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Structural developments
in global financial
intermediation: The rise
of debt and non-bank credit
intermediation

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Caroline Roulet**

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Structural developments in global financial intermediation: The rise of debt and non-bank credit intermediation

by

Robert Patalano and Caroline Roulet*

This paper examines global credit intermediation through the lens of financial markets and financial intermediaries in the post-crisis period during which highly accommodative monetary policies contributed to investors' search for yield. It reviews the extent to which non-bank intermediation contributed to the rise of sovereign and corporate debt levels and exuberance in global credit markets. It also assesses forms of market-based finance that are contributing to financial vulnerabilities, including leverage loans and collateralised loan obligations (CLOs), fixed-income investment funds, and bank contingent convertible debt. Post-crisis policy frameworks should adapt to the shift toward market-based finance in many countries to allow better consideration of the interactions between monetary, prudential, and regulatory tools with respect to credit intermediation and risks. Policies should also consider the optimal combination of macroprudential and activities-based tools in non-bank credit intermediation to address vulnerabilities without undermining the benefits of market-based finance.

Authorised for release by Greg Medcraft, Director, OECD Directorate for Financial and Enterprise Affairs

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Foreword

The global financial crisis of 2008 underlined the importance for policy makers in understanding the scale and types of financial intermediation in their economies. During the financial crisis, non-bank financial intermediation was of particular concern to authorities, as such forms of ‘shadow banking’, contributed to both the root causes of the crisis, the transmission of financial contagion, and the amplification of shocks.

As this report is published, the rapid spread of the novel coronavirus Covid-19 has caused a global health crisis, has brought economic activity in some sectors to a halt, and has presented the greatest challenge to the global financial system since 2008. As then, understanding financial intermediation activities is critical to mapping the faultlines in the global financial system and mounting effective policy responses.

However, the shape of financial intermediation has changed in important ways since the global financial crisis. Activities in non-bank intermediation, including market-based intermediaries like investment funds and securitised products, have grown and are increasingly interconnected with financial markets. Understanding the interplay between these elements, and the benefits and risks of each, offers a more complete understanding of how global finance can contribute to sustainable economic growth. It also helps provide the full picture needed to help policy makers prepare for and respond to shocks, including pandemics.

“Structural developments in global financial intermediation: The rise of debt and non-bank credit intermediation” shines a light on the evolution of global financial intermediation in three key ways. First, it maps the broad-based growth of financial intermediation relative to GDP in many advanced and emerging market economies, and with this growth a shift toward market-based finance. Second, it assesses the shift from equity to debt markets, and the growing imbalances in sovereign and corporate debt markets during a period of highly accommodative monetary policies. Third, it draws attention to key activities in credit intermediation that could contribute to structural vulnerabilities in the global financial system, including: a sharp rise of below-investment grade corporate debt, in particular leverage loans and collateralised loan obligations; the growth of open-ended investment funds that purchase high-yield debt and leveraged loans; and risks associated with the large stock of bank contingent convertible debt.

While these various activities have helped to satisfy investors’ reach for yield during years of market exuberance, they represent new potential faultlines of systemic risk in the event of exogenous shocks, be they from trade tensions, geopolitical risks or the current global pandemic. This report underlines the need for policy frameworks to adapt to market-based finance, and fully reflect the interaction between monetary, prudential, and regulatory tools on credit intermediation. It also underlines the need for dynamic microprudential and activities-based tools to help mitigate excessive risk taking with respect to liquidity and leverage.

By mapping the global financial system, evaluating growing imbalances and risks that could amplify shocks, and assessing the interaction between macro and regulatory tools, this report provides a practical complement to the OECD's Policy Framework for Effective and Efficient Financial Regulations. Financial authorities should use this analysis to inform both their assessments of activities and risks, and efforts to maximise available tools to harness the benefits of market-based finance to support fair, efficient markets and sustainable economic growth.

A handwritten signature in dark ink, appearing to read 'G. Medcraft', with a long horizontal flourish extending to the right.

Greg Medcraft

Director, OECD Directorate for Financial and Enterprise Affairs

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Executive summary

Since the Global Financial Crisis, considerable progress has been made by national authorities and international organisations to identify and better understand activities and risks in financial intermediation across the world. International bodies, such as the Financial Stability Board (FSB), International Monetary Fund (IMF), and European Systemic Risk Board (ESRB), and the OECD have contributed to the mapping of financial intermediation and the analysis of activities and risks across jurisdictions.¹ Given the contribution of the non-bank financial intermediation to the systemic risks that amplified credit shocks during the last financial crisis, greater attention has been paid to activities in “shadow banking”, which has since been referred to as non-bank credit intermediation. In this respect, various studies have made progress in assessing the shifting structures, activities, and risks to give a more thorough picture of potential vulnerabilities in the global financial system.

However, more than a decade since the crisis, concerns have shifted from systemic risks of non-bank intermediation to the predicament that highly accommodative monetary and often fiscal policies have not lifted most OECD countries out of tepid, low-productivity growth. Notwithstanding the need for such accommodation, the macro policy mix across many countries has contributed to high levels of credit intermediation; high and growing levels of debt, driven by historically high levels of sovereign and corporate credit to GDP; and, historically low yields on debt and credit risk pricing. Amid these developments, financial intermediation in a number of countries has shifted away from banks and toward non-bank financial intermediation, and in particular to forms of market-based finance such as investment funds and securitisation of corporate assets. While various assessments of non-bank financial intermediation have mapped the shifts in intermediation and their risks, less attention has been given to the concomitant rise of lower-quality debt and the shift of risk to non-bank credit intermediation in a prolonged period of monetary policy accommodation. It is this combination that calls into question the sustainability of debt-financed growth, and draws attention to the consequences of the current policy mix.

This report offers an integrated assessment of global financial intermediation that incorporates activities and risks in both *financial markets and financial intermediation, with a focus on market-based finance*. It reflects the purpose of markets, financial institutions and investment vehicles to effectively and efficiently intermediate between investors and issuers to support sustainable economic growth. The report first revisits the purpose and forms of financial activities that support economic growth, exploring the composition of banking and non-bank financial intermediation in a balanced manner. The report then explores the developments in credit intermediation and overall debt and equity levels in financial systems, relative to GDP, to understand how markets have contributed to financing the real economy. In doing so, it considers the extent to which post-crisis policy monetary accommodation may have contributed to exuberance, such as high leverage, elevated asset price valuations, and mispricing of credit risk. Thereafter, in light of the shift toward non-bank financial intermediation, the paper reviews the factors that have incentivised this shift, as well as potential vulnerabilities that have arisen. It

provides a more in-depth assessment of several areas of intermediation, including collateralised loan obligations CLOs, investment funds, and bank contingent convertible (CoCo) capital instruments.

Key findings

Financial markets and debt

With this approach in mind, the paper first takes a top-down perspective by considering macrofinancial imbalances.² In the period since the Global Financial Crisis, sovereign and corporate debt has risen to unprecedented levels, and the consequent strong growth of the size of sovereign and corporate bond markets amid rich asset valuations.

- Global sovereign and corporate debt levels have risen to 92% and 84% of GDP, respectively, which are well above pre-crisis levels and quite elevated in many OECD countries.
- Corporate bond spreads in major financial markets narrowed substantially to low levels, and were well-below average levels over the decade. This exuberance contributed to very heavy bond issuance and rising debt, which contributed to rising corporate leverage. The fragilities that arose from high corporate debt and leverage are now being tested by the sharp deterioration in economic and credit market conditions resulting from the rapid global spread of Covid-19.
- While equity market valuations have risen substantially, particularly in the United States, equity issuance has been lacklustre in many parts of the world, and many corporates have increased leverage by issuing debt to buy back equities.

Financial Intermediation

The report also assesses the extent to which financial intermediation contributed to the rise in debt and exuberance in credit markets and which aspects of non-bank financial intermediation contributed the most. Key observations include:

- Financial systems as a percentage of GDP have moderately increased relative to GDP in advanced economies and substantially increased in emerging market economies over the past two decades. This has important implications for financial resilience, as financial system losses could account for a larger share of domestic economies and public sector resources.
- Another notable phenomenon in the post-crisis era is the shift of global intermediation from bank to non-bank financial intermediation, and forms of market-based financing in particular, across numerous advanced and emerging market countries. While the specific drivers of this shift vary by country, the sharp rise of investment funds in the Euro Area and several G20 emerging markets contributed to this shift in composition. To this end, the growth of investment funds was the strongest in many advanced economies. This shift has coincided with the build-up of marketable sovereign, corporate and subordinated bank debt amid the exuberant pricing of risk.
- While open-ended funds can contribute to market liquidity under normal market conditions, funds holding less liquid fixed-income assets can be more prone to sharp outflows from investor redemption, which forces the sale of assets into increasingly illiquid markets. These mechanisms can be seen in the stress associated with high-yield corporate bond markets during heightened risk aversion caused by the global pandemic in the first quarter of 2020.

Leverage loans and CLOs

- The unprecedented growth of global leveraged loans and collateralised loan obligations (CLOs), to over USD 2.3 trillion and USD 600 billion respectively, illustrates the extent to which institutional and retail investors are exposed to very high corporate leverage through non-bank financial intermediation.
- Furthermore, the pervasive issuance of “covenant-lite” loans suggests that reduced credit protection in debt covenants will result in much lower recovery rates when defaults occur. While much of these loans are outside of the banking system, there are hundreds of billions of dollars worth of revolving facilities that allow speculative-grade corporates to borrow from major banks when they are facing cash flow challenges.
- Dislocation in these markets resulting from the impact of the Covid-19 has contributed to a spike in leveraged loan yields. It could also transmit stress to investors in leveraged loan funds and tranches of CLOs, which are held by banks, pension funds and insurers. Loss of market access could result in rising corporate default rates, which in turn could amplify stress and precipitate a broader deterioration of credit conditions.

Bank Contingent Convertible Debt

- Post-crisis regulatory reforms have made banking systems more resilient, partly resulting from bank issuance of contingent convertible capital (CoCo) within the framework of total loss absorbing capital. While early efforts to issue these products were cumbersome, credit markets have since supported over USD 500 billion of gross issuance of such capital over the past years at relatively narrow spreads.
- This sharp growth coincides with a surge in demand from retail investors, and the proliferation of CoCos in dedicated bank bond and broader fixed-income funds. As the loss-absorbing mechanisms of CoCos are still largely untested, additional incidents of loss that triggers these instruments conversion could contribute to market runs and contagion that results in higher funding costs across other parts of banks’ capital structures. Should this impede repair of banks’ balance sheets, it could raise concerns over the resilience of the core of the system, and may complicate banks’ stable access to wholesale funding markets.

Investment funds

- The rapid growth of regulated open-ended bond funds in the post-crisis period has been a major contributor of incremental credit intermediation through market-based finance. While this should provide welcome diversity of funding sources when credit levels and prices are balanced, the strong growth in credit funds that channel investment to higher-yielding corporate bonds, leveraged loans, and bank CoCos raises concerns over the sustainability of these positions.
- While these funds only hold a moderate portion of bonds outstanding, some periods of sharp outflows from bond funds have contributed to changes in the market price of credit. Sharp movements of large fund holdings of high-yield corporate bonds could amplify market contagion when there are large credit imbalances, and exacerbate the financing costs for higher-risk debt.
- Amid the market contagion from the heightened risk aversion caused by the pandemic, high-yield funds and ETFs have experienced substantial outflows and subsequent falls in net asset values amid credit market dislocations.

G20 financial sector reforms include several policy recommendations to address vulnerabilities related to non-bank credit intermediation, and implementation is underway. Yet, these measures alone will not

address macrofinancial forces that are contributing to credit exuberance, nor rectify the incentives associated with regulatory arbitrage. Moreover, as economic and credit conditions deteriorate in a maturing business cycle, the reversal of a decade-long reach for yield or an exogenous shock such as a global pandemic could result in dire consequences for global credit markets.

Policy considerations

Financial policies with respect to global financial intermediation should take a holistic approach that considers not only the distribution and intensity of risks throughout the system, but also the underlying factors that have contributed to elevated debt levels and asset prices. In this manner, the paper explores several aspects of policy related to macro and microprudential measures, and market regulation, and considers ways in which these tools can be better integrated to achieve in a holistic yet proportionate manner. In this vein, it further explores how product and activity-based tools could be utilised to address imbalances left by the gap in availability of macroprudential tools, and opines on some public and private sector perspectives on how to best implement. In doing so, they can balance the need to constrain systemic vulnerabilities while allowing market-based finance to help support sustainable economic growth.

Post-crisis policy frameworks to address financial sector risk should adapt to the shift toward market-based finance in many countries, and should better consider the interactions between monetary, prudential, and regulatory tools on credit intermediation and risks. Current efforts in international regulatory coordination tend to consider risks in non-bank finance as contributing to potential financial stability risks, irrespective of the size of the non-bank sector compared to banks, and without consideration of credit level and the extent of equity in the system to absorb losses. By contrast, the OECD's Policy Framework for Effective and Efficient Financial Regulations notes that financial regulation should be oriented to the risks in the financial system, such that they give priority to those risks with the greatest potential to undermine the resilience of markets and sustainable growth. Policy implementation should be comprehensive and well-coordinated across monetary, macro and microprudential, and regulatory policies, and should strive to encourage the efficient allocation of capital in the financial system toward productivity-led sustainable economic growth.

Amid a prolonged period of monetary and fiscal stimulus, macroprudential tools largely directed at global banks have not been effective in containing credit exuberance or liquidity transformation in the financial system. Hence, further consideration should be given to the optimal combination of macro and microprudential tools in non-bank credit intermediation that address vulnerabilities without undermining the benefits of market-based finance. In many jurisdictions, the use of macroprudential policies that target banks and real estate markets has in turn incentivised the further growth of credit intermediation and liquidity transformation in non-bank finance with respect to sovereign, corporate and bank CoCo debt. At the same time, balance-sheet equity levels have lagged behind debt, and have even decreased relative to GDP in some jurisdictions. This calls for a reconsideration of the mix of tools relative to the objective of balanced, resilient markets to support sustainable growth.

More work is needed to further develop and implement microprudential and activities-based tools in market-based finance, and to ensure the tools function dynamically to help mitigate excessive risk taking with respect to liquidity and leverage. Such tools are of particular importance in areas that have grown in the post crisis period, such as with open-ended investment funds and structured products that hold corporate credit, such as CLOs. As for investment funds, notwithstanding authorities' efforts to operationalise IOSCO recommendations liquidity risk management for collective investment schemes, there are questions as to the current state of resilience. More consistent implementation, in conjunction with further strengthening of data collection, assessment of synthetic leverage, and greater focus on the

risks of more complex and opaque products, could help ensure large parts of market-based finance are sufficiently resilient even during periods of market stress to continue to engage in price discovery and support intermediation to the real economy.

Given the current prospects for continued low rates and additional policy accommodation, the consideration of appropriate tools to address risks in market-based finance within the financial system is prescient. As unconventional monetary policies can encourage certain types of risk-taking that are not easily reversed in a controlled manner,³ particularly where markets and market-based finance is prominent, getting this mix right to contain credit exuberance while supporting productive intermediation to the real economy is important to ensure economic growth is not at the expense of large tail risks that threaten financial stability.

1. Introduction

The primary function of any financial system is to facilitate the allocation and deployment of financial resources between savers and users of capital, in a manner that efficiently assesses and transfers risks. Financial intermediaries are at the heart of this process. They engage in credit allocation and liquidity transformation, by tailoring products that have different risk and return characteristics.⁴ If done effectively, this serves to support fixed investments, capital accumulation, and sustainable economic growth. Sustainable economic expansion also benefits from greater availability of financial services and greater market depth, such that higher-income economies currently tend to have much deeper financial markets.

For a variety of reasons – including differences in financial sector size, complexity, and available technology, as well as differences in political, cultural, and historical backgrounds – the most efficient institutional structure for fulfilling the functions of the financial system generally changes over time and differs across jurisdictions.⁵ Notwithstanding these differences, the extent to which the system of financial intermediation provides enduring resilience through economic and credit cycles depends in part on the composition of financial intermediation and its ability in aggregate to deliver efficient allocation without resulting in excesses or imbalances that build up over time. Of course, other factors interact with the financial system to contribute to resilience or imbalances, including monetary and fiscal policy, regulation, legal systems, and cultural behaviours (e.g. societal trust).

However, financial intermediation – particularly during periods of financial innovation and adaptation – can lead to a build-up of imbalances that causes or contributes to financial shocks.⁶ The economic crisis and international financial contagion during the Global Financial Crisis resulted in the loss of a substantial part of the accumulated wealth of OECD countries.⁷ Many of the world's largest financial institutions became insolvent and considerable parts of the financial intermediation system required expensive official rescues. The authorities in OECD countries provided an unprecedented fiscal and monetary stimulus to prevent further economic contraction. Clearly, the economic crisis exposed the faultlines of so-called “shadow banking” due to the presence of asymmetrical information within and across the interlinked credit intermediation chains across intermediaries, products and investors. This increasingly fragile form of market-based finance offered benefits to investors that included efficient pooling of assets for diversification, and risk transformation to maximise returns. However, the combination of lofty asset valuations, low volatility, and excessive transformation and leverage contributed to an unsustainable system of intermediation when rising rates increased funding costs beyond what was sustainable for this increasingly fragile construct. The consequences of the toxicity of shadow banking is thoroughly chronicled in central bank and academic publications and need not be restated here.

Since then, global policy makers have set upon strengthening the resilience of the global financial system, addressing banks that are systemically important and developing remedies for financial stability risks in non-bank financial intermediation that proved to be contributors to the crisis. Multi-faceted post-crisis regulatory reforms have sought to address these faultlines, and their implementation has coincided with the demise of several toxic forms of shadow banking that contributed to excessive

maturity transformation and leverage (e.g. CDOs, SIVs, credit arbitrage ABCPs, TRUPs, and financial guarantees on some of these products).

In addition, the OECD, FSB, IMF, and individual institutions such as the Federal Reserve Bank of New York and ESRB, have made significant strides in assessing the extent of non-bank financial intermediation, and the ways in which risks can arise.⁸ This has resulted in a better understanding of the shifts in the financial system across the world and common risks. However, in response to the prior crisis, they are understood through the lens of “shadow banking”, and with the expectation that identification of such risks and treatment of these risks with greater regulation and some forms of macroprudential tools would be sufficient to address risks and transform the system into resilient market-based finance. In this regard, the current narrative appears to be that (i) market-based finance is a sign of economic development and market deepening, and provides a beneficial alternative form of finance to complement bank intermediation; (ii) insufficient regulation led to shadow banking which caused credit excesses and extreme risks; (iii) post-crisis regulatory reforms have largely addressed shadow banking risks, paving the way for resilient sustainable market-based finance that can provide balanced, countercyclical and compatible financing on terms that suit issuer and investor preference. This is a compelling narrative.

Thus, at this point in time, what is the purpose of revisiting aspects of well-understood global financial intermediation? To the extent that some aspects of this narrative merit serious reconsideration, this note serves to refocus the discussion on relevant global trends in financial intermediation, their risks, and the efficacy of policy responses to address the root cause of imbalances that could hinder sustainable economic growth.

This note serves to accomplish several tasks. First, it challenges the reader to dispense with the notions that (i) the growth of non-bank financial intermediation is somehow the reward of advanced and emerging market economies (EMEs); (ii) non-bank financial intermediation either is inherently risky and opaque (thus the pejorative term “shadow banking”), and must be tamed by enhanced regulation and macroprudential measures, and equally that such measures will categorically address potential stability risks. Instead, it asks the reader to appreciate that various forms of financial intermediation – banks, market-based finance, and other intermediaries – coexist to provide a range of services that address the different needs of a host of investors and issuers or borrowers. Thus, their behaviour and performance should be considered in light of their effectiveness in providing such intermediation, if it gives rise to structural weaknesses, and the extent to which such intermediation contributes to unsustainable market prices and levels of credit. In turn, an abrupt reversal could jeopardize long-term growth.

The analysis herein begins by asking the extent to which there is an overallocation of credit provided by banks, markets, and market-based intermediation. Given concerns over the credit allocation, it then asks whether the post-crisis growth of non-bank credit intermediation has experienced a healthy rebalancing away from bank intermediation due to market participants’ desire for alternatives, or the result of some other causes. In search of these causes, it explores the nexus between the growth in and pricing of credit during a lengthy period of highly accommodative monetary and fiscal policies, and the exuberance of non-bank financial intermediation. Then, it seeks to consider the drivers of this exuberance in credit allocation, and the embedded risks of such intermediation that could contribute to amplification of risks when macro policies change and the credit cycle turns. In this regard, the note contributes to the discussion of how global financial intermediation relates to the current debt challenges and the predicament for public policy makers who are being called upon to continue monetary policy accommodation.

The paper is structured as follows:

- *Section 2* offers a conceptual and historical overview of the ways in which financial intermediations are provided to support economic growth, noting the benefits and risks of both banking and non-bank financial intermediation.
- *Section 3* illustrates the credit intermediation that is generated through the markets, by mapping the growth of sovereign, corporate and household debt, and then to look at the markets for bonds and loans that corresponds to this level of debt, which forms the basis for this.
- *Section 4* outlines the shifting structure of credit intermediation around the world, focusing on bank versus non-bank dominated forms of intermediation, the extent to which this has shifted over times, and implications.
- *Section 5* assesses the drivers of non-bank credit intermediation, and the risks that have risen from this intermediation.
- *Section 6* concludes with key assessments of the policy implications of the shifts and associated risks in non-bank financial intermediation amid credit exuberance in parallel with elevated credit levels and corporate leverage, and amid continued monetary policy accommodation.

2. Conceptual overview

Financial intermediation – Historical context

One of the most notable features of modern finance has been the growth of financial markets, including innovations in market-based finance to provide an array of credit and equity to investors. As market-based financing underwent growth in the 1990s, a cross-country study by the World Bank found that banks, other financial intermediaries, and stock markets all grow and become more active and efficient as economies become richer.⁹ As income grows, the financial sector develops. In higher-income economies, stock markets become more active and efficient than banks. Also, insurance companies, pension funds, mutual funds, and other non-bank financial intermediaries are larger as a share of GDP in richer economies. Thus, recent evidence suggests that more developed economies tend to have financial systems that are large relative to their economies, and that market-based finance tends to also be large within the financial system. This is particularly the case in which a country's market-based intermediation has an international dimensions, such as with international financial centers.

However, extrapolating general trends about the relationship between economic development, the deepening of markets, and growth of market-based finance should be met with caution. The post-crisis assessments of structural developments in finance often portray market-based financing as a sign of maturing financial systems that exist in advanced economies, and grow with financial developments. There is evidence that early forms of bank-based and market-based finance have been in *co-existence* for over two millennia, and their forms and proportions have changed over centuries based on particular circumstances related to the need for financing of economic growth related to the incorporation of business activities, state-led growth, and internationalisation of economic activities.¹⁰

The emergence of bank-centric financial systems has often been associated with relationship lending that facilitated state-driven national growth. Early forms of modern banking – the *banchi grossi* – rose in Italy in the late Middle Ages to support the growth and endeavours of city states. Thereafter, the strong growth of banks within certain financial systems in the 17th through 19th centuries, such as in Japan, Germany, and France, are at least partially related to national-building, as banks are more efficiently directed by the state (through central bank policies, regulation, and direct state influence in credit allocation) to develop core industries that require an immense amount of long-term capital.¹¹ Indeed, it is not surprising that process of industrialisation with concentrated industries coexisted with dominant banking systems: during this period, the dominance of banks in the Japanese and German economic models differ from the more market-oriented financial systems of Britain and the US, which to some extent reflected a lower level of state-led industrialisation and greater international commercial engagement.¹²

Thus, it may be considered that the shift from banking to market-based finance in the modern era is more related to the reduction of state involvement in directing industrialization; forms of post-industrialized economic growth, such as in technology-driven sectors that are particularly reliant on equity financing; and also the extent of openness and liberalisation of capital markets which allows it to better integrate with global financial markets. There is ample literature that this shift offers a constructive

rebalancing toward equity and also debt financing that is more apt to be priced efficiently through market conventions, particularly where market transparency and integrity is high.

During periods of improving economic outlooks and rising business confidence, heightened risk taking in market-based financial intermediation is more prone to occur. Financial literature from the 19th century Britain sheds light on competitive pressures in market-based finance due to the proliferation of money markets, thereby contributing to exuberance even amid a turn in the commercial expansion.¹³ In the United States, non-bank financial intermediation developed after a regulatory cap was imposed on bank deposits (Regulation Q, established in 1930), which contributed to the growth of non-deposit money market funds and open-ended mutual funds and other forms of pooling to obtain pooling of assets with higher returns and risks than bank deposits.¹⁴ In the 1980s, non-bank intermediation evolved with the development of the mortgage securitisation markets, and further with the extension of credit intermediation chains through structured products (collateralised debt obligation (CDOs), asset-backed commercial paper (ABCP), special investment vehicle (SIVs), etc.).¹⁵ Indeed, this similar experience is occurring in China, contributing to the rise of non-bank finance through a range of bank-like and market-based financial products that are now growing in complexity.

Structures and evidence in modern experiences in intermediation

In light of these historical perspectives on financial intermediation, one can better appreciate that the degree to which financial systems are bank-based or market-based influences the way they can serve economic growth. In bank-based systems, financial assets and liabilities consist of direct commercial and household loans and bank deposits dominate the system. In market-based systems, tradeable assets in financial markets are a dominant form of financial asset. Bank-based systems appear to have an advantage in terms of providing a long-term stable financial framework for companies. Research by Merton (1995) suggested that financial institutions are better suited for low-volume products, which are either highly customised or have information asymmetries.¹⁶ By contrast, markets are better suited for high-volume transactions to a large number of investors, where transactions are well-enough understood for transactors to be comfortable enough with assessing prices and risks.

In light of these historical perspectives on financial intermediation, one can better appreciate that the degree to which financial systems are bank-based or market-based influences the way they can support economic growth by efficiently serving issuers and investors alike. In bank-based systems, financial assets and liabilities consist of direct commercial and household loans and bank deposits dominate the system. In market-based systems, tradeable assets in financial markets are a dominant form of financial asset. By contrast, markets are better suited for high-volume transactions to a large number of investors, where transactions are well-enough understood for transactors to be comfortable enough with assessing prices and risks.

Both bank-based and market-based financial developments have undergone periods of transparency and of greater opacity and complexity (Table 2.1) but the latter is more likely to occur in banks due to the very nature of relationship lending and information asymmetries. As such, market-based systems tend to be more volatile, which in extreme forms can amplify risks, but are better able to quickly channel funds to new companies in growth industries. There are comparative benefits and risks of each. Indeed, there is evidence that bank-based systems are more prone to systemic risks than financial systems that have a strong share of market-based financial intermediaries, in part due to the high leverage present in bank-based systems.¹⁷

Table 2.1. Classification of Financial Intermediaries

Transparent	Translucent	Opaque
Government bond market	Unit trusts	Insurance
Stock markets	Mutual funds	Commercial Banks
Futures markets	Pensions	CDOs * CLOs*
	Finance Companies	SIVs*
	Trade receivables ABCP*	Credit arbitrage ABCP*
	Corporate bonds and loans* ¹	

Note: CDO: collateralised debt obligation; CLO: collateralised loan obligation; SIV: special investment vehicle; ABCP: asset backed commercial paper.

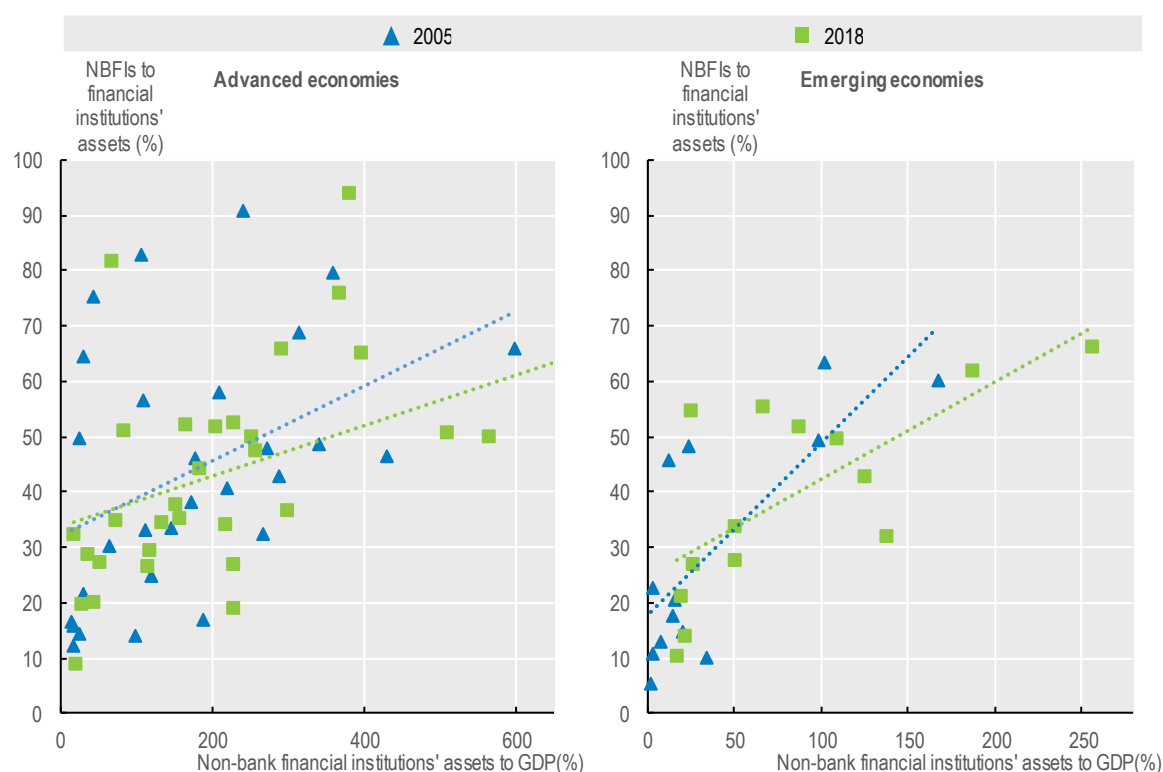
1. In recent years, efforts have been made to improve the transparency of trading prices and volumes in the corporate bond market, such as in the US and European bond markets. Due to the range of liquidity levels across bonds for even an individual issuer, the staff have assessed that a substantial portion of the market remains less than transparent. By contrast, leveraged loans markets are much less transparent and liquid.

Source: Merton, R (1995), "A Functional Perspective of Financial Intermediation", Financial Management 24: 23-41 and * denotes OECD staff adaptations; based on Merton's categorisation.

In this regard, systemic risks spread quickly during what became the global financial crisis due in part to commercial banks' arrangement of complex and risky structured products. These included asset backed commercial paper vehicles, collateralised debt obligations, structured investment vehicles, and other structures that pooled and tranching underlying assets related to corporate loan, municipal, and bank debt. In this respect, the extension of bank-like information asymmetries to market-based finance, which is better suited for more standardized and transparent products, as well as the financial linkages between banks and the structured products the originated, contributed to an unprecedented loss of market confidence.

OECD estimates from 2005 and 2018 show that, even from pre-crisis levels, non-bank financial intermediation has continued to grow as a percentage of the GDP, but the nature of this growth within the financial system differs across emerging and advanced economies (Figure 2.1). In EMEs, non-bank financial intermediation has grown both as a proportion of total financial intermediation (measured relative to banks), and relative to GDP. In advanced economies, evidence is mixed with respect to the composition of market-based finance in the system, as of course some economies have experienced an overall decline following the crisis. But, certainly there are a number of advanced economies in which non-bank finance has grown markedly relative to GDP, including six jurisdictions that now have non-bank finance as over 400% of GDP. However, on average there has been little net change in the level of non-bank versus bank financial intermediation, which illustrates that overall financial intermediation to GDP (bank and non-bank) has grown considerably.

