

European SF Weekly

End without beginning?

Alexander Batchvarov, CFA

alexander.batchvarov@bofa.com
Int'l Str. Fin. Strategist
MLI (UK)
+44 20 7995 8649

Altynay Davletova, CFA

altynay.davletova@bofa.com
Int'l MBS/ ABS Strategist
MLI (UK)
+44 20 7995 3968

Mark Nichol

mark.nichol@bofa.com
European CMBS/ABS Strategist
MLI (UK)
+44 20 7996 0965

Dustin Walpert

dustin.walpert@bofa.com
European CLO Strategist
MLI (UK)
+44 20 7996 0982

04 July 2022 | Structured Finance | Europe | ABS CMBS RMBS CLO

Key takeaways

- EIOPA declared Solvency II securitisation treatment 'fit for purpose': we disagree.
- Early signs of UK house prices slow-down can clearly be detected already.
- European CMBS principal losses represent 2.2% of all issuance since 1995 and 0.3% of AAA tranches.

Common acronyms (<https://rsch.baml.com/r?q=hMfRaYrddBVjg1ljaAecbg>)

CMBS: Losses have been lower than you might think

Principal losses have been limited to transactions issued prior to the financial crisis. Losses amounted to 1.2% of 2005, 4.9% of 2006 and 6.4% of 2007 issuance. Very few AAA notes were affected although the arrangers have largely exited the business. Improvements in CMBS 2.0 should avoid similar losses in the future, we think.

CMBS

Principal losses have been lower than you might think

In this report we update an earlier analysis CMBS losses to complement our recent report on [CMBS pricing volatility](https://rsch.baml.com/r?q=qBzBOSNkxbxA0zh!-GeFA) (<https://rsch.baml.com/r?q=qBzBOSNkxbxA0zh!-GeFA>). We think these performance analyses could be relevant to calibrating appropriate regulatory capital charges for CMBS.

Overall, we find no losses have been realised in CMBS 2.0 transactions to date, which we credit to improvements made to the product since the financial crisis. Among transactions issued prior to the financial crisis losses have been concentrated towards the bottom of capital stacks although triple A notes were affected in limited cases.

As we showed in a recent [review of CRE loan performance](https://rsch.baml.com/r?q=FQD-XSn5R7uE4CpPxUEuWw) (<https://rsch.baml.com/r?q=FQD-XSn5R7uE4CpPxUEuWw>), loan losses had amounted to €7.1bn. This represents 2.2% of the €329billion of CMBS issued since 1995. Bloomberg data show €5.2bn of aggregate principal losses have been realised on European CMBS notes, which suggests that €1.9bn of loan losses have not yet been allocated to the CMBS notes, in our interpretation. We have estimated the allocation of this €1.9bn of loss to the notes.

We analysed over 2000 CMBS notes from 450 transactions sold by banks and corporates. All legacy Merrill Lynch and Bank of America transactions were included. Over the 27 year period from 1995 to 2022 there has been €329bn of CMBS issued in Europe.

Losses by vintage

Almost all of the principal losses have come from notes issued between 2005 and 2007. These vintages were most exposed when the financial crisis saw commercial property values and appetite for CRE lending decline substantially for a number of years before recovering.

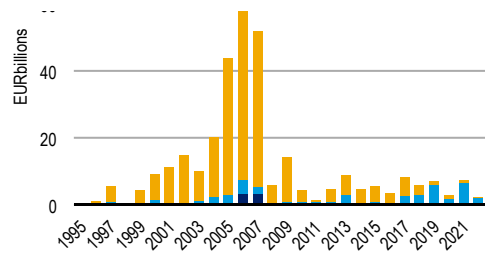
Principal losses amounted to 1.2% of 2005 issuance, 4.9% of 2006 issuance and 6.4% of 2007 issuance. Roughly 5% of the 2006 and 2007 vintages remains outstanding and further losses could be forthcoming.

Exhibit 28: Fate of European CMBS issuance by vintage
€5.2bn of principal losses since 1995



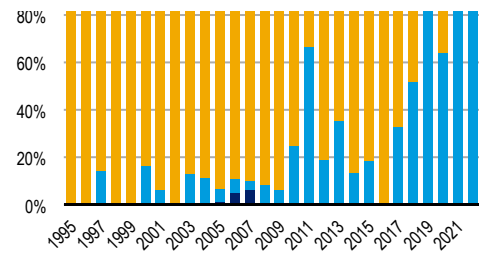
Exhibit 29: Fate of European CMBS issuance by vintage, %
Losses represent 1.6% of all CMBS issued since 1995





Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

There has been no loss incurred in any CMBS transaction issued since 2007. The performance of CMBS 2.0 transactions has proven to be more robust with just four loan defaults resulting during the Covid pandemic.

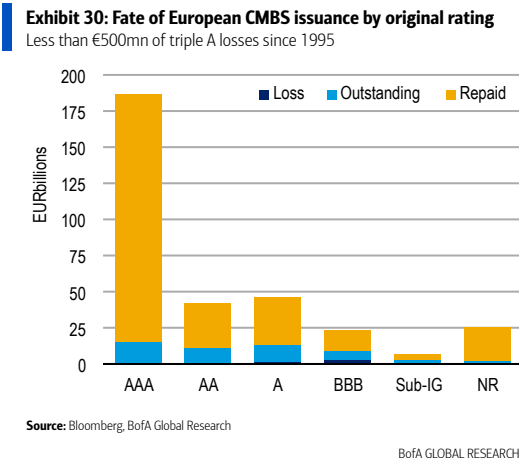
We think some losses are likely to be realised eventually, however, in impaired transactions such as Debussy, Intu Metrocentre Finance, and Elizabeth Finance 2018.

Losses by rating

Not surprisingly, lower rated CMBS notes suffered higher principal losses on average. **Among those CMBS notes originally rated AAA, principal losses to date represent €491mn, which is just 0.3% of aggregate AAA issuance.** We question whether this is consistent with the capital charges imposed on CMBS under the Solvency II regulatory regime.

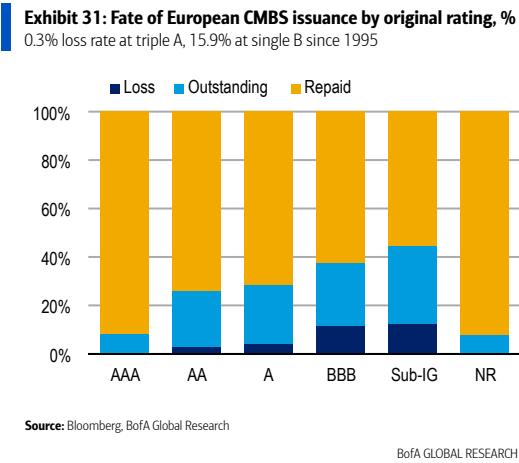
At the AA rating level, aggregate principal loss to date represents 2.9% of the total, in our estimation, while 23% of notes remain outstanding. At the single A rating level, the loss rate increases to 4.1% with 24% of notes still outstanding, and at BBB the loss rate reaches 11.7% with 26% of the notes still outstanding.

Below investment grade, loss rates increase sharply, which we would argue is expected and appropriate. Original BB and B rated notes have suffered 13.9% and 15.9% principal loss respectively to date.



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Which AAAs lost money?

The AAA rated notes that suffered principal loss were all issued between 2005 and 2007 and most were part of investment banks' conduit programmes that originated and securitised debt rapidly in some cases under an 'originate to distribute' model. The names are listed in the table below. We expect other names could be added to this list as losses are realised in the future.

We are aware of 13 notes issued with triple A ratings that incurred losses of which five were first pay tranches and eight were subordinate tranches. Among the first pay tranches, losses ranged from 0.2% to 28.0%. Losses were higher among the subs in some cases. Subordinate triple A notes are not common in CMBS 2.0 transactions: we are aware of just three being issued since 2011.

Looking ahead, we think changes in the industry have made losses less likely to reach triple A in the future. Since the

financial crisis, most of the arrangers on the list have not restarted conduit CMBS businesses to our knowledge. Regulatory retention requirements ensure that originators share losses, which has successfully encouraged conservative underwriting and structuring since the financial crisis, in our view.

