FSB FINANCIAL STABILITY BOARD

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

Consultation report

2 July 2024

The Financial Stability Board (FSB) coordinates at the international level the work of national financial authorities and international standard-setting bodies in order to develop and promote the implementation of effective regulatory, supervisory and other financial sector policies. Its mandate is set out in the FSB Charter, which governs the policymaking and related activities of the FSB. These activities, including any decisions reached in their context, shall not be binding or give rise to any legal rights or obligations.

Contact the Financial Stability Board

Sign up for e-mail alerts: www.fsb.org/emailalert
Follow the FSB on X/Twitter: @FinStbBoard
E-mail the FSB at: fsb@fsb.org

Table of Contents

Questions for consultation

The FSB invites comments on this consultation report and the questions set out below. Responses should be submitted via this **secure online form** by 2 September 2024.

For questions, please contact the FSB (fsb@fsb.org).

Responses will be published on the FSB's website unless respondents expressly request otherwise.

Background

This consultation report presents the preliminary results of, and seeks comments on, the evaluation of the effects of the G20 financial regulatory reforms on securitisation that have been implemented to date. The evaluation focuses, 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; and 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) market segments. The FSB will continue its analysis of the reforms, including through empirical work, and expects to publish the final report at the end of 2024.

Questions

Please provide details and supporting evidence where possible.

Overall

1. **Preliminary findings**: Does the report draw the appropriate inferences about the extent to which the securitisation reforms have achieved their objectives? Is there other evidence on the effects of the reforms to complement the preliminary findings of the report?
2. **Analytical approach**: Are the descriptive analyses used to evaluate the effects of the securitisation reforms appropriate? Are there other such analyses to consider? What types of empirical analysis based on available data could inform the evaluation?

Overview of securitisation markets

3. **Trends:** Are the securitisation market trends presented in this report adequate given the scope of the evaluation? Are there other important trends that should be included and, if so, what additional data sources could be used for this purpose?

Securitisation reforms

4. **Relevant reforms:** Does the report appropriately describe the key aspects of the design and jurisdictional implementation of the BCBS and IOSCO reforms for analysing their

impact on securitisation markets? Are there other important aspects of these reforms that should be considered for inclusion?

5. **Other reforms:** Does the report accurately identify other G20 and domestic financial reforms that are most relevant for securitisation markets? Are there other reforms that should be considered in terms of their impact on market participants?
6. **Conceptual framework:** Does the report adequately explain the objectives, transmission channels and expected outcomes of the securitisation reforms? What other metrics to assess the impact of the reforms should be considered?

Effectiveness of the securitisation reforms

7. **Resilience metrics for the CLO market:** Does the report accurately describe the evolution of resilience indicators for the CLO market? To what extent can the evolution of these indicators be attributed to the reforms?
8. **Risk retention in CLOs:** Does the report accurately describe risk retention practices in the CLO market before and after the reforms? What additional analysis could be included to assess the effectiveness of risk retention in CLOs across FSB jurisdictions, including on how financing of risk retention deals by third party investors impacts effectiveness?
9. **Resilience metrics for the non-agency RMBS market:** Does the report accurately describe the evolution of resilience indicators for the RMBS market? To what extent can the evolution of these indicators be attributed to the reforms?
10. **Risk retention in RMBS:** Does the report accurately describe risk retention practices in the RMBS market before and after the reforms? What additional analyses could be included to assess the effectiveness of risk retention in RMBS across FSB jurisdictions?
11. **Effectiveness of BCBS securitisation reforms:** Does the report accurately describe the changes in bank behaviour following the implementation of the BCBS securitisation framework reforms? To what extent can the effects of these reforms be disentangled from the broader Basel III framework, other reforms and confounding factors?
12. **Simple, transparent and comparable (STC) securitisations:** Does the report accurately describe the impact of the introduction of the STC framework on the securitisation market? To what extent has the reform met its objectives?

Broader effects of the reforms

13. **Effects on financing the economy:** Does the report accurately describe the main effects of the reforms on financing the economy? Is there additional analysis that could be undertaken to estimate the benefits and costs of these reforms and to assess their impact on securitisation as a financing tool?
14. **Effects on financial system structure and resilience:** Does the report accurately describe the extent to which there has been a redistribution of risk from the banking to the non-bank financial intermediation sector? What role did the reforms play in this process and what are the main benefits and risks from a system-wide perspective? How have the reforms impacted the demand and supply of liquidity in securitisation markets?

Additional considerations

15. **Other issues:** Are there any other issues or relevant factors that should be considered as part of the evaluation?

Executive summary

This consultative report presents the results of, and seeks comments on, 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 final report is expected to be published at the end of 2024.

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) market segments; 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 assets being securitised 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 and thereby limit 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 questionnaire by FSB member jurisdictions; input from stakeholders through a call for public feedback and through interviews with market participants; a review of the academic literature; 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, 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 around the 2008 global financial crisis (GFC) period 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 for 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. 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) and the market has not faced significant stress in recent years. However, it is difficult to attribute any of these outcomes directly to the reforms given the confounding factors mentioned above. 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 it only makes 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. The growth of STC securitisations, where implemented, may also have contributed to more transparent post-GFC structures and increased investor confidence in securitisation markets, at least in homogenous asset classes where the minimum STC requirements can be fulfilled (e.g. RMBS). Market pricing for STC transactions in the EU generally shows relatively lower spreads, 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 led to a relabelling of some transactions rather than stimulating activity in the securitisation market, potentially reflecting the underlying structural differences already present in the market.

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 that CLO managers are able to actively manage their portfolio. 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. Some evidence – based on analyses of deals since a US court overturned the

applicability of the risk retention rule to open-market CLOs in the US in 2018 – suggests that risk retention may impact pricing at the margin, potentially by broadening the eligible investor base.

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. 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 does not suggest 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 that the reforms have increased costs for issuers and investors, thereby diminishing the appeal of securitisation as a financing tool, even though several of the cited reforms are jurisdiction-specific and were not part of the G20 reform agenda. 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 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 has 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.

The analysis thus far suggests that the BCBS and IOSCO reforms have contributed to the resilience of the securitisation market (especially for RMBS) without strong evidence of material negative side-effects on financing to the economy, though the findings are preliminary and need to be confirmed by additional work. Looking ahead, the FSB will continue its analysis of the effects of these reforms, including through empirical work seeking to establish (where possible) a causal link between the reforms and observed outcomes in the selected market segments.

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

---

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 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. 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 include 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 FSB 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 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.

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

---

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

5 In recent years, agency MBS 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. See SIFMA (2024).

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

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.

The analysis of the effects of securitisation reforms will continue while the public consultation is ongoing. Data limitations and methodological questions present important challenges in carrying out 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. Looking ahead, the FSB intends to continue its analysis of these reforms, including through empirical work seeking to establish, where possible, a causal link between the reforms and observed outcomes in the selected market segments.

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;
- 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 to date 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 the preliminary findings on the broader effects of the reforms on financing to the economy and on financial system structure and resilience.

---

6 See FSB invites feedback on the effects of G20 financial regulatory reforms on securitisation (30 August 2023).

7 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).

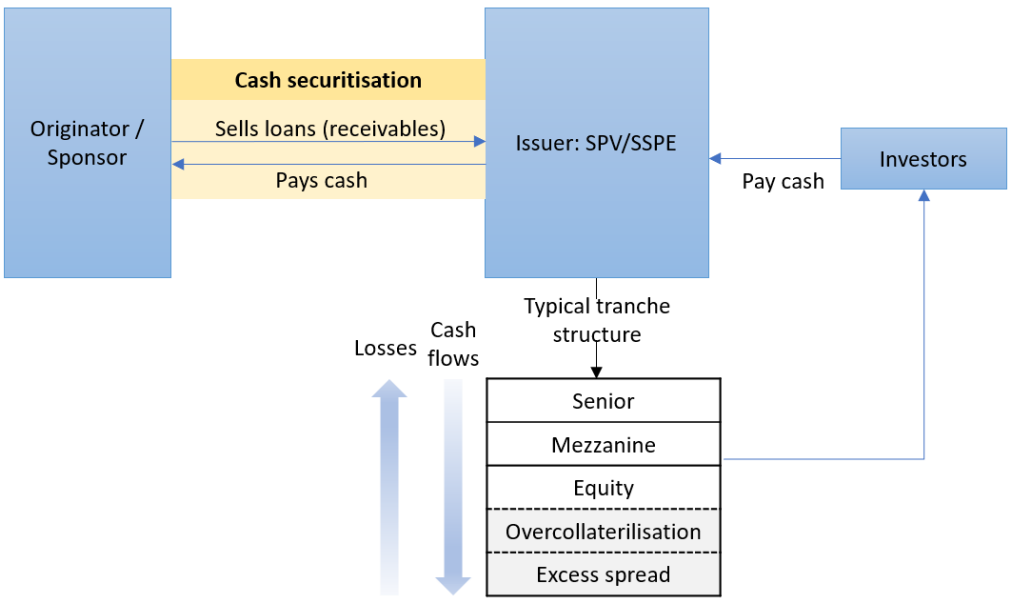
The report also includes annexes with additional information on securitisation reforms and their implementation (Annex 1); a literature review (Annex 2); the composition of the evaluation working group (Annex 3); and a bibliography.

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.[8] 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).[9] To finance this purchase, the SPV creates tradable securities – allocated to several 'tranches' of different seniority – which are collateralised by these 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.

Graph 1: Stylised cash securitisation process



8 For an overview of securitisation, see Fabozzi et al. (2006), "Introduction to structured finance," John Wiley.

9 SPV is also referred to as securitisation special purpose entity (SSPE).

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,[10] 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 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 auto non-bank 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.

[10] See the BCBS Basel Framework, Scope and definitions of transactions covered under the securitisation framework.

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 holds regulatory capital against 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.[11] 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.[12] 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, see 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.

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[13] are not comprehensive or consistent across FSB jurisdictions. Data on investors, especially non-bank financial entities such as various fund types, are typically not available through public sources. This limitation also

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

12 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.

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

applies to loan-level data for the underlying assets, which are publicly accessible only for a few FSB member jurisdictions.[14] 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.[15]

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, Japan, Korea and the UK. Smaller markets can be found in Argentina, India, 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.

[14] 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.

[15] 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	154 bn	9%	Agribusiness credit receivables (17%), real estate receivables (23%), credit rights (60%)	N/A	No	Yes (significant but N/A)	No
Canada	79 bn (includes private placements)	1.8%	Term ABS (47%), asset-backed commercial paper (ABCP) (44%), private placements (10%) Credit cards (39%), auto loans (22%), 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	234 bn	3%	RMBS (42%), lease and consumer finance ABS (18%), CLOs/CDOs (10%), CMBS (10%) and other types of collaterals	Depository institutions, insurance companies, special purpose companies and trusts, non-financial corporations	114 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

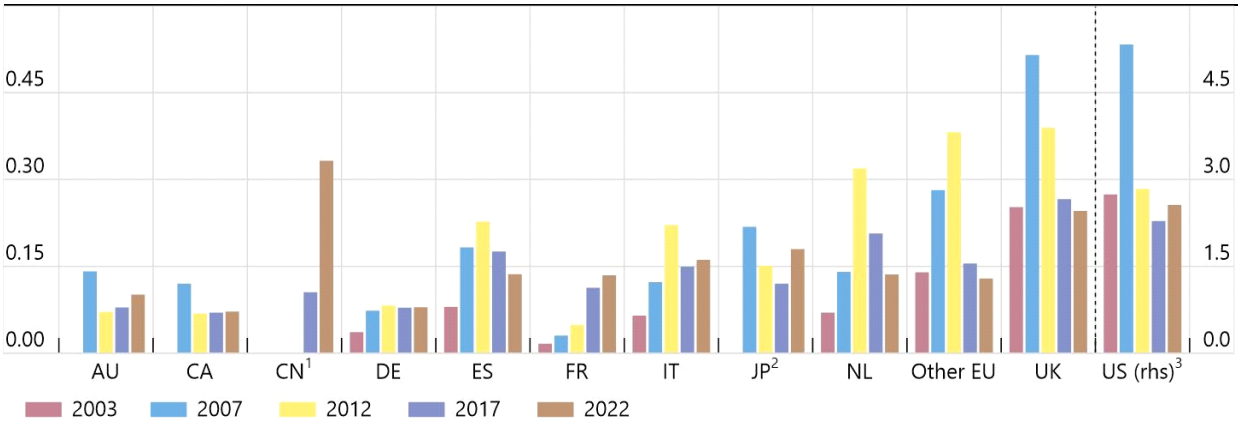
N/A = Not available. Unless otherwise noted, non-agency securitisation figures refer solely to public true sale deals. [1] Outstanding market size as of end-2022 or latest available. [2] A large proportion of RMBS is retained by banks. [3] There is a separate legal framework for securitisation of NPLs 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, 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 around the GFC period 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 trn **Graph 2**



* 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 latest value refers to 2021.