Figure 2.1. Jurisdictions' non-bank financial intermediation to GDP and as a percentage of the total financial system for selected advanced and emerging market economies, 2005 versus 2018



Note: National sector balance sheet data of 47 economies are used in this chart. This figure presents the year-on-year change in non-bank financial institutions assets and GDP in selected years. Reflecting the data collected and the desire for consistency across jurisdictions, the macro-mapping categories and type of asset classification are defined in annex A.

Source: Financial Stability Board 2017 Shadow Banking Monitoring Report, OECD Financial Account database, IMF World Economic Outlook Database, OECD calculations.

To a certain degree, the broad growth of markets and market-based finance has occurred due to: (i) the demand from investors for higher returns than on bank deposits and even money-market funds (MMFs) in this protracted low-rate environment; (ii) issuers' desirability to utilise this form of financing due to cost benefits, and agility in tailoring investments to meet financial objectives with respect to time horizon, returns, and liquidity needs; (iii) a market and credit environment which experienced very low realized and implied volatility and persistently low credit defaults. This global phenomenon differs considerably from the late-stage cycle in 2005-2007 in which relatively high rates were attracting flows into short-term funds and asset-backed commercial paper (ABCP), SIVs, and other vehicles, and in which the reach for yield and product innovation was occurring primarily to package and resell financially engineered slices of real estate and asset-backed securities, from subprime mortgages to commercial properties.

Several phenomenon have occurred over the past 15 years that may have further contributed to this shift to market-based finance. First, the very low interest rates and use of accommodative monetary policies in Japan, the United States, and the Euro area, which has influence rates across OECD and some EMEs, has contributed to a global reach for yield. This shift was, by design, compounded by the quantitative easing by major central banks that contributed to the demand for traded credit assets to replace over USD 12 trillion of assets that were brought onto central bank balance sheets. Second, the

growth of technology, including internet and now a fourth wave of digitalization, which requires more market-based financing. While market based financing has tended to be in the form of equity (e.g. a wave of initial public offerings (IPOs) in the internet boom), a considerable amount of bond and leveraged loan issuance has been to technology companies. Third, high saving rates in EMEs and the “savings glut” phenomenon contributed to foreign investment into US and other advanced economies safe assets. Fourth, the globalization of asset management, as the growth of funds and institutional investors in EMEs has incidentally coincided with the growth of local currency and foreign-currency denominated debt markets.¹⁸

The rise of market-based finance and risks

Increased attention has been given to the assessment of economic activities and financial risks in forms of non-bank financial intermediation in light of its disruptive consequences during the global financial crisis. The following section will review the key forms of market-based finance, their financial risks, and system-wide vulnerabilities that could arise. This assessment adds to the international discussion because it considers risks in the context of benefits provided by market-based finance in relation to bank finance.

Forms of market-based financing through non-bank financial intermediation

The forms of market-based financing range considerably, depending in part on the depth and forms of markets themselves, the array of institutional and retail investors and their demand for tailored products with credit and liquidity features. A brief review of two sides of the spectrum – financing through bank intermediation, and direct (non-intermediated) market investing – help clarify the value proposition of market-based intermediation.

One of the factors that may have contributed to a shift from banking to market based financing is regulatory arbitrage. Banks’ regulatory requirements (provisioning for expected loss, holding capital and capital for unexpected loss and outflows, and cost of being supervised) may give it a competitive disadvantage relative to market-based finance, which has lower if any capital burdens. As well, banks’ use of covenants, collateral, and monitoring of its more concentrated exposures (e.g. large corporates) imposes additional burdens to the borrower. Also, from a macrofinancial perspective, banks have several features that help maintain micro and macro stability: deposit guarantees reduce run risk; bank equity is not redeemable; provisioning ensures expected losses are modelled and covered with allowances; and – particularly following the introduction of Basel III regulatory framework– bank capital and liquidity are closely monitored to help ensure banks remain solvent and funded even under severe stress. These factors are critical to significantly reduce the need for banks to quickly deleverage or engage in firesales that amplify risks to other parts of the financial system. On the liabilities side, the scale of bank intermediation through the provision of deposits makes it relatively inexpensive in most markets, and the financial safety net features – including supervision and access to the central bank backstops – create a barrier to entry that must be overcome. Also, that bank equity has shown to be at or below the beta of major capital markets suggests that investors wishing to have higher exposure to the markets would need to diversify away from banks.

On the other side of the spectrum is individual investing in the markets, which offers greater return potential in concept but is costly in practice. Return potential is greater for several reasons. First, the array of market assets not held by banks is substantial, including various equities and lower rated credit products which may not be economical for banks to hold due to regulatory capital constraints or limitations. While individual investing in markets greatly reduces the costs of regulatory requirements

that could artificially reduce returns (e.g. high regulatory capital or liquidity requirements that reduce returns), the costs of assuming the role of portfolio management are not insignificant. Proper investing necessitates several stages, including return and risk assessments, portfolio construction trading implementation and rebalancing costs, and constant credit and liquidity risk monitoring.

Therefore, the benefits of market-based intermediation must exceed those marginal benefits above those of banks as well as from investors' direct investments in market assets, in a manner that sufficiently assesses returns and risks. They include the following:

- *Diversification.* Individual investors that invest directly into the markets must assume trading costs for managing and monitoring their investments. There is a utility curve between investing in fewer assets and assuming lower costs, but at the expense of concentration risk. By investing in a market intermediary, investors can greatly reduce idiosyncratic risks at a relatively low cost.
- *Portfolio construction, monitoring and market and credit risk management.* In addition, the investor can benefit from the expertise of the portfolio manager to engage in portfolio and risk management to ensure that the pool of assets either performs close to an index or otherwise confirms to a pre-defined objective with return and risk criteria.
- *Product customisation for absolute and risk-adjusted returns.* Investors may choose tailored instruments that meet specific need for return and risk criteria, such as volatility, duration, concentration risk, and can try to maximise returns within particular segments or ratings.
- *Liquidity.* In addition to these factors, investors often wish to have liquidity that is similar to bank or bank like instruments, such as daily redemptions. Products that provide higher returns than bank deposits, and yet provide greater liquidity at short-notice and with lower price impact than exiting a number of direct investments. Also, market-intermediation through broker-dealers that facilitates liquidity in markets between intermediaries and individual investors, and allows them to take on leverage and maturity transformation through collateralised borrowing, is a cornerstone of modern markets.

With these factors in mind, many of the institutions or vehicles that provide market intermediation offer end-investors with these benefits in different forms.

- **Investment funds** can provide diversification benefits by pooling a wide range of assets, either in one asset class or across asset classes. They are generally transparent, although higher risk funds such as hedge funds are less so. They also provide product customisation, as the wide range of funds available can target very particular exposures to assets or industries, and expected risk-adjusted returns above that of bank deposits. Moreover, open-ended funds and exchange traded funds (ETFs) are meant to offer liquidity on demand – either due to their structural features (redeemable equity of funds) or their markets (bond ETFs are traded on liquid equity markets). Investors can achieve risk and return profiles similar to bank deposits through low-return principle-protected (fixed net asset value) money market funds, or may chose much higher returns and risks through equity and higher-yielding debt investment funds. Both passive investments and active investment funds (non-MMFs), which respectively track and seek to exceed benchmark returns, do not provide principle protection. Therefore, *they do not shield investors from the need to monitor credit and market risks*, which is the feature by which other risks in market-based intermediation arise.
- **Securitised and structured products** also provide pooling of assets, and also credit risk transformation through the structuring of liabilities of the vehicle so that investors receive their cash payments in accordance with pre-determined schemes. Some products, such as mortgage backed securities (MBS) or commercial mortgage backed securities (CMBS), benefit from pooling, collateral management, and cash flow management to give different holders different

forms of return, also with different pre-payment and duration characteristics. Also, when products are tranchised, such as in CDOs or collateralised loan obligations (CLOs), they can provide benefits of financial engineering such that a tranche with the same rating as a corporate bond, for example, could provide a higher spread and return, and a higher Sharpe ratio during *normal* market conditions. While these products are engineered to greatly minimise the likelihood for actual credit losses at higher rated or “senior” tranches, the past financial crisis has shown that the opacity and complexity of such products – whether real or perceived – can result in much higher credit losses and severe market losses once investor confidence deteriorates.

- **Other intermediaries** include, among others, non-bank finance companies, which serve primarily to offer credit to households and companies funded through the wholesale funding; and, broker-dealers, which intermediate market-based financing through making markets using their balance sheet to inventory assets and managing market and credit risks. In this manner, they are a critical component of markets to facilitate market and liquidity, and to allow other intermediaries to engage in maturity transformation and leverage, such as hedge funds.

Risk from non-bank financial intermediation

The benefits from intermediation also bring risks, and the choice of business models often determines how intermediaries balance these risks in order to make profit while delivering value to stakeholders. In this regard, non-bank intermediaries take a combination of risks that arise from the provision of benefits – such as higher returns or liquidity on demand – to ensure a value proposition that remains superior to that of banks and direct investing.¹⁹ As a result, intermediaries often must adapt their business models including risk taking in response to rates, credit conditions, supply of liquidity, and other factors that vary during the financial cycle. This makes non-bank intermediaries fundamentally different from banks, which are largely price setters for risk-free savings and low-risk liabilities, and where strict regulation and supervisory oversight monitors the balance between risk taking, and capital and liquidity.

Financial risks are present to varying degrees depending on a given market's range of intermediation products, depth, complexity, and such risks vary over time depending on financial cycles and investors' level of risk tolerance. Given that these risks were procyclical and more correlated as the financial cycle advanced prior the last global financial crisis, an open question is the extent to which this is happening again during the current cycle. As far back as 1873, Bagehot wrote that “every great crisis reveals the excessive speculations of many houses which no one before suspected, and which commonly indeed had not begun or had not carried very far those speculations, till they were tempted by the daily rise of prices and the surrounding fever.”²⁰ Thus, it is important to consider such risks that, in aggregate, could impact the confidence and even trust in the system, in turn affecting the trajectory and sustainability of economic growth.

Consideration of systemic risks

Since the global financial crisis, there has been considerable debate with respect to the roles, risks, and interconnectedness of banking and market-based finance that caused the crisis, and also by extension whether high-levels of market-based financing can contribute to systemic risks. A number of papers highlight the growing interconnectedness between banks, markets, and more opaque forms of market based finance (securitised and structured products, repo-based leverage, etc.), which resulted in asset price firesales when the fragile network of maturity transformation and leverage rapidly unwound.²¹

Box 2.1. Risks from Financial Intermediation

Risks from intermediation, which have been widely covered in financial literature about financial intermediation, include the following:

Leverage occurs when intermediaries take on liabilities to fund assets. If the maturity of asset and liabilities are perfectly matched, then the core risk is that defaults of investments would result in intermediaries' inability to repay debt. If, however, they are not perfectly matched, then maturity and possibly liquidity transformation can occur.

Maturity transformation exists when intermediaries with leverage take on short-term liabilities to invest in longer-term assets. This transformation can exist when the average maturity of assets is greater than that over liabilities, but also when a portion of assets has a significant maturity over distinct periods of time, creating rollover risks. In their extreme forms, finance companies and ABCP conduits both funded longer maturity assets with very short-term debt from wholesale markets. However in market-based finance, when maturity transformation occurs through the investment of long-term assets, the risks depend on the extent to which those assets are sufficiently liquid to be sold into the markets – without material price movements – to repay maturing liabilities.

Liquidity transformation is present when short-term liabilities and redeemable equity are funding assets that are considered much less liquid, in that their sale over the short-term could affect market price, such that it would deviate below book or intrinsic value based on cash flow analysis. Liquidity transformation is typical in open-ended investment funds that offer investors daily-redemptions while investing in less liquid assets, such as leveraged loans or lower-rated emerging market bonds.

Imperfect risk substitution occurs when financial engineering allows certain intermediary products to offer superior returns to real-economy assets at the same rating (or other static measurement of risk), but whose performance is considerably worse during periods of credit downturn and market stress. Structured products that invest in high-yielding non-investment grade assets, and provide a range of tranches at investment grade, could engage in imperfect risk substitution when tranches of a certain rating (e.g. AAA) provide higher yields than a similarly rated plain vanilla product. During periods of market stress, the asymmetries in returns and risks become more apparent to investors.

Opacity and complexity risk from inter-linked intermediaries when end investors are not able to determine the aggregate risks because intermediaries fund other intermediaries. While disclosures may explain types of investments, it is often difficult to determine the layers of intermediation risks and how they interact during periods of stress. This is particularly the case in which funds invest in other funds, conduits and funds invest in structured products, and they in turn invest in securitisations. An example of this is where asset-backed commercial paper conduits were issuing very short-term high-quality paper to investors, and were using proceeds to invest in CDOs of MBS of subprime mortgages. In this case, there were three intermediation links between the end investor and the real asset, and every form of risk explained above was present.

Exuberant credit intermediation, which could refer to the aggregate levels of credit, and/or deteriorating quality of underwriting standards, occurs when the lack of structural constraints within the intermediaries that would otherwise limit their ability to grow and take on additional risks, which can in aggregate affect (i) prices of debt, and (ii) the quantity of debt in the system, relative to economic resources (e.g. GDP, earnings before interest and tax (EBITDA) for corporates, personal income for household debt). This is an important factor that, in combination with structural features in intermediation, can contribute to systemic risks.

At the same time, more recent research has taken a more holistic view of the balance of banking and market-based finance, and the types of non-bank intermediation that are more prone to risks with systemic consequences. One study assesses the merits of bank-based versus market-based financing by exploring the relationship between financial structure and systemic risk across 22 OECD countries; the results show that bank-based financing generates systemic risk while market-based debt and especially market-based stock financing reduce systemic risk.²² Another paper highlights the differences in risks of securitisation and other forms of opacity and lengthy credit intermediation chains, with less opaque or complex forms of market-based financing such as asset management.²³ For these reasons, in a major crisis, more transparent forms of market-based finance might therefore be expected to be a materially less disruptive way of passing very substantial losses back to end investors than bank lending, as it pertains to financial stability. However, that does not imply that growth and development of some forms of market-based finance in recent years are without financial stability risks due to the potential for amplification and contagion of risks.²⁴ In light of the evidence of much higher overall intermediation and debt relative to GDP, combined with mispricing of risk, the velocity and impact of the eventual adjustment of this debt overhang, and its impact on the financial system and sustainable economic growth, is of core relevance to financial policy makers.

With these perspectives in mind, the next sections of the paper assesses the trends in credit, including the extent of exuberance and excess, and then evaluates the structural shifts in bank and non-bank intermediation, to determine if the risks that are being born by financial intermediates to accommodate the supply and demand side factors are giving rise to new fragilities in the financial system.

3. The rise of global debt and exuberance in financial markets

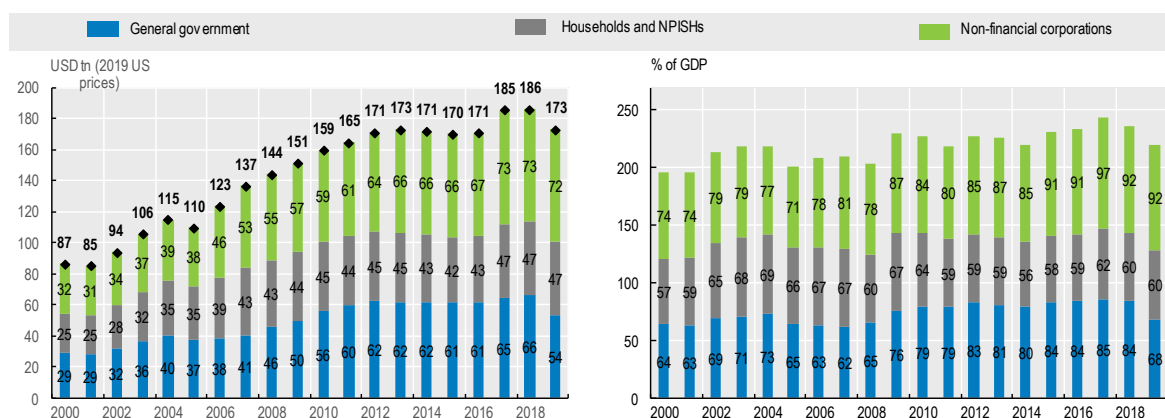
This section provides an overview of key global trends in the growth of financial markets to identify how much debt and equity financing have occurred in the several economic sectors – i.e. sovereign, households, non-financial companies and financial sector – in the post crisis era. In a context of weakening economic growth, rising downside risks are a major concern notably with increasing levels of indebtedness combined with high leverage and aggressive market pricing of risk that may complicate the path of debt sustainability. All these developments are likely to have major implications for financial intermediation both regarding the type of credit intermediation versus equity investment and the risk financial companies will be exposed to.

Growth of credit globally coupled with accommodative monetary policy in the post-crisis era

Since the global financial crisis in 2008, total global credit (including bonds and loans to household, non-financial corporate, and general government) has continued to rise, growing by one-quarter from USD 137 trillion in 2007 to USD 173 trillion in 2019, resulting from strong increases in sovereign and corporate debt (Figure 3.1). Global sovereign, household and corporate debt has risen substantially since 2008 and remains elevated in many jurisdictions. It is worth notice that corporate debt exceeds sovereign or households' debt both in nominal terms and as a share of GDP over the period 2000-2018.

Accommodative monetary policies, including unprecedented purchases of sovereign, corporate and household debt by major central banks, contributed to incentivise this growth through very low financing rates for an unprecedented period of time. Total balance sheets of the major central banks have expanded considerably from 2007 to 2018, while major central banks have lowered their main refinancing rates to below 1% in 2018-2019 (Figure 3.2). Such very low target interest rates have contributed to widely reduce fixed income yields to historically low levels. Such extraordinary circumstances in central bank policies have contributed to historically low yields. For the first time in modern finance, sovereigns are being compensated by investors to issue debt: by year end 2016, USD 12 trillion in debt – 15% of the Barclays' Global Aggregate Bond Index – was trading at negative yields.²⁵ In turn the combination of a very low interest rates and historically low to negative intermediate yields have created conditions such that growing vulnerabilities from indebtedness are not adequately priced by market participants that were indirectly competing with central banks to purchase debt instruments for their portfolios. Expansionary monetary policies have also contributed to portfolio rebalancing toward risk assets by design with an increase in demand for high yield assets to boost investment portfolio return.²⁶

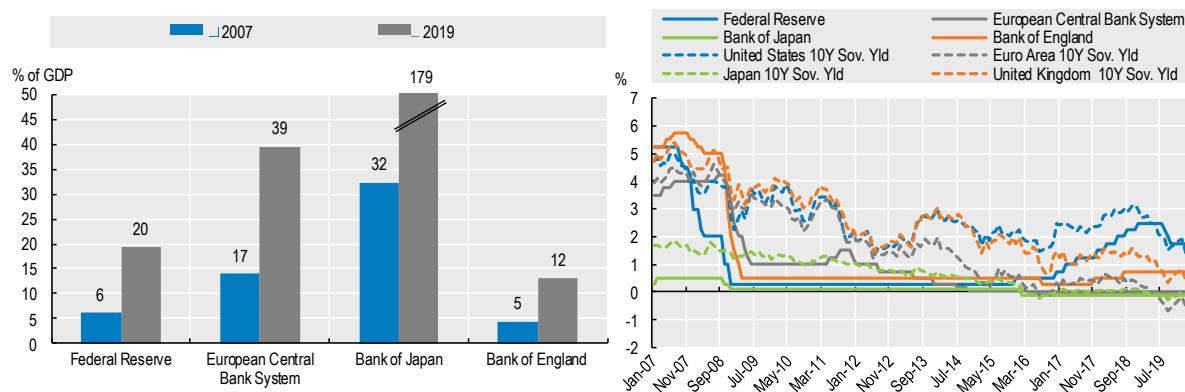
Figure 3.1. Sovereign and non-financial sector total outstanding debt, 2000-2019



Note: The financial instruments covered comprise currency and deposits (which are mostly zero in the case of credit to the private non-financial sector), loans and debt securities. The sum of these three instruments is defined here as "core debt". For the government sector, core debt generally represents the bulk of total debt. Debt data for 63 countries are used in this chart. Outstanding amounts are presented in 2019 USD adjusted by US CPI.

Source: Bank of International Settlements, Credit to the non-financial sector database, IMF World Economic Outlook Database, OECD calculations.

Figure 3.2. Major central banks total balance sheet and interest rates, 2007-2019

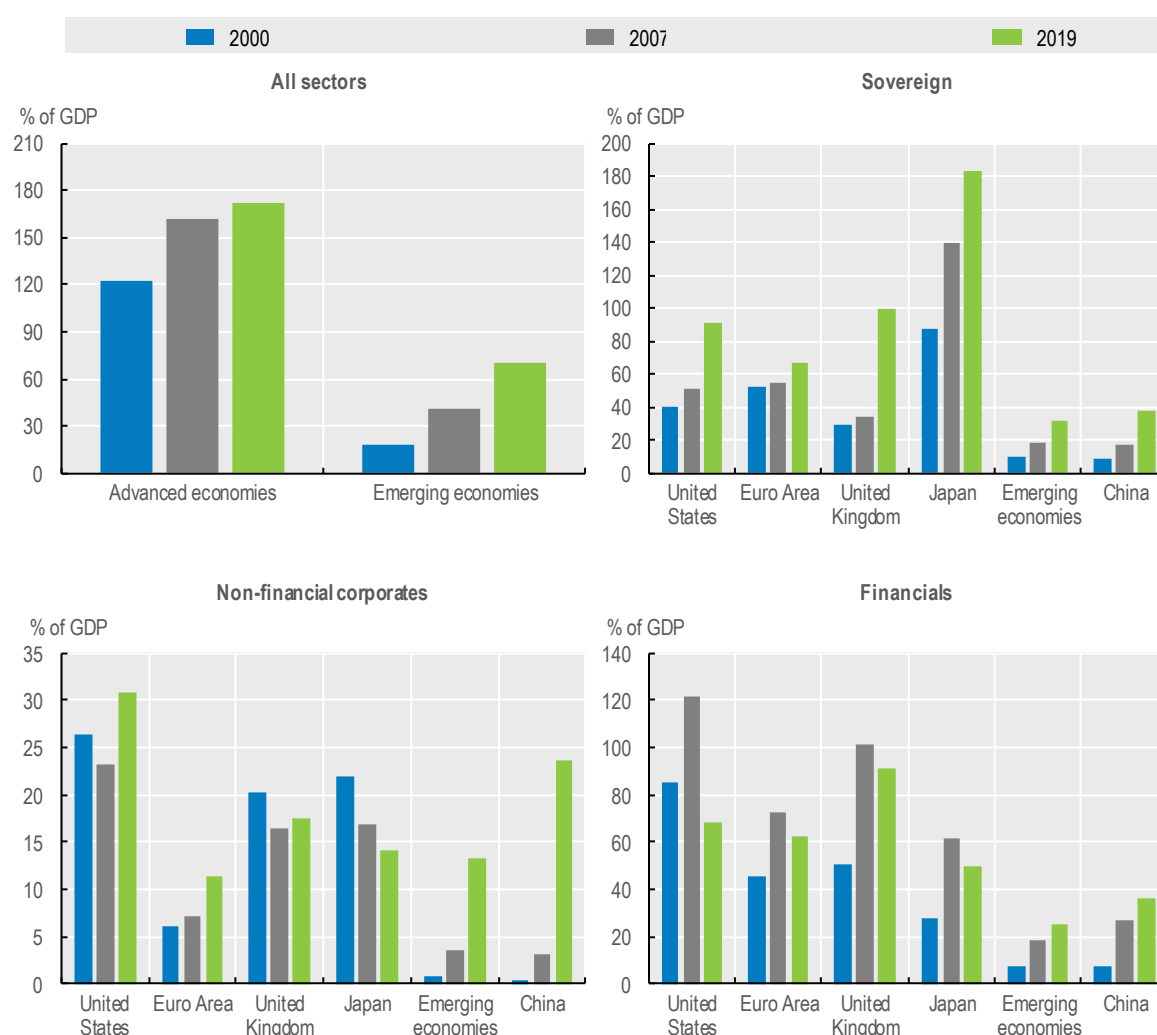


Source: Refinitiv, OECD calculations.

Total outstanding amount of bonds issued by sovereign, financial institutions and non-financial corporates

In the decade following the crisis, outstanding debt in sovereign, financial institution and non-financial corporate debt markets has grown considerably, and now stands at historically high levels in many advanced and emerging market economies (Figure 3.3). Also, total bond outstanding to GDP ratios is more than twice as high in advanced economies compared to EMEs over the period 2000-2018. Concerns are rising as such high debt levels have occurred through very high issuance of bonds and loans through market-based intermediation.

Figure 3.3. Bond outstanding to GDP ratios globally and for selected economies, 2000-2019



Note: Debt statistics cover borrowing activity in debt capital markets. They capture debt instruments designed to be traded in financial markets, such as treasury bills, commercial paper, negotiable certificates of deposit, bonds, debentures and asset-backed securities, and distinguish between debt securities issued in international and domestic markets. All non-marketable debt instruments (i.e., loans or bank customer deposit) are excluded. Consequently, these estimates of marketable debt by sector are lower than overall debt, including marketable and non-marketable debt instruments. The general government sector includes central government, state government, local government, and social security funds. The nonfinancial corporations sector comprises resident corporations (and non-profit institutions) whose principal activity is the production of market goods and nonfinancial services. Some nonfinancial corporations may have secondary financial activities, such as producers or retailers of goods that provide consumer credit directly to their customers. The financial corporations sector consists of all resident corporations principally engaged in providing financial services to other institutional units. The production of financial services takes the form of financial intermediation, financial risk management, liquidity transformation, or auxiliary financial activities. Source: Bank of International Settlements, Debt securities database, IMF World Economic Outlook Database, OECD calculations.

Sovereign bond outstanding to GDP ratios have continuously grown over the period 2005-2019 both in advanced and emerging market economies – although levels differ across countries. In 2019, Japan exhibits the highest sovereign bond outstanding to GDP ratio close to 200% of GDP compared to 100% in the United Kingdom, 91% in the United States and 67% in the Euro Area – with notable differences across European economies²⁷. Sovereign bond outstanding to GDP ratio is lower in China at 38%. The

rise in sovereign debt in many countries marked a coordinated global response to the global financial crisis and, subsequently, the European crisis. Fiscal stimulus in many countries was pursued through discretionary measures in response to the crisis, to prevent the downturn from gathering momentum and to support a sustainable economic recovery.²⁸ There is ample evidence of the positive effects of such stimulus, in concert with monetary policy accommodation, to stabilise economic and financial market conditions, and even to support improved corporate profitability.²⁹

While non-financial corporate bond outstanding to GDP ratios have been lower compared to sovereign or financial corporates, indebtedness levels of non-financial corporate have grown the most, particularly in EMEs. The highest ratios prevail in the United States and China in 2018 at around 30% and 25% of GDP respectively. Non-financial corporate bond outstanding to GDP ratio is also elevated in the United Kingdom at 17% of GDP while it is lower in Japan and in the Euro Area. Nevertheless, there is high heterogeneity across European economies, non-financial corporate bond outstanding to GDP ratios ranging between 35% in Luxembourg and nearly 0% in Greece in 2019, i.e. such low levels in certain economies are due in part to the reliance on borrowing from banks and through the syndicated loan markets. Accommodative monetary policies and increasingly benign credit conditions were meant to create favourable financing conditions for corporate issuers, thereby allowing businesses to reinvest excess cash flows into productive businesses. However, these policies also incentivised businesses to take on additional corporate debt and restructure balance sheets to engineer higher returns to equity.

Debt sustainability, risk associated with exuberance in debt markets and main drivers

Leverage and debt sustainability of sovereign, corporates and financials

Over the last two decades, the outstanding amount of debt has risen globally to their highest levels on record – and notably for sovereign and non-financial corporates. Main concerns are arising from increasing levels of indebtedness combined with high leverage in a context of weakening economic environment which may complicate the path of debt sustainability.

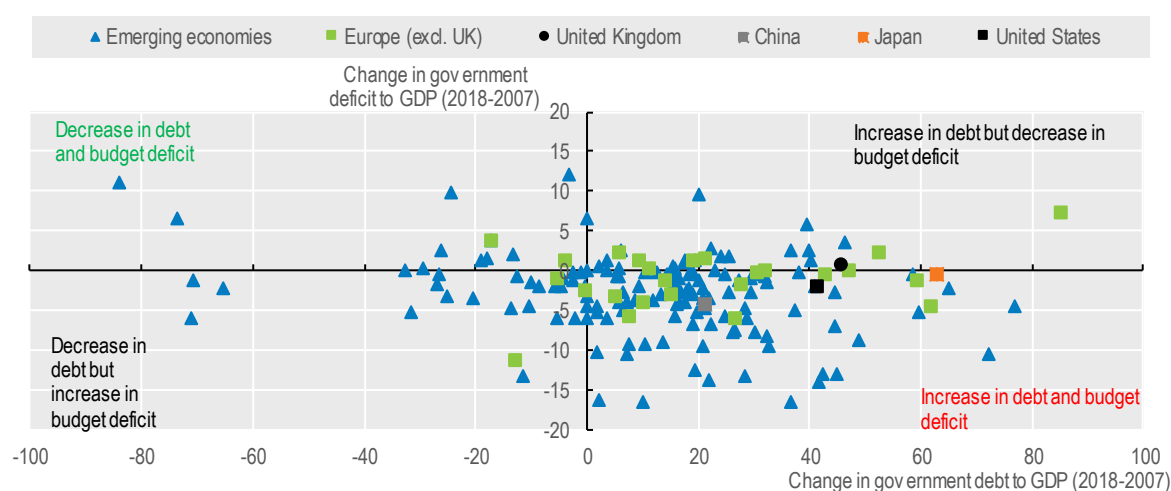
There has been a significant debate among economists whether there is a threshold in the level of sovereign debt-to-GDP above which a nation's medium-term economic growth prospects are dramatically compromised. Whether there is such a tipping point is of critical importance not just because of the historically high level of sovereign debt in many advanced economies, but also because of its implications for debt accumulation in all economies.³⁰ Unfortunately there is no consensus on the issue among researchers. Reinhart and Rogoff argue that there is a threshold effect: when debt in advanced economies exceeds 90% of GDP there is an associated dramatic worsening of growth outcomes.³¹ Others dispute the notion that there is such a clear threshold and suggest that it is weak growth that causes high debt rather than high debt that causes weak growth.³²

Increasing sovereign debt-to-GDP ratios combined with budget deficit can complicate the path of debt sustainability³³, particularly during a period of rising interest rates and financing costs across the yield curve. This is particularly the case where additional fiscal stimulus may be called upon a number of advanced and emerging market economies to support growth and adequate social safety nets. Evidence shows that adverse reactions in financial markets are likely in response to higher government debt and that such reactions may depend on the initial budget situation.³⁴ Most advanced economies exhibit sovereign debt-to-GDP ratios higher than 90% in 2018 while EMEs are facing lower levels of sovereign indebtedness.³⁵ Nevertheless, budget deficit of many advanced and emerging market economies has deteriorated in 2018 compared to 2007 (Figure 3.4). It is worth notice that the economies

with the highest levels of sovereign debt-to-GDP have experienced the highest increase in debt-to-GDP and budget deficit from 2007 to 2018 (Table 3.1).

The key risk of high sovereign debt is that it exposes a sovereign country to the risk that repayments could become unsustainable, either due to resource or political constraints.³⁶ However, even where debt is high but sustainable, market cost of refinancing debt could impose higher costs to the government budget, and could raise the price of debt across all domestic issuers, including local governments and other municipal issuers, corporates, and households. The relatively low sovereign debt in most EMEs gives more buffer against a potential economic downturn, enabling policy makers to use expansionary fiscal policy to support demand. But weak fiscal positions of EMEs – from Argentina to China – may complicate the efficacy of additional fiscal stimulus during a protracted downturn. Prolonged low levels of interest rates – with further Federal Reserve and ECB monetary policy easing over summer or autumn 2019 is weakening such immediate pressures of debt rollover risk. But a major issue is rising incentives for economies to take out even more debt at very a low cost.

