FSB FINANCIAL STABILITY BOARD

Evaluation of the Effects of the G20 Financial Regulatory Reforms on Securitisation

Final report

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Executive summary

This report presents the results of the evaluation of the effects of the G20 financial regulatory reforms on securitisation implemented to date. The objectives are twofold: to assess the extent to which the securitisation reforms implemented to date have achieved their financial stability objectives; and to examine broader effects (positive or negative) of the reforms on the functioning and structure of the securitisation markets and on the financing of the real economy.

The evaluation has been streamlined compared to previous FSB evaluations to make the exercise more manageable, given the complexity of the topic and significant data limitations. It focuses, in terms of scope, on the collateralised debt/loan obligation (CDO/CLO) and the non-government-guaranteed part of the residential mortgage-backed securities (RMBS) markets; and in terms of reforms, on the International Organization of Securities Commissions (IOSCO) minimum retention recommendations and the Basel Committee on Banking Supervision (BCBS) revisions to prudential requirements for banks' securitisation-related exposures. The analysis concentrates mostly on FSB member jurisdictions with securitisation markets that are material from a global perspective and have adopted the relevant reforms. Other G20 or domestic reforms relating to securitised assets or issuers and investors in these markets – such as on disclosures, credit rating agencies and credit underwriting standards – are only reviewed qualitatively.

From a conceptual perspective, both the risk retention recommendations and prudential requirements aim to reduce misaligned incentives and moral hazard, thereby limiting systemic risk. In addition, both aim to promote sound securitisation markets. Because systemic risk and moral hazard are not directly observable, the evaluation examines the mechanisms through which the reforms are expected to operate and associated metrics to assess securitisation market resilience. These include the complexity and opaqueness of structures; credit enhancement; changes in the investor base; credit quality of underlying loans and credit performance; pricing of securitised assets; and the robustness of these markets during recent episodes of stress and in hypothetical scenario analyses.

The evaluation draws on a broad range of information sources and analytical approaches. These include responses to a survey by FSB member jurisdictions; input from stakeholders through public feedback on the consultation report and outreach events; review of the academic literature including dialogue with academics; and quantitative indicators and descriptive analysis on the effects of reforms using data from commercial data providers, FSB members and other sources. These sources taken together form the basis for the conclusions in the report.

The evaluation faced important analytical challenges. These include data limitations (e.g. in terms of comprehensive and globally consistent information on securitisation markets) and methodological issues (e.g. multiple reforms taking place concurrently, overlapping implementation periods, establishing suitable benchmarks, confounding factors and market-specific idiosyncrasies). These challenges suggest that caution is needed when interpreting the findings and attributing particular market outcomes to the effects of the reforms.

The securitisation market is the largest in absolute terms in the US and the EU. Other FSB member jurisdictions in which the securitisation market is sizeable – including in relation to private sector credit – are Australia, Brazil, Canada, China, India, Japan, Korea and the UK. Smaller markets exist in other FSB jurisdictions, which developed more recently in some cases.

Global securitisation volumes experienced a spike prior to the 2008 global financial crisis (GFC) but have declined since then in most jurisdictions. RMBS is the largest segment of the cash securitisation market globally, though the CLO market has been growing fast in the US and to some extent in Europe. Synthetic securitisation, used by banks for credit risk transfer and regulatory capital relief, has gained popularity in recent years especially in Europe and more recently in other jurisdictions.

In general, the available literature suggests that risk retention and higher prudential requirements have enhanced the resilience of securitisation markets. Complex structures that contributed to the GFC – including securitisations of subprime assets, CDOs and re-securitisations – have declined significantly, while the market is more transparent. The quality of collateral underlying securitisation deals appears to have improved in some asset classes (e.g. RMBS) though not in others (e.g. CLOs). However, it is difficult to attribute any of these outcomes directly to the reforms given the above confounding factors. Previous evaluations by the FSB and BCBS have also found gains in banking sector resilience from Basel III, though it is not straightforward to estimate the benefits stemming specifically from securitisation reforms since securitised assets only make up a small fraction of banks' balance sheets and of the total financing to the economy.

The BCBS revisions to prudential requirements allow the application of lower risk weights to certain types of banks' securitisation-related exposures that can be classified as simple, transparent and comparable (STC) securitisations, though implementation of this framework is subject to national discretion. Thirteen FSB jurisdictions recognise STC securitisations, while implementation varies in some cases. The growth of STC securitisations, where implemented, may have contributed to more transparent post-GFC structures and increased investors' ability to assess risks for homogenous asset classes where the minimum STC requirements can be fulfilled (e.g. RMBS). Market pricing for true sale STC transactions in the EU generally shows lower spreads compared to non-STC transactions, likely reflecting investor perception of lower risk and (in the case of banks and insurers) reduced capital requirements. On the other hand, some stakeholders have noted that the introduction of the STC category has not stimulated activity in the securitisation market, though this was not the explicit objective of the reforms.

The growth and credit performance of CLOs after the GFC have been strong, notwithstanding a loosening of credit underwriting standards in the leveraged loan market. CLOs issued after the GFC have higher levels of credit enhancement and subordination, which may act as a compensating factor to protect senior tranche holders from losses due to the lower collateral quality. Non-bank investors hold most of the mezzanine and junior tranches, while banks have shifted to the senior tranches since the GFC. Analyses carried out by authorities and market participants in recent years suggest increased resilience of the senior tranches of CLO structures despite the deterioration in lending standards. However, the extent to which these outcomes can be attributed to the reforms is less obvious given that structural improvements were largely market-driven; risk retention is only one of the factors considered by CLO investors for risk alignment; and CLO managers are able to actively manage their portfolio. Analyses of deals since a US court overturned the applicability of the risk retention rule to open-market CLOs in the US in 2018 yields mixed results on the impact of risk retention on pricing, though it suggests that it may be used as a signalling tool in times of stress; but risk retention appears to have limited effect on the riskiness of CLO portfolios at least during normal times. The behavioural constraints resulting from such requirements are likely to vary over the cycle and could be most pronounced during peaks of the credit cycle. Moreover, the practice of some CLO managers

financing their risk retention obligations using funds from third-party investors raises questions about the extent to which the objective of risk alignment is fulfilled (see below).

The literature generally finds that risk retention is effective in better aligning the incentives of originators and investors in the RMBS market. Credit performance in the European and US RMBS markets has been strong post-GFC, while average subordination levels are much lower compared to the overall securitisation market, reflecting the comparatively lower credit risk of the underlying loans. Stress testing exercises also highlight the resilience of this market, which has benefited from tighter underwriting standards for residential mortgages and increased use of macroprudential policies for housing market risks. A large portion of RMBS is retained by banks in some jurisdictions as collateral for accessing central bank financing facilities. Analysis conducted for the European RMBS market suggests improved pricing of risk and no evidence of an obvious misalignment of incentives between issuers and investors in recent years, though this may also be due to other reforms such as strengthened mortgage underwriting standards.

Some stakeholders have raised concerns around divergences in jurisdictional implementation and that certain reforms have increased costs for issuers and investors, thereby diminishing the appeal of securitisation as a financing tool. However, several of the cited reforms are jurisdiction-specific and not part of the G20 reform agenda. Available evidence does not suggest a significant negative impact on cross-border investments in securitisation since the reforms were introduced. While securitisation has diminished in relation to private sector credit since the GFC, the decline has not been uniform across all segments and much of the decline took place in the immediate aftermath of the GFC, before the reforms were implemented. Moreover, it is not clear that overall financing to the economy has been negatively affected if one considers growing corporate and household indebtedness and the growth in alternative financing instruments over this period (e.g. corporate bonds, covered bonds in Europe, agency MBS in the US and other countries).

The reforms appear to have contributed to a redistribution of risk from banks to the non-bank financial intermediation (NBFI) sector, with banks shifting towards higher-rated tranches leading to an overall decrease in their risk-weighted asset density. However, the shift to the NBFI sector is not unique to securitisation as various conjunctural factors and structural changes in the global financial system since the GFC have increased reliance on market-based intermediation. The redistribution of risk has been driven both by an increase in credit provision to households and firms by non-bank financial institutions (e.g. funds and finance companies), some of which is funded through securitisations; and also by the growth of non-bank investors in securitisations. Risk transfer for investors is more evident in the CLO than the RMBS market. The financial stability impact of the redistribution of risks from the banking to the NBFI sector is difficult to assess since it is unclear if the non-bank entities taking on the risks previously held by banks are well-placed to assume them given their funding structure and ability to withstand losses in stress events. The FSB developed a comprehensive work programme to enhance NBFI resilience, which aims to ensure a more stable provision of financing to the economy and reduce the need for extraordinary central bank interventions.

In conclusion, the analysis carried out by the evaluation suggests that the BCBS and IOSCO reforms have contributed to the resilience of the securitisation market without strong evidence of material negative side-effects on financing to the economy. However, the post-GFC securitisation market has not yet been tested through a full credit cycle to fully confirm the

evidence on enhanced resilience. This is particularly relevant for CLOs that have grown significantly in recent years but have not, as yet, experienced a prolonged downturn.

Consistent with the FSB's evaluation framework, this evaluation does not make policy recommendations but identifies certain issues for consideration by relevant national authorities and international bodies. These issues are:

- **Monitoring risks in securitisation markets**. These markets may require greater attention by financial stability authorities going forward given recent developments, such as the growth of synthetic risk transfer, the emergence of private credit in securitisation structures, the growth of non-bank investors and the credit deterioration of leveraged loans and commercial real estate. To facilitate risk monitoring, addressing some of the data limitations identified in the report may need to be considered.

- **Risk retention for CLOs.** The academic literature highlights the role of risk retention as a mechanism to align the interests of securitisation originators/sponsors with investors, a view supported by some of the analysis and by stakeholders who see it as a key post-GFC reform. However, some other stakeholders note that other structural features (e.g. fees, coverage tests, manager track record) and the ability to 'look-through' to the underlying loans and actively manage the portfolio have operated as more important mechanisms than risk retention in the CLO market in recent years. Some respondents also argue that managed CLOs should be considered third-party asset managers and therefore should not be subject to risk retention requirements. In a 2018 US court decision, risk retention requirements for open-market CLOs were overturned in the US. As a result of that court decision, a large part of the global CLO market does not operate under risk retention requirements (although voluntary risk retention is present to some degree) and there is a question about the risk implications for the 'originate-to-distribute' leveraged loan securitisation chain.

- **Third-party risk financing for CLOs**. The financing, in some cases, of CLO managers' retained risk by third-party investors raises questions about the extent to which the objective of risk alignment is fulfilled, especially if the vehicle does not belong to the same corporate group as the CLO manager. Views on this issue tend to differ across stakeholders, with some arguing that third-party capital structures do not dilute the impact of risk retention while others note that they may do so in certain cases. More clarity on the conditions for such a practice to ensure risk alignment may be useful.

- **Implementation of securitisation reforms**. There are a number of differences in implementation of the relevant reforms across FSB member jurisdictions. Examples include certain other aspects of the BCBS securitisation framework and the divergence of risk retention rules for CLOs between the EU and US. While the evaluation has not identified instances where these differences in implementation have had a material negative impact on cross-border investments and financing to the economy, it would be important for authorities to consider the implications of these differences and explore opportunities to adjust their frameworks where possible.

1. Introduction

1.1. Motivation and objectives

A key FSB task is to evaluate the effects of the G20 financial regulatory reforms. In the aftermath of the 2008 global financial crisis (GFC), the G20 launched a comprehensive programme of financial reforms to increase the resilience of the global financial system, while preserving its open and integrated structure. With the main elements of these reforms agreed and implementation underway, an analysis of the effects of these reforms is becoming possible. To that end, the FSB, in close collaboration with other standard-setting bodies (SSBs), and informed by work carried out by its members and other stakeholders, has developed a framework for the post-implementation evaluation of the effects of the G20 financial regulatory reforms (Framework).[1] The Framework guides the analyses of whether these reforms are achieving their intended outcomes and helps to identify any material unintended consequences that may have to be addressed, without compromising on the objectives of the reforms. A number of evaluations have already taken place under that Framework.[2]

The securitisation evaluation offers a timely opportunity to assess the impact of the relevant internationally agreed reforms in FSB member jurisdictions. One of the main areas of focus by the FSB, working with SSBs, has been to assess and address the risks from non-bank financial intermediation (NBFI), formerly referred to as shadow banking. This included the development in 2013 of policy recommendations, which were endorsed by the G20, to strengthen the oversight and regulation of NBFI, including with respect to securitisation.[3] The complex structuring and multi-step distribution chains involved in certain securitisation structures in the run-up to the GFC generated misaligned incentives between the originator of a securitisation and its investors and led to weakened lending standards, while amplifying a rapid and largely undetected build-up of leverage and maturity mismatches. A number of regulatory reforms have since been introduced to improve transparency, address conflicts of interest, strengthen the regulatory capital treatment for banks' securitisation exposures by improving risk sensitivity and reducing cliff effects, and align incentives associated with securitisation.

The objectives of the securitisation evaluation are twofold:

1. To assess the extent to which the G20 reforms on securitisation implemented to date have achieved their financial stability objectives. The evaluation assesses whether the reforms have addressed misaligned incentives that weakened lending standards in the credit origination process, as well as opaque and complex structures that prevented proper due diligence and led to the mispricing of risks by investors.

2. To examine broader effects (positive or negative) of the reforms on the functioning and structure of the securitisation markets and the implications for financing to the real

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1 See FSB (2017), *Framework for Post-Implementation Evaluation of the Effects of the G20 Financial Regulatory Reforms*, July.

2 See the FSB webpage on Assessing the Effects of Reforms for details.

3 See FSB (2013), *An Overview of Policy Recommendations for Shadow Banking*, August.

economy. This type of analysis will help identify any material unintended consequences that may have to be addressed, without compromising on the objectives of the reforms.

1.2. Scope and approach

The evaluation takes the form of a streamlined and targeted exercise that covers some of the most relevant securitisation market segments from a financial stability perspective. The streamlining seeks to make the exercise more manageable, given the complexity of the topic and significant data limitations. To this end, the evaluation focuses on:

- (in terms of reforms) The IOSCO minimum retention recommendations to address incentive problems and the BCBS revisions to prudential requirements for banks' securitisation-related exposures. It should be noted that analysis of BCBS reforms not yet implemented or of the appropriate specification and calibration of capital standards – in terms of the approaches, factors and risk weight formulae used – is beyond the scope of this evaluation. Other relevant reforms are covered in a qualitative manner.

- (in terms of market segments) Those segments of the securitisation market that are material from a global perspective; relevant in several FSB jurisdictions; and involve cross-border issuers or investors. These segments comprise the collateralised debt/loan obligation (CDO/CLO) market, given the linkages with leveraged loans; and the non-government-guaranteed part of the residential mortgage-backed securities (RMBS) market, given the linkages with the housing sector. This scope excludes other market segments (e.g. commercial MBS) that may be material in some jurisdictions.

The evaluation focuses mostly on those FSB member jurisdictions with securitisation markets that are material from a global perspective and that have adopted the relevant G20 reforms.[4] The analysis also seeks to include, where possible, cross-border and cross-sectoral effects from the implementation of these reforms. A working group drawn from FSB members has conducted the evaluation, supported by FSB Secretariat staff and research analysts from the Bank for International Settlements (BIS).

Government-guaranteed (or agency) MBS in the US and other jurisdictions (e.g. Canada and Japan) are not in the scope of this evaluation even though they constitute an important part of the RMBS segment. Such instruments carry an implicit or explicit government-backed credit guarantee and thus fall outside the securitisation definition used in prudential regulation. Moreover, the existence of government sponsored agencies providing such guarantees influences the depth and characteristics of securitisation markets, including standardisation of the underlying loans and market liquidity.[5] Where data are available and given the distinct nature of these securitisations, the remainder of this report describes trends and examines the effects of the reforms in the non-government guaranteed part of the MBS market.

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4 Unless otherwise specified, this report does not include data for Russia.

5 According to the Securities Industry and Financial Markets Association (SIFMA), agency MBS in recent years represented around 90% and 80% of total MBS outstanding in the US and Canada respectively, while in Japan the agency MBS market accounts for around one-third of total outstanding.

The evaluation used various information sources and analytical approaches to ensure that evidence on the effects of securitisation reforms is comprehensive. These included:

- responses to a stocktake survey by FSB member jurisdictions;
- feedback from external stakeholders through a call for public feedback in August 2023 and responses to the consultation report issued in July 2024,[6] as well as through a series of meetings with market participants including a public workshop;[7]
- a review of the relevant literature in this area, including dialogue with academics;[8] and
- quantitative indicators and descriptive and other analysis on the effects of reforms using data from commercial data providers, FSB member authorities and other sources.

Since the publication of the consultation report,[9] analytical updates have been carried out in four areas: impact of the BCBS reforms; non-agency RMBS market reforms; risk retention requirements and the CLO market; and other issues. Feedback from the consultation and other stakeholder outreach have also prompted some other changes between the consultation report and the final report, such as bringing out more clearly details on securitisation trends, relevant reforms and their implementation. The final report also includes a new Annex with market and regulatory developments in other FSB jurisdictions with material securitisation markets.

The starting point for the evaluation is to set out the reforms' original objectives and the primary issues that they intended to address. The evaluation then identifies possible indicators to assess progress against these objectives; establishes post-crisis trends based on such indicators and descriptive statistics; identifies transmission channels through which the reforms have operated; and examines the effects by conducting various types of analyses.

Data limitations and methodological questions presented important challenges in the evaluation. These challenges suggest that caution is needed when interpreting the findings of the various types of analyses. While none of the analytical approaches individually can offer conclusive evidence on their own, collectively they form the basis for the conclusions in the report.

1.3. Structure of the report

The rest of the report is structured as follows:

- Section 2 provides an overview of the securitisation value chain and summarises stylised facts about trends in securitisation markets across FSB member jurisdictions;

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6 See FSB (2023), FSB invites feedback on the effects of G20 financial regulatory reforms on securitisation, August; and FSB (2024), Public responses to consultation on Evaluation of the Effects of the G20 Financial Regulatory Reforms on Securitisation, September.

7 See Virtual public workshop on the evaluation of the effects of the G20 financial regulatory reforms on securitisation.

8 The literature review drew also on the findings of a session organised by the FSB in the Central Bank Research Association (CEBRA) Annual Meeting in July 2023 on the effects of financial reforms on securitisation markets. See *Call for papers: 2023 Annual Meeting of the Central Bank Research Association (CEBRA)* (15 February 2023).

9 See FSB (2024), *Evaluation of the Effects of the G20 Financial Regulatory Reforms on Securitisation: Consultation report*, July.

- Section 3 outlines the securitisation reforms and their implementation status, along with a conceptual framework that links reform objectives, transmission channels and effects;

- Section 4 presents the results of the analysis on the effects of the minimum retention and prudential reforms on the resilience of the non-agency RMBS and CDO/CLO market segments; and

- Section 5 describes findings on the broader effects of the reforms on financing to the economy and on financial system structure and resilience.

The report also includes annexes with additional information on securitisation reforms and their implementation (Annex 1); developments in other FSB jurisdictions with material securitisation markets (Annex 2); a literature review (Annex 3); additional analyses on securitisation markets (Annex 4); the composition of the evaluation working group (Annex 5); and a bibliography.

2. Overview of securitisation markets

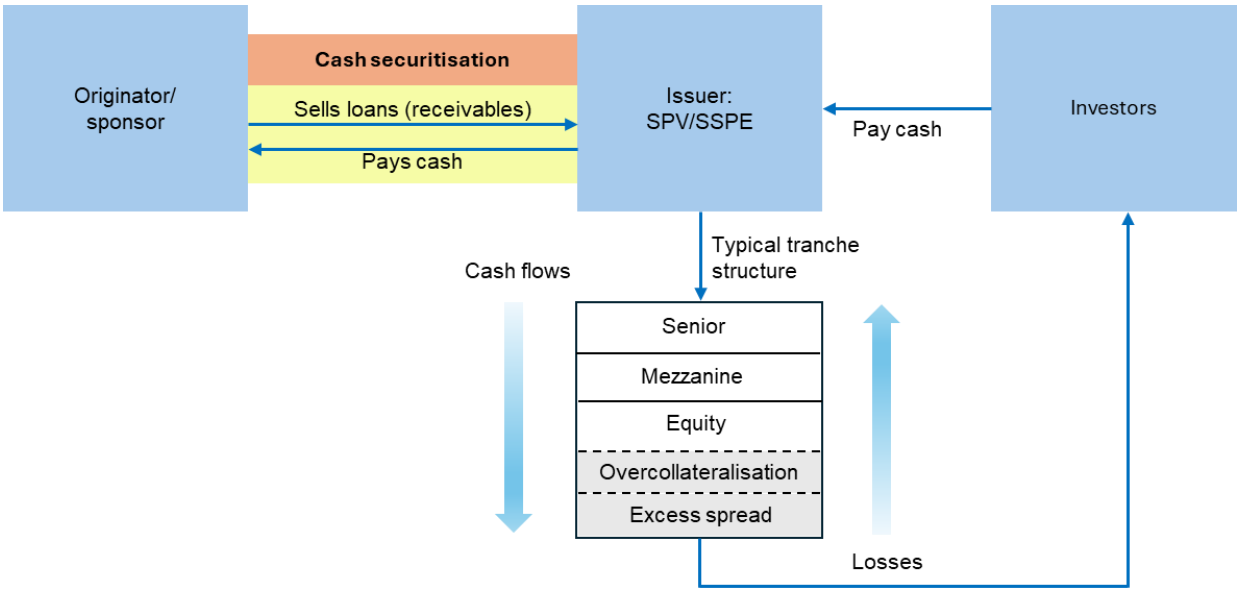
2.1. What is securitisation?

Securitisation is a structured finance tool that involves the actual (also known as cash or true-sale) or synthetic transfer of assets or risk exposure with the aim of achieving risk transfer or providing funding.[10] Various entities may take part in the securitisation process, with the most significant being originators, sponsors and investors. In a cash securitisation (see Graph 1), originators typically put together a pool of financial assets, such as loans or receivables, and then sell them to a special purpose vehicle (SPV).[11] To finance this purchase, the SPV creates tradable securities – allocated to several 'tranches' of different seniority – which are collateralised by this pool of assets that are then sold to investors. The SPV receives the cash flows (i.e. principal and interest) generated by the assets, which are redistributed to the investors based on the seniority of the tranches. Sponsors, often financial institutions, act as intermediaries by purchasing the assets from the originators (if they are different than the sponsor) and structuring the securities. Investors tend to be a broad range of financial institutions (e.g. banks, investment funds, insurance companies and pension funds) and non-financial corporations seeking specific risk-return profiles for their investment portfolios. In a synthetic (or on-balance sheet) securitisation, the assets are typically not sold but remain on the balance sheet of the originator. In these operations, credit risk related to the underlying exposures is transferred by means of a credit derivative contract or financial guarantees.

[10] For an overview of securitisation, see Fabozzi et al. (2006), *Introduction to Structured Finance*, John Wiley.

[11] SPV is also referred to as securitisation special purpose entity (SSPE).

Figure 1: A stylised cash securitisation process



There are differences in the definition of securitisation depending on regulations and market convention across jurisdictions. The BCBS definition of securitisation is a structure with at least two stratified credit risk positions (or tranches) with different levels of seniority,[12] though market practice (and vendor data) also includes structures where there is no credit tranching, such as in the case of pass-through agency MBS. In the EU, the definition relies on the tranching of credit risk of the exposure and includes both true-sale and synthetic securitisation. In the US, asset-backed securities (ABS) feature collateralisation by any type of self-liquidating financial asset where payments on the security depend primarily on cash flows of the underlying assets. In Japan, the securitisation definition also relies on tranching and stipulates that all or part of the credit risk of an underlying pool be transferred to one or more third parties. In Australia and Canada, the definition of securitisation requires at least two tranches of credit risk in a structure.

Banks participate in various parts of the securitisation chain and play a key role for the functioning of the market. As originators of loans and receivables, they engage in securitisation mainly for funding and/or risk transfer (which provides regulatory capital relief), while even in the case of an actual transfer to the SPV they often keep the servicing of the securitised assets. As sponsors, they warehouse loans and other receivables for third-party originators, underwrite securitisation deals, or provide liquidity facilities to cover temporary liquidity shortfall and sell securities to investors. As investors, banks purchase (typically highly rated) tranches for investment and risk management purposes. In their capacity as broker-dealers, they often have a market-making role, thereby exerting an important influence on market liquidity.

Depending on its use, securitisation can provide portfolio and funding diversification, regulatory capital relief, and liquidity provision, thereby contributing to the financing of the real economy. Securitisation converts certain illiquid assets into marketable securities with tranches of different credit risk and expands the universe of investible assets appealing to various types of investors due to the different risk-return characteristics of these tranches. This liquidity transformation

[12] See the BCBS Basel Framework, CRE40 – Securitisation: general provisions: Scope and definitions of transactions covered under the securitisation framework.

process enables trading, making securitisation a funding source for originators either by selling these securities or by retaining them to pledge as collateral when seeking financing. Securitisation is often a key funding tool for NBFI entities, e.g. mortgage, credit card and non-bank auto lenders. In addition, securitisations can be a means of credit risk transfer from the originators of the assets to investors, which provides capital relief and enhances the lending capacity of the originator (see Box 1). Overall, more diversified funding sources, greater capital management options and better risk allocation provided by securitisation can contribute to risk diversification and support the availability and cost of financing to the economy.

Box 1: Capital relief in securitisation

Significant risk transfer (SRT) is a key reason for bank securitisation issuance. For an originating bank to achieve capital relief, the risk transfer to third parties from a securitisation must be deemed significant by the supervisory authority. If the risk transfer is insufficient, the supervisory authority will deny capital relief. The Basel framework allows jurisdictional flexibility in implementation of SRT. Common examples of jurisdictional specificity include the requirement for supervisory approval and quantitative tests.

Once SRT is achieved, the bank no longer requires regulatory capital for the risks of the underlying portfolio but instead only against the risks of the retained tranches. This provides capital relief because the capital requirement for the retained tranches can be significantly lower than those for the underlying portfolio if the riskier tranches have been sold to investors. In the case of traditional securitisation, the underlying exposures are sold to a bankruptcy remote financial vehicle, while in the case of synthetic securitisation the underlying exposures are kept on banks' balance sheets and their credit risk is transferred through financial guarantees or credit derivatives. Virtually all synthetic transactions are used for capital relief, while some true-sale transactions also achieve SRT if a sufficiently large amount of higher-risk tranches is transferred to third-party investors.

SRT transactions are mostly used by larger and more sophisticated banks. A literature review on synthetic capital relief trades (SCRT) for Europe finds that larger banks are more likely to use these transactions, although the total capital ratio has no significant impact on whether a bank would use SCRT or not.[13] Furthermore, banks which are more profitable and with more non-performing loans (NPLs) are less likely to use SCRT. The study also shows that SCRT have ex-post no effect on total capital ratios, implying that banks invest in assets containing similar risks.

SRT is more prevalent in Europe than in the US. One study estimates that in 2022 around 55% of securitisation transactions issued by larger euro area banks were aimed at capital relief, of which most were synthetic transactions.[14] Around 84% of underlying asset classes used for SRT transactions were corporate and small and medium-sized enterprise (SME) loans, as well as project finance loans. Risk transfer trades via securitisation are more limited in the US, mainly because US banks can achieve capital relief by selling mortgages to government sponsored enterprises that in turn securitise them and guarantee their credit performance (so-called agency securitisations, as described in section 1.2 with trends in this segment in section 2.2 below) and due to the supervisory requirements to achieve SRT. Credit linked notes (CLNs) have been issued increasingly in the US by banks as a form of synthetic securitisation. The recognition of credit risk transfer for a reference portfolio via synthetic securitisation requires satisfaction of a number of operational criteria set by the US authorities.

13 See Klein et al. (2023), Credit securitisation as sustainable finance channel? – evidence from synthetic capital relief trades, *University Münster Working Paper*.

14 See González and Triandafil (2023), The European significant risk transfer securitisation market, *ESRB Occasional Paper Series* No. 23, European Systemic Risk Board (ESRB). Data exclude the UK.

2.2. Trends in securitisation markets

Comparable cross-country data on the size of the global securitisation market are not readily available. There have been significant improvements in regulatory reporting and public disclosures of securitisation markets since the GFC (though some of these requirements differ across jurisdictions), while vendor data from various providers are not comprehensive or consistent across FSB jurisdictions.[15] Data on investors, especially non-bank financial entities such as various fund types, are typically not available through public sources. This limitation also applies to loan-level data for the underlying assets, which are publicly accessible only for a few FSB member jurisdictions.[16] Information on privately placed securitisations is generally not available, although stakeholder feedback suggests that it plays a major role in some jurisdictions, adding up to half of funding needs for all NBFI sectors.[17]

Securitisation market size and structure differ widely across jurisdictions (see Table 1). In particular, the securitisation market is largest in absolute terms in the US and the EU. Other FSB member jurisdictions in which the securitisation market is sizeable – including in relation to private sector credit – are Australia, Brazil, Canada, China, India, Japan, Korea and the UK. Smaller markets can be found in Argentina, Mexico, Singapore and South Africa; in some of these jurisdictions the market has only developed recently, and granular data are not readily available, which limits the ability to analyse post-implementation effects of the reforms. No material securitisation market exists in Hong Kong, Indonesia, Saudi Arabia, Switzerland and Türkiye. The rest of this section focuses on salient trends for the largest securitisation markets based on data availability, while Annex 2 presents developments in some FSB jurisdictions (other than the EU, UK and US) with material securitisation markets.

15 These include, for example, Bloomberg, Dealogic, European Data Warehouse (EDW), Intex, JPMorgan Chase, Pitchbook LCD and the main global credit rating agencies.

16 In the EU and the UK, the two authorised securitisation repositories are the EDW GmbH and the SecRep B.V. Their role is to centrally collect and maintain the records of privately and publicly traded securitisation instruments and underlying assets.

17 Instead of issuing a full-fledged securitisation deal and marketing the deal to a broad range of investors, some non-bank lenders create bespoke credit-tranched deals that are privately placed with a small number of counterparties. Those deals may or may not have credit ratings and are often not captured by market data vendors.

Table 1: Key characteristics of securitisation markets in FSB member jurisdictions

Jurisdiction	Non-government guaranteed true sale securitisation				Government-guaranteed securitisation (outstanding in USD)[1]	Synthetic securitisation (outstanding in USD)[1]	STC securitisation (outstanding in USD)[1]
	Outstanding in USD[1]	% of private sector credit	Main asset classes	Main investor types			
Argentina	540 mn	0.5%	Collection rights (~65%), consumer credits (~22%), money (~9%), shares (~3%), treasury contributions, land and credits (~1%)	Mutual funds, insurance companies, other institutional investors	274 mn	No	No
Australia	98 bn	3.5%	RMBS[2] (~ 80% of total issuance), followed by auto loans and equipment, personal loans, business receivables, and small commercial property.	Banks (~half of all outstanding), foreign investors, asset-backed vehicles, real money investors	N/A	No (not eligible for SRT)	No
Brazil	167 bn	9%	Agribusiness credit receivables (14%), real estate receivables (23%), credit rights (62%)	N/A	No	Yes (significant but N/A)	No
Canada	78 bn (includes private placements)	1.8%	Term ABS (44%), asset-backed commercial paper (ABCP) (46%), private placements (10%) Credit cards (38%), auto loans (25%), residential mortgages (19%), home equity lines of credit (6%), commercial mortgages (4%)	N/A	363 bn	Yes	Yes
China	332 bn	0.9%	Personal auto loans, micro and small enterprise loans, consumer loans and non-performing loans	Banks (~70% of all outstanding)	N/A	No (prohibited)	Yes (except for ABCP)
EU	1.07 trn	3.8%	RMBS (~42%), other ABS (~31%), CLOs (~20%) and CMBS (~1%) Around 70% of RMBS and ABS are retained by banks.	Banks (84%), investment funds and MMFs (7%), insurance companies (5%)	~20 bn (NPL securitisations)	Yes (estimated at ~331 bn)	Yes (~40% of current issuances)

Hong Kong	Nascent market, mostly private and typical participants are sophisticated institutional investors. Asset classes include mortgages, personal and consumer loan receivables, credit card receivables, and trade receivables located in Hong Kong, mainland China and East Asia						No
India	32 bn (15 bn non-NPLs and 17 bn NPLs)[3]	1.5%	Non-NPLs: Vehicle loans (70%), micro-finance loans (6–8%), mortgages (6–8%), other loans including personal and business loans (14–18%) NPLs: Corporate loans (~82%), personal loans including mortgages (~14%), and loans to micro, small and medium-sized enterprises (MSMEs) (~4%)	Non-NPLs: Banks (70%), non-banking financial companies (8–10%), other investors (20–22%) NPLs: Banks and non-banking financial companies (60%), other investors (40%)	0.45 bn (NPLs only)	No (prohibited)	Yes (only for non-NPLs)
Indonesia	No	No	No	No	1.5 bn	No	No
Japan	229 bn	3%	RMBS (50%), lease and consumer credit ABS (18%), CLOs/CDOs (12%), CMBS (9%) and other types of collaterals	Depository institutions, insurance companies, special purpose companies and trusts, non-financial corporations	103 bn	Yes (but small)	Yes (but small)
Korea	41 bn (12 bn public, 29 bn private)	1.1%	MBS is most prevalent, followed by ABS backed by accounts receivables and loans	Asset managers	137 bn (129 bn public, 8 bn private)	No	No
Mexico	13 bn	1.7%	ABS (88%)[4] MBS by non-banks (12%)	Pension funds (~33%), private and government treasuries (~25%), and local banks (~20%)	52 bn[5]	No	No
Saudi Arabia	Nascent market, expected to launch sometime in the next couple of years with RMBS						Yes
Singapore	6.9 bn	0.8%	ABS	N/A	No	Yes (N/A)	Yes (N/A)

South Africa[6]	2 bn	0.8%	Mortgage advances (43%), instalment sale credit and leasing finance (14%), other loans and advances (44%)	Banks	No	No	Yes
Switzerland	1.6 bn	0.07%	Domestic credit cards (41%), auto leases (59%)	Banks (retained), institutional investors and funds	No	Yes (1.1 bn)	No
Türkiye	253 mn	0.1%	Consumer loans, commercial receivables	Investment banks and mutual funds	No	No	No
UK[7]	Public market: 232 bn (private market: annual issuance of 157 bn for 2019–23)	5.1%	Public market: RMBS[2] (63%), CMBS (12%), credit cards (10%), auto loans (7%), student loans (3%) and other types of collateral Private market issuance: ABCP (30%), RMBS (25%), auto ABS (10%)	N/A	N/A	Yes (estimated at ~54 bn)	Yes (69 bn public. Private issuance annually of 7 bn between 2019–2023)
US	3.4 trn	8%	RMBS (25%), CMBS (20%), ABS (23%), CLOs (24%), ABCP (8%)	RMBS: Asset managers. CMBS: Insurers, asset managers. ABS: Asset managers. CLOs: Banks, asset managers.	10.7 trn	Yes (but small)	No

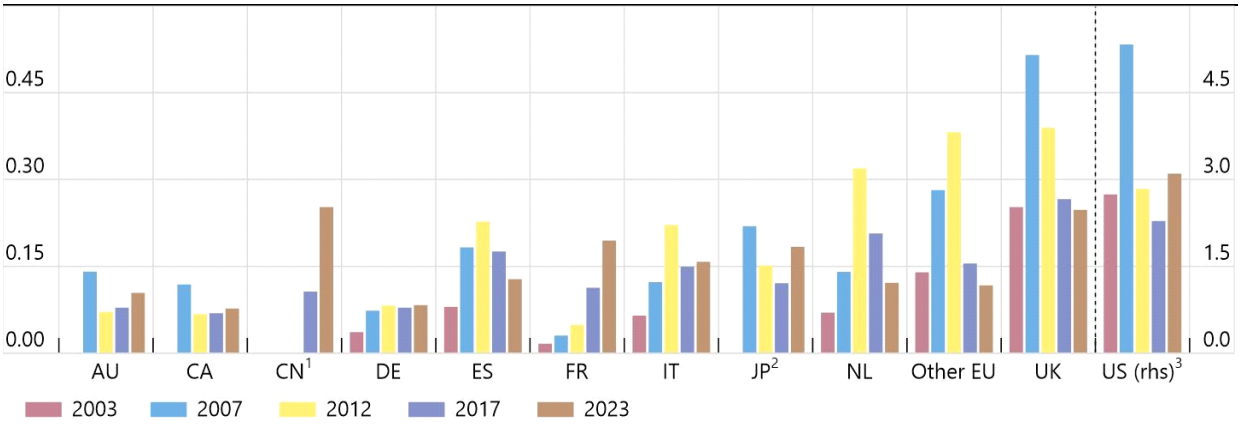
N/A = Not available. Unless otherwise noted, non-agency securitisation figures refer solely to public true-sale deals. [1] Outstanding market size as of end-2022 or latest available. [2] A large proportion of RMBS is retained by banks. [3] There is a separate legal framework for securitisation of NPLs through asset reconstruction companies (ARCs). Securitisation, for this purpose, is defined as acquisition of financial assets by an ARC from an originator by issue of securities (called 'security receipts'), representing undivided interest in such financial assets or otherwise. [4] Includes securitised road tolls and account receivables like airplane tickets, leasing and local government loans. [5] Includes securitisations made by government agencies (Infonavit, Fovissste and Infonacot) responsible for providing credit to workers, quasi-sovereign entities (Fonadin, Capufe, Farac), public owned companies (Pemex and CFE) and local government securitisations. [6] Includes only data from banks. Information on non-banks is not available. [7] CLOs not included in the figures but shown in the EU row as it is a pan-European market (UK leveraged loan collateral is ~16% of European CLO market).

Sources: AFME; BIS credit statistics; Bloomberg; Datastream; JPMorgan Italian NPL ABS Performance Tracker; Morningstar DBRS; Pitchbook LCD; SIFMA; jurisdictions' responses; FSB calculations.

Global outstanding non-agency cash securitisation volumes experienced a spike prior to the GFC but have declined since then in most cases (see Graph 2). The sharp fall in new securitisation issuances in the aftermath of the GFC was particularly concentrated around riskier underlying loans (in particular, non-prime RMBS), more complex structures (such as CDO-squared), and jurisdictions with the most active securitisation markets during pre-GFC times (see section 4.1). Outstanding cash securitisations in the EU peaked at around the time of the Eurozone sovereign debt crisis in 2010–11 and have declined since then in some markets (e.g. Italy, the Netherlands, Spain). Securitisation began to grow again for some jurisdictions in recent years (e.g. Australia, China, France), sometimes reaching higher levels than pre-GFC times.

Cash securitisation outstanding volumes by jurisdiction*

In USD trillions **Graph 1**



* Does not include CDO/CLO data. Includes privately placed securitisations only if the data are based on flow of funds information. Data for DE, ES, FR, IT, NL, Other EU, UK and US are by country of collateral. [1] Data start in 2015. [2] Does not include agency RMBS and is based on flow of funds data. [3] Does not include agency MBS. The 2023 value is an estimation.

Sources: AFME; Australian Bureau of Statistics; Business Development Bank of Canada; People's Bank of China; Bank of Japan; SIFMA; Datastream; DBRS Morningstar; FSB calculations.

RMBS represents the largest segment of the cash securitisation market globally (see Graph 3). US non-agency RMBS market outstanding amounted to around USD 840 billion as of end-2021.[18] Following a freeze in issuance in mid-2007 associated with the collapse of subprime lending, that market has rebounded but remains well below pre-crisis levels. In Europe the RMBS market consists of separate residential mortgage exposures in individual jurisdictions. The major European RMBS markets are in France, Ireland, Italy, the Netherlands, Portugal, Spain, and the UK, with the largest markets (the UK and the Netherlands) experiencing a significant drop of the non-prime segment that has not picked up again.[19] The RMBS market represented around 40% of total outstanding securitisation amounts in Europe in 2022. The Australian and Japanese securitisation markets are also dominated by the RMBS segment. Banks in Australia, the Euro area and UK retain a large proportion of RMBS securitisations to use as collateral to access liquidity from their central banks (see Annex 4).

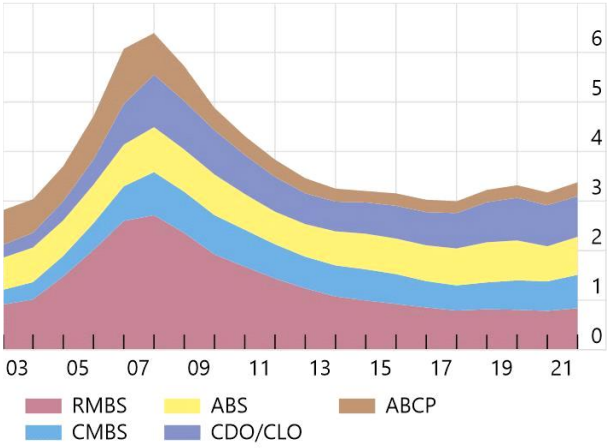
18 SIFMA (2025), *US MBS Securities: Issuance, Trading Volume, Outstanding*, January. Note publication of more recent data for this market is under review by the data provider.

19 See Bank of America (2020), Europe 2020–2021: Another year of two halves.

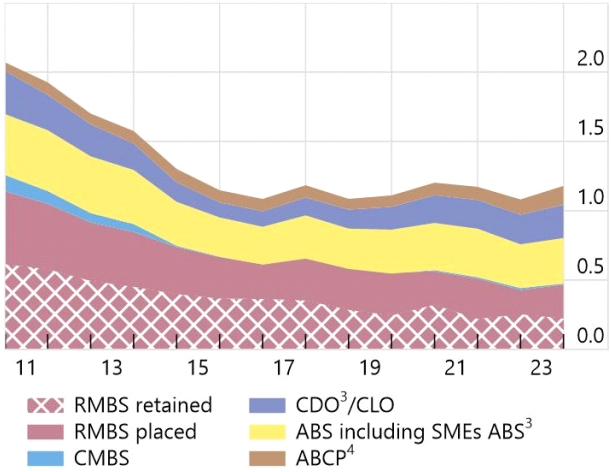
Cash securitisation outstanding volumes by segment and jurisdiction*

In USD trillions **Graph 2**

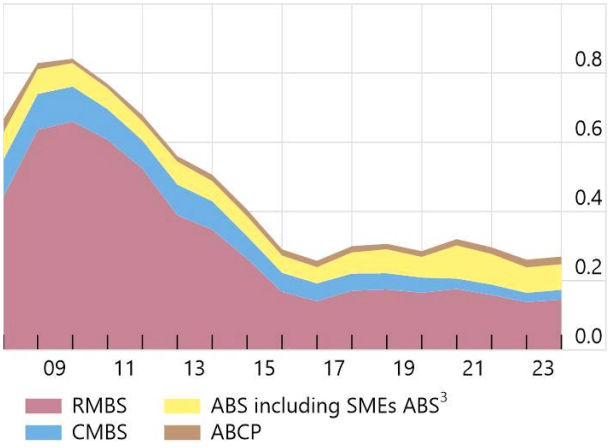
United States[1]



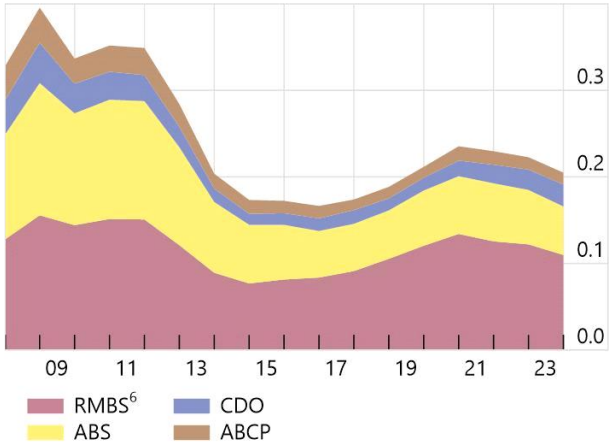
Europe[2]



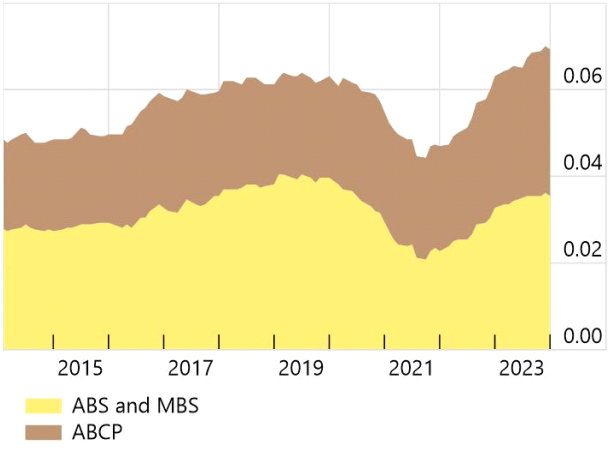
United Kingdom[5]



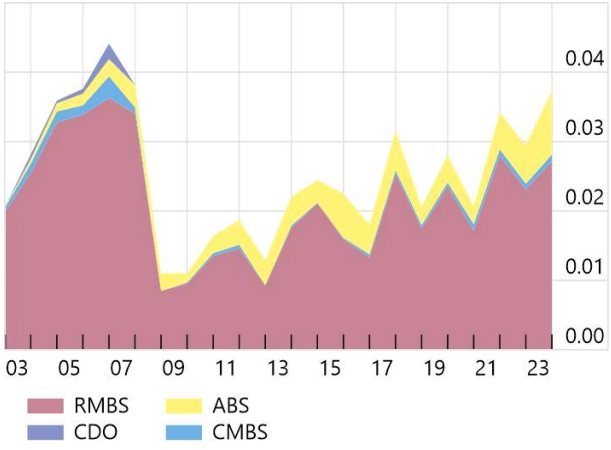
Japan



Canada



Australia[7] (issuances)



* Data for Europe, UK and US are by country of collateral. [1] Does not include agency securitisation and panel ends in 2021 based on data available from the SIFMA MBS database. [2] EU member jurisdictions and Switzerland. CDO/CLO data include the UK, since they are only available by currency and not jurisdiction. "RMBS retained" refers to the portion of RMBS securitisations that banks retain on their balance sheets rather than place it in the market; from 2015 onwards the outstanding amount is estimated from flow data. [3] The values for 2007 and 2008 are based on estimations. [4] Observations up to 2017 are based on estimates. [5] Time-series data on retained bank securitisations are not available. [6] Does not include agency RMBS. [7] Does not include RMBS securitisation exposures retained by banks to use as collateral to access liquidity from the central bank. Time-series data on retained bank RMBS securitisations are not available.