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

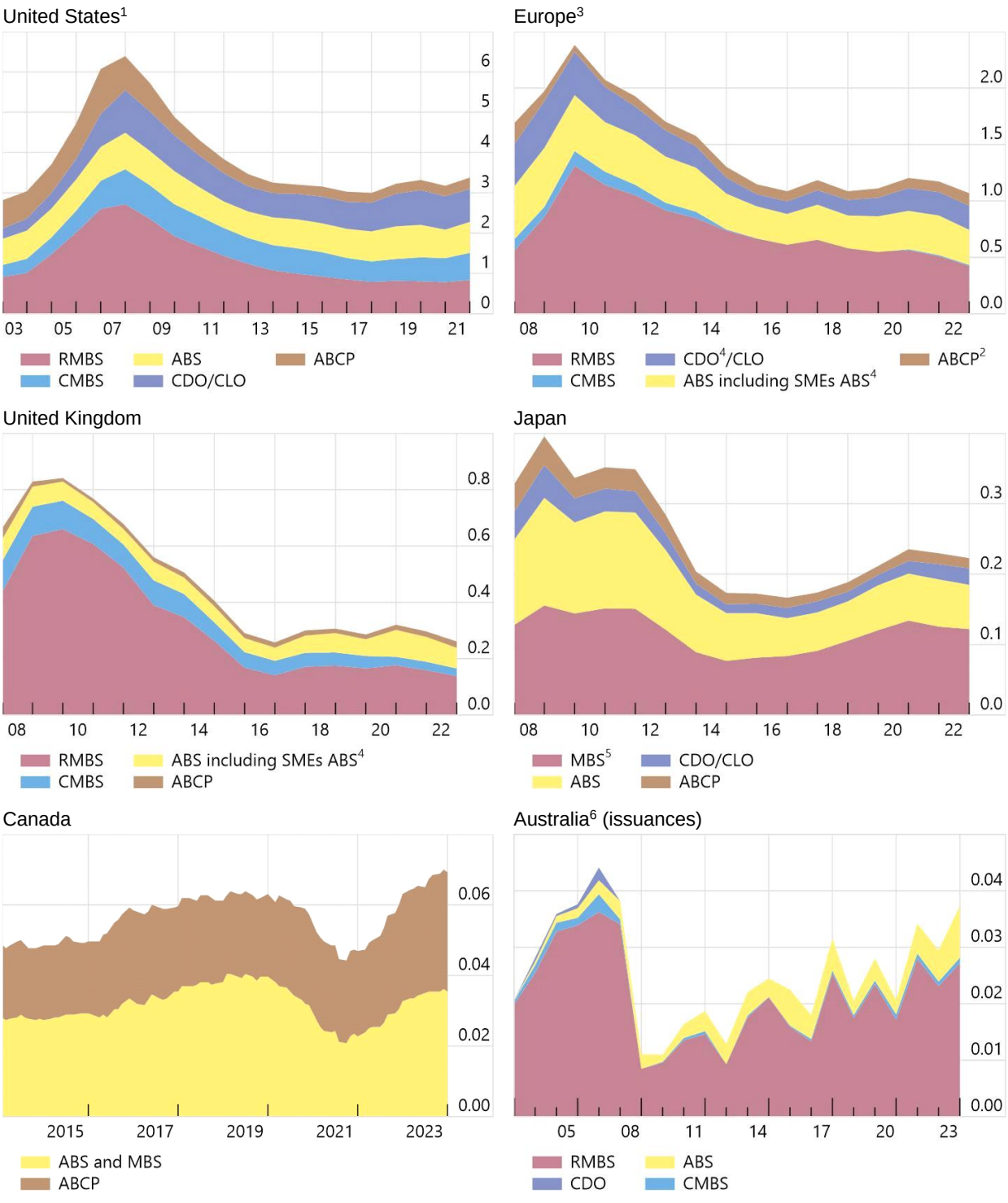
RMBS represents the largest segment of the cash securitisation market globally (see Graph 3). The US non-agency RMBS market amounted to around USD 840 billion as of end-2021.[16] Following a freeze in issuance in mid-2007 associated with the collapse of subprime lending, that market has rebounded but 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.[17] 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 Box 7).

16 AFME (2022), Securitisation data report.

17 See BofA (2020), Europe 2020–2021: Another year of two halves.

Cash securitisation outstanding volumes by segment and jurisdiction*

In USD trn **Graph 3**



* Data for Europe, UK and US are by country of collateral. [1] Does not include agency securitisation. [2] Observations up to 2017 are based on estimates. [3] EU member jurisdictions and Switzerland. CDO/CLO data include the UK, since they are only available by currency and not jurisdiction. [4] The values for 2007 and 2008 are based on estimations. [5] Does not include agency RMBS. [6] Does not include securitisation exposures retained by banks to use as collateral to access liquidity from the central bank.

Sources: AFME; Bank of Japan; Bloomberg; 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.[18] At USD 41 billion outstanding in 2022, CMBS accounts for only 3% 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%.[19] ABS accounts for the third-largest share (23%) of the US non-agency securitisation market and reached USD 766 billion outstanding in 2021,[20] with auto loans, student loans, credit card receivables, and equipment financing as the main sub-categories.[21] Although the COVID-19 pandemic negatively impacted the ABS market,[22] 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.[23] 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 214 bn of outstanding amount) of the securitisation market.[24] 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.[25] 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%.[26]

---

18 AFME (2022), op. cit.

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

20 AFME (2022), op. cit.

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

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

23 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.

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

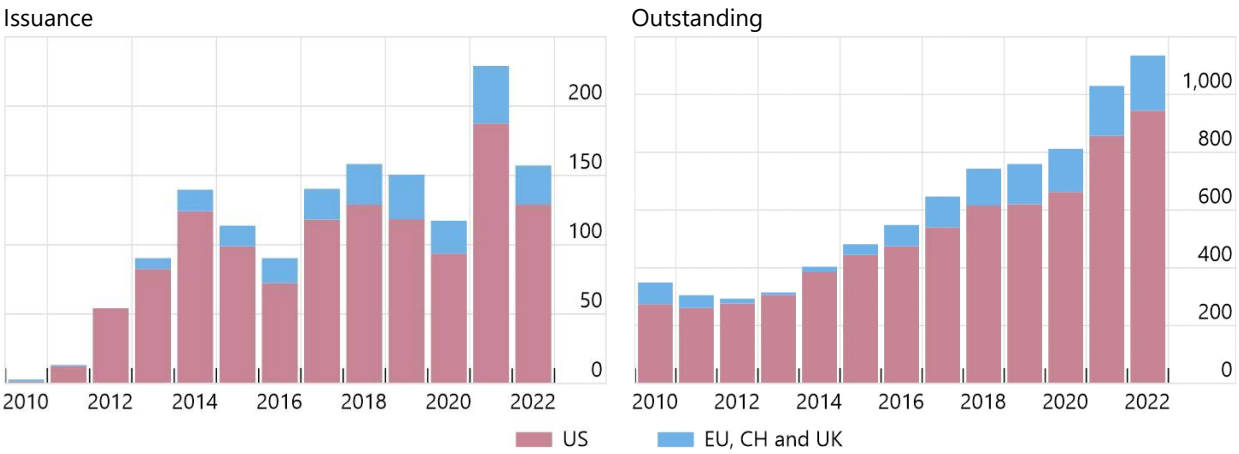
25 There is no commonly agreed definition of leveraged loans, which can lead to different estimates of the size of the market. Criteria used by regulators and data providers to classify a loan as leveraged typically include high indebtedness of the borrowing corporate, below investment grade credit rating 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.

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

Global CLOs

In USD bn

Graph 4

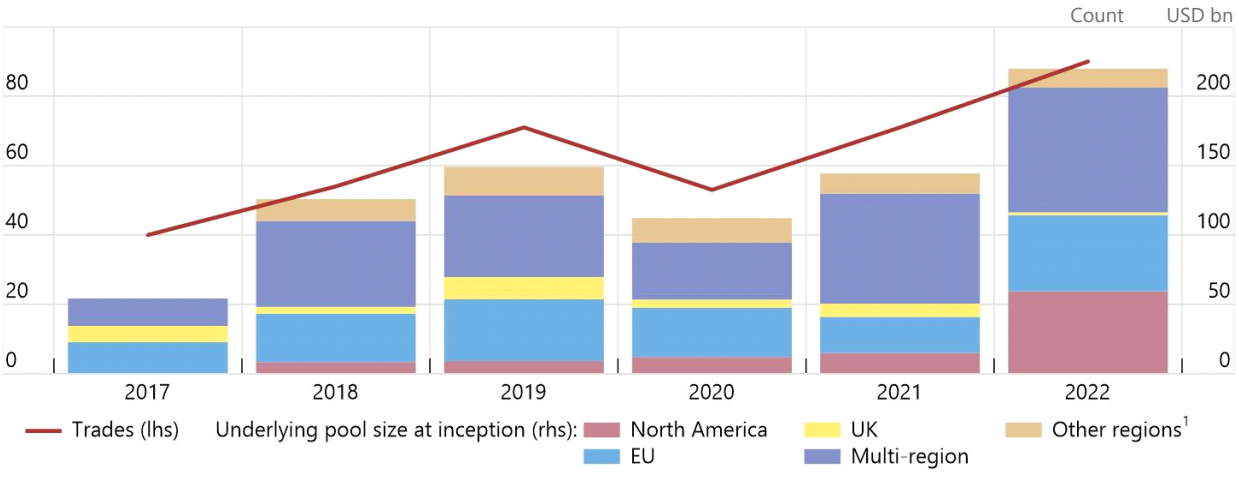


Sources: AFME; Bloomberg; Pitchbook LCD; FSB calculations.

Synthetic securitisations used mainly for capital relief purposes have gained popularity in recent years (see Graph 5).[27] 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 5



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

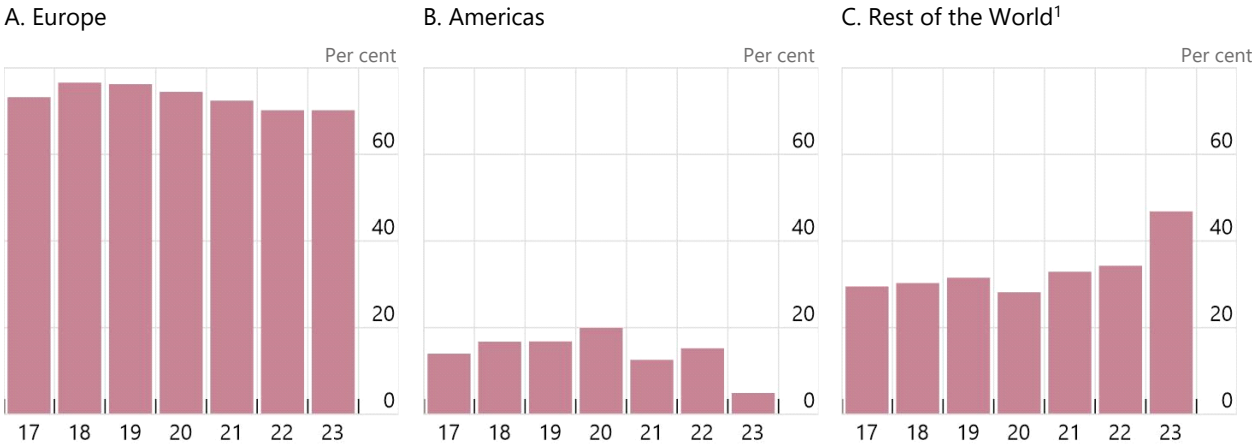
Sources: IACPM Synthetic securitisation market volume survey 2023; FSB calculations.

[27] 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)[28] 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 6



* Sample covers "group 1" banks which are defined as internationally active banks that have Tier 1 capital of more than €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 hold their securitisation exposures off-balance sheet thereby avoiding to hold equity against them. 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.

28 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[29]

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. Together with limited risk retention practices, this weakened lenders' incentives to apply robust 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 competing agencies. In addition, there was 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 and low capital requirements further incentivised banks to boost short-term profits by retaining the riskiest tranches and investing in other originators' securities.[30] 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)[31] 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 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

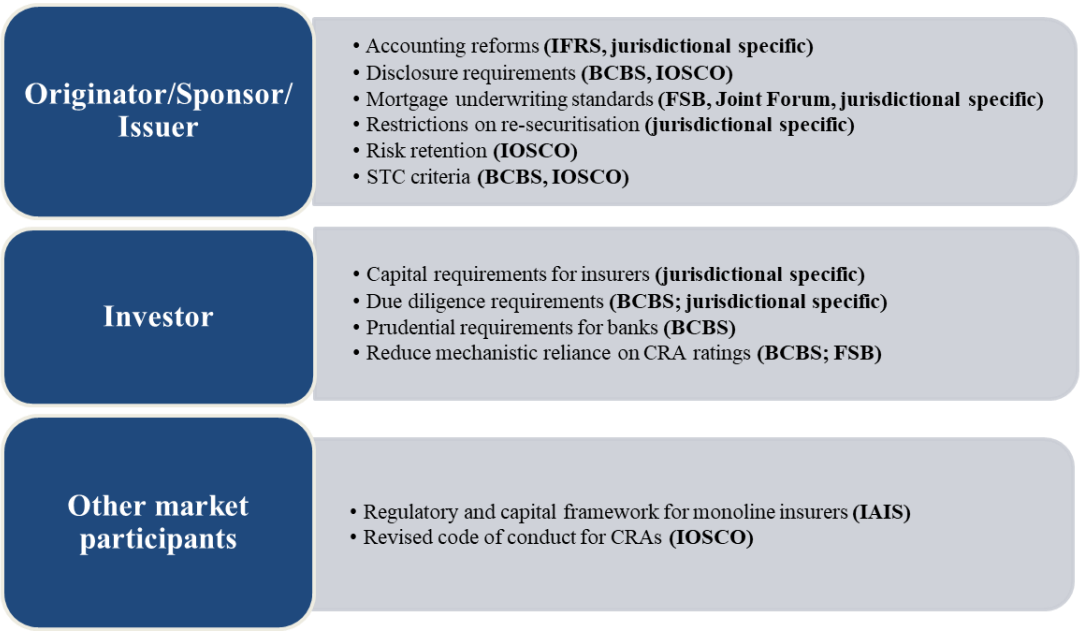
29 Based on FSB, 2017 FSB assessment of shadow banking reforms; 2009 IMF GFSR chapter 2 on restarting securitisation markets; Box 2.1 of the 2014 IMF GFSR chapter 2 on shadow banking; Box 4 of 2014 BoE-ECB paper on improving securitisation in the EU; and Box 3 of the 2022 ESRB report.

30 In the run up to the GFC, securitisation issuers began to heavily retain 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.

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

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.

Graph 7: 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.[32]

- 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.[33] The cumulative changes are set out in the consolidated Basel Framework and have been in effect since January 2023.[34]

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)[35] and due diligence requirements aimed to help limit reliance on external ratings, address cliff effects,[36] 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 with the STC criteria should *inter alia* mitigate or eliminate complexity and opaqueness of the transactions and provide additional confidence in their expected performance.[37] The lower

---

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

33 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.

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

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

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

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

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.[38]

The Basel III framework also includes a number of other requirements that impact banks' incentives to engage in securitisation as originators, sponsors, or investors. 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) (see Annex 1). 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.[39] 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.[40] Most jurisdictions also implemented the subsequent revised securitisation framework by the due date of January 2018 (see Graph 8),[41] 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 largely in line with the Basel III framework except for some parameters.[42] Further details on the implementation of the Basel securitisation framework in jurisdictions with material securitisation markets (Australia, Canada, China, EU, Japan, UK, and US) are provided in Annex 1.

---

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

39 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.