Figure 3.4. Sovereign debt and budget deficit to GDP for selected economies, 2007-2018



Note: These figures show sovereign debt and deficit in percent of GDP of 195 economies in 2007 and 2018 respectively. Europe (excl. the UK) includes the following economies: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovak Republic, Slovenia, Spain, Sweden and Switzerland.

Sources: IMF World Economic Outlook Database, OECD calculations.

Table 3.1. Global change in sovereign debt and deficit to GDP, 2007-2018

Sovereign debt (% of GDP):	2018 sovereign debt (% of GDP)	Change in sovereign debt to GDP (2018-2007)	Change in sovereign deficit to GDP (2018-2007)
<100%	134	46	-4
> 50% and <100%	68	16	-3
<50%	33	3	-2

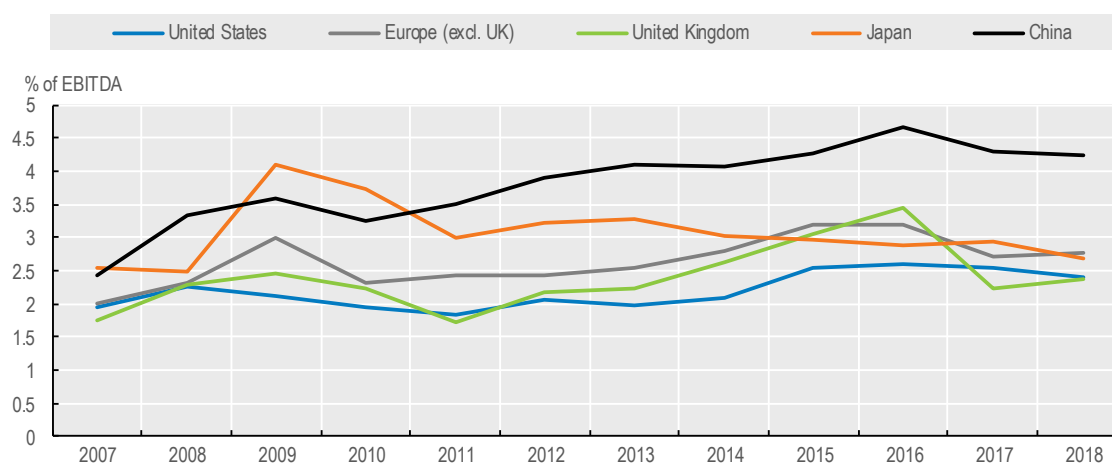
Note: These figures show change in sovereign debt and deficit in percent of GDP of 195 economies in 2007 and 2018 respectively. All figures are expressed in percentages.

Source: IMF World Economic Outlook Database, OECD calculations.

Similar concerns relate also to non-financial corporates facing elevated levels of indebtedness and leverage. Deteriorating credit quality over the recent years could pose a risk to financial stability in a weakening economic environment.³⁷ In fact, potential risks may crystallise with an increase in losses due to higher corporate defaults that would erode the resilience of debtholders. China exhibits the highest ratios of total debt to EBITDA at 4.3 in 2018, and is considerably higher than Japan, Europe, United States and the United Kingdom (Figure 3.5). Overall, the most notable increases in leverage by economic sector prevail for utilities, energy, telecommunication services and technology from 2007 to 2018 in the United States, Europe, Japan and China. Leverage has decreased in the industrial sector but increased in the healthcare sectors in the United States, Europe and Japan (Figure 3.6). Leverage of the basic materials sector has increase both in China and in the United States.

Even though interest rates have remained low for a prolonged period, solvency risks associated with high debt have increased due to the current global slowdown, which is likely to reduce firms' revenue growth.³⁸ Corporate stress could trigger a change in investors risk appetite and result in widespread sell-offs in corporate bonds. Even limited market shocks have the potential to produce large price corrections because non-investment-grade corporate debt is typically much less liquid. The current rating composition in corporate bond markets may also increase the risk of fire-sales, as a high share of corporate bonds is rated just above the non-investment grade.³⁹ If these bonds are downgraded to the non-investment grade, those institutional investors who are bound by rating-based regulatory requirements will be obliged to sell them to comply with internal investment policies.

Figure 3.5. Non-financial companies' debt to EBITDA ratio for selected economies, 2007-2018



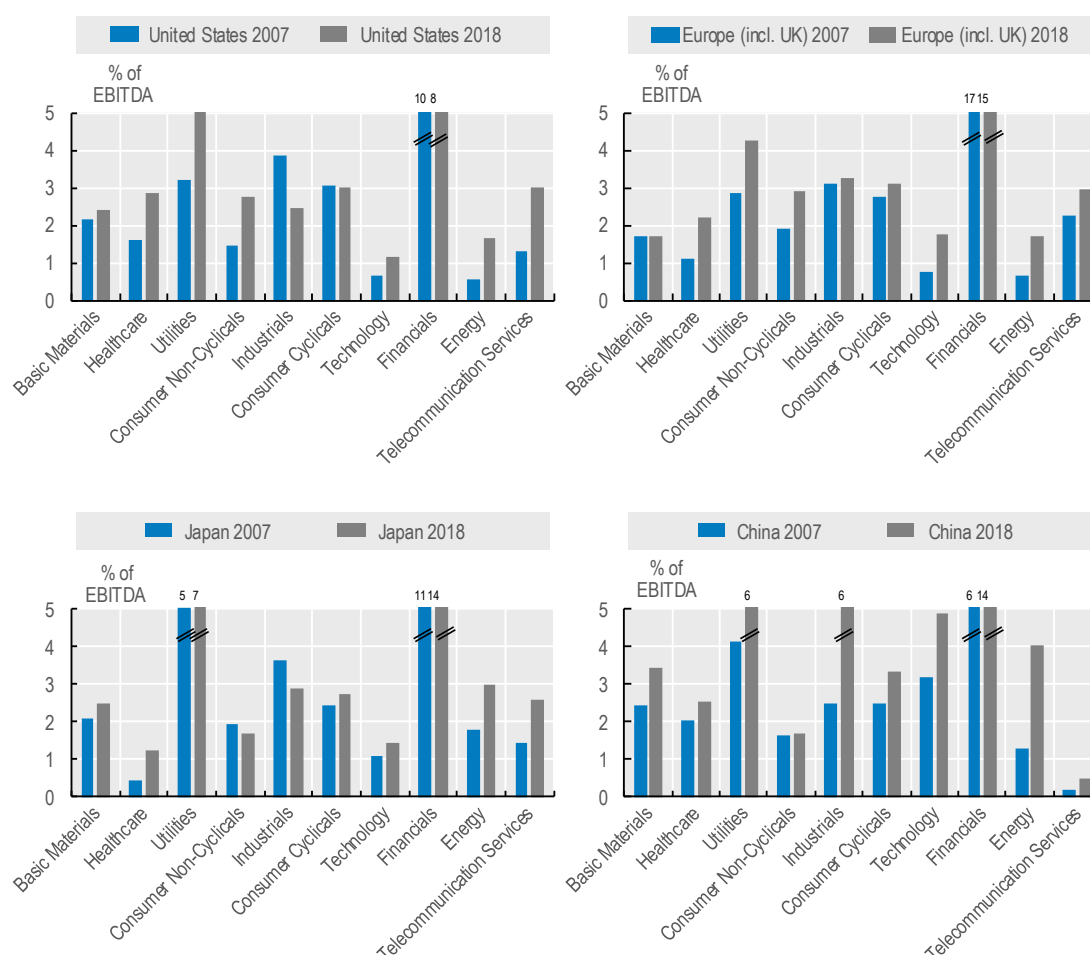
Note: EBITDA represents income before interest, taxes, depreciation and amortisation. Total debt includes loans and short and long-term bonds. Financials companies listed in S&P 500, STOXX 600 and Thomson Reuters Japan and China equity indices are excluded. Annual consolidated financial statements are collected on an annual basis, at the firm level and in current USD. The current primary source of this information is Refinitiv and some data are extracted from Bloomberg. All variables are trimmed at the 1st and 99th percentile levels to reduce the effect of outliers.

Source: Refinitiv, OECD calculations.

The historically high level of business debt and the recent concentration of debt growth among the riskiest firms could pose a risk to the sustainability of those firms and, potentially, their creditors. The most risky firms are also the ones most likely to be financially constrained. Hence, their investment and employment are particularly vulnerable to a widening in corporate debt spreads and a tightening in lending standards. Even without a sharp decrease in credit availability, any weakening of economic

activity could boost default rates and lead to credit-related contractions to employment and investment among these businesses. Moreover, existing research suggests that elevated vulnerabilities, such as excessive borrowing in the business sector, increase the downside risk to broader economic activity.⁴⁰

Figure 3.6. Non-financial companies' debt to EBITDA ratio for selected economies and economic sectors, 2007 versus 2018



Note: EBITDA represents income before interest, taxes, depreciation and amortisation. Total debt includes loans and short and long-term bonds. Financials companies listed in S&P 500, STOXX 600 and Thomson Reuters Japan and China equity indices are excluded. Annual consolidated financial statements are collected on an annual basis, at the firm level and in current USD. The current primary source of this information is Refinitiv and some data are extracted from Bloomberg. All variables are trimmed at the 1st and 99th percentile levels to reduce the effect of outliers. Economic sector classification is based on Refinitiv sectoral categorisation.

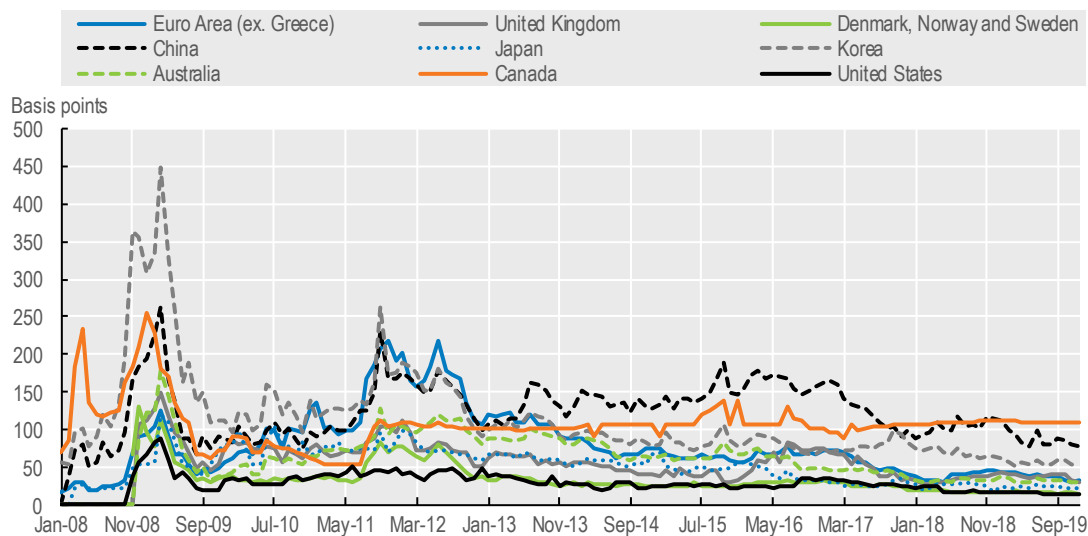
Source: Refinitiv, OECD calculations.

Fall in market credit risk pricing and the consequences of low rates on debt build-up

While outstanding amounts of sovereign and non-financial corporate debt and leverage have risen globally to their highest levels on record, risk pricing has fallen back to pre-crisis levels. This divergence in risk and asset valuations raises concerns over the level of exuberance of credit intermediation.

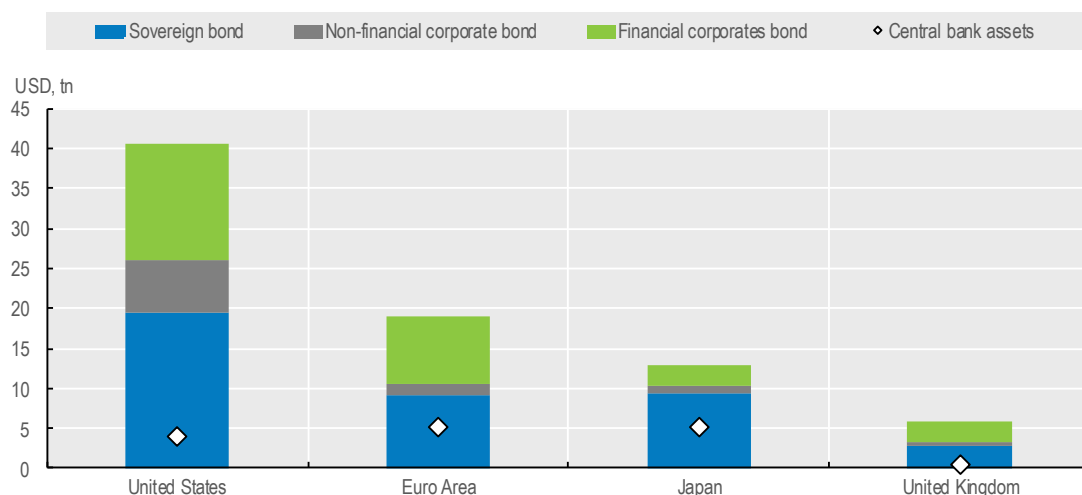
Sovereign bond spreads have decreased to historically low levels in 2018-2019 (Figure 3.7). In December 2018, average spread is at 78 basis points while it was peaking at 1106 basis points on June, 1st 2012. Prior periods of rising sovereign debt and high or rising deficit spending have increased market risk premia to compensate for additional risks. These phenomena can be seen clearly in the Latin American debt crisis, European peripheral sovereign-banking crisis earlier this decade⁴¹, several Asian countries during the Asian financial crisis, and idiosyncratic cases such as Russia, and Eastern Europe.

Figure 3.7. Sovereign bond spread for selected regions, 2008-2019



Source: Refinitiv, OECD calculations.

Figure 3.8. Total bonds outstanding and held at central banks for selected economies, 2019



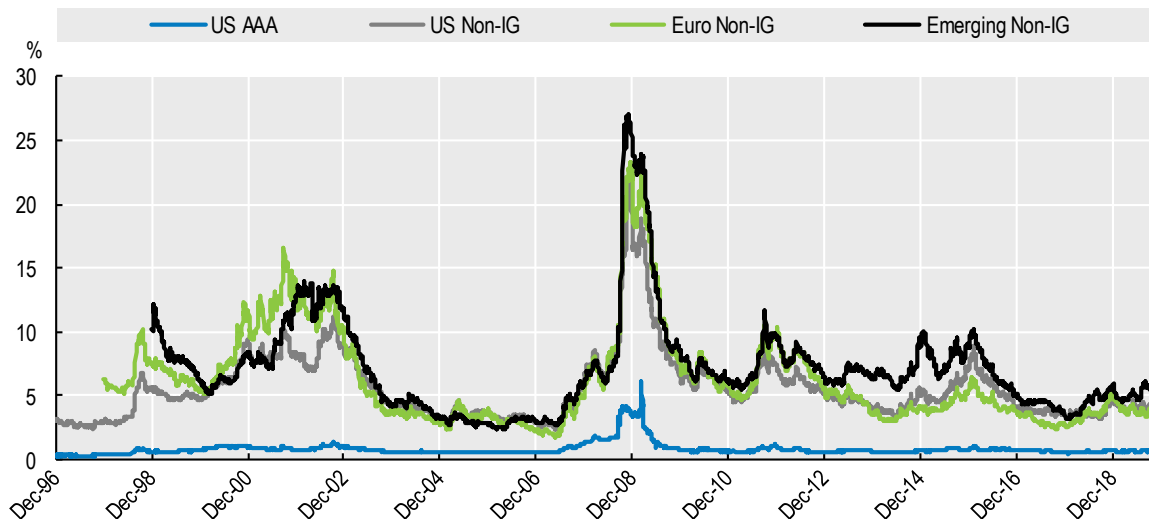
Note: This figure shows total bond outstanding by type of issuers in selected advanced economies in 2019. It also includes total assets of central banks in these jurisdictions that represent a fraction of these outstanding bonds.

Source: Refinitiv, Bank of International Settlements, OECD calculations.

Numerous assessments of post-crisis monetary and fiscal policies draw a relationship between highly accommodative policies and the rise in debt. By design, central bank policies, including bond and asset-backed securities purchases, sought to lower yields and spreads to lower refinancing costs in the real economy. As such, central banks have massively increased their bond holdings, and now hold material amounts of fixed income markets in their respective jurisdictions (Figure 3.8). In 2019, central bank assets represent a substantial share of sovereign bond market in the Euro Area (58%) and Japan (56%) while it is more moderate in the United States (22%) and the United Kingdom (24%).

Similarly, corporate bond spreads have fallen to historically low levels over the period 2011-2019 (Figure 3.9). In 2018-2019, average spreads of speculative grade bonds decreased to 5%. In a low interest rate environment, narrower non-investment grade corporate bond spreads are lowering funding cost of low credit quality borrowers. Nevertheless, concerns are rising on credit risk pricing valuation of new issued high-yield credit assets.

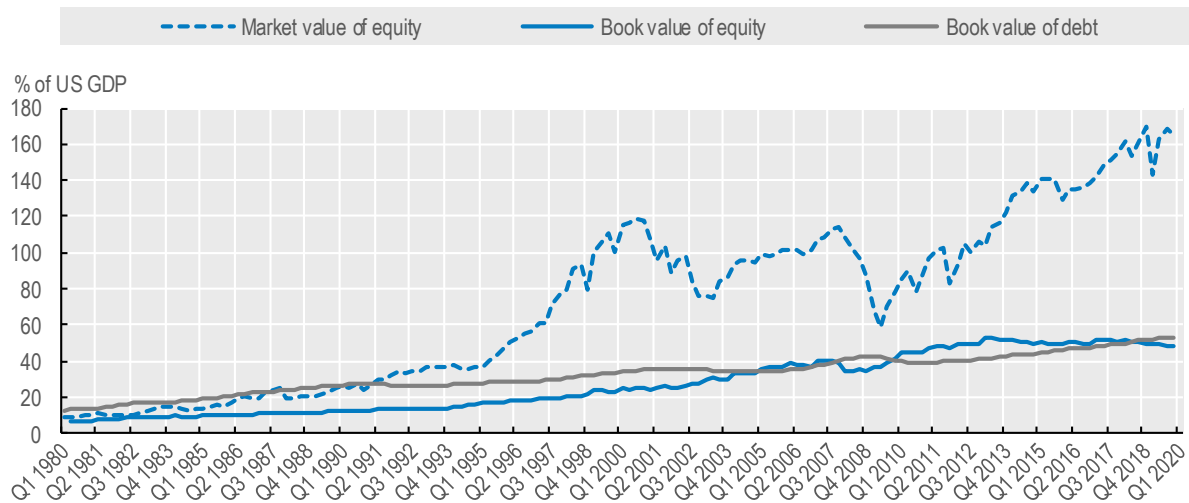
Figure 3.9. Corporate bond spread for selected regions, 1996-2019



Source: Refinitiv, OECD calculations.

Given concerns over substantial build-up of debt of non-financial corporations amid narrowing credit spreads throughout much of the post-crisis era, actual developments of equity financing should be analysed. Over the last 50 years, non-financial corporates' market value of equity to GDP ratio exceeds book value to GDP ratio (Figure 3.10).⁴² Equity markets have grown substantially while they have fluctuated widely around some major crisis episodes (i.e. mainly the dotcom crisis in the early 2000s and the GFC in 2008) – but have experienced a strong recovery since 2009. Nevertheless, the book value of equity has increased much more moderately and is even decreasing as a share of GDP in the US. In contrast, corporate indebtedness is continuously growing over the post-GFC period. This has been due in part to the use of debt to engage in share buybacks and higher dividends, which reduces equity buffers by returning cash to shareholders.

Figure 3.10. Historical equity and debt to GDP ratios of US non-financial corporates, 1980-2019



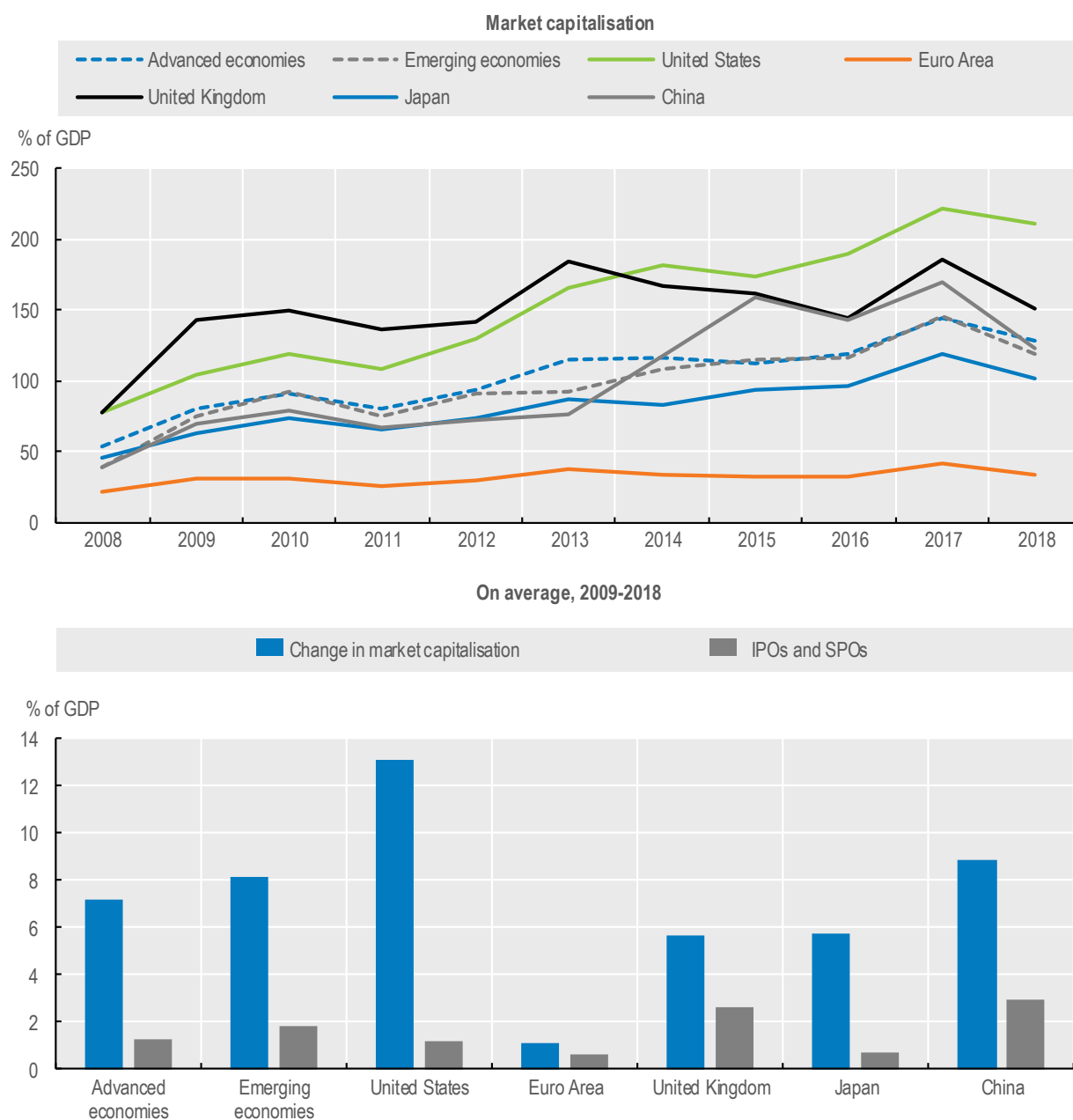
Note: This figure shows US non-financial corporate equity market value and book value of equity and non-financial corporations' debt securities and loans as a share of US GDP. Market value in USD and price-to-book value ratio of Datastream US Market index have been used to calculate market value and book value ratios as a share of US GDP.

Source: Refinitiv, Federal Reserve Bank of St Louis, OECD calculations.

Equity markets have recovered from the GFC in many economies across the globe following a continuous up-ward trend (Figure 3.11). Notably, equity markets in the United States, the United Kingdom and China have experienced the highest growth while expansion has been much slower in European equity markets. Nevertheless, such strengthening in the value of equity financing has been mainly driven by equity price valuations both in advanced and emerging market economies. In fact, average ratio of the change in market capitalisation to GDP substantially exceeds average IPOs and secondary public offerings (SPOs) issuance to GDP. This trend is particularly prevalent in the United States and Japan. The greatest relative contribution of IPOs and SPOs issuances to equity market growth relate to the United Kingdom, the Euro Area and China. This suggests some exuberance in equity markets characterised by limited issuances while equity price valuation is appreciating.

The non-financial corporate price-to-book value ratio is also a relevant indicator of the valuation of equity financing comparing market versus actual book value of equity. It indicates the extent to which an increase in the market value of equity relates to overall increase in market prices or to an increase in book equity. Non-financial corporate price-to-book ratios are the most elevated in the United States since 2014 – with a ratio around 2 – while it is more moderate in the Euro Area and the United Kingdom at around 1.3 (Figure 3.12). This suggests that high levels of debt financing are cushioned by strong equity base in certain countries while some others are more leveraged with limited equity buffers.

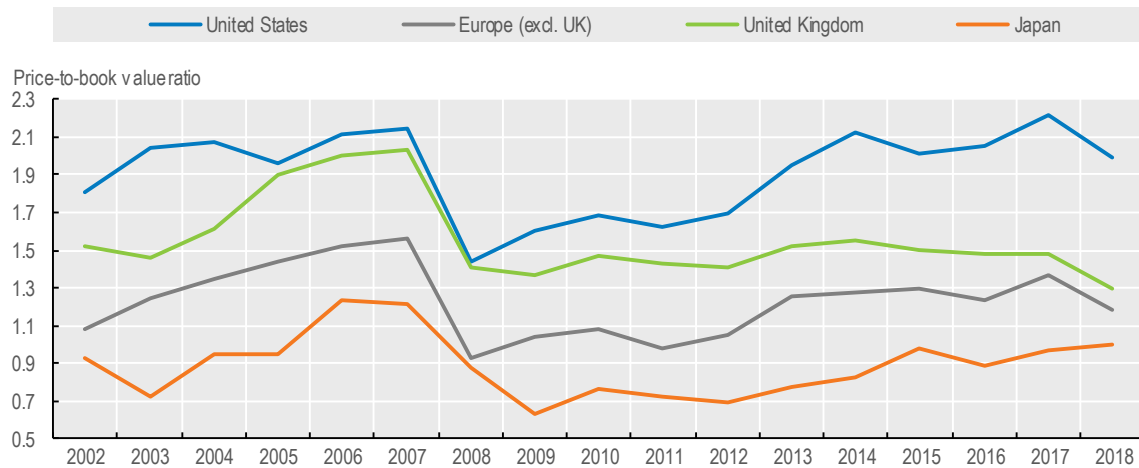
Figure 3.11. Evolution of equity markets, IPOs and SPOs issuances of selected economies, 2008-2018



Note: Top panel chart shows augmented equity market capitalisation, adding change in market capitalisation from previous period and current capital raised through shares issues (i.e. through IPOs or SPOs). All figures are expressed in percent of GDP. Average GDP ratios over the period 2009-2018 are shown in bottom panel chart.

Source: World Federation of Exchanges, OECD calculations.

Figure 3.12. Non-financial corporates price-to-book ratios of selected OECD economies, 2002-2018



Note: Price-to-book ratio is calculated as market capitalisation divided by total equity. Financials companies listed in S&P 500, STOXX 600 and Thomson Reuters Japan equity indices are excluded. Annual consolidated financial statements are collected on an annual basis, at the firm level and in current USD. The current primary source of this information is Refinitiv and some data are extracted from Bloomberg. All variables are trimmed at the 1st and 99th percentile levels to reduce the effect of outliers.

Source: Refinitiv, OECD calculations.

The combination of high levels of indebtedness, leverage, and aggressive market risk pricing may erode the debt sustainability of some leveraged issuers with limited equity buffers. A decade after excessive debt in the housing market contributed to the financial crisis and amid calls for more vigilant monitoring of systemic build-up of risks, widespread stress in the sovereign and corporate credit markets could draw public scrutiny to the effectiveness of post-crisis reforms.

In early 2020, high-yield credit markets are already experiencing acute stress due to the economic consequences from the Covid-19 pandemic. Credit spreads on lower rated issuers widened abruptly by over 400 basis points, more than doubling the interest expense rate for issuers that much refinancing under such conditions. A spike in credit financing costs for high-yield issuers, should the spike in credit financial costs persist in the medium-term without appropriate policy responses, would test the resilience of highly indebted corporate issuers.¹

Our analysis illustrates that financial intermediation has been more oriented to debt financing rather than to equity in the post-crisis era. Given the forces that shifted a larger portion of higher-risk debt into non-bank intermediaries, greater scrutiny of the functioning and resilience of market-based finance is warranted, and is the purpose of the remainder of this note.

¹ While beyond the scope of this note, internal simulations by OECD staff and also stress tests by academia indicate that the prolongation of credit spreads at levels experienced in 1Q2020 would result in a much higher level of vulnerable firms, including so-called zombie firms, contributing to much higher likelihood of future elevated levels of corporate default and loss.

4. Global structure of financial systems and financial intermediation channels

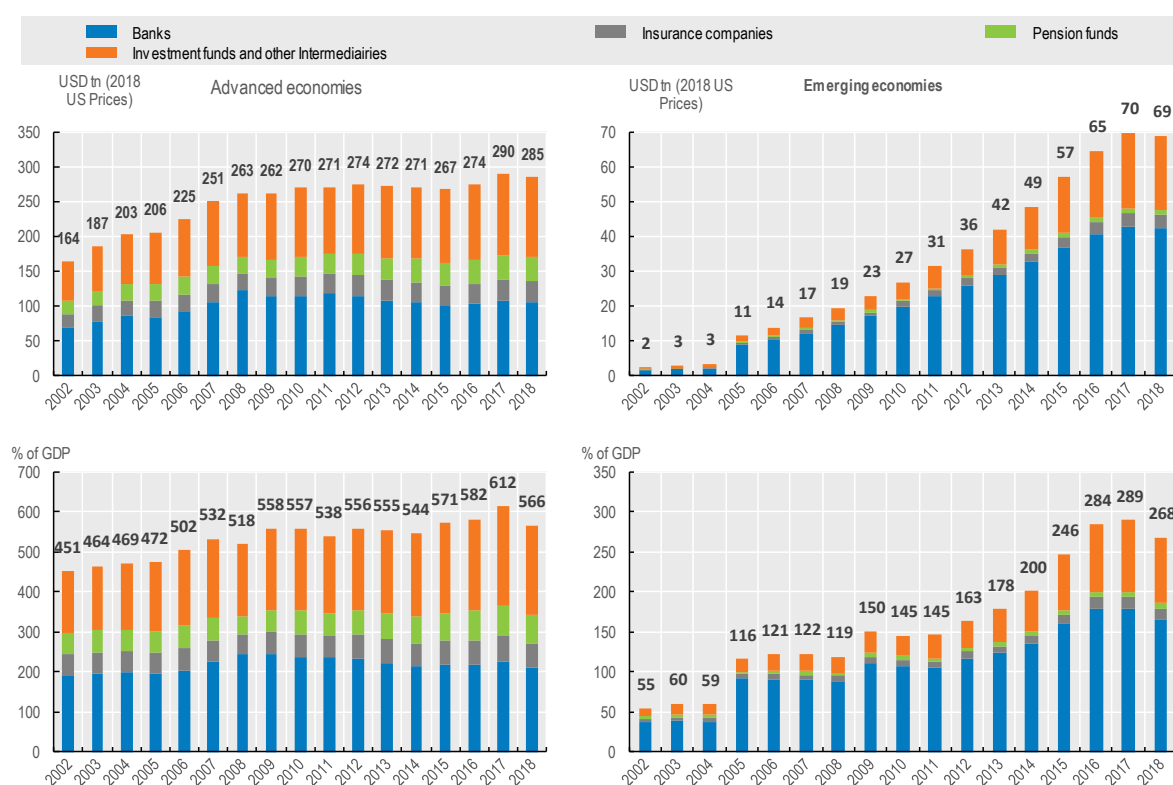
This section provides an overview of key global trends in financial intermediation, with an emphasis on non-bank financial intermediation. Reflecting the data collected and the desire for consistency across jurisdictions, the macro-mapping categories and type of asset classification are defined in annex A. The main purpose is to assess the extent to which banks and non-banks contributed to the growth of credit highlighted in the prior section; explore how the several types of non-bank financial institutions are increasingly involved in credit intermediation; and, determine their main characteristics that have fostered this shift.

