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Global Shadow Banking Monitoring Report 2017

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Executive summary

Non-bank financing provides a valuable alternative to bank financing and helps support real economic activity. For many firms and households, it is also a welcome source of diversification of credit supply, and provides healthy competition for banks. However, if non-bank financing involves bank-like activities, such as transforming maturity/liquidity and creating leverage, it can become a source of systemic risk, both directly and through its interconnectedness with the banking system. Since 2011, the Financial Stability Board (FSB) has been conducting an annual monitoring exercise to assess global trends and risks in the shadow banking system.[1]

This Report presents the results of the FSB's seventh annual monitoring exercise. It covers data up to end-2016 from 29 jurisdictions, including Luxembourg for the first time, which together represent over 80% of global GDP.[2] This Report also includes, for the first time, a classification of non-bank financial entities in China into the FSB's narrow measure of shadow banking. This assessment was conducted on a conservative basis and may be further refined as more granular data become available and in light of further analysis.

As in previous monitoring exercises, this Report compares the size and trends of financial sectors across jurisdictions based primarily on sector balance sheet data. It then narrows the focus to those parts of non-bank credit intermediation that may pose financial stability risks (hereafter the "narrow measure of shadow banking" or "narrow measure"), based on the FSB's methodology.[3] Depending on the context, two samples are presented in this Report. The first sample is comprised of 21 individual non-euro area jurisdictions and the euro area as a whole. For more detailed assessment using granular data, the second sample is comprised of 29 reporting jurisdictions (for details, see Section 1.1). The key terms used throughout this Report are defined in Box 0-1.

The main observations from the 2017 monitoring exercise are as follows:[4]

- *Monitoring Universe of Non-bank Financial Intermediation (MUNFI)* – **This measure of all non-bank financial intermediation grew in 2016 at a slightly faster rate than in 2015 to an aggregate $160 trillion** (ie for 21 jurisdictions and the euro area as a whole). MUNFI's share within the global financial assets (48%) increased for the fifth consecutive year.

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1 The FSB defines shadow banking as "credit intermediation involving entities and activities (fully or partly) outside of the regular banking system". Some authorities and market participants prefer to use other terms such as "market-based finance" instead of "shadow banking". The use of the term "shadow banking" is not intended to cast a pejorative tone on this system of credit intermediation. However, the FSB uses the term "shadow banking" as this is the most commonly employed and, in particular, has been used in earlier G20 communications.

2 Although Luxembourg has not participated in previous exercises, its data was included in the euro area aggregates used in some of the analysis in past Reports (eg macro-mapping).

3 Non-bank financial entities are assessed (or classified into five economic functions) conservatively, on a pre-mitigant basis and are only excluded if data are available and the analysis in accordance with the classification guidance provides sufficient grounds for exclusion. For details, see Section 4.

4 Measures of growth throughout the Report are adjusted for exchange rate effects by applying a constant end-2016 exchange rate across all years to convert data denominated in local currencies into US dollars. "Assets" refer to financial assets on an unconsolidated basis, where available. With improvements in national sector balance sheet statistics, more granular reporting, Luxembourg joining the monitoring exercise for the first time in 2017 and China's inclusion in the narrow measure, the results presented in this Report are not directly comparable to the 2016 Report (FSB (2017b)).

- *Insurance corporations and pension funds* - Insurance corporations' and pension funds' assets have increased since 2009 to $29 trillion and $31 trillion respectively, each now separately representing around 9% of total global financial assets.
- *Other Financial Intermediaries (OFIs)* – **OFI assets as a whole rose by 8.0% to $99 trillion in 2016**, faster than the assets of banks, insurance corporations and pension funds, but not as fast as those of central banks**.** OFI assets now represent 30% of total global financial assets, the highest level since 2002. OFI assets grew in all but four jurisdictions due to a combination of higher valuations and an increase in non-bank credit intermediation. With changes in the population and improved data submissions from other jurisdictions, captive financial institutions and money lenders have become the second largest OFI subsector after investment funds.

Key terms **Box 0-1**

The following monitoring aggregates are referred to throughout the Report, with (ii) and (iii) being the main focus of analysis (see Exhibit 0-1):

(i) **MUNFI** (or Monitoring Universe of Non-bank Financial Intermediation, also referred to as non-bank financial intermediation) is a measure of all non-bank financial intermediation, comprising insurance corporations, pension funds, other financial intermediaries (OFIs) and financial auxiliaries.

(ii) **OFIs** comprise all financial institutions that are not central banks, banks, insurance corporations, pension funds, public financial institutions, or financial auxiliaries.[5]

(iii) **Narrow measure of shadow banking** (or the "narrow measure") includes non-bank financial entity types that authorities have assessed as being involved in credit intermediation that may pose financial stability risks, based on the FSB's methodology and classification guidance.

- *Lending activity* – **Loans extended by OFIs grew in aggregate by 1.6% in 2016 in 21 jurisdictions and the euro area, continuing the trend observed since 2011** (this compares with bank lending assets growing by 5% in 2016). Growth of OFI lending was concentrated in emerging market economies (18%, compared to a 0.5% decline in advanced economies).[6] Advanced economies' share of total OFI lending assets has declined from 96% in 2011 to 87% at end-2016.
- *Wholesale funding and repo* – **OFIs have overall become less reliant on wholesale funding and repo, while banks' overall reliance[7] on wholesale funding and repo as a source of funding has changed little since 2011.** Total repo assets of banks and OFIs have increased since 2009, reaching $8.2 trillion at end-2016, and their repo liabilities reaching $7.9 trillion. OFIs continue to be net providers of cash to the financial system from repos, while banks remain net recipients of cash through repo, as reflected in net repo positions (repo assets minus repo liabilities) of these entities.

5 In previous Reports before the FSB had established a methodology for deriving the narrow measure of shadow banking, OFIs were used as a conservative proxy for, or broad measure of, shadow banking (see Section 2.3).

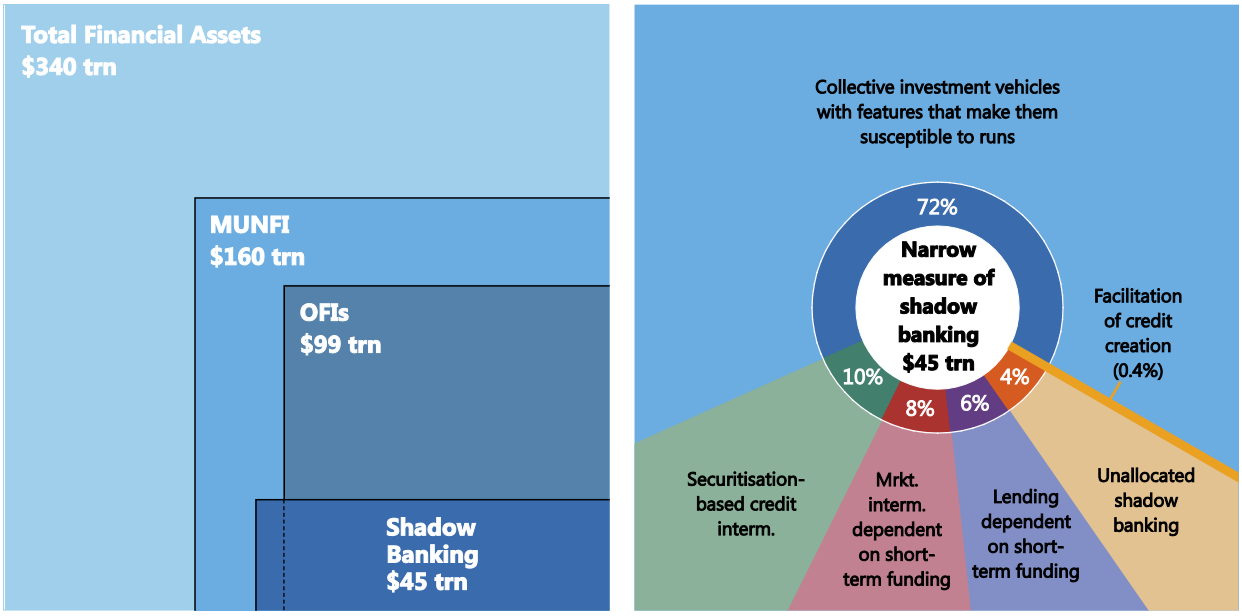
6 In some cases, this growth occurred from low levels and reflected greater financial deepening.

7 That is, the use of wholesale funding or repos as a percentage of total balance sheet assets.

Monitoring aggregates

USD trillion at end-2016 Exhibit 0-1

21 jurisdictions and the euro area[1] Composition of the narrow measure[2]



MUNFI = Monitoring Universe of Non-bank Financial Intermediation, includes OFIs, pension funds, insurance corporations and financial auxiliaries; OFIs also includes captive financial institutions and money lenders.

[1] The narrow measure is based on data from the 29 jurisdictions, instead of 21 jurisdictions and the euro area, because the data from eight participating euro area jurisdictions are more granular than the aggregate euro area data from the European Central Bank (ECB). For 29 jurisdictions, the corresponding aggregates are Total Global Financial Assets ($336 trillion), MUNFI ($160 trillion) and OFIs ($99 trillion). [2] For additional details on these categories, please see Section 4.