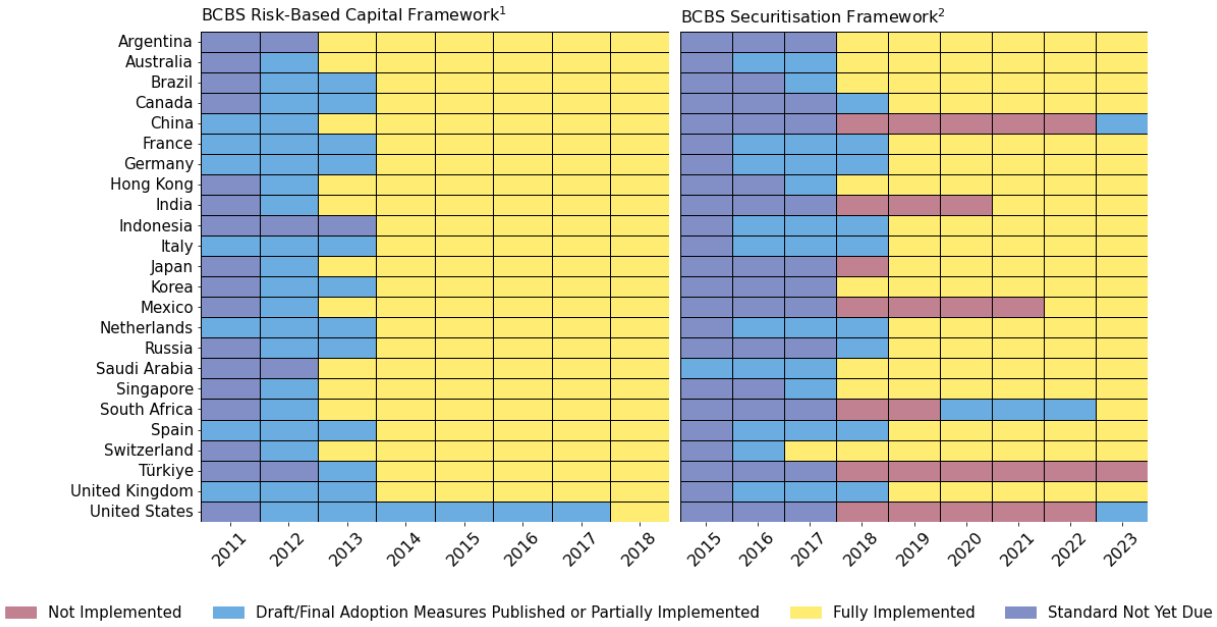
40 The BCBS RCAP of the US in 2014 found a material deviation for senior tranches of RMBS based on pre-GFC vintages.

41 See the BCBS Basel III implementation dashboard for details.

42 Key differences between SSFA under the current US capital rule and the SEC-SA rule include lower p factor (0.5 compared to 1.0 in the Basel framework), a higher risk weight floor of 20%, 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.

Implementation status across FSB jurisdictions

BCBS reforms **Graph 8**



[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 dispersion in the implementation of certain requirements such as STC, SRT, and hierarchy of approaches. Six FSB jurisdictions (including the US and Australia) do not recognise STC securitisations and therefore offer no capital reductions for these exposures. In the EU and UK, the comparable term used for STC is Simple, Transparent and Standardised (STS) securitisations. However, 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 EU has also provided further incentives by recognising certain STC securitisations as a type of high-quality liquid asset (HQLA) for the LCR. The BCBS framework allows differences in jurisdictional implementation of SRT (see Box 1 and Annex 1). Several jurisdictions limit the available securitisation framework methods,[43] while the EU and UK have a modified hierarchy of approaches. Some jurisdictions have also added further conservatism by restricting certain types of re-securitisation (e.g. EU, UK). At the same time, there are exclusions or preferential treatments for specific assets like SME and government exposures. These differences in implementation may, to some extent, have influenced the effects of reforms across jurisdictions.

[43] 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.

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.[44] 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 for issuers to hold on to some form of first loss or subordinate exposure in their securitisations.[45] 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.[46] 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.[47] 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 17 FSB jurisdictions. Australia, Canada, Mexico, Saudi Arabia, Singapore, South Africa and Switzerland have yet to implement these recommendations because, in the view of the respective authorities,

---

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

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

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

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

their domestic securitisation markets are too small or because the types of securitisation activities or assets do not necessitate incentive alignment requirements.[48]

Implementation status across FSB jurisdictions[1]

IOSCO Recommendations **Graph 9**

[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.

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. 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.

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

[48] See FSB (2023), Promoting Global Financial Stability: 2023 FSB Annual Report.

amount retained equals 5% of the market value. The horizontal method is the retention of 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.

Graph 10: Horizontal and vertical risk retention methods

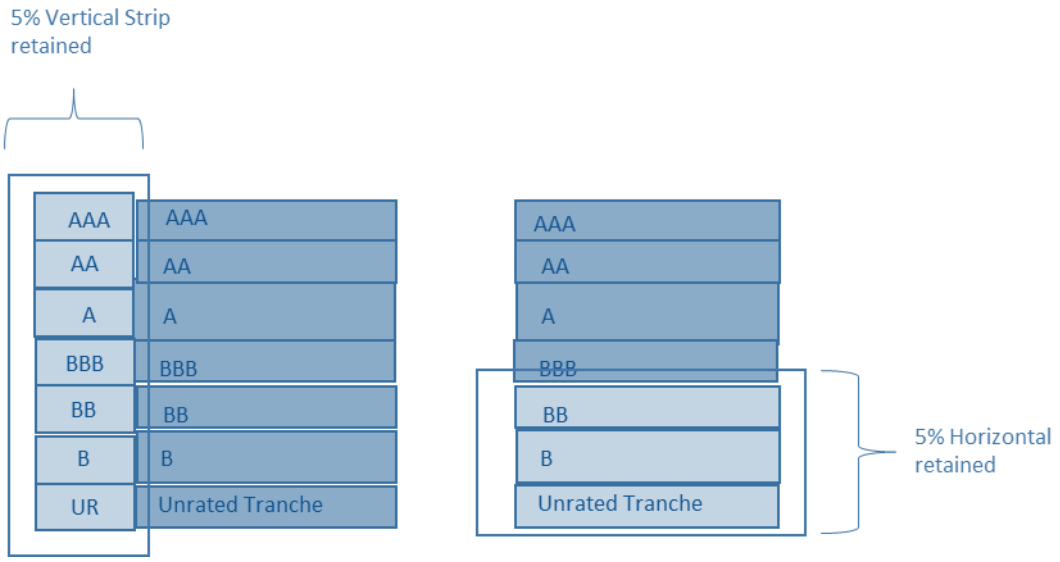


Table 2: Common use of risk retention forms

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[49]
	Where excess cash flow is used to finance risk retention

Jurisdictional differences on risk retention also involve additional requirements in a few cases.[50] 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",

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

[50] See IOSCO (2019) Update to the IOSCO Peer Review of Implementation of Incentive Alignment Recommendations for Securitisation.

preventing entities established for the sole purpose of securitising exposures from holding the risk retention.[51]

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 and certain other loans, open-market CLOs (per court decision, see also footnote 105). (This is not an exhaustive overview of applicable exceptions.)

Source: FSB member jurisdiction survey responses.

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

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.[52]

- **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 the need to hold regulatory capital 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.[53]

- **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.[54] 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.

---

52 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.

53 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.

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

- **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[55]. China, Germany, Hong Kong, India, Indonesia, Japan, Korea, Russia and Türkiye have 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.[56] Most securitisation transactions are exempt from registration and therefore Regulation AB has little direct impact for most of the US securitisation market.[57]

- **Reducing the reliance on CRA ratings**. Prior to the GFC, many investors believed the cost 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.[58] 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:

---

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

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

57 See Levitin (2023), op. cit.

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

- **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.[59] 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.

- 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 Box 8).

- 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 theoretical literature demonstrating that issuers signal their private information by retaining an economic interest in securitisation.[60] This literature on mandatory risk retention suggests that such a regulation is effective in reducing investor's informational loss.[61] 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

---

59 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.

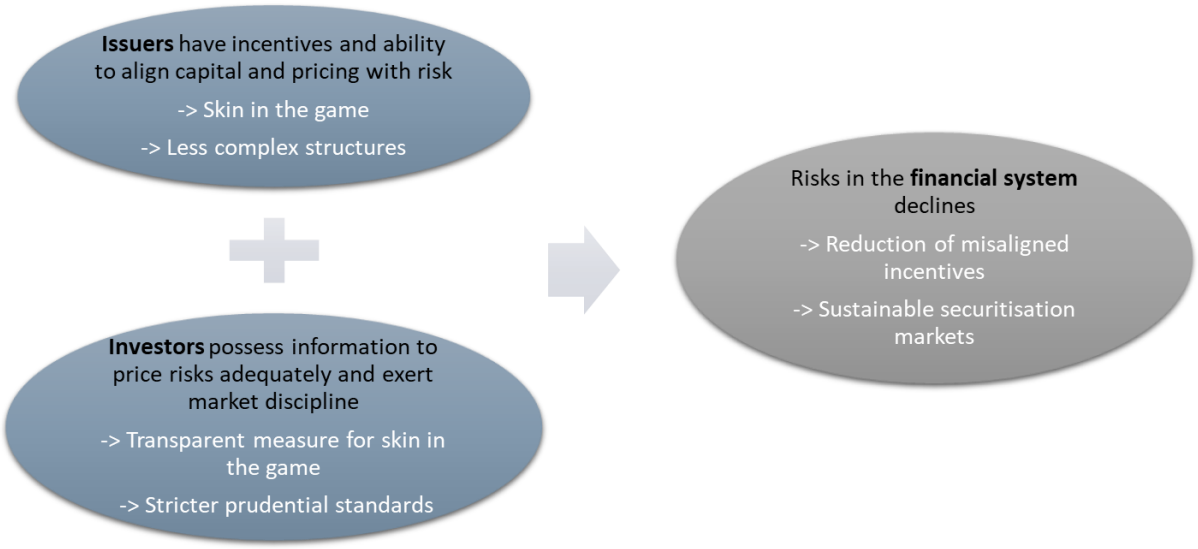
60 See Leland and Pyle (1977), "Informational Asymmetries, Financial Structure, and Financial Intermediation", Journal of Finance, vol. 32, no. 2, pp .371–387; Riddiough (1997), "Optimal design and governance of asset-backed securities", Journal of Financial Intermediation, vol. 6, issue 2, pp. 121–152;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

61 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.

retention method.[62] For example, if the probability of an economic downturn is likely and if the retained first loss tranche is likely to be depleted in a downturn, first loss tranche retention might not be the most effective mechanism to maximise originators' screening incentives. In such a case, a finding of the literature is that retaining either a vertical slice or mezzanine tranche can be more effective from a regulatory point of view.[63]

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.[64] 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.

Graph 11: 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.

62 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.

63 See Kiff and Kisser (2014), op. cit. and Fender and Mitchell (2009), op. cit.

64 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).

lowering prices and increasing volumes).[65] 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.

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.

Alignment of capital and risk. 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).

---

65 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.

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,[66] the Joint Committee (JC) of the ESAs identified certain concerns about the framework's risk sensitivity.[67] 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 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[68] that identified questions about the level of capital non-neutrality in the securitisation framework, noting an evaluation of these issues would be a complex exercise requiring a significant amount of data and analyses.

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, which goes beyond the scope of this evaluation. An indication of potential costs and benefits 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 (see section 5).

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;

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

67 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.

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

- credit enhancement (e.g. subordination,[69] over-collateralisation[70] and excess spread);[71]
- 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). 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. The FSB intends to continue its analysis of these reforms, including through empirical work seeking to establish, where possible, a causal link between the reforms and observed outcomes in the selected market segments.

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.

The available literature suggests that risk retention and prudential requirements have generally enhanced the resilience of securitisation markets (see Annex 2 for details). In particular, existing studies find that underlying loans of securitisation deals with risk retention have: a lower

69 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.

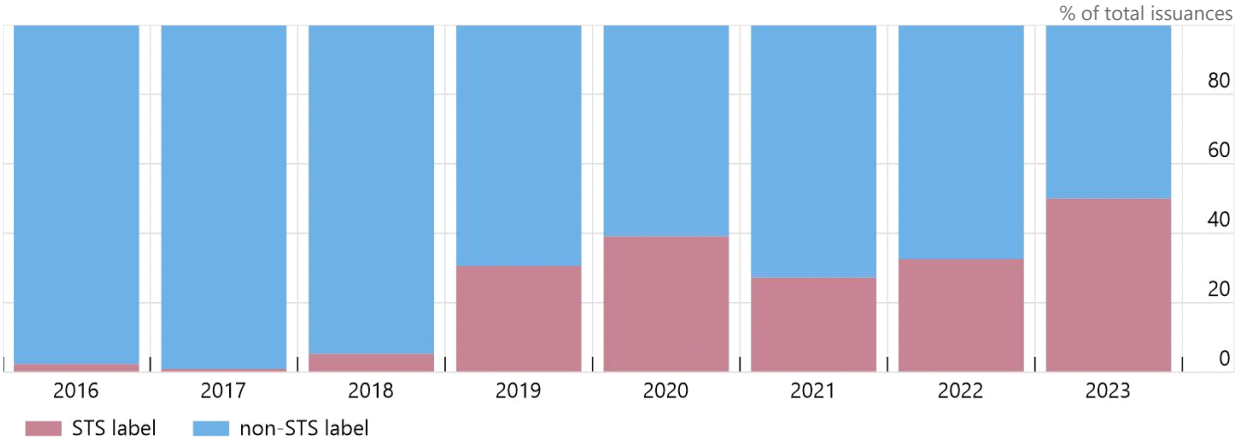
70 Over-collateralisation means that the face value of the underlying loan pool is larger than the par value of the issued bonds. So even if some of the payments from the underlying loans are late or in default, the transaction may still pay principal and interest payments on the bonds.

71 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.

probability of becoming non-performing, lower loan-to-value (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.[72] 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.[73]

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).[74] The growth of STC securitisations, where implemented, may also have contributed to more transparent structures (see Graph 12), at least in homogenous asset classes where the STC requirements can be fulfilled (e.g. RMBS). Market pricing for (true sale) STS transactions in the EU generally shows lower spreads compared to non-STS transactions, likely reflecting investor perception of lower risk, in the case of banks and insurers, reduced capital requirements.[75] However, some stakeholders have noted that the introduction of this label has led to a relabelling of some transactions rather than stimulating activity in the securitisation market, potentially reflecting the underlying structural differences already present in the market.

European issuances by regulatory label **Graph 12**



Includes EU countries and the UK. 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.

Sources: AFME; FSB calculations.

72 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.