Sources: AFME; Bank of Japan; Bloomberg; KangaNews; Morningstar DBRS; Pitchbook LCD; SIFMA; FSB calculations.

The CMBS, ABCP and ABS market segments globally are much smaller in size than RMBS. The non-agency CMBS market for the US and UK stood at USD 703 billion outstanding in 2021, nearly all of which was in the US. Non-agency CMBS accounts for around 20% of US securitisation.[20] At USD 36 billion outstanding in 2023, CMBS accounts for only 2.5% of outstanding securitisations in Europe and is mainly concentrated in the UK. In China, 6% of securitisation involves CMBS, much smaller than the RMBS share of 27%.[21] ABS accounts for the third-largest share (23%) of the US non-agency securitisation market and reached USD 766 billion outstanding in 2021,[22] with auto loans, student loans, credit card receivables, and equipment financing as the main sub-categories.[23] Although the COVID-19 pandemic negatively impacted the ABS market,[24] the outstanding amount of ABS in the US and Europe has been increasing since 2014/2015. ABCP programmes, in particular in the US, also declined in the aftermath of the GFC but have broadly stabilised since around 2015. They constitute the smallest share across all cash securitisation segments, with the exception of Canada.

The CLO market has been a fast-growing segment mainly in the US but also in Europe (see Graph 4), while the CDO market segment has shrunk significantly since the GFC. CDOs and CLOs differ from simple securitisation structures in that the collateral is often actively managed.[25] CDOs are collateralised by a pool of fixed-income assets, such as corporate bonds, RMBS or CMBS tranches, and by credit default swaps or guarantees if they are synthetic. These complex structures have been largely eliminated in the EU/UK after the GFC (see section 4.2). Conversely, CLOs are similar in structure to CDOs but the underlying pool of assets comprises leveraged loans. The CLO market has grown quickly since the GFC and is currently of similar size in the US as the non-agency RMBS market, whereas in Europe it represents a relatively smaller share (20%, USD 240 bn of outstanding amount in 2023) of the securitisation market.[26] CLOs purchase primarily leveraged (typically single-B) loans, mainly used for leveraged buy-outs, mergers and acquisitions, recapitalisation or refinancing of debt due to their attractive spreads (see section 4.2). The growth in CLOs has been underpinned by the growth in the leveraged loan market, estimated to be around 4.8 trillion as at end 2023 of which around 60% were institutional leveraged loans.[27] CLOs are the main investors in the institutional leveraged loan market; in 2022, 75% of the leveraged loans in Europe were held by CLOs, while in the US this share amounted to around 64%.[28]

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20 AFME (2022), op. cit.

21 Climate Bonds Initiative (2020), *China green securitisation report: State of the market 2020*.

22 AFME (2022), op. cit.

23 Vinod Kothari Consultants (2022), *Global securitisation markets in 2021: a robust year for structured finance*.

24 See Caviness et al. (2022), The term asset-backed securities loan facility, Federal Reserve Bank of New York, *Economic Policy Review* 28, No. 1.

25 The collateral pools of most securitisations typically consist of financial assets that are illiquid and are therefore not actively traded but are instead passively managed. By contrast, CLO collateral pools consist of leveraged loans for which there is a reasonably liquid market. Most, though not all, CLOs are therefore actively managed in a manner akin to active bond funds.

26 See FSB (2019), *Vulnerabilities associated with leveraged loans and collateralised loan obligations*, December.

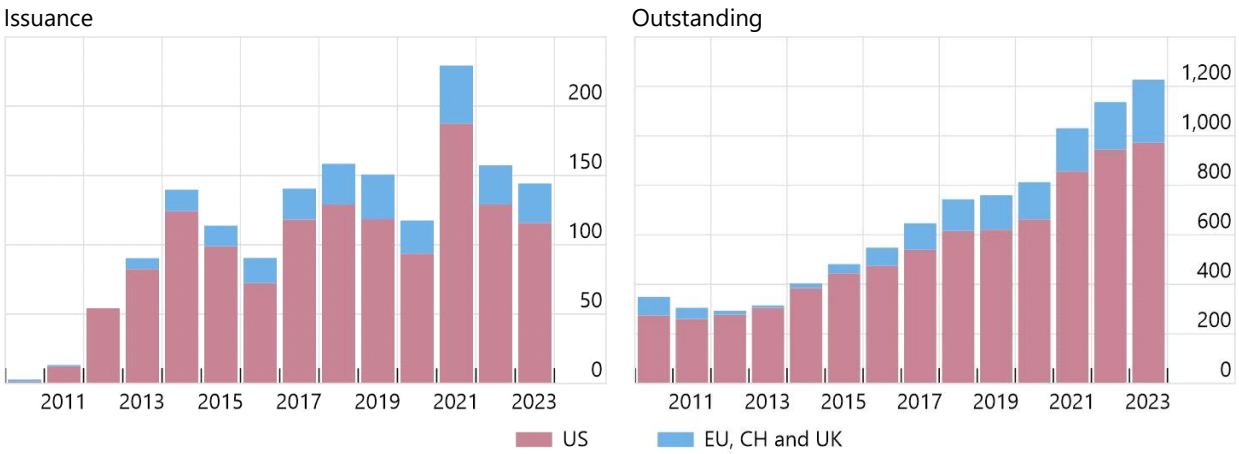
27 There is no commonly agreed definition of leveraged loans, which can lead to different estimates of the size of the market. Criteria used by regulators and data providers to classify a loan as leveraged typically include high indebtedness of the borrowing corporate, below investment grade credit rating for the loan, the loan being used to finance an acquisition or leveraged buy-out, presence of a private equity sponsor in the transaction, or high loan spread at issuance. The European Central Bank and the Bank of England have published definitions of leveraged transactions for regulatory or supervisory purposes, while in the US the 2013 Interagency Guidance on Leveraged Lending sets forth expectations that financial institutions include criteria (or parameters) for defining leveraged loans in their policies, providing examples that are commonly used. For the leveraged loan market size estimate here, see Bloomberg and Bank of England (2023), December 2023 Financial Stability Report.

28 See for Europe, ESRB (2023), *EU Non-bank Financial Intermediation Risk Monitor*. See for US, Pitchbook LCD (2023).

Banks are key investors in the global CLO market. The major EU banks had exposures to CLOs of approximately EUR 20 billion in 2023, which included some warehousing exposures (typically around 15%-25% of the total). The US banks held approximately USD 80 billion of CLOs as of Q2 2020, increasing since 2014 generally in line with their overall size (see Annex 4).

Global CLOs

USD bn **Graph 3**

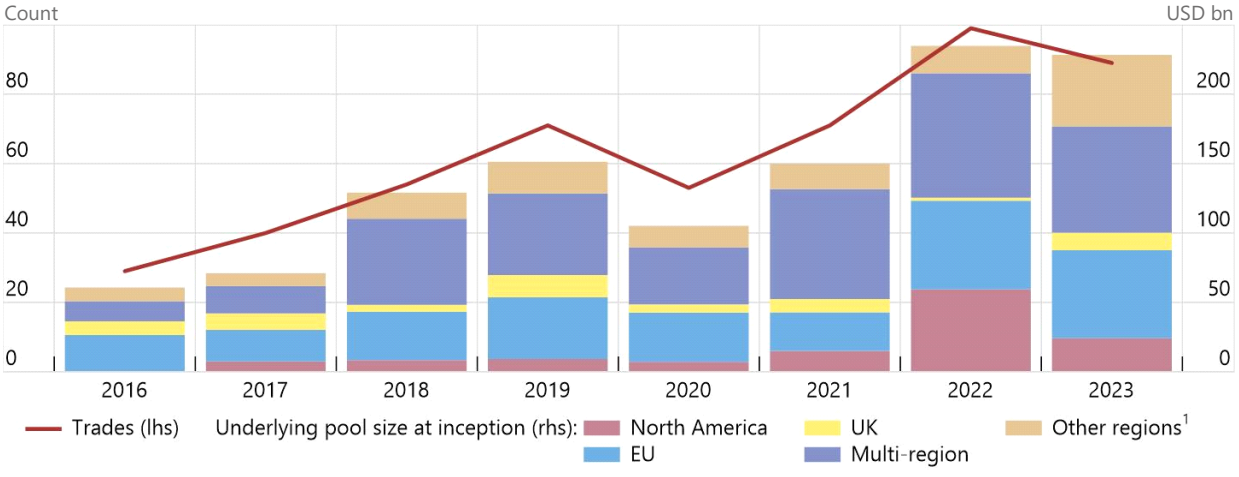


Sources: AFME; Bloomberg; Pitchbook LCD; FSB calculations.

Synthetic securitisations used mainly for capital relief purposes have gained popularity in recent years (see Graph 5).[29] While dominated by European collateral in the past with around two-thirds of the assets (see Box 1), the market is now opening to borrowers domiciled in the US, Canada and other jurisdictions, although in these cases its significance is substantially lower than that of the cash securitisation market. The main underlying asset class for synthetic securitisation is corporate loans, of which a small proportion comprises SME loans.

Synthetic securitisation outstanding amount by domicile of the underlying borrowers

Graph 4



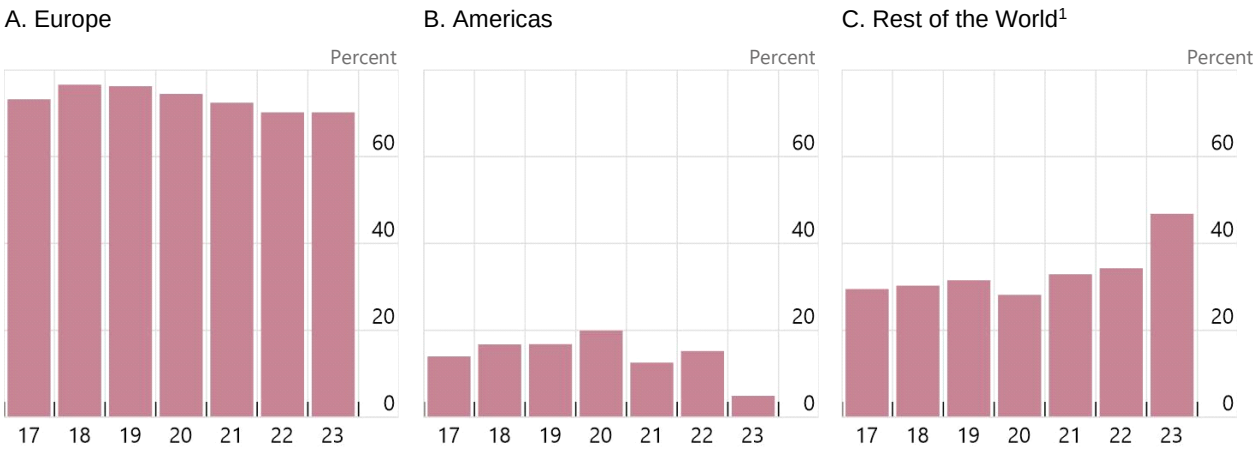
[1] Includes non-EU jurisdictions, South/Latin America, and Asia.

Sources: IACPM Synthetic securitisation market volume survey 2023; FSB calculations.

[29] See IACPM (2023), *Synthetic securitisation market volume 2016–2022*; and EBA (2020), *Report on STS framework for synthetic securitisation under Article 45 of Regulation (EU) 2017/2402*, May.

The role of banks, particularly global systemically important banks (G-SIBs), in the securitisation process appears to differ across regions (see Graph 6). Since the GFC, much of banks' cash securitisation holdings in Europe relate to their role as originator or sponsor and a large proportion is retained and used to access central bank financing facilities. By contrast, banks in the Americas and the rest of the world mainly invest in third-party securitisations, although there are some jurisdictions (such as Australia)[30] where banks also retain most of the issued securitisations. The dominance of banks in the securitisation market has decreased over the last decade, with the share of securitisation issued by non-bank lenders increasing (see section 5.2).

Share of banks' securitisation holdings when bank is originator or sponsor* **Graph 5**



* Sample covers "group 1" banks which are defined as internationally active banks that have Tier 1 capital of more than EUR 3 billion, and include all institutions that have been designated as G-SIBs. 1 This mostly reflects AU, CN, and JP as the largest other markets.

Sources: BCBS Securitisation dashboard; FSB calculations.

3. Securitisation reforms

3.1. Securitisation and the global financial crisis

Vulnerabilities in the securitisation market contributed to the amplification of losses during the GFC. In the years leading up to the crisis, the market grew rapidly – partly in response to ample liquidity and a credit boom in the US – but structures became increasingly complex and opaque, driven by the misalignment of incentives by market participants. These problems were exacerbated by low capital requirements for banks, overreliance on faulty CRA ratings, poor disclosures of the underlying exposures, and weak accounting and prudential standards that allowed banks to transfer many of their securitisation exposures off-balance sheet and thereby minimise the capital required to hold these risks. These practices were exposed during the crisis, contributing to significant bank losses and a freeze in short-term funding markets. Box 2 summarises the key failings exposed in the securitisation market during the GFC.

30 In addition to public securitisations sold to investors, Australian banks create and retain self-securitisations to be offered as collateral to the Reserve Bank of Australia. These self-securitisations are not sold to investors or traded on any public market.

Box 2: The role of securitisation in the GFC[31]

The securitisation market, particularly in the US, experienced rapid growth in the early 2000s, peaking in 2006. MBS, CDO and complex CDO-squared comprised the main types of issuances. However, the collapse of the US housing market in 2007 exposed vulnerabilities built up in the preceding years.

The underlying intermediation chain gave rise to a misalignment of incentives for market participants involved. By adopting an originate-to-distribute business model, bank and non-bank lenders began originating loans for the purpose of fee maximisation from securitising them. Limited risk retention practices also weakened lenders' incentives to screen asset quality. Together, these factors led to lenders putting more emphasis on volume over quality and apply loose credit underwriting standards. In parallel, investors at the other end of the chain relied extensively on credit rating agency (CRA) ratings. Some of this reliance was driven by the creation of more complex structures such as CDO-squared. The underlying pool of assets of many CDOs had been the mezzanine and junior tranches of RMBS deals, which in many cases were backed by subprime residential loans. The lower- rated CDO tranches were then repackaged into a new securitisation product (CDO-squared). This led to opaque structures with the true risk difficult to assess. The losses from the underlying RMBS collateral were severe enough to overwhelm the structural protections of CDOs and CDO-squared and produced defaults across the CDO tranches, including the AAA-rated tranche.

CRAs faced conflicts of interest that were not adequately mitigated. Their "issuer pays" business model led to a dependency on fees from originators and a desire to avoid losing business to competitors. There was also a significant underestimation of the correlation risk within CDOs and overestimation of the credit quality of the underlying subprime loans. As a result, many of the AAA-rated tranches linked to sub-prime mortgages faced rating downgrades as the crisis started to unfold.

The combination of generous yield, low capital requirements and inadequate assessment of the relevant risks (in part due to undue reliance on faulty credit ratings) further incentivised banks to boost short-term profits by electing to keep tranches and investing in other originators' securities.[32] This led to a concentration in the banking sector where at the peak in 2006, banks comprised around 51% of financial institutions' exposure to the subprime market. Banks also had indirect exposures through their support to ABCP conduits and structured investment vehicles (SIVs)[33] into which the risks had been transferred. Limited disclosure and weak accounting standards enabled this support to be kept off-balance sheet and stay hidden from investors in those financial institutions. In addition, these conduits and SIVs relied extensively on short-term funding markets that froze during the GFC.

Rising interest rates and a decline in US housing prices led to unexpectedly high number of borrower defaults, whose impact quickly spread across the financial system. Securities backed by mortgages became illiquid and saw their value and credit ratings drop significantly. This contributed to the drying up of short-term funding markets and to significant losses at banks and other market participants.

3.2. Relevant reforms and their implementation status

A range of reforms were introduced in the aftermath of the GFC to address the weaknesses identified in the securitisation market and its participants. The reforms introduced by the BCBS

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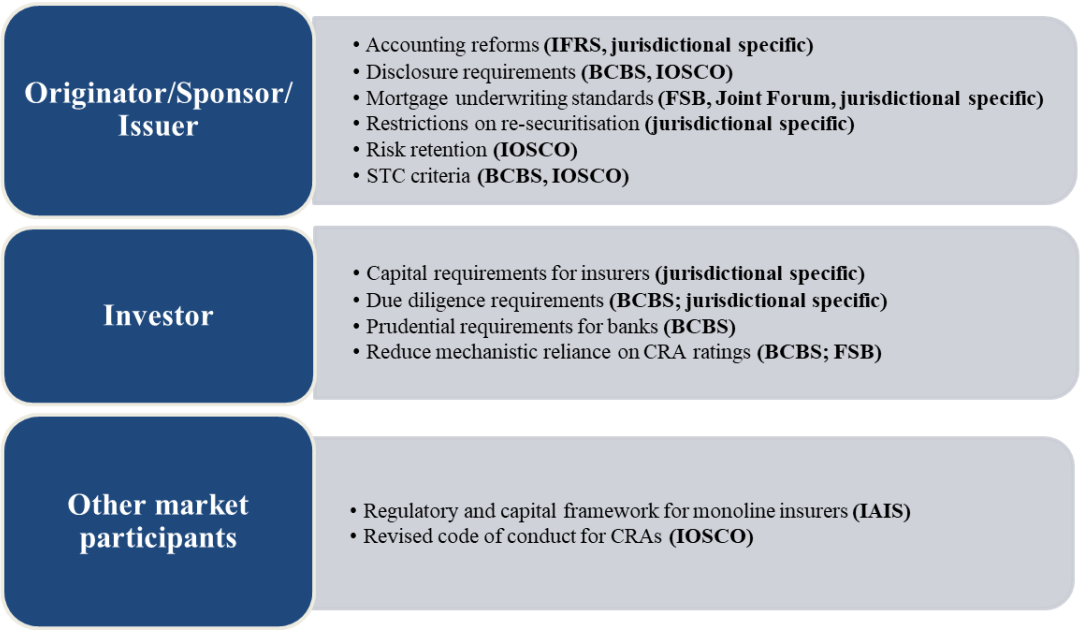
31 Based on FSB, 2017 FSB assessment of shadow banking reforms; 2009 IMF GFSR chapter 2 on restarting securitisation markets; Box 2.1 of the 2014 IMF GFSR chapter 2 on shadow banking; Box 4 of 2014 BoE-ECB paper on improving securitisation in the EU; and Box 3 of the 2022 ESRB report.

32 In the run up to the GFC, securitisation issuers began to heavily retain or purchase shares of a deal, while at the same time those positions had little or no capital backing. See the Financial Crisis Inquiry Commission (2011), The financial crisis inquiry report, p. 134.

33 A form of SPV that borrows short-term by issuing commercial paper to invest in long-term assets such as MBS.

and IOSCO were among the most substantive, though there were also a number of other G20 and domestic reforms relating to the assets being securitised or the issuers and investors in these markets. Graph 7 provides a visual depiction of how these reforms were directed at addressing weaknesses in different parts of the securitisation market. The remainder of this sub-section provides a summary of these reforms and their implementation status, while Annex 1 includes more details.

Figure 2: Overview of selected securitisation reforms



3.2.1. BCBS securitisation reforms

The securitisation framework was one of the areas of focus by the Basel Committee in the wake of the GFC. Prior to the GFC, Basel II established the risk-based capital framework for banks' securitisation exposures. Under the Basel II approach, the capital requirement for securitisation exposures was capped at the level that would apply to the underlying assets if they were not securitised and were held directly by the bank. The GFC revealed various shortcomings in the Basel II approach that were subsequently addressed by a series of reforms. The main reforms are summarised below and outlined in more detail in Annex 1.

- As a first step following the GFC, the BCBS modified the Basel II framework in July 2009 to address the higher risk posed by re-securitisation exposures; the larger drawdown risk on liquidity facilities; and inadequate due diligence by banks.

- In December 2010, the BCBS published the first set of Basel III revisions. These revisions resulted in a substantial recalibration of the capital framework for all exposures (including securitisation exposures) through the introduction of capital buffers and a more robust definition of capital. The December 2010 publication also introduced certain operational requirements requiring banks to perform their own internal assessments of the external credit ratings applied to securitisation exposures.

- In December 2014, the BCBS published its most fundamental securitisation reforms. In addition to better aligning capital with risk, these reforms introduced a new hierarchy of

approaches to simplify the framework and avoid a mechanistic reliance on external ratings. The reforms also included a capital non-neutral approach. Capital "non-neutrality" refers to the fact that under the Basel III reforms the total capital required for a securitisation (i.e. the sum of the capital required for all securitisation tranches) is greater than the amount of capital required for the underlying assets. This non-neutrality was introduced to address structural risks such as model and agency risks.

- In July 2016 the BCBS updated the securitisation standard to specify a preferential capital treatment for STC securitisations. This capital treatment built on the 2015 STC criteria published by the BCBS and IOSCO. In May 2018 an additional update was published to specify a preferential capital treatment for short-term STC securitisations.[34]

- Finally, in November 2020 the BCBS published an amendment to the securitisation standard to set out a capital treatment for securitisations of non-performing loans.

Thus, there are several Basel reforms to consider when evaluating the post-GFC securitisation market. The cumulative changes are set out in the consolidated Basel Framework and have been in effect since January 2023.[35] Components of the final phase of Basel III framework that have not been implemented, such as the output floor, are not in scope for this evaluation.[36]

The revisions to the Basel securitisation capital standard involved various prudential objectives. The main objectives were to address shortcomings in the framework revealed in the GFC by reducing mechanistic reliance on external ratings, increasing risk weights for highly-rated securitisation exposures, reducing risk weights for low-rated senior securitisation exposures, reducing cliff effects, and enhancing the risk sensitivity of the framework. While the capital requirements were significantly increased, maximum risk weights for senior tranches based on a "look-through" approach were introduced. The look-through approach promotes consistency with the credit risk of the underlying pool of exposures and does not disincentivise securitisations of low credit risk exposures. Additional risk factors (like tranche maturity and thickness)[37] and due diligence requirements aimed to help limit reliance on external ratings, address cliff effects,[38] and improve risk sensitivity.

The objective of the STC criteria was to support sustainable securitisation markets by helping investors evaluate risks in securitisations and compare transactions. Broadly, the STC criteria relate to matters such as the: relative homogeneity of underlying assets with simple characteristics and a structure that is not overly complex (simplicity); provision of information on the underlying assets; structure of the transaction and the parties involved in the transaction (transparency); and comparability across similar securitisation products within an asset class (comparability). The homogeneity condition generally prevents combining different asset types of underlying exposures in a single STC securitisation. The BCBS has noted that compliance

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34 See BCBS and IOSCO (2015), *Criteria for identifying simple, transparent and comparable securitisations*, July; and BCBS (2018), *Criteria for identifying simple, transparent and comparable short-term securitisations*, May, and BCBS (2016), *Revisions to the securitisation framework*, July.

35 See The Basel Framework, in particular chapters CRE40 to CRE45.

36 For the latest status on members' implementation of these reforms, see FSB (2024), *Promoting Global Financial Stability: 2024 FSB Annual Report*, November.

37 Tranche thickness is defined as the amount of losses the tranche can absorb before fully depleted.

38 Cliff effect describes the case of small changes in input parameters leading to jumps in risk weights.

with the STC criteria should *inter alia* mitigate or eliminate complexity and opaqueness of the transactions and provide additional confidence in their expected performance.[39] The lower capital requirements applied to STC securitisations, combined with the generally lower underlying credit risk of the assets that back them, results in risk weights for banks' STC exposures that are approximately half the risk weights for non-STC securitisation exposures.[40]

The Basel III framework also includes a number of other requirements that impact banks' incentives to engage in securitisation as originators, sponsors, or investors (see Annex 1). These requirements include bank consolidation rules for off-balance sheet entities; management of step-in risk; and the treatment of securitised assets in the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR). As far as the latter issue is concerned, the LCR recognises senior tranches of RMBS securitisations as HQLA at level 2B subject to a number of conditions, where it would be subject to a 25% haircut (and to the general limit of level 2B assets at 15% of the total HQLA stock). The eligibility conditions include the issuer being subject to risk retention regulations and the underlying quality of mortgages being of sufficient quality (maximum loan-to-value (LTV) of 80% on average at issuance).[41] For the NSFR, qualifying RMBS may receive a more favourable Required Stable Funding ratio.[42]

Securitisation exposures in the trading book under Basel III are restricted to only the standardised approach to market risk. The standardised approach to market risk was calibrated to the banking book treatment to reduce the potential discrepancy in capital requirements for similar risk exposures across the banking and trading books. These requirements may also affect banks' willingness to participate in securitisations.

3.2.2. Implementation status and jurisdictional differences

The large majority of FSB member jurisdictions have implemented the BCBS securitisation reforms, though there are some divergences in key jurisdictions. The initial Basel III risk-based capital reforms were implemented within a year of the due date (January 2013) by all member jurisdictions mostly consistently, as confirmed by the BCBS Regulatory Consistency Assessment Programme (RCAP) reviews.[43] Moreover, the US implementation, effective in 2014, eliminated the use of external ratings and introduced a simplified supervisory formula approach similar to the approach used in the revised Basel III securitisation framework, setting generally higher capital requirements than Basel II.[44] Most jurisdictions also implemented the subsequent revised securitisation framework by the due date of January 2018 (see Graph 8),[45] and all but two (Türkiye and US) had done so by the end of 2023. The US published draft rules for the revised framework in 2023, but the 2014 securitisation requirements are still in effect which are

39 In the EU, Solvency II also allows preferential capital treatment for insurance companies investing in STC securitisations.

40 See BCBS Securitisation dashboard for comparison of observed STC and non-STC risk weights.

41 See the consolidated Basel Framework, LCR30, for further details.

42 See the consolidated Basel Framework, NSF30, for further details.

43 The initial risk-based capital RCAPs covered securitisation (see RCAP Jurisdictional assessments: regulatory implementation consistency) as a distinct component of the exercise. The RCAPs found deviations in the EU and US and graded their securitisation component largely compliant (LC) and materially non-compliant (MNC) respectively.

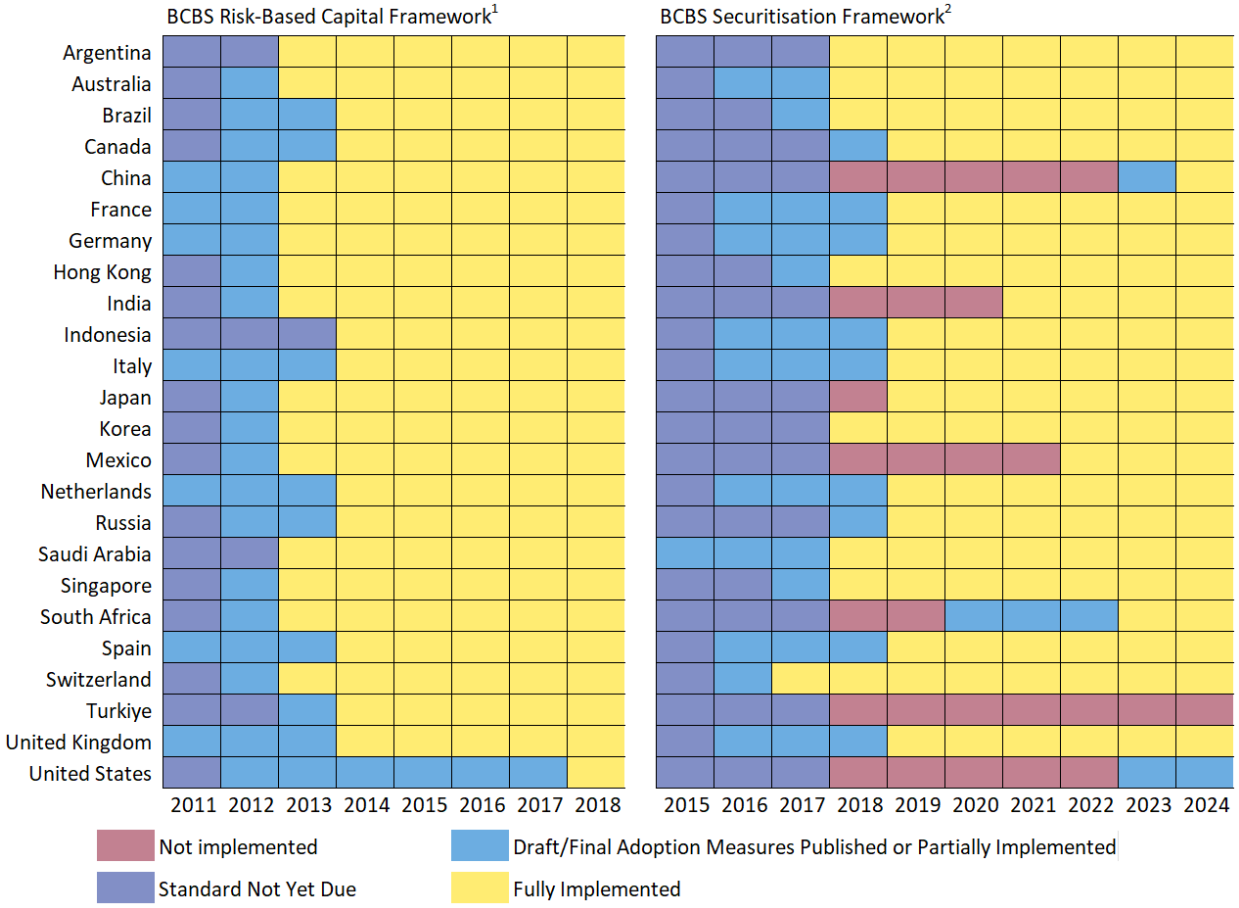
44 The BCBS RCAP of the US in 2014 found a material deviation for senior tranches of RMBS based on pre-GFC vintages.

45 See the BCBS Basel III implementation dashboard for details.

largely in line with the Basel III framework except for some parameters.[46] Further details on the implementation of the Basel securitisation framework in jurisdictions with material securitisation markets are provided in Annexes 1 and 2.

Implementation status across FSB jurisdictions

BCBS reforms **Graph 6**



[1] BCBS Risk-Based Capital Framework refers to "Basel II enhancements" published in 2009 and the initial phase of Basel III published in 2010. [2] BCBS Securitisation Framework refers to the revised securitisation framework published in 2014 and the STC amendments published in 2016 and 2018.

Note: BCBS metrics comprise four categories, which have been consolidated into the three displayed on the graph. In particular: "Draft regulation not published" is represented as "Not Implemented"; both "Draft regulation published" and "Final rule published (not yet implemented by banks)" are categorised under "Draft/Final Adoption Measures Published or Partially Implemented"; "Final rule in force (published and implemented by banks)" aligns with "Fully Implemented". The US securitisation framework under the risk-based capital framework was in effect since 1 January 2014 but the status of fully implemented is not given until all components are in effect which for the US was only in 2018. The status of implementation for Russia has not been updated and reflects progress reported as of 2021.

Sources: FSB Annual Reports; BCBS (2023).

FSB member jurisdictions report overall adherence to the scope and definitions under the revised securitisation framework but there is notable dispersion in the implementation of certain requirements such as STC, SRT, and hierarchy of approaches. These differences in implementation may, to some extent, have influenced the effects of reforms across jurisdictions.

[46] Key differences between the simplified supervisory formula approach under the current US capital rule and Basel III's standardised approach include a lower p factor (0.5 compared to 1.0 in the Basel framework), a higher risk weight floor of 20%, and a lack of specific treatment for non-performing exposures. See Annex 1 for a description for more details on the Basel approaches and the relevance of the p factor.

Thirteen FSB jurisdictions recognise STC securitisations and therefore apply lower capital requirements for these exposures relative to non-STC securitisations under their domestic regulatory framework. As Table 1 indicates, the STC framework is implemented in Canada, China, the EU, India, Japan, Saudi Arabia, Singapore, South Africa and the UK, though there are some differences in implementation. For example, in the EU and UK the comparable term used for STC is Simple, Transparent and Standardised (STS) securitisations. However, the EU's STS regime differs from the UK.[47] The EU STS regime covers both cash and synthetic securitisations, whereas the Basel framework's STC regime (and the UK STS regime) only covers true sale securitisations. The varied implementation also affects the deference or recognition processes of regulatory regimes for securitisation across certain jurisdictions.[48] In addition, the EU has requirements around disclosure that go beyond the BCBS-IOSCO provisions (see Box 8). The EU has also added a condition for eligible securitisations required to comply with the STS criteria in order to qualify as a type of HQLA.[49]

The BCBS framework allows differences in jurisdictional implementation of SRT (see Box 1 and Annex 1). Several jurisdictions limit the available securitisation framework methods,[50] while the EU and UK have a modified hierarchy of approaches. Some jurisdictions have added further conservatism by restricting certain types of re-securitisation (e.g. EU, UK). There are also exclusions or preferential treatments for the securitisation of specific assets like small- and medium-sized enterprise (SME) and government exposures.[51]

3.2.3. IOSCO incentive alignment recommendations

Some form of risk retention was in place in certain jurisdictions even before the IOSCO recommendations were developed, though practices differed across deals and over time. The G20 Leaders' statement from the September 2009 Pittsburgh Summit recommended that securitisation sponsors or originators retain part of the credit risk of the underlying assets to induce a stronger alignment of the interests of the issuers of securitisations and the final investors. That same year, IOSCO recommended that risk retention measures be considered so that retained long-term economic exposure could be used to promote aligned incentives in the securitisation value chain.[52] IOSCO found that prior to 2008, risk retention was not a regulatory requirement in any of the twelve surveyed jurisdictions, however, in most markets it was common

47 On 30 April 2024 the UK FCA and PRA published Policy Statements setting out their final rules relating to securitisation and feedback on responses to their earlier consultation papers. The new FCA and PRA rules, together with the Securitisation Regulations 2024, came into force on 1 November 2024.

48 For example, the EU does not consider the UK STS equivalent though it expects to review it in 2024 as part of its regulatory equivalence assessment, see European Commission (2022), *Report from the Commission to the European Parliament and the Council on the functioning of the Securitisation Regulation*, October. The UK Securitisation Regulations 2024, however, provide "grandfathered" EU STS securitisations that are registered with the ESMA prior to 31 December 2024, while new securitisations will need to comply by UK FCA and PRA regulations effective as of 1 November 2024, see PRA (2024), PS7/24 – Securitisation: General requirements, April; FCA (2024), PS24/4 Rules Relating to Securitisation, April and UK HM Government (2024), The Securitisation Regulations 2024, November.

49 See Commission Delegated Regulation (EU) 2015/61 of 10 October 2014 to supplement Regulation (EU) No 575/2013 of the European Parliament and the Council with regard to liquidity coverage requirement for Credit Institutions.

50 For example, Australia does not allow SEC-IRBA; Canada allows SEC-IRBA only with supervisory approval and no Internal Assessment Approach; and the US has proposed to only allow SEC-SA without implementing STC.

51 For example, the final Basel III framework for the Standardised Approach provides for favourable treatment for exposures to retail SMEs (75% risk weight) and to unrated corporate SMEs (85% risk weight).

52 See IOSCO Technical Committee (2009), *Unregulated Financial Markets and Products: Final Report*, September.

for issuers to hold on to some form of first loss or subordinate exposure in their securitisations.[53] Some jurisdictions – including Canada, the EU and US – adopted minimum risk retention requirements for certain types of issuers in the immediate aftermath of the GFC.

IOSCO issued policy recommendations in 2012 in relation to risk retention, transparency and standardisation of securitisations. The recommendations sought to align incentives of investors and issuers along the securitisation value chain by mandating risk retention, setting standardised disclosure templates, enhancing transparency to investors, and encouraging collaboration between regulators to ensure consistency and a level playing field. Risk retention, or 'skin in the game', was identified as one way to address the misaligned incentives that may be embedded in the 'originate to distribute' model of some securitisation products.[54] Holding an economic interest in the transaction should incentivise originators, issuers and investors to properly conduct quality screenings, improve underwriting standards and adequately monitor for credit risk. IOSCO recommended that all jurisdictions should evaluate and formulate approaches to aligning incentives of investors and securitisers in the securitisation value chain, including where appropriate, through mandating retention of risk in securitisation products.

3.2.4. Implementation status and jurisdictional differences

Most FSB jurisdictions have implemented the IOSCO policy recommendations. IOSCO's 2019 peer review suggested progress remained mixed across jurisdictions and sectors of the market, with less than half of the jurisdictions in the peer review having set out the elements of the incentive alignment approach, including risk retention.[55] However, since then, most of these jurisdictions have implemented the IOSCO policy recommendations related to transparency, standardisation and incentive alignment for securitisation (see Graph 9). Adoption of the recommendations on incentive alignment approaches has been completed by 18 FSB jurisdictions. Australia, Canada, Mexico, Saudi Arabia, South Africa and Switzerland have yet to implement these recommendations because, in the view of the respective authorities, their domestic securitisation markets are too small or because the types of securitisation activities or assets do not necessitate incentive alignment requirements.[56]

Implementation of the incentive alignment recommendations was not sequenced uniformly across jurisdictions. With regards to banks, most jurisdictions had taken measures in a uniform manner through the Basel III framework. The EU Securitisation Regulation (in force in 2018 and began applying on 1 January 2019) included risk retention and disclosure requirements, consolidating and replacing certain prior sectoral requirements. The UK approach is similar to the EU, as the Securitisation Regulation came into effect in the UK in 2019 and was converted, with certain modifications, into UK law at the end of 2020. Other jurisdictions, such as Japan and the US, have also implemented risk retention and disclosure requirements across sectors. In the US, implementation of incentive alignment regimes and disclosure requirements across the securitisation market has been in place since 2016, although a US court ruling in 2018

53 See IOSCO (2011), *Task Force on Unregulated Financial Markets and Products: Implementation Report*, March.

54 See IOSCO (2012), *Global Developments in Securitisation Regulation*, November.

55 See IOSCO (2019), *Update to the IOSCO Peer Review of Implementation of Incentive Alignment Recommendations for Securitisation*.

56 See FSB (2023), *Promoting Global Financial Stability: 2023 FSB Annual Report*.

overturned the risk retention rule for open-market CLOs (see Section 4.2). Japan also adopted disclosure requirements that oblige distribution companies to provide information on the characteristics, performance, and risks of the securitised assets and securities, as well as the incentive alignment method and risk retention amount.

Implementation status across FSB jurisdictions[1]

IOSCO Recommendations **Graph 7**

[1] For the EU the implementation assessment covers four sectors: Banking, Alternative Investment Fund Managers, Undertakings for Collective Investments in Transferable Securities and Insurance. The rating reflects the least advanced sector.

Sources: FSB Annual Reports; IOSCO.

The forms of risk retention differ across markets. Graph 10 and Table 2 below illustrate the most commonly used methods of risk retention (vertical and horizontal slicing). The vertical method is where the issuer retains a piece of every security in the capital structure such that the total amount retained equals 5% of each class. The horizontal method is the retention of residual interest equal to 5% of the fair value of all notes issued, starting with first-loss subordinate tranches. The combined L shape is where the issuer retains a combination of vertical and horizontal interest such that the total amount retained equals 5%. The IOSCO recommendations did not specify forms of risk retention, and different jurisdictions have permitted different modalities (see Table 3). Stakeholder outreach confirmed that the alignment of incentives achieved through risk retention differs by product and for different tranche investors.

Figure 3: Horizontal and vertical risk retention methods[57]

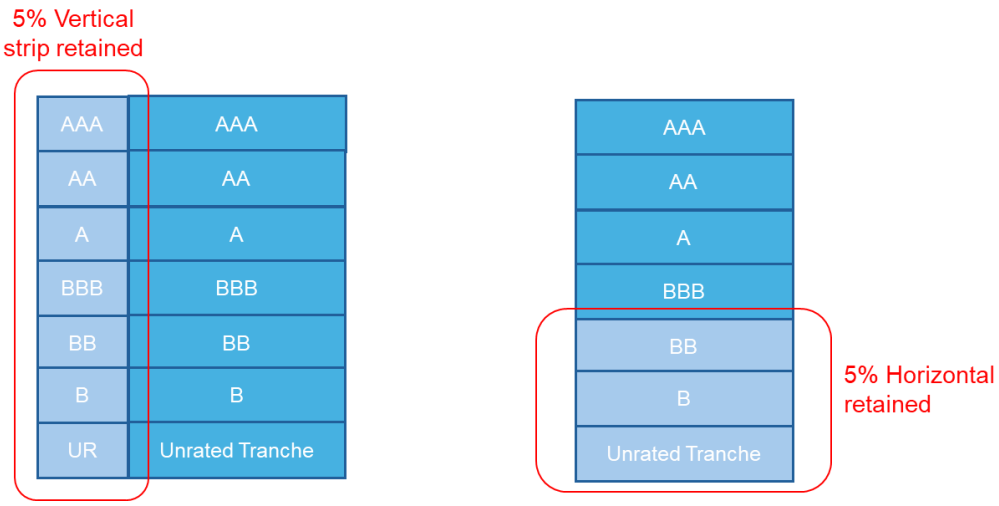


Table 2: Common use of risk retention forms

Form of risk retention	Most commonly used for:
Vertical	In SRT securitisations, to maximise regulatory capital relief
	To reduce concerns that retainer restructures/forebears defaulted assets to avoid first loss wipe out
	To reduce concerns of concentration of CLO managers' rights as equity holder
Horizontal	No investor demand for equity tranche
	Where retainer uses unaffiliated third-party purchasers to fund the retained slice[58]
	Where excess cash flow is used to finance risk retention

Jurisdictional differences on risk retention also involve additional requirements in a few cases.[59] In particular, the EU, Japan, and the UK have a combination of a 'direct' risk retention requirement for the retainer to comply with the requirement, and an 'indirect' requirement for institutional investors to verify certain matters relating to risk retention by the originator, sponsor, or original lender of the securitisation. In addition, the EU and UK have a "sole purpose test", preventing entities established for the sole purpose of securitising exposures from holding the risk retention.[60]

57 This is a stylised diagram. In reality, AAA-rated tranches often represent a much larger share, and with low-quality collateral, the unrated tranche can exceed 5%.

58 This applies to CMBS sponsors in the US and is only permitted in the horizontal risk retention method.

59 See IOSCO (2019) *Update to the IOSCO Peer Review of Implementation of Incentive Alignment Recommendations for Securitisation*, October.

60 See EU (2023), Commission delegated regulation (EU) 2023/2175, Article 2 (7.a and 7.b).

Table 3: Risk retention requirements in selected FSB jurisdictions

Jurisdiction	Legal entity subject to obligations	Minimum level	Permitted forms	Exceptions
China	Originators, original equity holder or its affiliates of debt-type and future operating income-type special plans	5% net economic interest	Horizontal, vertical	
EU	Originator, sponsor or original lender	5% net economic interest	5 different modalities including horizontal and vertical	Securitisations of assets guaranteed by government institutions or institutions with a risk weight of ≤ 50% or by multilateral development banks. (This is not an exhaustive overview of applicable exceptions.)
UK	As for EU	As for EU	As for EU	As for EU
Japan	Originator, sponsor, and investor (indirect)	5% net economic interest or equivalent amount of credit risk	Horizontal, vertical, combined L shape	
US	Sponsor, originator	5% net economic interest	Horizontal, vertical, combined L shape (i.e. 5% in total of horizontal and vertical), asset specific options	Qualified RMBS[61] and certain other loans, open-market CLOs (per 2018 court decision, see section 4.2 and Box 6). (This is not an exhaustive overview of applicable exceptions.)

Source: FSB member jurisdiction survey responses.

3.2.5. Other securitisation reforms

The following G20 recommendations, which are not in the scope of this report, are also relevant for securitisation and their implementation is reported as largely complete across FSB member jurisdictions.[62]

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61 A qualified mortgage is a mortgage that meets certain requirements for lender protection and secondary market trading under the Dodd-Frank Act. To be eligible for a qualified mortgage, borrowers must meet certain requirements based on an analysis of the ability to repay their mortgage (according to their income, assets, and debts). Qualified mortgages can be eligible for purchase, guarantee or insurance by a government-sponsored enterprise such as Fannie Mae and Freddie Mac (see Box 8).