Overview of trends

On an international scale, over the last two decades, the structure of the financial sector has undergone profound changes with the rise of market-based finance. The GFC, while disrupting global financial intermediation, did not weaken the expansion of the financial sector.

Since 2000, total assets of the financial sector has continuously increased in USD terms both in advanced and emerging market economies, reaching a peak of USD 285 and 69 trillion by end-2018 respectively (Figure 4.1).⁴³ The size of the financial sector compared to the overall size of the economy is much higher in advanced economies compared to EMEs but the speed of increase in the size of the financial sector has been higher in EMEs. During the post crisis era, financial assets to GDP grew from 500% in 2006 to over 570% in 2018 in advanced economies and from 120% in 2006 to 270% in 2017 in EMEs. In advanced economies, this growth has been mostly driven by the expansion of non-bank financial sector (Figure 4.2). While in EMEs, both bank and non-bank financial sectors have expanded, banks are still dominating the financial sector. This suggests that EMEs are still bank dependent and non-bank financial sector is at preliminary stage in its development questioning the current role of non-bank financial sector in supporting sustainable growth.

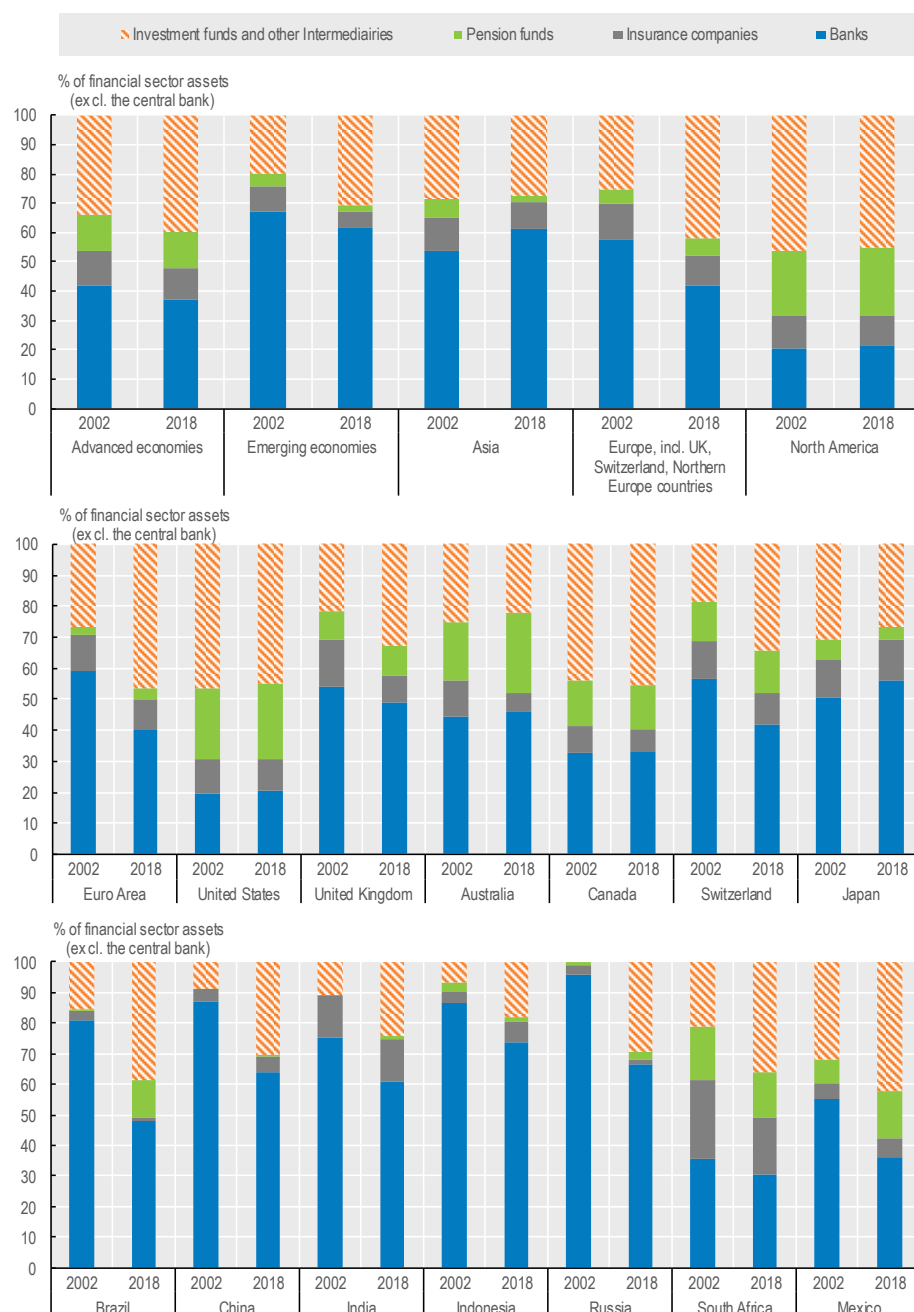
Figure 4.1. Size of the financial sector and total assets by type of institutions, 2002-2018



Note: National sector balance sheet data for 47 economies are used in this chart. This figure presents a detailed breakdown of total assets of the several components of the financial sector (excluding the central bank). Investment funds include money-market funds and other (i.e. non-money market) investment funds. Other intermediaries include financial auxiliaries, captive financial institutions and money lenders and other financial intermediaries (i.e., financial corporations engaged in securitisation of assets, securities and derivatives dealers, financial corporations engaged in lending and specialised financial corporations). Aggregate data are presented in 2018 USD adjusted by US CPI or as a share of GDP. Reflecting the data collected and the desire for consistency across jurisdictions, the macro-mapping categories and type of asset classification are defined in annex A.

Source: Financial Stability Board 2018 Shadow Banking Monitoring Report, OECD Financial Account database, IMF World Economic Outlook Database, OECD calculations.

Figure 4.2. Evolution of the structure of the financial sector by region and selected economies, 2002 versus 2018

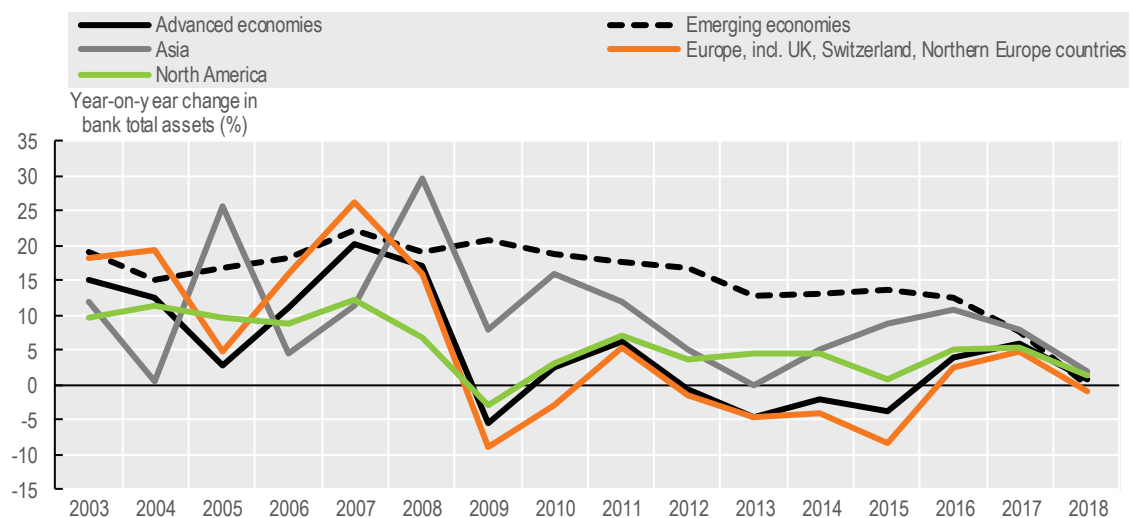


Note: National sector balance sheet data for 47 economies are used in this chart. This figure presents a detailed breakdown of total assets of the several components of the financial sector (excluding the central bank). Investment funds include money-market funds and other (i.e. non-money market) investment funds. Other intermediaries include financial auxiliaries, captive financial institutions and money lenders and other financial intermediaries (i.e., financial corporations engaged in securitisation of assets, securities and derivatives dealers, financial corporations engaged in lending and specialised financial corporations). Reflecting the data collected and the desire for consistency across jurisdictions, the macro-mapping categories and type of asset classification are defined in annex A.

Source: Financial Stability Board 2018 Shadow Banking Monitoring Report, OECD Financial Account database, OECD calculations.

The share of banks has notably declined in Europe over the period 2002-2018, as many banks have had to deleverage due to the need for balance sheet strengthening, or otherwise mandated by ECB-EC-IMF adjustment programs. Growth of European banks' total assets has been negative in 2009 and over the period 2012-2015 (Figure 4.3). This downward trend is also observed in EMEs such as Brazil, China, Russia, Mexico, India and Indonesia. Growth of bank's total assets has been decreasing since 2009 onwards also in Asia, North America and emerging market economies. Regulatory reforms and higher capital and liquidity constraints on large banks following the GFC may have also contributed to a shift of lending to market-based finance where the application of macro-prudential tools is more limited.

Figure 4.3. Change in bank total assets for selected region, 2002-2018

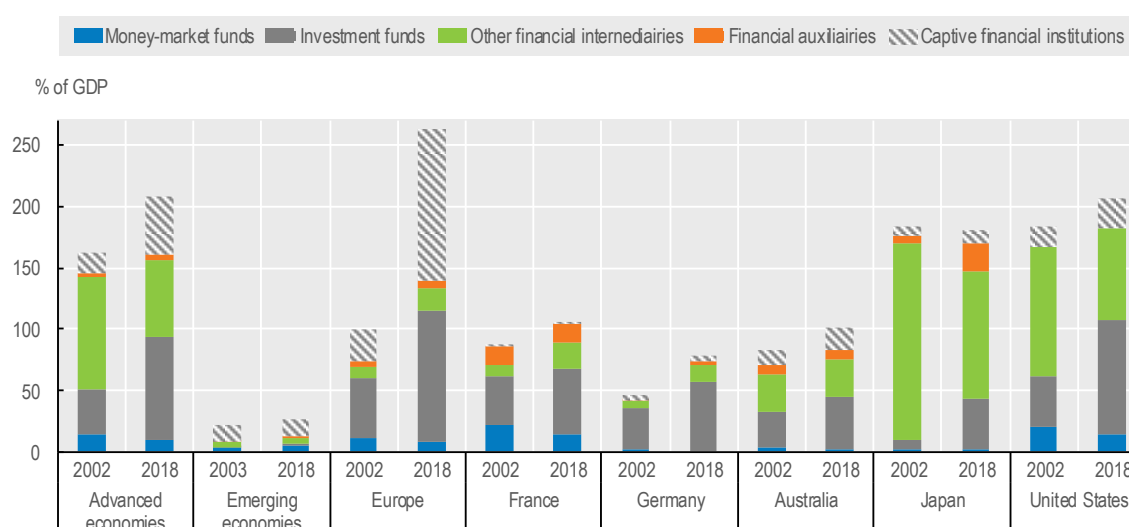


Note: National sector balance sheet data for 47 economies are used in this chart. This figure presents the year-on-year percent change in aggregate bank total assets. Reflecting the data collected and the desire for consistency across jurisdictions, banking institutions included and total assets are defined in annex A.

Source: Financial Stability Board 2018 Shadow Banking Monitoring Report, OECD Financial Account database, OECD calculations.

In parallel, the share of investment funds and other intermediaries⁴⁴ has increased as a share of GDP both in advanced and emerging market economies with a certain degree of heterogeneity across economies. In advanced economies, this increase is more pronounced in Europe driven by the rise in captive financial institutions (Figure 4.4). In the United States, a shift occurred with an increase in the shares of investment funds and captive financial institutions while the shares of MMFs and other financial intermediaries have contracted compared to levels in 2002. Similar trends prevail in Australia, Japan and Europe with an increase in total assets of investment funds and other intermediaries. Given the strong demand for money market funds as short-term rates increased substantially in the lead-up to the financial crisis, the very low rate environment has contributed to this decline. Also, some market assessments suggest that the reform of MMFs following the crisis, and the use of floating rate net asset value on certain funds, has contributed to a shift to investment funds.

Figure 4.4. Total assets of investment funds and other financial intermediaries, 2002 versus 2018

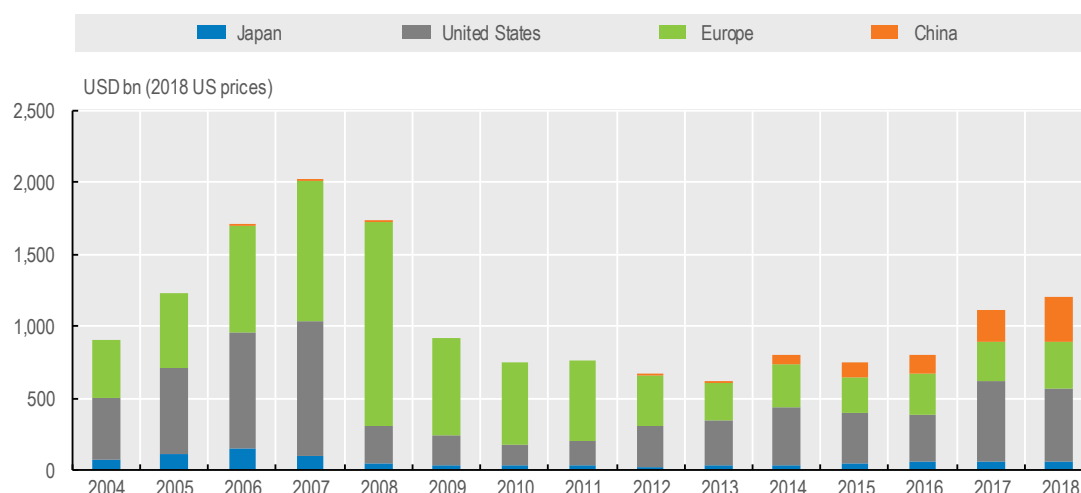


Note: National sector balance sheet data for 47 economies are used in this chart. This figure presents a detailed breakdown of total assets of the several types of funds. Other financial intermediaries include financial corporations engaged in securitisation of assets, securities and derivatives dealers, financial corporations engaged in lending and specialised financial corporations. Reflecting the data collected and the desire for consistency across jurisdictions, the macro-mapping fund categories and type of asset classification are defined in annex A. Source: Financial Stability Board 2018 Shadow Banking Monitoring Report, OECD Financial Account database, OECD calculations.

Following the GFC, the major collapse of asset-backed securities markets and the low interest rate environment with expansionary monetary policies around the world, led investors searching for yield and they became willing to transition from low-yielding MMF to higher-risk investment funds that provide higher yield. The decline in asset-back securities markets are reflected in securitisation issuance which have fallen drastically in Europe, Japan and United States since 2008 (Figure 4.5). In EMEs, the share of investment funds and other intermediaries has increased from 20% to 31% largely driven by rises in many economies such as Brazil, China, India, Indonesia, Russia, South Africa and Mexico. In the case of China, the securitisation market is expanding since 2012 and investment funds and other intermediaries (which are including securitisation vehicles but relevant data cannot be isolated for these entities) are expanding their balance sheet by also buying asset-backed securities.

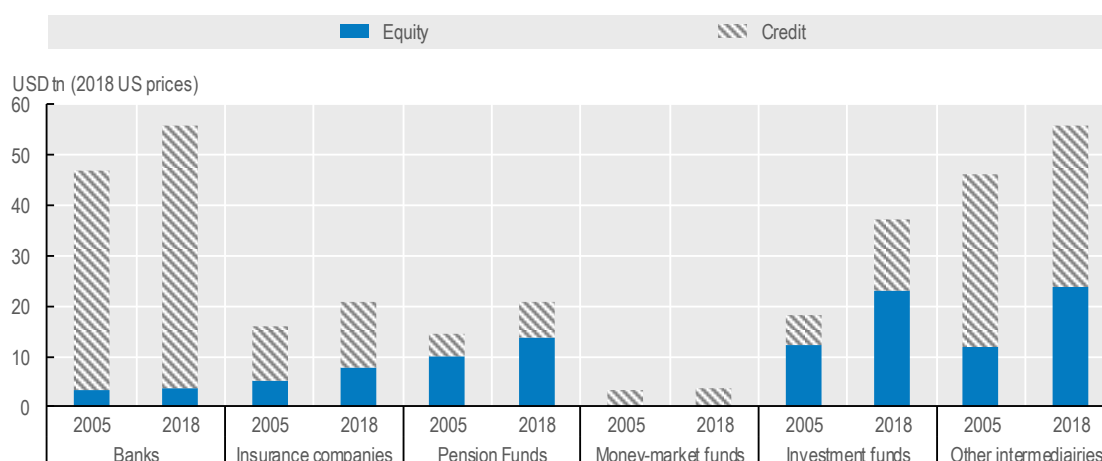
A focus on detailed asset allocation of the several financial institutions reveals that balance sheet composition between debt and equity has shifted over the post-crisis period. Several institutions types show relative stability in growth and composition, including banks and insurance companies. However, others have experienced sharp growth, such that while the composition has not changed significantly, the contribution to overall credit expansion is notable. This is particularly the case for funds and other financial intermediations (Figure 4.6). Notably, the value of credit assets amounts to USD 122 billion in 2018, almost double the value of equity assets. Also, the value of equity assets held by financial institutions has doubled from USD 43 in 2005 to 72 billion in 2018. Also, this suggests that financial institutions have expanded their balance sheet over the past decade – buying more equity and debt securities – and have partially contributed to absorb higher marketable debt and equity issuances.

Figure 4.5. Securitisation issuance in selected economies, 2004-2018



Source: SIFMA, AFME, JSDA, CNABS, OECD calculations.

Figure 4.6. Asset allocation of selected financial institutions, 2005-2018



Note: National sector balance sheet data for 47 economies are used in this chart. This figure presents a detailed breakdown of equity and credit assets held by the several components of the financial sector (excluding the central bank). Reflecting the data collected and the desire for consistency across jurisdictions, the macro-mapping categories and type of asset classification are defined in annex A.

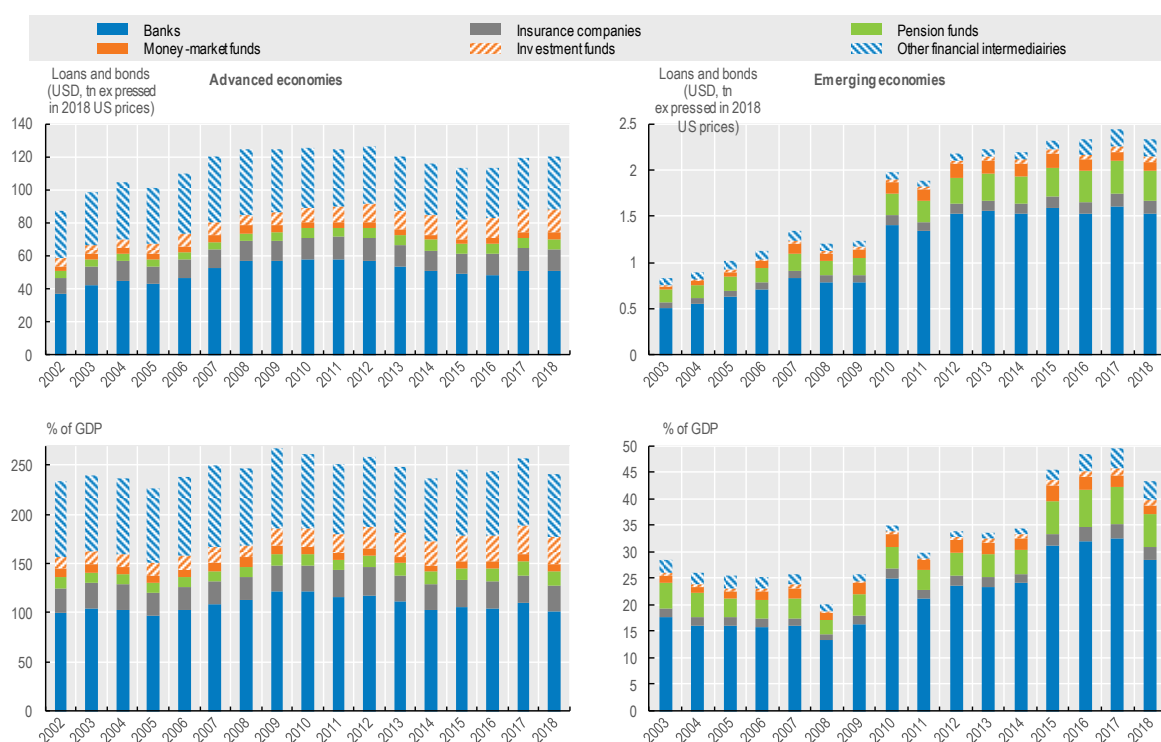
Source: OECD Financial Account database, IMF World Economic Outlook Database, OECD calculations.

The main underlying drivers of the increase in non-bank credit intermediation

The shift to non-bank financial intermediation in the aftermath of the GFC has been driven by several factors which differ depending on the type of financial institutions. Major strengthening in bank regulatory capital and liquidity requirements appear to have contributed to sluggish bank lending. However, other non-bank financial institutions – searching for yield in a low-interest-rate environment – have engaged in credit activities through direct mortgage lending or buying bonds and asset-backed securities, such as pension funds, insurance companies and investments funds.

The increase in reported credit assets by non-bank financial sectors – while the contraction of loans and bonds held by banks in advanced economies (Figure 4.7) – has resulted in part due to more stringent requirements in the aftermath of the GFC for banks which may have limited loans to companies and individuals (small and medium enterprises (SMEs) and large companies) in a number of economies. That growth in market-based credit intermediation has been beneficial, helping to mitigate the reduction in bank credit as the core banking system repaired balance sheets. In this context, entities other than banks have become more active in providing loans directly or taking on more exposures to higher-yield fixed income (including through investment in investment funds). This higher demand for high-yield credit assets is helping to absorb funding needs from borrowers which had no longer access to traditional bank funding but with more aggressive market pricing in a prolonged period of low interest rates.

Figure 4.7. Contribution of loans and debt securities by type of financial institutions in advanced versus emerging economies, 2002-2018



Note: National sector balance sheet data for 39 economies are used in this chart. This figure presents a detailed breakdown of credit assets held by the several components of the financial sector (excluding the central bank). Other financial intermediaries include financial corporations engaged in securitisation of assets, securities and derivatives dealers, financial corporations engaged in lending and specialised financial corporations. Reflecting the data collected and the desire for consistency across jurisdictions, the macro-mapping categories and type of asset classification are defined in annex A.

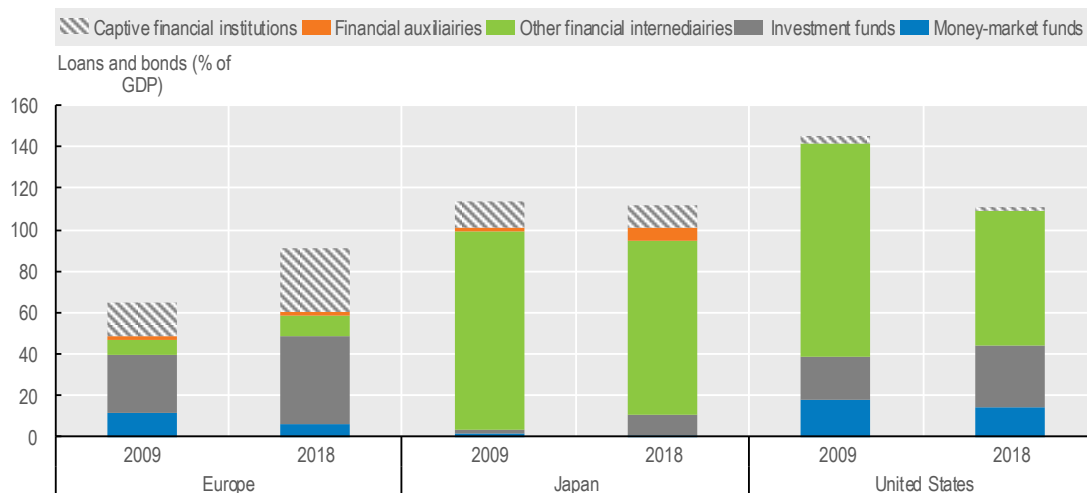
Source: OECD Financial Account database, IMF World Economic Outlook Database, OECD calculations.

Insurance corporations and pension funds have engaged in credit intermediation through the purchase of bonds or direct lending activities where allowed in the relevant regulatory regimes. They have also facilitated credit creation by providing credit enhancements or writing puts on credit assets (i.e., an institution writing a put option on a credit asset is agreeing to purchase a credit asset at a specified price, should the other party to the agreement choose to sell). Insurance companies and pension

providers have increased their lending to companies and individuals may be searching for yield in a context of prolonged low interest rates. In both cases, the main purpose is to build solid investment portfolios with high enough return strengthening pension funds and insurance companies' abilities to meet their commitments toward pension or insured recipients.

A key observation is also the rise of credit assets of investment funds and other intermediaries relative to GDP in Europe over the period 2007-2018 (Figure 4.8). Funds play an important role in channelling savings across diverse investors and institutions into an equally diverse range of investments. Investment funds and financial intermediaries are managing their asset portfolio on the on behalf of their clients who wanted increasing exposure to high-yield assets to boost their investment return. Focusing on Europe, the highest increases in the share of bond and loan portfolio relate to captive financial institutions and investment funds. In the United States and Japan, it is the share of bonds and loans held by investment funds which has grown the most. However, shares of bonds and loans held by money-market funds and other financial intermediaries have dropped in 2018 compared to levels in 2009. Such decline may be associated with the fall in securitisation assets as other financial intermediaries typically include financial corporations engaged in the securitisation of assets, security and derivative dealers, financial corporations engaged in lending, and other specialised financial corporations. Among other advanced economies such as Denmark, Korea, New Zealand and Australia, the share of loans and bonds held by non-bank credit financial institutions accounted for a large share of GDP in 2018 (Figure 4.9). In these jurisdictions, the share of credit assets of MMFs relative to GDP is negligible while the shares of investments funds or other intermediaries are the largest.

Figure 4.8. Share of loans and debt securities held by investment funds and other financial intermediaries relative to GDP in Europe, Japan and the United States, 2009-2018

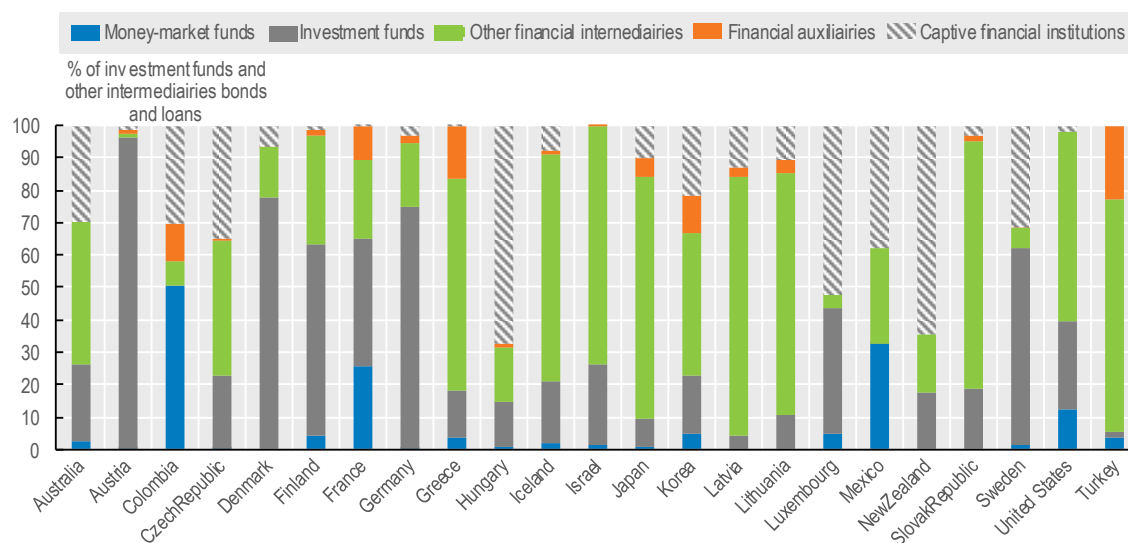


Note: National sector balance sheet data for 39 economies are used in this chart. This figure presents a detailed breakdown of credit assets held by the several types of funds. Other financial intermediaries include financial corporations engaged in securitisation of assets, securities and derivatives dealers, financial corporations engaged in lending and specialised financial corporations. Reflecting the data collected and the desire for consistency across jurisdictions, the macro-mapping fund categories and type of asset classification are defined in annex A. Source: OECD Financial Account database, IMF World Economic Outlook Database, OECD calculations.

In EMEs, the shares of bank and non-bank credit intermediation have increased, but the size of non-bank intermediation remains much smaller as a proportion of total financial intermediation, and relative to GDP. Banks remain the main source of credit in the economy; the share of bank holdings of bonds

and loans relative to GDP has increased from 16% in 2009 to 28% in 2018. The relative importance of non-bank credit intermediation is very heterogeneous across economies as some are more bank dominated and other more market oriented. Pension funds and other financial intermediaries have also notably increased their bond and lending portfolios over the past decade but they remained well under 10% in 2018.

Figure 4.9. Distribution of loans and debt securities by type of investment funds and other financial intermediaries in selected economies, 2018



Note: National sector balance sheet data for 39 economies are used in this chart. This figure presents a detailed breakdown of credit assets held by the several types of funds. Other financial intermediaries include financial corporations engaged in securitisation of assets, securities and derivatives dealers, financial corporations engaged in lending and specialised financial corporations. Reflecting the data collected and the desire for consistency across jurisdictions, the macro-mapping fund categories and type of asset classification are defined in annex A. Source: OECD Financial Account database, IMF World Economic Outlook Database, OECD calculations.

Overall, the rise in non-bank credit intermediation is characterised by the prominence of investment funds – which invest in bonds and loans from a wide range of sectors⁴⁵ – and coincides with the build-up of marketable debt and credit assets previously discussed in section 3. Most of the joint growth in non-bank credit intermediation, and sovereign and corporate debt outstanding, occurred in the United States and Europe. Bonds and loans held by investment funds and other intermediaries in the United States and Europe accounted for 64% of total credit assets held by investment funds and other intermediaries in advanced and emerging market economies in 2018, while the amount of bond outstanding in the United States and Europe was 41% of global total.

Over the post crisis, corporates have borrowed more from non-bank intermediaries and funds that invest in bonds or lend directly. Investments in bonds and loans enable funds and other financial intermediaries to further increase their portfolio diversification, and there is evidence that it can improve risk-adjusted returns of portfolios.⁴⁶ However, these activities, while entirely rationale from an investor perspective, in aggregate have contributed to credit exuberance and potentially a mispricing of credit and liquidity risk. The next section explores several areas in which sharp growth in forms of credit have coincided with the increased holding of such credit by forms of non-bank intermediation, thereby contributing to credit exuberance, potential mispricing, and greater levels of debt (in traditional or contingent forms).