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

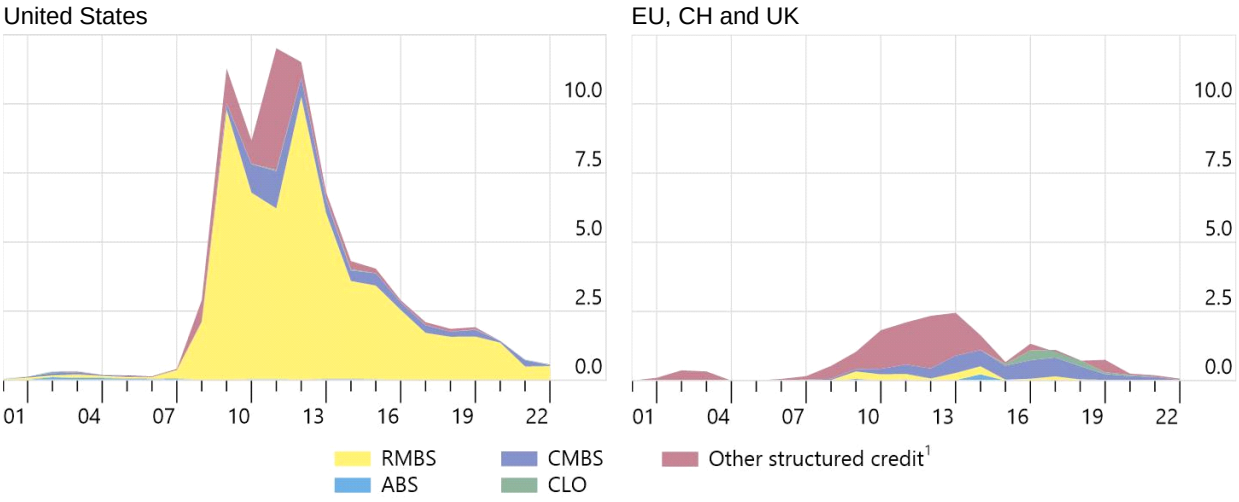
74 See FSB (2017), *Assessment of shadow banking activities: risks and the adequacy of post-crisis policy tools to address financial stability concerns*, July; and JPMorgan Chase (2020), *10 years after the financial crisis*.

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

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 13), 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.[76] 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).[77] This has been accompanied by a lower proportion of securitisations given the highest credit rating by CRAs, which can be attributed, at least in part, to rating downgrades post-GFC and the adjustment of CRA rating methodologies in response to the crisis lessons from the crisis.[78]

Annual default rates of structured credit by sector contributions

In per cent **Graph 13**



[1] Includes CDOs.

Sources: S&P; FSB calculations.

It is important to disentangle the effects of the prudential and risk retention reforms from other drivers of developments in securitisation markets (see Box 4). Identifying the effects of securitisation reforms is challenging, since the reforms were implemented over several years and securitisation market outcomes were impacted by a number of economic, financial and other regulatory developments. As a result, the findings need to be interpreted with caution, since more rigorous empirical analysis would be needed to establish a causal link.

76 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*.

77 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*.

78 See AFME Securitisation Data Reports 2008-2023, Balances outstanding by rating.

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 participants in this market segment.[79] 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.

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.[80] 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. However, this strategy relies on sufficient market liquidity, which may not be present in future stress episodes. 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.[81]

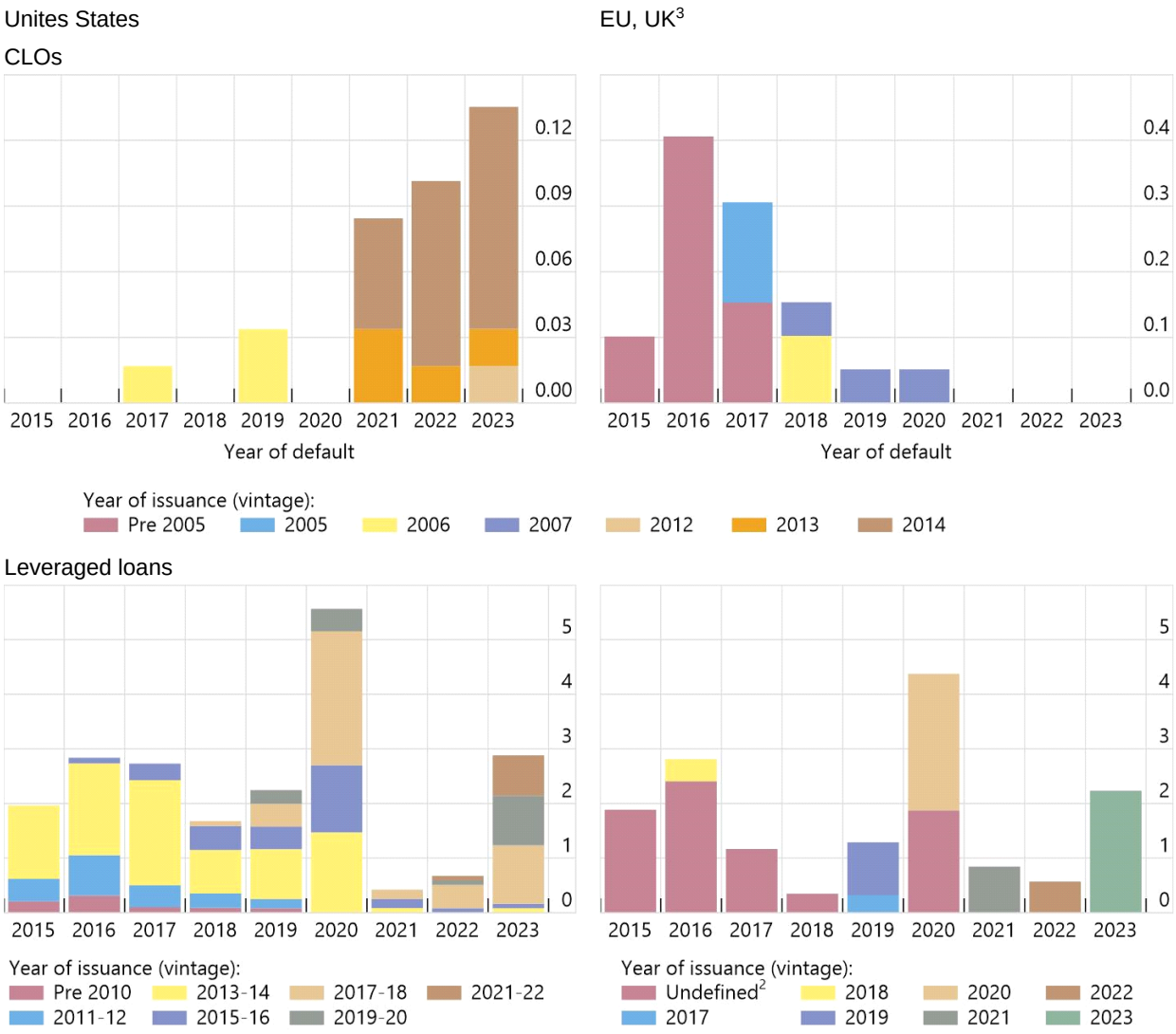
79 See FSB (2019), Vulnerabilities associated with leveraged loans and collateralised loan obligations.

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

81 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, per cent **Graph 14**



[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,[82] 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.[83] Other scenario analyses

82 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.

83 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.[84] 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.[85]

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.[86] 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.[87] 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.[88] 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,[89] higher leverage, lack of debt cushions[90] (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.[91] 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.[92]

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.[93] 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

---

84 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.

85 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?

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

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

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

89 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*.

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

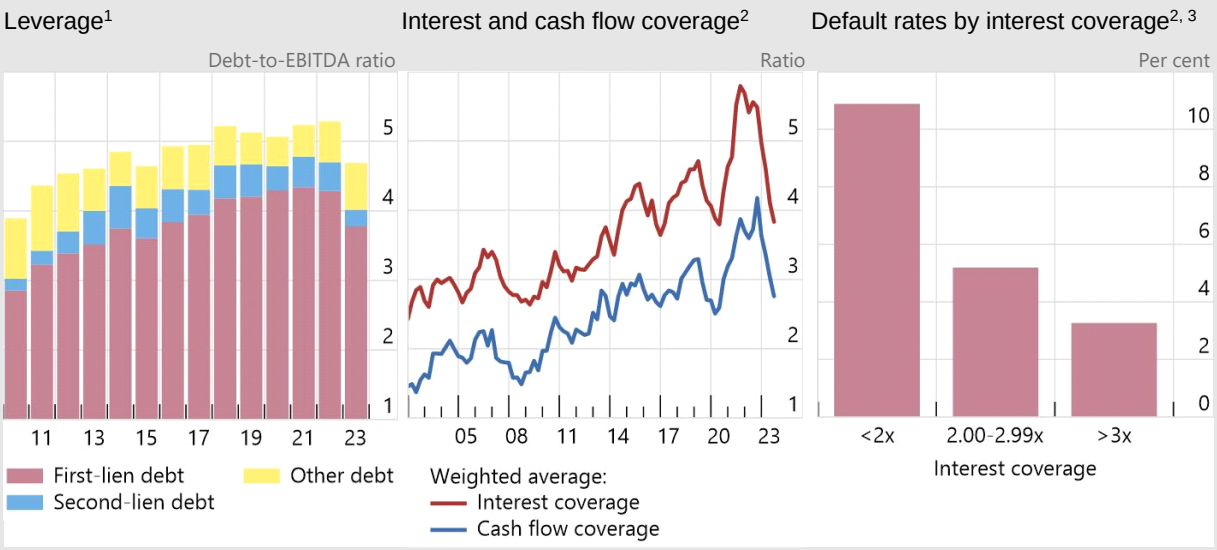
91 In particular, unrealistic estimations of EBITDA can undermine interest coverage and cash flow coverage ratios, making them less credible. Both coverage ratios experienced a historically strong decline in 2023, with interest coverage of new-issue LBOs at 2.3x, the lowest level since the GFC. See S&P (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*.

92 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.

93 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 15**



[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,[94] 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.[95]

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).[96] Credit enhancements such as test triggers and covenants embedded in post-crisis CLO structures are designed to protect senior noteholders from losses.[97] 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.

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

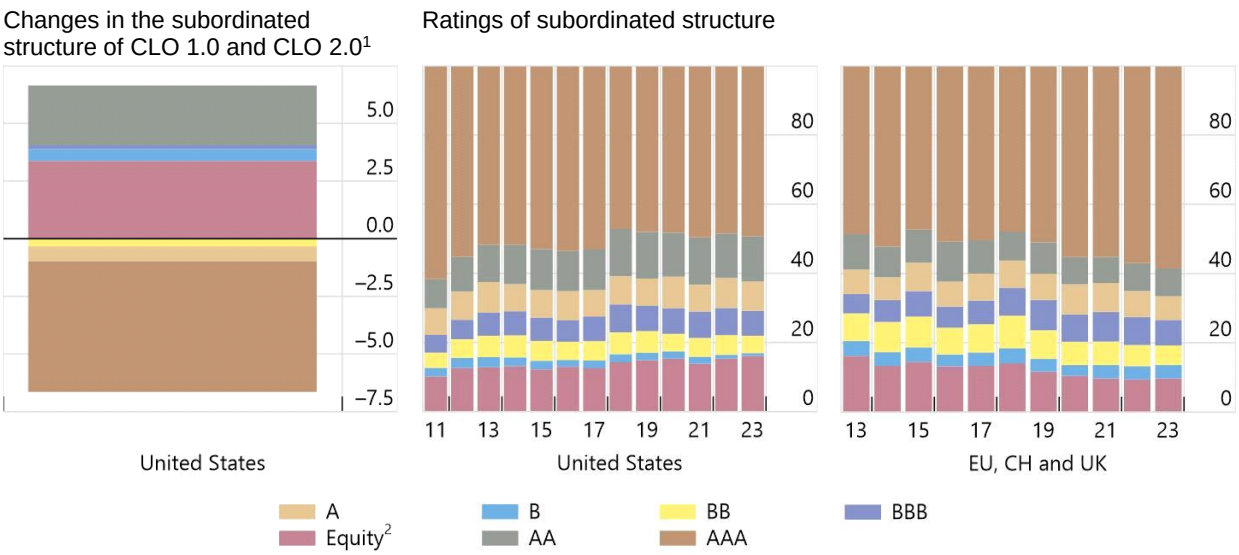
95 See IOSCO (2024), *Leveraged Loans and CLOs Good Practices for Consideration: Final Report*, June.

96 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 Western Asset (2021), *An Investor's Guide to Collateralised Loan Obligations (CLOs)*, June.

97 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

In per cent **Graph 16**



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

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

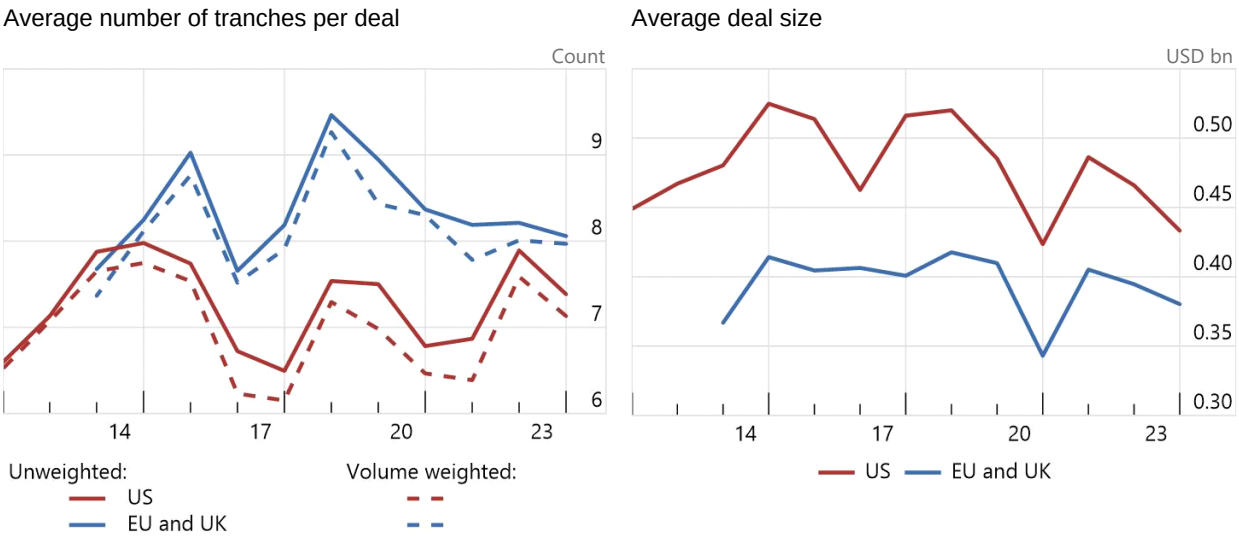
Complexity metrics generally used in the literature do not appear to have been impacted significantly by the post-GFC reforms (see Graph 17).[98] Academic research notes that the capital structure is an important indicator for complexity, since more tranches imply different risk layers, a more complicated waterfall, and difficult loss allocation.[99] Larger average deal or tranche volumes tend to increase the complexity in securitisation, as they represent more loans, underlying collateral, and geographic dispersions.[100] 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.

98 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.

99 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.

100 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 17



* 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.