62 See the FSB webpage on Monitoring of Other Areas and the note on Implementation of G20/FSB financial reforms in other areas: Summary of key findings based on the 2019 FSB Implementation Monitoring Network (IMN) survey.

- **Accounting rules on consolidation of off-balance sheet special purpose entities**. Historically a major incentive to securitise assets was to achieve off-balance sheet accounting that also eliminated capital requirements for those assets. Accounting consolidation principles changed in 2010 under US Generally Accepted Accounting Principles and in 2013 under International Financial Reporting Standards, with the effect of bringing a large proportion of securitised assets back onto balance sheets. Consolidation of the securitisation vehicle is required if the sponsor controls the vehicle, which involves having the power to direct activities that significantly impact economic performance, and an upside or downside exposure to the vehicle. In practice this means that retaining some risk (e.g. as required by risk retention obligations or contractual arrangements) and retaining loan servicing rights will typically lead to consolidation.[63]

- **Strengthening the regulatory and capital framework for monoline insurers in relation to structured credit**. Large amounts of credit risk transfer were predicated on the AAA guarantees and enhancements provided by monoline insurers. When the credit quality of the instruments they had guaranteed declined rapidly this affected their own AAA status and added to the dislocation in capital markets. Given their important connectivity to the stability of the system, the IAIS updated core principles and supervisory guidance on reinsurance and risk transfer, investment requirements, capital adequacy, and mortgage insurance. As of 2016, all FSB jurisdictions where monoline insurers are active and involved in structured credit have reported that they have implemented this recommendation through legislation, regulation and supervisory guidelines, or supervisory action. In the EU, this is implemented through Solvency II, including detailed capital requirements, risk management and governance rules.

- **Strengthening of supervisory requirements or best practices for investment in structured products**. Analysis of the securitisation market turmoil in the GFC uncovered that many institutional investors had an insufficient understanding of the risks of structures in which they invested.[64] The regulatory response was to strengthen requirements for investors to conduct adequate due diligence and to form their own view of the risks of the instruments in their portfolios. All FSB jurisdictions with an applicable market except the US report that implementation of recommendations for firms' processes for investment in structured products is complete.

- **Enhancing disclosure of securitised products and their underlying assets**. Enhanced disclosure about the underlying assets, waterfall, and performance of securitisation structures should reduce the information asymmetry, helping investors to make an informed choice and should reduce reliance on credit rating agencies. Implementation of IOSCO's recommendations in relation to disclosure requirements for issuers has been slightly slower than that for incentive alignments, with 10 jurisdictions having measures in force (compared with 12 on incentive alignments) as of 2019.[65] China, Germany, Hong Kong, India, Indonesia, Japan, Korea, Russia and Türkiye have

63 See Levitin (2023), "Report on the institutional and regulatory differences between the American and European securitisation markets", German Council of Economic Experts, Working Paper, 03/2023.

64 See Financial Stability Forum (2008), Report of the Financial Stability Forum on Enhancing Market and Institutional Resilience.

65 See IOSCO (2019), Update to the IOSCO Peer Review of Implementation of Incentive Alignment Recommendations for Securitisation.

all adopted legislation, regulation, or policy guidance that requires issuers or distribution companies to disclose the form, method, and scope of risk retention, as well as other relevant information, to investors and competent authorities. In the EU and the UK, disclosure requirements under the Securitisation Regulation apply, alongside due diligence requirements for any investor in securitised products. In the US, disclosure requirements under Regulation AB apply to securities offerings that are registered with the US Securities and Exchange Commission.[66] Most securitisation transactions are exempt from registration and therefore Regulation AB has little direct impact for most of the US securitisation market.[67]

- **Reducing the reliance on CRA ratings**. Prior to the GFC, many investors believed the benefit of significant additional in-depth review of securitisation tranches beyond credit ratings was not justified. Analysis of the securitisation markets in the GFC suggests this over-reliance on credit ratings contributed to the turmoil in the securitisation markets, given their susceptibility to generating cliff effects and credit rating inflation.[68] The 2010 FSB *Principles for Reducing Reliance on CRA Ratings* recommended removing the hardwiring of CRA ratings in standards, laws and regulations to reduce this reliance and force improvement in banks', institutional investors' and other market participants' own capacity for credit risk assessment. Requiring these firms to use their own risk assessments also reduces herding in market behaviour. Implementation of the principles is reported to be complete in all FSB jurisdictions except Brazil and Türkiye. In 2015, IOSCO released its *Code of Conduct Fundamentals for Credit Rating Agencies* which significantly revised its 2004 Code and offers a practical framework for CRAs to implement the 2003 IOSCO *CRA Principles.* These principles are designed to protect the quality and integrity of the rating process, ensure independence, and avoid conflicts of interest, embed transparency and timeliness of ratings disclosure in rating activities and maintain confidentiality. The transparency requirements support investors and other CRAs to conduct their own analyses.

Jurisdictions have also adopted a number of other domestic reforms that affect securitisation markets. While these reforms are not in the scope of this evaluation, they need to be considered when interpreting the findings of the analysis. They include for example:

- **Residential mortgage underwriting standards** were tightened in some jurisdictions, such as the EU, UK, and US, to avoid the pursuit of market share and income by lenders at the expense of prudent risk management.[69] In the US, there is a general prohibition on granting mortgages in the absence of verification of borrower's ability to pay. In the EU securitisation of self-certified residential loans is prohibited with some limited exceptions.

66 Fannie Mae, Freddie Mac and Ginnie Mae transactions are exempt from registration.

67 See Levitin (2023), op. cit.

68 See BIS Joint Forum (2011), *Report on asset securitisation incentives*.

69 See Joint Forum (2010), *Review of the Differentiated Nature and Scope of Financial Regulation* and FSB (2012), *Principles for Sound Residential Mortgage Underwriting Practices*, April.

- Several jurisdictions (e.g. EU, UK, US) adopted **stress testing** regimes that regularly assess whether banks are sufficiently capitalised to absorb losses during stressful conditions, including with respect to their securitisation holdings.

- Some jurisdictions have introduced **regulatory requirements for non-bank financial institutions** that may affect their participation in securitisation markets. For example, in 2016 the EU adopted a prudential regime for insurance and reinsurance undertakings (Solvency II) that included capital requirements for investments in securitisations.

- Some central banks in FSB member jurisdictions (e.g. ECB, Bank of England) have revised their eligibility rules to allow certain types of simpler and more transparent securitisations as **collateral for refinancing operations** (see Annex 4).

- Some jurisdictions, e.g. the US, UK and EU, introduced **regulatory requirements on CRAs** with the objectives of increasing transparency of methodologies, improving the quality of the rating process, managing conflicts of interest, and encouraging more operators in the market.

3.3. Intended effects of risk retention and prudential reforms

The separation of loan origination and ownership, combined with information asymmetries, can lead to moral hazard in securitisation. Originators who securitise loans and sell them to investors are not exposed to those loans' default risk and may therefore have lower incentives to ensure credit quality. Investors, on the other hand, have limited ability to assess the default risk since this would require detailed loan data and would involve high costs.

There is a wide strand of literature demonstrating that issuers signal their private information by retaining an economic interest in securitisation.[70] This literature suggests that mandatory risk retention regulation is effective in reducing investor's informational loss.[71] However, effectiveness measured by the level of screening of the originator might fluctuate with the state of the economy and also depends on the size of the retained tranche and the risk retention method.[72] For example, if expected loss in a downturn is greater than the required horizontal risk retention, then the first loss tranche retention might not be the most effective mechanism to maximise originators' screening incentives. In such a case, retaining either a vertical slice or mezzanine tranche can be more effective from a regulatory point of view as the retention method can signal different degrees of monitoring effort by the originator.[73]

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70 See Leland and Pyle (1977), "Informational Asymmetries, Financial Structure, and Financial Intermediation", Journal of Finance, Vol. 32, No. 2, pp .371–387; Riddiough (1997), "Optimal design and governance of asset-backed securities", Journal of Financial Intermediation, Vol. 6, issue 2, pp. 121–152; and DeMarzo and Duffie (1999), "A liquidity-based model of security design", Econometrica, Vol. 67, No. 1, pp. 65–99.

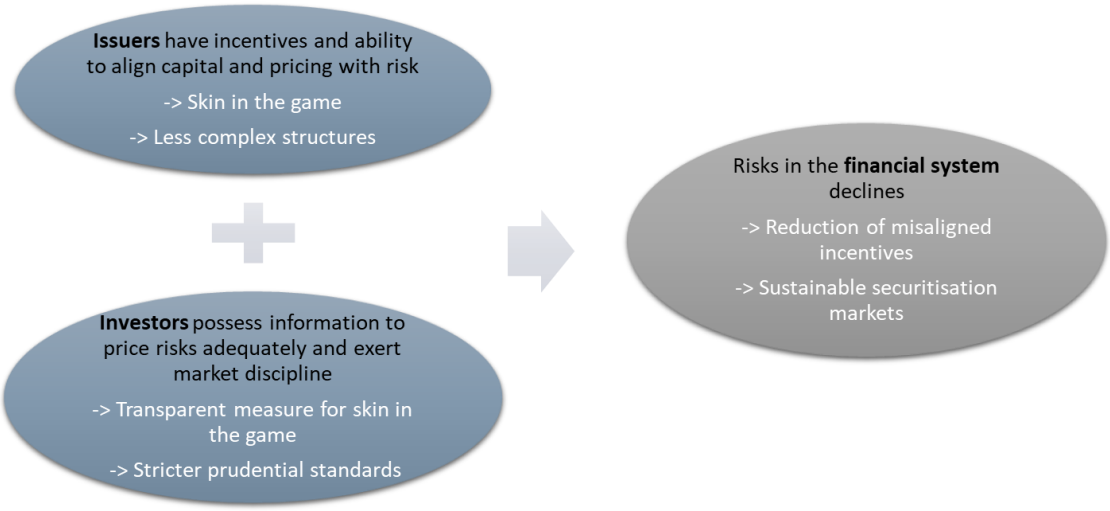
71 See Guo and Wu (2014), "A study on risk retention regulation in asset securitisation process", Journal of Banking & Finance, Vol. 45, pp. 61–71; and Kiff and Kisser (2014), "A shot at regulating securitisation", Journal of Financial Stability, Vol. 10, pp. 32–49.

72 See, for example, Fender and Mitchell (2009), The future of securitisation: How to align incentives?, *BIS Quarterly Review*, September 2009, pp. 27–43; and IMF (2009), *Global Financial Stability Report*, October, Chapter 2.

73 See Flynn et al. (2020), "Informational efficiency in securitisation after Dodd-Frank", Review of Financial Studies, Vol. 33 (11), pp. 5131–5172; and Krahnen and Wilde (2022), "Skin-in-the-game in ABS transactions: A critical review of policy option", Journal of Financial Stability, Vol. 60, pp. 1–12, for empirical evidence using US and EU data respectively.

Both the risk retention and prudential reforms aim to reduce misaligned incentives and moral hazard by promoting "skin-in-the-game" for securitisation issuers (see Graph 11). When these issuers remain partly exposed to the performance of the assets, they should be less inclined to engage in excessively risky lending practices because they can no longer offload the entire risk onto the investors, which could improve those issuers' screening, underwriting, and monitoring efforts before and after loan origination.[74] In addition, prudential reforms increase the skin-in-the-game for bank investors in securitisations, thereby enhancing their incentive to assess the default risk of the underlying exposures. Consequently, reforms that reduce misaligned incentives are expected to create securitisation structures that are of higher credit quality. By changing the availability, costs, or perceived risks of securitisation for market participants, reforms sought to internalise systemic risk externalities while also supporting the development of sustainable and resilient securitisation markets.

Figure 4: Intended effects of securitisation reforms



The reforms might impact securitisation volumes and prices in ways that differ between issuers and investors. On the demand side, the reduced moral hazard risks should increase investors' confidence in securitisation markets, in turn, spurring their demand for these financial tools and mitigating the "lemon premium" in securitisation markets, thereby reducing credit spreads (i.e. lowering prices and increasing volumes).[75] On the other hand, higher prudential requirements may lead banks to invest less in securitisations, although this may be a more sustainable outcome if those requirements more accurately reflect the risks involved. On the supply side, skin in the game and higher prudential requirements increase the screening and monitoring costs for originators and their cost of capital, which in turn (all other things being equal) decreases the relative attractiveness of securitisation as a financing tool (i.e. increasing prices and lower volumes). As a result, it is difficult to ascertain on an ex-ante basis what the combined expected effects of these reforms will be on volumes and prices at an aggregate level.

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74 Examples of pre-origination loan performance measures are loan-to-value and income-to-debt ratios, while post-origination loan performance measures involve managing delinquencies and recoveries (see Annex 2).

75 The "lemon premium" refers to economic costs arising from dishonesty and, hence, is particularly present in markets with pronounced information asymmetries and moral hazard. See Akerlof (1970), "The market for 'lemons': quality uncertainty and the market mechanism," Quarterly Journal of Economics, Vol. 84, No. 3, pp. 488–500.

In addition to curbing undue risks from incentive misalignment, both risk retention and prudential requirements aim to promote sound and sustainable securitisation markets. Such markets should be more resilient to stress and credit cycles, enabling them to absorb and recover from external shocks without strong adverse effect on the broader financial system and hence providing market participants with a more predictable financing tool. In particular, the prudential requirements aim to achieve this objective for the banking sector by better aligning capital and risk, increasing risk sensitivity, eliminating regulatory arbitrage, and supporting simpler and more transparent structures by applying lower risk weights to STC securitisations.

The prudential reforms also sought to address weaknesses in the risk measurement methodology that became evident during the GFC. In the run-up to the GFC, banks took advantage of differences in capital treatment for similar assets, which led to the growth of riskier securitisations (see Box 2). Key regulatory arbitrage possibilities were:

- **Off-balance sheet vs. on-balance sheet exposure:** Banks engaged heavily in off-balance sheet transactions (e.g. through SIVs) that allowed them to circumvent capital requirements and leverage their positions without regulatory scrutiny.

- **Capital requirements in the banking vs. trading book:** Since the trading book had more favourable capital requirements, banks placed securitised products in the trading book, which allowed them to take on more leverage.

The risk sensitivity of the prudential framework is one of the drivers of a sustainable securitisation market that can support financing to the economy. Such a framework, by ensuring that capital charges are commensurate with the risks, enables banks to contribute to a proper functioning of the market and to channel lending to the real economy. As noted in section 3.1, the Basel III reforms increased overall capital charges for securitisation exposures and generally made them more risk sensitive. This was one of the intended effects of the reforms to enhance the resilience of the banking sector and promote a sound securitisation market. However, analysis of the appropriate specification and calibration of the prudential standards – in terms of the approaches, factors and risk weight formulae used – is beyond the scope of this evaluation, although authorities in some member jurisdictions have examined the framework risk sensitivity as part of their securitisation reforms evaluation (see Box 3).

Box 3: EU and UK analyses on the securitisation framework

In 2022, the European Supervisory Authorities (ESAs) reviewed the securitisation prudential framework for banking in the EU against the framework's original objective of contributing to the sound revival of the EU securitisation market on a prudent basis. In their report to the EC,[76] the Joint Committee (JC) of the ESAs identified certain concerns about the framework's risk sensitivity.[77] However, the JC concluded that re-calibrating the securitisation prudential framework would not be a solution that would ensure the revival of the securitisation market. The JC noted that it is possible to increase the risk sensitivity of the framework, but this would require a more fundamental and comprehensive review

[76] See European Supervisory Authorities (2022), Joint committee advice on the review of the securitisation prudential framework.

[77] This included supervisory concerns related to the current design of the formula-based approaches in view of the three regulatory goals, resulting in the framework's ability to account for non-granular pools; enabling the framework to better account for the reduced agency and model risk in the case of originators; and concerns regarding the fit of the current shape of the risk weight function to the distribution of losses.

before conclusive opinions can be formed. Work is ongoing by the ESAs on this issue as part of a follow-up review under Capital Requirements Regulation (CRR) and the Securitisation Regulation.

In 2023, the UK Prudential Regulation Authority (PRA) published a discussion paper that identified questions about the level of capital non-neutrality in the securitisation framework,[78] noting an evaluation of these issues would be a complex exercise requiring a significant amount of data and analyses.

In 2024, the European Commission launched a consultation on the EU securitisation framework in response to recommendations around relaunching the securitisation market in Europe.[79]

4. Effectiveness of the securitisation reforms

4.1. Overall market

A number of metrics, both globally and for specific jurisdictions, can be used to assess the effect of reforms on the securitisation market. These metrics seek to assess changes in:

- complexity (e.g. in terms of capital structure, average deal size, average number of loans of the underlying exposure) and opaqueness of structures;
- credit enhancement (e.g. subordination,[80] over-collateralisation[81] and excess spread);[82]
- credit quality of underlying loans and credit performance across different tranches;
- the investor base and associated vulnerabilities;
- pricing of securitised assets, to reflect the alignment with their risk characteristics; and
- robustness of these markets to various shocks during recent episodes of stress as well as in terms of projected credit performance in scenario analyses and stress tests.

The attribution of observed securitisation market trends and resilience metrics to the reforms is subject to important data limitations and methodological challenges (see Box 4). In particular, it is important to disentangle the effects of the prudential and risk retention reforms from other drivers of developments in securitisation markets. Identifying the effects of securitisation reforms is challenging, since the reforms were implemented over several years and securitisation market outcomes were impacted by several economic, financial and other regulatory developments. These challenges suggest that caution is needed when interpreting the findings of the various types of analyses. While none of these metrics offer conclusive evidence on its own, collectively they form the basis for the conclusions presented in the report.

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78 See PRA (2023), *Securitisation: capital requirements, Discussion Paper 3/23*.

79 See EC (2024), *Targeted Consultation on the Functioning of the EU Securitisation Framework*, October.

80 Subordination level is defined as the principal outstanding of the junior tranches who will absorb the initial credit losses and determine how much credit support the deal structure provides to senior tranches.

81 Over-collateralisation means that the face value of the underlying loan pool is larger than the par value of the issued bonds. So even if some of the payments from the underlying loans are late or in default, the transaction may still pay principal and interest payments on the bonds.

82 Excess spread can be defined as the additional revenue generated by the difference between the coupon on the underlying collateral (such as a loan interest rate) and the coupon payable on the securities.

Box 4: Methodological challenges

The reforms were introduced in a sequence of partly overlapping time periods – and in the case of the BCBS securitisation rules, in various waves (see section 3.2). Absent granular data and a sufficiently long pre- and post-reform period, it is difficult to isolate the specific effects of each reform. Moreover, financial institutions may adjust to reforms at different stages, e.g. when the international standard is adopted, when the reforms implementing that standard are announced domestically, when the legal framework is published, or after the phase-in period expires. The impact of these reforms will also vary due to differences in the bindingness of regulatory constraints compared to pre-reform market practices.

Several other caveats may also limit the comparability of securitisation market trends over time and across jurisdictions or their attribution to the reforms. First, exceptionally accommodative monetary policy across many jurisdictions until recently may have affected incentives for securitisation in the post-reform period. Second, a number of other major financial reforms were implemented around the same period, including non-G20 domestic reforms relevant for securitisation market participants (see section 3.2.3). Third, there are substantial differences in securitisation markets across jurisdictions (see section 2.2), including the availability and importance of alternative financing instruments and the structure of housing finance systems. Finally, observations in the pre-reform period are potentially biased because they include the period when securitisation pricing and issuance did not fully reflect risks (culminating in the GFC), making it unsuitable as benchmark.

Notwithstanding the above challenges, the available literature suggests that risk retention and higher prudential requirements have generally enhanced the resilience of securitisation markets (see Annex 3). In particular, existing studies find that underlying loans of securitisation deals with risk retention have: a lower probability of becoming non-performing, lower LTV ratios, higher income to debt-service ratios, a lower delinquency amount, and a shorter time in arrears, relative to a control group of securitised loans without risk retention.[83] There are few studies on the effects of prudential reforms on securitisation markets, but these also indicate that the reforms have contributed to a higher level of investor protection and hence to more resilient markets.[84]

Default rates of structured finance products have declined in recent years, reflecting in part higher collateral quality, while subordination has increased. Many defaults following the GFC were concentrated in subprime RMBS and complex structured products (see Graph 12), reflecting riskier loans that were originated and securitisation deals that were issued prior to the GFC. Default rates across various securitisation types remain low, though the higher interest rate environment more recently has begun to adversely impact credit performance.[85] Some studies suggest that the quality of collateral underlying securitisation deals appears to have improved post-GFC in some asset classes (e.g. RMBS) though not in others (e.g. CLOs).[86] This has been accompanied by a lower proportion of securitisations given the highest credit rating by

83 See, for example, Agarwal et al. (2021), "Risk retention rules and the issuance of commercial mortgage-backed securities", Journal of Real Estate Finance & Economics; Furfine (2020), "The impact of risk retention regulation on the underwriting of securitised mortgages", Journal of Financial Services Research, Vol. 58, pp. 91–114; and Hibbeln and Osterkamp (2024), "The impact of risk retention on moral hazard in the securitisation market", Journal of Banking & Finance, Vol. 163.

84 See European Commission (2022), *Report from the commission to the European Parliament and the Council. On the functioning of the securitisation regulation*.

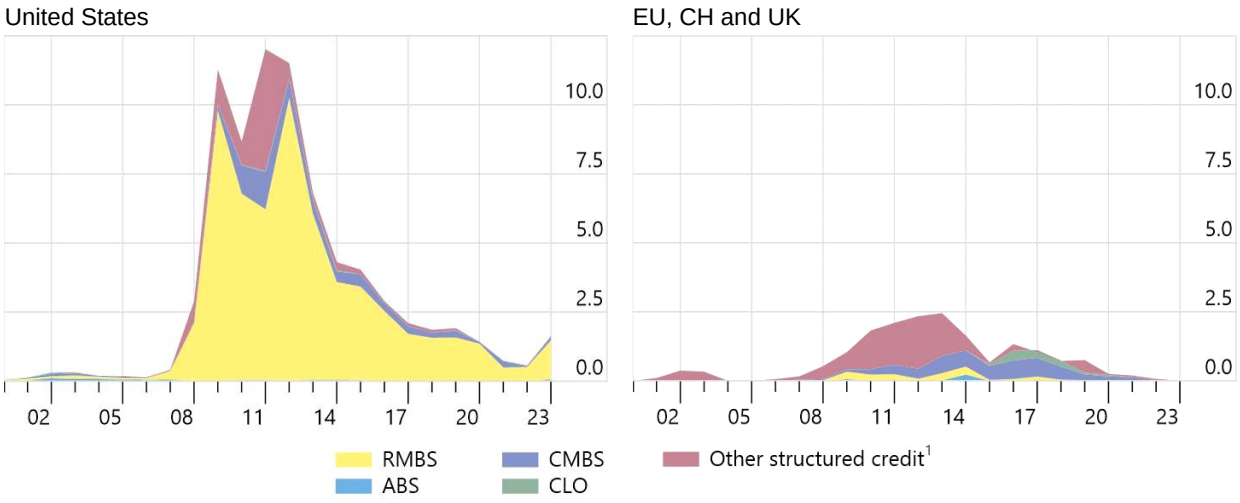
85 See Pitchbook, LCD (2024), US leveraged loan default rates move higher after two-dozen defaults in 2023; Pitchbook, LCD (2024), December Wrap, ELLI gains 1.21%, lifting 2023 return to post GFC-high; S&P (2023), European Structured Finance Outlook 2023; Fitch Ratings (2023), Office defaults drive U.S. CMBS delinquency rate higher in September.

86 See, for example, S&P (2020), How U.S. structured finance has changed since the credit crisis; and ESRB (2022), *Monitoring systemic risks in the EU securitisation market*.

CRAs, which can be attributed, at least in part, to rating downgrades and the adjustment of CRA rating methodologies post-GFC.[87]

Annual default rates of structured credit by sector contributions

Percent **Graph 8**



[1] Includes CDOs.

Sources: S&P; FSB calculations.

Securitisation market structures appear to be simpler and more transparent since the GFC. A number of stakeholders have acknowledged the availability of more information on the underlying loans (made possible because of disclosure and other requirements) as an important contributor to market transparency and to the reduction in asymmetric information between originators and investors – though some market participants note that securitisations continue to require more documentation and due diligence than other debt products. Complex structures that contributed to the GFC have declined significantly (subprime/alt-A RMBS, ABCP programmes invested in subprime MBS, CDO-squared) or been restricted (e.g. SIVs, re-securitisations in the EU).[88]

The growth of STC securitisations, where implemented, may also have contributed to more transparent structures, at least in homogenous asset classes where the STC requirements can be fulfilled (e.g. RMBS). STC securitisations now account for around half of total issuances in the EU and UK, following implementation in 2019 (Graph 13.A). The risk weights for non-STC transactions are on average twice of STC transactions (Graph 13.B). The share of STC tranches in EU banks' investments in securitisation has increased since 2019 (Graph 13.C).

CRA analysis on market pricing for (true-sale) STS transactions in the EU and UK generally shows lower spreads compared to non-STS transactions, likely reflecting investor perception of lower risk and, in the case of banks and insurers, reduced capital requirements.[89] However, this could also be driven by the fact that the STS criteria are more readily fulfilled by securitisations

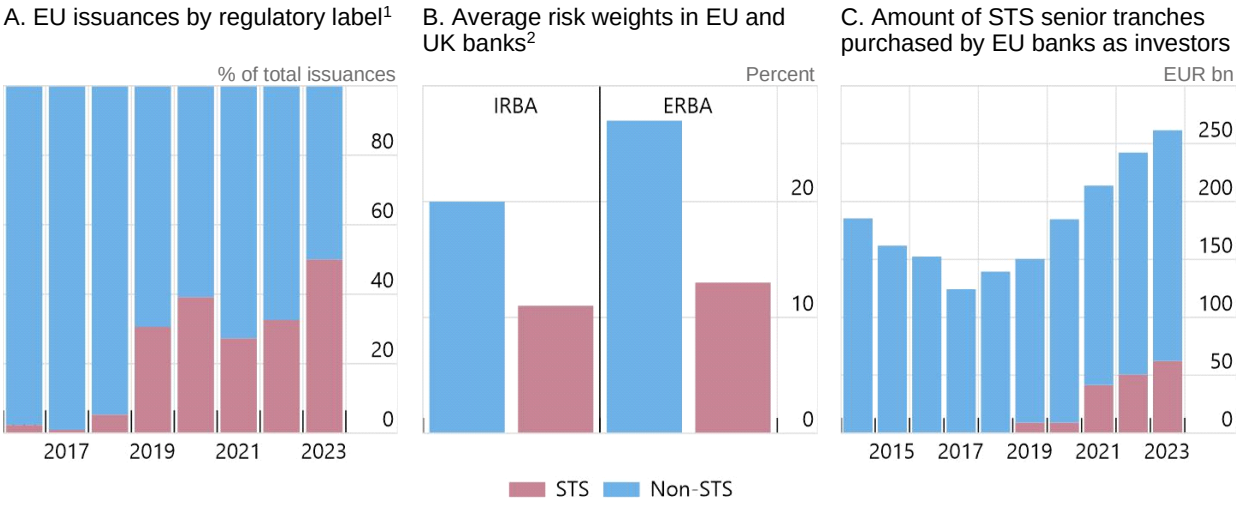
87 See AFME Securitisation Data Reports 2008–2023, Balances outstanding by rating.

88 See FSB (2017), *Assessment of shadow banking activities: risks and the adequacy of post-crisis policy tools to address financial stability concerns*, July; and JPMorgan Chase (2020), 10 years after the financial crisis.

89 See S&P (2019), *How STS has shaken up European securitisation so far*, November.

that investors already consider to be lower-risk and more liquid. Similarly, the analysis finds that from a collateral credit quality perspective, it is difficult to say whether recently issued STS transactions would have had different credit characteristics if they did not have the label. This correlates with some stakeholders' view that the introduction of this label has increased operational costs to improve transparency in existing transactions rather than stimulating new activity in the securitisation market, though this was not the explicit objective of the STC reforms.

Trends in STS in the EU and UK **Graph 9**



[1] STS issuance prior to the Regulation coming into force (1 January 2019) is due to legacy transactions being notified as STS. Synthetic STS not included. The figure for 2023 is extrapolated based on the issuances in the first quarter of 2023. [2] IRBA: internal ratings-based approach; ERBA: external ratings-based approach.

Sources: AFME; BCBS; ECB; FSB calculations.

The prudential and risk retention reforms also apply to other parts of the securitisation market that are outside the scope of the evaluation, such as the commercial mortgage-backed securities (CMBS) market. Some evidence suggests that risk retention is binding in that market and may have contributed to its ability to withstand the stress experienced in commercial real estate (CRE) to date (see Annex 4). In particular, the delinquency rate (loans across all property types that are late on their payments by at least 30 days) was observed to be significantly lower post adoption of risk retention across all property types, even when accounting for inherent 'adverse selection'[90] bias in the older loans.[91] Some academic research also suggests that risk retention has contributed to commercial mortgage loans having lower loan-to-value and higher debt service cost ratios, along with higher borrowing costs.[92]

4.2. CLO/CDO market

This section describes key trends in CLO/CDO markets and, where possible, seeks to relate these trends and resilience metrics to the reforms. A particular area of focus is how the reforms may have impacted the role of banks, which have been identified in previous work as key

90 The older portfolios are likely to contain weaker loans as strong performing properties pay off.

91 See Maximillian and Clancy (2022), Five years in, has risk retention had its desired effect?, Trepp, March.

92 See Furfine (2020), The impact of risk retention regulation on the underwriting of securitised mortgages, Journal of Financial Services Research.

participants in this market segment.[93] The section also considers the impact of risk retention rules and the role such rules play in risk alignment between the securitisation sponsors, originators, and original lenders in post-GFC CLO structures.

4.2.1. Resilience trends in the CLO market

CDOs, particularly those backed by subprime MBS, have largely disappeared from securitisation markets. These structures were at the epicentre of the housing bubble in the US that precipitated the GFC (see Box 2). Whereas the EU and the UK have restricted the use of re-securitisations after the GFC, this is not the case in other FSB jurisdictions including the US. However, the market for CDOs has significantly dwindled since 2008, in part due to investors' distrust, tighter prudential requirements for bank investments in such instruments, and the adjustments of CRA methodologies post-GFC that make it unlikely that such structures receive sufficiently high ratings to make them economically viable.[94] Given these developments, the rest of the section focuses on the effects of the reforms on CLOs.

The default rate of CLO tranches post-GFC has been low, with no defaults to date of issuances after 2014, though this may also be due to factors unrelated to the reforms (see Graph 14). One such factor is macroeconomic performance, with default rates in the underlying leveraged loan market remaining generally moderate in Europe and the US due to low interest rates and fiscal support in some cases, for example during the pandemic. Another factor that is specific to CLOs is that since they are actively managed, managers can mitigate credit deterioration and avoid collateral defaults by trading distressed loans.[95] However, this strategy relies on sufficient market liquidity, which may not be present in future stress episodes.[96] Furthermore, market conditions sometimes favour the reset or reissuance of outstanding CLOs, making it difficult to predict expected losses of CLO tranches over longer periods.[97]

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93 See FSB (2019), *Vulnerabilities associated with leveraged loans and collateralised loan obligations*.

94 See S&P (2014), What's holding back European securitisation issuance?

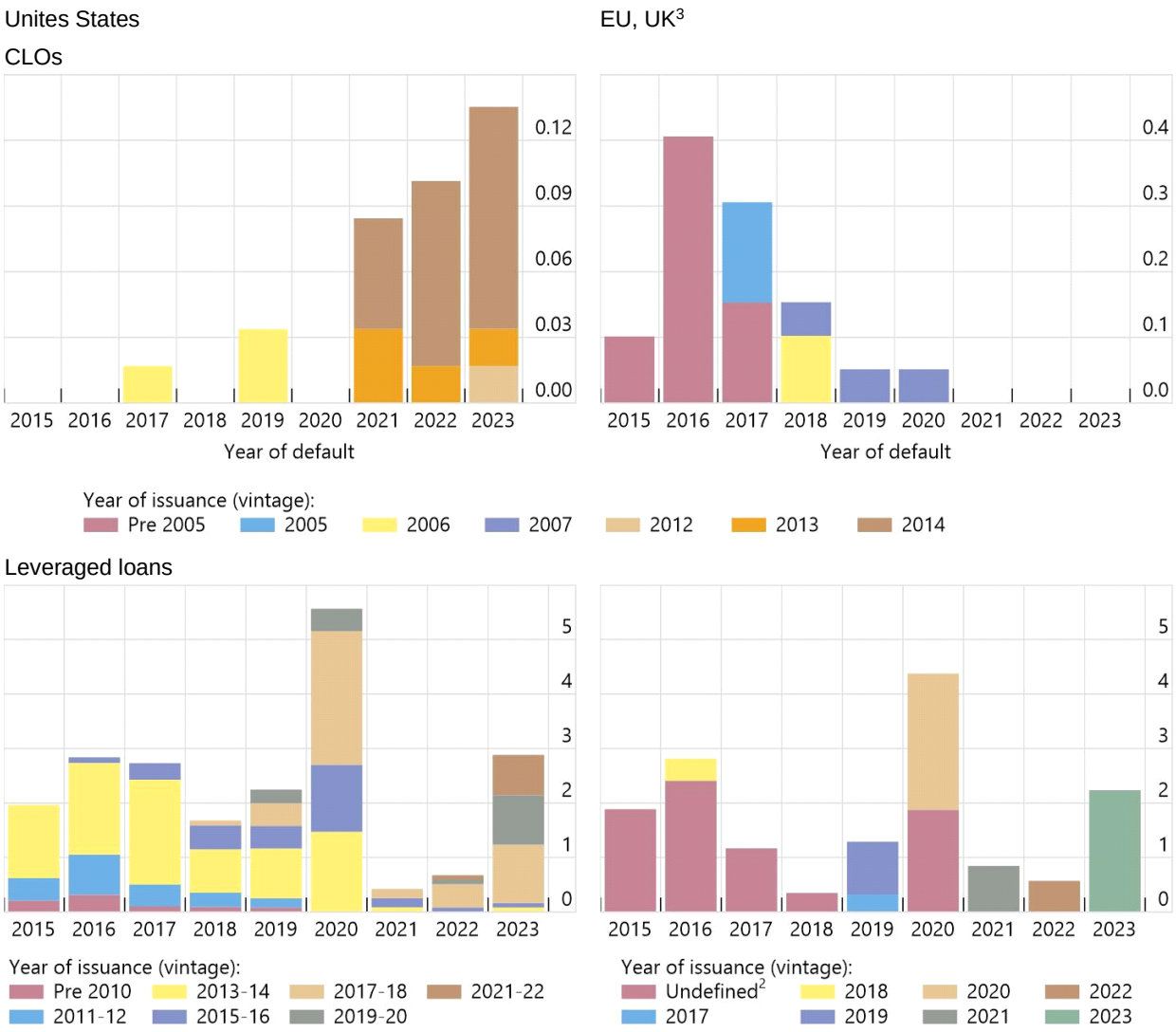
95 Cordell et al. (2023), "CLO performance", Journal of Finance, Vol. LXVIII, pp. 1235–1278, for example, find that the resilience of CLOs can be attributed to their long-term, closed-end structure, which protects against market volatility and roll-over risk.

96 See Griffin and Nickerson (2024), "Are CLO collateral and tranche ratings disconnected?", Review of Financial Studies, vol. 36, Issue 6, pp. 2319–2360. By examining the differences in downgrades of CLOs and the collateral loans during COVID-19, the authors suggest that rating agencies may exhibit different standards regarding the timeliness of rating actions.

97 For example, 42% of the CLO tranches rated as AAA by S&P at the beginning of 2021 (a year with strong CLO issuance) had migrated to "not rated" by the end of that year.

US and European CLO tranche and leveraged loan defaults[1]

Default rates by year, percent **Graph 10**



[1] Default rates are calculated based on the rated outstanding CLO tranche and leveraged loan for each combination of year of issuance and year of default. [2] Includes tranches for which the year of issuance is unknown. [3] According to the data provider CH is also covered, however, due to their inactive securitisation market it is not shown explicitly.

Sources: Pitchbook; S&P Global; FSB calculations.

Analyses carried out in recent years suggest increased resilience of the senior tranches of CLO structures despite the deterioration in lending standards. Since the GFC, underwriting standards in the leveraged loan market have weakened, resulting in a reduction in creditor protection (see Box 5 and Graph 15). Analysis of a small sample of representative CLOs carried out in 2019 found that, even after applying a higher loss rate to account for these developments,[98] holders of investment-grade tranches (i.e. rated BBB or above) would not incur losses (due to defaults) in a stress that resembled the GFC and that it would take a loss rate more than twice as severe as that of the financial crisis for AAA-rated tranches to incur losses.[99] Other scenario analyses

[98] Recovery rates were adjusted downwards by 20 percentage points to account for weaker underwriting standards on loans issued in 2018, when the analysis was undertaken.

[99] See Bank of England (2019), Financial Stability Report, July.

suggest that, while AAA-rated tranches appear better protected from defaults, higher tranche collateralisation may be offset by weaker underlying collateral, potentially lower recovery rates, and higher correlation of default rates within the pool.[100] More recent industry analysis in 2022 also suggests limited losses for tranches with investment-grade ratings even in scenarios where default rates exceed the GFC experience.[101]

Box 5: Evolution of underwriting standards in leveraged loans

CLO covenants operate as disciplining devices for managers to appropriately screen and monitor their investments within the closed-end structure.[102] However, the so-called "cov-lite" loans without maintenance covenants have become the norm in the underlying leveraged loan market, amounting to around 90% of total leveraged loans in the US and Europe.[103] Looser covenants may have contributed to the observed higher debt levels, as they prohibit creditors from early stepping into the restructuring process, and hence lengthen the default cycle and encourage excessive debt built-up.[104] More heavily indebted corporates tend to be more vulnerable during economic downturns, since they are more likely to encounter financial distress and be faced with rating downgrades, forced deleveraging, or default. Further indicators signalling a deterioration of the underlying credit quality are EBITDA add backs,[105] higher leverage, lack of debt cushions[106] (i.e. the amount of debt in a borrower's capital structure that is subordinated to the senior loan), opaque loan documentation (sometimes allowing to strip collateral from secured loans), and a higher share of low credit ratings.[107] Recent literature suggests that the weaker credit underwriting standards may increase fire sale of leveraged loans due to some features in the CLO market, such as specific CLO covenants (e.g. the requirement to diversify the loan portfolio across borrowers and industries, and to maintain a specific ratio of asset to debt (also called the over-collateralisation test), which when violated would have significant costs for managers, affecting their compensation and reputation, and the use of book values to evaluate most underlying loans.[108]

In general, the weaker underwriting standards (including looser covenants) in leveraged loans could lead to lower CLO recovery rates. Indeed, both US and European CLO portfolios have experienced a gradual decline in recovery rates since the GFC but particularly in recent years, reaching a historically low level in 2023.[109] Stakeholder feedback also suggests that hard defaults (i.e. when the borrower fails to make a payment on time, rather than a lesser covenant breach) are much more common in the CLO

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100 See ESMA (2019), Leveraged loans, CLOs – trends and risks, in Trends, Risks and Vulnerabilities No.2, September; and ECB (2019), CLOs: a financial stability perspective, Financial Stability Review, Box 4, May.

101 See Citi Research (2022), How Resilient Will Global CLOs Be in the Next Downturn?; and S&P (2019), When the cycle turns: How would global structured finance fare in a downturn?

102 See Kundu (2022), "The anatomy of corporate securitisations and contract design," Journal of Corporate Finance, vol. 81, pp. 1–23.

103 See ESRB (2023), *EU Non-bank Financial Intermediation Risk Monitor*, p. 62.

104 See FSB (2019), *Vulnerabilities associated with leveraged loans and collateralised loan obligations* , December..

105 S&P states that marketing EBITDA (inclusive of addbacks) is not a realistic indication of future EBITDA and that companies consistently overestimate debt repayment. Together, these effects meaningfully underestimate actual future leverage and credit risk. They also contribute to incremental event risk, as many covenant baskets are tied to EBITDA. See S&P (2023), *Leveraged finance: Fifth annual study of EBITDA addbacks finds management continues to regularly miss projections*.

106 See S&P (2018), Leveraged loans: As cov-lite levels grow, debt cushion shrinks.

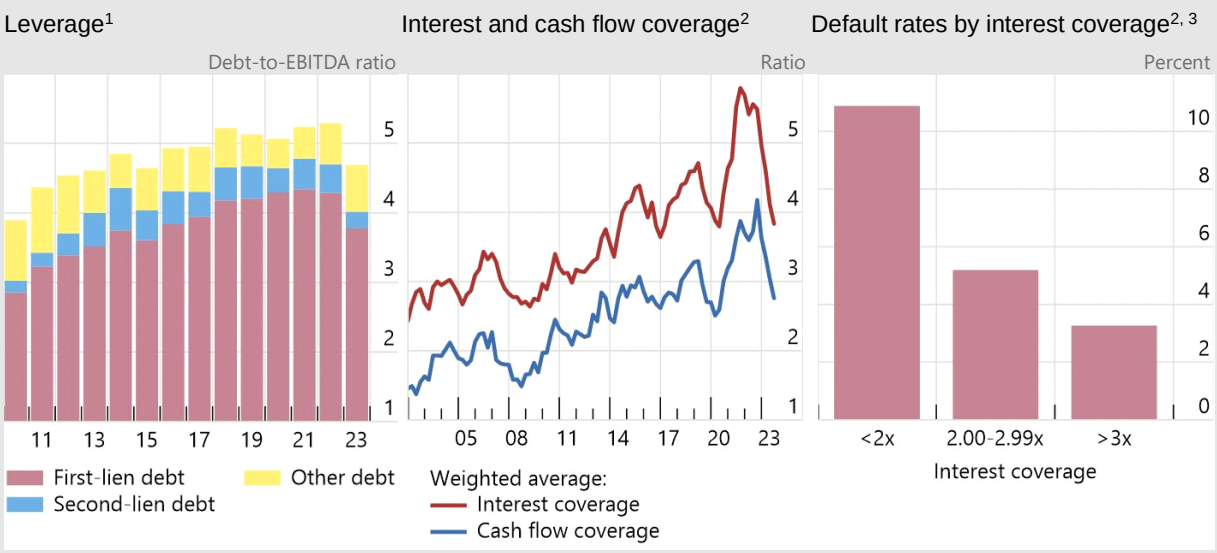
107 In particular, unrealistic estimations of EBITDA can undermine interest coverage and cash flow coverage ratios, making them less credible. Both coverage ratios experienced a historically strong decline in 2023, with interest coverage of new-issue LBOs at 2.3x, the lowest level since the GFC. See S&P (2020), How US structured finance has changed since the credit crisis and Pitchbook (2023), With LBOs scarce, leverage in syndicated US loan market sinks to 7-year low.

108 CLOs use book value to evaluate loans that are rated as B or above. They also use book value for loans rated between CCC and C (CCC loans) if the CCC loan holding in their portfolio is below a certain threshold. The excess CCC loans are required to be evaluated at fair value, which is close to market price. See Elkamhi and Nozawa (2021), "Fire-sale risk in the leveraged loan market," Journal of Financial Economics, Vol. 146, Issue 3, pp. 1120–1147; and Kundu (2023), op. cit.

109 See S&P (2023), US and European BSL CLOs: A comparative overview.

market post-GFC compared to pre-GFC times, indicating that borrowers may have exhausted their ability to make contractual payments.

US leveraged loans **Graph 11**



[1] Based on new issuances. [2] Based on outstanding amounts. [3] Comprises loans closed between 1995 and 2022.

Sources: Pitchbook LCD; FSB calculations.

A number of other factors also suggest that vulnerabilities in the leveraged loan market have grown since the GFC. As noted in an FSB report,[110] a shift of risk from banks to a range of non-bank entities may have increased the complexity and opacity of the leveraged loan and CLO markets, potentially introducing new risks and avenues for shock transmission (see also section 5.2). As a result, these markets may be more vulnerable to macroeconomic shocks than in the past, and stress in leveraged loan markets could disrupt other markets. Work is underway at the international level to address some of these vulnerabilities by enhancing good practices in the leveraged loan and CLO markets.[111]

CLOs issued after the GFC, commonly referred to as "CLOs 2.0", have higher levels of credit enhancement and subordination, which may act as a compensating factor to protect senior tranche holders from losses due to the lower collateral quality (see Graph 16).[112] Credit enhancements such as test triggers and covenants embedded in post-crisis CLO structures are designed to protect senior noteholders from losses.[113] If test levels fall below their trigger levels, cash flows from loan interest and principal payments are diverted away from equity and mezzanine tranches, and these cash flows are used to pay down the liabilities in order of seniority to deleverage the CLO and bring tests back into compliance.

[110] See FSB (2019), *Vulnerabilities associated with leveraged loans and collateralised loan obligations*, December.