Sources: National sector balance sheet and other data; FSB calculations.

- *Interconnectedness* – **Aggregate interconnectedness between banks and OFIs through credit and funding relationships were at 2003-2006 levels.** In some jurisdictions, however, the most sizeable linkage is between OFIs and pension funds as OFIs use funding from insurance corporations and pension funds.
- *Narrow measure* – **The narrow measure of shadow banking grew by 7.6%, to $45.2 trillion in 2016 for the 29 jurisdictions,** representing 28% of MUNFI and 13% of total global financial assets. Over 75% of the assets included in the narrow measure reside in six jurisdictions. The participation of China and Luxembourg increased the narrow measure by $7.0 trillion (15.5% of the narrow measure) and $3.2 trillion (7.2%), respectively.
- *Trends within the narrow measure* – **Collective investment vehicles (CIVs) with features that make them susceptible to runs (eg open-ended fixed income funds, credit hedge funds and money market funds (MMFs)), grew at 11.0% in 2016**. On average, assets of these CIVs have grown by around 13% a year since end-2011. CIVs assets represent 72% of the narrow measure (see Exhibit 0-1). Non-bank financial entities engaged in loan provision that is dependent on short-term funding (eg finance companies) shrank by 3.8% in 2016, to 6% of the narrow measure. Market intermediaries that depend on short-term funding or secured funding of client assets (eg broker-dealers) declined by 3.0%, to 8% of the narrow measure by end-2016.

Finally, the level of securitisation-based credit intermediation, which represents 10% of the narrow measure, increased slightly in 2016 after having fallen in recent years.

- *Risks within the narrow measure* – The coverage and consistency of data provided by jurisdictions for the calculation of risk metrics has continued to improve. While levels of risks vary across entity types, not least due to the diversity of business models, the available data point to several broad trends:
  - The considerable growth of CIVs in recent years has been accompanied by a relatively higher degree of credit investment (eg for fixed income funds and MMFs, reflecting their business models), as well as some liquidity and maturity transformation.
  - In some jurisdictions, finance companies tend to have relatively high leverage and maturity transformation, which increases their susceptibility to roll-over risk during periods of market stress.
  - Reflecting their business models, broker-dealers in some jurisdictions employ significant leverage compared to other OFIs, although it is considered to be lower than the levels seen prior to the financial crisis. These entities may also be vulnerable to roll-over risk or runs, particularly if they are dependent on short-term wholesale funding.

The Report also includes a set of collaborative case studies written by groups of experts from national and regional authorities that discuss types of non-bank financial entities and activities in greater detail (Annex 3).[8] These case studies examine: (i) the non-bank credit cycle; (ii) non-financial corporates' cash management as a demand factor; (iii) developments and adaptations in housing finance markets; and (iv) loan funds in the European Union (EU).

The 2017 monitoring exercise benefited from a number of improvements in data consistency and comprehensiveness. The participation of Luxembourg enhanced coverage, particularly of the global investment fund sector, as well as captive financial institutions and money lenders (CFMILs).[9] Going forward, the exercise will benefit from further improvements including potential enhancements to the monitoring of shadow banking activities and the data collection framework, as recommended in the FSB's assessment of shadow banking activities, risks and the adequacy of post-crisis policy tools to address financial stability concerns submitted to the G20 Summit in July 2017 (see Box 0-2).

July 2017 assessment of shadow banking activities and risks **Box 0-2**

Following a request from the G20, the FSB assessed the evolution of shadow banking activities and related financial stability risks since the 2007-09 global financial crisis, and whether the post-crisis policies and monitoring efforts were adequate to identify and contain these risks (FSB (2017e)). The results of this assessment were published in July 2017 and welcomed by the G20 Leaders at their Hamburg Summit (G20 (2017)). The assessment underscored the importance of establishing a system-wide oversight framework, and

[8] The views expressed in the case studies do not necessarily represent those of the FSB or the relevant authorities.

[9] In relation to this, see FSB (2016). Recommendation 2C encourages additional non-FSB jurisdictions with significant non-bank financial sectors or cross-border shadow banking links to participate in future exercises.

recommended further strengthening of the oversight and monitoring of shadow banking activities, and enhancements to the data collection framework.

The July 2017 assessment highlighted that the aspects of shadow banking considered to have contributed to the financial crisis had declined significantly and generally no longer posed financial stability risks. Regulatory reforms had also contributed to a reduction in vulnerabilities in areas such as MMFs and repos.[10] The assessment however noted that a rise in assets held in certain investment funds had increased the risks from liquidity transformation, underscoring the importance of effective operationalisation and implementation of policy recommendations agreed to address this, in particular those to address structural vulnerabilities in asset management activities.[11] At the time of the assessment, the FSB had not identified other new financial stability risks from shadow banking that would warrant additional regulatory action at the global level. New forms of shadow banking were nevertheless likely to develop in the future, emphasising the importance of continued monitoring to mitigate associated risks and support the transformation of these activities into resilient market-based finance.

To address any residual gaps and further enhance oversight, FSB member authorities have agreed on seven recommendations, the following four of which bear on the annual monitoring exercise:

1. Enhance the system-wide oversight of shadow banking and make policy responses to address the identified risks through implementing the recommendations of the 2015-16 Peer Review.[12]
2. Where sector balance-sheet statistics do not include granular data on short- and long-term assets and liabilities, authorities are encouraged to define and improve these data by creating more granular statistical categories. Overall, while progress has been made, greater attention is needed on collecting liabilities data to better assess funding vulnerabilities. Authorities are encouraged to seek further granularity on cross-border interconnectedness between banks and non-banks as well as among non-bank sectors.
3. Authorities should supplement flow of funds data, where needed, with supervisory and/or commercially available firm-specific data to assess activities and risks.
4. Authorities should closely monitor and share information and, where possible, data on emerging financial stability risks that are growing quickly and may become concerning.

Together, these recommendations will help address data gaps and improve the granularity of risk analysis to help authorities identify potential financial stability risks in a more forward-looking manner. The FSB, through its Shadow Banking Experts Group, will take these recommendations forward in the context of the FSB's annual monitoring exercise.

[10] The 2017 assessment for the G20 of shadow banking took into account the application of potential policy tools, while this Report takes a pre-mitigant approach, as described in Section 1.

[11] See FSB (2017a).

[12] See FSB (2016).

1. Introduction

Non-bank financing provides a valuable alternative to bank financing and helps support real economic activity. For many corporates and households, it is also a welcome source of diversification of credit supply from the banking system, and provides competition for banks. However, the financial system's increasing reliance on non-bank financial intermediation in many jurisdictions may also potentially give rise to new vulnerabilities. The comprehensive monitoring of global trends, innovations, adaptations as well as risks of credit intermediation in the non-bank financial system is a key priority for the FSB and an important element of its efforts to transform shadow banking into resilient market-based finance. To this end, the FSB conducts an annual monitoring exercise to assess global trends and risks in the shadow banking system, and to identify financial entity types or activities for which size or rapid growth, in combination with heightened risks, may call for an assessment of existing regulation by the relevant authorities. This monitoring exercise also helps authorities to deepen their understanding of non-bank financial intermediation and to identify areas for further improvements in data availability and analysis.

This Report sets out the results of the seventh annual monitoring exercise by the FSB. It covers 21 jurisdictions and the euro area as a whole (see Exhibit 1-1), representing slightly more than 80% of global GDP.[13] Jurisdictions submitted annual data up to end-2016 based on sector balance sheet data from national financial accounts statistics (ie "Flow of Funds"), complemented with supervisory and private sector data.[14]

The monitoring exercise is conducted by the FSB's Shadow Banking Experts Group (SBEG), which was established in 2016 under the Standing Committee on Assessment of Vulnerabilities (SCAV). SBEG includes experts from all participating jurisdictions, as well as standard-setting bodies and international organisations.[15]

The monitoring exercise adopts a practical two-step approach: (i) authorities "cast the net wide", looking at all non-bank credit intermediation to ensure that data gathering and surveillance cover all areas where risks to the financial system might potentially arise; and (ii) authorities then narrow the focus for policy purposes to the subset of non-bank credit intermediation where there are developments that increase the potential for systemic risk, and/or indications of regulatory arbitrage (FSB (2011)). The monitoring process starts from an aggregate measure of all non-bank financial intermediation, referred to as the "MUNFI", which comprises insurance corporations, pension funds, OFIs and financial auxiliaries.[16] It then

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[13] As has been the case this year and in previous years, the geographical scope of the monitoring exercise may be broadened in the future to include additional jurisdictions. Relatedly, the FSB Regional Consultative Group for the Americas (RCGA) has been conducting its own regional shadow banking monitoring exercise since 2012, using the FSB's monitoring approach. See FSB RCGA (2018) for the results of its 2017 exercise.

[14] Some jurisdictions that currently lack sector balance sheet statistics have used other data sources which may not be fully consistent with other participating jurisdictions.

