomesti~e	66,500	256.7795	132.5271	81.36143	682.1877

Output #1

```
Fixed-effects (within) regression               Number of obs      =     66,500
Group variable: BankCode                        Number of groups   =         35

R-sq:                                           Obs per group:
     within  = 0.1740                                         min =      1,900
     between = 0.9999                                         avg =    1,900.0
     overall = 0.0604                                         max =      1,900

                                                F(1,34)            =      23.23
corr(u_i, Xb)  = -0.0629                        Prob > F           =     0.0000

                                (Std. Err. adjusted for 35 clusters in BankCode)
------------------------------------------------------------------------------
             |               Robust
  CDSpremium |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 BankAverage |   .8026042   .1665239     4.82   0.000      .464187    1.141021
       _cons |   28.53223   41.77907     0.68   0.499    -56.37306    113.4375
-------------+----------------------------------------------------------------
     sigma_u |  259.95052
     sigma_e |  221.54388
         rho |   .5792612   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Output #2

```
Fixed-effects (within) regression               Number of obs      =     64,854
Group variable: BankCode                        Number of groups   =         35

R-sq:                                           Obs per group:
     within  = 0.4384                                         min =        484
     between = 0.8312                                         avg =    1,853.0
     overall = 0.5985                                         max =      1,900

                                                F(2,34)            =      44.25
corr(u_i, Xb)  = 0.4217                         Prob > F           =     0.0000

                                (Std. Err. adjusted for 35 clusters in BankCode)
------------------------------------------------------------------------------
             |               Robust
  CDSpremium |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
DomesticBank~e |   .5327105   .1417473     3.76   0.001     .2446452    .8207758
NonDomesticBa~e |   .3432003   .1546824     2.22   0.033     .0288479    .6575528
       _cons |   6.856372   24.15018     0.28   0.778    -42.22271    55.93545
-------------+----------------------------------------------------------------
     sigma_u |  130.89048
     sigma_e |  171.26443
         rho |  .36872382   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Summary Table #2

Variable	Obs	Mean	Std. Dev.	Min	Max
BankCode	8,855	18	10.10008	1	35
CDSpremium	8,855	170.3913	289.2568	37.79999	4847.172
BankAverage	8,855	170.3913	40.92713	93.91058	279.9075
DomesticBa~e	8,855	170.3913	287.9789	42.38449	4847.172
NonDomesti~e	8,855	175.0867	45.62863	84.89515	313.9856

Output #3

```
Fixed-effects (within) regression               Number of obs      =      8,855
Group variable: BankCode                        Number of groups   =         35

R-sq:                                           Obs per group:
     within  = 0.0340                                         min =        253
     between = 1.0000                                         avg =      253.0
     overall = 0.0047                                         max =        253

                                                F(1,34)            =       9.57
corr(u_i, Xb)  = -0.1810                        Prob > F           =     0.0039

                                 (Std. Err. adjusted for 35 clusters in BankCode)
------------------------------------------------------------------------------
             |               Robust
  CDSpremium |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 BankAverage |   .6515131   .2106402     3.09   0.004     .2234407    1.079586
       _cons |   59.37914   35.89126     1.65   0.107    -13.56068     132.319
-------------+----------------------------------------------------------------
     sigma_u |  260.38562
     sigma_e |  140.15054
         rho |  .77537128   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Output #4

```
Fixed-effects (within) regression               Number of obs      =      8,855
Group variable: BankCode                        Number of groups   =         35

R-sq:                                           Obs per group:
     within  = 0.1375                                         min =        253
     between = 0.9470                                         avg =      253.0
     overall = 0.6558                                         max =        253

                                                F(2,34)            =      89.51
corr(u_i, Xb)  = 0.7905                         Prob > F           =     0.0000

                                 (Std. Err. adjusted for 35 clusters in BankCode)
------------------------------------------------------------------------------
             |               Robust
  CDSpremium |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
DomesticBank~e |   .3455941   .0385221     8.97   0.000     .2673077    .4238804
NonDomesticBa~e |    .325074    .122466     2.65   0.012     .0761931    .5739548
       _cons |   54.58898   18.31977     2.98   0.005     17.35873    91.81924
-------------+----------------------------------------------------------------
     sigma_u |  176.34821
     sigma_e |   132.4379
         rho |  .63938442   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```