Also, rating agencies have tightened CMBS rating criteria based on the experience of the financial crisis. As a result, the Covid pandemic resulted in relatively few defaults in CMBS, as we discussed in our recent [default study](https://rsch.baml.com/r?q=FQD-XSn5R7uE4CpPxUEuWw) (<https://rsch.baml.com/r?q=FQD-XSn5R7uE4CpPxUEuWw>).

Exhibit 32: Principal losses in AAA rated CMBS
13 original triple A notes from 8 arrangers have suffered principal loss

Ticker	Arranger	Vintage	Fitch	Moody's	S&P	Country	Risk Transfer	Currency	Loss millions	Loss Severity
DECO 6-UK2X A2	Deutsche Bank	2005	AAA	Aaa	AAA	UK	True Sale	GBP	19.6	16.9%
ECLIP 2006-1 B	Barclays Capital	2006	AAA	-	AAA	UK	True Sale	GBP	0.5	2.5%
EPICP INDU A	RBS	2006	AAA	Aaa	AAA	UK	Synthetic	GBP	78.7	25.4%
EPICP INDU B	RBS	2006	AAA	-	AAA	UK	Synthetic	GBP	49.0	97.2%
GGLF 2006-2	Bayerische Hypo	2006	AAA	Aaa	-	Germany	True Sale	EUR	17.8	43.3%
PROMI 2 A	HBOS	2007	AAA	-	AAA	UK	Synthetic	GBP	4.8	1.3%
REC 6 A	Rothschild	2007	AAA	Aaa	AAA	UK	True Sale	GBP	35.0	28.0%
TAHIT 1 A	Citigroup	2005	AAA	-	AAA	UK	True Sale	GBP	0.7	0.2%
TITN 2006-3X B	Credit Suisse	2006	AAA	Aaa	AAA	Pan-Europe	True Sale	EUR	9.3	3.8%
TITN 2006-5X A3	Credit Suisse	2006	AAA	-	AAA	Germany	True Sale	EUR	54.2	87.6%
TITN 2007-1X A	Credit Suisse	2007	-	Aaa	AAA	UK	True Sale	GBP	41.8	9.6%
TITN 2007-3X A2	Credit Suisse	2007	-	Aaa	AAA	UK	True Sale	GBP	19.6	16.9%
TITN 2007-CT1X A2	Credit Suisse	2007	AAA	Aaa	AAA	Pan-Europe	True Sale	EUR	0.3	0.1%

Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

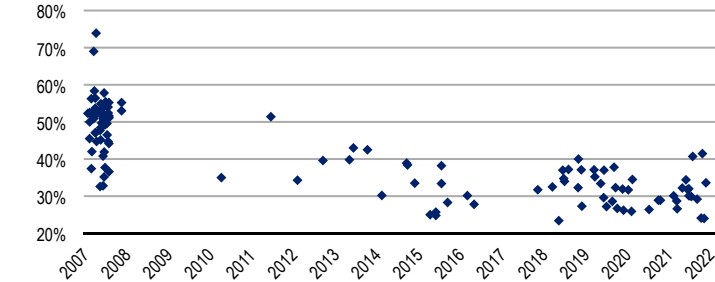
Improvements

In light of the problems revealed in the wake of the financial crisis, CMBS 2.0 transactions are significantly different from pre-crisis transactions as part of an industry wide collaboration to improve the product that included bond investors, borrowers, lenders, loan servicers, lawyers, researchers, rating agencies and others.

As well as addressing idiosyncratic challenges particular to real estate finance, CMBS 2.0 has seen a significant reduction in financial leverage, in the securitised loans and also in the rated notes.

Among the securitised loans, since 2009 loan to value ratios have been steady in the range of 60% to 65%, down from around 75% or higher before the financial crisis, corresponding to a **15% to 20% reduction in financial leverage**, we estimate.

Exhibit 33: Initial LTV of AAA rated CMBS notes
AAA has roughly 30% less debt now vs 2007



Source: BofA Global Research

BofA GLOBAL RESEARCH

Among CMBS notes, the rating agencies have tightened their rating criteria for European CMBS since the financial crisis occurred, in some cases more than once. As a result, the ratings in 2.0 transactions have to pass a greater number of stress tests based on more severe stresses than prior to the crisis. As regards financial leverage, prior to the crisis the detachment point for AAA ratings corresponded to a LTV ratio of around 50% on average, while post-crisis this has been reduced to around 35% on average, as illustrated below. This corresponds to a **30% reduction in AAA leverage**, we estimate.

The reduction in leverage described above is structural in nature and is likely to be a permanent feature of European CMBS going forward, in our view.

European SF Weekly

MIA European insurers

Alexander Batchvarov, CFA

alexander.batchvarov@bofa.com
Int'l Str. Fin. Strategist
MLI (UK)
+44 20 7995 8649

Altynay Davletova, CFA

altynay.davletova@bofa.com
Int'l MBS/ ABS Strategist
MLI (UK)
+44 20 7995 3968

Mark Nichol

mark.nichol@bofa.com
European CMBS/ABS Strategist
MLI (UK)
+44 20 7996 0965

Dustin Walpert

dustin.walpert@bofa.com
European CLO Strategist
MLI (UK)
+44 20 7996 0982

27 June 2022 | Structured Finance | Europe | ABS CMBS RMBS CLO

Key takeaways

- European insurers SF holdings update suggests low participation rate and no change yoy: missing support for European economy.
- UK rental/BTL markets were strong YTD but higher inflation and regulatory regime may bring challenges for the sector.
- CMBS price volatility compares well with senior unsecured bonds from REITs. Solvency II calibrations are due for a review.

Common acronyms (<https://rsch.baml.com/r?q=hMfRaYrddBVjg1ljaAecbg>)

A small uptick in primary and more pronounced, albeit selective, uptick in secondary activity characterized the European SF market activity last week. Retained deals dominated, but a reverse-enquiry driven ABS and amended format (static) CLO(s) may see the light of day soon. Spreads were on average wider, partially catching up and discovering prices after the Barcelona hiatus, but senior high quality more liquid RMBS saw small compression. See **European SF Weekly Data Addendum: Now you see me, now you don't, dated 27 June 2022.**

Commentary: MIA European insurers

The insurers' involvement with the Structured credit sector was low in 2021, as we have concluded in previous years and there has been little, if any, change. As we have argued for years, the MIA (missing in action) insurers on the European SF market is a missed opportunity for insures, securitisation, capital markets and the economy in Europe.

RMBS: UK rental and BTL markets strong YTD

UK rents accelerated in 1-5M22, as demand recovered but supply has not kept up. While affordability has held up thanks to higher incomes, rising cost of living is likely to produce an increase in rental arrears in 2H22-2023.

The BTL demand was also on the rise in 1Q22, but regulatory regime remains challenging, with a number of new initiatives recently announced. With higher rates on BTL mortgages, we think demand for BTL mortgages may weaken in 2022, but strong rental and housing markets remain supportive.

CMBS: How volatile is CMBS pricing?

The volatility of securitised bonds has been similar to that of REITs and broader corporates over the past 25 years in Europe and the UK. The strong performance during the Covid pandemic illustrates the need to review regulatory frameworks.

Commentary

Of insurers and Structured bonds

This long-standing annual study of the European insurance sectors (<https://rsch.baml.com/r?q=6B2IfglA9VXJrmSnaqMUkA>) by our insurance equity analysts looks at €3.7trn of invested assets on European insurance balance sheets. They observed that the fixed income assets grew by 1% YoY in 2021 reflecting the natural

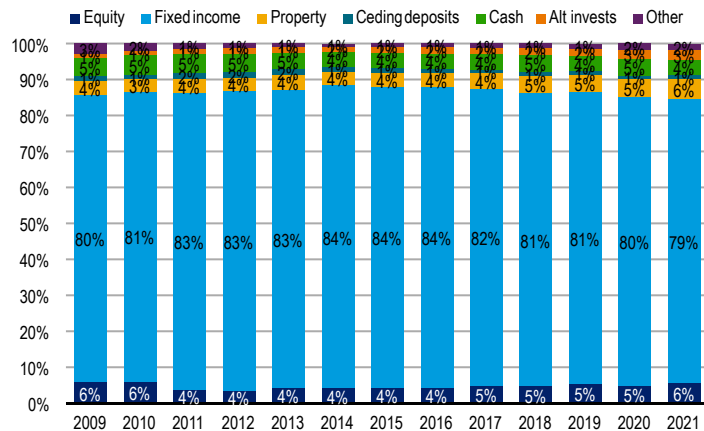
growth in the insurance companies under our coverage, somewhat offset by gently rising yields. The current value of fixed income assets will be lower still given higher yields YTD. The mix remains high quality and dominated (~80%) by fixed income.