[15] In addition to the jurisdictions listed in Exhibit 1-1, SBEG includes: the Bank for International Settlements (BIS), European Commission (EC), European Securities and Markets Authority (ESMA), European Systemic Risk Board (ESRB), International Association of Insurance Supervisors (IAIS), International Monetary Fund (IMF), International Organization of Securities Commissions (IOSCO) and the Organisation for Economic Co-operation and Development (OECD).

[16] Financial auxiliaries consist of financial corporations that are principally engaged in activities associated with transactions in financial assets and liabilities or with providing the regulatory context for these transactions but in circumstances that do not involve the auxiliary taking ownership of the financial assets and liabilities being transacted (see EC et al (2009)).

focuses on a narrow measure of shadow banking that may pose financial stability risks, classified into different economic functions. The narrowing down methodology is based on an approach that was introduced in the FSB's high-level *Policy Framework for Strengthening Oversight and Regulation of Shadow Banking Entities* (hereafter the FSB Policy Framework), published in 2013.[17]

The inclusion of non-bank financial entities or activities in the narrow measure does not constitute a judgement that policy measures applied to address the financial stability risks of these entities and activities are inadequate or ineffective, nor necessarily reflect a judgement that regulatory arbitrage is a relevant factor.[18] It is based on a conservative assessment of the potential risks they may pose, especially during stressed events, on a pre-mitigant basis (reflecting an assumption that policy measures and/or risk management tools are not exercised). This pre-mitigant assessment allows authorities to then assess existing policy tools to address financial stability risks that may arise from shadow banking and identify any residual risks, or regulatory gaps, that may warrant policy responses. This approach also helps improve the consistency in the assessment across jurisdictions and capture potential changes in risks from the shadow banking system. As a result, the narrow measure may overestimate the degree to which non-bank credit intermediation currently gives rise to post-mitigant financial stability risks.[19]

The FSB has continuously improved the monitoring exercise by broadening its geographic scope, deepening the analysis and learning from the experiences of previous exercises. In the 2017 monitoring exercise, the scope of participating jurisdictions was broadened to also include Luxembourg. The narrow measure includes data from China this year, and Chinese authorities are now fully contributing to the FSB monitoring exercise. In addition, many jurisdictions took steps to provide additional and improved data, particularly in relation to credit, lending, repos (repurchase agreements) and wholesale funding, as well as on interconnectedness. Further guidance was also provided to enhance the consistency of data submitted and the assessments made by jurisdictions.[20]

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17 See Section 2.3 of FSB (2013).

18 In other words, the inclusion of entities in the narrow measure does not necessarily mean that these entities pose financial stability risks and does not consider the impact of the use of policy measures and risk management tools to contain risks.

19 For example, although MMFs and fixed income funds are included in the narrow measure, their existing policy measures or risk management tools may have addressed or significantly reduced financial stability risks, including maturity/liquidity mismatches, imperfect credit risk transfer and leverage, so that no additional policy responses are currently warranted.

20 Achieving consistency in the economic function (EF) classification process is an iterative process, with the guidance for classification refined each year to reflect improvements in data availability, assessment of non-bank financial entities' involvement in the different EFs and new developments in financial markets such as the emergence of new entity types and risks.

Sample composition	Exhibit 1-1
29-group	***21+EA-group***
Argentina	Argentina
Australia	Australia
Brazil	Brazil
Canada	Canada
Cayman Islands	Cayman Islands
Chile	Chile
China	China
Hong Kong	Hong Kong
Indonesia	Indonesia
India	India
Japan	Japan
Korea	Korea
Mexico	Mexico
Russia	Russia
Saudi Arabia	Saudi Arabia
Singapore	Singapore
South Africa	South Africa
Switzerland	Switzerland
Turkey	Turkey
United Kingdom	United Kingdom
United States	United States
Belgium	Euro area
France	
Germany	
Ireland	
Italy	
Luxembourg	
Netherlands	
Spain	

This Report presents results using time series data ranging from end-2002 to end-2016 and cross-sectional data as of end-2016. Due to the addition of a new jurisdiction, improvements in national statistics and more granular reporting, the results are not strictly comparable to those presented in previous Reports. The data and information collected from jurisdictions are mostly based on sector balance sheet statistics (flow of funds), complemented with supervisory and private sector data where sector balance sheet statistics are not available in the required granularity. Sector balance sheet statistics are a useful source of information for mapping the global size and trends of non-bank credit intermediation, as they are available in a large number of jurisdictions and provide generally consistent data on assets and liabilities of bank and non-bank financial sectors.[21]

In an attempt to maximise both the scope and granularity of available data, the monitoring results are presented for two different samples of jurisdictions, which differ in terms of the treatment of euro area jurisdictions (see Exhibit 1-1).

The first sample, denoted *29-group*, comprises 29 individual jurisdictions and has better granularity of non-bank financial sectors. The second sample, denoted as *21+EA-group*, is more comprehensive in terms of jurisdiction coverage and comprises 21 individual non-euro area jurisdictions plus the euro area as a whole.[22] This sample excludes the eight euro area jurisdictions (Belgium, France, Germany, Ireland, Italy, Luxembourg, the Netherlands and Spain) individually participating in the exercise and uses instead aggregate data from the European Central Bank (ECB) for the euro area as a whole. Most of the macro-mapping results presented in Section 2 are based on the *21+EA-group* sample to benefit from the wider jurisdictional coverage. However, as the national submissions from the eight euro area

[21] Jurisdictions that are already using sector balance sheet statistics are encouraged to further improve their granularity, where needed, while those that have not yet implemented official sector balance sheet statistics are encouraged to develop them.

[22] The euro area jurisdictions are Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia and Spain.

jurisdictions provide some additional granularity on non-bank financial sectors, the discussion on non-bank financial sectors in Section 2 as well as Sections 3, 4 and 5 on interconnectedness and the narrow measure uses the *29-group* sample.

Measures of growth throughout the Report are based on historical data through to end-2016, which were submitted in 2017. The focus is mainly on trends since 2011, as data gaps were relatively few between 2011 and 2016.[23] Exchange rate effects have been corrected for when presenting growth rates by applying a constant end-2016 exchange rate across all years to convert the local currency data into US dollars. Growth rates of financial assets presented in this Report are not adjusted for the appreciation or depreciation of asset prices, which in 2016 tended to exert an upward influence on growth rates, and therefore only approximately reflect changes in financial transactions from one year to another.[24]

The rest of this Report is organised as follows. Section 2 presents a comparative macro-mapping perspective of all sectors in the financial system, including central banks, banks, public financial institutions, insurance corporations, pension funds, OFIs and financial auxiliaries. Section 3 provides an assessment of the interconnectedness between non-bank financial entities and banks, and also among non-bank financial entities based on additional data collected for this monitoring exercise. Section 4 discusses the narrow measure based on the activities that certain non-bank financial entities undertake, and the classification into the five "economic functions" developed by the FSB. Section 5 provides an assessment of the potential risks posed by these entities and their activities.

Recent innovations on non-bank credit intermediation **Box 1-1**

To foster a forward-looking perspective in the FSB's monitoring framework, SBEG members are asked each year to describe any recent innovations relating to non-bank credit intermediation in their jurisdiction as well as any adaptations of existing business models they have observed within their jurisdictions. These descriptions are shared among the jurisdictions participating in the monitoring exercise, and the potential benefits and risks of these innovations, as well as how they could potentially fit within the FSB's monitoring framework, are discussed within SBEG and reported to senior FSB committees. In some cases, this monitoring work serves as the basis for further research at the FSB.

For the 2017 monitoring exercise, several jurisdictions highlighted the rapidly increasing role of online or financial technology (FinTech) non-bank entities extending credit or otherwise facilitating credit creation (several other innovations were also noted by jurisdictions, for instance credit insurance). These entities employ a variety of different business models, differed greatly in their connections to other sectors of the financial system, and initially

[23] As a result, increases of aggregated historical data may to some extent also reflect improvements in the availability of data over time at the jurisdiction level.

[24] An increase in the nominal value of assets can be driven by (a) an increase in the quantity of assets valued at a given price, and (b) an increase in the price of a fixed quantity of assets. Exchange rate adjustments only filter out the price effect related to exchange rate movements. As such, other valuation effects are still included in the growth rates presented in this Report.

appear to face regulatory regimes that differ across jurisdictions. The business models described include:[25]

- **Matching platforms** (ie peer-to-peer lending) provide an online marketplace on which borrowers applying for loans are matched with prospective lenders, with the loan contract typically established between the borrower and one or more lenders.[26]
- **"Notarised" matching platforms** operate similar to pure matching platforms (in that borrowers seeking loans are matched with potential lenders), but with the loan originated by a partnering bank (ie after a bank lends funds, the loan is sold or assigned to one or more creditors). This model is particularly popular in jurisdictions where regulatory constraints prohibit non-banks from engaging in lending activity.
- **Balance sheet lenders** both originate and retain loans to borrowers using their own balance sheet assets. In some cases, these entities securitise the loans they have made, either directly or with the help of a bank. Some balance sheet lenders obtain funding from hedge funds or banks.