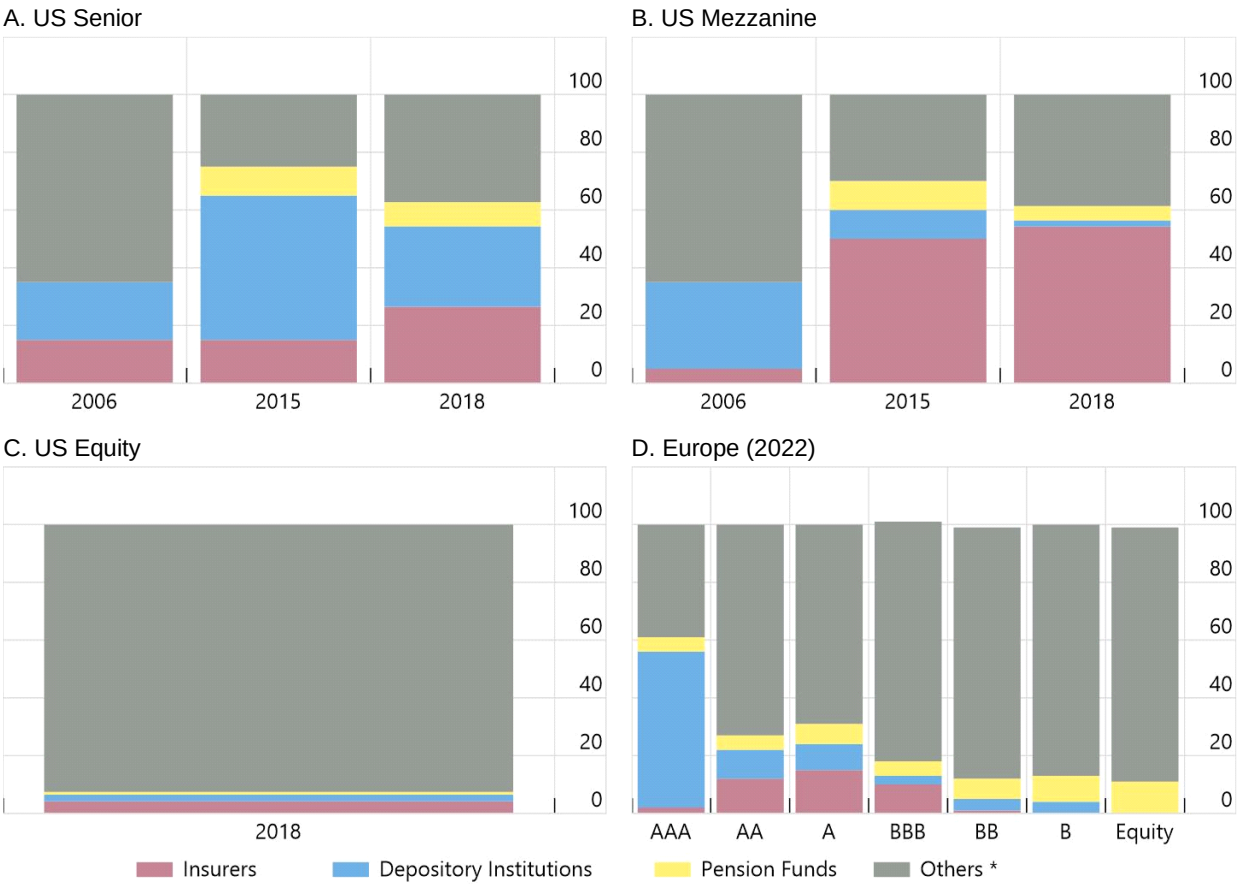
Sources: Pitchbook; FSB calculations.

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 (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.[101]

[101] 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

In per cent **Graph 18**



* Others include for example asset managers and hedge funds.

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

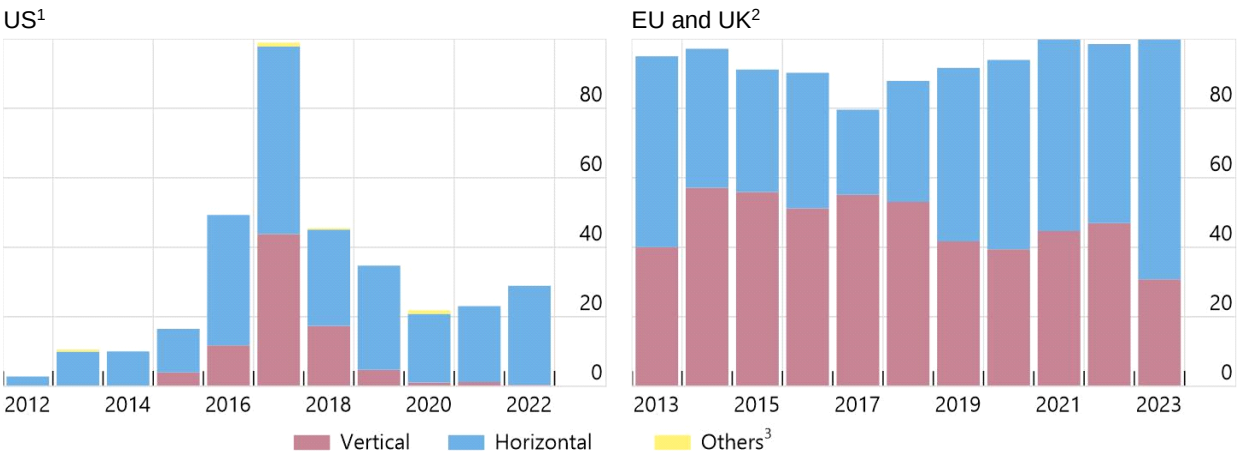
There does not appear to be a clear preference between risk retention methods in CLO markets when risk retention regulation is in place (see Graph 19). Under a voluntary risk retention regime, which applied to the US except for 2017 and the beginning of 2018 (see section 4.2), typically part of the equity 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.[102] However, the limited literature available to date is not conclusive about the influence of these methods when it comes to CLO ratings and pricing.[103]

[102] 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).

[103] 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

In per cent **Graph 19**



[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 US court's decision to overturn the risk retention rule for open-market CLOs[104] in the US provides some insights on the effects of that reform.[105] This rule was put into effect in 2017 but was then successfully challenged in court. Since February 2018, open-market CLO managers, which account for the large majority of CLOs in the US, have not been subject to a 5% credit risk retention requirement. The issuance of open-market CLOs after the court decision in the US has continued to increase (see Graph 4), and in general, characteristics such as asset quality at issuance (measured in terms of average loan rating factor or average spread) have remained fairly similar to those of deals issued prior to the court decision. However, subordination levels increased somewhat since 2018 and until recently, which would be consistent with the hypothesis that investors in non-retention deals require higher subordination for AAA-rated tranches.[106] That said, stakeholders' feedback was not conclusive on the relationship between CLO issuers' risk retention and a deal's subordination level.

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 20), which is consistent with some of the literature on this topic.[107] 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

[104] CLOs can be divided based on the motivation of the manager. The motivation is either "balance sheet" or "arbitrage". In the former, the manager removes assets from its balance sheet. In an "arbitrage" CLO, otherwise known as open market CLO, the motivations of the managers are: (i) to gain a fee for managing the underlying pool of assets and (ii) to capture a spread between the return realised on the collateral underlying the CLO and the borrowing costs.

[105] The Loan Syndications & Trading Ass'n v. SEC and Board of Governors of the Federal Reserve System, No. 17-5004 (D.C. Cir. Feb 9, 2018).

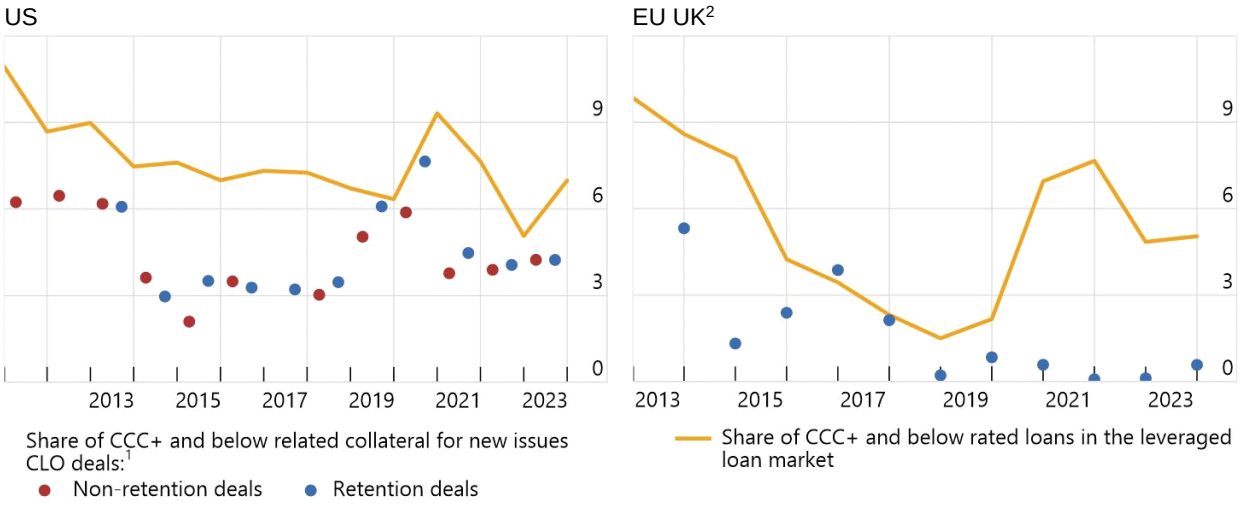
[106] See Demiroglu and James (2012), "How important is having skin in the game? Originator-sponsor affiliation and losses on mortgage-backed securities", Review of Financial Studies, vol. 25, pp. 3217–3258.

[107] 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*

In per cent **Graph 20**



* 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.

A comparison of US CLO deals with and without retention suggests that retention may impact pricing at the margin, potentially by broadening the eligible investor base (see Box 6). The analysis uses propensity score matching models[108] 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.[109]

Box 6: 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[110] 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

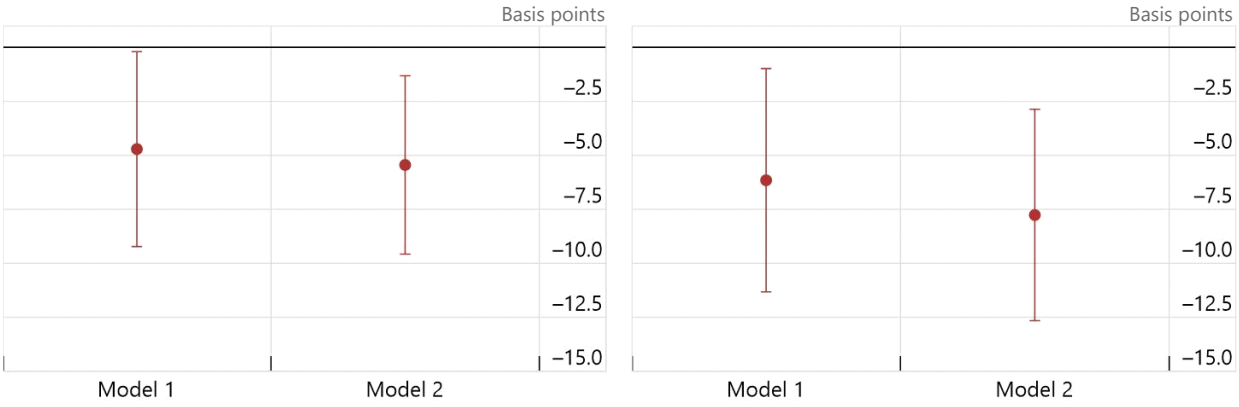
[108] Propensity score matching (PSM) attempts to reduce the effects of confounders by matching already treated subjects with control subjects who exhibit a similar propensity for treatment based on pre-existing covariates that influence treatment selection. See Guo and Fraser (2015), Propensity score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

[109] See, for example, Agarwal et al. (2021); and Demiroglu et al. (2012).

[110] Deals with missing WACC and AAA spread have been dropped from the estimation sample.

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.

Effect of risk retention on AAA spreads and WACC for US CLOs* **Graph 21**



* 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.

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.[111] This has contributed to the establishment of risk retention vehicles to attract third-party investors such as pension funds or family offices,[112] which appear to be used widely in both the US (where there are no risk retention requirements applicable to open-market CLOs) and Europe. This practice might not be fully aligned with the goals of risk retention regulation[113] because in many cases the vehicle does not belong to the same corporate group as the CLO manager, thereby moving risk to parties not originally envisioned by the IOSCO recommendations.[114] 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

[111] 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.

[112] 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.

[113] It may also destabilise CLO managers financially. For example, it has been argued that the need to finance risk retention requirements may have driven the sale of some traditional independent CLO managers to larger groups with balance sheet such as private equity firms.

[114] 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).

likelihood of industry concentration (in terms of arrangement, administration or funding), which might become an additional source of risk.

On the other hand, besides risk retention requirements other factors are also considered by CLO investors for ensuring risk alignment. 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.[115] 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.[116]

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.

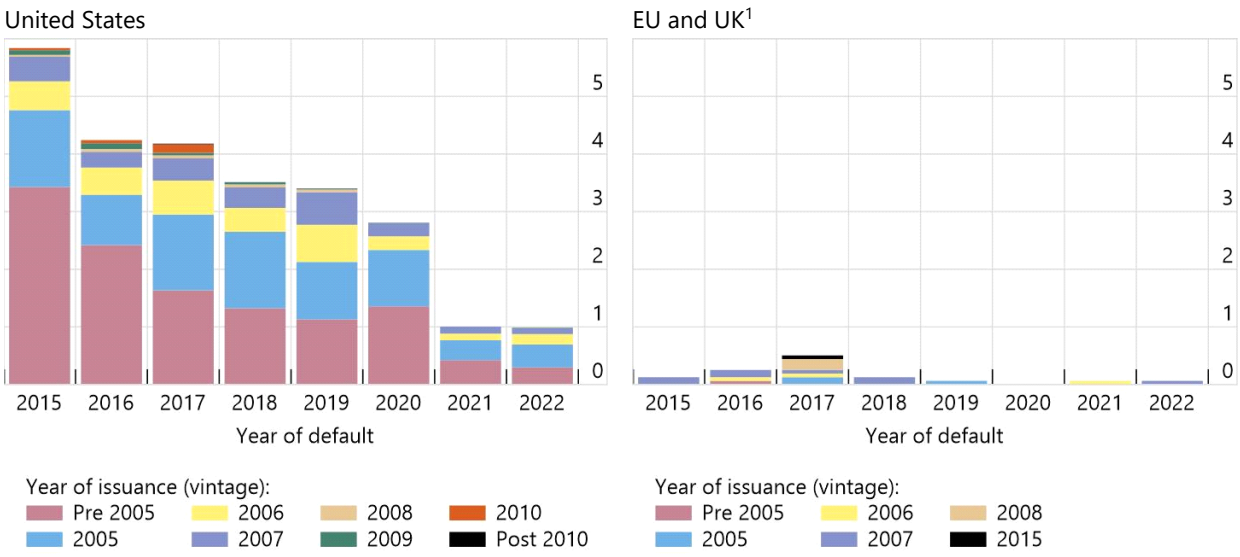
The European and US RMBS markets are characterised by generally fewer defaults of rated tranches following the GFC (see Graph 22). US RMBS issued pre-2005 have consistently higher default rates across the years observed, while the overall tranche default rates appear to be decreasing over time. Default 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 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.