Insurers are primarily fixed income investors

The sector's asset mix remains heavily fixed income oriented, amounting to 79% of investments. This is down slightly by 1% YoY and is now down around 5% since 2016 mainly as some fixed income like alternatives nibble away at the edges of traditional holdings.

Exhibit 1: Investment portfolio split by asset class - 2009 to 2021

European insurers' overall investment mix remains stable



Source: BofA Global Research, Company Reports

BofA GLOBAL RESEARCH

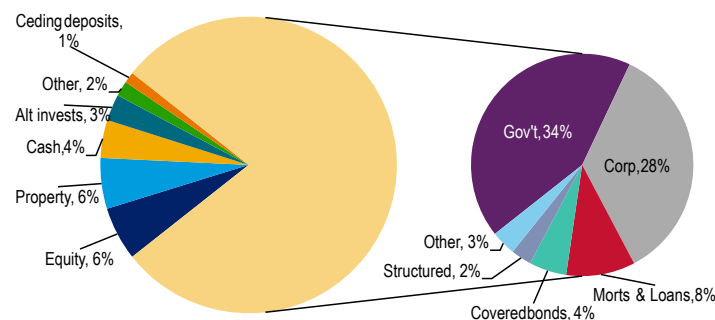
Fixed income mix continues to look quite traditional

The exhibits below shows the split of fixed income holdings. These are large books of assets (around €3 trillion) and naturally it takes time for noticeable shifts in weightings to occur. Within this fixed income holdings:

- just under half are government bonds,
- around one third are vanilla corporate bond holdings and
- the remainder (around 20%) are a combination of loans (10%), covered bonds (CB) (5%) and structured credit (3%). Mortgages & loans remain the greatest of these smaller components, as they offer an attractive risk-adjusted yield with a favourable capital treatment.

Exhibit 2: Fixed income assets continue domination in the overall investment mix

European insurers' investment mix, 2021

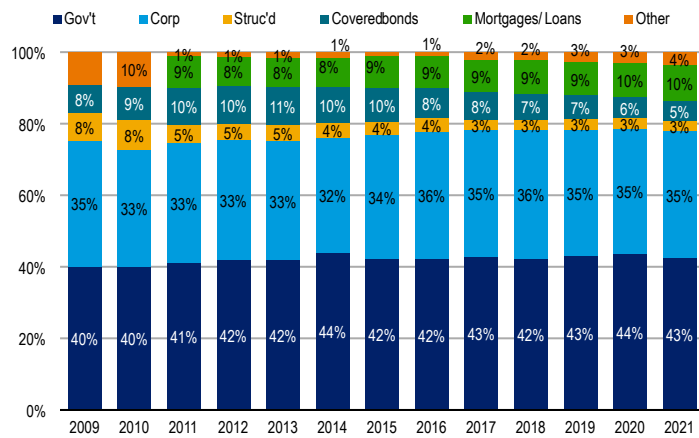


Source: BofA Global Research, Company Reports

BofA GLOBAL RESEARCH

Exhibit 3: European insurers' fixed income split 2009 to 2021

Traditional assets continue to weigh heavy within fixed income mix



Source: BofA Global Research, Company Reports

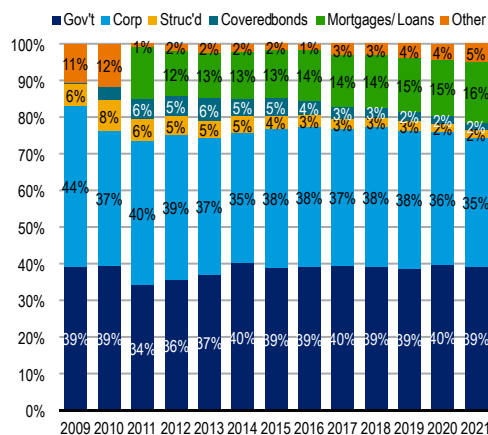
BofA GLOBAL RESEARCH

Looking at the differences in AUM for life insurers and non-life insurers we note:

- much larger holdings of mortgage loan portfolios by the former (16% vs 5%) possibly driven by the higher need for liquidity by the latter;
- equal and stable shares of CB and Structured (2%) of life insurers, and higher share of CB (8%) vs Structured (4%) for non-life insurers. For the latter, the share of Structured has varied between 3% and 4% in the last ten years compared with 8% and 13% share of CBs.

Exhibit 4: Life fixed income mix 2009-2021

Life fixed income holdings have moved slightly towards alternatives, but remain heavily weighted to government bonds and corporate bonds

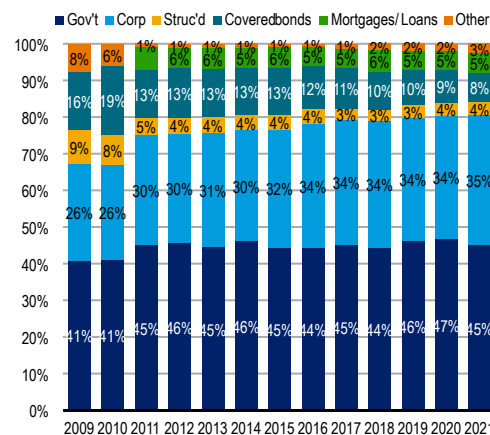


Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 5: Non-life fixed income mix 2009-2021

P&C fixed income holdings have remained more vanilla, dominated by government bonds and corporate bonds



Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 6: Fixed income detail, 2021 (local currency millions)

Fixed income portfolio analysis shows a broadly even split between government bonds and corporate bonds/others.

	Mortgages						Total	Mortgages/						Total
	Gov't	Corp	Struc'd	CB	/ Loans	Other		Gov't	Corp	Struc'd	CB	Loans	Other	
Admiral	166	2,409	0	0	0	19	2,594	6%	93%	0%	0%	0%	1%	100%
Aegon	31,101	61,133	9,829	0	42,517	0	144,580	22%	42%	7%	0%	29%	0%	100%
Ageas	35,556	18,529	54	0	2,161	12,337	68,637	52%	27%	0%	0%	3%	18%	100%
Allianz	240,500	295,500	26,892	55,600	26,892	26,916	672,300	36%	44%	4%	8%	4%	4%	100%
ASR	14,149	13,798	265	265	11,461	7	39,945	35%	35%	1%	1%	29%	0%	100%
Aviva	30,577	25,159	1,933	0	33,802	8,729	100,200	31%	25%	2%	0%	34%	9%	100%
AXA	228,000	125,580	18,000	30,420	34,000	0	436,000	52%	29%	4%	7%	8%	0%	100%
Beadley	4,008	2,264	0	0	38	0	6,310	64%	36%	0%	0%	1%	0%	100%
Direct Line	78	4,098	0	0	201	251	4,627	2%	89%	0%	0%	4%	5%	100%
Generali	194,293	101,006	817	12,142	14,759	33,467	356,484	55%	28%	0%	3%	4%	9%	100%