The most commonly reported of these recent business models for non-bank lending was that of matching platforms, which was the focus of a case study in the 2016 monitoring report.[27]

Since the size of FinTech non-bank entities relative to total global financial assets is still quite small, currently these activities do not seem to pose material risks to global financial system stability. However, their rapid growth suggests the importance of ongoing monitoring of developments in this market, particularly with respect to its size and the nature of its potential risks. In light of the FSB's assessment of shadow banking activities and risks for the G20 Hamburg Summit in July 2017, SBEG is carefully assessing the effectiveness of the current monitoring approach in identifying emerging risks and innovations.

[25] For details on credit intermediation by non-traditional online non-bank entities, see for example CGFS and FSB (2017) and IOSCO (2017a).

[26] In some jurisdictions, the loan contract is established between the borrower and the lending platform, and separately between the lending platform and the lender. For more details, see Samitsu (2017).

[27] See FSB (2017b), Annex 6 ("Lending-based crowdfunding in the euro area: credit provision outside of the banking sector" contributed by Christian Weistroffer and Lieven Hermans at the ECB).

2. Macro-mapping of all non-bank financial intermediation

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 presented are largely aligned with jurisdictions' sector balance sheet statistics, where available.[28]

2.1 Overview of trends

Since 2002, the total global financial assets of all financial corporations (or total global financial assets) in the *21+EA-group* have increased, reaching $340 trillion by end-2016 (Exhibit 2-1). During 2016, these assets also grew as a share of total GDP (from 523% to 540% of GDP).

Macro-mapping of the financial system

21 jurisdictions and the euro area — Exhibit 2-1

	Total global financial assets (FAs)	Central banks	Banks[1]	Public financial institu-tions	Insurance corpora-tions[2]	Pension funds	OFIs[3]	Financial auxiliaries
Size in 2016 ($ trillion)	339.9	26.2	137.8	16.0	29.1	31.0	99.2	0.7
Share of total global FAs (%)	100.0	7.7	40.5	4.7	8.6	9.1	29.2	0.2
Growth in 2016 (year-over-year, %)	7.5	12.3	6.9	6.3	5.9	6.4	8.0	9.7
Growth 2011-15 (compounded, %)[4]	5.6	8.3	3.1	3.7	5.8	6.3	9.0	5.0

Based on historical data included in jurisdictions' 2017 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). [1] All deposit-taking corporations. [2] For some jurisdictions, data on insurance corporations include separate accounts. [3] OFIs also includes "captive financial institutions and money lenders". [4] Increases in the value of assets may also reflect improvements in the availability of data over time at a jurisdictional level (for example, if a jurisdiction only provided data from 2013-2015 for a specific entity type included in OFIs, the aggregate 2011-2015 growth rate of OFIs might be slightly affected).

Sources: National sector balance sheet and other data; FSB calculations.

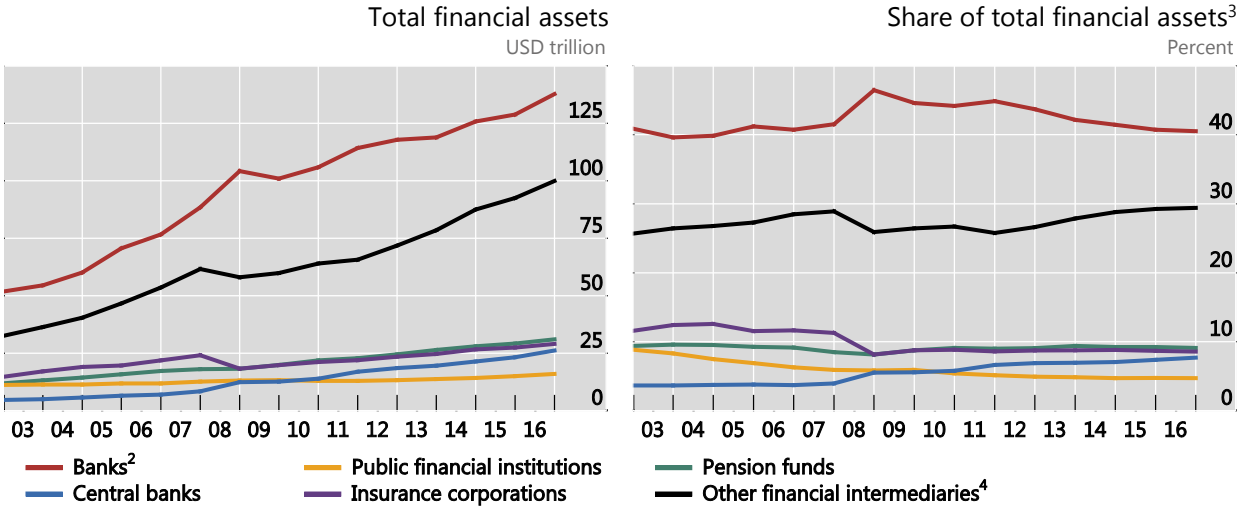
The two largest sectors of the financial system (banks, defined as all deposit-taking corporations, and OFIs) as well as central banks and financial auxiliaries grew at a quicker pace in 2016 than other sectors.[29] As a share of total global financial assets, the assets of banks (about 40%) and OFIs (about 30%) appear to be stabilising at pre-crisis levels (Exhibit 2-2). Although financial assets held by banks have increased at a faster pace than in previous years (largely as a result of increases in banks assets in China and, to a lesser extent, Japan, the UK and the US), banks' share in the financial system continued to decline for the fifth consecutive year. This decline continued to be more pronounced in the euro area.

[28] Nineteen jurisdictions currently use sector balance sheet statistics in their data submissions. Jurisdictions that currently lack sector balance sheet statistics may have used other data sources (eg publicly available information, supervisory data) which may not be fully consistent with other participating jurisdictions.

[29] Central bank increases are due to continued asset purchase programs in some jurisdictions. Financial auxiliaries account for less than one percent of total global financial assets.

Assets of financial intermediaries[1]

21 jurisdictions and the euro area | Exhibit 2-2



[1] Based on historical data included in jurisdictions' 2017 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). [2] All deposit-taking corporations. [3] Weighted average based on total national financial assets. [4] Also includes captive financial institutions and money lenders, and, for presentation purposes, financial auxiliaries. Increases in the value of OFI assets may also reflect improvements in the availability of data for some OFI sub-sectors over time at the jurisdiction level.

Sources: National sector balance sheet and other data; FSB calculations.

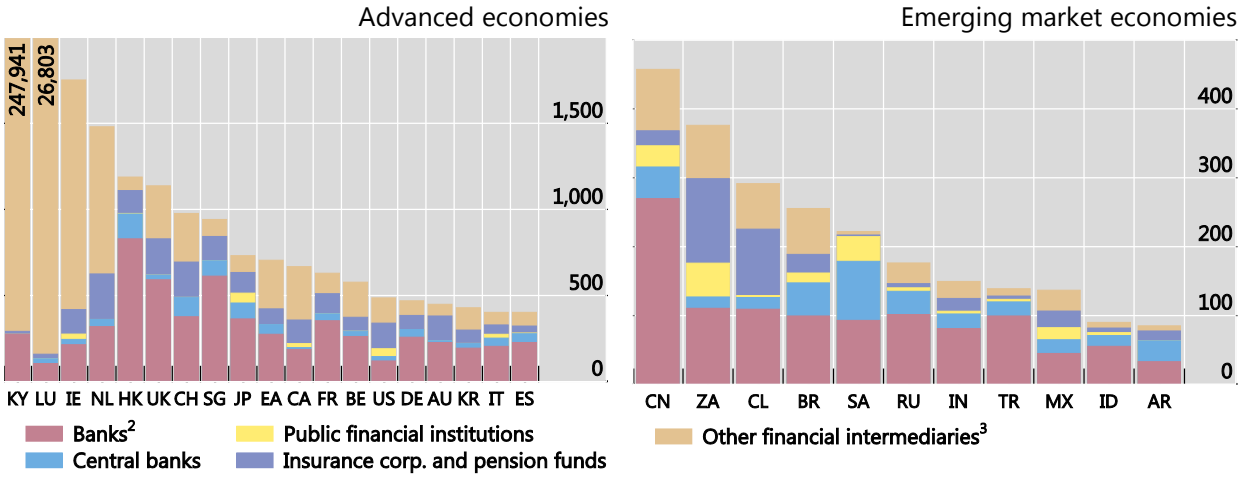
In most jurisdictions, banks make up the single largest sector of the financial system (Exhibit 2-3 and Annex 1). Specifically, banks tend to play a particularly large role relative to OFIs in Asia and most emerging market economies (EMEs). Since the financial crisis, however, OFIs have steadily increased their share of total global financial assets, particularly compared to banks, with the most significant increase occurring in Europe due to growth in certain EU jurisdictions. The financial systems of some jurisdictions were structured somewhat differently. In a handful of jurisdictions (Australia, Chile, South Africa and the US), insurance corporations and pension funds sectors are relatively large (combined they comprise roughly one third of the total domestic financial assets in these jurisdictions). In Saudi Arabia, the central bank (the Saudi Arabian Monetary Authority), which also manages the jurisdiction's foreign exchange reserves accumulated from conversion of oil reserves into monetary reserves, continued to account for about 40% of total domestic financial assets in 2016.