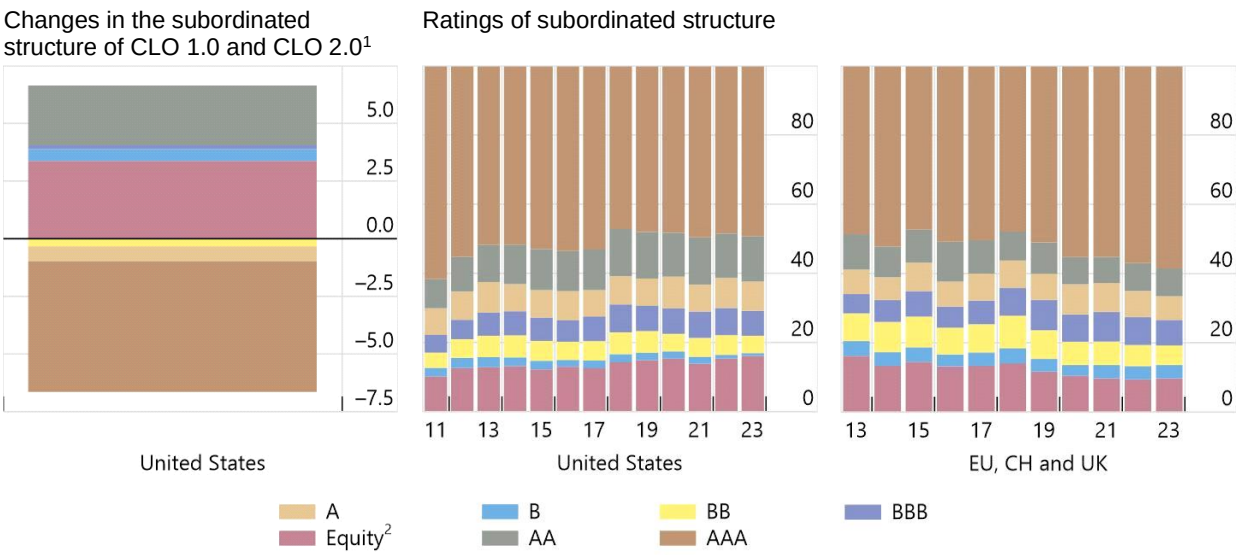
[111] See IOSCO (2024), *Leveraged Loans and CLOs Good Practices for Consideration: Final Report*, June.

[112] This partly reflects post-crisis action by CRAs, which increased subordination requirements following a reassessment of their rating methodologies. See FSB (2019), *Vulnerabilities associated with leveraged loans and collateralised loan obligations*, December; and Hwang (2021), An Investor's Guide to Collateralised Loan Obligations (CLOs), Western Asset Management, June. However, if the security is held on a mark-to-market basis, losses may still be realized in certain instances when subordination levels are eroded and this results in lower liquidity or investor demand.

[113] Standard tests refer to the quality of the collateral; the interest coverage, which is the ratio of scheduled interest due on the underlying collateral portfolio to scheduled interest to be paid to that tranche; and over-collateralisation, which involves the principal value of a CLO's loan portfolio exceeding the principal value of its issued debt.

CLO new issuances: Subordination structures

Percent **Graph 12**



[1] 2022–2007 changes. [2] Includes not rated tranches and tranches with missing ratings.

Sources: Pitchbook; S&P Global; FSB calculations.

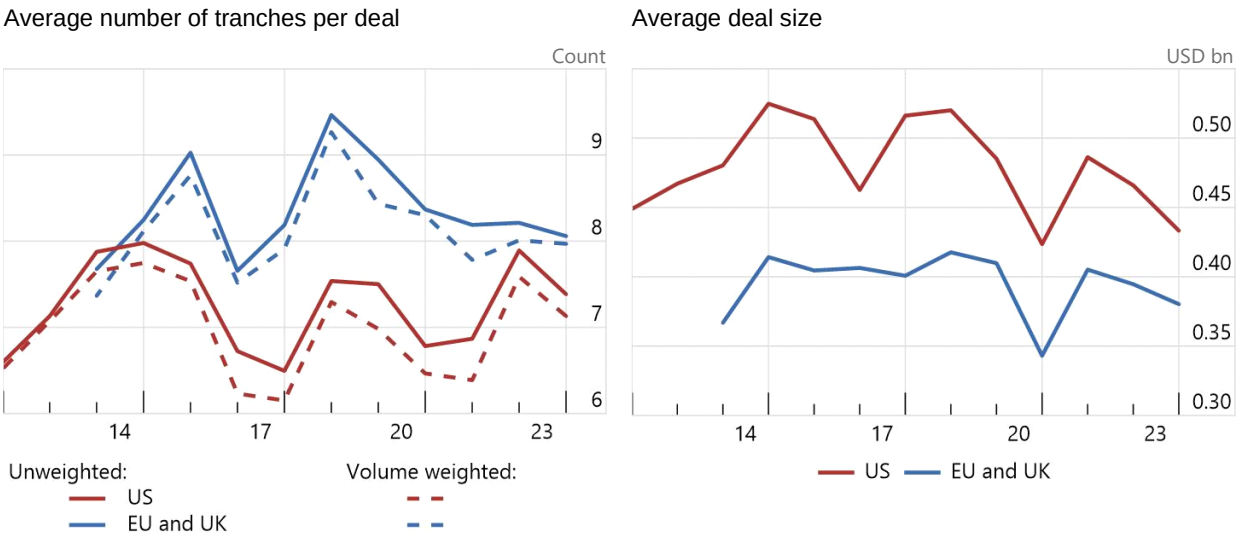
Complexity metrics generally used in the literature do not appear to have been impacted significantly by the post-GFC reforms (see Graph 17).[114] Academic research notes that the capital structure is an important indicator for complexity, since more tranches imply different risk layers, a more complicated waterfall, and difficult loss allocation.[115] Larger average deal or tranche volumes tend to increase the complexity in securitisation, as they represent more loans, underlying collateral, and geographic dispersions.[116] Even though securitisation reforms do not target these metrics directly, they might influence them to the extent that higher fixed costs due to regulation play a bigger role for smaller issuers and volumes, an issue that has also been highlighted by some stakeholders. However, average deal and tranche size have not changed materially during the post-GFC period, suggesting no obvious adverse effects from the reforms. Both in Europe and the US, larger deals tend to have slightly fewer tranches, as indicated by the volume weighted number of tranches, which can be seen as a compensating factor for deal size.

[114] For a discussion of complexity in securitisation, see Ghent et al. (2019), "Complexity in structured finance", The Review of Economic Studies, Vol. 86, issue 2, pp 694–722.

[115] See, for example, An et al. (2015), "What is subordination about? Credit risk and subordination levels in commercial mortgage-backed securities (CMBS)", Journal of Real Estate Finance and Economics; He et al. (2016), "Does the market understand rating shopping? Predicting MBS losses with initial yields", The Review of Financial Studies, Vol. 29, Issue 2, pp. 457–485; Vink et al. (2021), "Security design and credit rating risk in the CLO market", Journal of International Financial Markets, Institutions and Money, 72; and Van Breemen et al. (2023), "Risk retention in the European securitisation market: Skimmed by the skin-in-the-game methods?", ECB Working Paper, no. 2023/2837.

[116] See, for example, Van Breemen et al. (2023), op. cit.; and Jiang et al. (2018), "Revolving rating analysts and ratings of MBS and ABS: Evidence from LinkedIn", Management Science, Vol. 64, pp. 5461–5959.

Complexity metrics for the CLO market* Graph 13



* Based on new issuances. According to the data provider CH is also covered, however, due to their inactive securitisation market it is not shown explicitly.

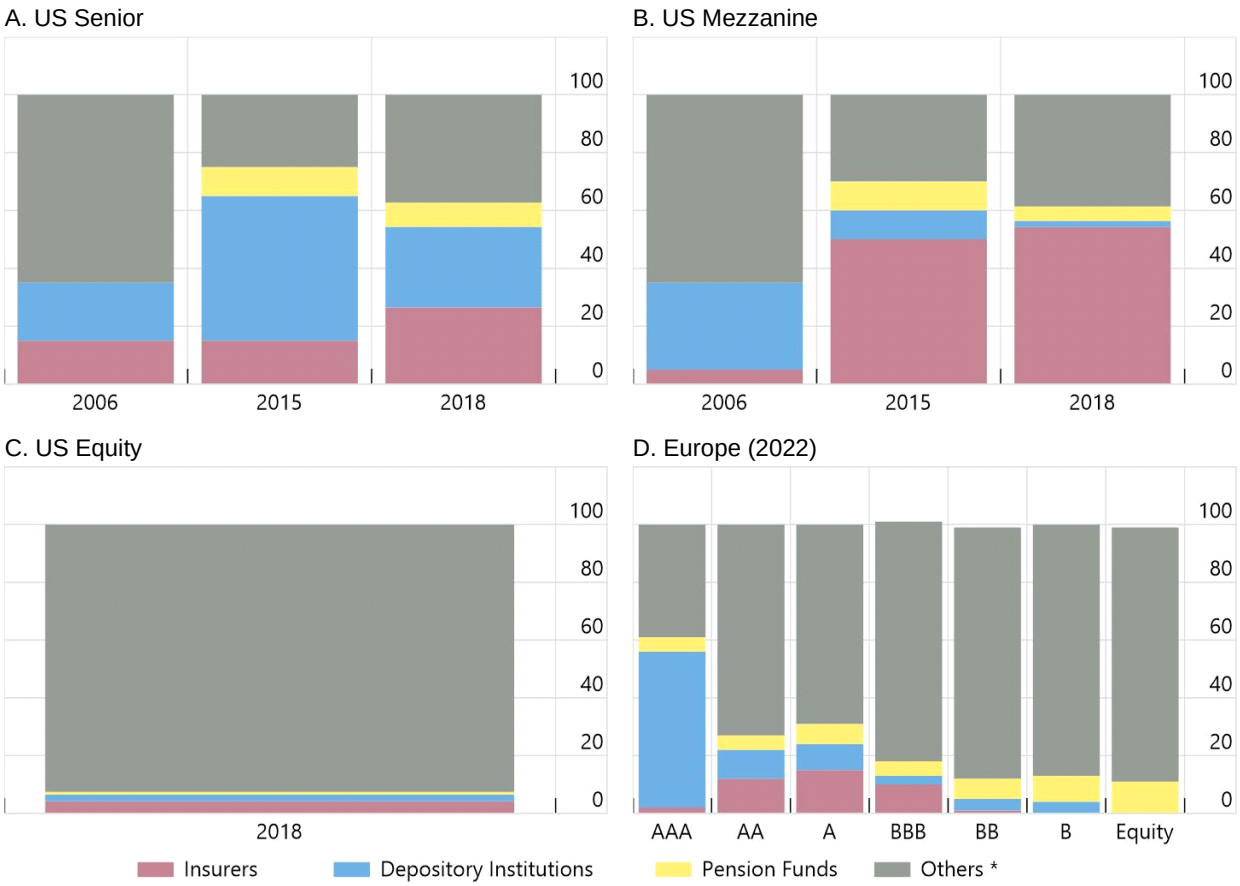
Sources: Pitchbook; FSB calculations.

The prudential reforms may have contributed to a shift in banks' CLO exposure from mezzanine to senior tranches since the GFC (see Graph 18). In particular, banks' CLO holdings are concentrated in a small number of large US and Japanese banks with a significant cross-border dimension. These banks hold mainly AAA-rated CLO tranches for various reasons, including yield pick-up over certain other securities (if they are not the underlying loan originator), liquidity management, and relationship management (if they want to place lower-rated tranches with investors). The more risk-sensitive regulatory capital charges under Basel III, as well as other post-GFC reforms (e.g. eligibility of collateral for central bank financing), may have contributed to this outcome. Lower in the CLO capital structure, the main buyers of the mezzanine tranches are money managers and, in the case of the US, insurers (a trend attributed by some stakeholders to differences in regulation). The equity tranche nowadays is mostly held by asset managers and hedge funds.[117]

[117] See DeMarco et al. (2020), *Who owns US CLO securities? An update by tranche*; ESMA (2023), *EU CLO credit ratings – risk of conflicts of interests relating to methodology changes*; and S&P (2019), Those $700B in US CLOs: Who holds them, what risk they pose.

CLO investors by capital structure

Percent **Graph 14**



* Others include for example asset managers and hedge funds.

Sources: Citi Research, ESMA, Federal Reserve Board, FSB calculations.

4.2.2. Risk retention in CLOs

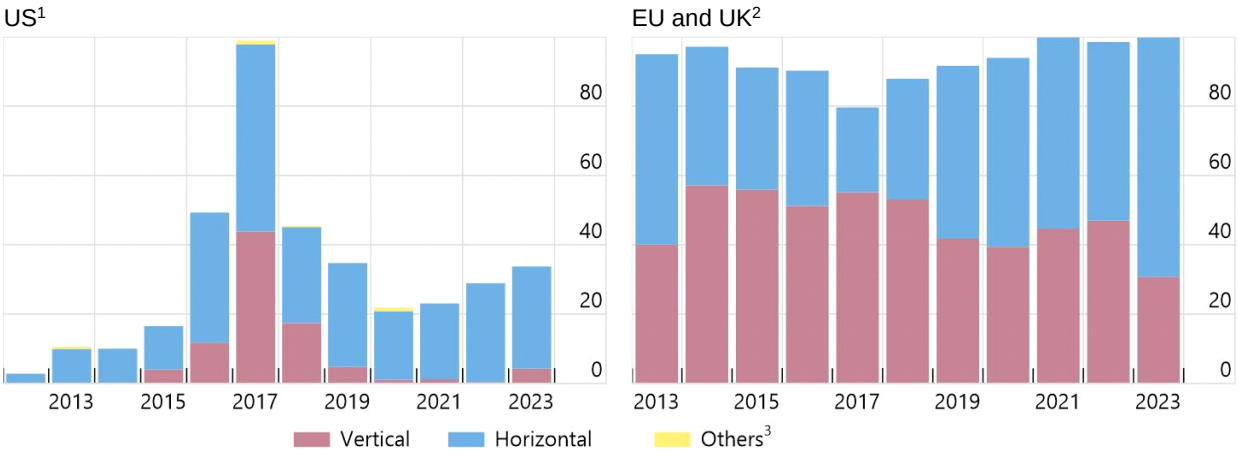
There does not appear to be a clear preference between risk retention methods in CLO markets when risk retention regulation is in place (see Graph 19). Under a voluntary risk retention regime, which applied to the US except for 2017 and the beginning of 2018 (see section 4.2), typically part of the equity slice is retained. The selection of a method depends on various factors including permitted forms and investors' preferences. Anecdotal evidence suggests that some CLO investors would prefer the vertical method to avoid having the CLO manager also be the equity holder, which confers significantly more rights and potentially different incentives than those of debt holders.[118] However, the limited literature available to date is not conclusive about the influence of these methods when it comes to CLO ratings and pricing.[119]

[118] For example, during the non-call period of a CLO, the CLO equity holder has the right, but not the obligation, to refinance CLO tranches. Furthermore, the equity tranche represents a claim on all excess cash flows that remain once the obligations for all debt tranches have been met, which might influence the risk appetite of the CLO manager. See Guggenheim (2023), Understanding collateralised loan obligations (CLO).

[119] See Bektic and Hachenberg (2021), "European arbitrage CLOs and risk retention", *The European Journal of Finance*, Vol. 27, Issue 18, pp. 1791–1803.

CLO new issuance by disclosed risk retention type

Percent **Graph 15**



[1] If risk retention is not disclosed, it is not captured by vendor data. Hence, data may underestimate the actual share of risk retention in CLO deals. [2] The bars do not sum up to 100%, in spite of the existence of risk retention requirements for European CLOs, because if risk retention is not disclosed, it is not captured by the vendor data. In addition, the vendor data includes Switzerland even though there are no CLOs with underlying loans in the country. [3] Other risk retention methods include mainly the on-balance sheet method in Europe, and the combined L shape method in the US (see section 3 for details).

Sources: Bloomberg; Fitch; Pitchbook; FSB calculations.

The 2018 US court ruling to overturn the risk retention rule for open-market CLOs (i.e. CLOs in which the loan assets are acquired from "arms-length negotiations and trading on an open market") in the US provides some insights into the effects of that reform (see Box 6). The US risk retention rule initially took effect in December 2016. However, following the court ruling in February 2018, open-market CLO managers were no longer required to retain a 5% interest in the credit risk of the CLOs they managed. By contrast, the rule continues to apply to balance-sheet CLO managers, which are "created, directly or indirectly, by the originators or original holders of the underlying loans to transfer the loans off their balance sheets and into a securitisation vehicle", although these represent only around 10% of the US CLO market.

The changes in risk retention requirements resulting from the court ruling allows for a difference-in-difference analysis, where CLOs affected by the court ruling act as a "treatment group".[120] One approach is to examine the differential effect of the court decision on the pricing of newly-issued open-market CLOs (which were affected by the court decision) to those of balance-sheet CLOs (where the risk retention requirements continue to apply).[121] Another approach is to examine the differential effect of the court ruling on the risk characteristics of similar CLOs issued before and after the original rule went into effect. In this approach, CLOs issued before the rule was adopted serve as the control group, while those issued after the rule was implemented serve as the treatment group.[122] The latter approach can also be extended to comparisons of small

[120] Difference-in-Difference (DiD) is an econometric method used to assess the causal effect of an event (the court ruling in this case). This method compares a set of units (open-market CLOs) where the event happened (treatment group) in relation to units (balance-sheet CLOs) where the event did not occur (control group). The underlying logic of DiD is that if the event never had happened, the differences between the treatment and control groups would remain the same overtime. The establishment of a causal effect holds under certain conditions and whether these conditions have been met.

[121] In principle, risk characteristics of newly-issued CLOs could also be examined in this manner. However, such comparisons are difficult in practice due to the small issuance volume and considerable heterogeneity of balance sheet CLOs. See Annex 4.

[122] An open-market CLO that was issued before the risk retention rule went into effect would be unaffected by the court ruling (i.e. the "treatment"), while a CLO issued during the time the rule was in effect would be impacted.

versus large CLO managers with the assumption that the latter are relatively less constrained in capital terms, and hence less affected by the risk retention requirements.

Box 6: US Court ruling on risk retention in CLOs

In October 2014, the Board of Governors of the Federal Reserve System (the Board), the Federal Deposit Insurance Corporation, Office of the Comptroller of the Currency, Securities and Exchange Commission (the SEC), Federal Housing Finance Agency, and Department of Housing and Urban Development (collectively the "Agencies") jointly adopted regulations pursuant to the Dodd-Frank Act to require any "securitizers" of asset-backed securities to retain at least 5% of the credit risk associated with the assets collateralising such securities. Under this rule as adopted, managers of CLOs were considered to be "securitizers" and became subject to its provisions on 24 December 2016.

After the adoption of the rule, the Loan Syndications and Trading Association (LSTA) sued the SEC and the Board, challenging the Agencies' decision to apply credit risk retention requirements to the managers of open-market CLOs. The LSTA challenged the nature of the transactions performed by open-market CLO managers, noting that the language of the statute invoked by the Agencies does not encompass their activities. Specifically, it argued that the managers of open-market CLOs typically never own the assets that collateralise a CLO, and thus cannot transfer them to the issuer. Instead, the manager acts as an agent of the issuer in selecting the assets to be purchased by the issuer from third parties.

In early 2018, the US Court of Appeals for the District of Columbia ruled in LSTA's favour. The court ruling effectively ended the risk retention requirement for open-market, but not balance-sheet, CLOs.

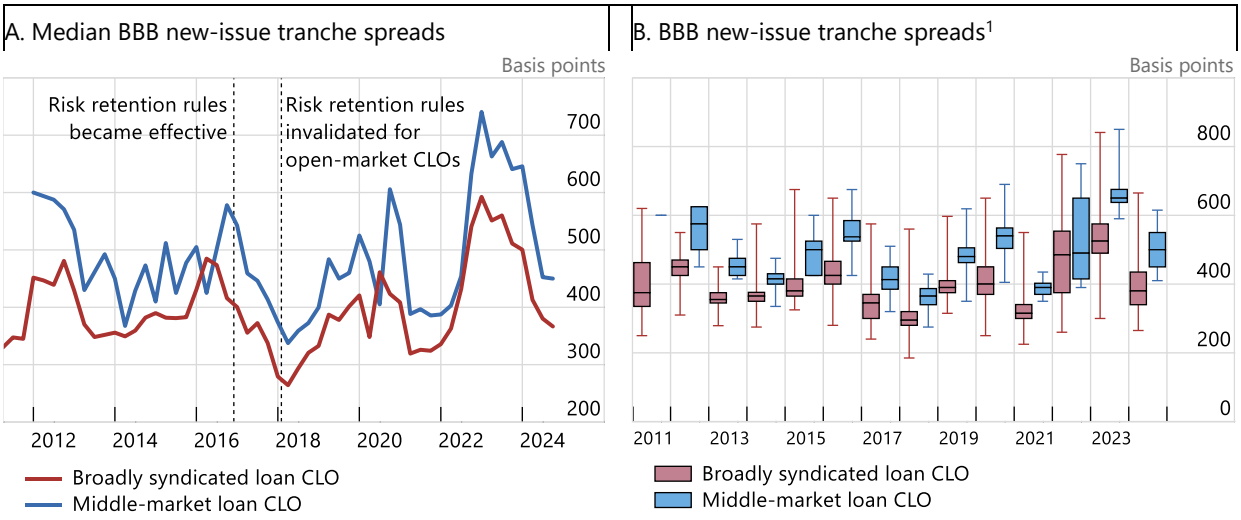
Comparing open-market and middle-market new issue CLO spreads does not provide clear evidence of an effect from the court's invalidation of risk retention in the US. Conceptually, if investors perceived CLO managers (as sponsors of CLO deals) holding some skin-in-the-game as a signal of the quality of the CLOs, there could be an observable impact on pricing after the rule was invalidated. Historically, middle-market CLOs traded at wider tranche spreads compared to open-market CLOs (Graph 20.A). All else being equal, one would expect the add-on "premium" that investors assign to comparable rated middle-market over open market CLO tranches to decrease after the 2018 court decision. However, the average add-on premium on median new issue BBB-rated tranche spreads of middle market over open market CLOs in the two years prior to the implementation of the retention requirement was 86 basis points, compared with 83 basis points since the first quarter of 2018.[123] Considering the variabilities in pricing in both sets of CLO tranches, the difference does not appear significant (Graph 20.B). Furthermore, difference-in-differences methods to analyse before-after retention rule invalidation also find no discernible effect on the spreads of open-market and middle-market CLOs (see Annex 4).

Insights from stakeholders suggest that the apparent indifference of the pricing of new issue CLOs before and after the court ruling can be attributed to a number of factors. First, a deeper and wider investor base. Second, third-party equity capital raised through a concerted industry effort in preparation for the retention rule. Third, an embedded risk alignment between CLO managers and rated note investors arising from manager fee structure and manager reputation.

[123] This analysis focuses on BBB-rated tranches — a tranche with investment-grade credit rating presumably with a wider investor base that is also relatively sensitive to credit losses.

New-issue tranche CLO spreads

Graph 16



[1] Box and whisker plot represents minimum, 25th percentile, median, 75th percentile and maximum.

Sources: Pitchbook LCD; FSB calculations.

On the other hand, analysis using propensity score matching models on CLO deals with and without risk retention suggests that risk retention may impact pricing at the margin, potentially by broadening the eligible investor base (see Box 7). The analysis uses propensity score matching models[124] to compare the weighted average cost of capital (WACC) and the spread of AAA-rated tranches ("AAA spread") of similar pairwise retention and non-retention deals at issuance for deals in the US. The findings suggest that the average WACC and AAA spreads if all deals were retention deals would be around 3.5%, or between 5 and 10 basis points lower than the average if none of the deals included risk retention (see Graph 21). The risk retention's dampening effect on pricing may stem from an expanded investor base and it aligns with the findings in the literature on other securitisation segments.[125] That said, there do not appear to be discernible differences in CLO risk measures before and after the adoption of risk retention and the court's subsequent invalidation.

Box 7: Methodological approach for propensity score matching models

To assess the effect of risk retention on the pricing of the AAA spreads and of the WACC of US CLOs, a sample of 681 deals[126] was examined from 2018 to 2023, i.e. after the US court overturned the risk retention rule for open-market CLOs. Two simple linear models were considered: the first relates the interest rate of AAA spreads (and, in parallel, the WACC) to the size of the operation and the presence of risk retention, while the second also considers whether the operation was issued after or before the outbreak of the COVID-19 pandemic. To address potential data imbalances and confounding factors, a preliminary matching phase was applied, in the form of Propensity Score Matching. The findings suggest a slightly beneficial effect of risk retention on the pricing of AAA spreads and on the WACC.

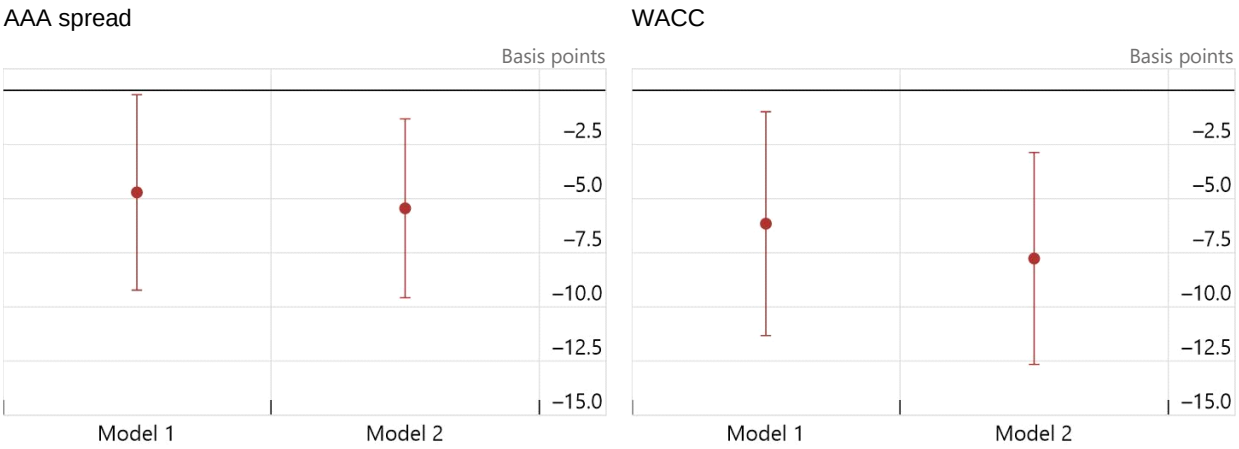
124 Propensity score matching (PSM) attempts to reduce the effects of confounders by matching already treated subjects with control subjects who exhibit a similar propensity for treatment based on pre-existing covariates that influence treatment selection. See Guo and Fraser (2015), Propensity score analysis, SAGE Publications, second edition.

125 See, for example, Agarwal et al. (2021); and Demiroglu et al. (2012).

126 Deals with missing WACC and AAA spread have been dropped from the estimation sample.

Effect of risk retention on AAA spreads and WACC for US CLOs*

Graph 17

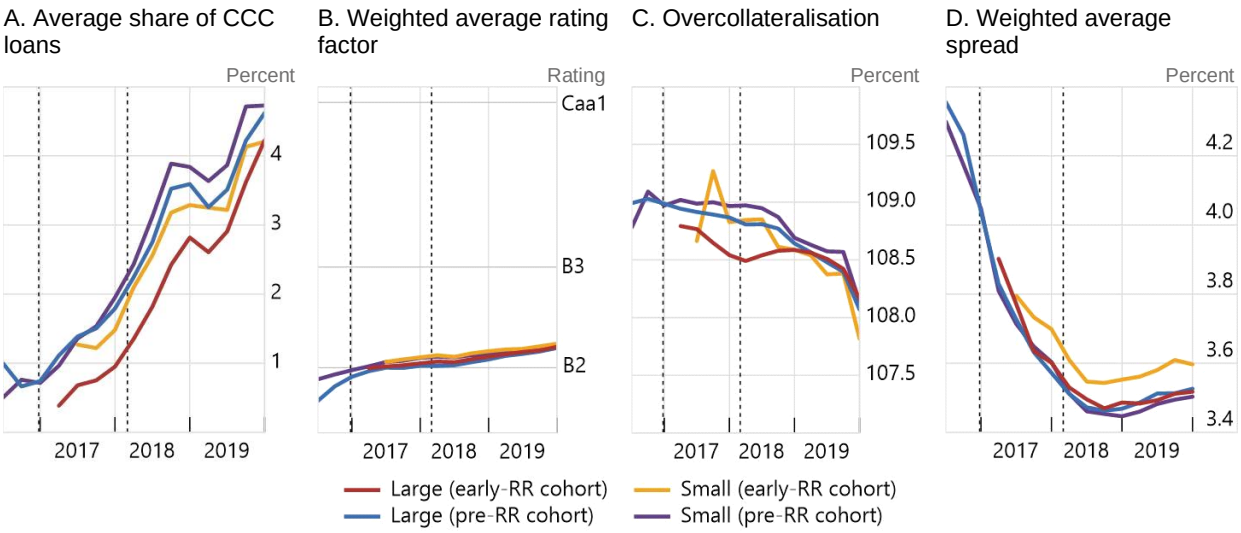


* Estimated effects and corresponding 95% confidence intervals of voluntary risk retention pricing of AAA spreads and WACC after Propensity Score Matching. Model 1 covers the time from 2018 to 2023. Model 2 excludes the pandemic year 2020.

Sources: Bloomberg; Fitch; Pitchbook; FSB calculations.

Similarly, risk retention appears to have had limited effect on risk measures of open-market CLOs. Most open-market CLO managers are fee-for-service agents and, smaller CLO managers in particular, may have had more difficulty financing the required risk retention interest for riskier loan portfolios and thus be more susceptible to the effects of such requirements. All other things being equal, one might expect that adoption of a risk retention requirement and its subsequent removal would show differential effects on risk measures across CLO cohorts (i.e. CLOs issued just before ("pre-RR" cohort) and just after the rule went into effect ("early-RR" cohort) and across managers' exposure (i.e. small-vs-large). However, all four risk measures examined – average share of CCC loans, weighted average rating factor (WARF), the degree of overcollateralisation and weighted average spread – exhibit broadly similar trends across cohorts both before and after the rule's adoption as well as before and after the rule's (partial) invalidation (Graph 22). This suggests that limited immediate effect of risk retention on observable CLO risk characteristics. Furthermore, new issuance by both large and small CLO managers declined in the quarter immediately after the implementation of risk retention, but quickly recovered thereafter. New issuance increased in the quarter immediately after the court ruling though there was no discernible difference between large and smaller CLO managers by historical standards.

Risk measures of large and small CLO managers in the US[1] Graph 18



[1] The two dotted lines represent December 2016 and February 2018 respectively.

Sources: Moody's Analytics CLO database; FSB calculations.

There are a number of potential explanations for the lack of clear evidence on the effect of risk retention. Given the constraints imposed on CLO managers in the indenture documents through numerous tests on observable portfolio characteristics (e.g. over-collateralisation, ratings, concentration limits), it is likely that most of the effect of risk retention on risk-taking would be unobservable, or latent. That is, a manager who is tempted to load up on riskier loans can be effectively constrained by covenants on the portfolio's WARF; however, a manager who loads up on the riskiest loans within a given rating is more difficult to constrain and detect. Evidence of such risk taking is difficult to detect econometrically without a significant and potentially persistent shock to economic conditions.

In addition, any effect on risk taking from a risk retention requirement is unlikely to be constant and immediate. The behavioural constraints resulting from such requirements could be most pronounced during peaks of the credit cycle. Insofar as that is the case, the period in which the rule came into (and out of) effect may have not offered the best venue, as – by some measures – credit market sentiment was relatively benign during that time.[127] Moreover, any effects are unlikely to have been immediate as any changes to manager's preference in loans could be expected to take time to trickle down to issuance in the loan market.

There is some evidence to suggest that voluntary risk retention is used as a signalling tool during periods of stress. During the pandemic, newly issued CLO deals in the US with voluntary risk retention exhibited a slightly higher share of lower-rated loans compared to deals without risk retention (see Graph 23), which is consistent with some of the literature on this topic.[128] This observation would also suggest that market practices on voluntary risk retention vary over time depending on various factors, e.g. competition, state of underlying credit market, and expertise

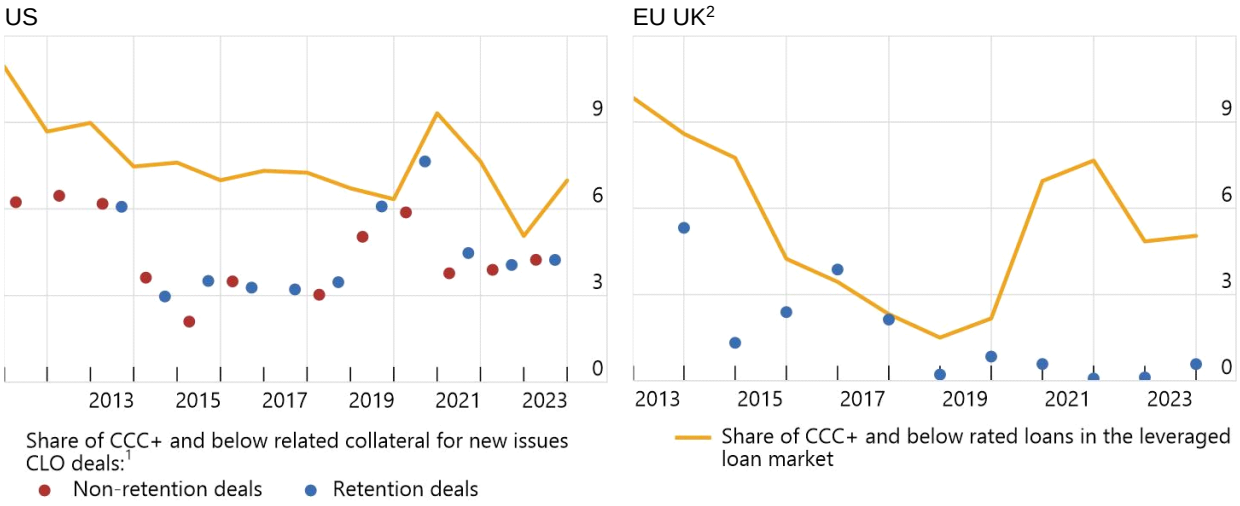
127 For example, the high yield share of debt issuance was relatively low by historical standards during that time. See Greenwood and Hanson (2013), "Issuer quality and corporate bond returns," Review of Financial Studies 26, No. 6, pp. 1483–1525.

128 See, for example, DeMarzo and Duffie (1999), op. cit.; DeMarzo (2005), "The pooling and tranching of securities: A model of informed intermediation", Review of Financial Studies, Vol. 18, pp. 1–35; and Guo and Wu (2014), op. cit.

in managing distressed loans. Furthermore, the share of loans rated CCC+ and below for CLO deals is generally lower than in the underlying leveraged loan market, which is likely driven by the covenants in those deals that place a limit to the proportion of such loans (typically between 5–7.5%) and highlights how they might influence CLO managers' behaviour when there is credit deterioration in the underlying loan market.

Open-market CLOs and leveraged loans: risk retention and collateral rated CCC+ and below*

Percent **Graph 19**



* If risk retention is not disclosed, it is not captured by vendor data. Hence, the graph may underestimate the actual share of risk retention in the market. [1] The quality covenant in CLOs places limits to the amount of loans rated CCC+ and below (typically between 5 and 7.5%). If data contains only few observations, it is not shown. [2] According to the data provider CH is also covered, however, due to their inactive securitisation market it is not shown explicitly.

Sources: Bloomberg; Fitch; Pitchbook; FSB calculations.

The financing in certain cases of CLO managers' retained risk by third-party investors raises questions about the extent to which the objective of risk alignment is fulfilled. CLO managers may operate with light balance sheets, so any retained risk would force them to fund these assets with additional debt or equity.[129] This has contributed to the establishment of risk retention vehicles[130] to attract third-party investors such as pension funds or family offices.[131] These vehicles appear to be used widely in both the US (where there are no risk retention requirements applicable to open-market CLOs) and Europe (where risk retention requirements apply via the EU Securitisation Regulation). These vehicles are designated as originators for risk retention purposes as they purchase leveraged loans on their balance sheets and then subsequently securitise them into the CLOs. These structures, however, are bankruptcy remote and funded by third-party investors with limited to no investment from the CLO managers.

[129] In this context, it has been argued that the need to finance risk retention requirements may have driven the sale of some smaller, independent CLO managers to larger groups such as private equity firms.

[130] These vehicles are typically SPVs or similar structures predominantly funded by investors who wish to gain exposure to a diversified pool of CLO risk retention notes. The vast majority of the SPV's revenues are derived from the risk retention notes.

[131] During the period when risk retention was mandatory for open-market CLOs in the US, some CLO managers started financing the horizontal risk retention slice through a separate SPV commonly referred to as the risk retention vehicle. Third-party investors are given incentives to participate, such as discounted management fees. See Risk.net (2014), Lawyers tout fixes for CLO risk-retention woes, 25 November; and Risk.net (2023), CLO managers tap captive capital for 'uneconomical' deals, 30 August.

This third-party risk origination model might not be always aligned with the goals of risk retention. In many cases the vehicle does not belong to the same corporate group as the CLO manager or have – in the view of some supervisory authorities – sufficiently robust governance arrangements in place (e.g. fully staffed and independent investment committees), thereby moving risk to parties not originally envisioned by the IOSCO recommendations. Such a practice may also complicate authorities' efforts to determine who is ultimately exposed to risk retention-related losses. Moreover, risk retention vehicles might themselves be levered and the financing arrangements may lead to margin calls, especially in cases where the retained risk consists of first loss exposures and hence subject to substantial asset value volatility. The niche nature of the vehicle also entails an elevated likelihood of industry concentration (in terms of arrangement, administration or funding), which might become an additional source of risk. Under the Securitisation Regulation in the EU, the third-party origination special purpose vehicle is also subject to a 'sole purpose test' whereby the risk retention holder must not be established, or operate, for the "sole purpose" of securitising exposures.[132]

Conversely, other factors besides risk retention requirements are also considered by CLO investors for ensuring risk alignment. As noted above, stakeholder feedback suggests structural features specific to a CLO can contribute to the alignment of interests between the manager and investors, like compensation and reputational risk.[133] Concerning compensation, while CLO managers receive an incentive fee if equity achieves a specific internal rate of return, the primary source of income for a CLO manager is the management fee, which is typically several times the incentive fee and is largely influenced by the deal's size, although it also depends to some degree on performances, since downgrades can force managers to pay down notes early.[134]

4.3. Non-agency RMBS market

This section describes key trends in non-agency RMBS markets and, where possible, seeks to relate these trends and resilience metrics to the reforms. It focuses, in particular, on the credit performance of RMBS since the GFC, developments in structures and how risk retention has likely enhanced the alignment of incentives.

The European and US RMBS markets are characterised by generally fewer defaults of rated tranches following the GFC (see Graph 24). US RMBS issued pre-2005 have consistently higher default rates across the years observed, while the overall tranche default rates appear to be decreasing over time. Default rates of European RMBS also appear to be consistently low (below 0.5%). Post-2010 issuances contribute minimally to tranche defaults, indicating an improvement in asset quality which reflects the favourable macroeconomic environment (house price appreciation as well as low interest and unemployment rates), although stakeholders noted that stricter rules for credit underwriting also had an important impact. Another driver of lower default

[132] To address this issue, the EU has recently introduced regulatory changes clarifying that an entity created solely for the purpose of holding the risk retention slice should not be considered as a legal option. See EU (2023), *Commission delegated regulation (EU) 2023/2175*, Article 2 (7.a and 7.b).

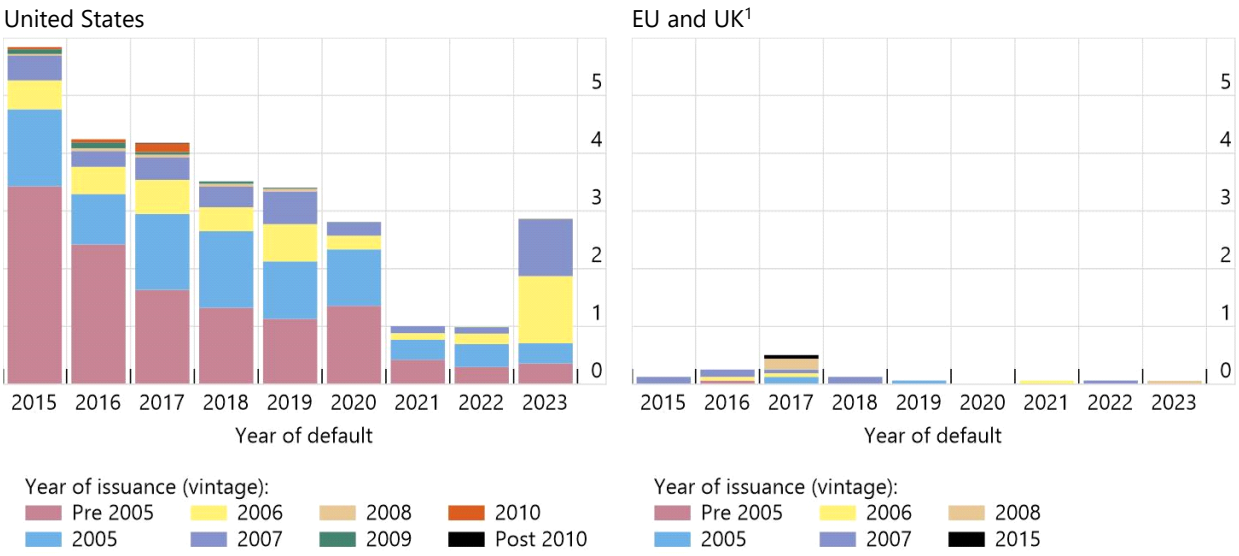
[133] See also Benmelech et al. (2012), Securitisation without adverse selection: The case of CLOs," Journal of Financial Economics, Vol. 106, issue 1, pp. 91–113.

[134] See IOSCO (2024), *Leveraged Loans and CLOs Good Practices for Consideration: Final Report*, June.

rates has been the changes in the methodologies of CRAs aimed at generating more rating stability and addressing some rating weaknesses revealed by the GFC.

RMBS default rates by year: breakdown by vintage

Percent **Graph 20**



[1] According to the data provider CH is also covered, however, no defaults have been observed.

Sources: S&P Global; FSB calculations.

In general, subordination levels in RMBS are lower compared to the overall securitisation market, reflecting the comparatively lower credit risk of the underlying exposure. In the European RMBS market, there have been relatively few credit rating downgrades since 2015. Such rating stability suggests the absence of unforeseen underperformance due to external shocks or securitisation-specific governance failures.[135] Even in the speculative-grade space, annual downgrade rates have remained below 5% of outstanding ratings. This contrasts with rating downgrades before 2015 when the annual average was 14% for investment-grade RMBS and 20% for speculative-grade ratings. In the US RMBS market, the share of non-agency RMBS has declined significantly since the GFC even though a wider range of products is now securitised. The decline in volume may be partly attributed to regulatory changes that include more favourable treatment for agency MBS (see Box 8).

Box 8: Evolution of the non-agency US RMBS market

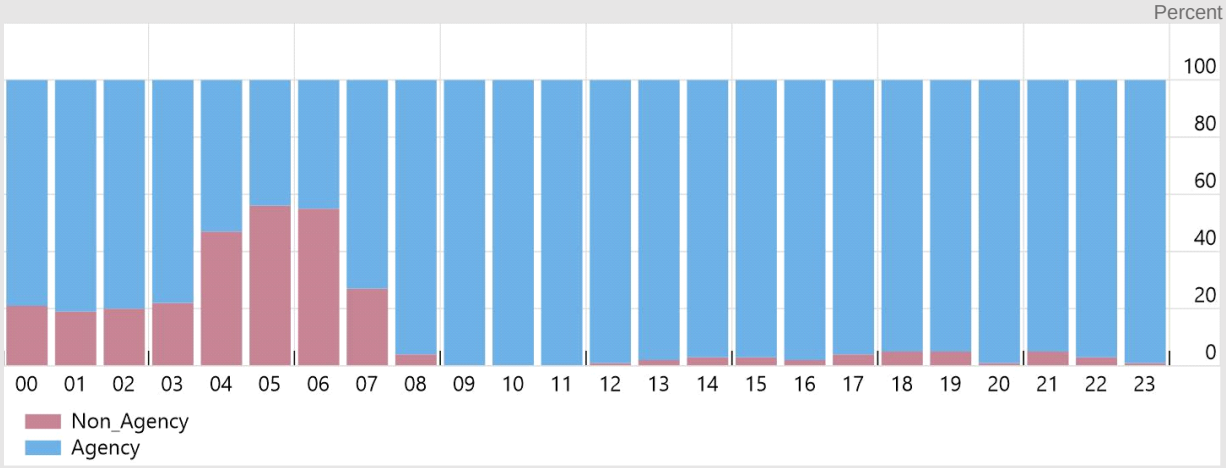
The non-agency RMBS market in the US has gone through significant changes since the GFC in terms of volume of issuance and types of securitisation products. While securitisation of residential mortgages continues to be active (around 65% of total home mortgages is securitised), a significant portion of the activity is in the form of agency MBS, which generally carries implicit or explicit government guarantee on timely interest and principal.[136] Issuance of non-agency RMBS as a share of residential mortgage securitisation declined from as high as over 50% pre-GFC to less than 5% in 2022 (Graph 25).