Gjensidige	8,900	34,982	0	4,068	0	0	47,950	19%	73%	0%	8%	0%	0%	100%	27%	13%	17%	16%	1%	3%	22%	100%
Hannover Re	26,193	16,319	1,224	1,820	2,498	495	48,549	54%	34%	3%	4%	5%	1%	100%	43%	13%	19%	19%	3%	1%	3%	100%
Hiscox	1,216	3,593	498	0	0	221	5,528	22%	65%	9%	0%	0%	4%	100%	12%	24%	28%	29%	0%	0%	7%	100%
Lancashire	703	662	243	0	110	91	1,809	39%	37%	13%	0%	6%	5%	100%	15%	35%	32%	12%	0%	0%	5%	100%
L&G	14,027	62,068	6,045	138	6,857	0	89,135	16%	70%	7%	0%	8%	0%	100%	9%	22%	34%	32%	1%	1%	0%	100%
M&G	7,154	16,744	1,194	0	2,589	0	27,681	26%	60%	4%	0%	9%	0%	100%	10%	26%	14%	16%	2%	2%	31%	100%
Mapfre	22,879	5,248	421	1,948	0	0	30,496	75%	17%	1%	6%	0%	0%	100%	15%	10%	48%	23%	1%	1%	3%	100%
Munich Re	114,100	35,400	5,883	33,500	8,789	4,487	202,159	56%	18%	3%	17%	4%	2%	100%	42%	23%	13%	13%	4%	1%	4%	100%
NN	61,587	38,231	3,730	349	60,220	576	164,693	37%	23%	2%	0%	37%	0%	100%	23%	27%	25%	20%	4%	2%	0%	100%
Phoenix	14,719	23,872	60	0	5,531	0	44,182	33%	54%	0%	0%	13%	0%	100%	12%	36%	33%	17%	1%	1%	0%	100%
Prudential	18,810	17,095	119	0	732	0	36,756	51%	47%	0%	0%	2%	0%	100%	7%	21%	19%	26%	24%	0%	4%	100%
Sampo	1,281	13,095	0	3,289	0	0	19,987	6%	66%	0%	16%	0%	0%	100%	30%	11%	24%	15%	3%	3%	14%	100%
SCOR	6,000	9,900	400	1,589	1,082	169	19,140	31%	52%	2%	8%	6%	1%	100%	15%	24%	28%	19%	4%	4%	6%	100%
Storebrand	79,929	79,183	0	40,231	49,685	0	249,028	32%	32%	0%	16%	20%	0%	100%	24%	13%	20%	17%	8%	8%	10%	100%
Swiss Life	52,287	33,808	0	8,127	12,044	6,204	112,469	46%	30%	0%	7%	11%	6%	100%	36%	27%	11%	20%	4%	2%	0%	100%
Swiss Re	47,205	35,750	3,200	830	3,943	0	90,928	52%	39%	4%	1%	4%	0%	100%	14%	35%	19%	26%	2%	2%	3%	100%
ZIG	86,571	52,553	8,125	5,376	13,159	12,325	178,109	49%	30%	5%	3%	7%	7%	100%	20%	28%	17%	30%	2%	2%	0%	100%
Life	490,835	440,520	25,796	24,775	206,437	62,771	1,251,135	39%	35%	2%	2%	16%	5%	100%	15%	24%	23%	28%	3%	1%	6%	100%
Non-life	762,979	595,663	63,429	134,029	88,669	43,502	1,690,593	45%	35%	4%	8%	5%	3%	100%	23%	26%	20%	24%	2%	2%	3%	100%
Reinsurers	193,014	98,789	10,972	37,639	15,967	5,426	361,807	53%	27%	3%	10%	4%	1%	100%	34%	24%	16%	17%	3%	1%	4%	100%
Composites	775,337	598,264	55,157	102,889	127,482	81,618	1,740,747	45%	34%	3%	6%	7%	5%	100%	16%	27%	21%	29%	2%	2%	2%	100%
Total	1,253,814	1,036,183	89,225	158,805	295,106	106,273	2,941,728	43%	35%	3%	5%	10%	4%	100%	19%	25%	21%	26%	2%	2%	4%	100%

Note: Data relates to end-2021. Most exposures are shown gross, but some companies show exposures net of what accrues to policyholders -- ie the shareholder share. See the Scope column. In all cases data excludes unit-linked assets. Source: Company reports, discussions with company managements and BofA Global Research.

BofA GLOBAL RESEARCH

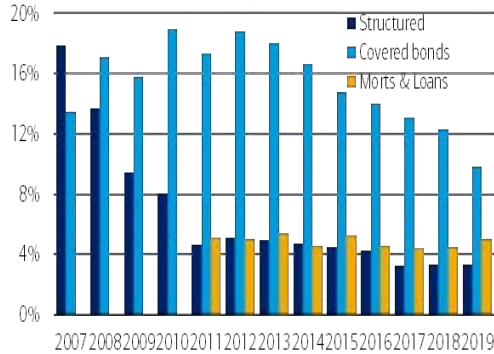
Looking at the individual companies' AUM distribution:

- It is notable that the involvement with the Structured sector is concentrated in a few companies only, namely 16 out of 27 companies, and 9 of the 16 insurers have Structured holdings equal to or above the industry averages.
- Although a similar number of company invests in CB, the level of concentration in holdings is much higher with three companies' share of holdings in the teens double-digits.
- All but four companies hold mortgage loan portfolios, and the concentration levels are even high as five companies hold mortgage loans equal or in excess of 20% of their AUM (between 20% and 37%).

Overall, the insurers' involvement with the Structured credit sector is low, as we have concluded in previous years and there has been little, if any, change in insurers' Structured share of AUM. As we have argued for years this is a missed opportunity for insures, securitisation, capital markets and the economy in Europe.

We often hear that the reason for the SF AUM of insurers is the events of the global financial crisis, the charts below suggests that this is not necessarily the case. While the non-lifers' share declined, the lifers' share actually increased. The charts also dispelled another myth, that the insurers do not like floating rate instruments; the European SF markets has always been dominated by floating rate instruments (well in excess of 95% of issuance). A peak lifers' AUM SF share of nearly 18% in in 2007 could not have been achieved with fixed rate SF instruments to any material degree.

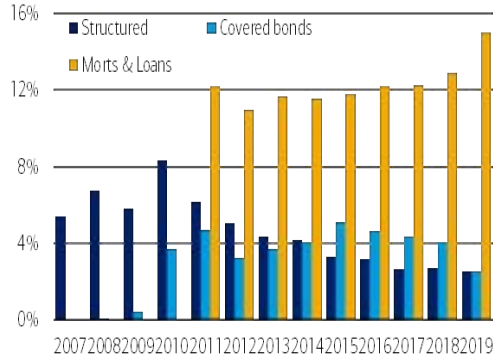
Exhibit 7: Non-Lifers shares of AUM: SF, CB, Mort&Loans, %
While the non-lifers' AUM share of SF declined during the GFC...



Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 8: Lifers shares of AUM: SF, CB, Mort&Loan, %s
... the lifers' AUM share of SF increased during the GFC



Source: BofA Global Research

BofA GLOBAL RESEARCH

The recently initiated by EIOPA consultation gives some hope for a constructive (long-overdue) change in Solvency 2. In hope the European securitisation market lives another year... The initial signs are that such hope is badly misplaced.

CMBS

How volatile is CMBS pricing?

In this report we update an [earlier analysis](https://rsch.baml.com/r?q=c3WEJtD00sweFkjgt2kcnw) of pricing volatility of CMBS in the context of the capital charges for CMBS under the CRR and Solvency II frameworks. In this update we consider a longer time series and include comparisons of volatility in additional products.

Overall, we find the volatility of securitised notes has been similar to that of REITs and broader corporates over the past 25 years in Europe and the UK. Our findings also illustrate the need to review regulatory frameworks in light of the exceptional performance during the Covid pandemic.

Given our understanding that Solvency II capital charges are derived from the mark-to-market volatility of securities prices, rather than credit performance, we attempt in this report to quantify the volatility of European CMBS in a Solvency II context using data from ICE BofA bond indices.

Total returns

In order to quantify the volatility of European CMBS, we need to look at the total returns of the notes. Owing to the lack of pricing data for individual names, we indices of securitised bonds in Europe and the UK as a proxy. These were the *ICE BofA Euro Asset Backed & Mortgage Backed Securities Index* (Bloomberg ticker, EA00 <Index>), which is composed of 9 senior securitised bonds with ratings of A and BBB, and the *ICE BofA Sterling Asset Backed & Mortgage Backed Securities Index* (Bloomberg ticker, UA00 <Index>), which is composed of 145 CMBS, whole business and other securitised names whose credit ratings range from AAA to BBB-. The names are almost all senior ranking.

For comparison, we used the US CMBS index, *ICE BofA 0-10 Year AAA US Fixed Rate CMBS Index* (Bloomberg ticker, CB15 <Index>), which is composed of 1,584 names. We also used Corporate bond indices and REIT bond indices in Europe and the UK. The characteristics of the seven indices are summarised in the table below.