Jurisdictions with the largest financial systems relative to GDP (Exhibit 2-3) tend to have relatively larger OFI sectors: Luxembourg (at 92% of total financial assets),[30] the Cayman Islands (85%), Ireland (76%) and the Netherlands (58%). OFIs in these jurisdictions were largely comprised of investment funds and/or captive financial institutions.

[30] For details about Luxembourg, see Box 2-1.

Composition of financial systems[1]

Percent of GDP at end-2016 Exhibit 2-3



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; EA = Euro area as a whole; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = the Cayman Islands; LU = Luxembourg; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

[1] Assets invested in foreign jurisdictions may distort these ratios. [2] All deposit-taking corporations. [3] Also includes captive financial institutions and money lenders and, for presentational purposes, financial auxiliaries.

Sources: National sector balance sheet and other data; IMF *World Economic Outlook*; FSB calculations.

Expanding the coverage of jurisdictions **Box 2-1**

In 2017, Luxembourg joined the FSB's monitoring exercise,[31] increasing the number of participating jurisdictions to 29, of which five are non-FSB members (Belgium, the Cayman Islands, Chile, Ireland and Luxembourg).

A large part of the world's investment funds are established in Luxembourg (representing 10% of investment funds other than MMFs and hedge funds in the *21+EA-group*). Its addition therefore helps provide more meaningful estimates of the size and trends of the global investment fund sector. It also helps to reduce the discrepancy between the *21+EA-group* and the *29-group* samples (Exhibit 1-1).

As shown in Exhibit 2-4, OFIs represent the largest share of Luxembourg's financial system. OFIs' share of total financial assets has also grown in recent years while the share of banks decreased. This results from sustained growth in the OFI sector, coupled with little change in the size of the banking sector in absolute terms.

An important feature of Luxembourg's financial system is the relatively large size of captive financial institutions and money lenders (CFIMLs) relative to other non-bank financial entities. These CFIMLs are largely set up for financial management, asset structuring and fund raising purposes by multi-national firms to channel funds (either through or from Luxembourg) to other parts of their own firm or to attract external funding for their parent

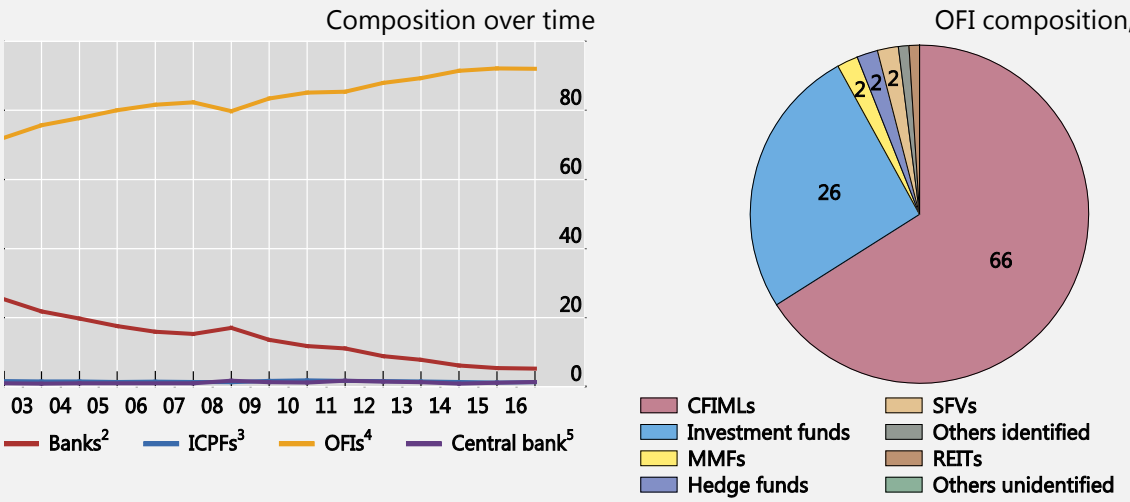
[31] Although Luxembourg has not participated in previous monitoring exercises, its data have been included in the euro area aggregates used in some of the analysis in past Reports.

company, with very little engagement in any investment or borrowing with entities external to the group.[32] The vast majority of these entities are part of a non-financial group. Their relative importance, as illustrated in Exhibit 2-4, reflects both growth and an increase in the coverage of the data collected by Luxembourg's authorities.

After CFIMLs, investment funds make up the next largest share of Luxembourg's OFIs (about a quarter), and consist of fixed income funds (39%), equity funds (34%), mixed funds (25%) and various other funds (2%). In terms of aggregate net asset value of the whole sector of undertakings for collective investment (ie investment funds, MMFs, hedge funds and real estate investment trusts (REITs)), 84% are set up as UCITS.[33] Although these investment funds are Luxembourg-based, their units or shares are, to a large extent, distributed on a cross-border basis, notably under the EU passport regime.[34]

Luxembourg - financial system composition[1]

In percent — Exhibit 2-4



[1] Based on historical data included in Luxembourg's 2017 submission. [2] Deposit-taking corporations. [3] Insurance corporations and pension funds, which combine to make about 1.5% of Luxembourg's total financial assets. This low share means this sector is not easily identifiable on the LHS graph. [4] Also includes captive financial institutions and money lenders, and, for presentation purposes, financial auxiliaries. [5] The central bank makes up about 1.4% of Luxembourg's total financial assets. [6] CFIMLs = Captive financial institutions and money lenders; MMFs = Money market funds; REITs = Real estate investment trusts and RE funds; SFVs = Structured finance vehicles.

Source: National sector balance sheet and other data; FSB calculations.

2.2 Insurance corporations and pension funds

Insurance corporations and pension funds play an important role in many jurisdictions' financial sectors. They may engage in credit intermediation through the purchase of credit assets or engage in direct lending activities if allowed in the relevant regulatory regimes. They may also facilitate credit creation by providing credit enhancements or writing puts on credit assets (eg 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). Accordingly,

[32] For details, see Box 2-2.

[33] UCITS refers to Undertakings for Collective Investment in Transferable Securities in accordance with European Directive 2009/65/EC. The Directive imposes binding rules concerning diversification, liquidity and the use of leverage.

[34] The EU passport regime enables fund promoters to create a single product for the entire EU rather than having to establish an investment fund product on a jurisdiction-specific basis.

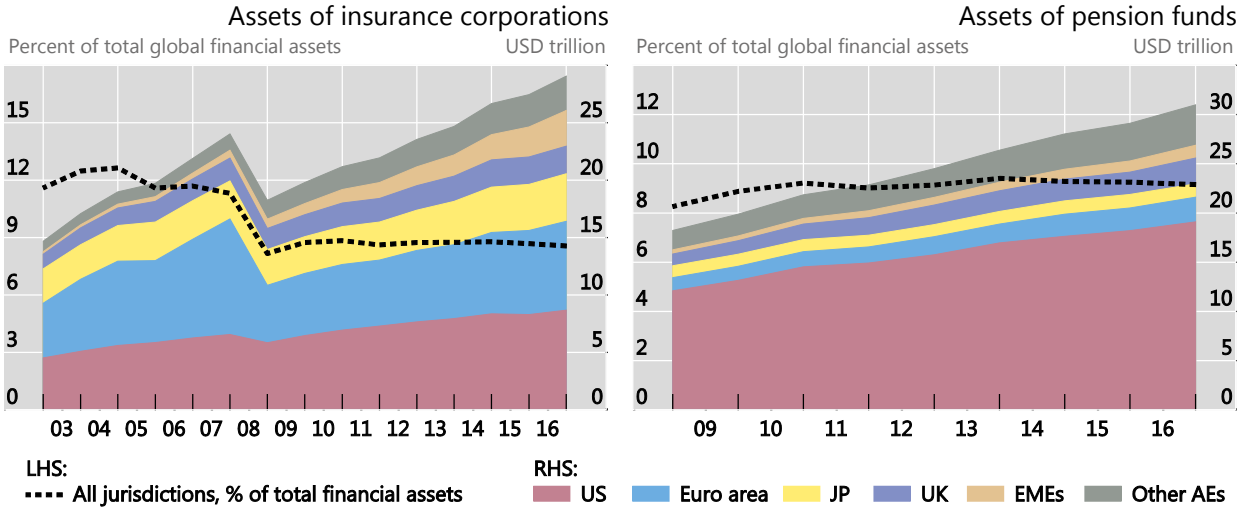
an overview of their size and trends can provide a broader context for their interconnectedness with banks and OFIs.

The financial assets of insurance corporations in the *21+EA-group* reached $29 trillion at end-2016, representing nearly 9% of total global financial assets (Exhibit 2-5) or 46% of total GDP. Although the assets of insurance corporations are above the pre-crisis peak ($24 trillion), their size relative to total global financial assets is much lower than the pre-crisis level (Exhibit 2-5). The US and the euro area each accounted for more than a quarter of global insurance corporations' assets (30% and 27%, respectively) followed by Japan (14%), although growth in these jurisdictions was below the average growth rate of insurance corporations.

Pension fund assets stood at $31 trillion at end-2016: 9% of total global financial assets or 50% of total GDP. Pension funds' annual average growth since 2011 was around 6%, largely driven by the US which represents over 60% of global pension fund assets.