5. Breakdown of the drivers of financial intermediation

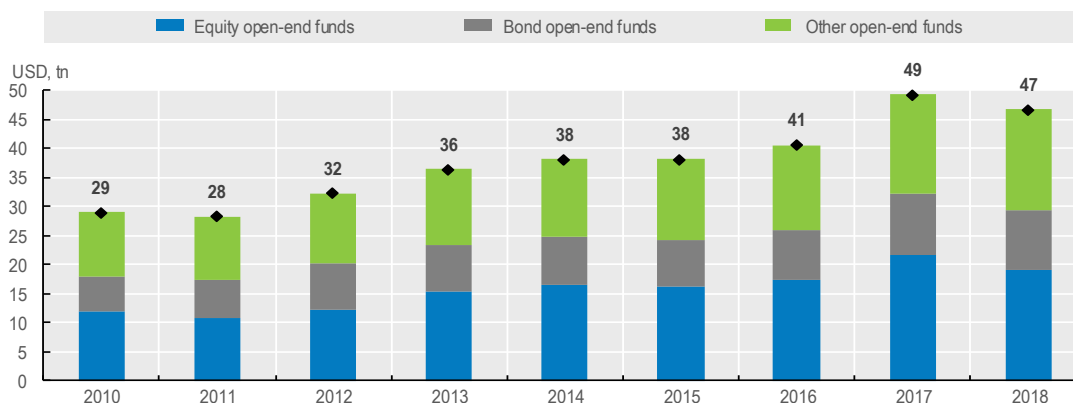
Building on the statistical assessment of the structural changes in global financial intermediation, this section will focus on several drivers of the shifts in credit intermediation in global finance, including investment funds, the growth of CLOs through leveraged loan investing and the rise of bank loss-absorbing contingent convertible capital.⁴⁷ These three areas illustrate several of the most prominent developments in which financial intermediation has given rise to credit risks and accompanying liquidity risks in financial systems in different parts of the world.⁴⁸

Focus on fund intermediation

Growth of bond funds

The growth of funds, and in particular funds holding fixed-income assets exclusively or as part of multiple-asset class portfolios, is a defining feature of the post-crisis structural shift in financial intermediation. Both bond and equity funds, in advanced and emerging market economies, have grown considerably over the past 15 years, and particularly since the crisis (Figure 5.1).

Figure 5.1. Total growth of equity and bond markets globally, 2003-2018



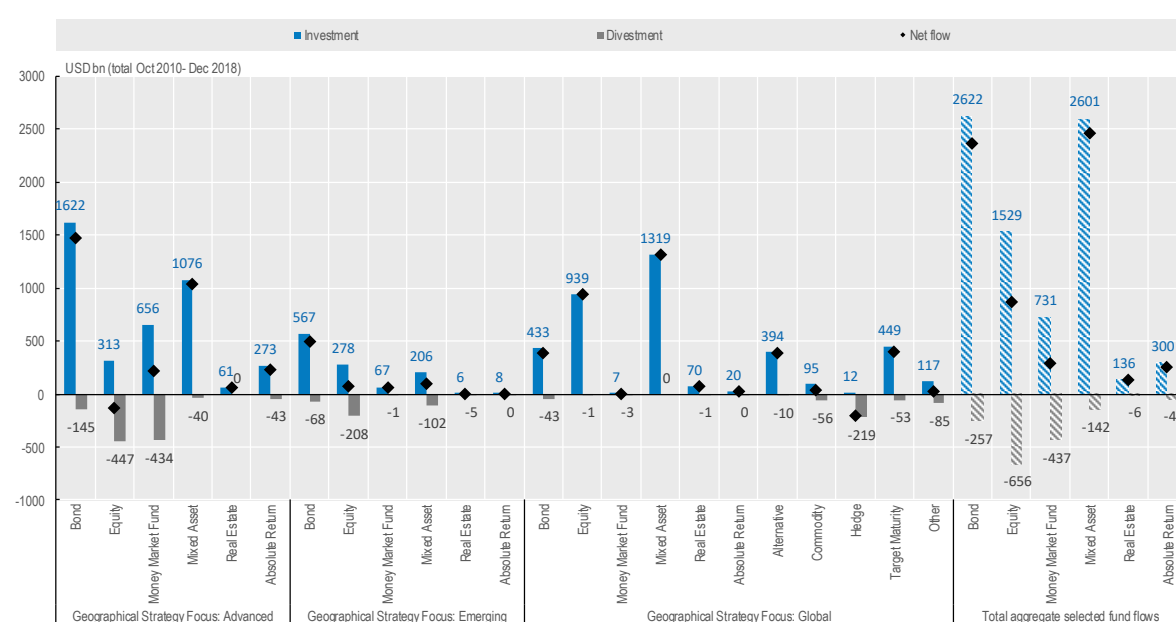
Source: Investment Company Institute, OECD calculations.

Moreover, the flows of these funds (Figure 5.2) illustrate that the growth of bond funds and mixed funds globally has been about USD 5 trillion on net over the past decade, whereas the growth of equity funds has been under USD 1 trillion, and money market funds, real estate funds and others have been about

USD 300 billion each. While this rise in bond holdings of funds is considerable, perhaps a more relevant question is how big this is relative to the total universe of bonds over this time.

As total debt securities have reached over USD 70 trillion in 2018, the total current holdings of bond and hybrid fund globally is about USD 16 trillion.⁴⁹ Assuming a substantial portion of these funds are bonds, one can assume between 15-20% of the entire global bond market is intermediated through bond and hybrid funds. Thus, while a substantial portion of the total increase in debt has been absorbed by funds, the vast majority of bond holdings remains with banks, broker-dealers, pension funds and insurers. Therefore, the risks associated with fund flows and their influence on bond prices needs to be further considered to understand the extent to which fund flows influence bond spreads.

Figure 5.2. Net fund inflows by fund investment strategy, 2010-2018



Note: This figure shows fund net-inflows in USD using monthly data with a global coverage over the period 2010-2018. Fund flow data are aggregated by investment strategies with regional (advanced versus emerging market economies) or global securities focus.

Source: Refinitiv, OECD calculations.

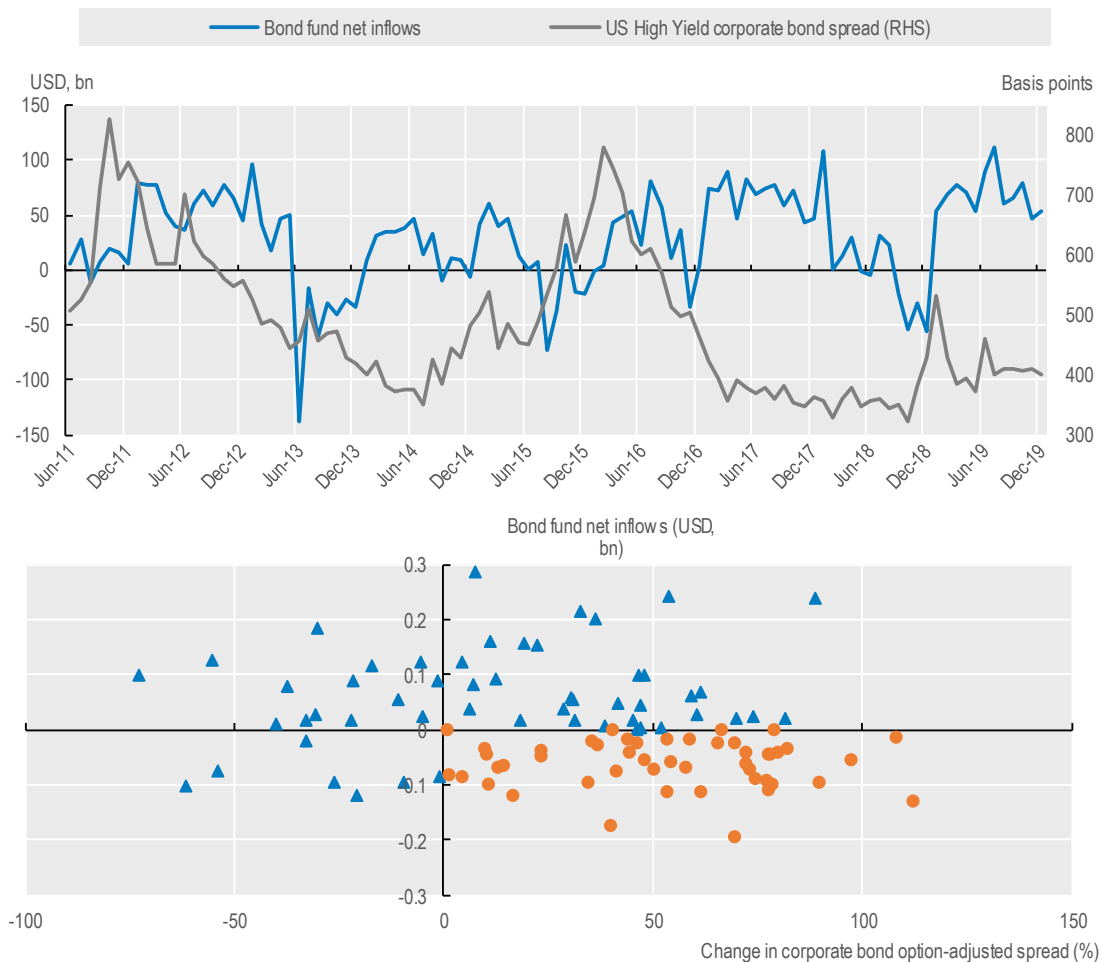
Risks associated with bond funds

There has been much debate about if and to what extent fund asset sales contribute to amplification of risks. Despite sharp declines in asset under management of particular funds that have faced reputational challenges, aggregate outflows from fund types (e.g. corporate bond funds) at their extreme have not been more than several percentage points of total fund assets, which is only itself a subset of total assets of that asset type held by investors. In light of these dimensions, to what extent can bond outflows contribute to corporate credit price movements?

To assess the extent to which this correlation may occur, this paper assesses the patterns between high-yield bond returns and spreads and periodic and cumulative net flows (Figure 5.3). While returns exhibited a low correlation, spread widening and outflows are correlated, albeit weakly. This does not suggest that net outflows trigger spread increases. It seems to illustrate that a material shift in which inflows decline and outflows grow occurs amid rising spreads. However, there are also times in which

outflows occur amid a period of stable or even declining credit spreads, which suggest that the overall demand for bond purchases from other investors, such as pensions and insurers, had an important effect. This highlights that any assessment of funds and prices must also consider the behaviour of other intermediaries and institutional investors.

Figure 5.3. High-yield US corporate bond spread and net inflows of bond fund, 2011-2018



Note: Top panel chart shows fund net-inflows in USD billion into bond funds globally and US high-yield corporate bond option-adjusted spread. Bond fund net-inflows are calculated using monthly data with a global coverage over the period 2011-2018. Fund flow data are aggregated by investment strategies with regional (advanced versus emerging market economies) or global securities focus. Bottom panel chart shows fund net-inflows in USD billion into bond funds globally and monthly percent change in US high-yield corporate bond option-adjusted spread over the period 2011-2018. Correlation between net flows and create spreads is -.21, such that there is a weak relationship between outflows and spread widening.
Source: Refinitiv, OECD calculations.

The behaviour of high-yield bond and leveraged loan funds during the market turmoil from the Covid-19 pandemic illustrates the extent of the co-movement of funds and the prices, driven by net flows, and the pricing of underlying assets. During first quarter 2020, some of the largest funds and ETFs investing in high-yielding credit and leveraged loans experienced losses over 20% on sharp credit spread increases of several hundred basis points amid heavy investor outflows. A number of funds were

required to suspend redemptions.⁵⁰ As leveraged loans and high-yield bonds are considered to be less-liquid assets, such that relatively small changes to low volumes of selling can impact prices. As such, sharp asset sales from funds and ETFs can put downward pressure on pricing during periods of heightened uncertainty where demand among institutional investors is tepid.

While it is more difficult to determine causation, a number of studies offer evidence that strong outflows could impact prices and create negative feedback dynamics that further depress the price in these markets.⁵¹ They illustrate that the bond markets through funds are correlated, such that herding is evidenced and can cause directional outflows, and also that declining returns in funds contributes to a second-order of selling out of funds. Under normal market conditions, supply and demand dynamics would suggest that when asset prices fall below some notion of intrinsic value, other investors would be attracted to absorb the liquidity risks and benefit from under-priced assets. However, market turbulence amid deteriorating macroeconomic and credit conditions -- such as in the case of the market dislocations related to the Covid-19 -- can give rise to heightened uncertainty between what constitutes credit and liquidity risk, which in turn could amplify stress in the financial system.⁵²

Implications

The implications of these findings are that abrupt changes in the outlook for rates and a deterioration in credit conditions is likely result in outflows from funds, all else equal, and that negative returns of funds would contribute to additional outflows which would amplify stress within and across credit markets. Indeed, a number of studies show that while bank interconnectedness has declined since the crisis, interconnections between intermediaries and markets through common holdings has increased, and may serve as a channel of contagion.⁵³ Should such stress occur amid a shift in central banks' reduction of assets as they exit from asset purchasing programmes, this could add to market pressures and a higher premia for credit and liquidity risks. At some level, and without considerable purchasing from other institutional investors, higher costs of refinancing would in turn impact overall financing conditions and creditworthiness of debt issuers in both the sovereign and corporate sectors.

Other assessments at the FSB and IOSCO have explained the attributes of funds that could give rise to risks due to structural vulnerabilities.⁵⁴ In light of this analysis, it is merely worth noting that some of the structural features of such funds could further contribute to amplification, such as the redemption features and an element of first mover advantage. Also, given that funds have shifted considerably into less liquid bond assets (corporate, municipal, leveraged loans and bank debt), the growing liquidity transformation appears to be the key shift that can increase the impact of fund outflows on prices during periods of uncertainty and stress. Moreover, given the high level of debt and aggressive pricing, the markets are much more prone to sharp corrections when central bank policies continue to normalise. Lastly, unlike banks or even leveraged institutions that must manage credit risks internally, many of the funds are passively managed against an index, or actively managed within tight tracking errors against an index, which suggests that the decision of the extent of exposure to credit risk amid growing macrofinancial imbalances resides with the end investor. Whether such investors are prudently assessing credit risks or simply expecting sufficient liquidity to exit when credit losses begin to rise is beyond the scope of this paper; however, there is ample anecdotal evidence that they believe fund liquidity allows them to exit at any time with little price impact, which in concept would discourage active credit monitoring. While this may be rationale for an individual investor, in aggregate it may give rise to a herding effect when weaknesses in credit conditions are exposed.

Beyond these observations, it should also be emphasised that the strong growth of assets under management in bond funds, particularly those that invest in corporate credit and leveraged loans, has resulted at least in part from investors' persistent reach for yield in a low rate environment. Consequently, low rates have incentivised corporate and sovereign issuers to increase debt levels,

which in turn supplies assets to meet fund demand. By contrast, balance sheet constraints of banks appears to have contributed to lacklustre supply of credit to corporates in many OECD countries. These mechanisms have been a defining feature of the interplay between monetary policy and bond funds in the post-crisis era.

Securitisation and CLOs

The second driver of risks -- highlighted in the statistical assessment of other financial intermediation - is with respect to securitisation and CLOs. From the work of the FSB, ESRB, and other bodies, it is understood that the intermediation includes finance companies, market intermediaries (broker dealers) and securitisation vehicles, among a host of smaller entities.

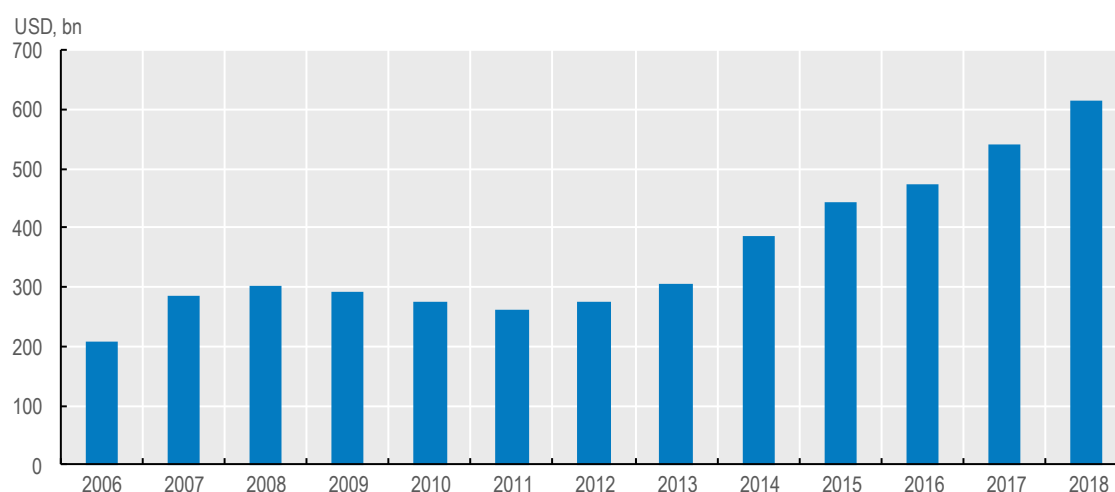
While overall securitisation has declined in the post-crisis era with the collapse of the CDO and subprime MBS markets, one segment that has undergone a resurgence is the market for collateralised loan obligations (CLO, Figure 5.4). As CLOs purchase leveraged loans syndicated by banks and non-bank arrangers and support financing for high-yield corporate borrowers, the next two subsections will assess the growth and risks of CLOs and the underlying leveraged loan markets.

CLOs

Overview

Collateralised loan obligations are structured vehicles that intermediate between corporate issuers in the leveraged loan markets and institutional or retail investors. CLOs engage in pooling of leveraged loan assets, and active portfolio management to manage exposures to deteriorating debt. CLOs fund these assets by selling tranches of these vehicles with a range of ratings (AAA senior tranches through mezzanine B tranches, and equity) to provide tailored products to meet the risk and return demand of a range of institutional investors. Unlike other parts of the non-bank financial intermediation, CLOs have very low maturity and liquidity transformation. However, they have significant leverage, because they issue tranches to investors that represent payment streams determined by the seniority of the tranches. Triple AAA tranche investors get paid first, AA tranches second, etc., and equity last, such that defaults of underlying loans can accrue without it ever affecting the cash flow of AAA tranches. Indeed, with subordination (liabilities and equity below the triple AAA) of roughly 30%, the expectation that AAA holders will be repaid in full is very high except in severe economic and credit downturn. Even during the prior crisis, the vast majority of AAA tranches of CLOs did not experience impairments to their cash flows.

Figure 5.4. CLOs outstanding in the United States, 2006-2018



Note: CLO: collateral loan obligation.

Source: SIFMA, OECD calculations.

This intermediation largely exists due to the ratings “arbitrage” between the corporate loan market and the tranche performance. As long as the demand for CLO tranches at given rates is below what, in aggregate, allows the CLOs to purchase leveraged loans and offer sufficient profits to equity holders, the structure offers value to market participants. CLO managers earn a fee for managing the portfolio, and where they hold equity, also receive returns on their investment through superior credit risk management.

CLO issuance and outstanding fell sharply after the financial crisis due to investor concerns over structured credit products, and the extreme volatility of CLO tranche spreads during the crisis. However, with the stabilisation of the leveraged loan markets resulting from improved credit conditions in the United States and Europe, CLOs again became a popular investment vehicle due largely to the search for yields among institutional investors in an increasingly low yield environment. CLOs have grown to over USD 600 billion in the United States, and now own nearly 60% of the institutional leveraged loan market (Figure 5.4).

Investor base

CLO tranches are dispersed widely across institutional investors. The CLO investor base is comprised of a range of institutional investors, and also some retail investors through funds (Table 5.1). While institutional investors traditionally held triple-A tranches of the CLOs, the reach for yield has incentivised insurers, pension funds, and asset managers to demand lower rated A and BBB tranches. While the higher tranches are assessed to have higher risk-adjusted returns (e.g. Sharpe ratios; a measure of return over volatility) than comparably rated corporates, the lower tranches have lower risk-adjusted returns than comparable debt, but much higher absolute returns, according to some industry assessment. This suggests that investors in BB and equity tranches are, at least in concept, informed and thus better prepared to manage the credit risks to achieve high absolute returns. Whether they have sufficient balance sheet to manage both high volatility and losses would depend on the level of concentration of high-yield corporate debt in the form of CLOs, leveraged loans and other exposures that suffer much higher losses during economic downturns.

Table 5.1. CLO investor base – for illustrative purposes

Tranche	Types of investors	Rationale
Senior: AAA – AA	Banks	Yield above similarly rated corporates; low monitoring costs.
	Asset managers	
	Pension funds	
Mezzanine: A – BB	Asian banks	Yield and Sharpe ratios above similarly rated corporates; moderate monitoring costs.
	Pensions funds	
	Insurance companies	
	Some hedge funds (with leverage)	
Equity	CLO managers	Higher returns potential as compensation for active monitoring and risk assessment.
	Hedge funds	
	Structured credit funds	
	Sovereign wealth funds	
	Private equity funds	
	Endowments	
	Permanent capital vehicles*	

* Includes Business Development Corporations.

Source: Guggenheim, Morgan Stanley Research, Citi Research, Pinebridge; OECD staff assessment from industry sources.

The largest ten global CLO arrangers in 2018 were among large banks, including Japanese, US and European banks (Table 5.2). Lead arrangers often purchase tranches that are not sufficiently demanded by the market. While during the crisis these and other banks had very large concentrated exposures to CDOs, CLOs and other structured products, most but not all large banks have very modest exposures.

Table 5.2. Bank CLO/CDOs holding to equity ratios (as % of total equity) for selected banking institutions, 2017-2018

	2018	2017
Japanese bank 1	125.32	72.75
US bank 1	18.09	17.46
US bank 2	10.41	11.66
Japanese bank 2	9.77	10.5
Japanese bank 3	9.68	9.55
European bank 1	4.71	3.73
Japanese bank 4	2.52	5.39
US bank 3	1.87	1.42
US bank 4	1.48	1.38
US bank 5	1.18	1.56
European bank 2	1.18	1.16
European bank 3	1.12	1.31
US bank 6	0.77	0.86
European bank 4	0.74	0.7
European bank 5	0.09	0.49

Note: This table shows CLO and CDO holdings to equity ratio in 2016 and 2017 of top 10 G-SIBs US, European and Japanese banks. It also includes some banks from these jurisdictions highly active on such markets. For most banks, the breakdown between CLO and CDO holdings is not available. However, for banks for which the breakdown is available, CLO substantially exceeds CDOs holdings.

Source: Individual banks' annual reports, OECD calculations.

Also, anecdotally, there are concerns that banks and other institutional investors remain exposed. For example, Japanese banks are known to be prominent purchasers of the issuance, and may now own 10% of the entire global CLO market.⁵⁵ A Japanese agricultural cooperative bank has exposure to CLO and CDO representing about 125% of equity in 2017. Analysts suggest that Japanese banks have been purchasing well over half of the new CLO issuance of AAA tranches.

Insurance companies are also one of the largest holders of CLOs. In the US, as of year-end 2018, U.S. insurers had about USD 122 billion in book value of CLO investments.⁵⁶ Life insurance owned over 75% of these tranches measured by assets, and the top ten largest insurance companies own about one third of this exposure. The majority of held tranches were rated between AAA and single-A, but roughly 30% were rated A or BBB, suggesting that losses would accrue to these tranches during economic downturn. Despite a steady increase in exposure, CLOs continue to represent a small proportion of insurers' total assets, at about 2% of total assets as of year-end 2018.

Risks

The key risks of CLOs relate to both potential default and losses in the loan portfolio, and marked-to-market losses that may force portfolio rebalancing to mitigate risks, and subsequent write-downs.

During periods of stress, the losses in CLOs range widely based on the tranche structure. Senior CLO tranches (AAA and AA) did not experience any impairment of cash flows. Analysis of the full universe of rated CLOs that between 1994 and 2013, only eight investment-grade CLO tranches (or 0.15% of the notes originally rated BBB- or higher) defaulted, while 17 speculative-grade CLO tranches (or 1.78% of the notes originally rated BB+ or lower) defaulted. This compares very favourably with the percentage of rated speculative corporate loans that have defaulted. By contrast, they have generated significant cash losses on lower-rated tranches.

Table 5.3. CLO and corporate defaults

	U.S. CLO Default Rate	U.S. Corporate Default Rate		
	1994 - 2013	5 YR	10 YR	15 YR
AAA	0.00%	0.40%	0.90%	1.30%
AA	0.00%	0.50%	1.20%	1.70%
A	0.50%	0.80%	2.10%	3.20%
BBB	0.30%	2.40%	5.30%	7.60%
BB	1.70%	9.20%	16.70%	20.50%
B	2.60%	21.40%	29.90%	34.10%

Source: Standard & Poor's Rating Services "Twenty Years Strong: A Look Back at U.S. CLO Ratings Performance From 1994 Through 2013." Defaults in incidents rather than asset value.

Recent analysis by industry participants, including rating agencies that rate structured credit, indicate that CLO structures have experienced deterioration. Market forces similar to those that have led to the proliferation of covenant-lite loans in recent years have weakened CLO financial covenants and also loan documentation⁵⁷, and this weakening could expose CLO noteholders to increased risk during the next credit downturn. The trend includes various changes to CLO structures that can distort collateral quality tests, increase the potential for par erosion or make CLO structures easier to change after issuance. Moreover, MSCI notes that the trend in credit metrics for CLO collateral has been deteriorating significantly in recent years, especially since 2015, while the Weighted Average Ratings Factor (the aggregate ratings of individual assets of the collateral pools, for seasoned deals has also been worsening steadily as they age.

Market disruptions in the CLO market contributed to much higher market losses as spreads widened dramatically during the crisis (Table 5.4), performing considerably worse than similarly-rated corporate bonds during deteriorating economic and credit conditions. Moreover, due to their illiquidity, the mark-to-market volatility on tranche spreads are significantly higher than comparable corporate bond prices during periods of market turbulence. That said, one comfort is that the recent spreads of CLOs appear to better reflect the underlying risks relative to corporate bonds.

Table 5.4. CLO and corporate spread performance

Rating	CLO versus corporate spreads (basis points)		
	2006	2008	2017
AAA	<30 / 60	650 / 410	100 / 70
A	<45 / 80	4200 / 630	220 / 90
BBB	<150 / 120	6000 / 770	650 / 160

Source: JPMorgan, Bloomberg, Barclays, BAML ICE (FRED), OECD calculations for illustrative purposes.

From a markets perspective, growing losses in CLOs could have several consequences. First, it would transmit losses to CLO subordinated tranche holders and trigger higher spreads on senior tranches, imposing losses on banks, insurers and asset managers. Also, growing losses would curtail CLO demand for leveraged loans, which would contribute to much higher financing costs for highly leveraged companies, thereby elevating defaults and restructuring within the industry. This spillover to the real economy could contribute to a broader decline in credit conditions, whereby rising underwriting standards and risk aversion further tighten financial conditions for corporate financing.

Regulatory responses

Following the crisis, structural vulnerabilities in the structured products market received an international regulatory response. In 2014, US and European regulators and banking authorities adopted credit risk retention rules for securitisations, which sought to align the incentives of originators with tranche investors, to minimise moral hazard. The rules served to “keep skin in the game” by ensuring that securitisers held a portion of equity in the CLO, to align their incentive to minimise losses for the entire CLO structure.⁵⁸ Despite this, the CLO market outpaced its pre-crisis peak as private equity and other institutional investors contributed equity to this market, which raises questions as to the effect of the regulation on the securitisation process.

Likewise, given the recent rise of CLO holdings among Japanese financial institutions, the Japanese market regulator is considering implementation of this risk retention rule. The regulations that are set to be implemented would impose capital requirements on CLO investors if originators did not retain a stake in the equity. However, it has proposed an exemption if the buyers can prove the products were constructed appropriately.

In the United States, this regulation was considered onerous by the industry, which raised concerns that it could hamper the viability of the CLO market. In early 2018, the United States court of appeals exempted CLO managers from the risk retention rule.⁵⁹ Consequently, CLO securitisers’ ability to distribute risk reintroduces the potential for misaligned incentives, when the CLO sponsors’ equity is no longer at risk. There is some evidence that CLO equity tranches are now being sold to third-party investors, such as asset managers that are creating funds for institutional and retail investors.

Underlying leveraged loan markets

Given the risks in the CLO market, a brief assessment of the underlying leveraged loan market is warranted to identify growing risks. The leveraged loan market comprises loans that are issued by businesses that are non-investment grade, and the loans are priced at yields similar to those in the high-yield bond markets. As indicated by the term, the issuers of these loans have considerable leverage – debt is now elevated at 6.2 times EBITDA, which serves as cash flow from which to pay of interest and amortising principal. As such, leveraged loans are more likely to default, particularly during economic downturn and recessions, or during protracted market stress.

Leveraged loans are distinct from corporate bonds in several ways. First, leveraged loans are priced against LIBOR and are floating-rate instruments, which in turn means issuers must pay higher refinancing costs, all else equal, when rates increase. Also, leveraged loans are senior in the liabilities structure and secured by collateral of real assets, which allows them to trade and lower spreads for the same credit risk of the issuer. As well, traditionally leveraged loans included financial and maintenance covenants, such that holders could collectively protect themselves against behaviours that would reduce creditor interests in favour of shareholders.

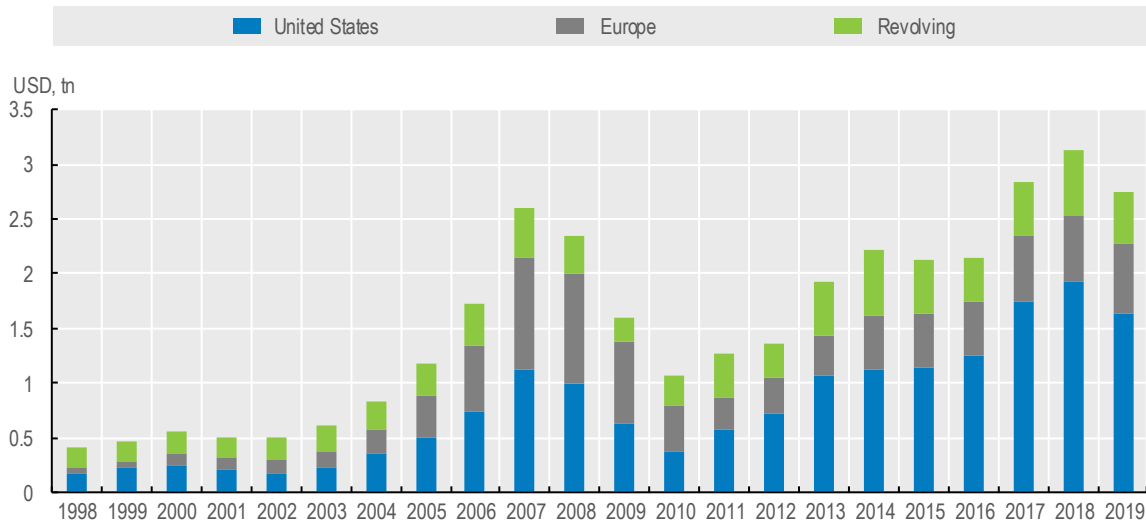
However, in recent periods, investors have been willing to accept weaker covenant terms in order to receive higher yields; resulting in covenant-lite issuance to rise from under 20% in 2009 to well over 90% of issuance in 2018, and are over three-fourths of the outstanding leveraged loans.⁶⁰ While the lack of covenants give issuers more financial flexibility to rake risks during benign credit conditions, it can expose investors to higher losses when credit conditions deteriorate. As such, rating agencies and market analysts are raising concern over the potential for significant losses during the next credit downturn. Moody's noted that the combination of aggressive financial policies, deteriorating debt cushions, and a greater number of less creditworthy firms accessing the institutional loan market is creating credit risks that foreshadow an extended and meaningful default cycle once the current economic expansion ends. Its analysis indicated the likelihood of more defaults than the last downturn as well as lower recoveries, undercutting a foundational premise for investing in loans.⁶¹

Estimates of market size range depending on the industry sources. Market participants often make reference to the S&P Global Leveraged Loan Index, which indicates that the overall leveraged loan market rose to USD 1.3 trillion in 2018 (S&P LCD, 2018).⁶² It is worth noticing that the Index only includes leveraged loans that are institutional, sufficiently large (i.e. with at least USD 50 million initially funded loans) and liquid (i.e. traded to be captured within industry indexes).