Exhibit 9: Characteristics of bond indices
Availability of CMBS pricing data is limited in Europe

Index	UK Securitised	UK REITs	UK Corporates	Europe Securitised	Europe REITs	Europe Corporates	US CMBS
Ticker	UA00	UIRE	URNF	EA00	EJRE	ENSO	CB15
	ICE BofA Sterling Asset Backed & Mortgage Backed Securities Index	ICE BofA Sterling Real Estate Index	ICE BofA Sterling Corporate Non-Financial Index	ICE BofA Euro Asset Backed & Mortgage Backed Securities Index	ICE BofA Euro Real Estate Index	ICE BofA Euro Senior Non-Financial Index	ICE BofA 0-10 Year AAA US Fixed Rate CMBS Index
Full Name							
Currency	GBP	GBP	GBP	EUR	EUR	EUR	USD
No. Constituents	145	180	606	9	340	2508	1584
Effective Duration	7.4	11.2	8.9	6.3	5.5	5.6	4.3

Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

For each of the seven indices, total returns are available going back to 1997. The following three charts illustrate the returns for (i) the UK names, (ii) the European ex-UK names, and (iii) the securitised names.

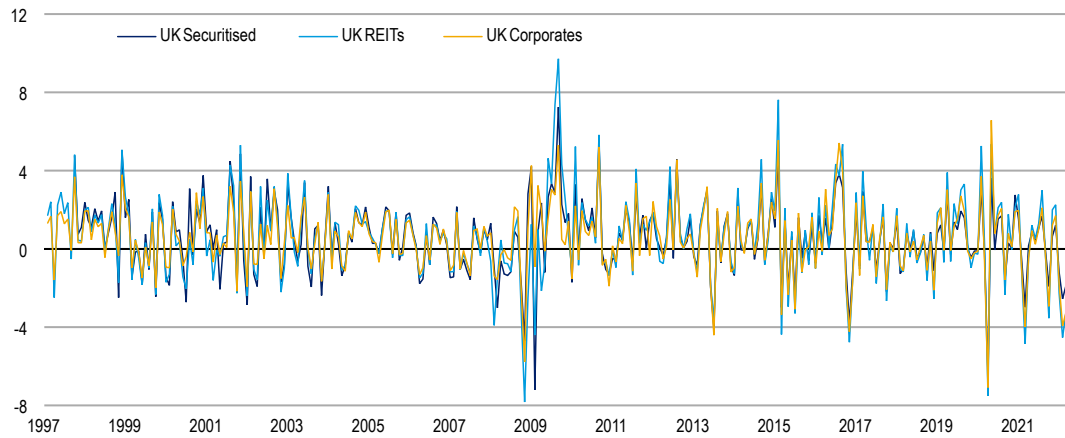
UK Total Returns

Among the Sterling bond indices, total returns over the 25 year period were most volatile among the REITs (UIRE), with a standard deviation of 2.23 compared to 1.87 for the securitised index (UA00) and 1.76 for Corporates (URNF).

The securitised bond returns had the lowest kurtosis at 1.54 compared to 1.87 for REITs and 1.97 for Corporates.

Exhibit 17: Monthly total returns of GBP bond indices, %

The Covid-19 pandemic was less volatile than the financial crisis



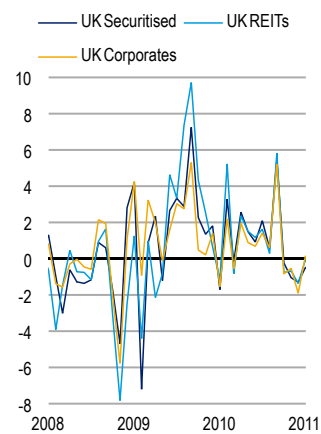
Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

UK bond returns were most volatile during the financial crisis in 2008 and 2009 when monthly returns whipsawed between -8% and 10%. The effect of the Covid pandemic was similar but briefer in 2020. At their most volatile, returns ranged from -7% to 7% within two successive months.

Exhibit 18: UK total returns during the GFC, %

Volatility was elevated for over a year

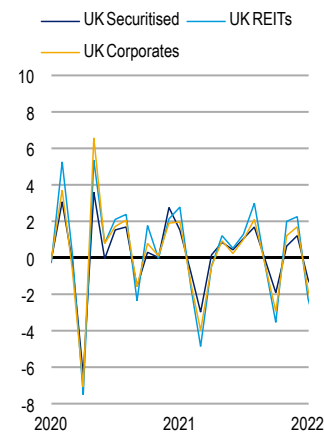


Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 19: UK total returns during Covid, %

Returns recovered sharply after just one month

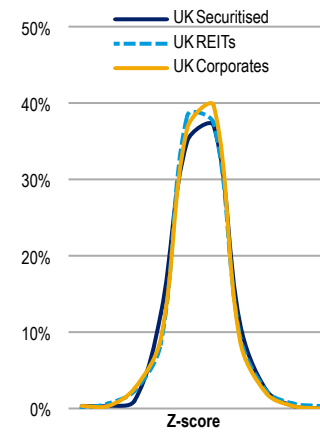


Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 20: GBP bond returns distributions

Securitised returns had lowest kurtosis



Source: Bloomberg, BofA Global Research

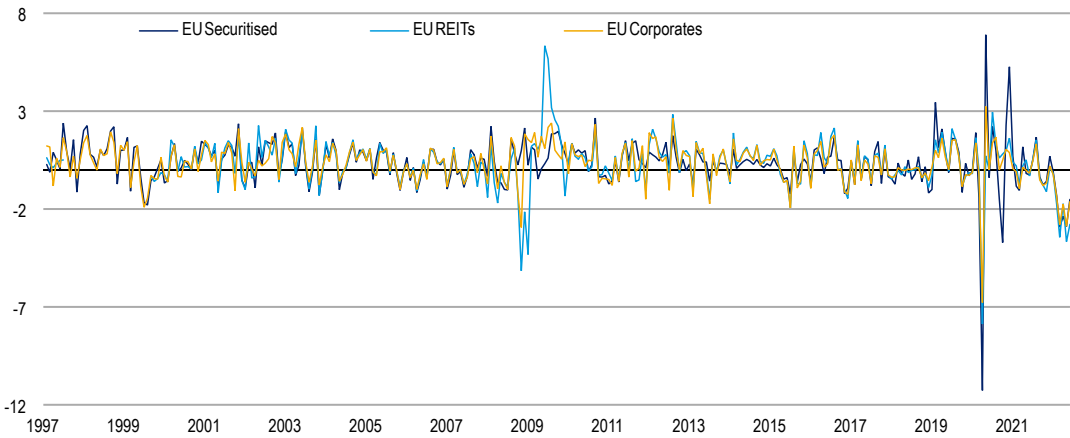
BofA GLOBAL RESEARCH

Europe Total Returns

Among the Euro bond indices, total returns over the 25 year period were again most volatile among the REITs (EJRE), with a standard deviation of 1.30 compared to 1.26 for the securitised index (EA00) and 1.02 for Corporates (ENS0). The securitised bond returns had the highest kurtosis at 25.59 compared to 9.15 for REITs and 7.55 for Corporates.

We caution, however, that the European Securitised index (EA00) comprises just nine names, compared to 145 in the UK Securitised index. As such, we think the European Securitised index may be less representative of European CMBS and the conclusions less robust. Ideally, this analysis could be repeated in the future using returns data for more individual CMBS names.

Exhibit 21: Monthly total returns of EUR bond indices, %
The Covid-19 pandemic was more volatile than the financial crisis

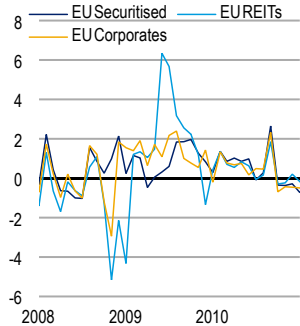


Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

European bond returns were most volatile during the Covid pandemic in March 2020 when monthly returns reached a low of -11.3%. This return was nine standard-deviations less than the mean, the most extreme result in our data set. In the same month, Corporate returns of -6.8% was seven standard-deviations below the mean.