135 Note that RMBS rating stability tends to compare positively with corporate ratings, because the latter have a higher exposure to idiosyncratic (firm specific) shocks, in addition to macro-shocks. S&P provides additional information on the sensitivity of its ratings by estimating that less than 10% of AAA ratings on European RMBS would be downgraded if house prices were to decline by 10% and 90+ days arrears were to increase by 4 percentage points (from early 2023 levels); see S&P (January 2024), European Structured Finance Outlook 2024.

136 See Fuster et al. (2022), Mortgage-Backed Securities, FRBNY Staff Reports No. 1001.

Share of non-agency vs agency MBS over time

Share of total issuance by balance **Graph 21**



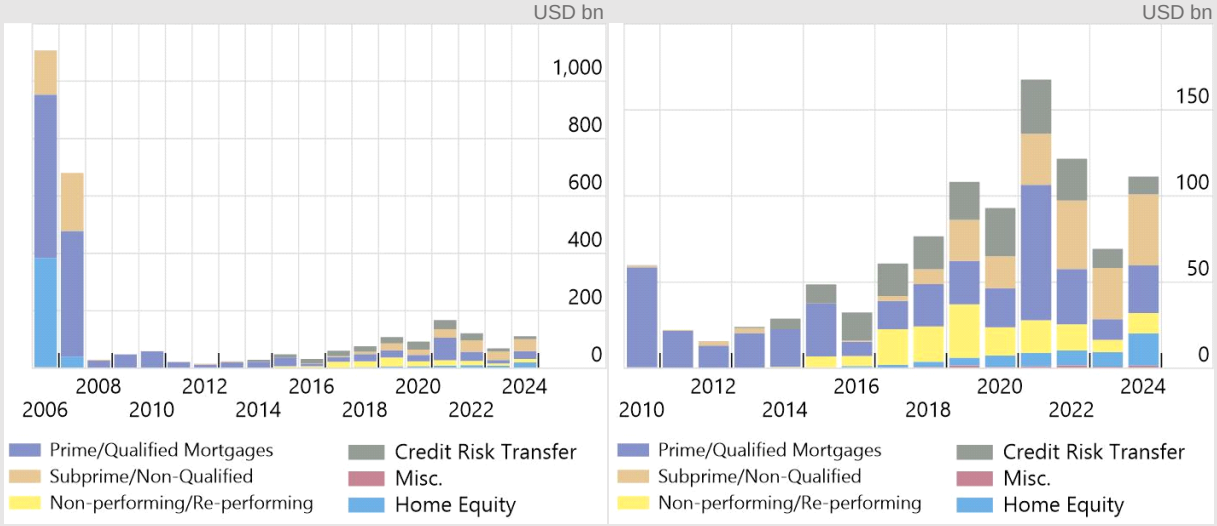
Sources: eMBS, Corelogic, Goldman Sachs Global Investment Research; FSB calculations.

Since the GFC, non-agency RMBS securitisation issuance has experienced substantially lower overall issuance volume and has become more diverse. The overall issuance volume reached about USD 170 billion in 2021, a post-GFC peak, but it is significantly lower than the USD 1.1 trillion of issuance in 2006 (Graph 26). Whereas a substantial portion of the pre-GFC non-agency RMBS issuance was comprised of subprime mortgages and home equity loans, the post-GFC activities involve a wider range of products securitised, including credit risk transfer deals from government-sponsored enterprises (GSEs) as well as securitisation deals backed by non-qualified residential mortgages.

Composition of non-agency RMBS issuance over time

Graph 22

A. 2006–2024[1] B. 2010–2024[1]



[1] Excludes synthetic risk transfer transactions

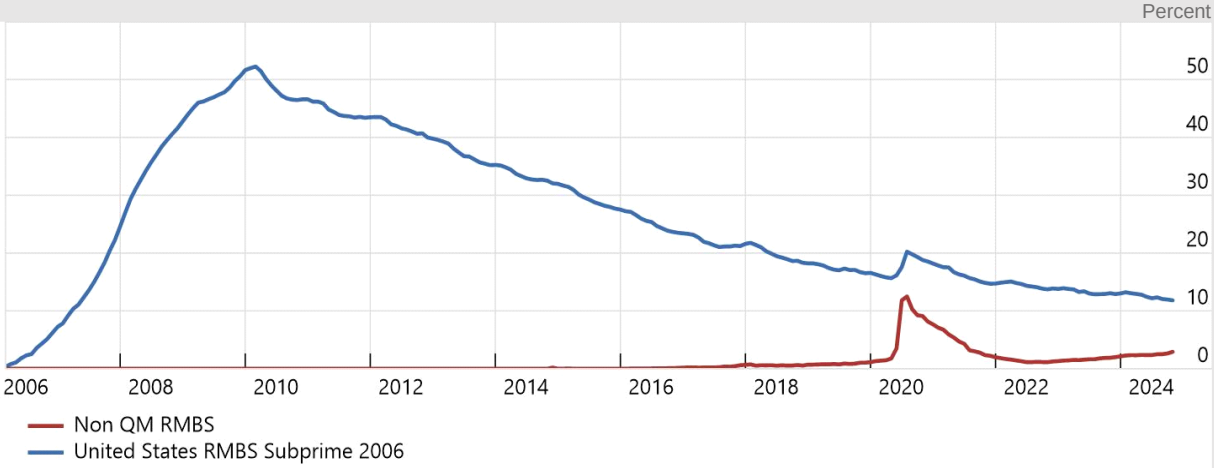
Sources: Green Street (Asset-backed Alert); FSB calculations.

Post-GFC regulatory policy changes likely have impacted non-agency RMBS issuance. These include:

- Dodd-Frank Act, which introduced the consideration of borrowers' 'Ability-to-Repay" (ATR) and "Qualified Mortgage (QM)",[137] a safe harbour for mortgage loans originated under the ATR rule, and also risk retention requirements for securitisation sponsors
- Higher conforming loan limits for certain areas for government-sponsored enterprises (GSEs)
- Favourable treatment for agency MBS for bank liquidity requirements.

Non-QM RMBS experienced a spike in loan delinquency rates with the onset of the pandemic but declined subsequently (Graph 27). Loan delinquency rates has been steadily increasing since mid-2022 but are generally performing significantly better than pre-GFC RMBS deals.

Non-QM vs Subprime RMBS delinquency rates **Graph 23**

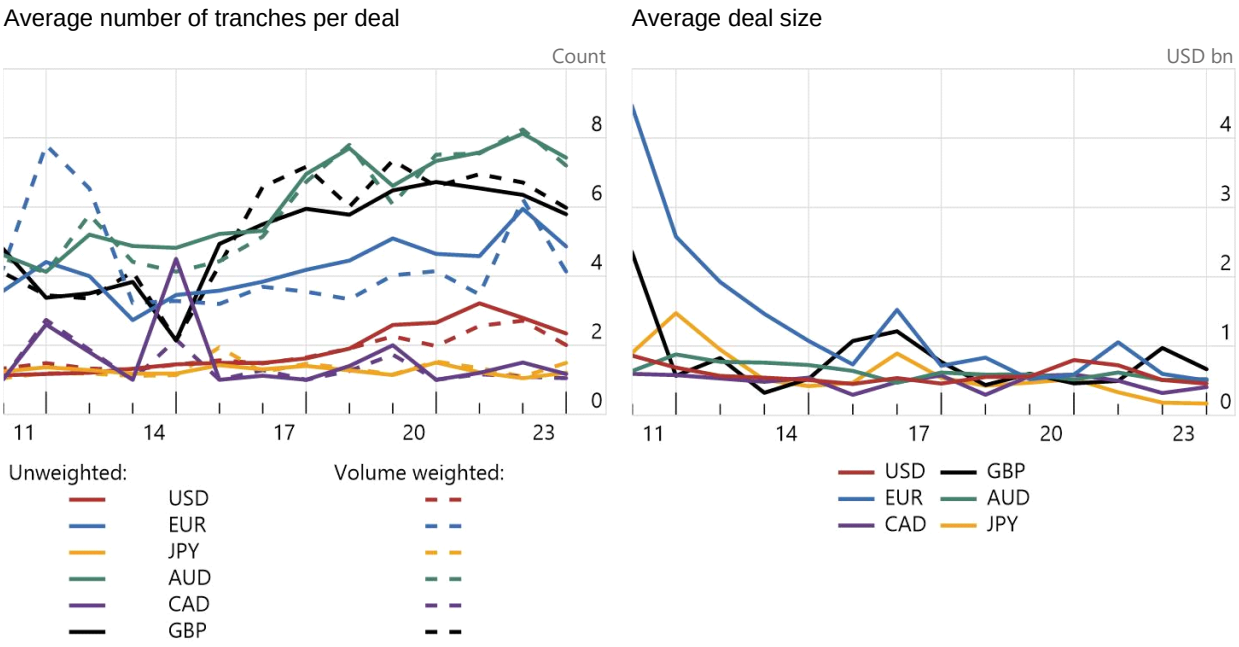


Sources: Intex; JPMorgan; CoreLogic; McDash; Freddie Mac; FSB calculations.

Complexity metrics related to the size of an RMBS deal or tranche do not appear to have worsened in FSB jurisdictions compared to 2011 (see Graph 28). As noted previously (see section 4.2), academic research notes that the capital structure is an important indicator for complexity, since more tranches imply different risk layers as well as a more complicated cash flow distribution methodology ("waterfall") and more difficult loss allocation. Larger average deal and tranche volumes increase the complexity in securitisation, as they represent more loans, underlying collateral and geographic dispersions. The fact that these indicators have not increased post-GFC suggests no clear adverse effects on fixed costs stemming from regulation on RMBS market activity.

[137] The resulting rule requires mortgage originators to consider a variety of factors including, borrower's credit history, current income, expected income and other factors. The Consumer Financial Protection Bureau implemented the rule under its definition of qualified mortgages that includes threshold on debt-to-income ratios. Importantly, it removed certain risky features demonstrated during the GFC, such as negative amortization with which borrowers could pay a monthly amount less than interest, thereby having unpaid interest added to principal balance, as well as interest-only loans or balloon loans. Deals that are considered QM-compliant are exempt from the risk retention rule.

Complexity metrics by currency: RMBS market* Graph 24



* Based on new issuances.

Sources: Dealogic; FSB calculations.

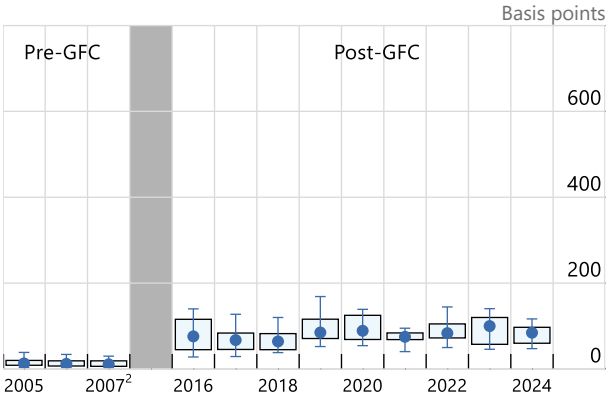
Some data suggest improved pricing of risk in European RMBS since the GFC,[138] but it remains unclear to what extent this can be attributed to the G20 reforms. In the period prior to the GFC, the differences in coupon rates between investment-grade and sub-investment-grade tranches of European RMBS deals were relatively small. A narrow dispersion in coupons might suggest inadequate risk-sensitive pricing, including for risks associated with misaligned incentives. The perceived heterogeneity in the riskiness of RMBS may have been compensated somewhat by the variation of tranche subordination and over-collateralisation. Since the GFC, not only have the median coupons of all tranches increased, but the differences between individual deals have widened considerably (see Graph 29). This post-GFC widening in dispersion may be indicative of greater risk sensitivity across and within tranches, in part due to the effects of the reforms.

[138] Include Belgium, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain and the United Kingdom.

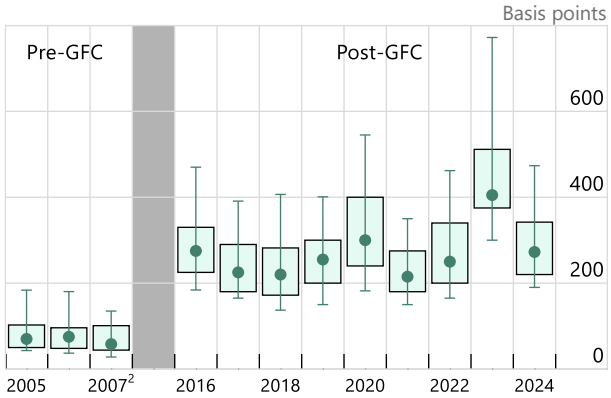
European RMBS spreads across tranches[1]

Graph 25

A. AAA and Aaa coupons over floating rates



B. BBB+ to BBB– and Baa1 to Baa3 coupons over floating rates



[1] The box and whisker plot represents the 5th percentile, 25th percentile, median, 75th percentile, and 95th percentile coupons. Tranches with a credit rating of either Fitch, Moody's or S&P at issuance; number of tranches 2005–2007 = 933 and 2016–2023 = 454. [2] Up to mid-2007.

Sources: Bloomberg; FSB calculations.

Stress testing exercises highlight the resilience of the RMBS market, while also identifying specific vulnerabilities in particular FSB jurisdictions. The stability of RMBS performance across FSB jurisdictions is supported by low unemployment and other macroeconomic variables. A stress test carried out in 2019 by a CRA[139] pointed to significant post-crisis improvements in mortgage origination and securitisation processes in the US and Europe, regulatory measures in Europe that have improved transparency and stability, and strategic adjustments in Australia that mitigate risks associated with global housing market trends and household indebtedness. More recent analysis by the ESRB[140] finds that RMBS markets in the EU are resilient to property price corrections and income reductions, while a significant rate increase could push the DSTI ratio higher but still within acceptable limits. A further vulnerability highlighted in this analysis is high concentration: more than half of EU RMBS were originated by a few banks, while a few large banks also hold the majority of RMBS in the banking sector.[141] Most of these holdings are retained securitisations used as collateral for central bank financing (see Annex 4).

The academic literature generally finds that risk retention better aligns the incentives of originators and investors in the RMBS market. Some of these studies assessed the effectiveness of risk retention as a market practice rather than as a regulatory requirement, and the level of risk retention in such cases may have been lower than 5%.[142] Measuring risk retention by originator-sponsor affiliation in the US RMBS Alt-A market pre-GFC, one study finds that retaining even a little "skin in the game" is related to significantly better ex-post loan performance, with lower cumulative net loss and foreclosure rate.[143] The study also shows that risk retention matters most for low documentation loans, where originator screening is more important to

[139] See S&P (2019), When The Cycle Turns How Would Global Structured Finance Fare In A Downturn, September.

[140] See ESRB (2022), *Monitoring systemic risks in the EU securitisation market*, July.

[141] These largest originators combined represented 43% of total EU assets in the second quarter of 2021.

[142] Data on the level of risk retention in securitisation deals pre-reform are not readily available. For the US CMBS market, for example, risk retention amounted to no more than 2% of total deals' proceeds in the years immediately preceding the GFC. See Committee of European Banking Supervisors (October 2009), Call for technical advice on the effectiveness of a minimum retention requirement for securitisations; and Furfine (2020), op. cit.

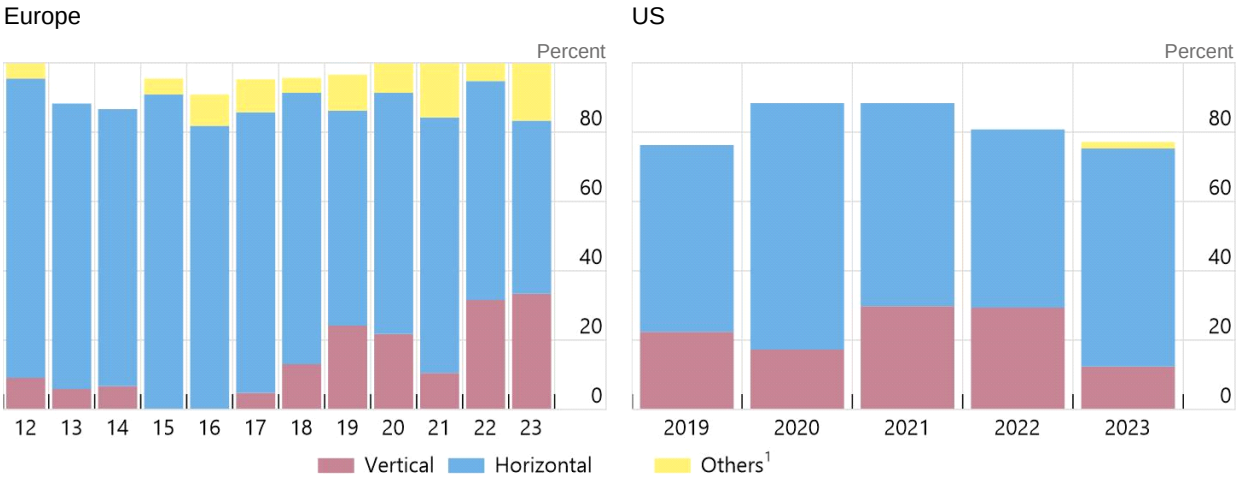
[143] See Demiroglu and James (2012), op. cit.

determine the creditworthiness of borrowers, and that deals with risk retention have less subordination for AAA-rated tranches and lower yields. Another study analyses the effects of the European prudential and other securitisation regulations in place since 2018 on the RMBS market and concludes that these have decreased complexity in the securitisation market and contributed to higher quality of the underlying loans, with lower delinquency rates compared to the pre-regulation period.[144]

RMBS issuers in the US and Europe predominantly use the horizontal risk retention method (see Graph 30). In the case of Europe, one reason might be that banks use investment-grade RMBS securities as collateral to access central bank financing, thereby leaving the horizontal (first loss) slice to retain. Since risk retention requirements in the US market only apply to the non-qualified RMBS market, signalling to investors about the credit risk of the underlying exposures becomes more relevant, thereby also favouring the use of the horizontal method.

RMBS share by risk retention type*

Graph 26



* If risk retention is not disclosed, it is not captured by vendor data. Hence, figures could underestimate the share of deals with risk retention in the market. [1] Other risk retention methods include mainly the on-balance sheet method in Europe, and the combined L shape method in the US (see section 3 for details).

Sources: European Data Warehouse; Bloomberg; Green Street (Asset-backed Alert).

The literature finds that the retention method can influence the spread at issuance. Academic studies for the European securitisation market find that in general risk retention leads to a lower risk premium, especially if the originator selects the vertical method.[145] A common reason discussed in the literature is that in an economic downturn, the equity tranche is very likely to default so that there is no incentive of monitoring the loans if the equity tranche has been retained.[146] On the contrary, retaining a vertical slice maintains incentives for originators even in downturn scenarios. Following this line of argumentation, originators might rather choose the vertical over the horizontal method if an economic downturn becomes more likely.

[144] See Billio et al. (2023), "Complexity and the default risk of mortgage-backed securities", Journal of Banking & Finance, Vol. 155.

[145] The literature focuses on various securitisation segments, although RMBS is a large part of their estimation sample. See Gürtler and Hibbeln (2012), "How smart are investors after the subprime mortgage crisis? Evidence from the securitisation market", ZBW Working Paper Series; and Van Breemen et al. (2023), op. cit.

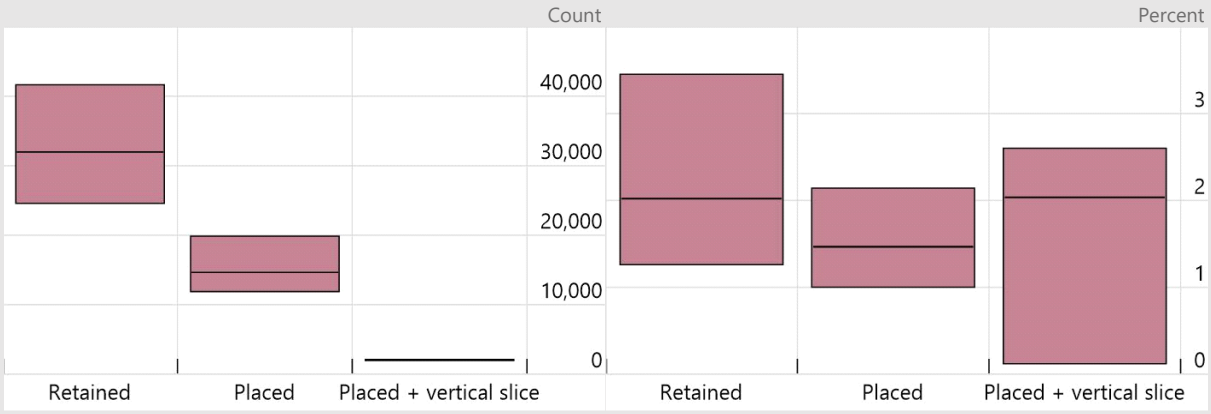
[146] See Gürtler and Hibbeln (2012), op. cit., and Kiff and Kisser (2014), op. cit.

Analysis using European loan-level data for RMBS does not suggest an obvious misalignment of incentives for issuers and investors between 2015 and 2023 (see Box 9 and Graph 28). In particular, the analysis finds that the fraction of loans in arrears is broadly similar across different segments of RMBS deals, including the segment with potentially the most significant risk transfer (i.e. placed deals that have the vertical slice as the method of risk retention). In addition, over this period there has been a declining trend in default rates in the RMBS market,[147] which aligns with a decreasing share of mortgages in arrears for the underlying RMBS.

Box 9: Analysis of risk retention in European RMBS deals

The relevance of effective risk retention requirements increases where market participants transfer significant risks. Given this, it may be useful to distinguish different segments of securitisation deals for an in-depth analysis. For simplicity, it is assumed that the probability of material risk transfer – and the relevance of incentive problems in RMBS – increases in the following order: retained deals, distributed deals, and distributed deals that have the vertical slice as the method of risk retention. The analysis is based on a sample that combines data from EDW with qualitative deal data obtained from Bloomberg. Over the reporting years the number of "retained" deals in the sample varies between 124 and 202, in the case of "placed" deals (where at least one tranche is intended for immediate distribution) between 163 and 283, and within this group those with "vertical slice" vary between 0 and 16.

Loan-level data for underlying exposures in European RMBS (2015–2023)[1] **Graph 27**



[1] The upper and lower limits of the box represent respectively the maximum and minimum amounts. The line within the box indicates the median value. Data are averages across all reported deals.

Source: European Data Warehouse; Bloomberg.

Since 2015 the fraction of loans in arrears has been broadly similar on average in all three groups (see Graph 31.B). In addition, deals that combine "placed and vertical slice" (P&V) deals tend to have relatively few loans (see Graph 31.A), which could make them structurally more vulnerable to co-movement of default risk and could be another reason for choosing the vertical slice method.

Beyond parameters determining the probability of default, risk retention should strengthen incentives for a prudent management of the underlying mortgages over the lifetime of the transaction, especially in cases where these mortgages go through a modification or foreclosure process. In the absence of stress periods in the historical time series, vulnerability indicators can be useful to identify structural characteristics of deals with more risk transfer. The analysis finds that P&V deals tend to have higher fractions of loans with LTV ratios over 100% or with planned amortisation periods over 30 years. Both indicators could imply *ceteris paribus* that recovery rates on defaulted loans would be lower. Consistent

[147] See EBA risk dashboard.

with this, an indicator of net losses shows somewhat weaker performance of placed deals compared to retained deals. Investors appear to be aware of relatively higher risk in the P&V deals at the time of issuance as they typically feature above average credit support for the senior notes.

Strengthened mortgage underwriting regulation, including borrower-based (macro)prudential requirements for credit quality, may also have contributed to greater risk alignment in RMBS. Mortgage delinquencies and lower outstanding exposures at default are factors that determine the frequency and materiality of potential discretionary issuer decisions. For example, EDW data show that the fraction of mortgages with a current LTV above 100 has been broadly stable below 6% for both the weighted averages of all RMBS reported as retained or placed. The fraction of mortgages with a current planned amortisation period of more than 30 years has declined to 2% for retained and placed deals. Furthermore, verified borrower income is reported significantly more often for loans originated after 2015 than before. These findings suggest that improved RMBS credit performance may also be due to enhanced mortgage underwriting standards.

5. Broader effects of the reforms

Evaluating the broader effects of the risk retention and prudential requirements involves an assessment of their social benefits and costs. These assessments typically estimate the expected benefits of reforms in terms of reducing the likelihood and severity of financial crises. Concerning costs, such exercises generally assume that more stringent regulatory requirements increase the funding costs of financial institutions that are in turn passed on to borrowers through higher lending spreads, thereby reducing overall lending and economic output. To be comprehensive, such cost-benefit analyses require a general equilibrium model of the economy. While this type of analysis goes beyond the scope of the evaluation, this section presents other qualitative and quantitative evidence on the broader effects of the securitisation reforms.

The social benefits and costs of the reforms. Concerning benefits, previous evaluations by the FSB and BCBS have found:

- gains in banking sector resilience from Basel III, particularly for banks more heavily impacted by the reforms;
- while the reforms may have limited lending by banks with weaker initial regulatory ratios, there is no indication that the reforms impaired the aggregate supply of credit to the economy;[148] and
- that these reforms helped shield the global banking sector and real economy from a more severe banking crisis during the March 2023 banking turmoil.[149]

In contrast to the immediate and (mostly observable) direct costs of the reforms, the longer-term economic benefits are difficult to quantify and often less evident as they take longer to unfold (at least a full financial cycle), making a cost-benefit analysis challenging to conduct. This is even

[148] See, for example, BCBS (2022), *Evaluation of the impact and efficacy of the Basel III reforms*, December 2022.
[149] See BCBS (2023), *BCBS Report on the 2023 banking turmoil*, October 2023.

more the case when considering the specificities of a single market segment like securitisation since it only makes up a small fraction of banks' balance sheets and of financing to the economy.

An indication of the realised costs of securitisation reforms can be inferred from examining the effects of the reforms on overall financing to the economy and on financial system structure and resilience. In particular, the benefits of enhanced securitisation market resilience described in the previous section need to be compared to any costs brought about by these reforms. The most commonly cited cost is that, by excessively constraining securitisation as a financing tool, the reforms have reduced overall financing to the economy. Another potential negative impact to consider is whether the reforms have encouraged the redistribution of risk to parts of the financial system that are not as well-placed to assume it compared to the banking sector. Both hypotheses are discussed below.

5.1. Financing to the economy

Some stakeholders consider that the reforms have excessively constrained securitisation, noting the reduced role it plays nowadays in private sector financing compared to the pre-GFC period. The argument is that the reforms – by imposing more conservative prudential and new risk retention requirements – have increased costs for issuers and investors, thereby diminishing the appeal of securitisation as a financing tool, which may have in turn unduly reduced the overall financing to the economy and hence economic output. This apparent outcome, particularly as it relates to securitisation in the EU, has been expressed by some stakeholders – even though they did not provide any empirical evidence in support of this assertion and mostly cited jurisdiction-specific reforms that do not form part of the G20 reform agenda (see Box 10). On the other hand, some studies carried out recently conclude that other non-regulatory factors constrain the growth of the EU securitisation market.[150] It is also worth keeping in mind that the period immediately prior to the GFC was characterised by excessive risk-taking and the unsustainable build-up of leverage by the private sector, so it is not appropriate as a reference point for comparisons.

[150] These include the interplay between low supply and weak demand due to a lack of inherent interest from both sides. On the originator side there are other cheaper funding sources such as covered bonds, deposits and ECB repos; and on the investor side there remains a perception of securitisation as a complex product with extensive due diligence requirements. A further factor is that most EU securitisation is done with national level collateral, which results in a set of smaller, less liquid fragmented markets. See, for example, ESAs (2022), Joint committee advice to the EC on the review of the securitisation prudential framework; and Levitin (2023), op. cit.

Box 10: Stakeholder concerns about the effects of securitisation reforms

Some stakeholders have expressed concerns about the potentially dampening impact of G20 and jurisdiction-specific reforms on securitisation markets.[151] The main concerns are described below.

The implementation of **disclosure requirements** was seen as too prescriptive and not sufficiently proportionate in some jurisdictions. For example, some EU stakeholders argued that the transparency and reporting framework for securitisations has increased transaction costs for issuers, which may make less regulated or transparent instruments appear more attractive.

Some market participants also argued that the EU **due diligence requirements** could be more principles-based, to better reflect investor needs and avoid adding to compliance costs and discouraging cross-border investments in securitisations.

Some stakeholders perceive progress in **STC** issuance as disappointing. They consider the relevant requirements in the EU (STS framework) to go further and be more constraining (as well as more costly to adhere to) than the BCBS-IOSCO provisions, thereby limiting the supply of eligible securitisations.

EU stakeholders argue that **Solvency II** is not sufficiently risk sensitive or reflective of the actual risk in securitisation investments, which has allegedly reduced insurers' interest in this product. Relatedly, some stakeholders argue that the **bank capital calibration for securitisation exposures** has resulted in overly prudent risk weights and that further analysis is needed in relation to capital non-neutrality.

Some EU and US stakeholders suggest the **treatment of securitisation in the LCR framework** compared to other alternatives (e.g. covered bonds) has inhibited investment in this product by banks.

Reforms might have affected securitisation volumes in a positive way by increasing investors' trust in the market. Reforms might have enhanced transparency and trust in securitisation markets that were damaged due to the GFC experience. This may have brought back investors or even broadened the investor base, thereby increasing the demand for securitisations.[152] Indeed, some stakeholders have highlighted the positive effects of greater data availability in securitisation markets and the implementation of risk retention rules. The higher trust might boost securitisation market activity and hence act against a reduced supply due to potentially higher costs for issuers. Ultimately, an assessment of the relative importance of supply versus demand factors depends on the counterfactual, i.e. what would have happened to securitisation and to the financing of the economy in the absence of these reforms.

Securitisation has diminished in relation to private sector credit since the GFC, though the decline has not been uniform across all segments (see Graph 32). The post-GFC reduction has been mainly driven by the non-prime RMBS segment, while some other segments experienced increasing volumes, e.g. CLOs, certain ABS types (e.g. auto loans) and synthetic securitisations. In particular, CLO volumes have grown significantly since approximately 2013, exceeding the growth in credit to non-financial corporations.[153]

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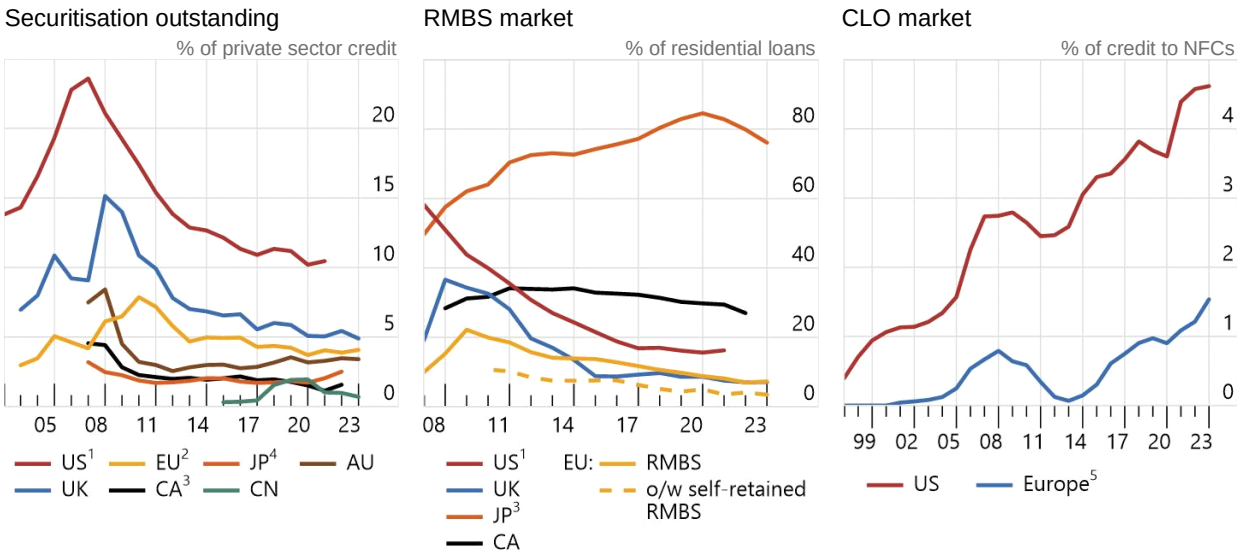
[151] The overview note on consultation feedback and the individual responses, which were not cited as confidential by the respondent, are available on the FSB website alongside feedback received on the terms of reference. See, for example, AFME (2023), *Response to the FSB invitation for feedback on the effects of the G20 reforms on securitisation*, September; IIF (2023), *Feedback on the FSB Evaluation of the G20 Securitisation Reforms*, October; and Managed Funds Association (2023), *Comment Letter re FSB Securitisation Evaluation*, October.

[152] See, for example, Maddaloni and Peydro (2011), "Bank risk-taking, securitisation, supervision, and low interest rates: Evidence from the Euro-Area and the US lending standards", The Review of Financial Studies, Vol. 24, No. 6, pp. 2121–2165.

[153] The increase in outstanding leveraged loan volumes has been partially offset by a decrease in high-yield bonds outstanding.

Much of the reduction of securitisation as a share of private sector credit took place in the immediate aftermath of the GFC and before the reforms were implemented, reflecting the stigma associated with securitisation. The strongest decline was seen in the US, followed by the UK and the EU. Japan and Canada have not witnessed a major decline in securitisation activity (volume) since the GFC, while China experienced moderate growth since at least 2015 in the share of securitisation to private sector credit.[154]

Evolution of cash securitisation outstanding amounts by jurisdiction **Graph 28**



[1] Does not include agency securitisation. [2] Does not include UK. [3] Includes government guaranteed MBS. [4] Does not include agency RMBS. [5] Europe includes EU and UK. [6] Does not include retained securitisation exposure.

Sources: People's Bank of China; Federal Reserve Bank of St Louis, FRED; AFME; Australian Bureau of Statistics; Business Development Bank of Canada; European Covered Bond Council, EMF Hypostat; Bank of Japan; SIFMA; Datastream; DBS Morningstar; FSB calculations.

The reduced utilisation of cash securitisations in some cases does not necessarily imply that overall financing to the economy has been negatively affected. Financial conditions have generally been accommodative in the post-GFC period,[155] as evidenced by growing corporate and household indebtedness. For example, in the case of RMBS, strong growth in mortgage volumes and house prices between 2012 and 2022 suggests that the effective economic costs of lower RMBS utilisation may not have been substantial. In a similar vein, loans to the corporate sector – especially lower-rated firms – have grown in the US and Europe during this period.[156] However, empirical analysis would be necessary to validate this hypothesis by examining the marginal effect of the reforms on the volumes and pricing of loans.[157]

[154] In Canada's case, agency MBS dominates the securitisation market (see Annex 2).

[155] See, for example, p. 3 of the IMF (2022), *Global Financial Stability Report*, October, where the aggregated financial conditions indices for advanced economies have been mostly in the "easy" half from 2014–2022.

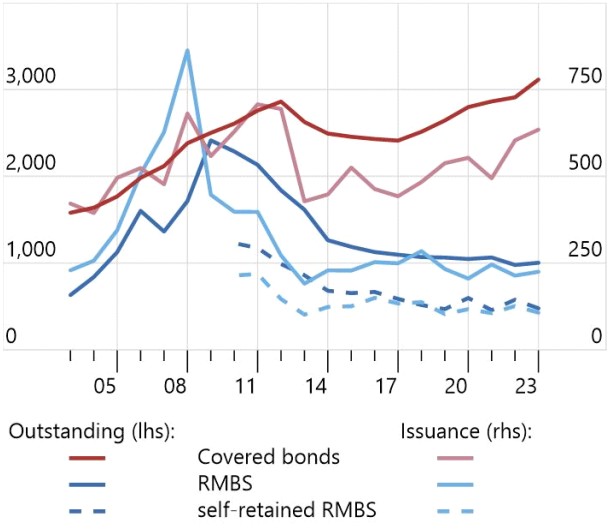
[156] See ECB (2023), Euro Area statistics, December 2023; and FRED St. Louis Fed, Commercial and industrial loans.

[157] For example, Furfine (2020), op. cit. finds that in the US commercial mortgages used as collateral for securitisation deals subject to the risk retention rule have on average an 8% higher interest rate than non-securitised commercial mortgages.

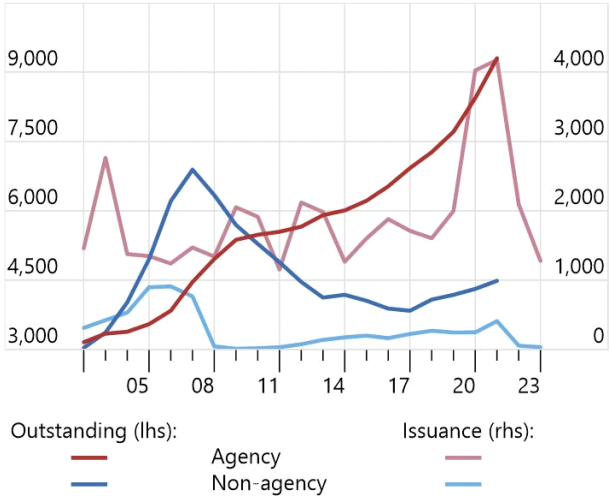
Evolution of cash securitisation and alternative instruments in Europe[1] and US

USD bn **Graph 29**

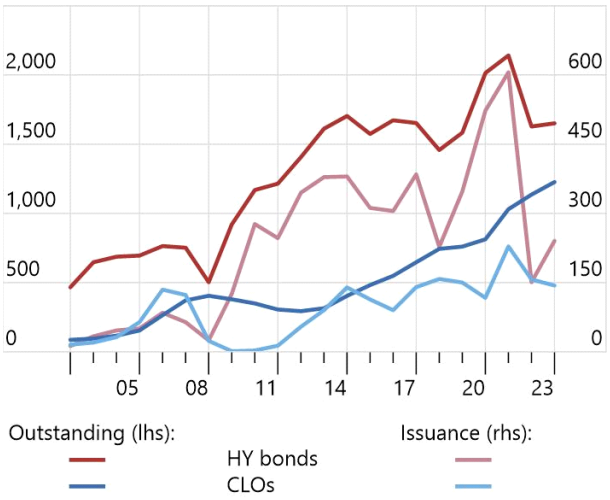
European RMBS and covered bonds[2]



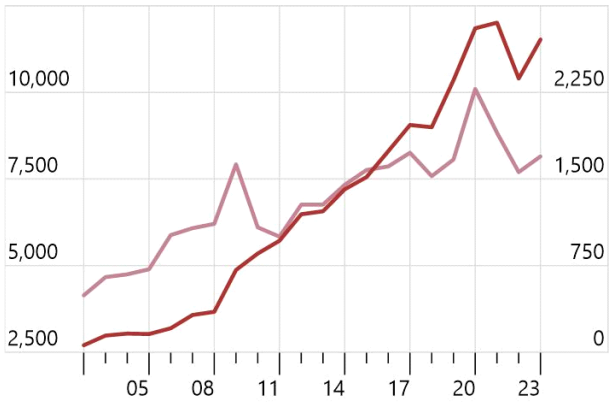
US agency and non-agency MBS



US/European CLOs and HY corporate bonds



US and European IG corporate bonds



[1] Europe includes EU countries and UK. [2] RMBS retained refers to the portion of RMBS securitisations that banks retain on their balance sheets rather than place it in the market; from 2015 onwards the outstanding amount is estimated from flow data.

Sources: Federal Reserve Bank of St Louis, *FRED*; AFME; European Covered Bond Council; SIFMA; ICE Bank of America; FSB calculations.

The use of other financial market instruments as an alternative to cash securitisation increased since the GFC (see Graph 33). In particular, financial institutions turned to government-guaranteed MBS, particularly in the US and Japan, and covered bonds, particularly in Europe, to finance residential mortgage lending.[158] Covered bonds also emerged as a suitable funding option in the euro area to pledge as collateral for short-term central bank refinancing (see Annex 4).[159] In jurisdictions where banks use securitisation for risk transfer and capital relief, they have

[158] See S&P (2023), European Structured Finance outlook. In the euro area, bank deposits remain the most important funding source for mortgages and these deposits have expanded more than covered bonds since 2012.

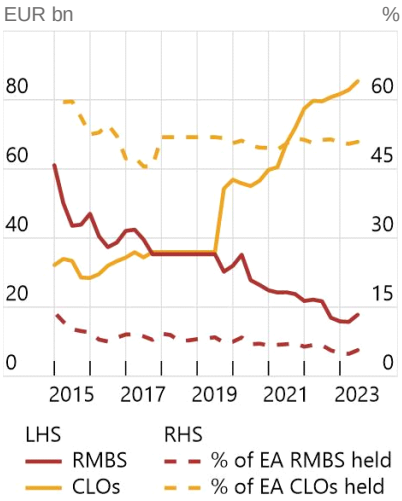
[159] See Skyrman (2024), "Why didn't Europe securitise more? The institutionalisation of covered bonds as an efficient instrument for financialisation", New Political Economy, Vol. 29, No. 1, pp. 144–158.

also opted for synthetic securitisation (see section 2.2).[160] In addition, debt issuance by non-financial corporates has grown significantly in recent years as an alternative to bank borrowing.

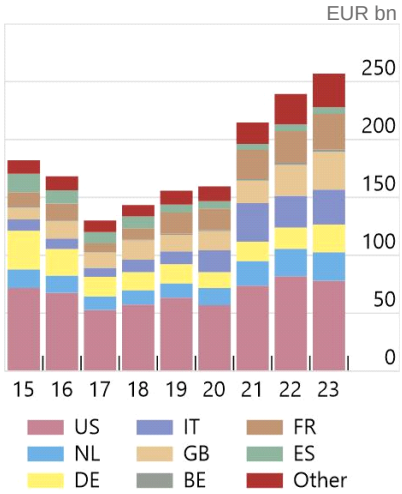
Available evidence does not suggest a significant negative impact to date on cross-border investments in securitisation since the reforms were introduced. International demand amounted to around 20% share of total euro-area securitisations as of end-2022, largely unchanged from 2014. Foreign investors have a preference for CLOs, whereas demand for RMBS has significantly fallen (Graph 34.A). Approximately 45% of the obligors of exposures underlying the securitisation of EU banks' investments are based in the US and UK (Graph 34.B).[161] The US banks' securitisation investment focus is on USD denominated securitised assets, such as for CLOs (Graph 34.C).

Cross-border securitisation activity in the EU and US **Graph 30**

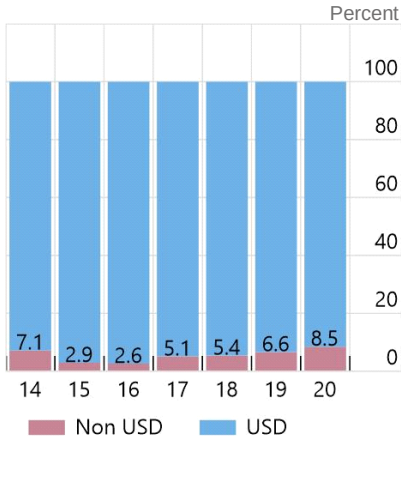
A. Foreign investors in the euro-area securitisation market



B. Large euro-area bank groups' investment in securitisations by country of obligor (approximated)[1]



C. US banks investments in CLOs by currency



[1] Information on securitisation activity based on supervisory data for Significant Institutions in the euro area.

Source: Securities Holdings Statistics by Sector (SHSS), ECB; FRBB; ECB and FSB calculations.

5.2. Financial system structure and resilience

The securitisation reforms appear to have contributed to a redistribution of risk from banks to the NBFI sector across the financial system, though this forms part of a broader trend. The redistribution of risk has been driven both by an increase in credit provision to households and firms by non-bank financial institutions (e.g. funds and finance companies),[162] some of which is funded through securitisations; and also by the growth of non-bank investors in securitisations.