A more comprehensive assessment of the full leveraged loan market is needed to better consider a broader definition of leveraged loans. Based on Refinitiv definition of leveraged loans, smaller, middle-market deals and loans that are less widely syndicated are also included.⁶³ Considering this broader definition of leveraged loans, the estimated stock of leveraged loans outstanding is currently above USD 2.3 trillion (Figure 5.5). Furthermore, banks continue to have exposure to one part of the market that is all but hidden from the analysis of leveraged loans is the existence of roughly USD 550 billion of “revolving” loans. These revolvers give issuers the right to draw down such credit when needed, which is generally when they are suffering from limited cash flows. Even if the majority are one-year revolvers, drawdowns in stressed markets could result in the full stated amount of the revolvers, thereby pushing the total leveraged loans outstanding to nearly USD 3 trillion in 2018. In this regard, a recent survey by Moody's suggests that in the next three years, nearly half of US regional banks surveyed anticipate their leveraged loans outstanding will moderately increase, driven in part by drawdowns on their unfunded commitments. However, most banks anticipate a moderate increase or no material changes in their leveraged loans pipeline, which indicates that US regional banks will continue to underwrite leveraged

loans commitments.⁶⁴ As such, banks may be exposed to a much higher amount of leveraged issuer exposure at the very point that the leveraged finance market begins to erode.

Figure 5.5. Leveraged loans outstanding in the United States and in Europe, 1998-2019

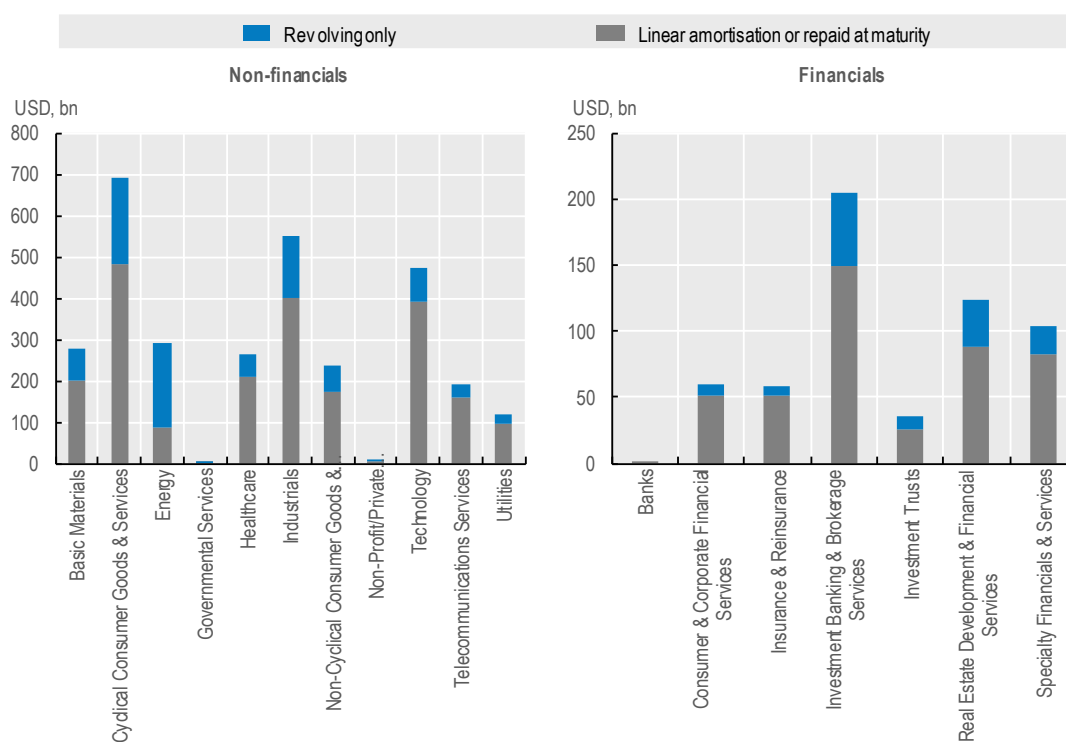


Note: This figure shows leveraged loan outstanding in the United States and Europe including financial and non-financial borrowers. Data and methodology are detailed in Annex B.

Source: Refinitiv, OECD calculations.

The distribution of leveraged loan issuance also varies across economic sectors. Among non-financial sectors, largest leveraged loan issuances in 2017 and 2018 are in consumer cyclicals, industrials and technology sectors (Figure 5.6). Banks are mostly exposed through revolving loans to consumer cyclicals, energy and industrial sectors. Among financial firms, investment banking, real estate development and financials and speciality financials are the top issuers – with on average 20% of their total issuance being revolving loans. Hence, bank are also exposed to credit risk of other types of financial firms. Bank credit risk exposure may be of particular concern should underwriting standards of underlying leveraged loans deteriorate.

Figure 5.6. Leveraged loan issuance in 2017 and 2018 in the United States and in Europe, by economic sectors



Note: This figure shows leveraged and highly leveraged loan issuance in the United States and Europe including financial and non-financial borrowers. Issuance figures in 2017 and 2018 have been added. Data and methodology are detailed in Annex B.

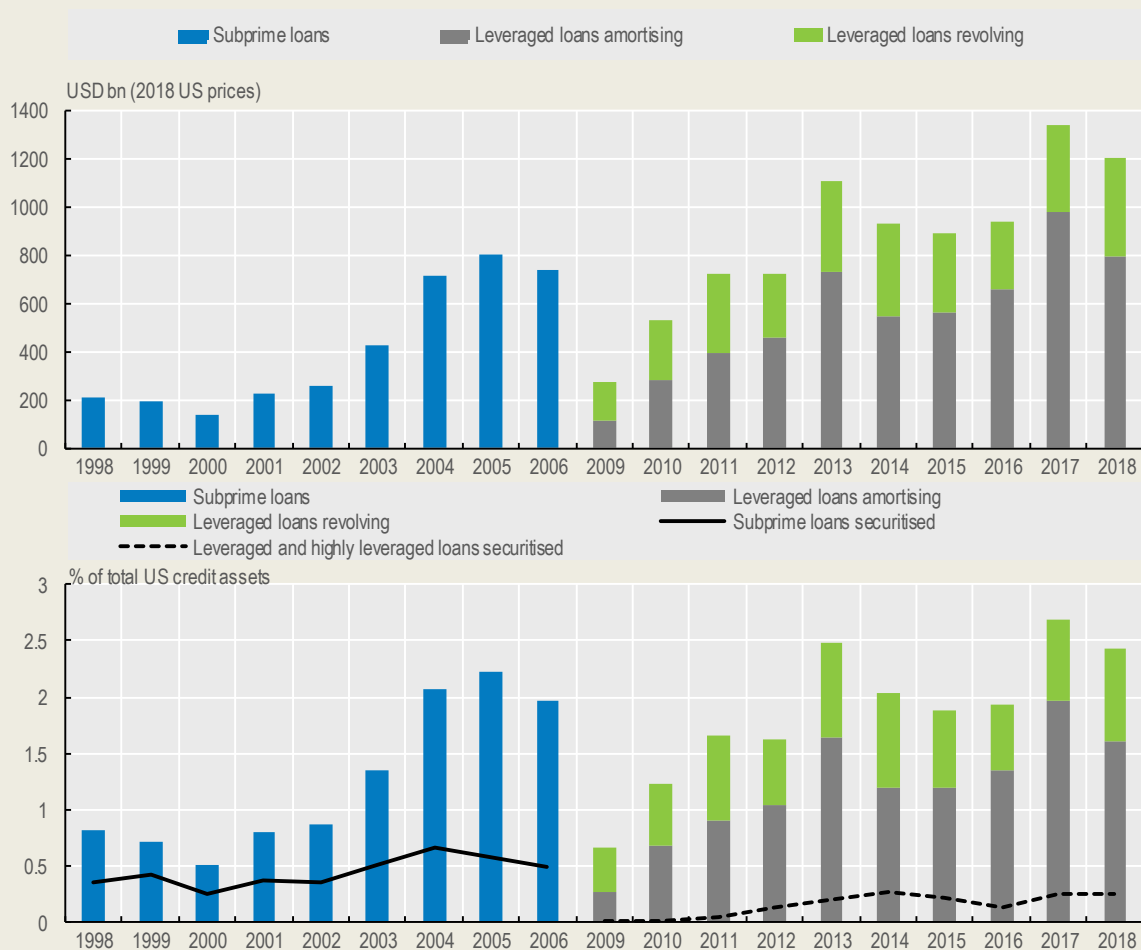
Source: Refinitiv, OECD calculations.

Box 5.1. Twenty-year comparison of US subprime mortgage and leveraged loan markets

The rapid growth of non-investment grade private debt may pose risks to financial stability and economic growth. These risks materialised during the Global Financial Crisis in 2008 following the bubble-burst of the United States subprime mortgage loan market. Global leveraged lending is growing at rates – and has reached a scale – comparable to that of US subprime mortgages on the eve of the GFC.

In nominal terms, the subprime lending market peaked at USD 805 billion in 2005 while the leveraged loan market reached USD 1082 billion in 2017 (Figure 5.7). If revolving loans are included, the overall market issuance reached USD 1339 billion in 2017, more than twice the size of the 2005 subprime lending market.

Figure 5.7. US subprime and leveraged loan markets, 1998-2018



Note: This figure shows originated subprime loans over the period 1998-2006 and leveraged loan issuance over the period 2009-2018 in the United States. Gross issuance of leveraged loans refers to total issuance, including for refinancing purposes. It does not subtract repayments of outstanding loans. Financial companies are excluded from the sample. Issuance amounts are presented in 2018 USD adjusted by US CPI or are expressed as a percentage of total US credit assets. Credit assets correspond to the outstanding amount of currency and deposits, loans and debt securities of sovereign, households and non-financial corporates.

Source: Refinitiv, SIFMA, US Financial Crisis Inquiry Commission report (2011), Bank of International Settlements, OECD calculations.

Bank contingent convertible bonds

The third area of consideration is the strong issuance of a form of bank subordinated debt, known as contingent convertible (“CoCo”) debt. While bank liabilities are not included in the FSB approach to assessing non-bank financial intermediation, wholesale bank funding markets serves as a key point of interconnectedness between bank and market-based finance. Given the growing engagement of retail investors and open-ended funds in this rapidly growing part of the market, which could be a channel for broader contagion in much larger bank debt markets, it merits a brief review of developments and risks.

This subsection will highlight the significance of this issuance to help improve banks’ balance sheets within the framework of total loss absorbing capital (TLAC). The TLAC standard requires global systemically important banks to have financial instruments available during resolution to absorb losses and enable them to be recapitalised to continue performing their critical functions while the resolution process is ongoing. Thus, TLAC serves to make debt/equity holders absorb losses (“bail-in”), instead of using public funds (“bailout”).⁶⁵ In addition, the explicit guidance by authorities to limit inter-bank holding of loss-absorbing debt helps ensure that the contingent losses would be widely distributed across market participants to limit concentrations of loss in systemically-important entities. At the same time, the bail-in regimes and conversion of loss-absorbing capital creates uncertainty which could, under some circumstances, result in market contagion as losses are imposed on institutional and retail holders. Due to this concern, a review of the rise of bank debt, and the involvement of market-based intermediation, is warranted.

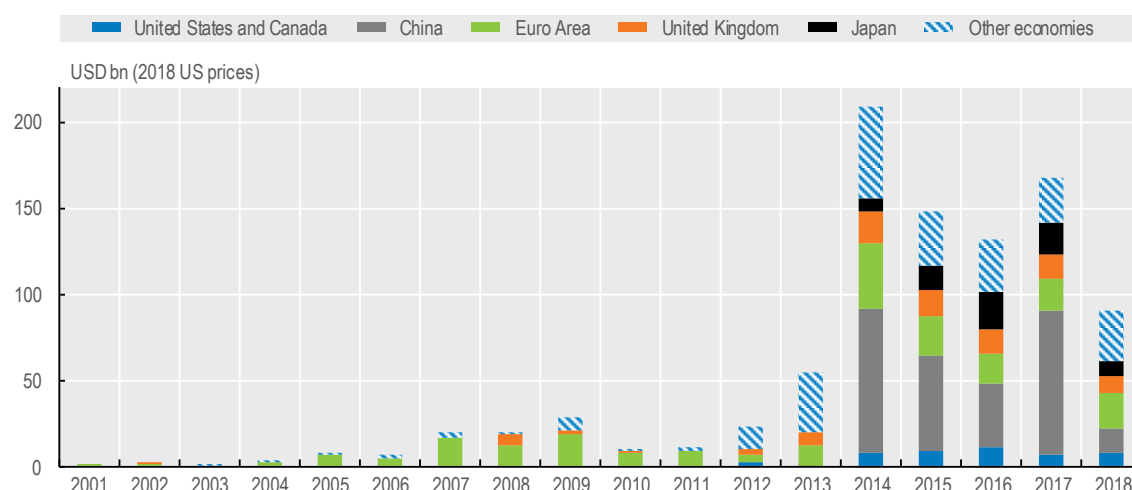
Over the past decade, the market for bank CoCo bonds experienced notable growth as banks issued them as a means to buffer balance sheets without resorting to equity issuance. The market for contingent convertible bonds has risen substantially, as annual issuance has risen from under USD 25 billion in 2008 to an average of USD 150 billion of issuance since 2014 (Figure 5.8), contributing to an approximated outstanding of roughly USD 500 billion.⁶⁶ European banks and, more recently, Chinese banks have issued most heavily into the market.

Initially, CoCo bonds faced several challenges in generating investor demand due to uncertainty over the conversion mechanisms. Amid the reach for yield, the investor base of these instruments has shifted from primarily long-term institutional investors to a growing retail base. In particular open-ended investment funds have become a large holder of CoCo debt. Recent evidence suggests that retail investment funds are now the largest holders of bank CoCo bonds, either as funds targeting higher-yielding bank exposures, or as investments within broad fund categories, whereas European household direct exposure to CoCos has declined sharply. Moreover, the primary investors in European funds with CoCo exposure are non-residents, which suggests they may be less knowledgeable of European banking conditions and regulatory treatment. Non-European investors are exposed to well over USD 130 billion of CoCo bonds in open-ended funds, according to recent research.⁶⁷

There are several factors that can contribute to risks in the bank CoCo bond market. First, the convertible nature of the bonds complicates valuation of their bond and equity-like structures. Second, the contingent element of the bonds depends in part on the regulatory treatment, and the bonds may be required to convert to equity due to banks’ failure to pass supervisory stress tests, rather than actual losses. Due to these features, the bonds are generally considered to have low liquidity, and have experienced wide price fluctuations during periods of market stress, in comparison to non-convertible bonds of corporates and banks. To this end, there is evidence of recent contagion in the European CoCo bond market, which has exceeded USD 150 billion, as application of bail-in has given rise to uncertainty over the consistency of treatment. A Bank of Italy working paper illustrates the significant CoCo-specific contagion in the two stress episodes, which could be the result of investors’ reassessment of the CoCos’ riskiness or of uncertainty about their supervisory treatment.⁶⁸ During a

major stress event of a major global bank, European senior debt showed little sign of stress, whereas the CoCo market experienced considerable CoCo-specific contagion.

Figure 5.8. Bank's convertible bond issuance, 2001-2018



Note: Only contingent convertible bonds issued by banks are included in the statistics (i.e., contingent convertible (write-down) and contingent convertible (conversion)). Issuance amounts are presented in 2017 USD adjusted by US CPI.

Source: Refinitiv, OECD calculations.

The key driver of the growing demand is that, amid investors' reach for yield, CoCo bond yields are well above 5%, which is higher than most other fixed-income products in Europe. In this regard, anecdotal evidence suggests that a number of fixed income funds are allowed to hold up to certain portion of such bonds, such as a 10% limit. Therefore, investors may be less aware of the specific CoCo exposure in their fixed-income portfolios.

In sum, while the reach for yield and strong performance of these bonds may have contributed to a growing sense of investor confidence in the CoCos as an asset class, the untested nature of the bail-in regimes in different parts of the world and structural features of CoCo instruments could eventually give rise to unexpected outcomes that could sharply alter perception of risks of these products, and could in some circumstances add to rather than dampen contagion risks.⁶⁹

6. Policy considerations

This paper assesses developments in global financial intermediation, with attention to the growth and structural shifts, the relationship these shifts may have with credit exuberance in the post-crisis era, and potential risks to sustainable growth. While experiences differ across countries and regions, numerous financial systems in OECD countries have experienced an extended period of very low rates and cost of credit, rising market-based finance through investment funds and securitisations of corporate credit, and the appearance of abundant liquidity. While markets have been effective in transmitting monetary policy to the real economy, rising debt and leverage amid a potential mispricing of credit raises concerns over the consequences under less benign macrofinancial conditions.

As financial authorities reflect on risks and vulnerabilities, this paper concludes that the growth of market-based finance is not the *cause* of financial imbalances. It is rather a prominent conduit by which highly accommodative monetary and fiscal policies have passed through the financial system to the real economy. The key features of market-based finance explained in Section 2 illustrate that certain forms of market-based finance are much better able to facilitate price discovery and transactions relative to more opaque financial institutions such as commercial banks. Open-ended funds, in particular, have become a preferred intermediation vehicle by retail and institutional investors to gain exposures to pools of sovereign, corporate, and bank debt. In this respect, market-based finance has contributed to passing through monetary and fiscal stimulus to the real economy. However, in combination with regulatory developments and the use of macroprudential tools for large banks, the search for yield and regulatory arbitrage have incentivised the shift to market-based forms of intermediation for issuers and investors alike. Therefore, while further consideration of prudential policies (macro and micro) directed at non-bank financial intermediation is needed, policy makers should keep in mind that these tools cannot address overall credit exuberance without giving consideration to monetary and fiscal policies.⁷⁰ Put differently, the question may be asked: even if the numerous global policy recommendations related to non-bank financial intermediation were to be applied fully and consistently across jurisdictions, would it sufficiently address the continued rise of credit, its exuberant pricing, and the potential for spillover? In doing so, would it result in market distortions and inefficiencies? As the assessment of intermediation in this paper suggests, the answer is no. The framework for considering the interplay between the structure of intermediation and the levels of credit exuberance should be given further consideration.

Frameworks for considering policy tools

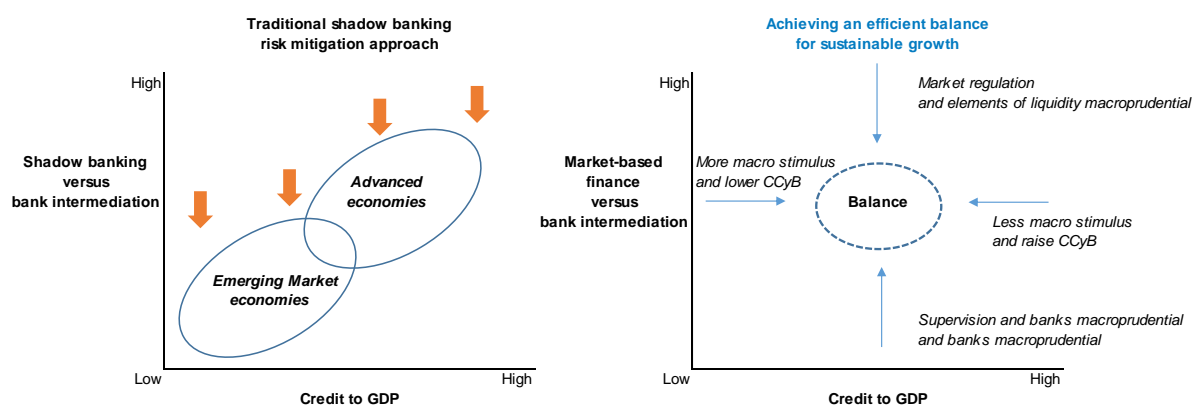
While monetary policy frameworks have developed in the post-crisis era with respect to unconventional measures (large-scale asset purchases, negative policy rates, greater forward guidance, etc.), the intended and unintended consequences of asset bubbles and credit exuberance have drawn more attention to the use of macroprudential, microprudential and various regulatory tools to help maintain stable and well-functioning financial systems to support economic growth. Certainly, more attention has

been given to how to coordinate and event calibrate the use of macroprudential tools during different monetary policy stances. As well, the excesses of securitised vehicles that contributed to the prior crisis, as well as continued growth of market-based finance since then, has prompted financial reforms to reduce regulatory arbitrage and excessive risk taking. Nevertheless, there is not an integrated approach to considering how these tools in combination can best address procyclicality in credit and liquidity in areas of non-bank financial intermediation. This is particularly relevant where the level of credit intermediation relative to buffers and pricing of risk are giving rise to potential systemic vulnerabilities.

There is currently no integrated policy framework at the international level that considers how to balance the trade-offs among various tools – monetary, macroprudential, microprudential, and product and activities regulation – when considering how to balance various policy objectives to achieve a desired outcome. These objectives may include stable inflation and economic growth, financial stability, and financial effectiveness and efficiency, and financial inclusion among others. Certainly, preliminary efforts have been made to address formal coordination of some policy elements, such as monetary and macroprudential policies, and also macro and microprudential measures for banking systems.⁷¹ Yet, the appropriate use and calibration of a suite of tools to balance productive financial intermediation and financial risks remain a work in progress.

The OECD's Policy Framework for Effective and Efficient Financial Regulations considers several of these policy issues at a high level (Figure 6.1, for illustrative purposes only). The Framework notes that financial regulation should be oriented to risks in the financial system, such that it prioritises those risks with the greatest potential to undermine the resilience of markets and sustainable growth. In terms of comprehensiveness, it emphasises that all appropriate tools and mechanisms are used to ensure a global, integrated approach to the regulation and supervision of relevant participants, products, services, institutions, systems, and markets. At the same time, they should ensure the financial system allocates capital efficiently to productive uses and supports efficient pricing of financial services to balance financial returns and risks.

Figure 6.1. Aligning financial policy frameworks with sustainable growth



Note: CCyB: Countercyclical Capital Buffer.

Source: OECD staff illustration.

Thus, the current approach to the use of tools to address risks from financial intermediation could benefit from a better alignment of the use of tools with the level and distribution of credit risks within the financial system. Currently, the consideration of policy tools in international fora often emphasises the need for policy measures where there is non-bank credit intermediation that gives rise to liquidity and maturity transformation, and leverage, irrespective of (a) the amount of market-based finance relative to the total

financial system, or (b) the amount of total credit exuberance, measured below by credit to GDP.⁷² This approach can lead to undesirable outcomes, particularly when credit intermediation is tepid. The first illustration in the table below highlights this concept of blunt use of tools that do not reflect either the balance of intermediation or its contribution to levels of credit exuberance in the economy. This approach lacks proportionality, and could lead to counterintuitive results. For example, where concentrated banking intermediation dominates and there is relatively low credit to GDP, the shift to market-based intermediation could actually improve overall financial resilience and sustainable growth. While this is more likely the case in EMEs, at least some OECD countries have relatively low levels of overall corporate borrowing, and could benefit from additional market-based credit and equity to GDP.

Thus, there is a need for a more balanced approach to consider how a range of policy measures can help address the extent of macro-level credit imbalances the genuine risks of market-based finance within the financial system, and the extent to which it is contributing to credit exuberance. Policy makers should give consideration to the appropriate balance of bank and non-bank intermediation suitable for productivity-enhancing economic growth, and sustainable levels of financial intermediation that supports the desired balance of equity and credit to support growth without raising fragilities associated with leverage and mispriced credit that can lead to amplification of risks. In this light, the policy framework should consider this balance of forms of intermediation and risks, and the macrofinancial conditions, to guide the appropriate and effective use of various policy tools. Several practical examples include:

Where credit levels and valuations are stretched, authorities may consider the extent to which monetary/fiscal stimulus and regulatory arbitrage are driving risk-taking toward market-based finance. Attempts to impose macroprudential measures in non-bank intermediation could slow the growth of credit, and may be utilised where there is little evidence of leakage. However, the imposition of macroprudential tools across the financial sector are more likely to lead to distortions and further arbitrage when macrofinancial policies heavily subsidise financial risk-taking. Thus, some macroprudential tools could simply shift risk-taking to more opaque forms of non-bank finance. Furthermore, liquidity measures should be applied in a manner that reduces the mechanisms that amplify risks, but does not distort the price-discovery benefits of these forms of intermediation.

Where credit valuations to GDP are high, and equity issuance is strong, and market-based financing (e.g. funds and ETFs) are intermediating such growth, authorities might consider how sustainable overall financing is relative to market valuations and forecasts of economic growth. Where financial policy-makers may be comfortable with the overall levels of intermediation due to equity buffers, in aggregate, they may scrutinise pockets of elevated risks to ensure appropriate microprudential measures.

By contrast, where overall financial intermediation is below trend and not leading to macro leverage and price distortions, market regulation and microprudential measures may be sufficient to address firm-specific risks where they arise. This would help ensure financial sector resilience without inhibiting credit intermediation.

Where bank intermediation dominates and non-bank financial intermediation is very low, this could be due to underdeveloped local capital markets and perhaps disincentives for innovations in market-based finance. In such circumstances, more attention may be placed on fostering growth in market-based finance, and tools could be applied in a more flexible manner proportional to the risks. The use of “sandboxes” to monitor fintech innovations, including in marketplace lending, in some OECD countries offers a clear example of this.

Thus, to be efficient and effective, financial sector policy considerations should take into account the levels of credit to economic growth, the balance of credit to equity financing, and the risks associated

with different forms of intermediation, and overall macroeconomic and credit conditions. While harmonisation of standards and good practices are important, clearly a one-size-fits-all approach to addressing risks in market-based finance could create unwanted distortions, and could also stifle needed credit growth or efficient allocation, which could undermine productive and sustainable growth.

The macrofinancial policy mix

Post-crisis financial reforms have included the development and strengthening of macroprudential, microprudential, and regulatory tools that strive to contain credit exuberance and financial risks. The efficacy of these tools are particularly important during periods where they are meant to ensure financial sector resilience while monetary and fiscal tools may contribute to the build-up of excess credit. This next subsection draws attention to the evidence of the use of macroprudential tools, and how coordinated use of macro/microprudential and regulatory tools could better contain financial system risks.

While some studies point to the efficacy of macroprudential tools to contain household debt, there is little evidence that shows macroprudential tools have contained overall credit exuberance amid a prolonged period of accommodative monetary policy. Amid recent research on the use and effectiveness of macroprudential tools, in particular related to household debt, it is difficult to assess outcomes distinct from the influence of highly accommodative monetary policies across many OECD countries. Some recent evidence shows effectiveness of macroprudential measures in limiting the growth of housing risks in Europe, and also in several EMEs.⁷³ Yet examples are more limited where tools are scarce, and in some jurisdictions the tools have yet to be tested. As well, there are far fewer tools to address corporate debt. As such, the empirical evidence on the effectiveness of macroprudential policies in influencing credit flows and asset prices remains preliminary and inconclusive.⁷⁴ At this stage, given the state of the financial system, uncertainty about the effectiveness of these policy instruments is high.⁷⁵ Such circumstances pose a challenge for financial policy making as credit growth in non-bank finance contributes disproportionately to credit exuberance in numerous OECD countries.

As policy makers further consider the development of integrated policy approaches at the domestic and international level, the following element may warrant further assessment:

*Macroprudential policies are generally not comprehensive in addressing a build-up of risks, and can encourage arbitrage and shift risks to other parts of the system.*⁷⁶ Amid high levels of monetary and fiscal stimulus, targeted macroprudential tools to contain credit exuberance on one part of the system are more likely to attract regulatory arbitrage to shift activities to other parts of the system, rather than to contain overall credit exuberance.⁷⁷ The fact that macroprudential policies are most often applied to large systemically important entities such as banks, collateral through minimum haircuts, or on lending such as household mortgages (e.g. loan-to-value ratios), suggests incentive for arbitrage. Research suggests that efforts to apply leveraged lending guidance on US banks was effective in limiting the leverage in bank syndications, but resulted in arbitrage through non-bank activities that contributed to much higher leverage loan risks in the overall market.⁷⁸ That these tools do not generally address corporate or sovereign debt may shed light on the potential need for other tools to address the current exuberance in the sovereign and corporate markets.

In practice, more attention is needed to the alignment of macroprudential and microprudential policies across financial systems, including non-bank financial intermediation, to improve efficacy and reduce regulatory arbitrage. While conceptual elements of the interplay between macro and microprudential measures have been considered, particularly with respect to banking systems and mortgage lending, in practice this has not been given sufficient consideration across elements of non-bank financial

intermediation. Nor has the interplay and spillovers of macroprudential and microprudential measures across bank and non-bank intermediation been given enough attention. This is despite the fact that strong shift in credit intermediation outside of the banking sector has occurred while substantial macro and microprudential measures have been applied to banks. Where non-bank financial intermediation is growing and is a larger share of the financial system, more attention in this area is needed.

The consideration of static versus dynamic policy measures for market-based finance is still at an early stage. Whereas static measures that set explicit limits (such as for leverage on investment funds or minimum capital for broker dealers) are well-established, there is need for further exploration of the use of dynamic microprudential and activities-based measures that are *risk-based* and thus flexible to help address growing risks. These measures, while directed at activities or entities, collectively can make market-based finance more resilient to mitigate excesses and procyclicality. Microprudential tools related to the liquidity of credit funds, for example, are dynamic because they must adapt to changing market liquidity of assets in funds due to credit and market conditions.

In this respect, further consideration of the cost-benefit assessment of the use of macro vs microprudential tools is needed to ensure flexibility and proportionality, so that market-based finance remains efficient and effective in supporting sustainable economic growth at an acceptable level of risk. This will be given further attention in the next subsection.

Product and activities-based tools

As the consideration of leverage and maturity transformation tools of leveraged institutions are fairly well understood, this subsection will focus on policy tools primarily to address risks related to liquidity transformation, which are most prominent in investment funds.

Tools to address liquidity transformation

A considerable effort has been made by the FSB to articulate key structural vulnerabilities from asset managers, and detailed recommendations have been developed by IOSCO.⁷⁹ Among the considerations for tools to address liquidity transformation:

- Setting appropriate liquidity thresholds which are proportionate to the redemption obligations;
- Carefully determine a suitable dealing frequency for the units, and ensure collective investment scheme (CIS) dealing (subscription and redemption) arrangements are appropriate for its investment strategy and underlying assets;
- Effectively perform and maintain its liquidity risk management process, including to regularly assess the liquidity of the assets held in the portfolio. In this regard, funds should integrate liquidity management in investment decisions;
- As such, funds should identify an emerging liquidity shortage before it occurs, including by conducting ongoing liquidity assessments in different scenarios, which could include fund level stress testing.

The consistent operationalisation of these recommendations is important, and remains a focus of FSB and IOSCO to facilitate good practices.

There are differing views as to whether these tools – except for macroprudential stress testing of fund liquidity– are macroprudential in nature, as several are at the discretion of fund managers. As such, authorities are not in the position to count on such tools as a coordinated instrument to reinforce countercyclical behaviour. Mandated use of certain tools, such as suspension of redemptions of a set

of funds, could signal more broad-based concerns over types of funds holding affected assets, which could contribute to heightened amplification of risks.