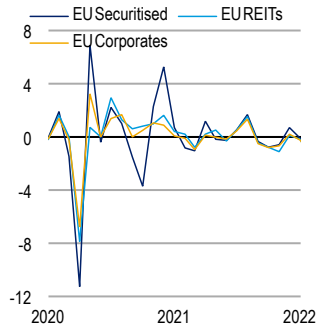
Exhibit 22: EUR total returns during the GFC, %
Securitized bonds were least volatile



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

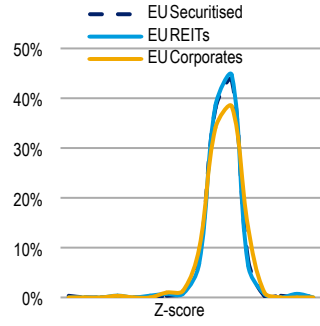
Exhibit 23: EUR total returns during Covid, %
A 9-Sigma move in March 2020



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 24: EUR bond returns distributions
Securitized index had highest kurtosis



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

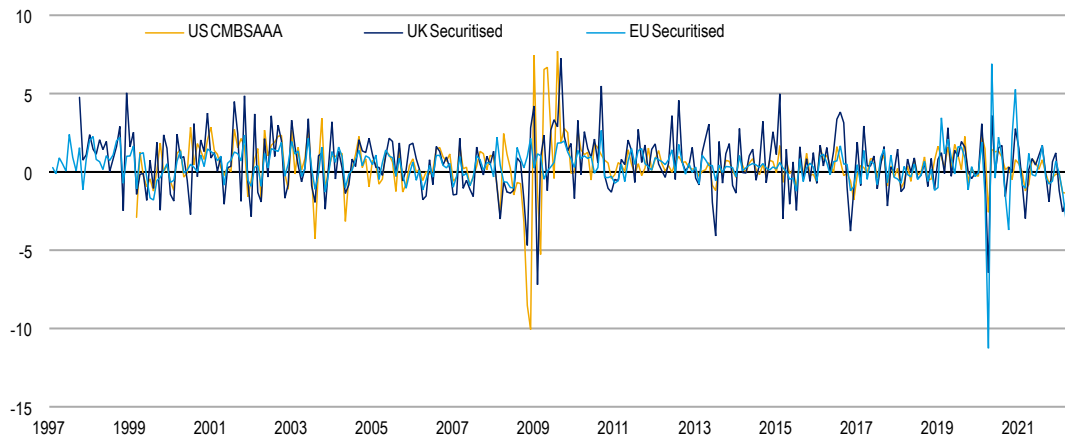
The extreme negative returns during the Covid pandemic were responsible for the high kurtosis of the European Securitised index at 25.6. Prior to March 2020 the European Securitised index had had a Kurtosis of 0.0 including the financial crisis period.

During the financial crisis, the European Securitised index was less volatile than European REITs and European Corporates, as illustrated above. Negative returns in particular were limited during the period

US CMBS

Over the past 25 years the volatility of triple A rated US CMBS has been in between the UK and European Securitised indices. The standard deviation of monthly returns has been 1.64 for US CMBS (CB15) compared to 1.26 for European Securitised (EA00) and 1.87 for UK Securitised (UA00). Likewise, the kurtosis of US CMBS has been 12.0 compared to 1.5 for UK Securitised and 25.6 for European Securitised

Exhibit 25: Monthly total returns of US CMBS, %
US CMBS was more volatile during the financial crisis

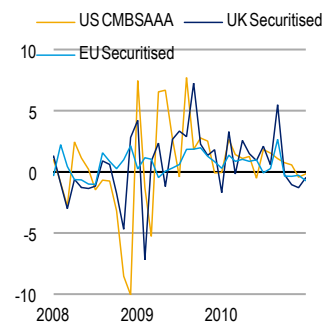


Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

US CMBS was more volatile during the financial crisis but less volatile during the Covid pandemic than securitised bonds in European and UK.

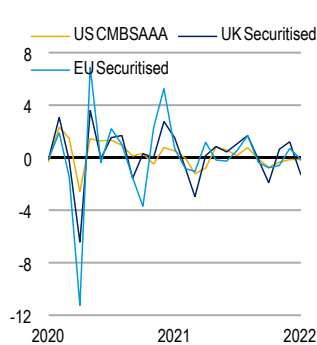
Exhibit 26: US CMBS returns 2008-10, %
Higher volatility in the US than Europe



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

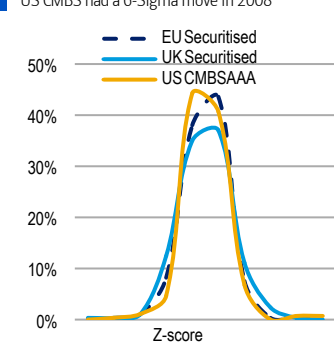
Exhibit 27: US CMBS returns 2020-21, %
Higher volatility in Europe than the US



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 28: Securitised returns distributions
US CMBS had a 6-Sigma move in 2008



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Conclusions

We find that the volatility of securitised notes has been similar to that of REITs and broader corporates over the past 25 years in Europe and the UK. The returns of securitised notes were less volatile, expressed as lower standard deviation, than REIT bonds but higher than corporates on average in both EUR and GBP denominations.

Likewise, the UK securitised notes were less prone to fat tails, expressed as lower kurtosis, than corporate and REIT bonds. European securitised notes exhibited a particularly high kurtosis and negative skew owing to a negative 9-sigma return during the Covid pandemic. Previously, the kurtosis had been 0.0 for the 23 years since 1997.

We think the pricing of the European securitised index may be less representative of the sector and could have been more sensitive to outliers owing to the small number (9) of constituents. By contrast, we think the results from UK securitised index may be more meaningful owing to the higher number (145) of constituents.

Despite the limited pricing data in Europe, the EUR and GBP securitised indices had similar results to the bigger and deeper US CMBS index. This consistency lifts our confidence in the robustness of the European and UK securitised results.

Volatility was higher during the Covid pandemic than the financial crisis in many cases including European corporate bonds, REITS and securitised bonds as well as UK corporate bonds. We think this illustrates the need to review regulatory frameworks in light of recent performance.



12 January 2018

The first week of the New Year was dominated by the street on the secondary market, while on the primary the pipeline began to bulge. Spreads were marked down on low trading volume and depleted inventories in need of replenishment. The second week of the year allowed for price discovery, with UK RMBS Finsbury Square 2018-1, UK auto ABS E-Carat 9 PLC and Dutch RMBS Storm 2018-1 all pricing in the primary, and the investor return to the secondary in BWICs or otherwise. More deals – especially UK RMBS, are added to the pipeline for SF bonds; we expect to see a rare 144A placement for UK RMBS – a harbinger of 2018 USD supply. Benchmark CB supply continues strong, banks front loading issuance for the year. Issuers, in our view, would be wise to front load their funding to lock in low cost funding, as we contend that a rally is underway in the beginning of the year, but we continue to see the market moving sideways and even in risk of retracing some of the early gains in the second half of the year, as ECB - together with the other major central banks, turns more hawkish.

EU SF supply scarcity will remain intact, though, as we see issuers, especially from the UK, tapping the USD RegS/144A market, thus creating both pricing tension and subtracting from already low local supply. EU investors are well advised to consider new geographies, with Australia's supply of €35bn in 2017 and likely higher in 2018 standing out among the investment options.

Commentary: Homogeneity is in the eye of the beholder

As we have argued in our recent commentaries on EU securitisations, a lot of work remains to be done to make the recently published EU securitisation regulatory framework implementable and supportive of market revival. Case in point is the EBA consultation on homogeneity. On the case of EU real life examples of prime RMBS and auto ABS, we highlight some of the uncertainties that need to be addressed to clear the way for an operational and irrevocable homogeneity assessment.

RMBS: Australian NC RMBS continue to perform in line with expectations

In 2017, average 30+ arrears were 1.6% higher than in 2016, while CPRs were down 1.8%. Significant tiering is in place, linked to exposures to risk factors, such as adverse credit and Low Doc loans

CMBS: Do securitised loans outperform balance sheet loans?

It appears they may. Since 2008, UK banks have written-off 10.0% of pre-crisis CRE loans vs 4.0% among pre-crisis conduit CMBS loans.

CLO: 2.0 collateral snapshot

Defaulted and distressed assets remain low in CLO 2.0 portfolios. Steadily tightening loan spreads may be taking some assets out of reach of CLO managers.