Insurance corporations and pension funds

21 jurisdictions and the euro area[1] Exhibit 2-5



JP = Japan; UK = United Kingdom; US = United States; EMEs = emerging market economies; AEs = advanced economies.

[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Based on historical data included in jurisdictions' 2017 submissions. Increases of assets may also reflect improvements in the availability of data over time at a jurisdictional level.

Sources: National sector balance sheet and other data; IMF *World Economic Outlook*; FSB calculations.

2.3 Other financial intermediaries (OFIs)

2.3.1 Global trends

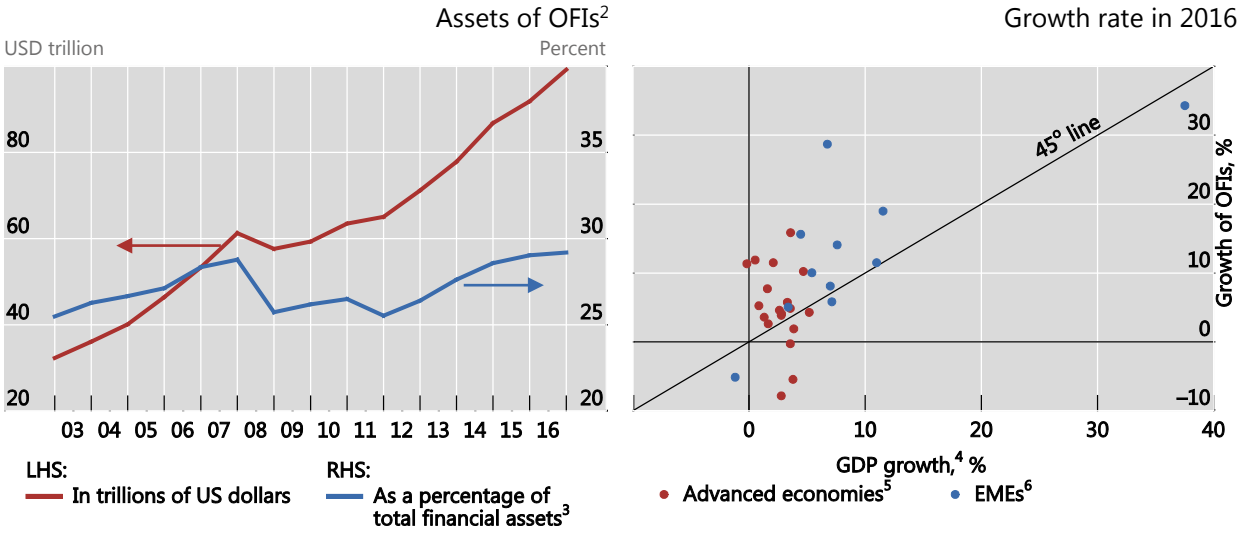
The size of OFIs is measured as the sum of assets of all financial corporations that are not classified as central banks, banks, insurance corporations, pension funds, public financial institutions, or financial auxiliaries. There are 10 core OFI sub-sectors which are broadly in line with the way jurisdictions' sector balance sheet statistics are typically structured.[35] Individual jurisdictions reported additional sectors where applicable.

[35] For the 2017 monitoring exercise, the ten core OFI sub-sectors are MMFs, hedge funds, other investment funds, real estate investment trusts and real estate funds (hereafter REITS), trust companies, finance companies, broker-dealers,

The OFI sector has continued to grow since 2008 (LHS panel of Exhibit 2-6), and accounts for a larger share of total global financial assets than it did prior to the crisis. However, while this growth has continued, the rate of growth slowed slightly, with an 8.0% exchange rate-adjusted growth rate in 2016 compared to an average annual rate of growth of 9.0% between 2011 and 2015. The growth of OFIs was primarily driven by the largest jurisdictions (China, the euro area and the US) and OFIs grew faster than the real economy in many jurisdictions (dots above the 45-degree line in the RHS panel of Exhibit 2-6). This growth in the assets of OFIs was largely driven by growth in investment funds and CFIMLs, described in detail in Section 2.3.3.

Other financial intermediaries (OFIs)[1]

21 jurisdictions and the euro area — Exhibit 2-6



[1] Also includes captive financial institutions and money lenders. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Based on historical data included in jurisdictions' 2017 submissions. [2] Increases in assets may also reflect improvements in the availability of data over time at a jurisdictional level [3] As a weighted average of total financial assets. [4] Calculated from GDP figures in local currency based on current prices. Growth rates in Argentina reflect a high rate of inflation. [5] Australia, Belgium, Canada, Cayman Islands, France, Germany, Hong Kong, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, Singapore, Spain, Switzerland, the UK and the US. [6] Argentina, Brazil, Chile, China, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa and Turkey.

Sources: National sector balance sheet and other data; IMF *World Economic Outlook*; FSB calculations.

2.3.2 Developments across jurisdictions

There are considerable differences between jurisdictions in terms of the relative size and growth of OFIs. The euro area as a whole had the largest OFI sector at end-2016 with assets totalling $32.2 trillion, followed by the US ($27.1 trillion), China ($9.6 trillion) and the UK ($7.1 trillion). Within the euro area, Luxembourg, the Netherlands and Ireland continue to have the largest OFI sectors (Exhibit 2-7).

structured finance vehicles, central counterparties, and captive financial institutions and money lenders. See the *reporting templates* for more details. Many of the entities in OFI or its sub-sectors are also entities that authorities included in the five economic functions as part of the narrow measure (see Section 4).

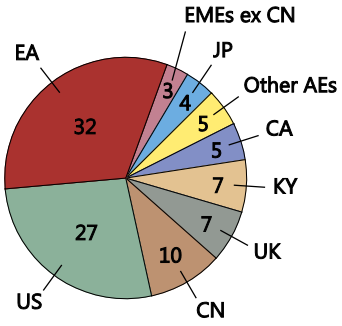
Share of global OFI assets[1]

21 jurisdictions and the euro area

Exhibit 2-7

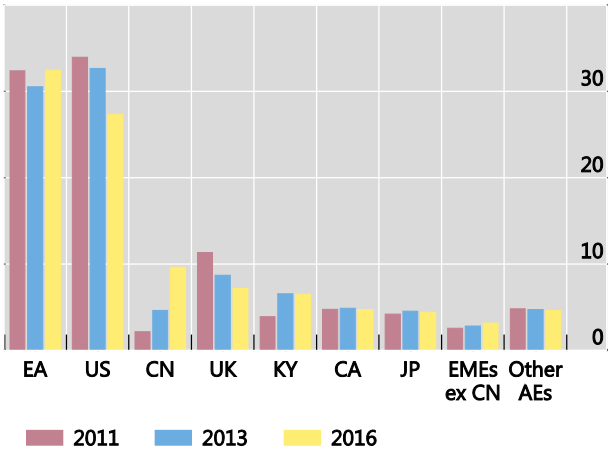
Composition at end-2016

Percent



Historical evolution of the shares by jurisdiction[2]

Percent



CA = Canada; CN = China; EA = euro area; EMEs = emerging market economies; JP = Japan; KY = Cayman Islands; UK = United Kingdom; US = United States. Other AEs include Australia, Hong Kong, Korea, Singapore and Switzerland. EMEs include Argentina, Brazil, Chile, India, Indonesia, Mexico, Russia, Turkey, Saudi Arabia, and South Africa.

[1] Also includes captive financial institutions and money lenders. [2] Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Based on historical data included in jurisdictions' 2017 submissions. The increase of aggregated data may also reflect improvements in the availability of data over time at a jurisdictional level.

Sources: National sector balance sheet and other data; FSB calculations.

Several jurisdictions included in this Report had OFI sectors that were quite large compared to the size of their domestic economy: OFI assets were 2,118 times GDP in the Cayman Islands, 246 times GDP in Luxembourg,[36] 13 times GDP in Ireland,[37] and 8.6 times GDP in the Netherlands. No other jurisdictions exceeded 5 times GDP for this measure. Investment funds and/or CFIMLs with limited linkages to their respective domestic economies make up the largest share of the OFI sectors in these jurisdictions. For example, a majority of the assets of investment funds in the Cayman Islands are managed and/or marketed outside of the jurisdiction, particularly in the US.

OFIs grew in most jurisdictions in 2016, albeit at a slower rate than in recent years (Exhibit 2-8). Nonetheless, some jurisdictions still saw high rates of growth. For instance, Argentina's OFI sector grew by 34% in 2016, largely due to inflation and growth in investment funds, while OFIs in China grew 29%, due to an increase in trusts, CFIMLs, investment funds and other entities. Indeed, jurisdictions with smaller OFI sectors (often EMEs) have seen larger growth in recent years. As a result, advanced economies' share of global OFI assets has been decreasing steadily over time. For example, since 2011, the UK and the US share of global OFI assets have decreased from 11.3% to 7.2% and 33.9% to 27.3% respectively (Exhibit 2-7), while that of China has increased from 2.2% to 9.6%.