[115] 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.

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

RMBS default rates by year: breakdown by vintage

Per cent **Graph 22**



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

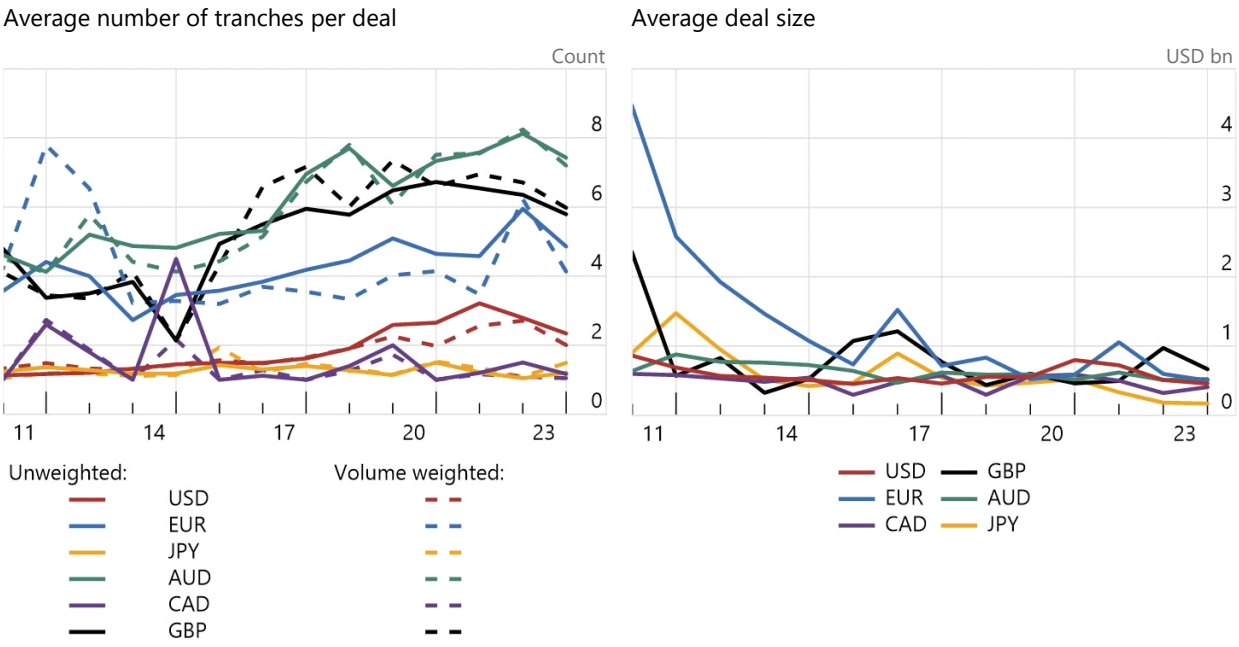
Sources: S&P Global; FSB calculations.

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.[117] 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.

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 23). 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.

[117] 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.

Complexity metrics by currency: RMBS market* Graph 23



* Based on new issuances.

Sources: Dealogic; 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[118] 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[119] 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.[120] Most of these holdings are retained securitisations used as collateral for central bank financing (see Box 9).

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%.[121] Measuring risk retention by originator-sponsor affiliation in the US RMBS Alt-A market pre-GFC, one study finds that

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

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

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

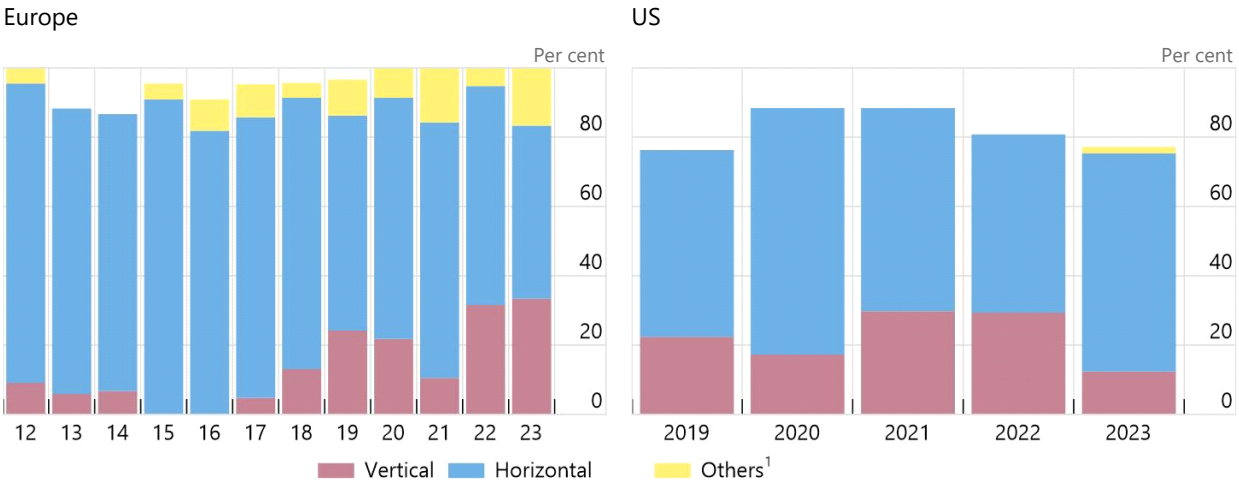
[121] Data on the level of risk retention in securitisation deals pre-reform are not readily available. For the US CMBS market, for example, risk retention amounted to no more than 2% of total deals' proceeds in the years immediately preceding the GFC. See Committee of European Banking Supervisors (October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

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.[122] The study also shows that risk retention matters most for low documentation loans, where originator screening is more important to 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.[123]

RMBS issuers in the US and Europe predominantly use the horizontal risk retention method (see Graph 24). 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 24



* 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.[124] 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.[125] On the contrary, retaining a vertical slice maintains incentives for originators even in

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

[123] See Billio et al. (2023), “Complexity and the default risk of mortgage-backed securities”, Journal of Banking & Finance, vol. 155.

[124] 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.

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

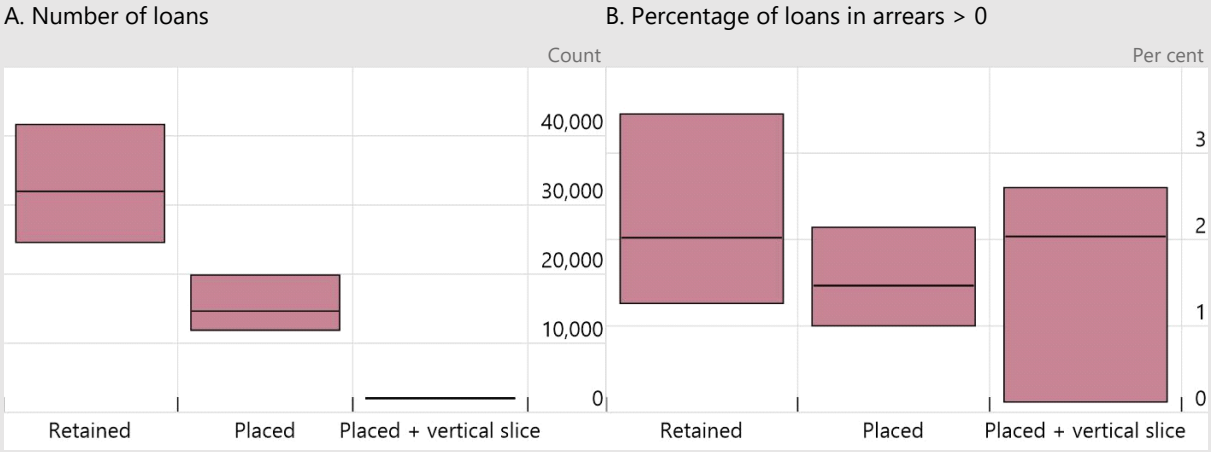
downturn scenarios. Following this line of argumentation, originators might rather choose the vertical over the horizontal method if an economic downturn becomes more likely.

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 7 and Graph 25). 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,[126] which aligns with a decreasing share of mortgages in arrears for the underlying RMBS.

Box 7: 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 25**



[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 25.B). In addition, deals that combine "placed and vertical slice" (P&V) deals tend to have relatively few loans (see Graph 25.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

[126] See https://www.eba.europa.eu/risk-and-data-analysis/risk-analysis/risk-monitoring/risk-dashboard.

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 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 prudential requirements, 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

The preceding analysis largely focuses on securitisation market resilience and needs to be complemented with other evidence on 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;[127] 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.[128]

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 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

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

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 8). On the other hand, some studies carried out recently conclude that other non-regulatory factors constrain the growth of the EU securitisation market.[129] 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.

[129] 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, EU (2022), Joint committee advice to the EC on the review of the securitisation prudential framework; and Levitin (2023), op. cit.

Box 8: 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.[130] 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 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.[131] 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 26). 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.[132]

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

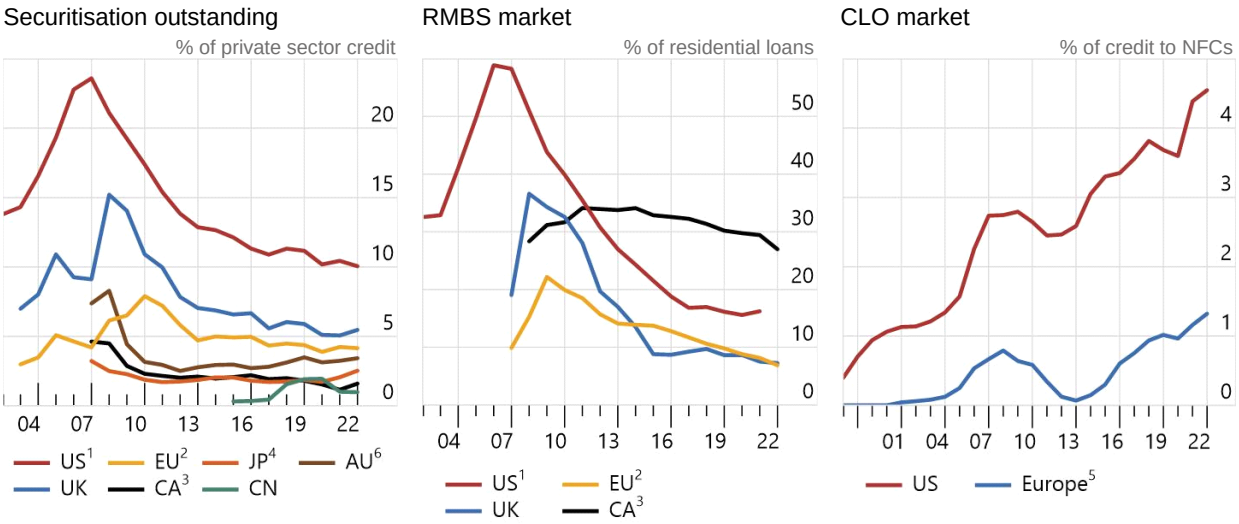
[130] See, for example, AFME (2023), *Response to the FSB invitation for feedback on the effects of the G20 reforms on securitisation*, September; IIF (2023), *Feedback on the FSB Evaluation of the G20 Securitisation Reforms*, October; and Managed Funds Association (2023), *Comment Letter re FSB Securitisation Evaluation*, October.

[131] 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.

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

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.[133]

Evolution of cash securitisation outstanding amounts by jurisdiction **Graph 26**



[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,[134] 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.[135] 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.[136]

[133] In Canada's case, agency MBS dominates the securitisation market. There are no data available separately showing the evolution of the non-agency market.

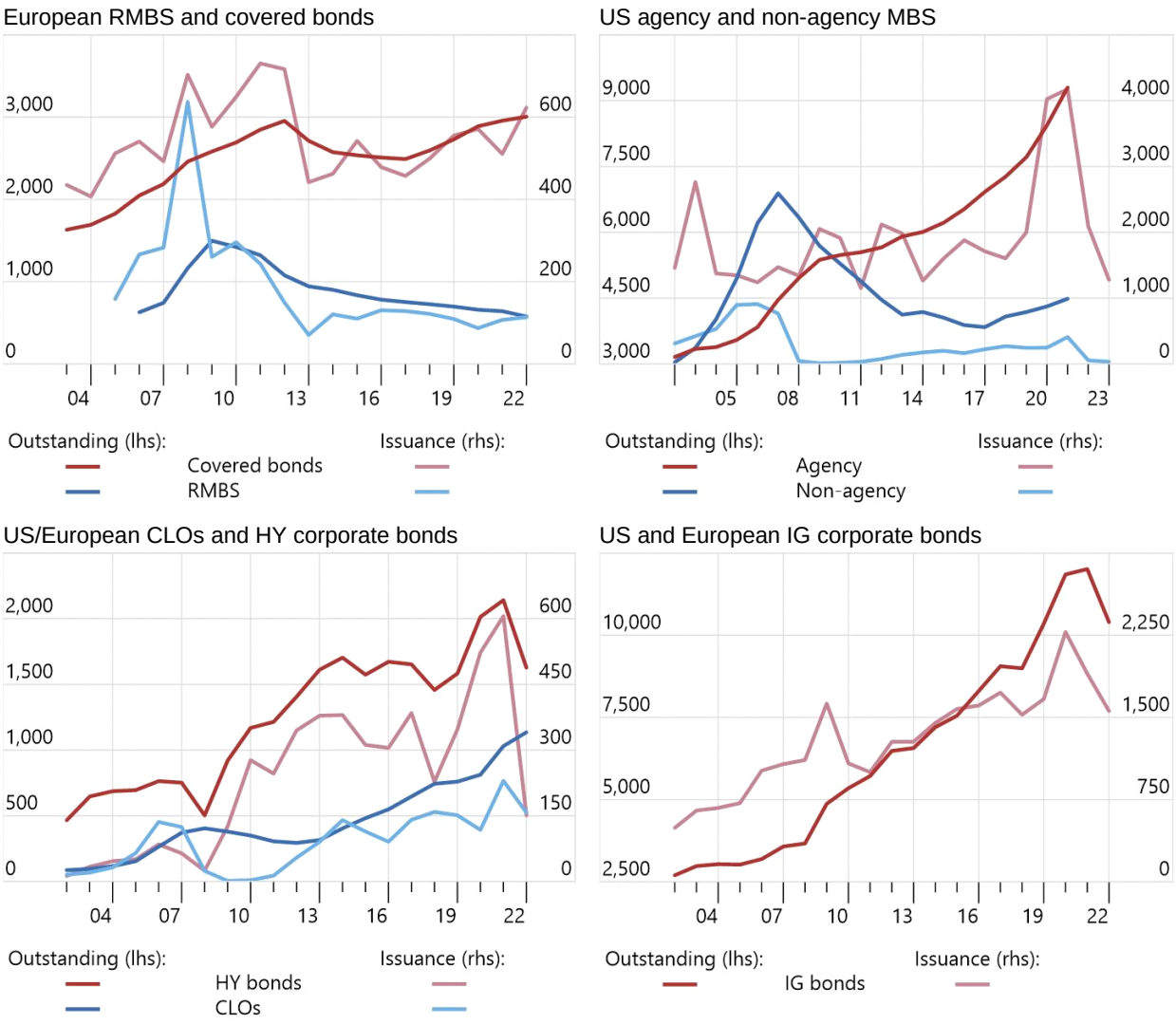
[134] See, for example, p. 3 of the IMF (2022), *Global Financial Stability Report*, October, where the aggregated financial conditions indices for advanced economies have been mostly in the "easy" half from 2014–2022.