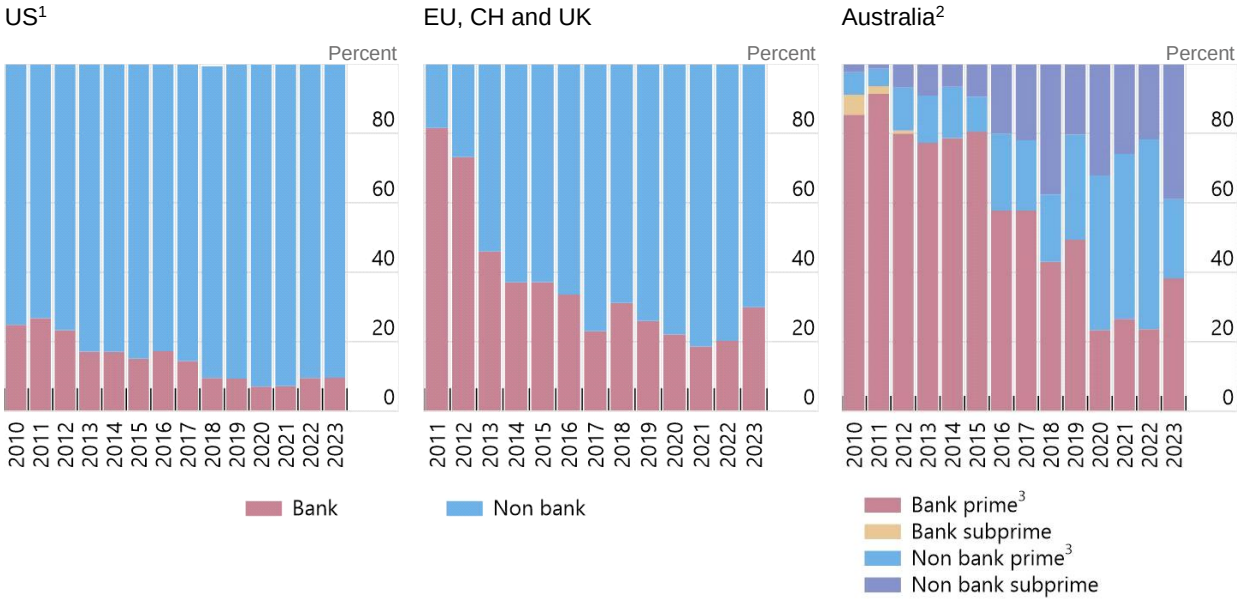
[160] See, for example, ESRB (2022), *Monitoring systemic risks in the EU securitisation market*, p. 24; and Mersch (2017), Securitisation Revisited, speech at the Euro Finance Week.

[161] This is an approximation as only the most dominant country in the underlying pool is considered as long as it reaches a threshold of 20%.

[162] For example, in the US, nonbank mortgage companies' share in mortgage lending increased from 20% in 2008 to around two-thirds in 2024. See Bowman (2020), *The changing structure of mortgage markets and financial stability*, November; and FSOC (2024), *Report on nonbank mortgage servicing*, May. Increases have also been observed in the EU; see ECB (2017), *Financial stability review*, May. The private credit market, where non-banks entities lend to corporate borrowers, is also at an all-time high; see IMF (2024), *Global financial stability report*, "The rise and risks of private credit", April.

This trend is not unique to securitisation, as various conjunctural factors and structural changes in the global financial system since the GFC have increased reliance on market-based intermediation.[163] They include long-term demographic trends leading to asset accumulation; macro-financial factors such as accommodative monetary policies; and rising valuations. For example, in Australia, Europe (driven largely by the UK RMBS market)[164] and the US there has been a shift in the share of securitisation issuance from the banking to the NBFI sector since 2011 (see Graph 35), although banks in most cases continue to provide liquidity and to support NBFI securitisation issuance as, for example, broker-dealer and warehouse lender.

Share of securitisation issuance by bank and non-bank sector **Graph 31**



[1] Non-agency securitisation (excl. CMBS). [2] RMBS. Does not include retained securitisation exposure. [3] Prime securitisations are deals in which 90 per cent or more of the underlying loans are extended on full documentation. Owing to the lack of comparable data, loans categorised as "subprime", "non-conforming", or "incomplete documentation" for Europe and the US are not shown.

Sources: Bloomberg; Green Street (Asset Backed Alert); KangaNews; S&P; FSB calculations.

Banks have shifted their securitisation exposures towards lower risk tranches, especially after the implementation of the Basel securitisation framework in 2018 (see Graph 36). The higher risk weights for riskier tranches introduced by the framework initially led to an increase in banks' risk weighted asset (RWA) density, consistent with findings from the EU and the UK.[165] In response, many banks replenished maturing investments of riskier securities issued pre-GFC with more highly rated tranches that benefit from greater credit enhancement. Banks' shift to mostly highly rated (AAA) senior tranches likely stems from their lower regulatory capital and their use (to some extent) to satisfy liquidity needs. This trend was confirmed by stakeholders and by further analyses on banks' public and supervisory data; the trend was most notable for EU and UK banks where their exposures to securitised assets shifted towards lower risk weights since the GFC (see Annex 4). Larger American and European banks appear to have reduced

[163] See FSB (2023), *Global monitoring report on non-bank financial intermediation 2023*, December.

[164] See S&P (2023), European Structured Finance outlook, slide 17.

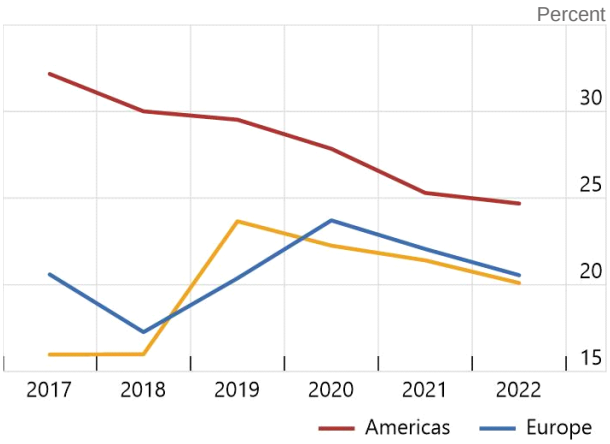
[165] See Joint Committee of the European Supervisory Authorities (2022), Joint Committee advice on the review of the securitisation prudential framework; and Bank of England (2023), Securitisation: capital requirements.

securitisation investments as a proportion of their credit exposures in the immediate aftermath of the GFC but began to grow them again recently.

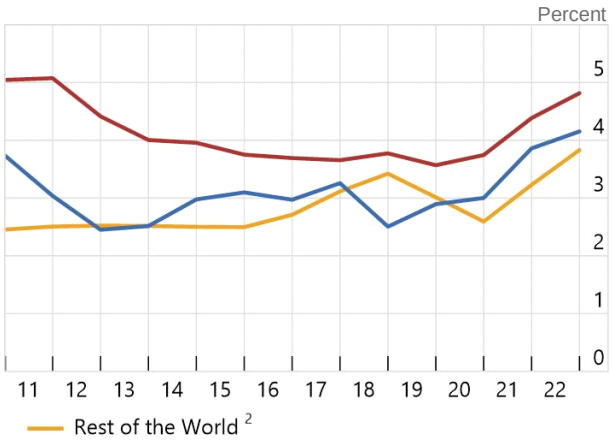
Evolution of banks' securitisation exposure and risk weighted asset density*

Graph 36

A. Risk weighted asset density[1]



B. Exposure in securitisation relative to credit exposure

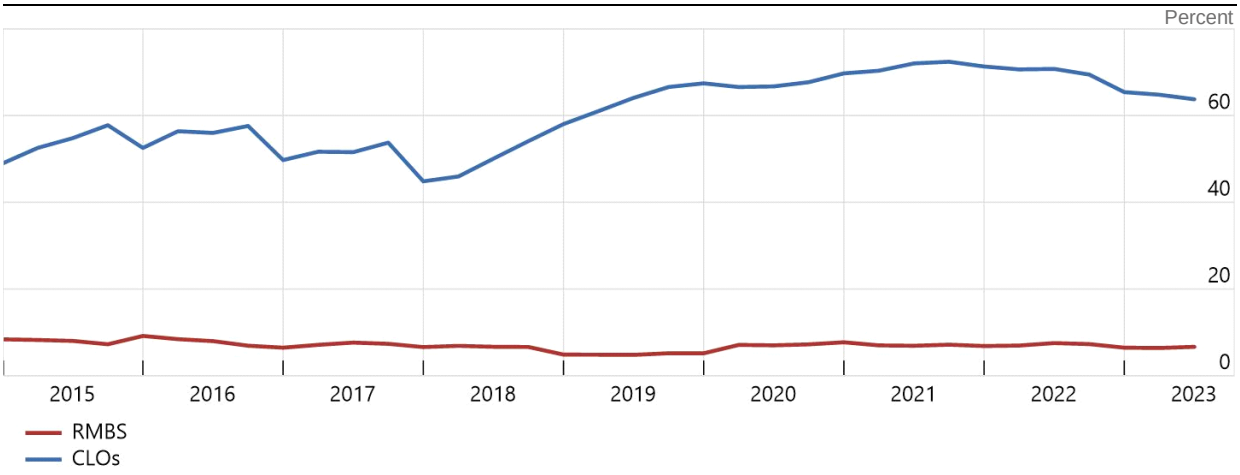


*Exposure in securitisation and risk weighted asset (RWA) density by region for so-called Group 1 banks, defined as having Tier 1 capital of more than €3 billion and a balanced dataset (i.e. that the sample of banks is kept constant over time). [1] Calculated as the RWA of the securitisation exposure divided by the total securitisation exposure. [2] This mostly reflects banks in AU, CN, and JP as the larger markets. Sources: BCBS Basel III monitoring exercise; FSB calculations.

As investors, NBFI entities do not hold significant RMBS holdings in the euro area; however, their investments in CLOs have increased over the past 10 years from 50% to around 60% of euro-area CLOs (Graph 37) and 72% of US CLOs.[166] These investments are held by a range of NBFI entities. Insurance companies, pension funds and other asset managers typically invest in the mezzanine tranches. The equity tranche is mostly held by hedge funds, credit opportunity funds and CLO managers, though the latter may be financed by others (see Section 4.2).

Non-banks' share in euro-area issued securitisations

Graph 37



Sources: SHSS and ECB Calculations

[166] See FRB (2020), Who Owns U.S. CLO Securities? An Update by Tranche, June.

The increased importance of NBFI entities in securitisation markets has both benefits and risks for financial stability – and more work is needed to assess and address these risks. On the one hand, the transfer of risk outside the banking sector – if done in a prudent manner – suggests a more diverse and potentially more robust financing ecosystem. On the other hand, a key question is whether non-bank investors are well-placed – in terms of their funding structure and ability to withstand losses in stress events – to assume securitisation risks. The heterogeneous nature of these investors and the different ways in which they are regulated and funded suggests there is no uniform answer. For example, a key question is the extent to which these investors are leveraged, interconnected with banks, and subject to liquidity mismatches, which would make them more prone to contagion and fire sale risks in times of stress. Building on the lessons from the March 2020 market turmoil and subsequent strains in commodities and bond markets, the FSB has developed a comprehensive work programme to enhance NBFI resilience. The aim of the work is to ensure a more stable provision of financing to the economy and reduce the need for extraordinary central bank interventions.[167]

[167] See FSB (2023), *Enhancing the Resilience of Non-Bank Financial Intermediation: Progress report*, September.

Annex 1: Securitisation reforms and their implementation

BCBS capital reforms

Prior to the GFC, Basel II established the risk-based capital framework for banks' securitisation exposures. The Basel II approach included a standardised approach (SA) and an internal ratings-based (IRB) approach. The IRB approach included a ratings-based approach (RBA) and a supervisory formula approach (SFA), in addition to other treatments. The SA and RBA relied heavily on the use of external credit ratings. By contrast, the SFA linked the risk weights of securitisation tranches to the risk of the underlying pool of assets, level of subordination and tranche thickness.

In July 2009, in the immediate aftermath of the GFC, some initial revisions were made to the securitisation sections of Basel framework to address issues revealed by the crisis, such as the higher risk posed by re-securitisation exposures, the larger drawdown risk on liquidity facilities and inadequate due diligence by banks.[168]

In December 2010, the Basel Committee published the first set of Basel III revisions. These revisions resulted in a substantial recalibration of the capital framework for all exposures (including securitisation exposures) through the introduction of capital buffers and a more robust definition of capital.[169] The December 2010 publication also introduced certain operational requirements requiring banks to perform their own internal assessments of the external credit ratings applied to securitisation exposures.

In December 2014, the Basel Committee published its most fundamental securitisation focused post-GFC reforms.[170] In addition to improving the recognition of various risk drivers, these reforms also introduced a new hierarchy of approaches in order to simplify the framework and avoid the mechanistic reliance on external ratings. Under the new hierarchy, the SA and IRB approaches were redesigned to be based on a simplified SFA, which does not use external ratings. These new approaches, renamed SEC-SA and SEC-IRBA, were complemented with an external rating-based approach (SEC-ERBA). The SEC-ERBA may only be used if the bank is not able to apply the SEC-IRBA and is in a jurisdiction that permits the use of external ratings in their capital framework.

In July 2016, the Basel Committee updated the securitisation standard to specify a preferential capital treatment for "simple, transparent and comparable" (STC) securitisations.[171] This capital treatment built on the 2015 STC criteria published by the Basel Committee and the International Organization of Securities Commissions.[172] In May 2018, published an additional update to specify a preferential capital treatment for short-term STC securitisations.[173]

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[168] See BCBS (2009), *Enhancements to the Basel II framework*, July.

[169] See BCBS (2010), *Basel III: A global regulatory framework for more resilient banks and banking systems*, December.

[170] See BCBS (2014), *Revisions to the securitisation framework*, December.

[171] See BCBS (2016), *Revisions to the securitisation framework*, July.

[172] See BCBS and IOSCO (2015), *Criteria for identifying simple, transparent and comparable securitisations*, July.

[173] See BCBS (2018), *Capital treatment for simple, transparent and comparable short-term securitisations*, May.

Finally, in November 2020, the Basel Committee published an amendment to the securitisation standard to set out a capital treatment for securitisations of non-performing loans.[174]

Thus, there are several Basel reforms to consider when evaluating the post-GFC securitisation market (see Table A1.1).[175] The cumulative changes are set out in the consolidated Basel Framework and have been in effect since 2023.[176]

Table A1.1: Relevant Basel securitisation capital reforms

Basel reform	Published	Effective date	Main features/changes
Basel II	2004	2005–2009	Included a SA and IRB approach, the latter included the RBA and SFA. The risk weights under the SA and RBA relied heavily on the use of external ratings. The capital requirement for securitisation exposures was capped at level that would apply to the underlying assets if they were not securitised and were held directly by the bank.
Basel II enhancements	2009	2010	Initial enhancements to the Basel II framework to address lessons from the GFC, such as increased requirements for high-risk exposures to re-securitisation and new due diligence requirements.
Basel III initial phase	2010	2013	Recalibration of capital framework for all exposures (including securitisations), through introduction of capital buffers and more robust definition of capital. Addition of operational requirements relating to use of external credit ratings for securitisation exposures.
Revised securitisation framework	2014	2018	Improved capture of risk drivers and simplified hierarchy of approaches, with SEC-IRBA and SEC-SA based on a simplified SFA to reduce reliance on external ratings. Capital requirements higher than if underlying assets held directly.
STC treatment	2016	2018	Preferential treatment introduced for STC securitisations.
Short-term STC treatment	2018	2018	Preferential treatment introduced for short-term STC securitisations.
NPL securitisations	2020	2023	Amendment published to set out the capital treatment for securitisations of NPLs.

While the capital requirements were significantly increased, caps for senior tranches based on a "look through" approach were introduced to promote consistency with the credit risk of the underlying pool of exposures and therefore to not disincentivise securitisations of low credit risk exposures. Additional risk factors (i.e. tranche term and thickness) and due diligence

[174] See BCBS (2020), *Capital treatment of securitisations of non-performing loans*, November.

[175] Note that components of the final phase of Basel III framework that have not been fully implemented, such as the output floor, are not in scope for this evaluation.

[176] See BCBS, The Basel Framework, in particular chapters CRE40 to CRE45.

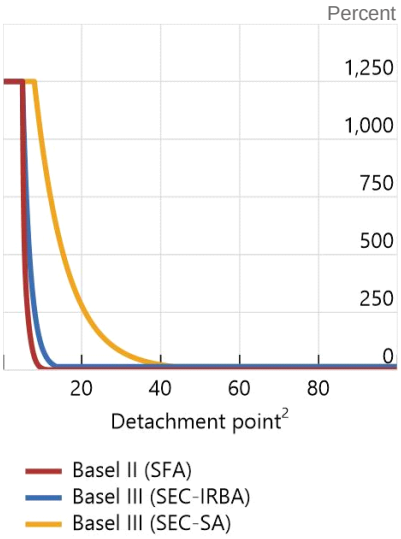
requirements aimed to help limit reliance on external ratings, address cliff effects and improve risk sensitivity.

Although SEC-SA and SEC-IRBA use a similar capital formula, the risk weights that result from the SEC-SA are generally more conservative. One reason for this is the approach to credit risk used for the underlying exposures in the securitisation pool. The SEC-SA formula uses as a key input the capital requirement that would apply to the underlying exposures under the Basel Framework's standardised approach to credit risk (K_{SA}). The SEC-IRB formula, by comparison, uses the capital requirement that would apply under the internal ratings-based approach to credit risk (K_{IRB}). The second reason is a parameter (p) which impacts the level of capital non-neutrality and how it is allocated across tranches. Capital "non-neutrality" refers to the fact that under the Basel III reforms the total capital required for a securitisation (i.e. the sum of the capital required for all securitisation tranches) is greater than the amount of capital required for the underlying assets. This non-neutrality was introduced to address structural risks such as model and agency risks. A "p" equal to 1 means a capital surcharge of 100% over the capital requirements for the underlying assets. The parameter p in the formula for SEC-IRBA is floored at 0.3, while it is set to 1 for SEC-SA and 1.5 for re-securitisation exposures.

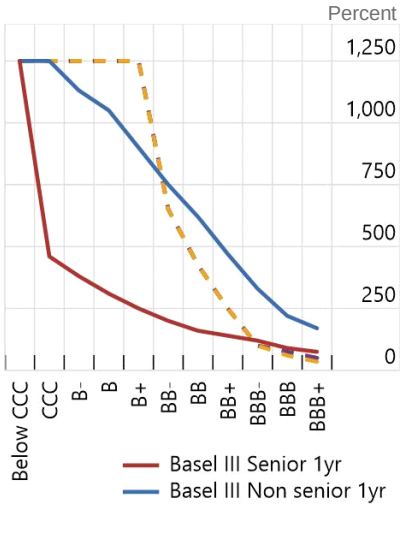
Overall, the Basel III reforms increased the regulatory capital for banks' securitisation exposures compared to Basel II while also changing some of the relative differences in risk weights across tranches. Graph A1.1 below provides stylised examples comparing Basel II to Basel III risk weights. Panel A shows the overall increase in Basel III risk weights for both SEC-IRBA and SEC-SA relative to Basel II SFA. Panel B shows the same comparison for the external ratings-based approaches under Basel II and Basel III, with Panel B focusing on lower rated tranches and Panel C focusing on higher rated tranches. In this stylised example, Panels B and C show an increase in risk weights for the higher rated tranches (BBB– or better) under Basel III and decrease for the lower rated tranches (BB+ or below).

Stylised comparison of Basel II to Basel III risk weights **Graph A1.1**

A. Internal models (IRBA) and standardised approaches (SFA and SA)[1]



B. External rating approaches (BBB+ and higher risk tranches)[3]



C. External rating approaches (A- and lower risk tranches)[3]

Note: [1] Stylised example based on corporate exposures with K_{IRB} of 5%, loss given default (LGD) of 30%, number of loans in underlying pool (N) of 100 and K_{SA} of 8%. [2] Detachment point is the percent threshold at which losses within the underlying pool result in a total loss of principal for the tranche in which a securitisation exposure resides. [3] While under Basel II the risk weights by external rating depended only on seniority and granularity, the Basel III revisions added maturity and tranche thickness for further risk differentiation. The Basel III risk weights in Panel B assume a maturity of 1 year for the securitisation exposures and that the non-senior tranches under Basel III are considered "thin". Under both Basel II and Basel III, when there are several tranches that share the same rating, only the most senior tranche in the cash flow waterfall would be treated as senior.

Sources: BCBS. ECB and FSB calculations.

Other relevant BCBS reforms

The introduction of new accounting standards to consolidate off balance sheet activities brought many securitisation vehicles back on balance sheet and therefore risk-based capital calculations applied where previously they had not. The GFC showed that banks sometimes have incentives beyond a contractual obligation or equity ties to step in to support unconsolidated entities to which they are connected rather than allow them to fail and potentially suffer reputational damage and lose access to capital markets. Prominent examples of credit or liquidity support provided by banks to securitisation conduits, structured investment vehicles and money market funds were observed during the crisis. The revised securitisation framework addressed two main causes of step-in risk to securitisation entities by: (i) not permitting SRT for securitisations of revolving credit facilities with early amortisation features (as the risks returning to the originator increase if early amortisation is triggered); and (ii) applying a 100% credit conversion factor to the undrawn portion of all liquidity facilities (eliminating any preferential treatment for ABCP facilities). The BCBS released guidelines in 2017 on the Identification and management of step-in risk to mitigate potential spill-over effects from the NBFI sector to banks.

Whilst the changes to consolidation rules, capital and some minor changes to the LCR (beyond those explained below) have generally reduced the likelihood of a bank stepping in to provide financial support, this step-in risk still exists. The guidelines provide banks and supervisors with a method for identifying step-in risk and possible responses to be agreed on a case by cases basis.

Changes to the liquidity risk framework included a change in the LCR in 2010 (effective 2015) to allow senior tranches of residential mortgage-backed securities with the STC label to be treated as high quality liquid assets (HQLA) at level 2B which is subject to a capped percentage portion of total HQLA. The assets are subject to a 25% haircut and other conditions. In the revised NSFR (introduced in 2010 and effective in 2018), banks must hold a set percentage (generally less than 100%) of stable funding for securitisations included as HLQLA2B.

Pre-GFC the differences in treatment of securitisation exposure in the trading book as compared to the banking book provided another capital arbitrage incentive. The Basel 2.5 revision of market risk published in 2009 (revised 2010) restricted most securitisation exposures in the trading book to only the standardised market risk approach.[177] In turn, the calibration of that standardised market risk treatment of securitisation was aligned to the banking book treatment to reduce the potential discrepancy in capital requirements for similar risk exposures across the banking book and trading book.

Jurisdictional differences in implementation of BCBS reforms

Table A1.2: Relevant Basel securitisation capital reforms

Jurisdiction	Key Securitisation framework deviations
Australia	Only two approaches: SEC-SA and SEC-ERBA, no IAA for ABCP Synthetic, revolving facilities, ABCP not recognised for capital relief purposes. Limits on eligible credit protection. Some simplifying adjustments due to market characteristics
Canada	Reduced credit conversion factor (CCF) for certain off-balance sheet securitisations to 40% and 10% for unconditionally cancellable More granular calculation of tranche maturity IRB can be used for unrated SA pools within ABCP
China	No IAA
EU	STC extended to synthetics. Possible switch in hierarchy of approaches to further reduce reliance on ratings. Restrictions on re-securitisation.
UK	Possible switch in hierarchy of approaches to further reduce reliance on ratings. Restrictions on re-securitisation.
Japan	Definition of re-securitisation excludes government programs for SMEs, treatment of unrated liquidity and ABCP exposures.
US	Initial reforms introduced in 2013 introduced simplified SFA and external ratings not allowed to be used, no proposal to implement STC.[178]

[177] Internal models could still be used for correlation trading.

[178] While the simplified supervisory SFA is generally similar to the Basel securitisation standard published in 2016, the p parameter is set to 0.5 and the capital for underlying assets is based on the corresponding standardised approach to credit risk.

IOSCO recommendations – additional information

The recommendations, issued in 2012, relate to adopting an incentive alignment and risk retention approach, setting standardised disclosure templates and ensuring transparency to investors, and collaboration between regulators to ensure consistency and a level playing field.[179]

Adopting an incentive alignment approach and risk retention

1. All jurisdictions should evaluate and formulate approaches to aligning incentives of investors and securitisers in the securitisation value chain, including where appropriate, through mandating retention of risk in securitisation products. Any exemptions to the risk retention requirements should be limited and warranted.

2. In line with G20 commitments and recommendations in IOSCO's 2009 Report on Unregulated Financial Markets and Products (IOSCO 2009 Report), jurisdictions should clearly set out the elements of their incentive alignment approach with risk retention being the preferred approach.

3. Regulators should seek to minimise the potentially adverse effects to cross border securitisation transactions resulting from differences in approaches to incentive alignment and risk retention.

Transparency and standardised disclosure

4. To further improve the detail of information to be made available to investors, IOSCO calls on members to work domestically (at the national level or regional level, where relevant), with other authorities involved in disclosure requirements or initiatives in their home jurisdictions (such as central banks) and industry to continue to standardise templates, as appropriate, for detailed reporting by asset classes by end 2013. IOSCO should develop – in conjunction with the BCBS – general principles for policy makers and regulators to ensure as much convergence as possible of these templates across jurisdictions, consistent with a jurisdiction's laws and regulations, starting with RMBS templates by 2014.

5. Regulators should consider ways issuers may be required to provide investors at the point of sale and on an ongoing basis, consistent with a jurisdiction's disclosure framework, information necessary to make an informed investment decision. Specifically, investors should:

    (i) Receive from issuers essential information to assess a securitisation product's performance. At a minimum, average expected loss coverage for bullet or pass through securities and average expected life of the asset pool for pass through securities should be provided in all circumstances. Additional key indicators including information about risk/reward profile, fees and scenario analysis including

179 See IOSCO (2012), Global developments in securitisation regulation, November.

structuring assumptions may also be provided. The information should be included in disclosure documentation that is made available to investors. It will be insufficient for this information to be provided only in marketing materials.

(ii) Be provided, at no cost, with modelling tools that enable investors to conduct cash flow analyses of a given securitisation transaction through its life.

(iii) Receive equal access to all documents and data relevant to assess creditworthiness of a given securitisation product that are provided to credit rating agencies, consistent with applicable privacy, confidentiality, and other laws.

Supporting recommendations

6. Prudential regulators should collaborate with other relevant regulators to determine whether the differences are justified between the capital and liquidity treatments for securitisation products versus other structure products and collateralised financing.

7. In order to ensure that risk retention requirements do not penalise originators under the relevant accounting rules, IOSCO urges the FSB in the context of its Shadow Banking Work (Work Stream 1) and in conjunction with International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB) to work toward further harmonisation of approaches to consolidation of securitisation SPVs.

8. IOSCO should develop guidance on possible measures that could eliminate or reduce the potentially negative effects of differences in securitisation regulation and terminology on cross-border transactions.

9. IOSCO supports industry efforts to develop less complex and standardised products and encourages more liquid securitisation products at the national and international level.

10. IOSCO considers that the FSB's Principles for sound residential mortgage underwriting practices have the potential to improve the stability of the housing market, which is an essential part of the securitisation chain of RMBS. IOSCO therefore encourages all jurisdictions to implement these principles at the national level.

Annex 2: Securitisation markets in other FSB member jurisdictions

This Annex provides a brief overview of the securitisation market and regulatory developments in FSB jurisdictions that have sizeable securitisation markets other than the EU, US and UK. The information has been provided by the relevant authorities in those jurisdictions.

Australia

Market developments

The Australian securitisation market began to grow again in the mid-2010s after experiencing a sharp contraction following the GFC. Asset securitisation in Australia took off in the 1990s, and early 2000s, with total ABS issuance rising to over AUD 60 billion in 2006 (Graph A2.1A).[180] However, issuance fell dramatically with the onset of the GFC in 2007. It was not until around 2016 that the market started a steady recovery. Importantly, securitisation markets continued to grow throughout the pandemic, partly due to the policy measures supporting the markets both directly, including the Government's Structured Finance Support Fund, and indirectly, including the Reserve Bank's Term Funding Facility (TFF) (see Annex 4). For instance, there was increased investor demand for RMBS due to a significant reduction in banks' issuance of senior unsecured bonds during the TFF drawdown period.[181]

The Australian ABS market has been dominated by securitisations of residential mortgages. Over the past two decades, RMBS have accounted for an average of 78% of the total amount of outstanding ABS. While the four major banks in Australia have cheaper alternatives to fund housing loans, RMBS remains an important funding source for non-major banks and, to a much greater extent, non-bank lenders such as specialist mortgage originators. The share of non-bank RMBS issuance has risen strongly since 2017, to around two-thirds of total issuance in 2024 (Graph A2.1.B).

Regulatory developments

In response to the GFC, the Australian Prudential Regulation Authority (APRA) implemented the Basel securitisation framework with adjustments tailored for the appropriate Australian market.[182] These adjustments aimed to simplify the framework, acknowledging that Australian bank securitisation structures typically represent a relatively modest and representative portion of a

[180] Despite the absence of the lack of transparency issues and overly complex securities that plagued the EU and US securitisation markets prior to the GFC, the Australian securitisation market suffered severe brand damage, Investor appetite for structured products fell sharply and spreads in the secondary market widened considerably. This oversupply in the secondary market was exacerbated by the forced liquidation of the portfolios of offshore special investment vehicles (see DeBelle (2009), "Whither securitisation?", Address to the Australian Securitisation Conference 2009, Sydney – 18 November 2009).

[181] See Kearns (2022), Securitisation: past, present and future, Speech to the Australian Securitisation Conference, Sydney –30 November 2022; and Reserve Bank of Australia (2024), *Review of the Term Funding Facility*.

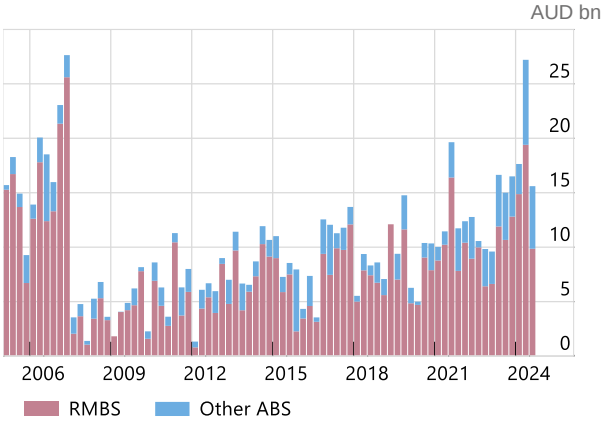
[182] Two of the most important deviations are: i) APRA has not implemented the Securitisation – Internal Ratings-Based Approach (SEC-IRBA). Instead, APRA applies a full deduction approach for certain low-rated exposures under the Securitisation – External Ratings-based Approach (SEC-ERBA); and ii) Asset-backed commercial paper (ABCP) securitisation and synthetic securitisation are ineligible for regulatory capital relief.

bank's loan portfolio, and that complex securitisation structures are not a prominent feature in Australia.

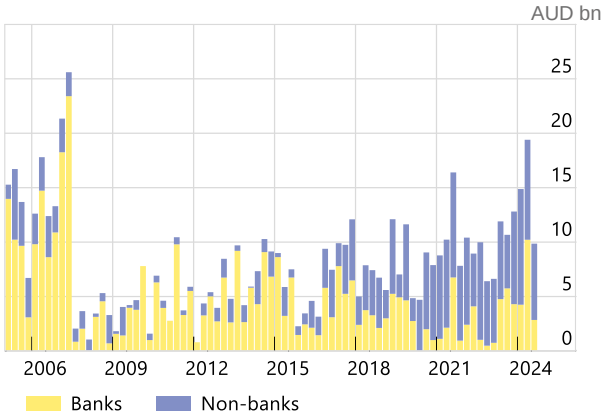
APRA revised its prudential standard and practice guide covering securitisation activity (APS 120/APG 120) to facilitate simpler and safer securitisation, while becoming more restrictive on complex and less safe structures. The updated versions of APS 120 and APG 120 were released in 2016 and 2017 respectively. The new standard, which was implemented in January 2018, provides banks with more flexibility in their securitisation funding arrangements, introduces simpler requirements for the use of securitisation and enforces more conservative regulatory capital requirements for certain types of securitisation.

Australian securitisation vehicles **Graph A2.1**

A. ABS issuance



B. RMBS issuance: banks vs. non-banks



Sources: KangaNews.

APRA notes that, generally, Australian bank originators do not adopt an 'originate-to-distribute' business model. As such, securitisation structures typically represent a relatively modest and representative portion of a bank's loan portfolio. APRA does not have any specific risk retention or 'skin-in-the-game' requirements. Australian bank originators also generally retain a number of linkages to their securitisation structures through excess spread (a direct financial interest in cashflow surpluses that typically accumulate in Australian bank securitisations) and loan servicing where banks maintain the direct customer relationship with the underlying borrowers in the pool. Many Australian bank originators also provide basis swaps and various other facilities to their securitisation structures, as well as managing the schemes. Such linkages distinguish securitisation programs of Australian banks from many overseas structures and reinforce Australian banks' incentives to maintain the quality of lending standards for loans in their securitised pools.

In addition, APRA has not adopted STC securitisation or capital requirements for exposures to securitisations of non-performing loans.

Brazil

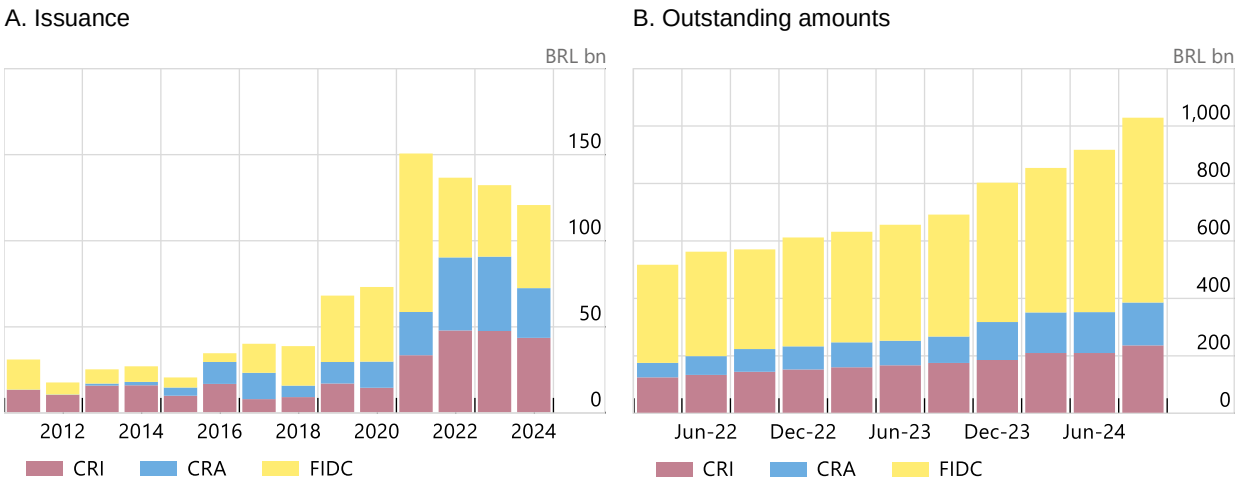
Market developments

Prior to the GFC, the development of securitisation market in Brazil was primarily driven by three key pieces of legislation. It began in 1997 when the government passed a law to allow SPVs to securitise real estate receivables (including both residential and commercial real estate) via the issuance of Real Estate Receivables Certificates (CRIs). In 2004, the law was amended to permit the securitisation of agribusiness receivables via the issuance of Agribusiness Receivables Certificates. In addition, the National Monetary Council (CMN) issued a resolution in 2001 to allow the establishment of the Credit Receivables Investment Fund (FIDC), a type of structured fund that primarily invests in financial receivables, including credit card payments and auto loans, as well as trade receivables.[183]

The issuance of all three securitised products began to pick up in 2019 (Graph A2.2A). After being relatively stable for most of the 2010s, securitisation issuance rose sharply in 2019, up 75% from 2018. Since 2021, annual total issuance has exceeded BRL 100 bn, compared with the average of BRL 34 bn over the past 10 years. This growth was broad-based, supported by all three types of products. In the first nine months of 2024, the amount raised with FIDCs reached BRL 48 billion, surpassing the total for 2023 (BRL 42 billion); the issuance of Agribusiness Receivables Certificates and CRIs also rose by 21% and 37% respectively.

From March 2022 to September 2024, the total outstanding amount of securitisation products in Brazil surpassed BRL 1 trillion, representing a growth of 99%. As of September 2024, FIDCs accounted for 62% of transactions in the total securitisation outstanding market, CRIs amounted to 23%, and Agribusiness Receivables Certificates represented 15% (see Graph A2.2B).

Securitised instruments in Brazil[1] **Graph A2.2**



[1] Figures for 2024 up to September. CRI = Real Estate Receivables Certificates. CRA = Agribusiness Receivables Certificates. FIDC = Credit Receivables Investment Funds.

Sources: Brazilian Financial and Capital Markets Association (ANBIMA); Brazilian Securities and Exchange Commission (CVM).

[183] In Brazil, the CMN sets the policies and the basic regulations for the functioning of the financial market and for the activities of financial institutions, see Central Bank of Brazil (2016), Functions of the Central Bank of Brazil.

Regulatory developments

Resolution CVM 175 (23 December 2022) provides a framework regulating Brazilian investment funds, including FIDCs, which can be used as conduit entities for securitisation purposes. Notably, it requires the registration of all credit rights in financial investment registrars regulated by the Central Bank of Brazil (BCB). This registration aims to ensure the uniqueness of the credits acquired by FIDCs and minimise the risk of double transferring the same asset. The resolution also delegates more powers to fund managers, aligning them with other categories of investment funds, since both the manager and administrator are responsible for establishing a fund under the new model.

Law 14,430 (3 August 2022) sets forth general rules applicable to the securitisation of receivables and the issuance of Receivables Certificates. It extends the possibility for securitisation companies to issue securities backed by any kind of receivables (previously limited to real estate, financial, or agribusiness receivables). The law also allows any operation carried out by a securitisation company to benefit from the institution of a fiduciary regime. It is important to note that all issuances by currently registered securitisation companies have separate assets from the issuer's assets, providing greater security for investors. Since these issuances have separate assets, securitisation companies do not record the assets and investor funding on their balance sheets. Each separate asset has its own balance sheet, information regime, and annual financial statements audited by independent auditors.

To provide a regulatory framework for securitisation companies, CVM published Resolution 60, which came into effect on 2 May 22, based on Law 14,430/22. This resolution established a specific regime for securitisation companies, which is different from the rules that apply to other publicly traded companies. In addition, it set the requirements and obligations of securitisation companies, as well as the requirements for the public issuance of receivables certificates.

There are no risk retention requirements in Brazil as CVM views that disclosure, combined with market practices, characteristics and governance requirements, serve as an appropriate incentive alignment strategy. The key factor is that the information regime should provide useful information for investors to assess the transaction’s risk profile.

Canada

Market developments

As in other countries, the securitisation market in Canada fell sharply after the GFC. The amount of ABCP outstanding declined from about CAD 120 billion at its peak in mid-2007 to approximately CAD 24 billion by mid-2011 (Graph A2.3A).[184] A large part of that decline was driven by the disappearance of the Canadian third-party ABCP market. Between 36% and 40% of outstanding issuance in this market was not sponsored by financial institutions and often involved complex collateralised debt obligations backed by US subprime mortgages.

[184] Hendry, Lavoie and Wilkins (2010), Securitised products, disclosure, and the reduction of systemic risk, *Bank of Canada Financial System Review*, June 2010, pp. 47–55.

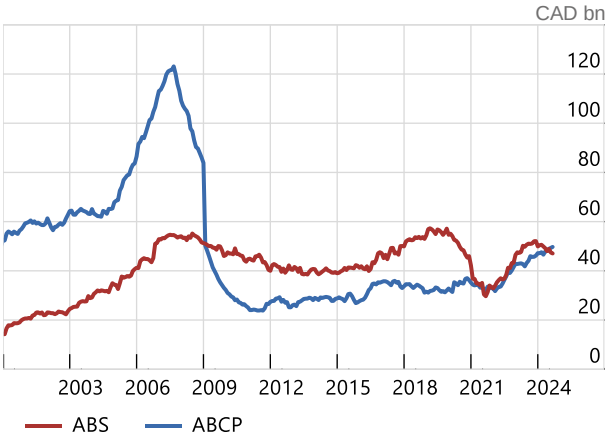
The Canadian government plays a dominant role in the residential mortgage securitisation, while private-label securitisation of uninsured mortgages primarily consists of short-term ABCP. The government supports housing finance through mortgage insurance and public securitisation programmes. Banks pool mortgage portfolios into an MBS, which are insured under the National Housing Act (NHA) Mortgage-Backed Securities Programmes of the Canada Mortgage and Housing Corporation (CMHC). These CMHC-insured MBS are then sold to the Canadian government, which subsequently sells them to various investors. As of March 2024, CMHC-insured MBS stood at around CAD 557 billion, compared to less than CAD 7 billion for private-label residential MBS and commercial MBS.

The securitisation market in Canada contracted during the pandemic years. The outstanding amount declined from around CAD 80 billion in 2019 to approximately CAD 60 billion in 2021. This was largely the result of a significant decline in the amount of outstanding term ABS. The level of outstanding ABCP was mainly flat in the early pandemic period but increased significantly as economic activity recovered in 2022 and after. During the post-pandemic rate hike cycle, the securitisation market grew to more than CAD 90 billion, exceeding its pre-pandemic size, before stabilising in the second half of 2023 along with policy rates and inflation.

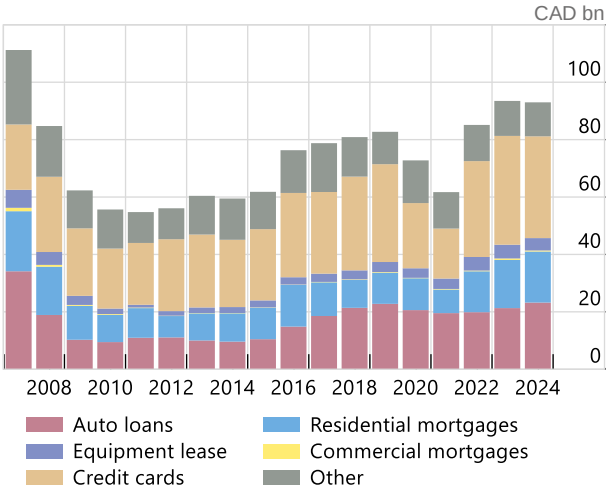
The term-ABS market was mainly driven by rising credit card securitisation since 2022 (Graph A2.3B). However, in total it did not reach pre-pandemic levels before contracting again at the end of 2023 and through 2024 as global policy rates lowered. In contrast, ABCP has been growing steadily since 2022. ABCP securitisation of residential mortgages rose significantly while Canadian households faced increasing financial stress due to rapidly rising interest rates. Private-label RMBS and CMBS is still a small market, totalling less than CAD 7 billion.

Amounts outstanding of securitised products in Canada **Graph A2.3**

A. Private-label securitisation outstanding



B. Amounts outstanding of securitised products



Sources: DBRS Morningstar, OSC calculations.

Regulatory developments

In Canada, private sector securitisation issuers/conduits are mostly "partially supported" – that is, they are backed by a liquidity support provider for liquidity risk, but not credit risk.[185] This is in contrast to the US where issuers are generally "fully supported" by a liquidity support provider. The liquidity backstop provision in Canada either follows the Global Liquidity Standard (GLS) or is a "Full Wrap" backstop where liquidity is provided in all circumstances other than the credit risk of the Full Wrap provider.[186] In Canada, all ABCP conduits are sponsored by banks, which are regulated by Canada's prudential regulator – the Office of the Superintendent of Financial Institutions (OSFI).

In Canada, almost all ABCP conduits are multi-seller, with only one being single-seller. Unlike in the US, Canada does not currently have match-funded conduits.[187] Most issuers/conduits generally rely on prospectus exemptions to issue securities and distribute securities to institutional investors.[188] Among other things, exemption qualification for ABCP conduits requires that securitisations have no synthetic exposure (a key issue pre-financial crisis), bank sponsorship, and a minimum credit rating from at least two designated credit rating agencies.[189]

The Basel III reforms targeting asset securitisations were implemented in Canada in fiscal Q1 2019 subject to a maximum two-year transitional arrangement via OSFI's CAR Guideline.[190] The BCBS STC criteria was also implemented in the 2019 CAR Guideline. Canadian authorities have not broadly implemented the 2019 IOSCO recommendations on risk retention as domestic securitisation markets are considered too small or because the types of securitisation activities or assets do not necessitate incentive alignment requirements. However, it is common practice for conduits to also adhere to US regulations, which include risk retention requirements.[191]

China

Market developments

After a four-year suspension following the GFC, Chinese authorities restarted the asset securitisation pilot programmes in 2012.[192] Since then, the ABS market has grown rapidly in both size and diversity of underlying assets. This growth has been driven by continuous improvements in the regulatory framework and increasing investor demand for risk diversification. New securitisation issuances have grown from negligible amounts in 2012 to over

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185 Fitch (2024), Canadian ABCP Primer.

186 Bankers Acceptances Transition Virtual Network (2024), Primer on Canadian ABCP, Canadian fixed-income forum.

187 Fitch (2024), op. cit.

188 Goodmans LLP (2022), In review: securitisation law and regulation in Canada – Lexology.

189 The liquidity backstop provision follows the Global Liquidity Standard (GLS).

190 OSFI (2019), *Changes to the Capital Adequacy Requirements (CAR) Guideline*.

191 Bankers Acceptances Transition Virtual Network (2024), "Primer on Canadian ABCP", Canadian fixed-income forum.

192 Guided by regulatory agencies, China launched its first credit asset securitisation pilot programme in 2005. Under the programme, two financial institutions – China Development Bank and China Construction Bank – were chosen to engage in securitisation of credit assets and mortgage loans respectively. The pilot was expanded from 2006 through 2008 to foster market development.

CNY 3 trillion (USD 420 billion) by 2021 (Graph A2.4.A). However, ABS issuance fell sharply to around CNY 2 trillion in both 2022 and 2023.