A small number of jurisdictions saw OFIs shrink in 2016 (Belgium, Australia, Saudi Arabia and Spain). The reasons for these declines varied across jurisdictions. Belgium's 7.8% decline in OFIs was largely driven by declines in CFIMLs (due to treasury centres leaving Belgium after a

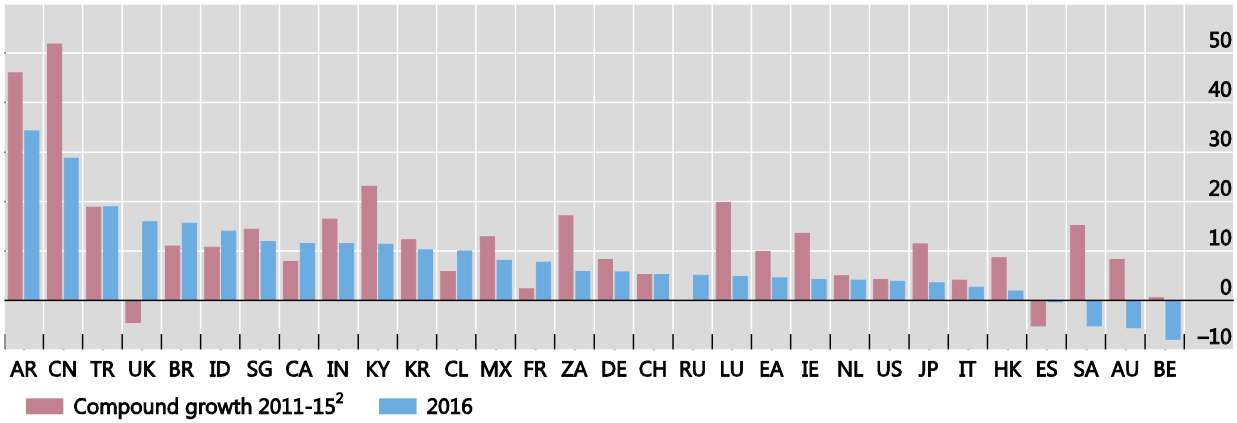
[36] For more details, see Box 2-1.

[37] For a more detailed analysis of the Irish shadow banking system, see Annex 2 of FSB (2015b).

recent change in taxation) and MMFs (due to rebalancing by certain equity funds). Australia's 5.3% decline in OFIs was largely due to declines across several sectors, namely in investment funds (due to reduced holdings by life insurers), broker-dealers and structured finance vehicles (mainly reflecting a reduction in banks' self-securitisations). In Saudi Arabia, OFIs declined 5.2% due to end-of-year redemptions and decreases in unit prices in MMFs and other investment funds.

Annual growth of other financial intermediaries (OFIs)[1]

By jurisdiction, in percent — Exhibit 2-8



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; EA = Euro area; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = the Cayman Islands; LU = Luxembourg; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

Based on historical data included in jurisdictions' 2017 submissions. Increases in aggregated data may also reflect improvements in the availability of data over time and inflation. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). [1] Also includes CFIMLs. [2] Growth rates in Argentina reflect a high rate of inflation. For Hong Kong, the compound growth rate is based on 2012–15 due to incomplete OFIs data in 2011. For Russia, the compounded growth rate could not be calculated because OFIs data prior to 2014 are incomplete.

Sources: National sector balance sheet and other data; FSB calculations.

2.3.3 OFI sub-sectors

This Section offers some detail on the different sub-sectors comprising the OFI category. In contrast to the preceding sections, the analysis is mostly based on data from the *29-group*, instead of the *21+EA-group*, because data from the eight participating euro area jurisdictions are more granular than the aggregate euro area data.[38]

The OFI sector can be split into 10 major sub-sectors of varying significance (Exhibits 2-9 and 2-10).[39] In particular:

- **Investment funds** (other than MMFs and hedge funds) remains the largest OFI sub-sector by far in 2016 with about $37.8 trillion in assets, although it grew at a slower rate (8.7%) than in 2011-2015 (12.9%). About 43% of the sector was concentrated in the US and 32% was concentrated in participating members of the EU.

[38] Participating euro area jurisdictions are: Belgium, France, Germany, Italy, Ireland, Luxembourg, the Netherlands, and Spain. See also Exhibit 1-1 for the composition of the samples.

[39] Entities prudentially consolidated into banking groups are included in this Section, which describes the structure of the overall financial system, but are excluded from the narrow measure of shadow banking (see Section 4).

Investment funds are comprised of equity funds, fixed income funds and mixed/other funds. About 51% ($19.0 trillion) of the investment funds sector consisted of equity funds, which grew by 8.6% in 2016. Fixed income funds make up 27% ($10.2 trillion) of the investment funds sector, growing at 9.7% in 2016. Finally, the remaining 22% ($8.2 trillion) are mixed/other funds that grew by about 7.5% in 2016 (Exhibit 2-11). These growth rates are net of exchange rate effects, but do not account for the overall appreciation of asset prices in 2016.

Major OFI sub-sectors

29 jurisdictions — Exhibit 2-9

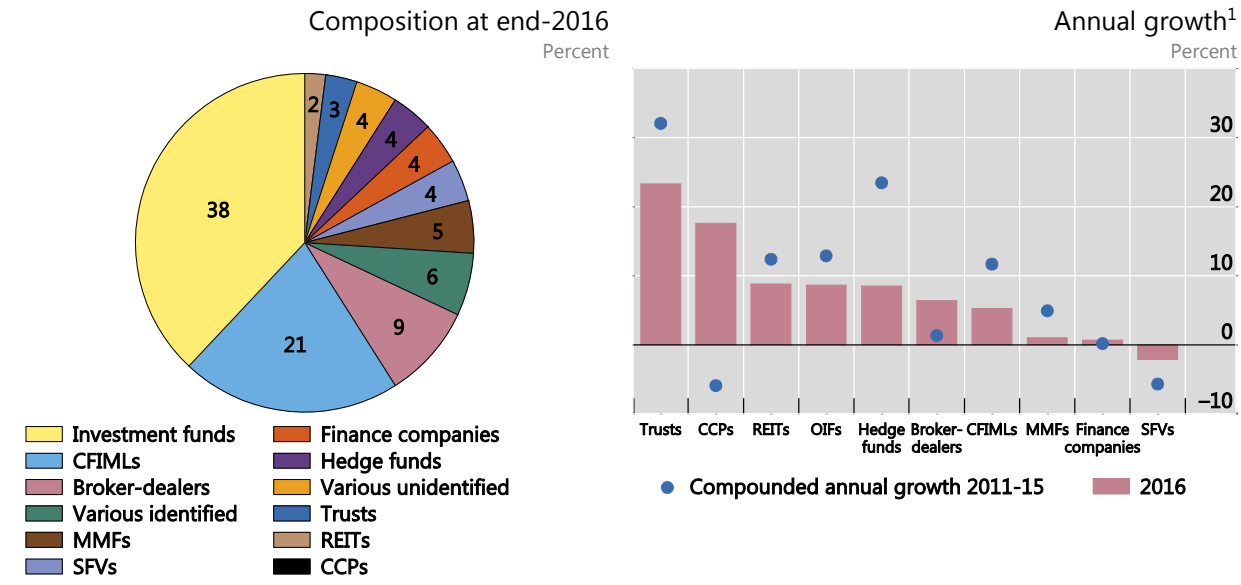
	Total	Inv. funds	MMFs	HFs	CFIMLs	BDs	SFVs	Fin. co.	Trusts	REITs	CCPs
Size in 2016 ($ trillion)	99.2	37.3	5.0	3.7	20.4	9.2	4.4	3.9	3.4	1.9	0.4
Share of OFI total (% of OFIs)	100	37.6	5.1	3.8	20.5	9.3	4.5	4.0	3.4	1.9	0.4
Growth in 2016 (year-over-year, %)	7.9	8.7	1.0	8.5	5.3	6.4	−2.1	0.7	22.3	8.8	17.6
Growth 2011-15 (compounded, %)	9.3	12.9	4.9	23.4	11.7	1.3	-5.7	0.2	32.1	12.4	-5.9

Based on historical data included in jurisdictions' 2017 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Inv. funds = Investment funds (equity funds, fixed income funds, mixed/other funds); MMFs = Money market funds; HFs = Hedge funds; CFIMLs = Captive financial institutions and money lenders; BDs = Broker-dealers; SFVs = Structured finance vehicles; Fin. co. = Finance companies; REITs = Real estate investment trusts and real estate funds (RE funds); Trusts = Trust companies; CCPs = Central counterparties.

Sources: National sector balance sheet and other data; FSB calculations.