Recent considerations have been given by macroprudential bodies to consider how macroprudential tools could be better utilised with respect to investment funds, to help address the credit exuberance and liquidity transformation in some markets. The European Central Bank, for example, has assessed the use of ex-ante and ex-post macroprudential-oriented tools, and believe that at least some of those suggested by IOSCO may not address liquidity mismatch and stress in funds.⁸⁰ However, they do find a portion to be relatively efficient and effective, if applied in a highly consistent manner, such as through compulsory implementation. Other studies have explored the systemic nature of liquidity risk, which results from interconnectedness between banks, non-bank actors including funds, and financial markets. In this respect, a macroprudential toolkit to address systemic liquidity is likely to integrate existing microprudential liquidity requirements, and also for financial authorities to issue targeted warnings or recommendations for policy actions when systemic liquidity becomes a financial stability risk.⁸¹

Industry participants have also offered recommendations for how to further strengthen policy tools to ensure the resilience of market-based finance with respect to investment funds. While some of the suggested tools are similar, the industry focuses more on *principles for prudent management of liquidity and leverage*, which have both regulatory and microprudential elements. They include:

- More granular and comprehensive collection of data, to be shared with authorities;
- More clear and consistent availability and use of the policies operationalised by IOSCO following the FSB high-level guidance;
- Better assessment of the use of leverage – net and gross – through funds' derivatives exposures;
- Considering a more narrow definition of ETFs for less complex exchange traded products of stocks and bonds, while leveraged and complex products would be labelled and regulated differently.⁸²

These steps, if taken in a comprehensive and well-coordinated manner, might help address the rise of financial intermediation risks in collective investment vehicles while minimising the distortions associated with traditional macroprudential tools (e.g. capital buffers). These steps have merit, particularly in sophisticated financial markets where the fund sector is large, uses leverage, and has growing complexity in fund and ETF products. However, as credit exuberance is unprecedented in some advanced economies that have very large and growing fund sectors, additional assessment and scenario analysis is needed to determine adequacy of this suite of policy tools.

In light of the OECD CMF Policy Framework for Effective and Efficient Financial Regulation,⁸³ further consideration should be given to the proportionality of fund tools and the appropriateness of macroprudential tools, as side effects may distort the benefits of market-based finance.⁸⁴ Authorities might consider greater emphasis on Principle 1B – Transparency of the Financial Landscape, to more consistently communicate concerns over bond market liquidity to stakeholders, including authorities' own efforts and research with respect to macro liquidity stress tests, so that funds are able to incorporate assessments of growing fragilities in debt markets into their own assessments of liquidity risks.

To this end, authorities should better consider the extent to which they have sufficient dynamic product-based tools that, while not explicitly macroprudential or compulsory, nevertheless provide guidance and incentives for investment funds to take heed of liquidity transformation risks.

In alignment with the OECD's Policy Framework, authorities may consider closer surveillance of the levels of liquidity in key asset markets and communicate potential vulnerabilities. Market regulators may

wish to engage in communication and discussions with the asset management industry over market conditions, and how their own liquidity risk management practices are developing in light of periods of elevated risk of market fragility. In this respect, market regulators with economic analysis departments may be in a position to take an international leadership role to bring forward such efforts.

Given that there are costs and competitive dynamics related to portfolio composition choices to account for systemic liquidity risks, further guidance by securities regulators could help determine good practices for how liquidity tools could be utilised in a dynamic manner that incorporates both micro risks of the fund and macro risks associated with the broader liquidity conditions in global markets.

Tools to address opacity and risk transfer related to securitised products

In the post-crisis period, risk retention rules have been used by authorities to address opacity and risk transfer related to securitised products. Risk retention rules related to asset securitisation were put into place in the United States and Europe to address misaligned incentives of securitisation sponsors and managers with the senior tranche holders. Despite these measures, the continued growth of and increasing riskiness of the CLO market reflects the confluence of rising risk tolerance by a range of investors amid the reach for yield, innovations in the leveraged loan market that has increased covenant-lite issuance in CLOs, and deteriorating structural resilience that suggests the ratings methodologies may underestimate risks. More attention is needed in this area to the need for strengthening risk retention requirements; considerations of a Japanese proposal to require CLO sponsors to attest to the appropriate due diligence in structuring a portfolio parameters and assets; and rating agency methodologies for its comfort with its ratings of tranches when the structural features are deteriorating.

While progress has been made on the toolkit for non-bank financial intermediation, and some of the most toxic issues of shadow banking have been addressed, nevertheless the non-bank credit intermediation is the largest recipient of credit – particularly the highest risk credit – and such macroprudential tools were not meant to, or are not effective, in containing such risks without distorting some inherent benefits of market-based finance, and could in turn incentivise additional regulatory arbitrage to new forms.

Further research is needed to understand the extent to which the current suite of globally-agreed policies for banking and non-bank financial intermediation, if implemented as agreed by OECD / G20 countries, would lead to optimal outcomes that help contain global financial risks associated with high debt levels and spillovers.

Reconsideration of macro policies

In light of the limited effects of macroprudential policy to contain overall debt in the system when policy accommodation is high, attention must turn back to monetary policy as at least one factor underpinning the substantial growth of sovereign and corporate debt. When considering the effects of monetary policy, the seminal work by Borio and Lowe sheds light on the potential consequences of maintaining stable and low inflation on asset prices. Their work suggests that financial imbalances can build up in a low-inflation environment, and sustained rapid credit growth combined with large increases in asset prices – rather than in goods and services prices – appears to increase the probability of an episode of financial instability. Accordingly, in some situations, a monetary response to credit and asset markets may be most effective in preserving both financial and monetary stability.⁸⁵

Given the current prospects for continued low rates in the United States, the euro area and Japan, the implications for markets and market-based finance is prescient. Returning to the observations by Feroli et. al. (2017), the policy trade-off is not the contemporaneous one between more versus less policy stimulus today, but is better understood as an intertemporal trade-off between more stimulus today at the expense of a more challenging and disruptive policy exit in the future.⁸⁶ This suggests that unconventional monetary policies (including quantitative easing and forward guidance) can build future hazards by encouraging certain types of risk-taking that are not easily reversed in a controlled manner, particularly where market-based finance is dominant. Additional research and assessment of the interplay between debt, credit markets, and structural shifts in financial intermediation is needed to better understand consequences and policy implications. Notwithstanding the pressures from credit exuberance on financial markets and intermediation, the policy considerations related to financial intermediaries should serve to guide authorities to make choices that best align with the objectives, structure and balance of risks in their financial systems.

Annex A. Global mapping of the structure of financial systems

Data from OECD Financial Account Database complemented by FSB Shadow Banking Monitoring Report 2019 dataset⁸⁷ have been used in the paper for a global mapping of the structure of financial systems. Both databases are compiling information derived from countries national financial accounts. Financial institutions are grouped according to their type into 5 categories: banks, investment funds (i.e., MMFs and other investment funds), insurance companies, pension funds and other intermediaries (i.e., financial auxiliaries, captive financial institutions and money lenders and other financial intermediaries). Investment funds and other intermediaries are classified into two groups as both have experienced substantial growth over the past two decades and also are facing liquidity versus maturity transformation risks.

This annex provides further details on the methodology used in the OECD Financial Account Database and the definitions of the several types of assets and financial intermediaries mentioned in the paper. The 2008 SNA framework of accounts is used in the OECD Financial Account Database. This reporting framework is presented as a sequence of interconnected accounts representing different types of economic activity occurring within a period of time, including balance sheets that record stocks of assets and liabilities held by each institutional sector at the start and end of that period. This complete sequence of accounts is referred to as “institutional sector accounts”.

An important principle that is sometimes applied in presenting results from financial accounts and balance sheets is the principle of consolidation. The principle of consolidation means that transactions and positions between units within the same sector or subsector are eliminated in the presentation of financial accounts. The standard according to the 2008 SNA is to present financial accounts and balance sheets on an unconsolidated basis to have a comprehensive overview of all transactions and positions within an economy.⁸⁸

1. Definition of financial assets and credit assets

Total financial assets

Financial assets, for the most part, represent a claim on another institutional unit and entitle the holder to receive an agreed sum at an agreed date. The only exception is equity, which is treated as a financial asset even though the financial claim their holders have on the corporation is not a fixed or predetermined monetary amount. For financial institutions excluding the central banks, it includes cash and other cash items, debt securities purchased, loan granted or purchased, equity securities and investment fund shares held in portfolio, financial derivatives, insurance, pension and standardised guarantee schemes, employee stock option and other accounts receivable or payable. There are many different ways to classify assets and liabilities; the 2008 SNA uses a classification that groups together instruments with similar properties and characteristics. The selected financial instruments that are distinguished within the 2008 SNA are defined below.

Debt securities

A debt security is a negotiable instrument serving as evidence of debt, such as bills, bonds, commercial paper and asset-backed securities. Debt securities include:

- i. *Short-term debt securities* are those with an original term to maturity of one year or less, such as bills of exchange, negotiable certificates of deposits and commercial paper;
- ii. *Long-term debt securities* include those securities that have an original maturity of more than one year, such as government bonds, asset-backed securities, covered bonds and convertible notes prior to conversion.

Loans

Loans are direct borrowings between a debtor and a creditor which are not evidenced by the issue of debt securities. They are usually not traded. Loans to be recorded on the balance sheets of both creditors and debtors are recorded at their nominal values, i.e. the amounts of the principal outstanding and the amount of interest earned but not yet paid. Loans include:

- i. *Short-term loans* comprise loans that have an original maturity of one year or less. Loans repayable on the demand of the creditor should be classified as short-term even when these loans are expected to be outstanding for more than one year. Examples of short-term loans include debt related to credit cards and other forms of revolving credit. Furthermore, overdrafts on transferable deposits should also be recorded as short-term loans.
- ii. *Long-term loans* comprise loans that have an original maturity of more than one year, such as commercial loans, consumer loans, and mortgages.

2. Definition of the several financial institutions

The financial corporations' sector is defined in the 2008 System of National Accounts (2008 SNA) as all institutional units whose principal activity is the production of financial services which are "the result of financial intermediation, financial risk management, liquidity transformation or auxiliary financial activities" (SNA 2008, paragraph 4.98). This definition does not only include financial intermediaries, such as banks, insurance companies and pension funds, but also financial auxiliaries as well as captive financial institutions. Table A B.1 presents a detailed breakdown of financial corporations.

Monetary financial institutions (MFIs)

Monetary financial institutions (MFIs) comprise:

- i. *The central bank*, which issues currency and deposits, and exercises control over the financial system.
- ii. *Deposit-taking institutions*, which engage in financial intermediation via incurring liabilities in the form of deposits (or close substitutes).
- iii. *Money market funds (MMFs)* which consist of investment schemes that raise funds by issuing shares (or units), and invest primarily in short-term funds. MMFs belong to the MFI sector, as their shares are considered close substitutes for bank deposits. Because of their important role in the supply of money, they are usually closely monitored and subject to specific regulations.

Table A A.1. The financial corporations' sector and its subsectors

Financial corporations	
Monetary financial institutions (MFIs)	
Central bank	
Deposit-taking corporations except the central bank – “banks”	
Money market funds (MMF)	
Other financial institutions (OFIs, i.e. financial corporations except MFIs, insurance corporations and pension funds)	
Non-MM investment Funds	
OFIs excluding investment funds	
<i>Other financial intermediaries</i>	
	Financial corporations engaged in securitisation of assets
	Securities and derivatives dealers
	Financial corporations engaged in lending
	Specialised financial corporations
<i>Financial auxiliaries</i>	
<i>Captive financial institutions and money lenders</i>	
Insurance corporations	
Pension funds	

Source: Van de Ven, P. and D. Fano (eds.) (2017), Understanding Financial Accounts, OECD Publishing, Paris, <https://doi.org/10.1787/9789264281288-en>.

Non-monetary financial institutions

Non-monetary financial institutions are characterised by the fact they cannot issue deposits or money market shares. As they do not offer deposits (or close substitutes) to the public they are not subject to the same regulations as MFIs. Three non-monetary financial subsectors can be distinguished:

- i. *Non-MMF investment funds (referred as “investment funds” in the paper)* are of numerous variety and offer a myriad of investment products for all types of investors, from individual savers to large institutional investors. Investment funds are collective investment schemes that raise funds by issuing investment fund shares⁸⁹ (or units), and invest these funds in the financial markets or in real estate.
- ii. *Insurance corporations* and iii) *Pension funds*. Both types of institutions provide financial services associated with five types of activities: non-life insurance, life insurance and annuities, reinsurance, social insurance schemes, and standardised guarantee schemes. This subsector, however, does not include obligatory insurance schemes, like protection against unemployment, illness and invalidity, medical expenses and retirement, which are provided and controlled by the government. These social security schemes, and the funds operating them, are treated as part of the general government.

Other financial intermediaries, excluding investment funds

This group is very heterogeneous and comprises:

- i. *Other financial intermediaries* consist of specialised branches. They typically raise funds from savers and lend these funds to the public or invest them in markets, but they are not deposit taking institutions, investment funds, insurance corporations, or pension funds. Other financial intermediaries include, for example, financial corporations engaged in the securitisation of assets, security and derivative dealers, financial corporations engaged in lending, and other

specialised financial corporations. Generally, these institutions are less regulated and their economic and financial importance differs widely between economies.

- ii. *Captive financial institutions* and money lenders are defined as institutional units, for which most of either their assets or liabilities are not transacted on open markets. They do not channel funds from one part of the public to another part of the public, and are thus not considered as financial intermediaries. They either raise funds from the public but only channel them to an enterprise group, or they receive funds from one individual household, enterprise, or enterprise group and invest the funds in the financial markets on their behalf. Examples of the latter are trusts and money lenders. Trusts receive funds from individual households or families and invest the funds in the financial markets. Similarly, money lenders use their own funds, i.e. they do not raise funds from the public to lend to creditors.
- iii. *Financial auxiliaries* facilitate financial transactions between third parties without becoming the legal counterpart, for example as brokers or consultants. They therefore do not put themselves at risk and their financial positions tend to be small. The only type of financial auxiliaries which may have substantial financial positions are head offices with financial corporation subsidiaries.

Annex B. Leveraged loans: Data and methodology

A leveraged loan is a commercial loan provided to a borrower that has a non-investment grade rating, by a group of lenders. It is first structured, arranged, and administered by one or several commercial or investment banks, known as arrangers. It is then sold (or syndicated) to other banks or institutional investors.

This database includes leveraged and highly leveraged loan deals in the United States and Europe⁹⁰ from twelve economic sectors⁹¹ over the period 1990-2018. The most granular level of data breakdown is considered to account for the possible multiple tranches of the loan issued. For example, overall loan package may include several tranches, each of them having different characteristics, maturity date, pricing, even seniority etc. and be targeted towards different types of institution in the secondary loans market as well. Given the lack of consistent definition of leveraged lending, there is uncertainty over the total stock of outstanding leveraged loans. The commonly cited S&P index captures liquid, institutional loans. In this paper, estimates of the total stock is based on Refinitiv's definition of leveraged loans. Relative to other estimates, it is more likely to cover smaller, middle-market deals and loans that are less widely syndicated. This estimate includes only the value of closed loans. In other words, liquid and illiquid loans are included as well as institutional and non-institutional term loans. The loan amount is converted in USD using the spot exchange rate at the loan closing date.

Gross issuance refers to total issuance, including for refinancing purposes. It does not subtract repayments of outstanding loans. Outstanding amount is calculated based on loan issuance but excludes the value of drawn and undrawn revolving credit facilities. Linear amortisation schedule is postulated for term loans A and other amortising loans (i.e., mortgages, equipment, construction, commercial loans). All other terms loans are not amortised as they are repayable at maturity. To account for loan re-financing, a 40% early repayment ratio is used.

Deals are identified as "leveraged" in Refinitiv loan deal database based on a combination of the following criteria:

- Margins: transactions with drawn spread of at least LIBOR+175 bps for US syndications and at least LIBOR+250 bps for European syndications
- Ratings: transactions for issuers with senior debt ratings of BB+/Ba1 or lower. In the event of a split rating, the higher rating is applied.
- Price-earning sponsor-backed financings: transactions whereby a private equity sponsor maintains an ownership position allowing them to influence the management of the company via buyouts or levering of issuer.
- Loans to unrated companies are included in the database on a case-by-case basis as long as the spread is greater than or equal to the applicable LIBOR margin thresholds. In case the pricing does not represent market characteristics, debt-to- EBITDA levels may be considered on a case-by-case basis for unrated issuers. For US leveraged deals structured with an Asset Based component with spreads less than the applicable LIBOR margin thresholds, the entire

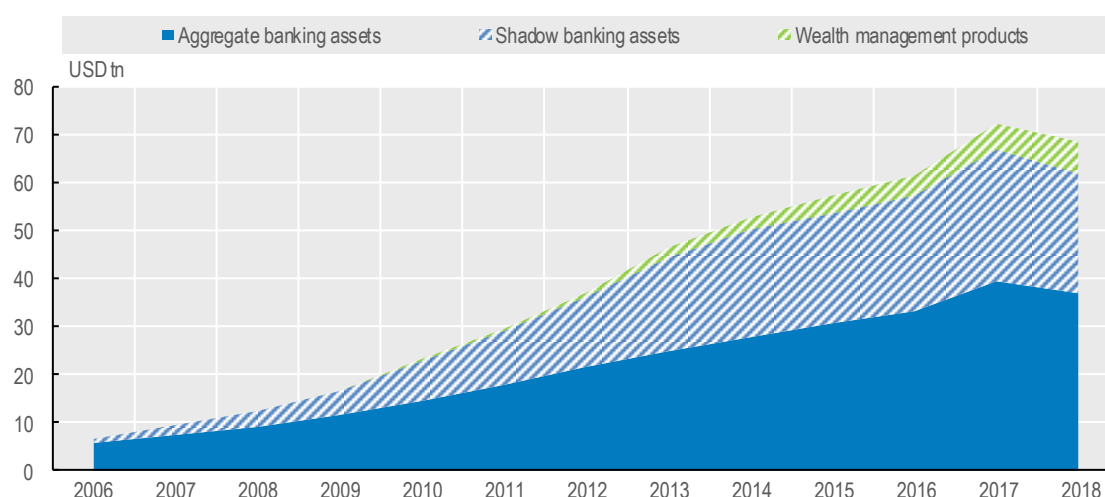
deal would be considered as leveraged credit. The following types of loans are excluded from the leveraged loan deal database regardless of pricing and borrower rating: traditional project finance, real estate, and securitisation projects.

- Deals identified as “highly leveraged” in Refinitiv loan deal database refer to transactions with drawn spread of LIBOR+275 for US syndications and of LIBOR+350 or greater for European syndications.

Annex C. China – WMPs, entrusted loans, and peer-to-peer

Extensive Chinese development, which is reaching a more diversified and complex stage, urges the need of alternative financing amplified by the quantitatively-constrained banking system. Most shadow financing in China includes undiscounted bank acceptances, trust and entrusted loans and wealth management product (WMPs). In 2006, assets of Chinese banks totalled USD 5.6 trillion compared to USD 1.2 trillion of shadow financing assets. In 2018, shadow banking assets have nearly reach the levels Chinese bank assets, increasing to USD 31.7 trillion and USD 37 trillion respectively (Figure A D.1).

Figure A C.1. Rising shadow banking and WMP in China, 2006-2018



Note: This figure shows Chinese banks' aggregate total assets and shadow banking assets which include entrusted loans, trust loans and undiscounted bank acceptances. Wealth management products (WMPs) are uninsured financial product sold by Chinese banks and other financial institutions which promise higher returns than traditional bank deposits.

Source: Bloomberg Intelligence, OECD calculations.

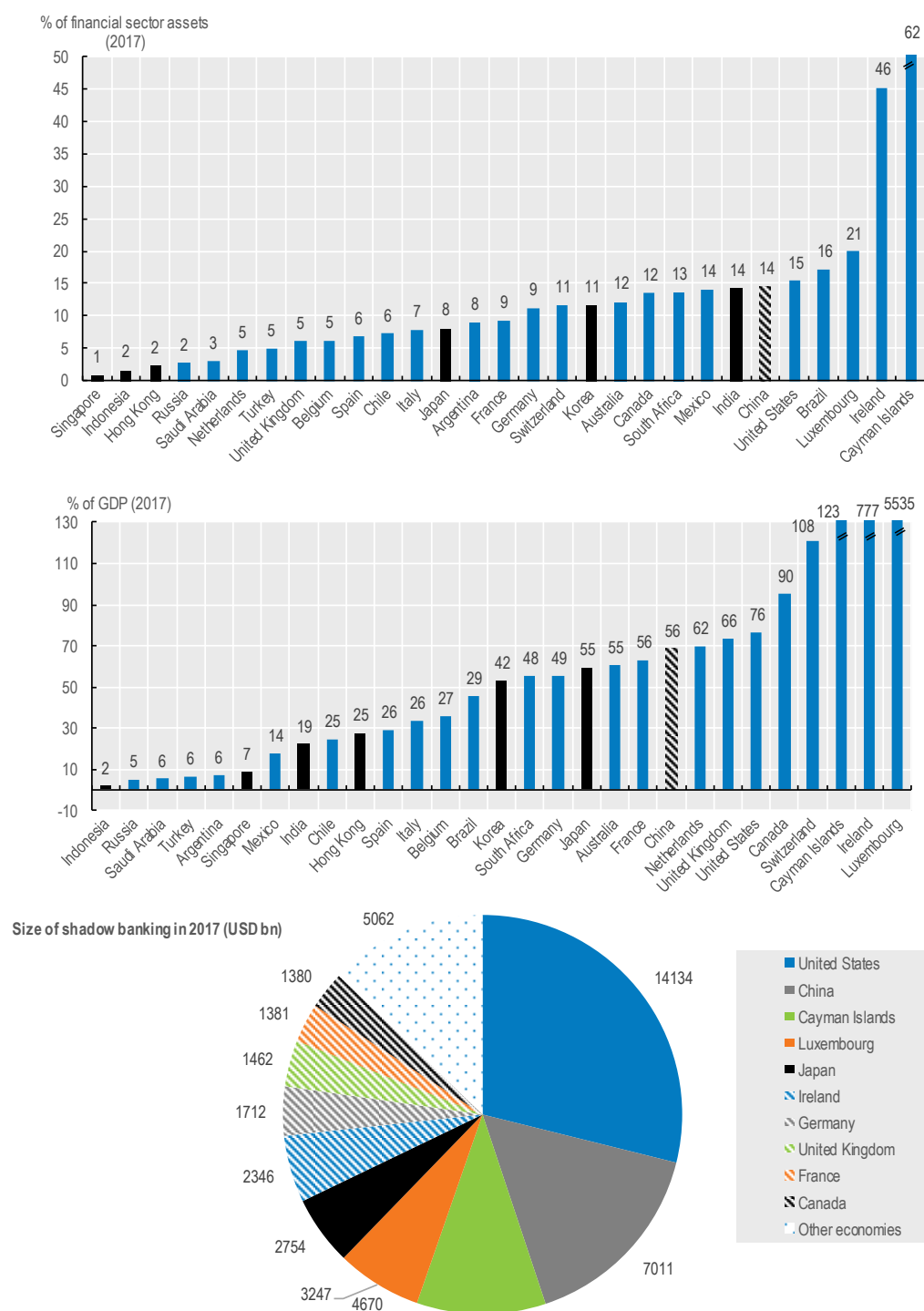
Shadow banking in China takes a markedly different form compared to that in the United States. A key characteristic is that commercial banks are the dominant players in China's shadow banking system.⁹² The rise of such new and complex "structured" non-bank credit intermediation has emerged and quickly reached a large scale driven by banks trying to alleviate regulatory burdens (i.e., NPL provisions or loan to debt ratio ceilings) through a reclassification of existing bank assets into investment receivables. Using Financial Stability Board (FSB) narrow measure of shadow banking⁹³ scaled by financial sector assets (including the central bank) or GDP, China is ranked 6th and 9th among 29 selected economies

respectively in 2017 (Figure A D.2). In absolute terms, Chinese shadow banking sector is the world's second-largest in 2017 after the United States, with total assets of USD 8.2 trillion. In 2017, total assets of China shadow banking sector accounts for about half of US shadow banking sector but is about 3 times more than in Japan or in Ireland and between 4 and 5 times more than in the United Kingdom, Germany or France.

Companies are now able to lend to each other through three mechanisms that involve banks as intermediaries only, and to which reserve requirements and ceilings on interest rates and bank credit do not apply. First, with undiscounted bank acceptances, companies can issue a bill that instructs the bank to make payments to corporates and the bank acts as a guarantor (the acceptance liability replacing the money paid to the third party). This transaction is essentially a bank loan in economic form, but remains off the balance sheet of the bank unless the exposure becomes non-performing. Second, with trust loans, the company can also engage in direct lending, with the bank again acting as intermediary. Third, with entrusted loans, banks also administer trust funds on behalf of individuals and entities and may lend funds. China has moved from a negligible level of undiscounted bank acceptances, trust and entrusted loans in 2006 (representing less than 4% of the amount raised at a peak in 2017) to a record amount of CNY 27.8 trillion (USD 4.3 trillion) in 2017. After reaching a peak in 2017, the amount of shadow bank loans in China decreased by 11% in 2018 at CNY 24.9 trillion (USD 3.6 trillion) in 2018, in part due to the authorities' efforts to constrain non-bank credit growth due to elevated concerns over risks. In relative terms, the share of shadow banking loans in China's GDP peaked up at 34.28% in 2017 and decreased to 28.1% in 2018.

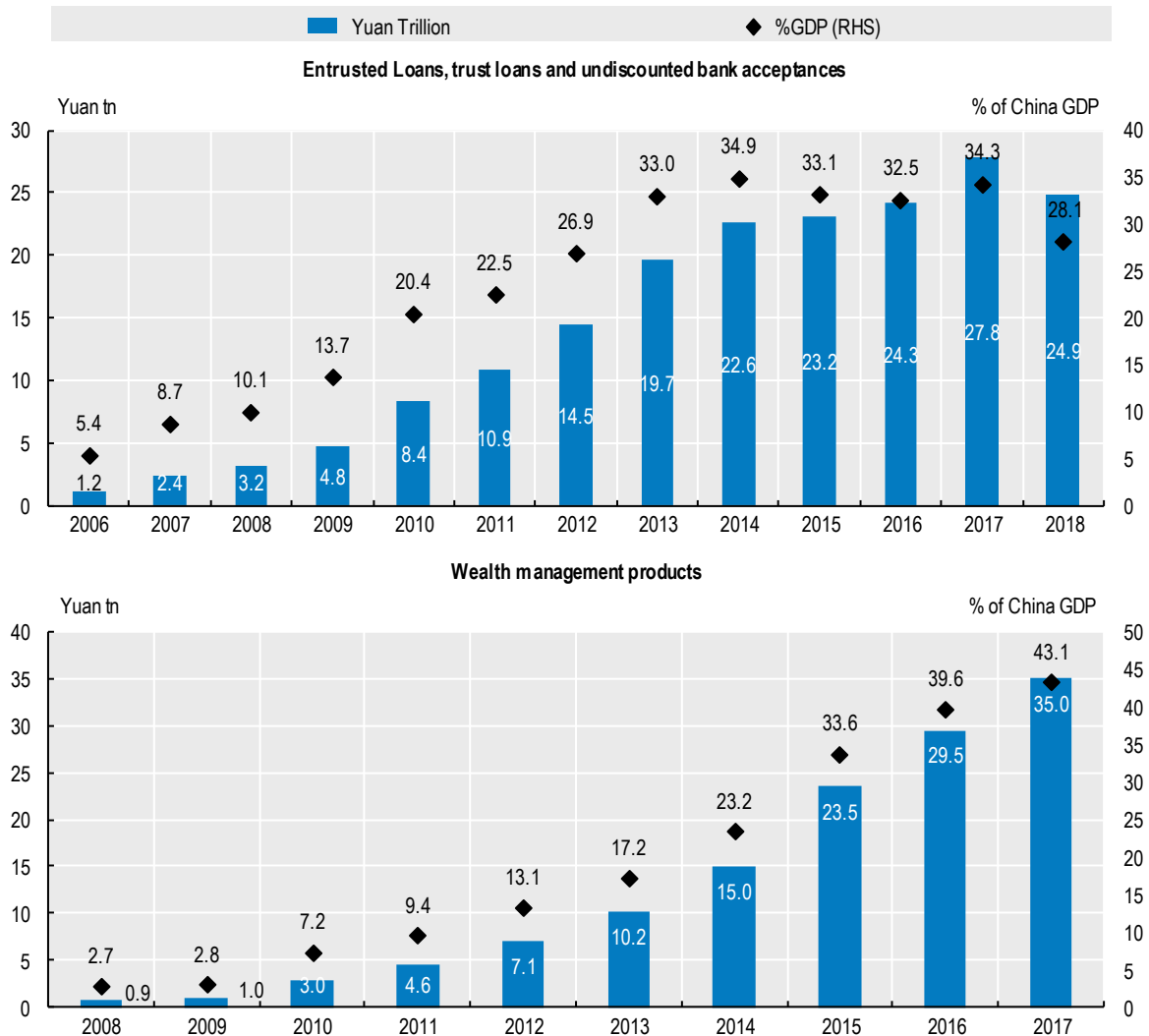
In addition to shadow banking loans, wealth management products (WMPs) are uninsured financial product sold in China by banks and other financial institutions. These products serve as alternative savings instruments, which promise higher returns than traditional bank deposits. Banks are the dominant issuers of WMPs⁹⁴. Similarly to shadow banking loans, China has moved from a negligible level of WMPs in 2008 (representing less than 2.5% of the amount raised at a peak in 2017) to a record amount of CNY 35 trillion in 2017. In relative terms, the share of WMPs in China's GDP has continuously increased from 3% in 2008 to 43% in 2017 (Figure A D.3). Non-bank credit intermediation not only implies tight interlinkages between commercial banks and shadow banking entities, but also generates close ties with China's bond market.⁹⁵ A large share of the proceeds from WMPs have been invested in the bond market. This is an intended consequence of regulation on WMPs, stipulating that at least 75% of the underlying assets of WMPs must consist of so-called standardised debt instruments, including bonds, money market instruments, and bank deposits. WMPs have effectively provided a channel for retail investors to invest in bonds, as direct access to the interbank bond market is restricted to financial institutions. WMPs are widely reported to be aggressively investing in municipal corporates bonds (MCBs). Chen, He, Liu (2018) find that the share of MCBs are invested by WMPs has risen sharply to over 60% in 2016.⁹⁶ The strong demand for MCBs from WMPs contributed to considerable increase in local government debt. Local government non-bank debt as a fraction of the shadow banking balance in China was at a negligible level of 1.5% in 2008 but surged to 48% in 2016.

Figure A C.2. Shadow banking sector's absolute and relative for selected economies, 2017



Source: Financial Stability Board 2018 Shadow Banking Monitoring Report, IMF World Economic Outlook database, OECD calculations.

Figure A C.3. Outstanding balance of shadow banking loans and wealth management products (WMPs) in China, 2006-2018



Note: This figure shows Chinese shadow banking assets which include entrusted loans, trust loans and undiscounted bank acceptances. Wealth management products (WMPs) are uninsured financial product sold by Chinese banks and other financial institutions which promise higher returns than traditional bank deposits.

Source: Bloomberg Intelligence, IMF World Economic Database, OECD calculations.

For these reasons, the potential systemic risk of China's local-government debt is an important question. Local governments have been relying heavily on land sales to balance their budget⁹⁷, which is unlikely to be sustainable in the long run. These debts are backed by governments at different authority levels, explicitly or implicitly. The market participants, including WMP investors, have "bail-out" expectations, implying that either banks (which sold WMPs) or local governments (which sold MCBs) are bearing the loss ultimately. In 2015, the Ministry of Finance started the "swap program" that allows local governments to issue munibonds to replace their maturing "qualified" debt, which largely excludes the "contingent bailout liability". The widespread understanding is that these munibonds are ultimately fully backed by the central government, which have plenty of resources to absorb the losses. This significantly reduces, though far from eliminates, the uncertainty of the local governments' repayment

ability and the default risk of MCBs. A wave of defaults may trigger a systemic banking crisis as China's local government debts are either hidden on the banks' off-balance sheets (such as MCBs through WMPs) or even directly sitting on their on-balance sheets.