ABS in China can be categorised into four broad types: credit ABS (e.g. backed by auto loans, mortgage loans, and non-performing loans), enterprise ABS (e.g. backed by accounts receivables, lease payments and microfinance loans), asset-backed notes for non-financial enterprises (ABN) (e.g. backed by preference shares, toll and other fees) and insurance asset-backed plans (insurance ABS).[193] These securities differ in their regulatory agencies, initiating institutions, investors, trading market, and registration and clearance processes (Table A2.1).

Credit ABS products, which account for around 25% of total ABS issuance, have seen a significant decline in recent years. Before 2021, RMBS were the main driver of total credit ABS issuance (Graph A2.4.B). Owing to the significant adjustments in China's real estate sector since 2021, RMBS issuance has halted, with no new issuance since February 2022. In addition, as the Omicron variants of COVID-19 spread rapidly in China in 2022, private consumption fell sharply, leading to a strong decrease in enterprise ABS issuance.

Despite the growth of credit ABS market, risk has not been effectively transferred outside the banking system. The total outstanding balance of credit ABS has reached over CNY 800 billion, but that accounts for less than 1% of total credit in the financial system. In addition, since credit ABS products, including RMBS, are traded in the interbank market, commercial banks remain the dominant investor type, holding around 70% of the market share. Although the involvement of other interbank market participants – insurance companies, funds, trusts, asset management firms, and other financial institutions – is growing, their participation remains limited due to various regulatory investment constraints.

Table A2.1: Types of securitisation structures in China

	Credit ABS	Enterprise ABS	ABN	Insurance ABS
Regulators	PBoC & NFRA	CSRC	NAFMII	NFRA
SPV	Special purpose trust (SPT)	Special asset management plans	SPTs or special purpose companies	Asset-backed plans
Originators	Financial institutions (FIs)	Non-financial companies or FIs	Non-financial companies	Non-financial companies or FIs
Investors	Interbank market investors	Qualified investors (QIs)	Interbank market investors	Insurers and other QIs
Underlying assets	Credit asset	Certain debt or equity asset[1]	Certain debt or equity asset	Certain debt or equity asset[1]
Trading market	Interbank market	Exchanges	Interbank market	Insurance exchange

CSRC = China Securities Regulatory Commission; NAFMII = National Association of Financial Market Institutional Investors; NFRA = National Financial Regulatory Administration; PBoC = People's Bank of China.

[1] Companies not on the "negative list" can issue ABS securities from cash flows from this firm without prior approval of the regulation.

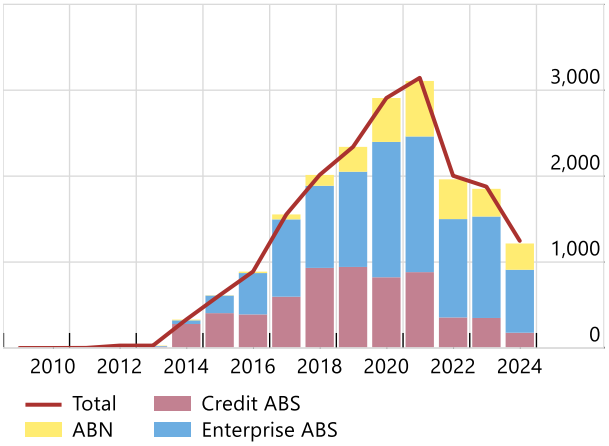
Source: Zong et al. (2019), "Asset-backed securities" in Schipke et al. (eds), *The future of China's bond market*, IMF, Washington DC.

[193] In 2020, China launched a pilot scheme for infrastructure project-backed REITs to be listed on the stock exchanges. The scheme has since expanded to other areas, including government-subsidised rental housing, new energy and consumption-related projects. Given that REIT development is still in its early stages, it will not be covered in this Annex.

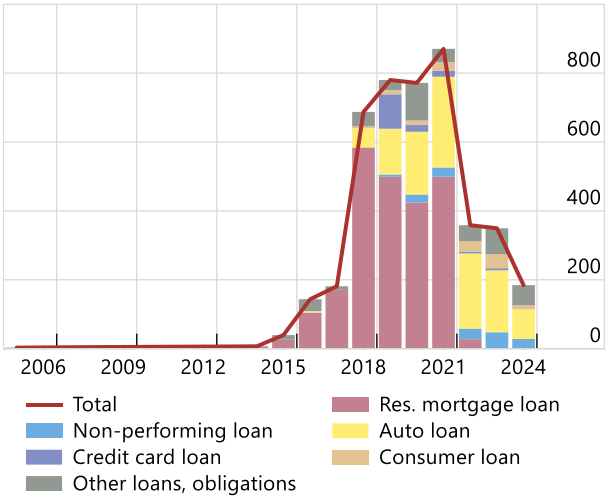
Securitisation market in China

CNY bn **Graph A2.4**

A. Issuance of asset-backed securities[1]



B. Issuance of credit ABS by type[1]



[1] Figure for 2024 up to 10 September.

Source: Wind.

Regulatory developments

For credit ABS, the 2013 regulations from the PBoC and the National Financial Regulatory Administration (NFRA) mandate that the initiating financial institution (originator) must retain a minimum of 5% of the total issuance amount of the securitisation. In addition, the institution must retain at least 5% of the lowest class of securities. The originator has the option to choose between horizontal or vertical retention. In 2023, the NAFMII introduced risk retention requirements for originators of ABN traded in the interbank bond market. However, exemptions are available for securitisations where the originator or debtor demonstrates good credit standing, and the SPV incorporates credit enhancement mechanisms such as guarantees, shortfall supplements, or debt accessions.

The NFRA's new Capital Rules that are based on Basel III reforms, came into effect on 1 January 2024.[194] Under these new rules, risk exposures that meet the STC standard can use the STC rule to measure risk-weighted assets. Commercial banks are required to perform due diligence to assess and confirm whether their risk exposures meet the STC standard. This evaluation ensures that the risk associated with asset securitisation is accurately measured and appropriately reflected in the calculation of risk-weighted assets.

[194] The previous Commercial Bank Capital Management Rules, which came into effect in 2013, were based on the Basel III framework and adjusted to suit the Chinese banking system.

India

Market developments

The securitisation market in India started gaining traction in the early part of the century, which necessitated a regulatory framework for securitisation of loans originated by the regulated lenders, such as banks and non-banking financial companies (NBFCs). These non-bank entities, which are a sub-set of broader NBFI segment, are regulated and supervised by Reserve Bank of India. in 2006. The initial framework was introduced in 2006 and has been updated multiple times since then.

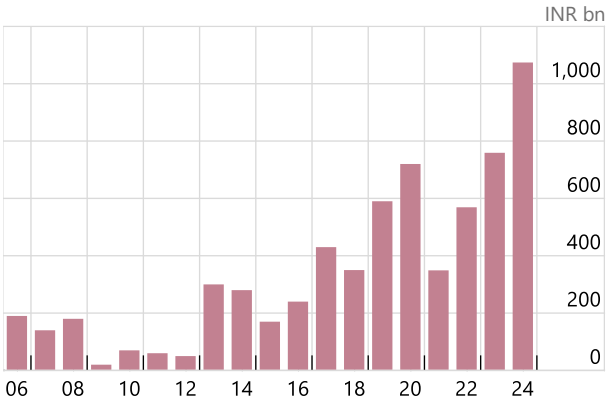
The issuance volumes have been consistently rising over the past few years, with securitisation becoming a key funding mechanism for lenders, particularly NBFCs. After a significant decline in issuance volume following the GFC, the market began to recover only after the issuance of revised regulatory guidelines in 2012. Although the COVID-19 pandemic caused a temporary drop in volumes, they quickly regained traction, reaching pre-pandemic highs within just two years. In FY2024, the issuance volume has crossed the INR one trillion mark for the first time ever (Graph A2.5A).

The securitisation market in India is primarily concentrated in the retail segment, with limited volume in the securitisation of standard corporate and wholesale loans. In terms of the asset classes, securitisation of auto loans is the dominant segment, followed by relatively smaller volumes of MBS and micro-finance loans (Graph A2.5B). The 'others' category includes a variety of retail assets such as gold loans, lease rent, personal loans, and business loans.

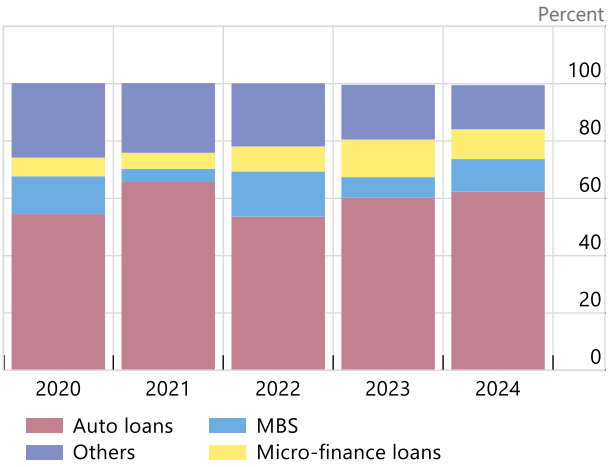
Regarding the investor base, banks are the largest investors, capturing nearly three-fourths of the total volume. However, other investor classes, including private credit funds, are also seeing increased participation.

ABS market in India **Graph A2.5**

A. Volume of retail ABS



B. Indicative asset class mix



Source: RBI.

Regulatory developments

The regulatory guidelines on securitisation are aimed to provide a supporting environment for securitisation and regulatory safeguards to address potential risks. The framework was last updated in 2021 to align with the Basel III securitisation framework, including provisions relating to the STC criteria.

The regulatory framework focuses *inter alia* on the due diligence requirements on the loans being securitised; enhanced disclosures for the investors; ensuring arm's length relationship between the originator and the special purpose entity (SPE) issuing securitisation notes; complete risk transfer by the originator. For capital purposes, securitisation exposures of banks are subject to the External Ratings Based Approach (SEC-ERBA).

The regulatory guidelines generally encourage listing of securitisation notes issued, which is governed in terms of the guidelines on Issue and Listing of Securitised Debt Instruments and Security Receipts Regulations, 2008 issued by the securities regulator, the Securities Exchange Board of India (SEBI).

Some distinctive features of securitisation framework applicable in India are:

- Negative list of assets: The framework provides a negative list of assets that cannot be securitised which include re-securitisation exposure, synthetic securitisation, revolving credit and short-term loans.

- Structure of risk retention: The minimum risk retention (MRR) requirement is a function of the nature as well as maturity of the underlying assets – while minimum MRR for RMBS is 5%, for non-RMBS segment, it is 5% for assets having maturity less than two years and 10% for maturity over two years. In terms of structure, the risk retention has to be in form of horizontal retention (first loss/equity tranche) up to 5% and in any other tranche (vertical, horizontal, or combination thereof) for the remaining proportion.

- Minimum Holding Period (MHP): The MHP requirement, which is one of distinctive features of regulation, was introduced in 2012 as an incentive alignment measure. It requires the originators/acquirers to keep the loans on their books for a minimum period of three months (in case tenor of loans is below two years) or six months (tenor exceeding 2 years) before securitising the same.

Securitisation of stressed assets

A legislative framework for securitisation of stressed assets has been in place since 2002 – namely, the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002. The Act provides a legal framework for special entities, Asset Reconstruction Companies (ARCs), to be licenced by RBI to undertake securitisation of non-performing assets (NPA), and also empowers the RBI to frame suitable regulations in this regard. This Act defines securitisation as "acquisition of financial assets by any asset reconstruction company from any originator, whether by raising funds from qualified buyers by issue of security receipt or otherwise". It has been further specified in the Act that the investors of security receipts (SRs) will have an 'undivided interest' in the financial asset involved in the securitisation.

Based on compiled supervisory data, it is estimated that annual issuance of security receipts by ARCs averaged around INR 550 billion in the recent years, with the outstanding value of SRs at approximately INR 1.40 trillion as on September 30, 2024. Around 80% of the stressed loans acquired by ARCs are classified as corporate loans, underscoring the importance of this mechanism as an important tool of stress resolution of corporate loans by the Banks and NBFCs.

RBI is at an advanced stage of finalising a securitisation framework of stressed assets through SPEs, taking cues from international practices and Basel norms, and also taking into account the feedback received on a Discussion Paper issued in 2023. Once implemented, this framework will complement the existing framework for securitisation of NPAs under SARFAESI Act.

Japan

Market developments

The securitisation market experienced significant growth in the 1990s and early 2000s, spurred by the enactment of several laws that established a legal framework for securitisation. Initially, this growth was driven by lease and consumer credit ABS. In the early 2000s, the market expanded rapidly and diversified to include products such as MBS and CLOs.

The outstanding amount of securitised products in Japan peaked in 2007 at around JPY 38 trillion (USD 340 billion), before declining due to the GFC (Graph A2.6). In recent years, the market has shown a recovery trend, led by assets such as MBS, lease and consumer credits ABS. As of December 2023, the outstanding amount of securitised products stands at JPY 32 trillion (USD 230 billion).

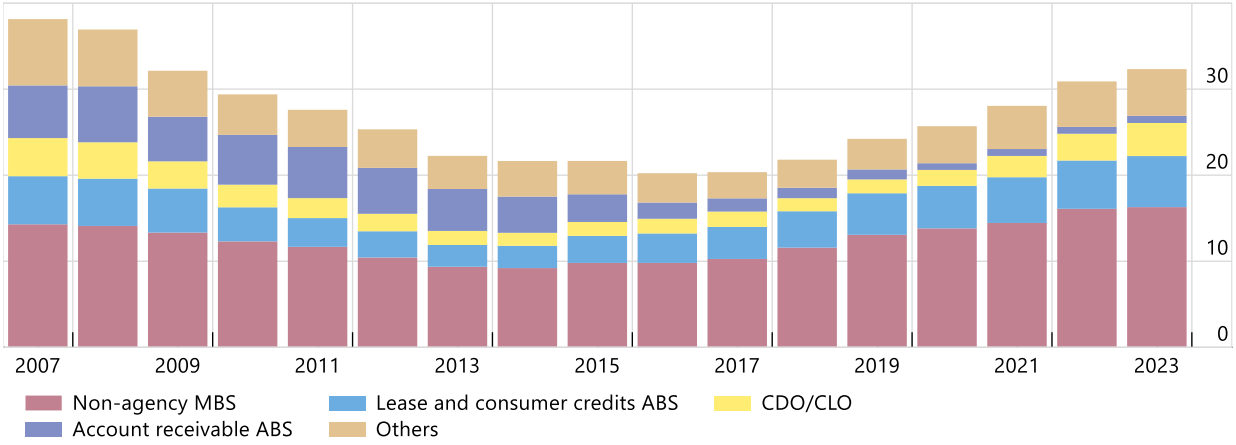
By asset class, non-agency MBS represent the largest segment, accounting for approximately 50% of the market (excluding agency MBS), followed by lease and consumer credits ABS at around 20% and CDOs/CLOs at 10% respectively.[195]

In terms of holdings of securitised products, financial corporations and non-financial corporations each hold nearly half of the securitised products issued in Japan. Before the GFC, financial corporations, especially banks, contributed to the increase in holdings of securitised products. After the GFC, there were no significant changes in the holdings of both banks and non-bank financial intermediations.

[195] Agency MBS, issued by the Japan Housing Finance Agency (an independent administrative agency fully funded by the government), account for approximately JPY 15 trillion (USD 100 billion), representing almost one-third of the total outstanding amount of securitised products in Japan.

Amounts outstanding of securitised products in Japan[1]

JPY trn **Graph A2.6**



[1] Excludes agency MBS.

Source: Bank of Japan, *Flow-of-funds statistics*.

Regulatory developments

In Japan, the risk retention requirement was first introduced as supervisory guidelines in 2015, and subsequently incorporated into banks' capital adequacy requirements in 2019. In 2015, the Financial Services Agency revised the Comprehensive Guidelines for Supervision. These Guidelines require financial institutions as investors to check if an originator continuously retains the part of the risks associated with securitisation products. In 2019, the risk retention was introduced in capital adequacy requirements as a minimum retention level, requiring investors to confirm that the originator retains at least 5% of the securitisation exposures with either horizontal, vertical, or L-shaped retention. In case investors cannot confirm that the minimum retention rules are met, an increased capital charge will be applied by applying a risk weight three times higher than that otherwise applied to compliant securitisation exposures. While a higher risk weight would apply in cases where the minimum retention is not met, there would be an exception to this treatment if the bank can show that the securitised products are not the result of inappropriate structuring of the underlying assets. This would typically be done by thorough analyses on the status of the originator's involvement in the underlying assets and the quality of those assets.

In Japan, the revised prudential framework for securitisation exposures was implemented in March 2019, in line with the Basel III reforms published in 2014. In addition, the preferential treatment for securitisation exposure meeting the STC criteria was introduced as a part of the prudential regulation. It allows banks to apply a lower risk weight to securitisation transactions for asset transfer, for which the eligibility requirements can always be confirmed by the originator and investors (excluding re-securitisation exposures, ABCP, and ABL). The preferential treatment for short-term STC securitisations also came into effect in 2024.

Korea

Market developments

The securitisation market in Korea took off in the late 1990s, driven by a series of government measures aimed at liberalising financial markets and promoting economic growth after the Asian financial crisis. In particular, the enactment of the Asset-backed Securitisation Act (ABS Act) in September 1998 enables approved originators (e.g. government agencies, financial institutions and large corporations) to restructure nonperforming assets and support sound and stable financing activities, including long-term housing loans.196 In 2000, the quasi-government Korea Mortgage Corporation (KoMoCo) issued Kora's first RMBS.

The asset-backed securities market grew steadily before stabilising in the late 2010s. Following the introduction of the ABS Act, total ABS issuance rose sharply from KRW 7 trillion (USD 5.2 billion) in 1999 to KRW 83 trillion in 2015 (Graph A2.7.A). Notably, ABS issuance doubled in 2015, driven by the Korea Housing Finance Corporation (KHFC) – the successor of KoMoCo, which issued KRW 56 trillion of RMBS. This sharp increase (up 285% year-on-year) was attributed to policies promoting the government-guaranteed housing mortgage market. Since then, ABS issuance has stabilised at around KRW 60 trillion, with over half being agency RMBS, followed by ABS backed by consumer financing (e.g. credit card receivables), non-performing loans and account receivables.

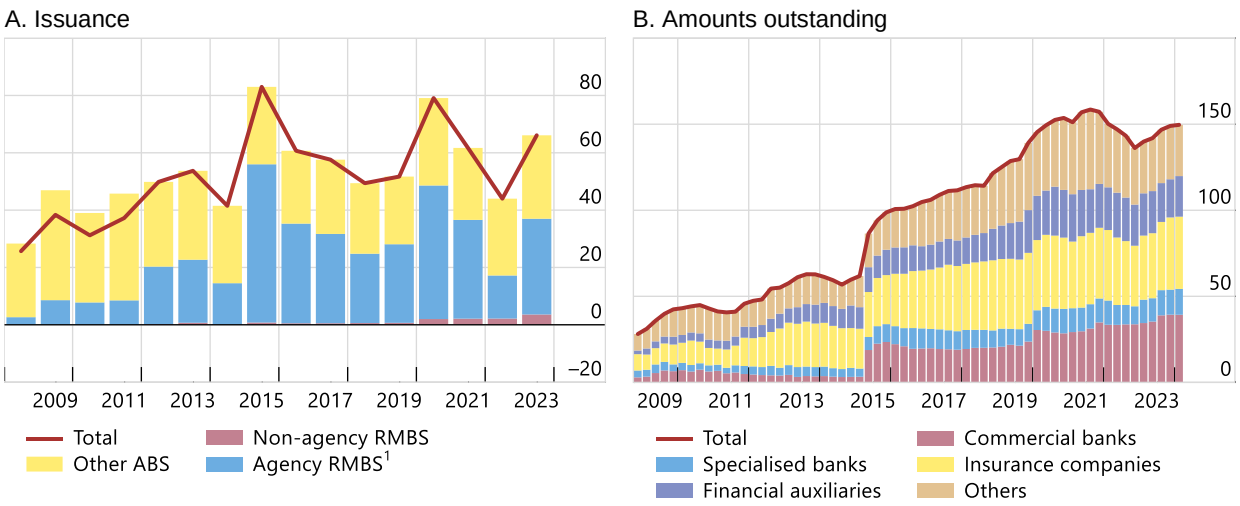
Commercial banks and insurance companies are the largest holders of asset-backed securities. Flow-of-funds data indicate that commercial banks and life insurance companies each hold about 25% total outstanding long-term asset-backed securities (Graph A2.7.B). Other significant holders include specialised banks (e.g. the Korean Development Bank) and financial auxiliary companies, including KHFC.

196 Note that issuance of short-term securitised paper such as asset-backed commercial paper and asset-backed short-term bond are typically not governed by the ABS Act in Korea. These securities are termed "non-registered" ABS.

Asset-backed securities issuance and holders in Korea

KRW trn

Graph A2.7



[1] RMBS issued by KHFC.

Sources: Bank of Korea, *Flow of funds*; Korea Financial Supervisory Services; KHFC.

Regulatory developments

In Korea, the Basel III framework came into effect in December 2013 and the BCBS RCAP report in September 2016 concluded that the Korean rule implementing the securitisation framework is considered compliant with the Basel standards.[197]

In January 2024, a revised ABS Act came into effect to further promote the ABS market. The amended Act has four key elements. First, it expands the eligibility for originators to include a wider range of corporations. In addition, a multi-seller securitisation structure has been introduced, allowing multiple originators to transfer receivables to issue ABS. Second, it enhances information disclosure by requiring all types of ABS to be registered in the Korea Securities Depository's ABS integrated information scheme. Previously short-term ABS that were not governed by the ABS Act (or non-registered ABS) must now disclose securitisation structures, issuance details, and credit enhancement.

Third, the ABS system has been restructured to further alleviate corporate burdens and enhance the utilisation of the registration process. The scope of assets eligible for securitisation has been broadened beyond traditional assets such as receivables, real estate and other property rights to also encompass future receivables and intellectual property rights. Furthermore, the mandatory requirement for registering asset-backed securitisation plans has been eased, allowing for optional registration when returning securitized assets or creating security interest.

Fourth, a risk retention system has been adopted, requiring originators to retain 5% of the ABS issuance balance to address conflicts of interest. This regulation applies to both registered and non-registered securitisations. Various methods for mandatory risk retention, such as vertical, horizontal, and mixed, are permitted. However, exemptions are granted for ABS with low credit

[197] See Regulatory Consistency Assessment Programme (RCAP) – Assessment of Basel III risk-based capital regulations – Korea.

risk or a low possibility of conflicts of interest. ABS fully acquired by the government, local governments, and public institutions are also exempted.

Annex 3: Literature review

Pre-GFC securitisation was seen among others as an efficient funding tool to enhance the credit creation capacity of a banking sector mainly by alleviating capital constraints, as those assets transferred to the bankruptcy remote financial vehicle would be out of the scope for prudential requirements. Securitisation was much less regulated during pre-GFC times, and hence, allowed for regulatory capital arbitrage, with a positive effect on bank profitability by increasing non-interest income for a given level of equity.[198] Yet, the GFC highlighted that securitisation without proper constraints results in misaligned incentives on the side of the originator/sponsor and other involved service providers, as the process along the securitisation chain is opaque and complex, limiting investors' ability to proper conduct due diligence.

Deku et al. (2019) provide a broad literature review on securitisation and conclude that securitisation prior to the GFC led to riskier bank behaviour and a deterioration in lending standards. With respect to the bank performance, Casu et al. (2013) show that pre-GFC securitising US banks, on average, tended to be more profitable, with higher credit risk exposure, had a more diversified funding structure but higher funding cost, held larger and less diversified loan portfolios, had less liquidity, and held less capital. Several papers suggest that securitisation pre-GFC may have weakened screening and monitoring efforts for lenders, resulting in a worse performance of securitised loans compared to loans retained by the original lender. For example, Keys et al. (2010) note that during the period 2001–2006 securitised subprime mortgage loans were 10% to 25% more likely to default compared to similar risk profile loans. Wang and Xia (2015) find that banks active in securitisation imposed looser covenants on borrowers and exerted less effort on ex post monitoring. Furfine (2014) shows that loan performance between 2001–2007 was worse for those in more complex securitisations, while at the same time neither the price of a deal's securities nor a deal's risk retention reflected the fact that complexity correlates with lower loan quality. This underscores the information asymmetries inherent in securitisation markets during this period. However, there is also some literature contrasting the negative relationship between loan performance and a loan being securitised. For example, Jiang et al. (2014) analyse a loan-level data set from a major US mortgage bank in the period 2004–2008 and find that loans remaining on the bank's balance sheet had higher delinquency rates compared to sold loans. They explain such evidence with the expansion of the secondary mortgage market and the ease of loan securitisation, which according to the authors weakened the bank's incentive to screen borrowers by allowing the bank to offload risk.

The main regulatory tools introduced to challenge such threats are related to risk retention, disclosure, accounting and banking regulation. Some years passed since the introduction of the reforms, and the market, albeit smaller, still plays a role in the financial sector, although mostly dominated by government-sponsored enterprises (e.g. US, Japan and Canada). In the light of the reforms implemented and the heterogeneity of the markets, this annex discusses the empirical and theoretical literature on the regulatory impact of reforms on the securitisation market.

[198] Regarding the regulatory arbitrage motive, see, for example, Ambrose et al. (2005); Calomiris and Mason (2004); and Jones (2000).

Risk retention

"Skin in the game" increases risks for the originator. As it is seen as a signal to investors, credibly conveying the quality of the underlying assets,[199] originators might lean towards securitising high-quality loans as a means of establishing a strong reputation and retaining the riskier ones. While this might mitigate information asymmetries between investors and originators/sponsors, the literature also suggests that retaining shares of the first loss (often also called equity) tranche heightens originators' default risks since they are prone to be wiped out first as a result of conjunctural rather than idiosyncratic factors.[200]

There is an ongoing debate on the signalling under a risk retention regulation compared to a voluntary risk retention regime. Risk retention regulation allows usually for various forms, most commonly the vertical and horizontal method. The vertical method requires that the originator/sponsor retains a portion of each tranche of the securitisation, whereas the horizontal method would necessitate an originator/sponsor retaining a portion of the first loss piece. Guo and Wu (2014) show theoretically that both risk retention and information disclosure regulations are effective in reducing investors' informational loss, but neither can unconditionally enhance social welfare upon the unregulated case since a flat-rate requirement for all originators contains no signalling value of risk retention for investors anymore.[201] The existence of this signalling effect has also been questioned per se, as reputation as a self-disciplining mechanism would fail to incentivise the production of high-quality securities.[202] On the other hand, however, the critique on flat-rate regulatory retention requirements disregards the signalling effect that could stem from an excess buffer which originators could hold above the minimum retention requirements or the thickness of the first loss tranche.[203] Begley and Purnanandam (2017) find that securitisation deals with a higher level of equity tranche have a significantly lower delinquency rate conditional on observable loan characteristics. The effectiveness of retaining the first-loss tranche measured by the level of screening of the originator fluctuates with the state of the economy and also depends on the thickness of the retained tranche.[204] If the probability of a downturn is high and if the retained first loss tranche is likely to be depleted in a downturn, first loss tranche retention might be not the most effective mechanism to maximise originators' screening incentives. In such a case, retaining either a vertical slice of all the issued tranches or mezzanine tranche can be more effective from a regulatory point of view. Kiff and Kisser (2014) conclude that countercyclical retention requirements could be a policy implication of their theoretical model, i.e. to advise equity retention in the case the economy is expected to perform well and mezzanine tranche retention during economic downturns.

Literature suggests that the risk retention method is neutral when assessing the effectiveness of this regulation, although this might vary among ABS segments. Among the various types, the vertical and horizontal methods are commonly implemented by most jurisdictions. Kiff and Kisser (2014) show that the vertical retention method does not dominate other retention methods in

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[199] See, for example, DeMarzo and Duffie (1999); DeMarzo (2005); Guo and Wu (2014).

[200] See, for example, Greenbaum and Thakor (1987).

[201] See, for a similar finding Flynn et al (2020).

[202] See, for example, Deku et al. (2019).

[203] The excess or managerial buffer is common for example in the literature on the impact of capital requirements on the financial sector (see among others Imbierowicz et al. (2020); and Berrospide et al. (2021)).

[204] See, for example, Fender and Mitchell (2009) and IMF (2009).

terms of higher screening incentives, warranting a differentiated view in light of achieving the broader objectives of risk retention regulation. While Flynn et al (2020) show theoretically that the signalling can still occur by varying the retention methods, Gürtler and Hibbeln (2012) and van Breemen et al. (2023) show empirically that deals in which the originator/sponsor uses the vertical method have a significantly lower risk premium, indicating a different risk perception by investors. On the contrary, Bektic and Hachenberg (2021) find that the method in which the CLO manager retains the risk does not seem to play a role.

Empirical studies confirm the effectiveness of retention reforms in Europe and in the US. Hibbeln and Osterkamp (2024) focus on the European RMBS market and estimate ordinary least square propensity score matching and instrumental variable (IV) regressions to examine why retention versus non-retention deals perform better. They conclude that loans in those deals which are partly retained by the originator/sponsor (retention loans) have a lower probability of becoming non-performing, a lower delinquency amount, and a shorter time in arrears. Moreover, during the workout process retention loans are more likely to recover, pointing to originators being stronger incentivised to support troubled borrowers. Furfine (2020) and Agarwal et al. (2021) investigate the US mortgage CMBS market. Using difference-in-difference models the authors confirm that loans subject to the retention regulation perform better than loans not subject to the rule. In addition, Furfine (2020) finds that these retention loans have lower LTV ratios, and higher income to debt-service ratios, signalling that the originator applies stricter lending standards under a skin in the game regime. Agarwal et al. (2021) show that lenders conduct greater due diligence after the implementation of the regulation, measured by the time-to-securitisation (the so-called warehouse risk), and deals' credit spread decrease, suggesting that the regulation mitigated the "lemon premium" due to lower information asymmetries between investors and securitisers.

The implementation of risk retention regulation, however, may generate unintended consequences. Furfine (2020) shows that risk retention implementation is associated with mortgages being issued with markedly higher interest rates, while Agarwal et al. (2021) conclude that it curtailed the growth of credit granted by lenders that primarily securitises loans in the commercial real estate debt market.

Cordell, Roberts and Schwert (2023) highlighted a key distinction between traditional securitisations and CLOs: the majority of CLOs are open-market vehicles. This means that CLO managers acquired the loans in the collateral pool through participations or purchases on the secondary market, rather than originating the loans themselves. This legal distinction, which was central to the US court ruling that exempts open-market CLO managers from the risk-retention rule, is supported by empirical evidence from Benmelech et al. (2012).

Disclosure and complexity

The issuance of complex subprime securities, particularly in the mortgage-backed securities (MBS) market, increased rapidly in the years preceding the GFC. The structure and quality are not easy observe for investors given the extensive pooling and tranching in securitisation products. In particular, their structures are detailed in lengthy prospectuses describing the collateral, the allocation of cash flows from the pool of loans to the securities in various states of nature, the ratings of the securities, and other structural features. The discussion of security

complexity featured prominently in the 2011 US Financial Crisis Inquiry Commission's Report as a plausible contributing factor to the financial crisis.

Billio et al. (2023), through analysing loan-level data, investigate the impact of transparency and simplicity standards introduced by the European securitisation regulation implemented in 2018. One of these standards is the implementation of a simple, transparent and comparable label for securitisation instruments, which defines certain criteria that a deal needs to fulfil in order to receive it. The authors find that loans securitised after the regulation exhibit lower annual delinquency rates than in the pre-regulation period and has contributed to improving credit quality in the securitisation market in Europe. The study also analysed the impact of COVID-19 pandemic on the European credit market and demonstrated that these reforms have mitigated adverse effects of the pandemic.

The complexity of securitised products has been found to have a negative impact on performance. Ghent et al (2019) show that securities in more complex deals are more likely to default, however, investors do not perceive more complex securities as riskier, as indicated by the lack of higher yields for these assets. Furfine (2014) also finds that loan performance is worse in more complex securitisations, challenging theories of optimal security design.

Prudential requirements

The effects of prudential requirements have been less of a focus in the academic literature, with policy papers providing insights into the impact of the BCBS securitisation framework, and an academic publication, although focusing on the insurance sector, still supportive in providing indirect conclusions on the direction of the effects for the banking sector.

Becker et al (2022) analyse the effects of the 2009 US reform, which eliminates capital buffers against unexpected losses associated with insurance portfolio holdings of MBS, whereas capital requirements for all other fixed-income assets remain unaffected and tied to credit ratings. They estimate whether the new system increases insurers' willingness to bear risk in structured securities relative to other asset classes, for example, corporate bonds, by exploiting downgrades of MBS versus other asset classes before and after the regulatory reform. They find that after the reform, insurance companies are much more likely to retain downgraded MBS compared to other downgraded assets, with a pattern that is more pronounced for financially constrained insurers, which corroborates the interpretation that capital requirements are a key driver for insurers' differential trading behaviour across asset classes.

Policy papers from regulatory authorities take a more holistic view covering both risk retention and prudential requirements and jurisdictional specificities but do not provide empirical evidence and identification of effects. According to the results of a public consultation by the European Commission (2022) targeting a broad range of stakeholders (buy-side and sell-side of the market as well as public authorities and academics), the new EU legal framework for securitisation has been mostly effective in providing a high level of investor protection. Nevertheless, a majority of the respondents did not think that securitisation improved access to credit for the real economy, including SMEs, without providing evidence or clarification how they derived to this conclusion. Likewise, respondents did not witness a widening of the investor or issuer base, and most felt that the Securitisation Regulation has so far brought no tangible benefit to the real economy and SME lending. In particular, this is because the market's volume has not increased since the

introduction of the EU Securitisation Regulation, especially for SME loans. In line with this finding, a recent report by the Joint Committee of the European Supervisory Authorities (2022) which focuses on the current securitisation framework in the EU, concludes that the introduction of the Securitisation Regulation and the amendments to Chapter 5 of the CRR in 2019 has not yet produced the additional funding for the economy that was expected (EUR 100-150 bn).[205] However, the report argues that the weak state of the securitisation market in the EU seems to come from the combination of low supply and low demand, due in part to a lack of interest from investors and originators.

Securitisation of non-performing loans

A strand of literature investigates the role of government guarantee schemes in NPL securitisation. Boudiaf et al. (2022) investigates the impact of government guarantee scheme on NPL securitisation. This study finds that NPL securitisations without government guarantees show from materially lower purchase price discount levels, although publicly traded NPL securitisation without government guarantee are probably those containing less credit risk. Their analysis indicates that government guarantee schemes might not solely act as an incentive to new investors who would otherwise not invest in NPLs, but possibly also create conditions, for a new market, distinct in particular from the private NPL securitisations market. This could be due to a combination of better underlying asset quality and higher investor trust. Despite higher cost in securitisation transactions with government guarantee scheme, banks do engage in these transactions as more complex and problematic portfolios tend to require such credit enhancement from government guarantee schemes for successful market placement.

The role of credit rating agencies

Credit rating agencies (CRAs) are pivotal to structured finance as they assess credit risks of the underlying exposures, hence facilitating investor decisions and influencing pricing. However, their role has also faced scrutiny due to concerns about conflicts of interest, and their role in the run up of the GFC.

Despite the fact that the CRA industry in securitisation markets operates under an issuer-pay revenue model, this should not interfere with their independence during the rating process, when guided by the credit risk of the underlying exposure. ESMA (2020), completing a first thematic review of the CRA methodologies for rating CLOs, took a closer look at the type of models used by CRAs to assess default risk among CLO tranches and assign credit ratings. They find that modelling and calibration of default correlation within the CLO portfolio is key in determining credit ratings. Moreover, they find that moderate changes in default correlation can have a sizeable impact on default probability (and on credit ratings' accuracy). They conclude that their findings underline the importance of model sensitivity analysis and stress testing, and how the transparency on these analyses is key to informing investors' reliance on ratings.

CRAs' outreach activities have also deserved attention. Continuing its monitoring of CLO rating methodologies and changes to them, ESMA (2023) highlights the existence of potential conflicts

[205] See Joint Committee of the European Supervisory Authorities (2022), Response to the Commission's October 2021 call for advice to the JC of the ESAs.

of interest risks arising from market outreach activities: if analytical market outreach plays an important role for CRAs and is as such beneficial, sharing of non-analytical information to CRAs analyst (lost mandates, preferences of CLO third parties on credit ratings and methodologies, comparisons with competitor) could undermine the accuracy, objectivity and independence of CLO credit ratings. Therefore, this analysis highlights the need for CRAs to have sounds controls over their market outreach activity.

Improved disclosure of CRA's rating methods could enhance capital allocation. Griffin and Nickerson (2022) observed that during the COVID-19 pandemic, CRAs downgraded approximately 25% of collateral feeding into CLOs but only 2% of tranche values, with rating actions primarily affecting junior tranches. The authors found evidence that that active CLO management helped mitigate COVID-19's impact on tranche ratings. However, the lack of senior tranche downgrades in senior tranches indicates the influence of non-model considerations. Enhanced disclosure from CRAs, including non-model considerations, could benefit market participants. The authors conclude that more favourable and delayed credit rating actions toward tranches may incentivise the off-loading of systemically risky assets into structured products. Further, the authors conclude that these issues are practically important to policy makers and investors as substantial research has shown ratings' impact on the allocation of capital and economic decisions. In a similar vein, Van Breemen et al. (2023) analyse the credit rating market for residential mortgage-backed securities (RMBS) in the period 2017-2020 and find that CRAs adjust their credit rating based on competition. More precisely, they find that competition between large credit rating agencies and newer smaller ones creates rating quality inconsistencies in this market. They also find that small CRAs tend to relax their rating standards when competitive pressure from their larger counterparts increases and to inflate ratings when dealing with more powerful issuers. They conclude that regulation should not focus solely on the number of ratings or rating agencies on the market, but rather ensure that rating agencies apply their rating methodologies independent of business and competitive concerns.

The EU regulatory reforms of the credit rating industry aimed at addressing conflicts of interest in the rating process. The initial stage of EU credit rating agencies regulation was established in September 2009 (No 1060/2009, known as CRA I) and sought to address conflicts of interest in the rating process by requiring comprehensive disclosures by CRAs of their rating models, historical performance and annual transparency reports. Subsequently, regulation had been adjusted in 2011 and 2013. Jones et al. (2022) find that these reforms reduced rating inflation and led to a significant decrease in rating levels. They also find a significant decrease (increase) in the informativeness of rating downgrades (upgrades). One of the intended aims of the regulation is to reduce the mechanistic market reaction to negative credit signals and it could therefore be argued that this has been successful.

Regulatory action on credit ratings also affected insurance companies. Hanley and Nikolova (2020) analyse the impact of the National Association of Insurance Commissioners (NAIC) decision to reform capital regulations for mortgage-backed securities (MBS) by replacing credit ratings with third-party estimates of expected credit losses and by considering an insurer's exposure to future losses when determining regulatory capital. They find that insurers change their investment and financing choices after the new regulations take effect. They are less likely to sell distressed MBS and to engage in gains trading. Insurers with larger regulatory capital savings are even less likely to do so. Moreover, insurers are less likely to raise external capital, particularly when their capital savings due to the change are larger. However, at the same time,

insurers are more likely to increase their secondary market purchases of low-rated securities and hence risk taking, questioning the impact of the regulation in terms of systemic risk.

Annex 4: Additional analysis on securitisation markets

Recent developments in CMBS markets

Commercial real estate (CRE) prices have already fallen in several jurisdictions and valuations – particularly of office buildings in metropolitan areas – are being challenged amid an ongoing structural decline in demand, increased borrowing costs and thin transaction volumes. This has impacted the securitisation of CRE loans, namely commercial-backed mortgage securities (CMBS) and CRE loans securitised in CLOs (CRE-CLOs).

The CMBS market is largest in the United States and estimated to be around USD 636 billion as of Q2 2024, the highest value since 2011 but still below its pre-GFC peak of USD 830 billion[206] (Table A4.1). The market is significantly smaller in Europe at around €30 billion as of 2024 Q1, slightly lower compared to previous years. The CRE-CLO market is smaller, estimated to be around $75 billion as of April 2024.[207]

Table A4.1: Non-agency CMBS market outstanding in billions

	2024	2023	2022	2021	2020	2019
US (USD)	636	627	641	642	565	540
EU (EUR)	30	33	35	35	31	33

Sources: Mortgage Bankers Association (2024), AFME (2024).

The typical CMBS deal is backed by a portfolio of properties. However, another type available is single asset/single borrower whereby the CMBS is based on one property or one borrower with multiple properties. CMBS tends to be focused on office and retail segments, which represent around 45% of the market composition in US CMBS deals. The underlying loans offered to the end borrowers are typically non-amortising and have a tenure of 5-10 years.[208] CRE CLOs differ from CMBS as they collateralise shorter-term, transitional financing.

Similar to CLOs, CMBS bonds are structurally more resilient compared to pre-GFC vintages (2000–2008). The average loan-to-value for post-GFC vintages (2010 to 2022) is lower alongside higher debt-servicing ratios and thicker subordination tranches (See Table A4.2). These changes are part of a broader set of enhancements including the introduction of a 5% minimum risk retention requirement,[209] conservative changes to the ratings criteria by rating agencies, and tighter underwriting standards for the underlying loans by loan originators.

Table A4.2: Key changes in CMBS structures

CMBS metrics	CMBS pre-GFC	CMBS post-GFC
Loan-to-value	70.0%	52.8%
Debt Service Cost Ratio	1.4x	2.6x

206 See Mortgage Bankers Association (2024), Commercial / Multifamily Quarterly Databook Q2 2024, September.

207 See CrediQ (2024), Nearly 40% of CRE CLO Loans are on the Watchlist, May.

208 See DoubleLine (2023), Introduction to Commercial Mortgage-Backed Securities, March.

209 See IOSCO (2012) Global Developments in Securitisation Regulation, November.

AAA Credit enhancement	12.0%	19.5%
Average cumulative loss	7.2%	0.6%

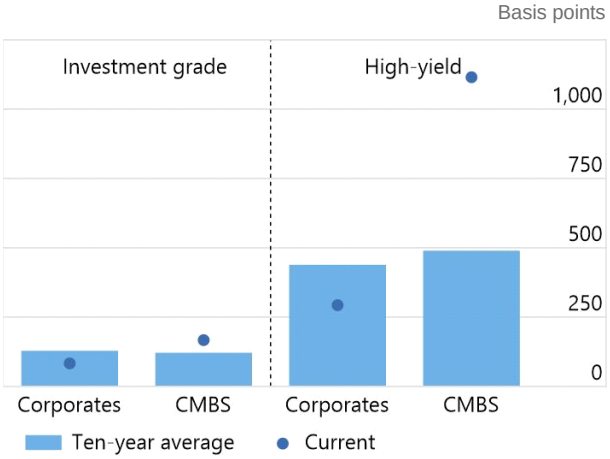
Sources: Doubleline, BoA Global Research (2023).

The ongoing stress in the CRE market is putting pressure on the CMBS market. Spreads are elevated relative to their historical average (Graph A4.1). This holds across higher and lower grade tranches, reflecting investors' uncertainty about the wider market. Similarly, the share of loans in distress are higher particularly in the office and retail segments.[210]

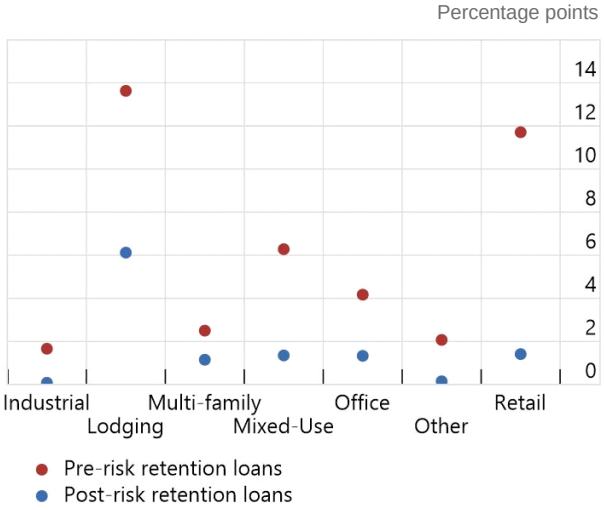
CMBS spreads are elevated, reflecting uncertainty in CRE among investors

In basis points **Graph A4.1**

A. Corporate and CMBS spreads[1]



B. Delinquency rates by property types[2]



[1] As of 23 October 2024. [2] As of December 2021

Sources: ICE Bank of America, LSEG; FSB calculations.

Maximillian and Clancy (2022), *Five Years In, Has Risk Retention Had Its Desired Effect?*, March.

There is some evidence to suggest the role of risk retention in ensuring safer CMBS. The delinquency rate (loans across all property types that are late on their payments by at least 30 days) was observed to be significantly lower post adoption of risk retention across all property types, even when accounting for inherent 'adverse selection'[211] bias in the older loans. Previous academic research suggests that risk retention has contributed to loans having lower loan-to-values and higher debt service cost ratios, along with some higher borrowing costs.[212] Further, risk retention was seen to be a binding constraint compared to lower retention held pre-GFC.