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

[136] 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

In USD bn **Graph 27**



[1] Europe includes EU countries and UK.

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

The use of other financial market instruments as an alternative to cash securitisation increased since the GFC (see Graph 27). 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.[137] Covered bonds also emerged as a suitable funding option in the euro area to pledge as collateral for short-term central bank refinancing (see Box 9).[138] In jurisdictions where banks use securitisation for risk transfer and capital relief, they have also opted for synthetic securitisation (see section 2.2).[139] In addition, debt issuance by non-financial corporates has grown significantly in recent years as an alternative to bank borrowing.

[137] See S&P (2023), *European Structured Finance outlook*.

[138] 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.

[139] See, for example, ESRB (2022), *Monitoring systemic risks in the EU securitisation market*, p. 24; and ECB (2017), Speech on Securitisation Revisited by ECB Executive Board member Yves Mersch.

Box 9: 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 Box illustrates how this practice varies across jurisdictions by focusing on central bank collateral frameworks in the Euro area, UK and US.

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.[140] Beginning in 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.[141] 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.[142] 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.[143] 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.[144]

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.

---

[140] See Eurosystem Collateral Data.

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

[142] 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.

[143] See ECB, accessed 13 March 2024.

[144] 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).[145]

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.[146] Later, the type of loans eligible as collateral expanded to include unsecured consumer loans, SME and asset finance, auto loans etc.[147] 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).[148] 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.[149]

5.2. Financial system structure and resilience

The securitisation reforms appear to have contributed to a redistribution of risk across the financial system, though this forms part of a broader trend. In Australia, Europe, driven largely by the UK RMBS market,[150] and the US there has been a shift from the banking to the NBFI sector since 2011, with the latter significantly increasing its share of securitisation issuance (see Graph 28), although banks in most cases continue to have a liquidity provision role and to support NBFI securitisation issuance as, for example, broker-dealer and warehouse lender. This 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.[151] These include long-term demographic trends leading to asset accumulation; macro-financial factors such as accommodative monetary policies; and rising valuations.

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

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

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

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

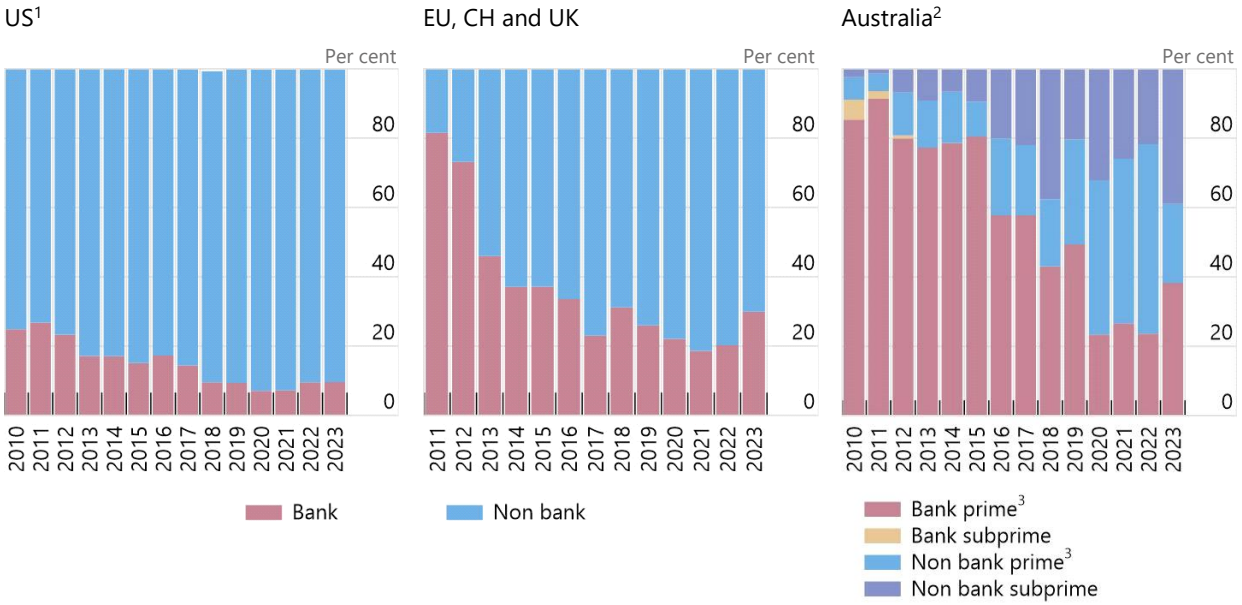
[149] See Term Funding Scheme with additional incentives for SMEs (TFSME) – Market Notice | Bank of England.

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

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

Share of securitisation issuance by bank and non-bank sector

Graph 28



[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.

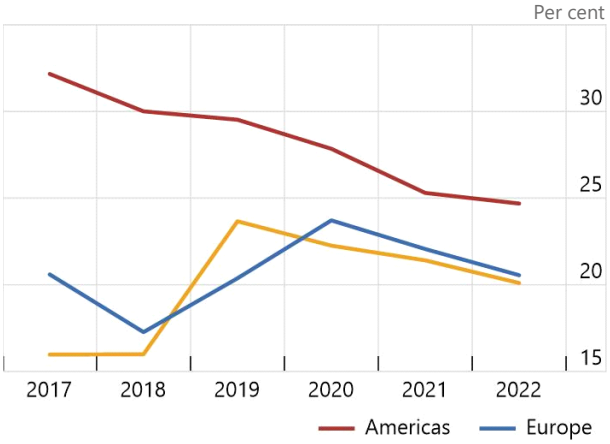
Sources: Bloomberg; Green Street (Asset Backed Alert); Reserve Bank Australia; S&P; FSB calculations.

Banks have shifted their securitisation exposures towards lower risk tranches, especially after the implementation of the Basel securitisation framework in 2018 (see Graph 29). The higher risk weights in particular 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.[152] 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. Furthermore, larger American and European banks appear to have reduced securitisation investments as a proportion of their credit exposures in the immediate aftermath of the GFC but began to grow them again recently.

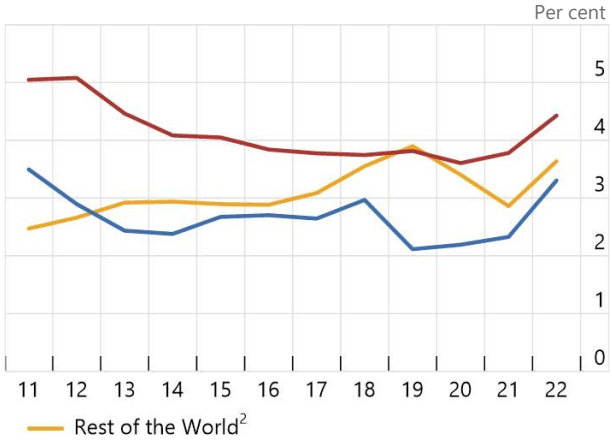
[152] See Joint Committee of the European Supervisory Authorities (2022), Joint Committee advice on the review of the securitisation prudential framework; and Bank of England (2023), *Securitisation: capital requirements*.

Banks securitisation exposure and risk* Graph 29

A. RWA density[1]



B. Exposure in securitisation relative to credit exposure



* Exposure in securitisation and RWA density by region 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 AU, CN, and JP as the larger other markets.

Sources: BCBS, FSB calculations.

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 (insurance companies, pension funds, open-ended funds, hedge funds, etc.) 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, 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.[153]

[153] 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.[154]

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.[155] 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.[156] 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. [157] This capital treatment built on the 2015 STC criteria published by the Basel Committee and the International Organization of Securities Commissions.[158] In May 2018, published an additional update to specify a preferential capital treatment for short-term STC securitisations.[159]

---

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

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

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

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

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

[159] 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.[160]

Thus, there are several Basel reforms to consider when evaluating the post-GFC securitisation market (see Table 4).[161] The cumulative changes are set out in the consolidated Basel Framework and have been in effect since 2023.[162]

Table 4: 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

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

[161] 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.

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

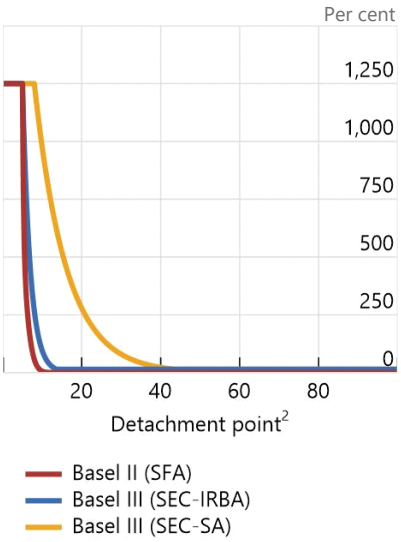
requirements aimed to help limit reliance on external ratings, address cliff effects and improve risk sensitivity.

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.

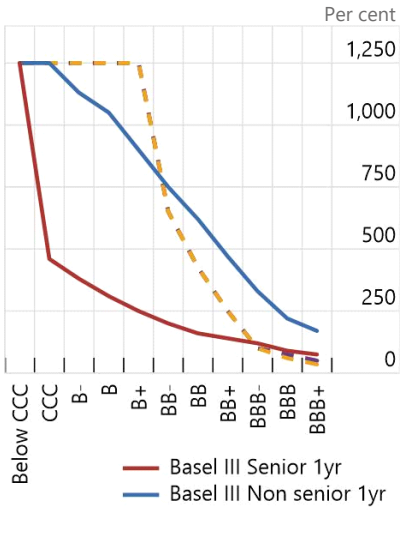
Overall, the Basel III reforms increased the regulatory capital for banks' securitisation exposures compared to Basel II while also changing some of the relative differences in risk weights across tranches. Graph 30 below provides stylised examples comparing Basel II to Basel III risk weights. Panel 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 B1 focusing on lower rated tranches and Panel B2 focusing on higher rated tranches. In this stylised example, Panels B1 and B2 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 30**

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



B1. External rating approaches (BBB+ and higher risk tranches)[3]



B2. 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. 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.[163] In turn, the calibrated 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 5: 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.[164]

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

[164] 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.[165]

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

[165] See IOSCO (2012), Global developments in securitisation regulation.

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: 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.[166] 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.

[166] 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,[167] 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.[168]

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. [169] 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.[170] 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.[171] 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.[172] 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

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

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

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

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

[171] 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)).

[172] 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.

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).[173] 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, which is likely to remain subdued in the foreseeable future.

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 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

[173] 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.

CLO credit ratings. Therefore, this analysis highlights the need for CRAs to have sounds controls over their market outreach activity.

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 3: Composition of the evaluation working group

Chair	**Benjamin Weigert** Head, Directorate General Financial Stability Deutsche Bundesbank[174]
Canada	**Paul Redman** Director & Chief Economist, Regulatory Strategy & Research Ontario Securities Commission
France	**Louis Genty** Policy Expert, International Banking Affairs Division, Prudential Supervision and Resolution Authority Banque de France
	Sebastian 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

[174] The Chair gratefully acknowledges the contributions of Alessandro Barbera and Kazuki Ueda (BIS) to the analysis.

Spain	**Mikel Bedayo** Senior Economist, Global Regulatory Policy Unit Banco de España
	Begoña Gutiérrez-Barquín Senior Policy Expert, Global Regulatory Policy Unit Banco de España
UK	**Susanne Leitterstorf** 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
US	**Woojung Park** Policy & Market Monitoring Principal, Markets Group Federal Reserve Bank of New York
Basel Committee on Bank Supervision	**Irina Barakova** Member of Secretariat
European Central Bank	**Claudiu Moldovan** Senior Financial Stability Expert, Directorate General Macroprudential Policy and Financial Stability
	Christina Triandafil Supervisor, SPO Securitisation Team, Banking Supervision
European Commission	**Presiyan Petkov** Policy Officer, Directorate General for Financial Stability, Financial Services and Capital Markets Union
FSB Secretariat	**Costas Stephanou** Head of Financial Stability Analysis
	Lara Douglas (since December 2023) **Michael Chui (since April 2024)** **Shahzad Gitay (since April 2024)** Members of Secretariat
	Takis Antonopoulos (January-March 2024) Senior Financial Markets Analyst

Abbreviations

ABCP	Asset-Backed Commercial Paper
ABS	Asset-Backed Securities
BIS	Bank for International Settlements
CDO	Collateralised Debt Obligation
CLN	Credit Linked Notes
CLO	Collateralised Loan Obligation
CMBS	Commercial Mortgage-Backed Securities
CRA	Credit Rating Agencies
CRR	Capital Requirement Regulation
EU	European Union
FSB	Financial Stability Board
GFC	Global Financial Crisis
HQLA	High-Quality Liquid Assets
IOSCO	International Organization of Securities Commissions
IRBA	Internal-Ratings Based Approach
LCR	Liquidity Coverage Ratio
NBFI	Non-Bank Financial Intermediation
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

SPV	Special Purpose Vehicle
SRT	Significant Risk Transfer
SSBs	Standard-Setting Bodies
SSPE	Securitisation Special Purpose Entity
STC	Simple, Transparent and Comparable
STS	Simple, Transparent and Standardised

Bibliography

Agarwal, S., B. W. Ambrose, Y. Yildrim and J. Zhang (2021): “Risk retention rules and the issuance of commercial mortgage-backed securities”, Journal of Real Estate Finance & Economics.