The development of the non-bank credit intermediation sector offers ample opportunities for additional funding sources, risk management and new investment vehicles that are tailored to the needs of actual market participants. However, resulting tight and growing financial sector linkages further raise the potential for the transmission of financial shocks among savers, banks and bond market. The combination of rising interest rates and slower global growth perspectives will erode the debt sustainability of these leveraged products, and could contribute to considerable rating downgrades and defaults. These negative market dynamics may lead to downward spiral and increased financial crisis risk similarly to what happened in the United States during the 2008 Subprime crisis. Besides, the development and adoption of innovative WMPs, while bringing potentially high profitable investment opportunities may also give rise to potential risk of unexpected losses without appropriate traditional loss buffers. This might have a durable negative on impact trust sentiment and saving buffers of the wide base of small bank customers. WMPs invest in a wide range of industries, including industries that are vulnerable to weak property market conditions or those experiencing overcapacity. Most WMPs are not explicitly guaranteed by the issuing bank so investors legally assume the risk of these products. A key issue is whether the presumption of implicit guarantees is upheld or the authorities allow failing WMPs to default and investors to experience losses arising from these products.

Annex D. List of previously published working papers

The full series is listed below in chronological order. Prior to March 2010, the series was named *OECD Working Papers on Insurance and Private Pensions*. All working papers can be accessed online at: www.oecd.org/daf/fin/wp.

2017

WP.43: Financial Education for MSMEs and Potential Entrepreneurs

WP.42: Behavioural Economics and Financial Consumer Protection

2016

WP.41: Unleashing the Export Potential of SMEs in Greece

WP.40: Financial Education Policies in Asia and the Pacific

2015

WP39: Financial Education for Long-term Savings and Investments: A Review of Research and Literature

WP38: Financial Education for Migrants and their Families

WP37: The Bitcoin Question: Currency versus Trust-less Transfer Technology

2013

WP36: Institutional Investors and Infrastructure Financing

WP35: Institutional Investors and Green Infrastructure Investments: selected case studies

WP34: Promoting Financial Inclusion through Financial Education

WP33: Financial Education in Latin America and the Caribbean

WP32: Pension Fund Investment in Infrastructure: A Comparison between Australia and Canada

WP31: Policyholder Protection Schemes: Selected Considerations

2012

WP30: The Effect of Solvency Regulations and Accounting Standards on Long-Term Investing

WP29: Trends in Large Pension Fund Investment in Infrastructure

WP28: Communicating Pension Risk to DC Plan Members: The Chilean Case of a Pension Risk Simulator

- WP27: The Role of Funded Pensions in Retirement Income Systems: Issues for the Russian Federation
- WP26: Infrastructure Investment in New Markets: Challenges and Opportunities for Pension Funds
- WP25: The Status of Financial Education in Africa
- WP24: Defining and Measuring Green Investments: Implications for Institutional Investors' Asset Allocations
- WP23: The Role of Institutional Investors in Financing Clean Energy
- WP22: Financial Education, Savings and Investments
- WP21: Identification and Assessment of Publicly Available Data Sources to Calculate Indicators of Private Pensions
- WP20: Coverage of Private Pensions Systems: Evidence and Policy Options
- WP19: Annual DC Pension Statements and the Communications Challenge
- WP18: Lessons from National Pensions Communication Campaigns
- WP17: Review of the Swedish National Pension Funds
- WP16: Current Status of National Strategies for Financial Education
- WP15: Measuring Financial Literacy: Results of the OECD International Network on Financial Education Pilot Study
- WP14: Empowering Women through Financial Awareness and Education
- WP13: Pension Fund Investment in Infrastructure: Policy Actions
- WP12: Designing Optimal Risk Mitigation and Risk Transfer Mechanisms to Improve the Management of Earthquake Risk in Chile

2011

- WP11: The Role of Guarantees in Defined Contribution Pensions
- WP10: The Role of Pension Funds in Financing Green Growth Initiatives
- WP9: Catastrophe Financing for Governments
- WP8: Funding in Public Sector Pension Plans - International Evidence
- WP7: Reform on Pension Fund Governance and Management: The 1998 Reform of Korea National Pension Fund

2010

- WP6: Options to Improve the Governance and Investment of Japan's Government Pension Investment Fund
- WP5: The New IAS 19 Exposure Draft
- WP4: The EU Stress Test and Sovereign Debt Exposures
- WP3: The Impact of the Financial Crisis on Defined Benefit Plans and the Need for Counter-Cyclical Funding Regulations

WP2: Assessing Default Investment Strategies in Defined Contribution Pension Plans

WP1: Framework for the Development of Financial Literacy Baseline Surveys: A First International Comparative Analysis

OECD Working Papers on Insurance and Private Pensions

2010

WP41: Policy Action in Private Occupational Pensions in Japan since the Economic Crisis of the 1990s

WP40: Pension Funds' Risk-management Framework: Regulation and Supervisory Oversight

WP38: Managing Investment Risk in Defined Benefit Pension Funds

2009

WP37: Investment Regulations and Defined Contribution Pensions

WP36: Private Pensions and Policy Responses to the Financial and Economic Crisis

WP35: Defined-contribution (DC) arrangements in Anglo-Saxon Countries

WP34: Evaluating the Design of Private Pension Plans

WP33: Licensing Regulation and the Supervisory Structure of Private Pensions

WP32: Pension Fund Investment in Infrastructure

Notes

¹ The FSB Global Monitoring Report on Non-bank Financial Intermediation (formerly the Global Shadow Banking Report) reports offer a useful example of comprehensive global mapping of key structural shifts in post-crisis financial intermediation. For an example of work using OECD statistics, see Hagino S. and L. Cavieres (2012), “OECD financial statistics for measuring the structure and size of the shadow banking system”, IFC Bulletin N°36. See also, Adrian, T. and B. Jones (2018), “Shadow Banking and Market-Based Finance”, Financial Stability Review, Banque de France.

² In this paper, macrofinancial imbalances relate to the level and growth of credit and overall credit intermediation relative to economic growth, and the pricing of financial imbalances. It does not explicitly incorporate the international dimensions, such as current account imbalances.

³ Feroli, M., Greenlaw, D., Hooper, P., Mishkin, F. S., & Sufi, A. (2017). “Language after liftoff: Fed communication away from the zero lower bound. *Research in Economics*”, 71(3), 452–490.

⁴ The Reserve Bank of Australia provided a useful reference with respect to the core functions of the financial system. See Reserve Bank of Australia (2014), “Submission to the Financial System Inquiry”.

⁵ Merton, R (1995), “A Functional Perspective of Financial Intermediation”, *Financial Management* 24: 23-41.

⁶ Adrian T. and H. Shin (2010), “The Changing Nature of Financial Intermediation and the Financial Crisis of 2007-09”, Federal Reserve Bank of New York, Staff Reports, N°439.

⁷ Thompson, J. K. (2009), “Current and Structural Developments in the Financial Systems of OECD Enhanced Engagement Countries”, *OECD Financial Markets Trends*, 2009/2.

⁸ Hagino S. and L. Cavieres (2012), “OECD financial statistics for measuring the structure and size of the shadow banking system”, IFC bulletin N°36.

⁹ Demirgüç-Kunt A. and R. Levine (1999), “Bank-Based and Market-Based Financial Systems: cross country analysis”, *World Bank Research Series*.

¹⁰ It is useful to consider that both banking and market-based finance, the breadth of international financial markets, and the risk of financial contagion were evident and understood even during the Roman Empire. See Temin, P. (2001), “Financial Intermediation in the Early Roman Empire”, *The Journal of Economic History*, 64(3), 705-733. At that time, Cicero noted “this system of credit and finance which operates at Rome, in the Forum, is bound up in, and depends on capital invested in Asia; the loss

of the one inevitably undermines the other and causes its collapse.” Examples of early forms of bank and money market fund instruments are given.

¹¹ Jackson, Gregory and Vitols, Sigurt (2001), “Between Financial Commitment, Market Liquidity and Corporate Governance: Occupational Pensions in Britain, Germany, Japan and the USA”, in B Ebbinghaus and P Manow (eds), *Comparing Welfare Capitalism*. Routledge, London: 171 189.

¹² Sylla R and R Wright (2004), “Networks and Financial Systems”, Business History Conference. New York, USA. The research notes that in both Germany and Japan, banks held significant equity stakes in non-financial firms and often exerted some degree of managerial control over borrowers.

¹³ Bagehot, W. (1873), “Lombard Street: A Description of the Money Market”, London: Henry S. King, 1873, Third Edition. He noted that “Lombard Street is the great go-between, as a sort of standing broker between quiet saving districts of the country and the active employing districts.”

¹⁴ While mutual funds appeared in US markets as early as the 1890s. While the first open-ended mutual fund was created in 1924, the liquidity strains on closed-ended funds during the Great Recession prompted greater demand for open-ended funds that provided daily liquidity. See speech by Paul Royce, Director, Division of Investment Management, SEC (2000), “Regulation of Mutual Funds in the United States – A Successful Regulatory Regime”.

¹⁵ Adrian, Tobias and Shin, Hyun Song (2011), “Financial Intermediary Balance Sheet Management”, Federal Reserve Bank of New York, Staff Report No. 532.

¹⁶ Merton, R (1995), “A Functional Perspective of Financial Intermediation”, *Financial Management* 24: 23-41.

¹⁷ Batsa, J. and A. Houben (2017), “Bank-based versus market-based financing: implications for systemic risk”, DNB Working Paper N°577. Based on a fixed effects regression model estimated over a panel of 22 OECD countries, the results show that bank-based financing generates systemic risk while market-based debt and especially market-based stock financing reduce systemic risk. Implications for policy depends on the extent to which the post-crisis reforms have reduced the inherent risks of banking systems relative to market-based finance.

¹⁸ IMF and World Bank (2016), “Staff note for the G20 IFAWG: Development of Local Currency Bond Markets.” This phenomenon is also occurring due to the greater holdings of EM pension funds and insurers of local debt.

¹⁹ Risks such as leverage, maturity and liquidity transformation conform to shadow banking risks described in the FSB (2013) “Policy Framework for Strengthening Oversight and Regulation of Other Shadow Banking Entities.”

²⁰ Bagehot (1873).

²¹ See Gorton, G. and A. Metrick (2012), “Securitized banking and the run on repo”, *Journal of Financial Economics*, 104(3), 425-451; Pozsar, Z., T. Adrian, A. Ashcraft, and H. Boesky (2013), “Shadow banking”, Federal Reserve Bank of New York, *Economic Policy Review*; Blundell-Wignall A (2008), “The Subprime Crisis: Size, Deleveraging and Some Policy Options”, *OECD Financial Market Trends*, 2008/1.

- ²² Bats, J., and A. Houben (2017), “Bank-based vs. market-based financing.”
- ²³ Adrian, T. and B. Jones (2018), “Shadow banking and market-based finance”, Financial Stability Review, Banque de France.
- ²⁴ Sir Jon Cunliffe, Deputy Governor Financial Stability (2017), “Market-based finance: a macroprudential view”, Speech given at the Asset Management Derivatives Forum.
- ²⁵ References on the high debt levels and consequences are many: Carmen M. Reinhart, Kenneth S. Rogoff (2008), “This Time is Different: A Panoramic View of Eight Centuries of Financial Crises,” NBER Working Paper No. 13882.
- ²⁶ Çelik, S., G. Demirtaş and M. Isaksson, 2019. “Corporate Bond Markets in a Time of Unconventional Monetary Policy”, OECD Capital Market Series, Paris, www.oecd.org/corporate/Corporate-Bond-Markets-in-a-Time-of-Unconventional-Monetary-Policy.htm.
- ²⁷ Detailed bond outstanding data by sector for selected European economies are available upon request.
- ²⁸ OECD, 2009. “Report on the Strategic Response: Strategies for Aligning Stimulus Measures with Long-term Growth”, Reports submitted to the OECD’s annual ministerial meeting in June 2009.
- ²⁹ Correa-Caro, C., Medina, L., Poplawski-Riberio, M. and B. Sutton, 2018. “Fiscal Stimulus Impact on Firms’ Profitability During the Global Financial Crisis”, IMF Working Paper Series.
- ³⁰ If there is a level above which debt substantially lowers growth, then reducing debt below that threshold should be a high priority. On the other hand, if there is no point at which growth prospects start to decline dramatically, then policy makers may find it appropriate to give priority to increasing growth rather than reducing debt ratios.
- ³¹ Reinhart, C., M., and Rogoff, K., S. (2010), Growth in a Time of Debt, American Economic Review, Vol. 100, No. 2, pp. 573–78. Reinhart, C., M., Reinhart, V., R., and Rogoff, K., S., 2012. Public Debt Overhangs: Advanced-Economy Episodes since 1800, Journal of Economic Perspectives, Vol. 26, No. 3, pp. 69–86. Reinhart, C., M., and Rogoff, K., S., 2014. This Time is Different: A Panoramic View of Eight Centuries of Financial Crises, Annals of Economics and Finance, Society for AEF, vol. 15(2), pages 1065-1188.
- ³² Herndon, T., Ash, M., and Pollin, R. (2013), Does High Public Debt Consistently Stifle Economic Growth? A Critique of Reinhart and Rogoff, Political Economy Research Institute Working Paper No. 322 (Amherst, Massachusetts).
- Panizza, Ugo, and Andrea F. Presbitero (2012), Public Debt and Economic Growth: Is There a Causal Effect?, MoFIR Working Paper No.65 (Ancona, Italy: Money and Finance Research Group).
- Pescatori, A., Sandri, d., and Simon, J. (2014), Debt and Growth: Is There a Magic Threshold?, 2014 IMF Working Paper 14/34.
- ³³ Freedman, C., Kumhof, M., Laxton, D., Muir, D., and S. Mursula (2010), “Global Effects of Fiscal Stimulus During the Crisis”, Journal of Monetary Economics, 57(5), pp. 506-526.

Auerbach, A., J., and Y. Gorodnichenk (2017), “Fiscal Stimulus and Fiscal Sustainability”, NBER Working Paper No. 23789.

³⁴ OECD (2009), “Report on the Strategic Response: Strategies for Aligning Stimulus Measures with Long-term Growth”, Reports submitted to the OECD’s annual ministerial meeting in June 2009.

³⁵ Data sourced from IMF World Economic Outlook Database including 197 economies.

³⁶ For a detailed analysis of how high indebtedness can create vulnerabilities, see OECD (2012), “Debt and Macroeconomic Stability”, OECD Economics Department Policy Notes, No. 16 January 2013.

³⁷ Çelik, S., G. Demirtaş and M. Isaksson (2019), “Corporate Bond Markets in a Time of Unconventional Monetary Policy”, OECD Capital Market Series, Paris, www.oecd.org/corporate/Corporate-Bond-Markets-in-a-Time-of-Unconventional-Monetary-Policy.htm.

³⁸ OECD (2019), “General Assessment of the Macroeconomic Situation”, OECD Economic Outlook, Volume 2019 Issue 1, OECD Publishing, Paris, <https://doi.org/10.1787/b2e897b0-en>.

³⁹ Çelik, S., G. Demirtaş and M. Isaksson (2019), “Corporate Bond Markets in a Time of Unconventional Monetary Policy”, OECD Capital Market Series, Paris, www.oecd.org/corporate/Corporate-Bond-Markets-in-a-Time-of-Unconventional-Monetary-Policy.htm

US Federal Reserve (2019), Financial Stability Report, May. This report documents that the sizeable growth in business debt over the past seven years has been characterised by large increases in risky forms of debt extended to firms with poorer credit profiles or that already had elevated levels of debt. While growth in these riskier forms of debt slowed to zero in late 2016, it has rebounded more recently, with leveraged loan net issuance more than offsetting a modest decline in issuance of high-yield and unrated bonds. Issuance of leveraged loans continued at a solid pace in the first quarter of 2019, though refinancing activity has decreased because of the somewhat elevated spreads.

⁴⁰ For evidence linking deteriorating financial conditions to increased downside risk in gross domestic product growth, see: International Monetary Fund (2017), “Financial Conditions and Growth at Risk,” Chapter 3 in Global Financial Stability Report: Is Growth at Risk? (Washington: IMF, October), pp. 91–118; and Tobias A., Boyarchenko, N., and Giannone, D. (2019), Vulnerable Growth, American Economic Review, vol. 109, pp. 1263–89. For similar evidence on risk to unemployment, see Kiley, M., T. (2018), Unemployment risk, Finance and economics Discussion Series 2018-067, Board of Governors of the Federal Reserve System, Washington.

⁴¹ Sovereign bond spread in Greece have risen to historically high levels reaching 10760 basis points from March 2012 to March 2017.

⁴² Such empirical evidences are based on US data as no extensive historical data are available for other countries.

⁴³ These figures are higher than the ones presented in Figure 3.3 showing marketable outstanding debt of financial institutions, excluding customer deposit financing and equity. Figure 4.1 present total assets of financial institutions. Financial assets include several types of assets such as cash and other cash items, debt securities purchased, loan granted or purchased, equity securities and investment fund shares held in portfolio, financial derivatives, insurance, pension and standardised guarantee schemes, employee stock option and other accounts receivable or payable.

⁴⁴ Investment funds and other financial intermediaries are contrasting to banks in terms of alternative financial intermediation with distinct roles and characteristics. Investment funds and other financial intermediaries are the main providers of market-based finance. Investment funds are of numerous variety and offer a myriad of investment products for all types of investors. Other financial intermediaries consist more of specialised branches and include, for example, financial corporations engaged in the securitisation of assets, security and derivative dealers, financial corporations engaged in lending, and other specialised financial corporations.

⁴⁵ For further details on investment funds and other financial intermediaries, see Annex A.

⁴⁶ Nesbitt, S. L. (2018), "Private Debt: Opportunities in Corporate Direct Lending", Wiley Editions.

⁴⁷ This discussion is complemented by some detailed analysis of shadow banking in China in Annex C.

⁴⁸ Other aspects of this growth, related to mortgage financing and emerging market credit, for example, are not explored in this note.

⁴⁹ Investment Company Institute (ICI) Worldwide Marketing Data, www.ici.org/research/stats/worldwide/.

⁵⁰ For example, regulators in Sweden and Norway guided funds to suspend redemptions on a range of high-yield corporate debt funds in March 2020. Investors withdrew \$12.2 billion from U.S. funds that buy corporate bonds and loans, the biggest weekly total in at least a decade.

⁵¹ Goldstein, I., H. Jiang and D. Hg (2017), "Investor flows and fragility in corporate bond funds", *Journal of Financial Economics*, 126(3), 592-613; Cetorelli, N., F Duarte, T. Eisenbach (2016) "Are Asset Managers Vulnerable to Fire Sales?", Federal Reserve Bank of New York, Liberty Street Economics; Baranova, Y., J. Coen, P. Lowe, J. Noss and L. Silvestri (2017), "Simulating stress across the financial system: the resilience of corporate bond markets and the role of investment funds" Bank of England Financial Stability Papers 42, Bank of England.

⁵² M. Feroli, A. Kashyap, K. Schoenholtz, H.S. Shin, (2014), "Market Tantrums and Monetary Policy", Chicago Booth Research Paper N°14-09.

⁵³ ESRB (2017), "Mapping the interconnectedness between EU banks and shadow banking entities", Working Paper Series N°40.

⁵⁴ FSB (2017), "Policy Recommendations to Address Structural Vulnerabilities of Asset Managers."

⁵⁵ Bank of England estimate.

⁵⁶ National Association of Insurance Commissioners (2018), "U.S. Insurance Industry's Exposure to Collateralized Loan Obligations as of Year-End 2018."

⁵⁷ While deteriorating loan covenants have been the focus of investor attention, and is quantifiable through cov-lite issuance, the deterioration of quality of loan documentation is also a growing concern. Issues such as loose EBITDA adjustment definitions, and allowance of incremental loan tranches.

⁵⁸ Federal Reserve press release (2014), "Six agencies jointly approve final risk retention rule."

⁵⁹ In 2014, the Loan Syndications and Trading Association sued the SEC and the Federal Reserve to exempt open-market CLOs from the rules, since CLO managers do not originate the loans they securitise. In early 2018, a US court of appeals unanimously ruled that risk-retention rules for securitisations should not apply to CLOs. This has allowed CLO managers to begin to distribute the riskiest tranche to institutional and retail investors. See [www.cadc.uscourts.gov/internet/opinions.nsf/871D769D4527442A8525822F0052E1E9/\\$file/17-5004-1717230.pdf](http://www.cadc.uscourts.gov/internet/opinions.nsf/871D769D4527442A8525822F0052E1E9/$file/17-5004-1717230.pdf).

⁶⁰ Leveraged loans have historically utilised maintenance covenants, which are fairly restrictive, in that they would require issuers to meet some form of regular financial test (e.g. certain ratios related to balance sheet and cash flow strength), irrespective of any particular actions being taken by the issuer. In the post-crisis period, however, loan covenants often do not have these features, and are therefore called “cov-lite”. Nevertheless, they do have incurrence covenants, which require an issuer to be in compliance with financial targets only if they take particular actions that may be deemed to affect bondholder interests (e.g. shareholder dividends, issuing additional debt, engaging in M&A that alters cash and leverage, etc). The concern is that without maintenance covenants, loan holders are not able to monitor and prevent highly leveraged issuers from engaging in additional risks that could prompt a default or increase loss-given default. Market participants anticipate that leveraged loans will have lower recoveries than in prior periods, in large part due to the cov-lite features. See Moody’s Investors Service (2019), “Weak covenant protections are the new normal”; Bain Capital (2019), “Implications in the Growth of Covenant-light Loans,” Credit Markets Insights, Q2.

⁶¹ Moody’s Investor Services (2018), “Convergence of loan and high-yield bond markets sets stage for lower recoveries in next downturn.”

⁶² S&P Ratings (2018), “Leveraged Loans: Another New Record for Covenant-Lite”, News and Insights, <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/leveraged-loan-news/leveraged-loans-another-new-record-for-covenant-lite>. Deals are identified as “leveraged” in the S&P/LCD database based on the following criteria. A loan is included in the leveraged universe if it is rated BB+ or lower; or it is not rated or rated “BBB-” or higher but has (i) a spread of LIBOR +125 or higher and (ii) is secured by a first or second lien. Under this definition, a loan rated BB+ that has a spread of LIBOR+75 is qualified as leveraged, but a nonrated loan with the same spread is not. Also, an investment grade rated loan is included if its spread exceeds LIBOR+125 and is secured.

⁶³ For further details on leveraged loan data used and methodology, see Annex B.

⁶⁴ Moody’s Investors Service (2018), “Banks - United States: Regional banks' leveraged loan exposures are modest but growing,” November 1.

⁶⁵ BIS (2015), “TLAC, Executive Summary” and BIS (2013), “Cocos: a primer.” CoCos have two main defining characteristics – the loss absorption mechanism and the trigger that activates that mechanism (Graph 1). CoCos can absorb losses either by converting into common equity or by suffering a principal writedown. The trigger can be either mechanical or discretionary (ie subject to supervisory judgment).

⁶⁶ Due to lack of data availability on the extent to which debt has been called, it is difficult to convert annual issuance to total outstanding amounts. Assuming much of the debt over the past several years has not been reissued within this time frame, the market estimate of roughly USD 500 billion.

⁶⁷ Boermans, M. and S. Wijnbergen, (2017), “Contingent convertible bonds: Who invests in European CoCos?”, *Applied Economics Letters*, 25:4, 234-238.

⁶⁸ Bologna, P., A. Miglietta, and A. Segura (2017), “Contagion in the European CoCos Market?”, CEPR Policy Portal.

⁶⁹ See Robert A. Eisenbeis (2019), “Bailouts, Capital, or CoCos: Can Contingent Convertible Bonds Help Banks Cope with Financial Stress?”, CATO Institute.

⁷⁰ While not a key focus of this paper, the authors note that credit-related risks in market-based finance cannot be addressed without considering the macro environment, as the existing tools applied to many of the non-bank intermediaries do not explicitly seek to contain credit growth or the erosion of credit quality.

⁷¹ Certainly preliminary efforts were made in the post-crisis era to better reflect upon the coordinated use of macroprudential policies, and their interaction with other policy initiatives and impacts. See post-crisis work including: Group of Thirty (2010), “Enhancing Financial Stability and Resilience: Macroprudential Policy, Tools, and Systems for the Future.”; IMF, BIS, FSB (2011), *Macroprudential Policy Tools and Frameworks Progress Report to G20*; and Claessens, S. (2014), “An Overview of Macroprudential Policy Tools”, IMF.

⁷² Credit exuberance can also be assessed by the pricing, such as very low spreads and low absolute yields, which is currently the case in many OECD countries. See OECD (2019), *OECD Business and Finance Outlook: Strengthening Trust in Business*, Chapter 1.

⁷³ Carreras, O., E. Davos. R. Piggott (2018), “Assessing macroprudential tools in OECD countries within a cointegration framework”, *Journal of Financial Stability*.

⁷⁴ Cerutti, E., S. Claessens, L. Laeven (2017), “The use and effectiveness of macroprudential policies”, IMF Working Paper, WP/15/61.

⁷⁵ Buch, C., E. Vogel, and B. Weigert (2018), “Evaluating macroprudential policies”, ESRB Working Paper N°76.

⁷⁶ See Adrian, T. and B. Jones (2018), “Shadow banking and market-based finance”, *Financial Stability Review*, Banque de France. This paper raises concerns, amid the implementation of the FSB’s Policy Framework for Shadow Banking Entities across many G20 jurisdictions, about the extent that economic motivations for shadow banking activities have not been fully addressed, and this may have contributed to a shift in risks toward corners of the financial system where policy makers have lower visibility and fewer policy instruments to use.

⁷⁷ Research in this emerging policy area is mixed, such that the efficacy of different macroprudential tools under different macroeconomic circumstances vary considerably. Speech by Vitor Constancio, Vice President, ECB (2014), “Making macro-prudential policy work”, also notes that where monetary policy and macroprudential tools are serving different purposes (one expansionary, on restricting credit), their effects on each other have to be considered. See BIS (2018), “Macroprudential tools have a greater effect on credit growth when reinforced by the use of monetary policy to push in the same direction” which suggests that macroprudential tools have a greater effect on credit growth when reinforced by the use of monetary policy to push in the same direction. Gebauer, F. and S. Mazelis (2019),

“Macroprudential Regulation and Leakage to the Shadow Banking Sector”, finds that tighter capital requirements on commercial banks increase shadow bank lending, which may have adverse financial stability effects.

⁷⁸ See Kim, S., M. Plosser and J. Santos (2016), “Did the Supervisory Guidance on Leveraged Lending Work?” New York Fed; Liberty Street Blog.

⁷⁹ FSB (2017), “Recommendations to address structural vulnerabilities of asset management activities,” and IOSCO (2018), “Recommendations for Liquidity Risk Management for Collective Investment Schemes.”

⁸⁰ Cominetta, M, C. Lambert, A. Levels, A. Rydén and C. Weistroffer (2018), “Macroprudential liquidity tools for investment funds – A preliminary discussion,” ECB Working Paper.

⁸¹ Houben, A., S. Schmdtz, M. Wedow (2015), “Systemic liquidity and macroprudential supervision.” Financial Stability Report, Oesterreichische Nationalbank.

⁸² SUERF (2019), “A products and activities approach to managing risk in asset management” SUERF Policy Note, Issue No 80 by Barbara Novick, Vice Chairman, BlackRock, www.suerf.org/policynotes/6211/a-products-and-activities-approach-to-managing-risk-in-asset-management/html.

⁸³ OECD (2010), “Policy Framework for Effective and Efficient Financial Regulation.”

⁸⁴ Conceivably, if funds were to adjust their liquidity buffers substantially, thereby lowering returns and increasing tracking error against a given index, to may in turn incentivise regulatory arbitrage to shift to ETFs or other vehicles, or similar derivatives strategies that mimic indices.

⁸⁵ Borio, C. and P. Lowe (2002), “Asset prices, financial and monetary stability: exploring the nexus,” BIS Working Papers No 114.

⁸⁶ Feroli, M., Greenlaw, D., Hooper, P., Mishkin, F. S., & Sufi, A. (2017). “Language after liftoff: Fed communication away from the zero lower bound. *Research in Economics*”, 71(3), 452–490.

⁸⁷ Further details on the data and the methodology used by the FSB are available at <http://www.fsb.org/2019/02/global-monitoring-report-on-non-bank-financial-intermediation-2018/>.

⁸⁸ Unconsolidated data are not available for Australia. Thus, consolidated data have been used in the case of Australia only.

⁸⁹ In the case of so-called “open-end” funds the value of the investment fund shares reflects on a one-to-one basis the value of the funds’ investments, i.e. the IF is not “leveraged”. In the case of closed-end funds, a limited number of shares are being issued which are subsequently traded on the stock market, as a consequence of which there may be a difference between the fund’s assets and the value of the shares issues by the fund. Exceptions from this simple investment funds financing model are hedge funds which may incur substantial amounts of other liabilities such as loans. This additional financing allows hedge funds to purchase more assets – the fund gets “leveraged”.

⁹⁰ The following economies are included according to Refinitiv grouping: Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Isle of Man, Italy, Jersey, Latvia, Lithuania, Luxembourg, Malta, Monaco, Netherlands,

Norway, Poland, Portugal, Romania, Russian Federation, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.

⁹¹ Basic Materials, Cyclical Consumer Goods and Services, Energy, Financials, Governmental Services, Healthcare, Industrials, Non-Cyclical Consumer Goods and Services, Non-Profit/Private Organisations/Services, Technology, Telecommunications Services and Utilities.

⁹² Further detailed information on the mapping of China shadow banking are presented in Ehlers et al. (2018).

⁹³ This measure is based on the FSB Policy Framework (2013), in which non-bank financial entities are classified with reference to five economic functions (i.e., management of collective investment vehicles with features that make them susceptible to runs, loan provision that is dependent on short-term funding, intermediation of market activities that is dependent on short-term funding or on secured funding of client assets, facilitation of credit creation and securitisation-based credit intermediation and funding of financial entities), each of which involves non-bank credit intermediation that may pose risks to financial stability.

⁹⁴ Chinese banks are offering two main types of WMPs. First, the principal or return-guaranteed WMPs (PRG-WMPs) that entail full bank guarantees either on the principal or on the return. They are recorded on banks' balance sheets along with the underlying investment which they finance. PRG-WMPs are akin to negotiable certificates of deposit (NCD) and subject to normal banking regulations. They are therefore do not consider to be part of shadow banking. Second, banks offer non-principal guaranteed WMPs with no explicit bank guarantees, which are not recorded on banks' balance sheets. The underlying investment of the non-principal guaranteed WMPs is usually held by a channelling company (i.e., banks' investment or wealth management branch) but the issuing bank normally retains full control over the investment. Effectively, banks act as asset managers, charging fees to investors, without being subject to regulatory restrictions, except for those governing the admissible design of WMPs.

⁹⁵ Ehlers T., Kong, S. and Zhu, F. (2018). Mapping shadow banking in China: structure and dynamics, Bank of International Settlements Working Papers, No 701.

⁹⁶ Chen, Z., He, Z., and Liu, C. (2018), The Financing of Local Government in China: Stimulus Loan Wanes and Shadow Banking Waxes, working paper, Chicago Booth. This 61.5% number is likely to represent an underestimation of the extent to which MCBs are relying on WMPs with the ultimate endorsement of banks. Before the 2017 regulation tightening on China's shadow banking activities, it was popular for managers of WMPs to invest in asset management plans (or several layers of asset management plans, like CDO square in the US market before the 2007-08 financial crisis), which then eventually invest in MCBs. The official statistics ignore this indirect exposure of WMPs in MCB (hence introducing a downward bias of the estimate in this paper). According to Amstad and He (2018) and from practitioners in this market, the rough estimate of the true exposure is that about 70% of MCBs were invested by WMPs around 2016.

Amstad, M., and He, Z. (2018), Chapter 6: Interbank System, Handbook of China's Financial System, edited by Marlene Amstad, Guofeng Sun and Xiong Wei.

⁹⁷ Zhang, Y., and Barnett, A., S. (2014), Fiscal vulnerabilities and risks from local government finance in China, Working paper; Ambrose, B., W., Deng, Y., and Wu, J. (2015), Understanding the risk of China's local government debts and its linkage with property markets, Working paper.