Stakeholder feedback in the workshop and academic roundtable suggest that: (i) market participants' experiences during the GFC led to the CMBS market adopting simpler structures; (ii) risk retention was binding and, once the new minimum risk retention requirements were introduced, the homogeneity of risk retention practices could not be used as a differentiating tool

[210] See Trepp (2024), CMBS Special Servicing Report September 2024, October and See CrediQ (2024), Distress Rate Hits All-time High of 13.1% for CRE CLOs, October.

[211] The older portfolios are likely to contain weaker loans as strong performing properties pay off.

[212] See Furfine (2020), op. cit.

for investors on the alignment of incentives by CMBS managers; and (iii) the CRE stress is still ongoing so the CMBS market could face continued pressures.

The role of securitisation in central bank collateral frameworks

The eligibility of securitised assets as collateral for central bank funding is considered an important non-regulatory driver for the use of securitisation by banks. This section illustrates how this practice varies across jurisdictions by focusing on central bank collateral frameworks in Australia, the Euro area, UK and US.

Australia

The implementation of Basel III liquidity reforms in Australia in 2015 prompted the Reserve Bank of Australia (RBA) to introduce a new Committed Liquidity Facility (CLF) that accepted securitised assets as collateral.[213] When the LCR framework was implemented in Australia on 1 January 2015, the stock of public debt in Australia was relatively low. The banking system's overall liquidity needs to meet the LCR exceeded what the banks could reasonably hold in HQLAs. In response, the RBA introduced the CLF and committed to provide pre-specified amounts of Australian dollar liquidity to banks subject to the full LCR, against a range of assets, including high-quality, Australian dollar-denominated supranational and foreign government debt, and certain related-party debt securities such as self-securitised RMBS (i.e. those RMBS created using banks' existing mortgage assets specifically to be offered as collateral to the RBA). With the large increase in government debt outstanding to finance government's support measures during the COVID-19 pandemic, the RBA assessed that the CLF is no longer needed and the CLF was fully phased out in January 2023.

As part of a monetary policy package to reduce funding costs across the economy and to support lending during the COVID-19 pandemic, the RBA introduced in March 2020 the Term Funding Facility (TFF). To facilitate large scale use of TFF, eligible collateral was extended beyond the government and bank securities typically used for open market operations to include the AAA rated tranches of self-securitisations. By the time it finished in June 2021, TFF provided a total of AUD 188 billion in funding to banks.[214]

According to the RBA, the primary collateral type that banks held for the TFF and CLF was self-securitisations.[215] And out of the total pool of securities that are eligible to be accepted as collateral under repo, self-securitisations comprised 21% as at 30 June 2020.[216]

Euro area

Pre-GFC, bank holdings of government securities, bank bonds and covered bonds were generally used as collateral for eligible transactions within the Eurosystem.[217] Beginning in

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[213] See Rustia et al. (2024), The Committed Liquidity Facility: 2015–2022, *RBA Bulletin January 2024.*

[214] See RBA Monetary Policy Statement August 2021, Box C: Use of the Reserve Bank's Term Funding Facility.

[215] See, Kearns. (2022), Securitisation: past, present and future, Speech to the Australian Securitisation Conference.

[216] See, Cole and de Roure (2020), "Managing the risks of holding self-securitisation as collateral", *RBA Bulletin September 2020*.

[217] See Eurosystem Collateral Data.

February 2012, the ECB launched various long-term refinancing operations for banks in the euro area. Their interest rates and other features (such as eligible collateral and repayment options) meant that these facilities competed with banks' other funding sources for similar maturities, such as securitisation and covered bonds.

Given the elevated need for funding and shortage of other collateral at the onset of the GFC, banks issued and retained securitisations to pledge as eligible collateral for transactions with the Eurosystem. Between 2007 and 2010 the amount of eligible securitisations almost doubled to €1.3 trillion.[218] In 2010 and 2011, the tightening of eligibility criteria for securitisations in central bank transactions (e.g. loan-by-loan information, more stringent rating requirements and higher haircuts), coincided with the implementation of the regulatory risk retention requirement in the EU.[219] ABS as a share of total collateral pledged accounted for around 28% at its peak in 2008, similar to the share for covered bonds.

The Eurosystem also conducted outright net purchases of eligible ABS. The ABS purchase programme was active between November 2014 and December 2018, followed by a reinvestment-only period. Net purchases restarted in November 2019 and continued until June 2022. A second reinvestment-only period was discontinued in July 2023.[220] These purchases are likely to have influenced market liquidity and the relative attractiveness of eligible versus ineligible securitisations and tranches. By 2013, ABS pledged fell to 14% (as a share of total pledged collateral) before rising back to 20% as of 2024 Q1.

United States

Non-agency securitised products, such as ABS, CLOs, and CMBS, are not eligible for outright purchase operations by the Federal Reserve. Non-agency securitised products, subject to certain collateral eligibility criteria (e.g. ratings), are generally accepted for discount window borrowing for depository institutions, but asset eligibility has not changed significantly since the GFC. In addition, asset eligibility for discount window borrowing has not been a factor for securitisation activities, as banks are not permitted to securitise assets on balance sheet to pledge to the discount window. Much of the pledged collateral recently is instead in the form of consumer and commercial loans, while agency MBS and ABS comprise around 7% and 9% respectively.[221]

In addition, the Federal Reserve established emergency lending facilities, the Term Asset-Backed Securities Lending Facility (TALF), in 2009 and 2020 to help stabilise market disruptions and restore functioning of non-agency securitisation markets. The facilities were authorised to lend USD 200 billion and USD 100 billion respectively, though the actual borrowing amounts were significantly smaller as market conditions improved rapidly after the announcement of the lending facilities. The TALF facilities were fully repaid and terminated in 2014 and 2024 respectively.

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218 See ESRB (2022), *Monitoring systemic risks in the EU securitisation market*, July, p. 27 and Box 5.

219 A precise assessment of the impact of changes in the collateral framework on securitisation issuance is further complicated by a selective relaxation of eligibility criteria for simpler ABS; see Bindseil et al. (2017), The Eurosystem collateral framework explained, *ECB Occasional Paper Series*, No. 189/May 2017.

220 See ECB, accessed 13 March 2024.

221 FSB calculations based on the Fed's discount window data releases, see Discount Window Lending.

United Kingdom

In response to the GFC the Bank of England (BoE) expanded the range of collateral accepted in its market operations to include private sector assets, notably ABS and covered bonds. This collateral was first accepted in the BoE's Extended Collateral Long-Term Repos (from end-2007), and then its Special Liquidity Scheme (SLS) which was designed as a collateral upgrade (in April 2008).[222]

From 2013, the BoE began to accept portfolios of 'raw loans' (i.e. not securitised) as collateral in its facilities – initially residential mortgage loans to UK households.[223] Later, the type of loans eligible as collateral expanded to include unsecured consumer loans, SME and asset finance, auto loans etc.[224] Since that point, portfolios of residential mortgage loans have grown to consistently be the majority of collateral pre-positioned at the BoE. Securitised assets also remain eligible as collateral and continue to be pre-positioned alongside raw loan pools.

The full set of eligible collateral can be used to secure any of the BoE's liquidity insurance facilities – namely the: indexed long-term repo (ILTR); discount window facility (DWF); and contingent term repo facility (CTRF).[225] Additionally, in early 2020, the BoE launched the Term Funding Scheme (TFS) to reinforce the transmission of the reduction in Bank Rate to funding costs in the real economy; all eligible collateral can be used to secure the TFS.[226]

Spreads of CLOs in the US after the court ruling on risk retention

Impact of the US court decision on the pricing of new issue CLOs

The risk retention rule for broadly-syndicated loan (BSL) CLOs, accounting for approximately 90% of the total US market, was overturned by a US court ruling in February 2018, while the rule remained in place for the middle-market (MM) CLOs that represent the rest of the market. This provides an opportunity to examine if there has been an additional premium for new issuances of BSL CLOs post-court decision vis-à-vis MM CLOs that are unaffected by the court's decision.

The rationale for this analysis is that if investors priced some value in requiring CLO managers (as sponsors of CLO deals) to hold some skin-in-the-game, there would be an observable impact on pricing after the invalidation of the rule by the court. As MM CLOs historically have traded at wider tranche spread compared to BSL CLOs (Graph A4.2), the way to gauge the market impact is done by analysing the add-on "premium" that investors assign on MM CLO tranches over BSL CLO tranches with same ratings. This analysis focuses on BBB-rated tranches—a tranche with investment-grade credit rating presumably with wider investor base that is also relatively sensitive to credit losses.

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[222] See Bank of England Quarterly Bulletin 2010 Q2.

[223] See Bank of England Quarterly Bulletin 2014 Q2.

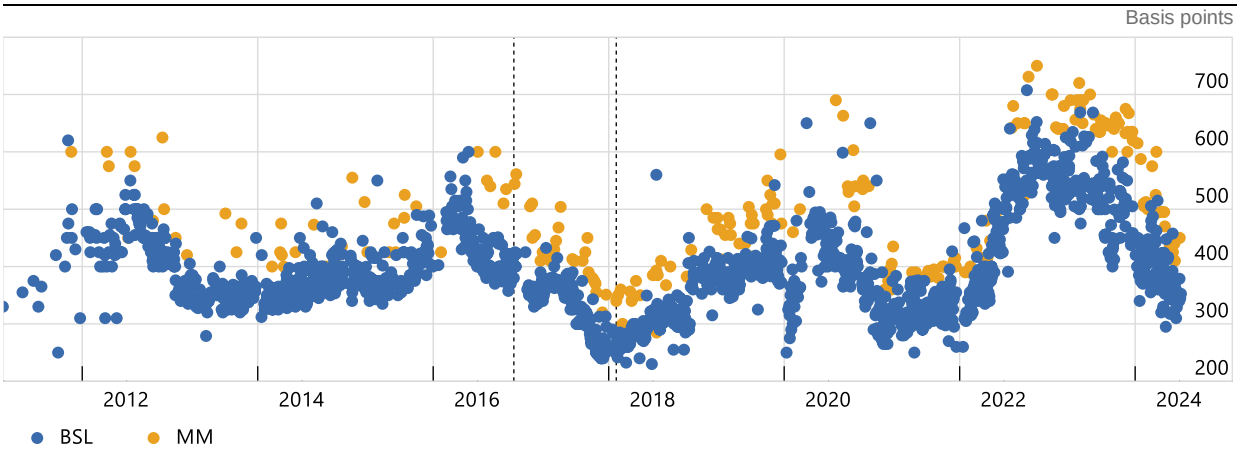
[224] For the full list, see Eligible collateral | Bank of England.

[225] See Bank of England Market Operations Guide | Bank of England.

[226] See Bank of England (2020), Term Funding Scheme with additional incentives for SMEs (TFSME) – Market Notice.

All else being equal, one would expect the add-on "premium" that investors assign to comparable rated middle-market over open market CLO tranches to decrease after the 2018 court decision. However, the variability in the premium on new issue BBB-rated tranche spreads does not appear significant pre and post court decision. The analysis suggests that the credit risk retention rule, at least in the BSL CLO market, does not appear to have had a significant impact on the pricing of CLO tranches. The apparent indifference of the pricing of new issue CLOs before and after the court ruling can be attributed to a number of factors (see section 4.2.2 for details).

BBB new-issue tranche spread for BSL CLO and MM CLO **Graph A4.2**



Source: Pitchbook LCD.

Impact of the risk retention rule on the pricing of new BSL CLO deals by manager size

Using the same dataset as in the analysis above, new issue BSL CLO tranche spreads were compared by manager size to assess if there is a discernible change in pricing of small versus. large CLO managers for BSL CLO new issue deals after the court decision.

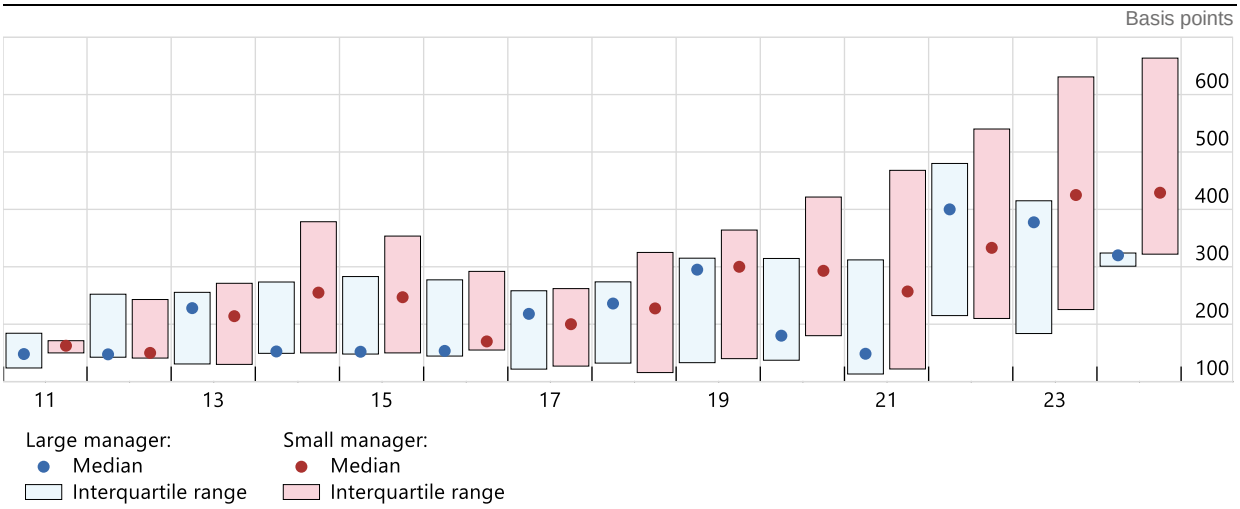
AAA-rated tranches of BSL CLO tranches are assessed as these represent the largest tranche in a typical CLO structure, thus the most determinant piece in the overall cost funding for CLO vehicles. The "large" managers are top 20 managers in terms of issuance from 2015 to 2017.[227]

"Small" CLO managers have historically priced wider to "large" managers. For the two quarters prior to the implementation of the risk retention rule (i.e. 3Q16 and 4Q16), tranches issued by smaller managers priced somewhat wider compared to the ones by larger managers than they have historically. The annual issuance data indicate a similar finding – the median pricing spreads on AAA tranches in 2016 have wider gap between manager size (Graph A4.3). This suggests some scepticism for smaller CLO managers about their ability to comply with the risk retention rule once implemented. However, it should also be noted that the gap doesn't appear

[227] The following CLO managers are classified as "large" managers in the analysis, with the number of deals in brackets: Carlyle Investment Management LLC (71); Blackstone Inc (69); Sound Point Capital management LP (63); Golub Capital Management LLC (61); CIFC Asset Management LLC (59); PGIM (54); Ares Management LLC (54); Octagon Credit Investors LLC (52); Credit Suisse Asset Management (49); Barings LLC (45); KKR Financial Advisors LLC (44); First Eagle Investment Management (42); Bain Capital Credit (42); Blackrock Financial Management (36); Voya Alternative Asset Management (34); MJX Asset Management LLC (34).

significant and there are likely other confounding factors. In addition, this analysis doesn't consider whether those deals issued prior to 4Q2016 voluntarily complied with the rule.

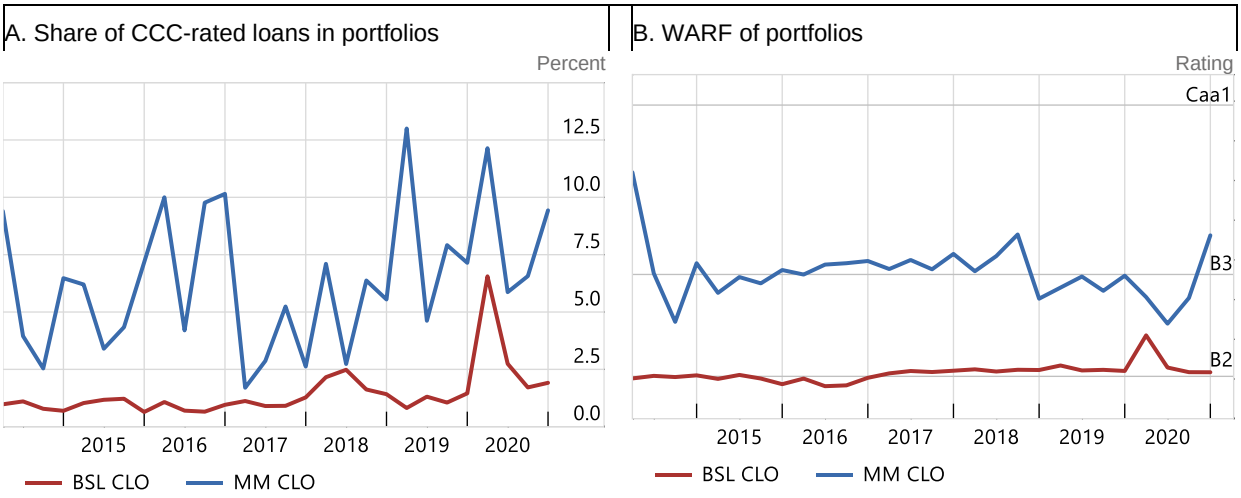
Spreads of new-issue AAA tranche for CLOs by type of managers **Graph A4.3**



Source: Pitchbook LCD.

There is limited evidence of the effects of risk retention on riskiness of CLO portfolios, measured by CCC bucket size and the weighted average rating factor (WARF) 3 months after issuance (Graph A4.4). While the bucket size increased for BSL CLOs following the court ruling, this was a small temporary increase which began before the court ruling and declined in the subsequent quarters. Similarly, there is no indication of a material effect on the WARFs of BSL CLOs following the court decision. However, comparing BSL and MM CLOs is problematic in this context. There are few MM CLOs issued each quarter, and those that are issued exhibit considerable variation in their underlying portfolio characteristics.

Observation of risk measures in BSL and MM CLOs (new issuances) **Graph A4.4**



Source: Moody's Analytics.

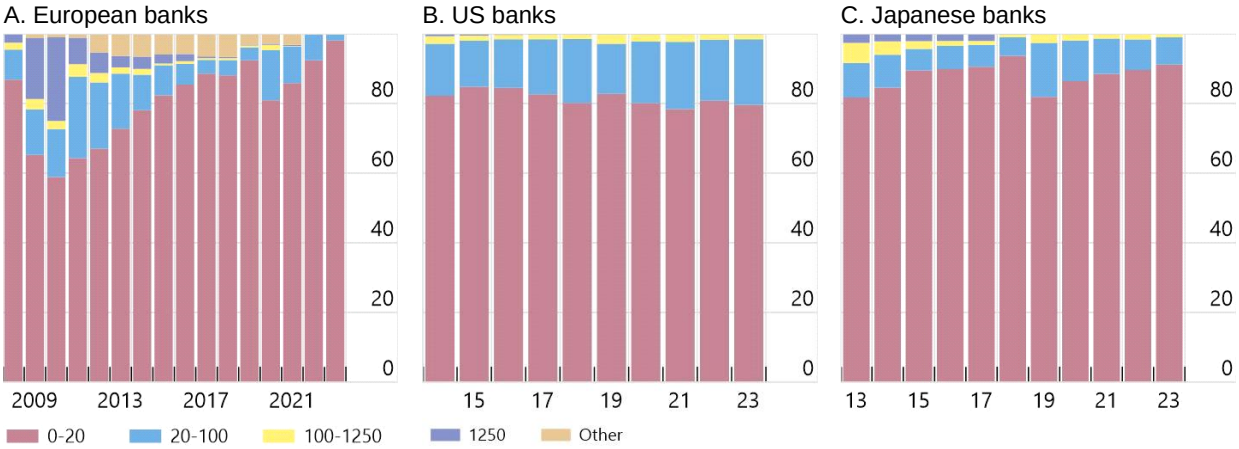
Trends in banks' activities in the securitisation market

Insights from public disclosures

An examination of a sample of European (including UK), Japanese and US G-SIBs' Pillar 3 disclosures indicates securitisation exposures (which includes CLOs and non-agency RMBS) of the European banks have shifted towards "safer" (in terms of lower risk weight) securitisations since 2010, whereas the trend for the US banks since 2014 is broadly unchanged and Japanese banks have shown a slight shift towards safer securitisations between 2013 and 2018 (Graph A4.5). This suggests that much of the adjustment in banks' securitisation portfolios may have taken place in the years immediately following the GFC (for which data is limited), though the reforms – and especially the changes in regulatory capital treatment of different tranches – may have contributed to a change in (at least) European banks' investment strategies.

Distribution of securitisation exposure by risk weight for sample of banks

Percent **Graph A4.5**



Other relates to any non-numeric risk weighting (e.g. Internal Assessment Approach, Standardised Approach, Supervisory Formula Method).

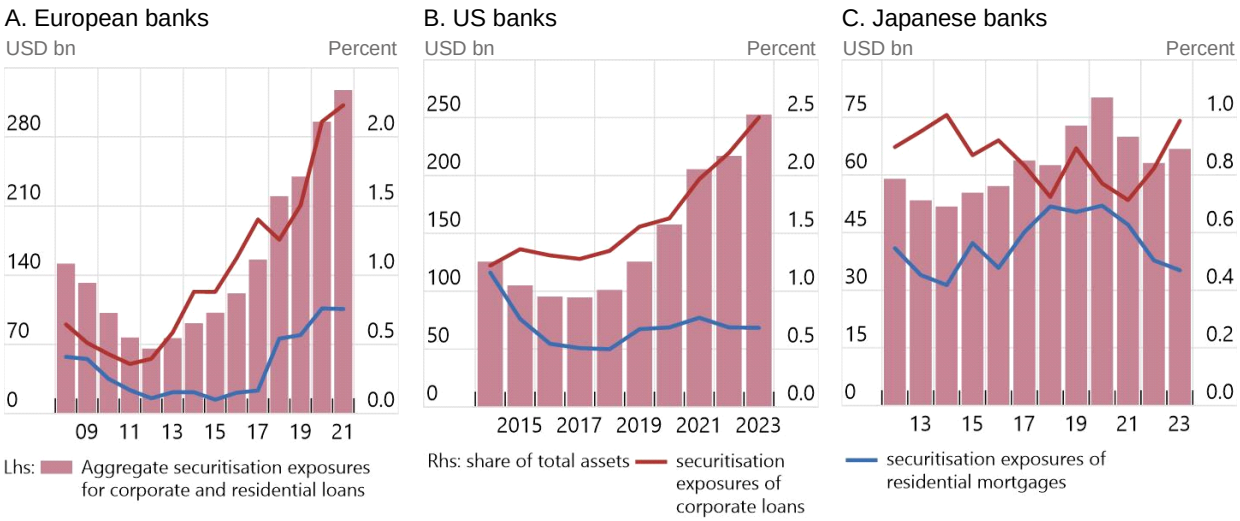
Sources: Pillar 3 reports of Barclays, BNP Paribas, Citigroup, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan, Mizuho Bank, MUFG Bank, and Sumitomo Mitsui Financial Group; FSB calculations.

Aggregate securitisation exposures, in absolute terms and where the underlying is a corporate or residential loan, have increased for the sample of European (including UK) and US banks whose Pillar 3 disclosures were analysed (Graph A4.6). Relative to the overall growth of total assets, the increases are driven by the share of corporate loan securitisations. For the US banks, analysis of supervisory data across the same time period suggests this is driven by non-CLO corporate securitisations – such as small and medium-sized enterprises – as US banks' CLO exposures have remained fairly stable (see "Insights from US supervisory data" below).[228]

[228] Specific CLO exposures are not fully available across a long time series for European banks.

Aggregate securitisation exposures to key segments

Graph A4.6



Sources: Pillar 3 reports of Barclays, BNP Paribas, Citigroup, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan, Mizuho Bank, MUFG Bank, and Sumitomo Mitsui Financial Group; FSB calculations

Insights from EU supervisory data

Issuances of leveraged loans by major banks[229] in the euro-area has increased since 2019, peaking at EUR 250 billion in 2021 (Graph A4.7A). In 2023, issuances declined to EUR 120 billion as interest rates in those economies increased. Investor appetite for leveraged loans has remained high with the share of "hung deals"[230] remaining below 3% in 2023. The major EU banks also had exposures of approximately EUR 20 billion to CLOs in 2023 (Graph A4.7B). This includes some warehousing exposures, which typically range from 15%-25% of the overall CLO exposures retained by the major EU banks. The appetite of banks to distribute leveraged loans instead of retaining them on balance sheet might partly be driven by capital optimisation. Leveraged loans kept on balance sheet require more capital compared to the senior CLO tranches purchased by banks, which attract lower risk weights under the post GFC reforms.[231]

[229] Information on securitisation activity (investment and origination) based on supervisory data for euro area Significant Institutions.

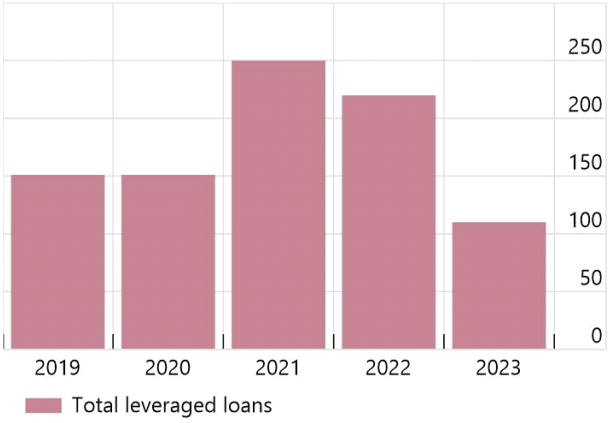
[230] Failed syndications – that is, a transaction which has not been syndicated within 90 days following the commitment date.

[231] ECB supervisory analysis indicates leveraged loans typically have a 150% risk weight compared to senior CLO tranches having 25% risk weight.

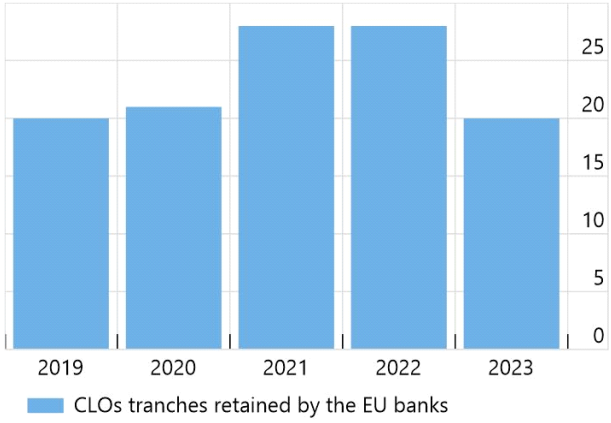
Leveraged loans and CLO tranches by major EU banks for 2019-23

EUR bn **Graph A4.7**

A. Evolution of leveraged loans originated



B. Evolution of CLOs tranches retained



Source: ECB

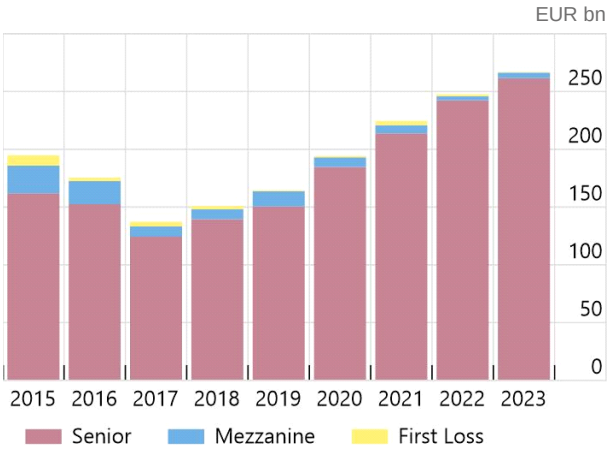
An analysis of the large euro area banks' regulatory data reporting[232] indicates that these banks are actively engaging in securitisations across various jurisdictions as originators (for capital and funding) and investors (to earn yield from deploying excess funds with relatively low risk).

Investments in senior tranches increased by 62% from 2015 to 2023, while investments in mezzanine tranches declined by 80%. Furthermore, investments in junior tranches decreased from EUR 9.1 billion to less than EUR 0.5 billion after the implementation of Basel III framework in 2019 in the EU (see Graph A4.8A). Overall, securitisation exposures as a proportion of Common Equity Tier 1 (CET1) capital ratios increased slightly from 17% in 2015 to 19% in 2023 (see Graph A4.8B).

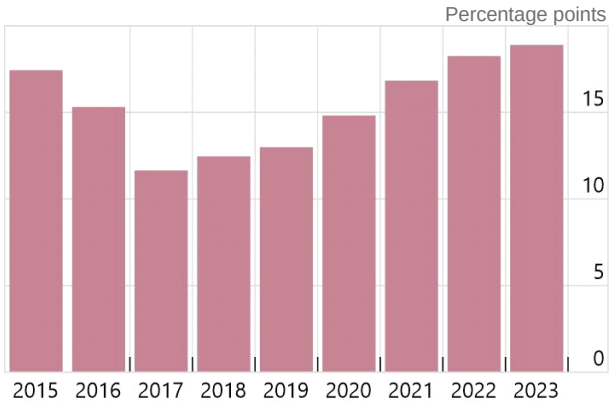
EU major banks' investments in securitisation

Graph A4.8

A. Total per tranche



B. Investor total as CET1 share



Source: ECB.

[232] Information on securitisation activity (investment and origination) based on supervisory data for euro area Significant Institutions. Origination activity captures only the capital relief trades (SRT), approximated before 2020 due to the lack of specific categories in the supervisory reporting.

Given the complexity of securitised products, the origination and investment in securitisations is mostly carried out by large and mid-sized EU banks. The largest EU banks, with CET1 capital greater than EUR 51 billion, account for around a third of the total activity by all EU banks with respect to origination and investment in securitisation. Mid-sized banks (CET1 capital of EUR 15 billion to 51 billion) have a higher share of around 40% of total securitisation activity.

The EU banks have originated significant volumes of capital relief trades, with peak years in issuances above EUR 100 billion. The origination activity increased by approximately 50% from 2018 to 2023, although a significant share was retained by the originating institutions. With the introduction of Securitisation Regulation in 2019, the amount of outstanding originated exposures peaked at almost EUR 600 billion in 2023.

Origination activity for capital relief trades is concentrated mainly in five EU Member States: Germany, Greece, France, Italy and Spain. The cross-border component is measured by the share of non-EU underlying assets included in the securitisation pools: loans with non-EU obligors (approximately 24%), primarily US, were securitised in transactions originated by the EU banking groups, i.e. including their non-EU subsidiaries. Overall, the magnitude of non-EU obligors is not negligible, showing that banks had the capacity to diversify their securitisation pools by adding exposures originated in other jurisdictions.

Insights from US supervisory data

An analysis of data reported by US banks indicates that the reforms have not had a significant impact on their securitisation activity in recent years. The analysis of large and complex US bank holding companies is based on US Y-14 stress testing data and Form FR Y-14Q reports.[233]

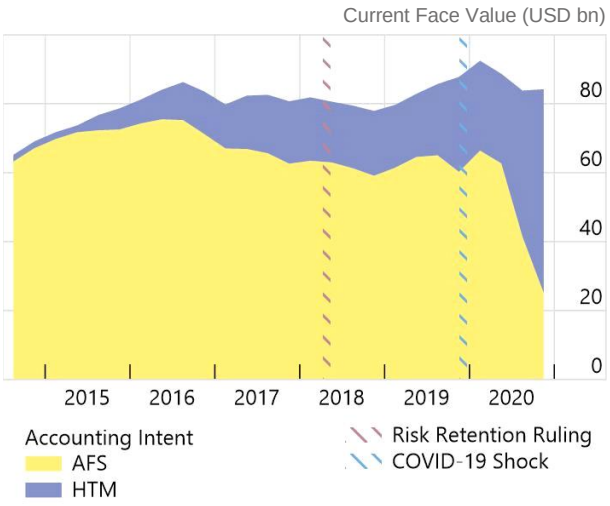
The US banks held approximately USD 80 billion of CLOs as of Q2 2020, increasing from USD 65 billion in 2014 though the quantum has been fairly stable since 2016 (Graph A4.9A). In 2020, these banks changed the composition of some of their holdings from available for sale to held to maturity. The banks' domestic non-agency RMBS holdings have declined over time, consistent with the broader decline in the non-agency market (see Box 8). Similarly, there has been a small shift in the composition from available for sale to held to maturity since Q2 2020 (Graph A4.9B).

[233] The analysis depicts the full aggregated data of US financial institutions with total assets of $100 billion or larger and are subject to the Federal Reserve Board's supervisory stress test rule. However, the analysis on US banks' CLO exposures relative to their overall size depicts averages of a subset of the FR Y-14 stress test institutions consisting of the US G-SIBs.

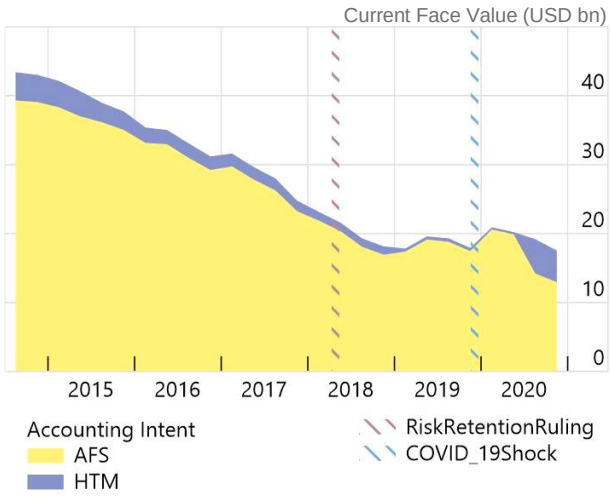
US banks' exposures to CLOs and non-agency RMBS

Graph A4.9

A. CLOs



B. Domestic non-agency RMBS



AFS = Available for sale. HTM = Held to Maturity.

Source: OCC.

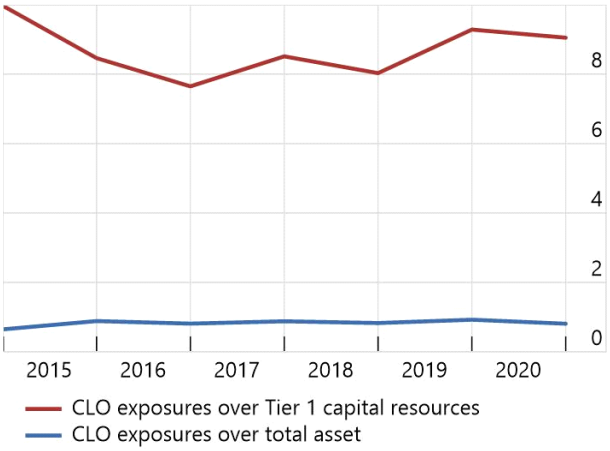
The growth in CLO holdings appears to be in line with the US banks' overall growth since 2014 (Graph A4.10A). An examination of the ratings of banks' CLO holdings suggests a migration to higher-rated investment grade tranches (Graph A4.10B). This trend was partially accelerated during the pandemic as banks invested some of excess deposits received in these instruments.

US bank's CLO exposures and CLO credit quality

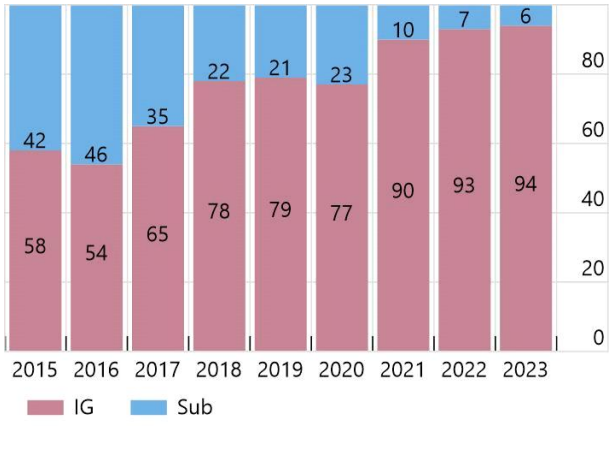
Percent

Graph A4.10

A. US banks' CLO exposures relative to their overall size



B. Credit quality of US banks' CLO Investments and Trading Portfolio



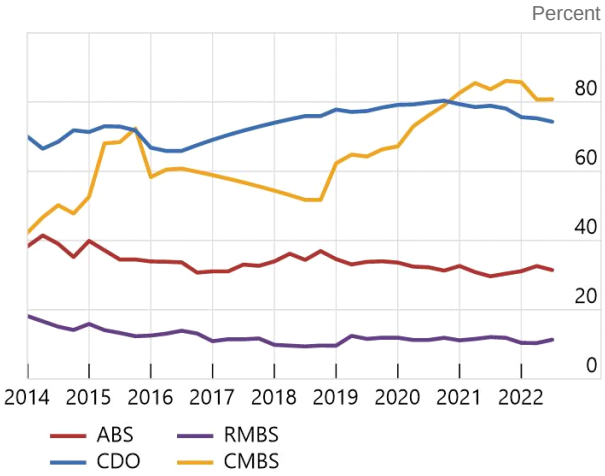
Source: Federal Reserve Bank of Boston.

Analysis of non-bank and foreign investors in RMBS and CLOs

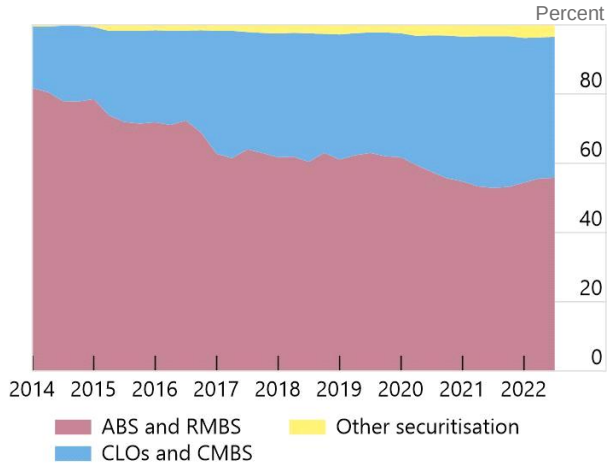
Non-bank investors – such as insurance companies, money market funds, pension funds and financial vehicle corporations – have increased their investments in euro area securitisations, especially for CLOs and CMBS, since 2014 (Graph A4.11). Further, they appear to invest a higher proportion in the mezzanine tranches for these market segments relative to their investments in ABS and RMBS (Graph A4.12). This demand for riskier tranches may be driven by a range of factors, such as a search for yield. The US banks hold small amounts of foreign RMBS assets, which appears to be unchanged since the risk retention reform was implemented.

Non-bank investors' exposure by product type to euro area securitisations **Graph A4.11**

A. Share of securitisations, by type, held by non-banks



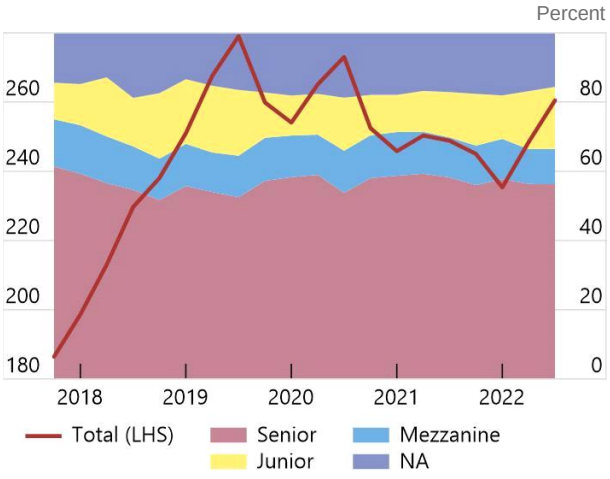
B. Non-bank share of the main securitisations products



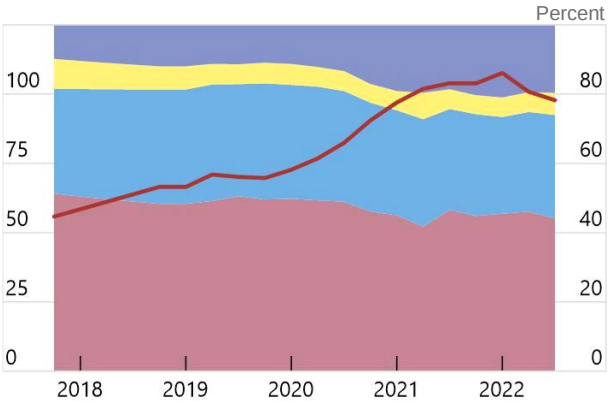
Note: Eurosystem holdings are not included. Charts show euro area (EA) issuance held by EA and non-EA holders.
Sources: SHSS and ECB calculations.

Euro area non-banks' securitisation exposures by tranche **Graph A4.12**

A. ABS & RMBS



B. CLOs and CMBS



Sources: SHSS and ECB calculations.

Annex 5: Composition of the evaluation working group

Chair	**Benjamin Weigert** Head, Directorate General Financial Stability Deutsche Bundesbank
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	Sebastien Piednoir Deputy Head, Savings and Financial Market Division Treasury
Germany	**Sebastian Wider** Senior Expert, Directorate General Financial Stability Deutsche Bundesbank
India	**Vaibhav Chaturvedi** General Manager, Department of Regulation Reserve Bank of India
Italy	**Bernardo D'Alessandro Tavani** Policy Expert, Regulation and Macroprudential Analysis Directorate Banca d'Italia
	Riccardo Scimone (since March 2024) Expert in Statistics, Financial Supervision Directorate Banca d'Italia
	Gianluca Vittorioso Senior Officer, Issuers Information Division CONSOB
Japan	**Asuka Watanabe** Member of International Division, Financial System and Bank Examination Department Bank of Japan
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	Begoña Gutiérrez-Barquín Senior Policy Expert, Global Regulatory Policy Unit Banco de España
UK	**Susanne Leitterstorf (until July 2024)** Policy Adviser and Manager, Securitisation Policy Team, Prudential Policy Division Bank of England
	Joanne Cleary (until February 2024) Technical Specialist, Market Analysis & Policy, Sell-side, Infrastructure & Exchanges Directorate Financial Conduct Authority
	Reto Bachmann (from July 2024 until November 2024) Senior Associate, Conduct & Credit Team, Market Analysis and Policy Department Financial Conduct Authority
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	Scott Strah (since July 2024) Assistant Vice President Federal Reserve Bank of Boston
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	Kevin Walsh (since July 2024) Deputy Comptroller Office of the Comptroller of the Currency
	Ricky Rambharat (since July 2024) Applied Statistician Office of the Comptroller of the Currency
Basel Committee on Banking Supervision	**Irina Barakova (until July 2024)** Member of Secretariat
	Rebeca Anguren (since July 2024) Member of Secretariat

European Central Bank	**Claudiu Moldovan (until May 2024)** Senior Financial Stability Expert, Directorate General Macroprudential Policy and Financial Stability
	Cristina Triandafil Supervisor, SPO Securitisation Team, Banking Supervision
European Commission	**Presiyan Petkov** Policy Officer, Directorate General for Financial Stability, Financial Services and Capital Markets Union
European Securities and Markets Authority	**Thierry Sessin-Caracci (since July 2024)** Senior Policy Expert, Securitisation & Supervision
FSB Secretariat	**Costas Stephanou** Head of Financial Stability Analysis
	Lara Douglas (from December 2023 until June 2024) **Michael Chui (since April 2024)** **Shahzad Gitay (since April 2024)** Members of Secretariat
	Takis Antonopoulos (January-March 2024) Senior Financial Markets Analyst

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Abbreviations

ABCP	Asset-Backed Commercial Paper
ABS	Asset-Backed Securities
ATR	Ability to Repay
BIS	Bank for International Settlements
BSL	Broadly Syndicated Loan
CDO	Collateralised Debt Obligation
CLN	Credit Linked Notes
CLF	Committed Liquidity Facility
CLO	Collateralised Loan Obligation
CMBS	Commercial Mortgage-Backed Securities
CRA	Credit Rating Agencies
CRE	Commercial Real Estate
CRR	Capital Requirement Regulation
DSTI	Debt Service to Income
ESRB	European Systemic Risk Board
EU	European Union
FSB	Financial Stability Board
GFC	Global Financial Crisis
GSE	Government Sponsored Enterprise
HQLA	High-Quality Liquid Assets
IOSCO	International Organization of Securities Commissions
IRBA	Internal-Ratings Based Approach
JC	Joint Committee of the European Supervisory Authorities
LCR	Liquidity Coverage Ratio
LSTA	Loan Syndications and Trading Association

MBS	Mortgage-Backed Securities
MM	Middle Market
NBFI	Non-Bank Financial Intermediation
NPL	Non-Performing Loan
NSFR	Net Stable Funding Ratio
RBC	Risk-Based Capital
RCAP	Regulatory Consistency Assessment Programme
RMBS	Residential Mortgage-Backed Securities
RWA	Risk-Weighted Assets
SA	Standardised Approach
SCRT	Synthetic Capital Relief Trades
SFA	Supervisory Formula Approach
SIV	Structured Investment Vehicle
SPV	Special Purpose Vehicle
SR	Security Receipt
SRT	Significant Risk Transfer
SSBs	Standard-Setting Bodies
SSPE	Securitisation Special Purpose Entity
STC	Simple, Transparent and Comparable
STS	Simple, Transparent and Standardised
WARF	Weighted Average Rating Factor

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