Structured Finance
Europe
ABS CMBS RMBS CB

Alexander Batchvarov, CFA
Int'l Str. Fin. Strategist
MLI (UK)
+44 20 7995 8649
alexander.batchvarov@baml.com

Rondeep Barua, CFA
Int'l CLO/ ABS Strategist
MLI (UK)
+44 20 7996 2360
rondeep.barua@baml.com

Altynay Davletova, CFA
Int'l MBS/ ABS Strategist
MLI (UK)
+44 20 7995 3968
altynay.davletova@baml.com

Mark Nichol
Int'l CMBS/ CRE Strategist
MLI (UK)
+44 20 7996 0965
mark.nichol@baml.com

[Common acronyms](#)

This document is intended for BofA Merrill Lynch institutional investors only. It may not be distributed to BofA Merrill Lynch Financial Advisors, retail clients or retail prospects. BofA Merrill Lynch does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision. Refer to important disclosures on page 43 to 44.

11829136

Timestamp: 12 January 2018 12:11PM EST

CMBS

Do securitised loans outperform balance sheet loans?

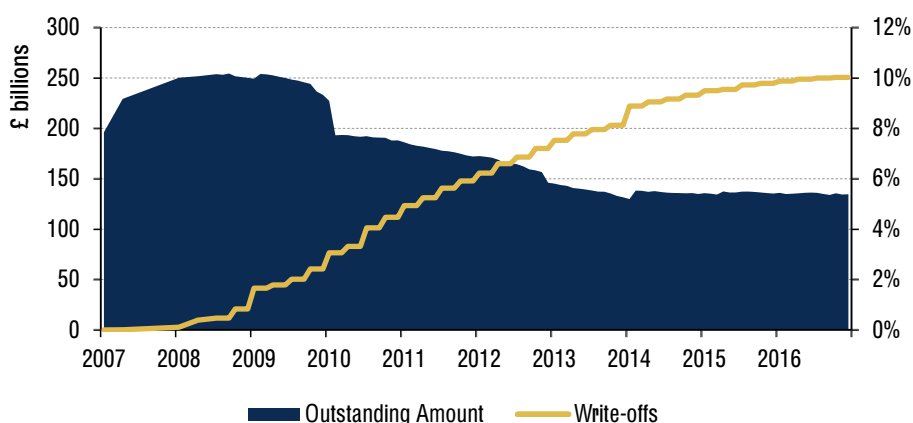
In this report we compare the losses experienced on securitised loans to those of loans that were not securitised. It is intended to complement recent publications in which we showed that losses and price volatility among securitised CRE loans compare favourably to other products, which is not reflected in the regulatory treatment of securitised CRE products.

To recap, at the AAA level CMBS losses amounted to just 0.26% of aggregate issuance from 1995 to 2017 (click [here](#)) and 1.4% for all investment grade issuance (AAA to BBB-). Annualised, we estimate this corresponds to a loss rate of roughly 0.05% pa and 0.28% pa respectively assuming an average weighted average life of five years. All observed losses occurred in conduit transactions. We are not aware of any losses ever having occurred in a CMBS issued by a corporate in the UK or Europe. In terms of MTM volatility, we found minimal difference between the volatility of securitised bonds and corporate bonds over a 20 year period, which does not justify the five-fold increase in regulatory capital required for the securitised bond over the corporate bond under Solvency II. The standard deviation of total returns over the period was 6.6 for a portfolio of 63 UK securitised bonds with an average effective duration of 8.2, compared to a slightly lower standard deviation of 5.2 for a portfolio of 548 UK corporate bonds with a slightly lower average effective duration of 7.5 (click [here](#)).

In this report, we compare the scale of write downs of CRE loans held by banks (ie loans that were not securitised) to those of CRE loans that were securitised. (Spoiler alert: the securitised loans performed better.) The bank loan data was produced by the Bank of England (BoE) and is publicly available online. The securitised loan data was produced by Trepp based on public disclosures.

By our calculations using the BoE data, write-offs by UK banks of pre-crisis CRE loans have reached 10.0% in aggregate of the £196bn that was outstanding at the end of 2007. Our calculations are consistent with the statement in the BoE's December 2015 Financial Stability Report (p32) that, "In aggregate, 9% of the UK banks' pre-crisis stock of CRE debt was written off between 2008 and 2014, while lenders with lower-quality underwriting standards typically had write-off rates above 20%." We estimate write-offs had reached 8.9% by the end of 2014, as shown in the following chart.

Chart 31: Aggregate write-offs by UK banks of pre-crisis CRE loans that were not securitised



Source: Bank of England, BofA Merrill Lynch Global Research

It is interesting to note the BoE's comment that some UK lenders suffered write-off rates exceeding 20%. The BoE only makes aggregate data publicly available so we do not have any information about these lenders or the affected loans, nor what constitutes "lower-quality underwriting standards". If a database for UK CRE loans is

ever built, as has been proposed, it may be possible in the future to perform this analysis on individual banks, which we think would be helpful for systemic transparency.

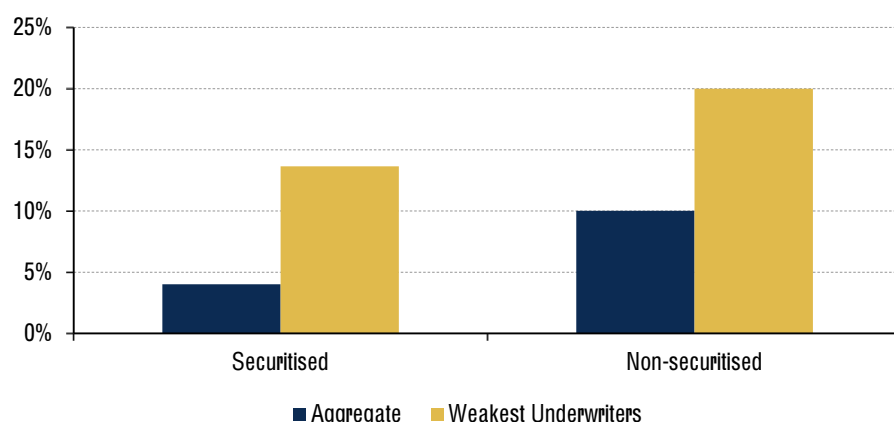
As we understand it, the BoE collects data from just those UK resident banks and building societies it supervises whereas UK loans made by foreign banks are not captured.

Securitised loans performed significantly better than the 9% write-off rate cited by the BoE for non-securitised loans, in our view. We think we have come reasonably close to making the comparison on a like-for-like basis using the different data sets.

Of the £14.3bn of CRE loans originated and sold via conduit securitisation by UK banks from 2000 to 2008, the subsequent write-offs, or principal losses, amounted to £572mn or 4.01% in aggregate. This is less than half the rate of write-offs suffered among the loans that were not securitised. Including the £18.9bn of securitised debt issued by UK corporates over the same period, none of which suffered impairment to our knowledge, the write-off rate decreases to 1.73% in aggregate

In our interpretation, this suggests that loan quality is the primary driver of loan performance, not whether the loan subsequently changed hands – in the capital markets via securitisation, the syndication market, or remained on the bank's balance sheet.

Chart 32: Write-off rates by UK banks of CRE loans in wake of the financial crisis



Source: BofA Merrill Lynch Global Research

Just as the BoE noted higher write-offs by lenders with lower-quality underwriting standards, there were broad differences in write-off rates among the UK banks that securitised. HBOS experienced the highest rate of principal losses subsequent to 2008, representing 13.7% of the £705mn of CRE loans they securitised, we estimate. RBS' aggregate write-offs totalled 5.0% on £5.8bn of securitised loans while Barclays' write-offs totalled 3.1% on £5.9bn of securitised loans, by our calculation. We are not aware of any loans from HSBC securitisations having suffered a loss.

Table 5: Aggregate write-off rates among CRE loans securitised by UK banks

UK Bank	Write-Off Rate
HBOS	13.7%
RBS	5.0%
Barclays	3.1%
HSBC	0.0%
Total	4.0%

Source: Trepp, BofA Merrill Lynch Global Research

Overall, we conclude the above analysis provides evidence that securitised CRE loans have outperformed CRE loans that banks held on balance sheets in the UK. We think it is reasonable that securitised loans should outperform non-securitised loans given the additional scrutiny from the rating agencies and the securitisation investors in addition

to the bank's own underwriting and credit committee. Also, the lender's obligation to retain 5% of the securitised loan(s) means it continues to be exposed to any loss and ensures alignment of interest with securitisation investors, in our view.