Akerlof, G. A. (1970): “The Market for ‘Lemons’: Quality uncertainty and the market mechanism”, The Quarterly Journal of Economics, vol. 84, no. 3, pp. 488–500.

Ambrose, B. W., M. LaCour-Little, and A. B. Sanders (2005): “Does regulatory capital arbitrage, reputation, or asymmetric information drive securitisation?”, Journal of Financial Services Research, vol. 28, pp. 113–133.

An, X., Y. Deng, J. Nichols, and A. B. Sanders (2015): “What is subordination about? Credit risk and subordination levels in commercial mortgage-backed securities (CMBS)”, Journal of Real Estate Finance and Economics.

Ashcraft, A. B., K. Gooriah and A. Kermani (2019): “Does skin-in-the-game affect security performance”, Journal of Financial Economics, vol. 134, pp. 333–354.

Association for Financial Markets in Europe (2022): “Securitisation report, European structured finance”.

Bank of England – European Central Bank (2014): “The case for a better functioning securitisation market in the European Union”, Box 4, Discussion Paper.

Bank of England (2019): “Financial Stability Report”, July.

——— (2023a): “Financial Stability Report”, December.

——— (2023b): “Securitisation: capital requirements”, Discussion paper 3/23.

Basel Committee on Banking Supervision (2010a): “Review of the differentiated nature and scope of financial regulation”, December.

——— (2010b): “Basel III: International framework for liquidity risk measurement, standards and monitoring”, December.

——— (2011): “Report on asset securitisation incentives”, July.

——— (2014a): “Identification and management of step-in risk”, October.

——— (2014b): “Revisions to the securitisation framework”, December.

——— (2022): “Evaluation of the impact and efficacy of the Basel III reforms”, December.

——— (2023): “BCBS report on the 2023 banking turmoil”, October.

BCBS and IOSCO (2015): “Criteria for identifying simple, transparent and comparable securitisations”, July.

Begley, T. A. and A. Purnanandam (2017): “Design of financial securities: Empirical evidence from private-label RMBS deals”, Review of Financial Studies, vol. 30, issue 1, pp. 120–161.

Bektic, D. and B. Hachenberg (2021): “European arbitrage CLOs and risk retention”, The European Journal of Finance, vol 27, issue 18, pp 1791-1803.

Benmelech, E., J. Dlugosz and V. Ivashina (2011): “Securitisation without adverse selection: The Case of CLOs”, Journal of Financial Economics, vol. 106 (1), pp. 91–113.

Berrospide, J. M., A. Gupta und M. P. Seay (2021): “Un-used bank capital buffers and credit supply shocks at SMEs during the Pandemic”, Finance and Economics Discussion Series, 2021–043.

Billio, M., A. Dufour, S. Segato and S. Varotto (2023): “Complexity and the default risk of mortgage-backed securities”, Journal of Banking & Finance, vol. 155.

Bindseil, U., M. Corsi, B. Sahel and A. Visser (2017): “The Eurosystem collateral framework explained”, ECB Occasional Paper Series − No 189.

Calomiris, C. W., and J. R. Mason (2004): “Credit card securitisation and regulatory arbitrage”, Journal of Financial Services Research, vol. 26, pp. 5–27.

Casu, B., A. Clare, A. Sarkisyan, and S. Thomas (2013): “Securitisation and bank performance” Journal of Money, Credit and Banking, vol. 45, pp. 1617–1658.

Caviness, E., Sarkar, A., Goyal, A. and Park, W. (2022): “The term Asset-Backed Securities loan facility”, Federal Reserve Bank of New York, Economic Policy Review 28, no. 1.

Chouliara, E. and E. D. Martino (2021): “Risk retention in securitisation and empty creditors”, European Banking Institute Working Paper Series, no. 2021–91.

Citi Research (2022): “How resilient will global CLOs be in the next downturn?”.

Climate Bonds Initiative (2020): “China green securitisation report: State of the market 2020”.

Deku, S. Y., A. Kara, and Y. Zhou (2019): “Securitisation, bank behaviour and financial stability: A systematic review of the recent empirical literature”, International Review of Financial Analysis, pp. 245–254.

DeMarco, L., L. Emily and T. Schmidt-Eisenlohr (2020): “Who owns US CLO securities? An update by tranche”, FEDS Notes no. 2020-06-25.

DeMarzo, P. (2005): “The pooling and tranching of securities: A model of informed intermediation”, Review of Financial Studies, vol. 18, pp. 1–35.

DeMarzo, P., and D. Duffie (1999): “A liquidity-based model of security design”, Econometrica, vol. 67, no. 1, pp. 65–99.

Demiroglu, C., and C. James (2012): “How important is having skin in the game? Originator-sponsor affiliation and losses on mortgage-backed securities”, Review of Financial Studies, vol. 25, pp. 3217–3258.

Demyanyk, Y., and O. Van Hemert (2011): “Understanding the subprime mortgage crisis”, The Review of Financial Studies, vol. 24, issue 6, pp. 1848–1880.

EBA (2014): “Discussion Paper on simple standard and transparent securitisations”, October.

——— (2020): “Report on STS Framework for synthetic securitisation under Article 45 of Regulation (EU) 2017/2402”, May.

ECB (2019): “CLOs: a financial stability perspective”, Financial Stability Review, Box 4, May.

Elkamhi, R. and Y. Nozawa (2021): “Fire-sale risk in the leveraged loan market”, Journal of Financial Economics, vol. 146, Issue 3, pp. 1120–1147.

ESMA (2019): “Leveraged loans, CLOs – trends and risks”, Trends, Risks and Vulnerabilities no. 2, September.

——— (2020): “EU CLO credit ratings – an overview of credit rating agencies practices and challenges”, Thematic Report, May.

——— (2023): “EU CLO credit ratings – risk of conflicts of interests relating to methodology changes”, December.

European Commission (2022): “Report from the commission to the European Parliament and the council: On the functioning of the Securitisation Regulation”, COM(2022) 517 final.

European Systemic Risk Board (2022): “Monitoring systemic risks in the EU securitisation market”, Box 3.

——— (2023): “EU Non-bank financial intermediation risk monitor”, June.

Fabozzi, F. J., Davis, H. A. and Choudhry, M. (2006): “Introduction to structured finance”, John Wiley & Sons.

Fender, I., and J. Mitchell (2009): “The future of securitisation: How to align incentives?”, BIS Quarterly Review, September 2009, pp 27–43.

Financial Crisis Inquiry Commission (2011): “The financial crisis inquiry report”.

Financial Stability Board (2012): “FSB Principles for Sound Residential Mortgage Underwriting Practices”, April.

——— (2013): “An Overview of Policy Recommendations for Shadow Banking”, August.

——— (2017a): “Framework for Post-Implementation Evaluation of the Effects of the G20 Financial Regulatory Reforms”, July.

——— (2017b): “Assessment of shadow banking activities: risks and the adequacy of post-crisis policy tools to address financial stability concerns”, July.

——— (2017c): “Implementation of G20/FSB financial reforms in other areas: Summary of key findings based on the 2019 FSB Implementation Monitoring Network (IMN) survey”, November.

——— (2019): “Vulnerabilities associated with leveraged loans and collateralised loan obligations”, December.

——— (2023a): “Enhancing the Resilience of Non-Bank Financial Intermediation: Progress report”, September.

——— (2023b): “Promoting Global Financial Stability: 2023 FSB Annual Report”, October.

——— (2023c): “Global monitoring report on non-bank financial intermediation 2023”, December.

Financial Stability Forum (2008): “Report of the Financial Stability Forum on enhancing market and institutional resilience”, April.

Fitch Ratings (2023): “Office defaults drive US CMBS delinquency rate higher in September”, October.

Flynn, S. J., A. C. Ghent, and A. Tchistyi (2020): “Informational efficiency in securitisation after Dodd-Frank”, The Review of Financial Studies, vol. 33, pp. 5131–5172.

Furfine, C. (2014): “Complexity and loan performance: Evidence from the securitisation of commercial mortgages”, Review of Corporate Finance Studies, vol. 2, no. 2, pp. 154–187.

——— (2020): “The impact of risk retention regulation on the underwriting of securitised mortgages”, Journal of Financial Services Research, vol. 58, pp. 91–114.

Ghent, A. C., W. N. Torous, and R. I. Valkanov (2019): “Complexity in structured finance”, The Review of Economic Studies, 86(2 (307)), pp 694–722.

González, F. and Triandafil, C. M. (2023): “The European significant risk transfer securitisation market.” ESRB Occasional Paper Series No. 23. European Systemic Risk Board (ESRB).

Greenbaum, S. I., and A. V. Thakor (1987): “Bank funding modes: Securitisation versus deposits”, Journal of Banking & Finance, vol. 11, pp. 379–401.

Guggenheim (2023): “Understanding collateralised loan obligations (CLOs)”, December.

Guo, G., and H-M Wu (2014): “A study on risk retention regulation in asset securitisation process”, Journal of Banking & Finance, vol. 45, pp. 61–71.

Guo, S., and M. W. Fraser (2015): “Propensity score analysis”, SAGE Publications, second edition.

Gürtler, M. and M. Hibbeln (2012): “How smart are investors after the subprime mortgage crisis? Evidence from the securitisation market”, ZBW Working Paper Series.

He, J. J., Q. J. Qian and P. E. Strahan (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.

Hibbeln, M., and W. Osterkamp (2024): “The impact of risk retention on moral hazard in the securitisation market”, Journal of Banking & Finance, vol. 163.

IACPM (2023): “Synthetic securitisation market volume 2016–2022”.

Imbierowicz, B., A. Löffler, and U. Vogel (2020): “The transmission of bank capital requirements and monetary policy to bank lending in Germany”, Review of International Economics, vol. 29, pp. 144–164.

International Monetary Fund (2009): “Restarting securitisation markets", IMF Global Financial Stability Report, Chapter 2.

——— (2014): “The Run on the Shadow Banking System and Bank Losses during the Financial Crisis”, IMF Global Financial Stability Report, Box 2.1.

International Organization of Securities Commissions (2011): “Task Force on Unregulated Financial Markets and Products: Implementation report”, March.

——— (2012): “Global Developments in securitisation regulation”, November.

——— (2019a): “Update to the IOSCO Peer Review of Implementation of incentive alignment recommendations for securitisation”, October.

——— (2019b): “Unregulated financial markets and products: final report”, December.

——— (2024): “Leveraged loans and CLOs good practices for consideration final report”, June.

Jiang, J. X., I. Y. Wang, and P. Wang (2018): “Revolving rating analysts and ratings of MBS and ABS: Evidence from LinkedIn”, Management Science, vol. 64, pp. 5461–5959.

Joint Committee of the European Supervisory Authorities (2022): “Response to the Commission’s October 2021 call for advice to the JC of the ESAS”, JC/2022/66.

Jones, D. (2000): “Emerging problems with the Basel Capital Accord: Regulatory capital arbitrage and related issues”, Journal of Banking & Finance, vol. 24, pp. 35–58.

JPMorgan Chase (2020): “10 years after the financial crisis”.

Keys, B., T. Mukherjee, A. Seru and V. Vig (2010): “Did securitisation lead to lax screening? Evidence from subprime loans”, The Quarterly Journal of Economics, vol. 125, issue 1, pp. 307–362.

Kiff, J., and M. Kisser (2014): “A shot at regulating securitisation”, Journal of Financial Stability, vol. 10, pp. 32–49.

Klein, P., Nitschke, A., and Pfingsten, A. (2023): “Credit securitisation as sustainable finance channel? – Evidence from synthetic capital relief trades”, University Münster Working Paper.

Kundu, S. (2022): “The anatomy of corporate securitisations and contract design”, Journal of Corporate Finance, vol. 81, pp. 1–23.

——— (2023): “The externalities of fire sales: evidence from collateralised loan obligations”, ESRB: Working Paper Series.

Leland, H. and Pyle, H. (1977): “Informational asymmetries, financial structure, and financial intermediation,” Journal of Finance, vol. 32, no. 2, pp. 371–387.

Levitin, A. J. (2023): “Report on the institutional and regulatory differences between the American and European securitisation markets”, German Council of Economic Experts Working Paper, 03/2023.

Maddaloni, A. and J. L. 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.

Pitchbook (2023): “With LBOs scarce, leverage in syndicated US loan market sinks to 7-year low”, April.

Pitchbook, LCD (2024a): “December Wrap, ELLI gains 1.21%, lifting 2023 return to post GFC-high”, January.

——— (2024b): “US leveraged loan default rates move higher after two-dozen defaults in 2023”, January.

Purnanandam, A. (2011): “Originate-to-distribute model and the subprime mortgage crisis”, Review of Financial Studies, vol. 24, pp. 1881–1915.

Riddiough, T. J. (1997): “Optimal Design and Governance of Asset-Backed Securities”, Journal of Financial Intermediation, vol. 6, issue 2, pp. 121–152.

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

——— (2019): “Those $700B in US CLOs: Who holds them, what risk they pose”, June.

——— (2019a): “When the cycle turns: How would global structured finance fare in a downturn?”.

——— (2019b): “How STS has shaken up European securitisation so far”, November.

——— (2020): “How US structured finance has changed since the credit crisis”, February.

——— (2023a): “European Structured Finance Outlook 2023”.

——— (2023b): “Leveraged finance: Fifth annual study of EBITDA addbacks finds management continues to regularly miss projections”.

——— (2023c): “US and European BSL CLOs: A comparative overview”.

S&P RatingsDirect (2014): “What’s holding back European securitisation issuance?”, May.

Skyrman, V. (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.

Van Breemen, V. M., C. Schwarz and D. Vink (2023): “Risk retention in the European securitisation market: skimmed by the skin-in-the-game methods?”, ECB Working Paper no. 2023/2837.

Vickery, J. and Wright, J. (2013): “TBA trading and liquidity in the agency MBS market”, Federal Reserve Bank of New York Economic Policy Review.

Vink, D., M. Nawas and V. van Breemen (2021): “Security design and credit rating risk in the CLO market”, Journal of International Financial Markets, Institutions and Money, 72.

Vinod Kothari Consultants (2022): “Global securitisation markets in 2021: a robust year for structured finance”.

Wang, Y., and H. Xia (2015): “Do lenders still monitor when they can securitise loans?” Review of Financial Studies, vol. 28, pp. 2354–2391.