Disclosures

Important Disclosures

BofA Merrill Lynch Research Personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

BofA Merrill Lynch Global Credit Research analysts regularly interact with sales and trading desk personnel in connection with their research, including to ascertain pricing and liquidity in the fixed income markets.

Other Important Disclosures

Prices are indicative and for information purposes only. Except as otherwise stated in the report, for the purpose of any recommendation in relation to: (i) an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report; or (ii) a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including Bank of America Merrill Lynch trading desks.

The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

This report may refer to fixed income securities that may not be offered or sold in one or more states or jurisdictions. Readers of this report are advised that any discussion, recommendation or other mention of such securities is not a solicitation or offer to transact in such securities. Investors should contact their BofA Merrill Lynch representative or Merrill Lynch Financial Global Wealth Management financial advisor for information relating to fixed income securities.

Rule 144A securities may be offered or sold only to persons in the U.S. who are Qualified Institutional Buyers within the meaning of Rule 144A under the Securities Act of 1933, as amended. SECURITIES DISCUSSED HEREIN MAY BE RATED BELOW INVESTMENT GRADE AND SHOULD THEREFORE ONLY BE CONSIDERED FOR INCLUSION IN ACCOUNTS QUALIFIED FOR SPECULATIVE INVESTMENT.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.

The securities discussed in this report may be traded over-the-counter. Retail sales and/or distribution of this report may be made only in states where these securities are exempt from registration or have been qualified for sale.

Officers of MLPF&S or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

This report, and the securities discussed herein, may not be eligible for distribution or sale in all countries or to certain categories of investors.

Information relating to Affiliates of MLPF&S and Distribution of Affiliate Research Reports:

BofA Merrill Lynch includes Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") and its affiliates. Investors should contact their BofA Merrill Lynch representative or Merrill Lynch Global Wealth Management financial advisor if they have questions concerning this report. "BofA Merrill Lynch" and "Merrill Lynch" are each global brands for BofA Merrill Lynch Global Research.

MLPF&S distributes, or may in the future distribute, research reports of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSF); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Investment Industry Regulatory Organization of Canada; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; Merrill Lynch (Japan): Merrill Lynch Japan Securities Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; DSP Merrill Lynch (India): DSP Merrill Lynch Limited, regulated by the Securities and Exchange Board of India; Merrill Lynch (Indonesia): PT Merrill Lynch Sekuritas Indonesia, regulated by Otoritas Jasa Keuangan (OJK); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (Russia): OOO Merrill Lynch Securities, Moscow, regulated by the Central Bank of the Russian Federation; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Spain): Merrill Lynch Capital Markets Espana, S.A.S.V., regulated by Comisión Nacional del Mercado De Valores; Merrill Lynch (Brazil): Bank of America Merrill Lynch Banco Multiplo S.A., regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company, Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.

This research report: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK) and Bank of America Merrill Lynch International Limited, which are authorized by the FCA and regulated by the FCA and the PRA, and is distributed in the UK to retail clients (as defined in the rules of the FCA and the PRA) by Merrill Lynch International Bank Limited, London Branch, which is authorized by the Central Bank of Ireland and subject to limited regulation by the FCA and PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been considered and distributed in Japan by Merrill Lynch (Japan), a registered securities dealer under the Financial Instruments and Exchange Act in Japan; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSF; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by DSP Merrill Lynch (India); and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch International Bank Limited (Merchant Bank) (MLBLMB) and Merrill Lynch (Singapore) (Company Registration Nos F 06872E and 198602883D respectively). MLBLMB and Merrill Lynch (Singapore) are regulated by MAS. Bank of America N.A., Australian Branch (ARBN 064 874 531), AFS License 412901 (BANA Australia) and Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distribute this report in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of BANA Australia, neither MLEA nor any of its affiliates involved in preparing this research report is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this report in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Research reports prepared and issued by Merrill Lynch (DIFC) are done so in accordance with the requirements of the DFSA conduct of business rules. Bank of America Merrill Lynch International Limited, Frankfurt Branch (BAMLI Frankfurt) distributes this report in Germany and is regulated by BaFin.

This research report has been prepared and issued by MLPF&S and/or one or more of its non-US affiliates. MLPF&S is the distributor of this research report in the US and accepts full responsibility for research reports of its non-US affiliates distributed to MLPF&S clients in the US. Any US person receiving this research report and wishing to effect any transaction in any security discussed in the report should do so through MLPF&S and not such foreign affiliates.

General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Merrill Lynch.

This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Merrill Lynch clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment

objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Merrill Lynch, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

BofA Merrill Lynch is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

This report may contain a trading idea or recommendation which highlights a specific identified near-term catalyst or event impacting a security, issuer, industry sector or the market generally that presents a transaction opportunity, but does not have any impact on the analyst's particular "Overweight" or "Underweight" rating (which is based on a three month trade horizon). Trading ideas and recommendations may differ directionally from the analyst's rating on a security or issuer because they reflect the impact of a near-term catalyst or event.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned in this report. Investors in such securities and instruments effectively assume currency risk.

UK Readers: The protections provided by the U.K. regulatory regime, including the Financial Services Scheme, do not apply in general to business coordinated by BofA Merrill Lynch entities located outside of the United Kingdom. BofA Merrill Lynch Global Research policies relating to conflicts of interest are described at <http://go.bofa.com/coi>.

MLPF&S or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. MLPF&S or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Merrill Lynch, through business units other than BofA Merrill Lynch Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented in this report. Such ideas or recommendations reflect the different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Merrill Lynch is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this report.

In the event that the recipient received this information pursuant to a contract between the recipient and MLPF&S for the provision of research services for a separate fee, and in connection therewith MLPF&S may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom MLPF&S has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by MLPF&S). If such recipient uses the services of MLPF&S in connection with the sale or purchase of a security referred to herein, MLPF&S may act as principal for its own account or as agent for another person. MLPF&S is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

Copyright, User Agreement and other general information related to this report:

Copyright 2018 Bank of America Corporation. All rights reserved. This research report is prepared for the use of BofA Merrill Lynch clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Merrill Lynch. BofA Merrill Lynch Global Research reports are distributed simultaneously to internal and client websites and other portals by BofA Merrill Lynch and are not publicly-available materials. Any unauthorized use or disclosure is prohibited. Receipt and review of this research report constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained in this report (including any investment recommendations, estimates or price targets) without first obtaining express permission from an authorized officer of BofA Merrill Lynch.

Materials prepared by BofA Merrill Lynch Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Merrill Lynch, including investment banking personnel. BofA Merrill Lynch has established information barriers between BofA Merrill Lynch Global Research and certain business groups. As a result, BofA Merrill Lynch does not disclose certain client relationships with, or compensation received from, such issuers in research reports. To the extent this report discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this report. BofA Merrill Lynch Global Research personnel's knowledge of legal proceedings in which any BofA Merrill Lynch entity and/or its directors, officers and employees may be plaintiffs, issuers mentioned in this report is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Merrill Lynch in connection with the legal proceedings or matters relevant to such proceedings.

This report has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of MLPF&S, any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Merrill Lynch Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Merrill Lynch and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This report may contain links to third-party websites. BofA Merrill Lynch is not responsible for the content of any third-party website or any linked content contained in a third party website. Content contained on such third-party websites is not part of this report and is not incorporated by reference into this report. The inclusion of a link in this report does not imply any endorsement by or any affiliation with BofA Merrill Lynch. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Merrill Lynch is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of the report and are subject to change without notice. Prices also are subject to change without notice. BofA Merrill Lynch is under no obligation to update this report and BofA Merrill Lynch's ability to publish research on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Merrill Lynch will not update any fact, circumstance or opinion contained in this report.

Certain outstanding reports may contain discussions and/or investment opinions relating to securities, financial instruments and/or issuers that are no longer current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with MLPF&S or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Merrill Lynch nor any officer or employee of BofA Merrill Lynch accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this report or its contents.