Major OFI sub-sectors

29 jurisdictions — Exhibit 2-10



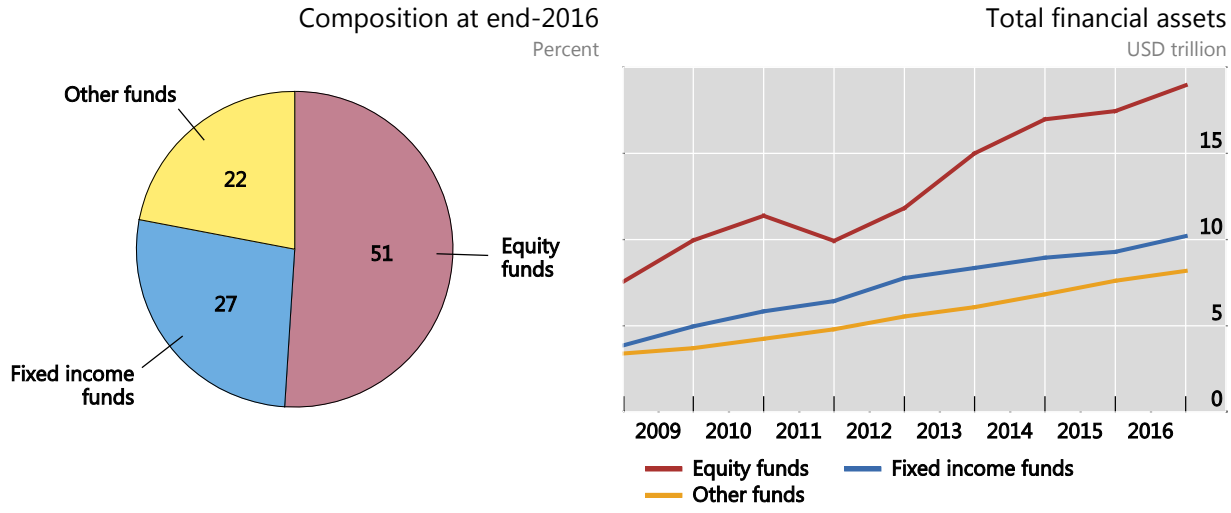
CCPs = Central counterparties; CFIMLs = Captive financial institutions and money lenders; MMFs = Money market funds; OIFs = Other investment funds; REITs = Real estate investment trusts and RE funds; SFVs = Structured finance vehicles; Trusts = Trust companies;

[1] Based on jurisdictions' 2017 submissions. Increases in aggregated data may also reflect improvements in the availability of data over time. Exchange rate effects have been netted out by using a constant exchange rate (from 2016).

Sources: National sector balance sheet and other data; FSB calculations.

Investment funds decomposition

29 jurisdictions — Exhibit 2-11

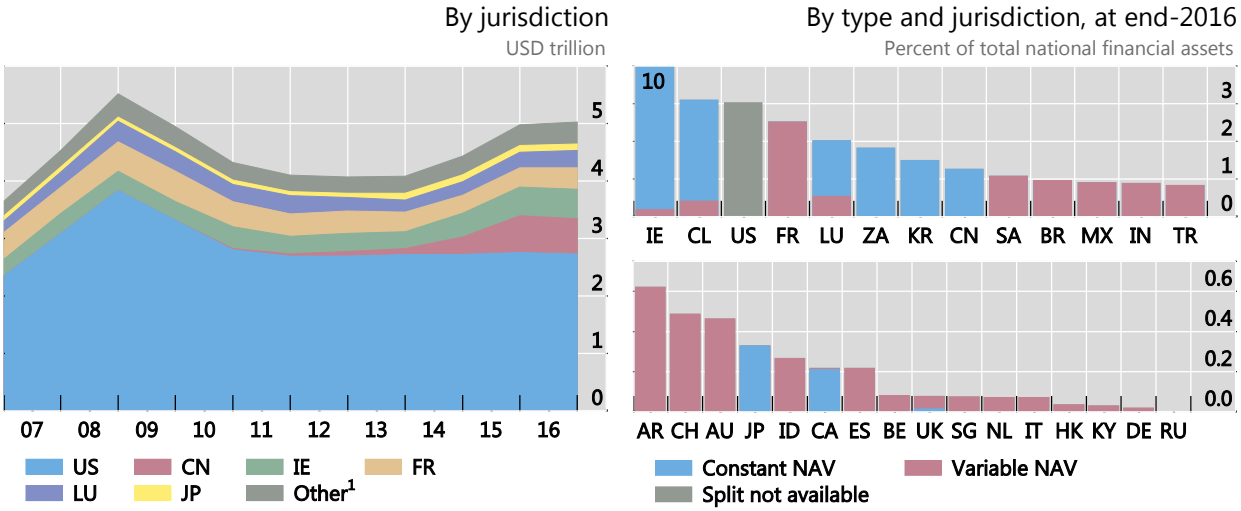


Sources: National sector balance sheet and other data; FSB calculations.

- **MMFs'** assets were $5 trillion at end-2016, equivalent to 5.1% of total OFI assets. While overall growth was small (around 1%), it varied significantly across jurisdictions with modest growth in France and Luxembourg being largely offset by modest declines in the dollar value of MMF assets in China and the US. The MMF sector is mostly concentrated in five jurisdictions (US at 54% of total MMF assets in the *29-group*, China at 12%, Ireland at 10%, France at 7% and Luxembourg at 6%). Significant regulatory reforms came into effect for MMFs in 2016, affecting MMFs in China and the US (See Box 2-2). All but one jurisdiction reported the split between MMFs offering variable (or floating) net asset value (NAV) and constant (or stable/fixed) NAV (Exhibit 2-12).

Assets of MMFs

29 jurisdictions — Exhibit 2-12



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = Cayman Islands; LU= Luxembourg; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa. [1] Other = AR, AU, BE, BR, CA, CH, CL, DE, ES, HK, IN, IT, KR, KY, MX, NL, RU, SA, ZA, TR, UK.

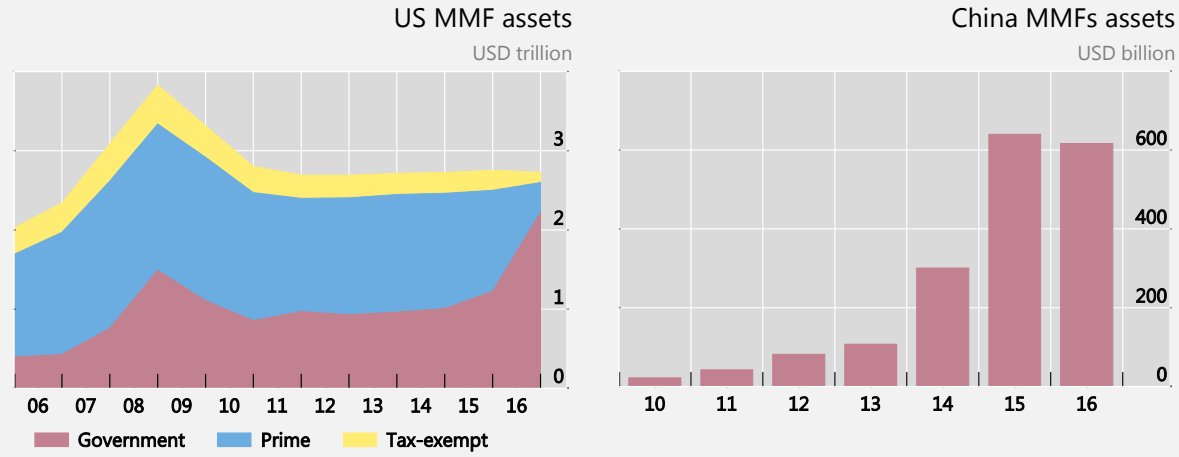
Sources: National sector balance sheet and other data; FSB calculations.

Recent regulatory reforms related to MMFs in major markets **Box 2-2**

Post-crisis regulatory reforms of MMFs are progressing to enhance their resilience, in particular to address liquidity/maturity mismatches and improve their ability to cope with large redemptions. At the international level, in light of the recommendation from the FSB in October 2011 (FSB (2011)), IOSCO issued policy recommendations in October 2012 that provided the basis for common standards of regulation and management of MMFs across jurisdictions, including a recommendation that regulators should require, where workable, a conversion of MMFs with stable NAV to floating NAV (IOSCO (2012)). Alternatively, IOSCO recommendations stated that safeguards should be introduced to reinforce stable NAV MMFs' resilience and ability to face significant redemptions.[40]

In 2016, a number of regulatory reforms related to MMFs came into effect in the US and China, the two largest MMF markets, improving the resilience of these funds and contributing to some of the changes seen in the overall MMF sector. In 2017, additional regulatory reforms came into effect in the EU, which is home to three of the five largest MMF markets (France, Ireland and Luxembourg).

MMF assets Exhibit 2-13



Sources: ICI Factbook, jurisdiction data, FSB calculations.

Note: Prior to 2016, all MMFs in the US were permitted to seek to maintain a stable share price. Since the rule amendments discussed above took effect in October 2016, institutional prime MMFs have been required to "float" their net asset values, while government and retail MMFs are allowed to continue to seek to maintain a stable share price.

In the US, MMFs are a type of mutual fund registered under the Investment Company Act of 1940 and regulated under rule 2a-7 of that Act. In general, MMFs invest primarily in certain asset classes, such as corporate debt securities ("prime MMFs"), government securities, or tax-exempt municipal securities.[41] Following the financial crisis, the US Securities and

[40] The FSB endorsed IOSCO's recommendation and noted that where a conversion from constant NAV MMFs to floating NAV MMFs was not workable, the safeguards required to reinforce stable NAV MMFs' resilience to runs should be functionally equivalent to the capital, liquidity, and other prudential requirements that protect banks against runs on their deposits. See FSB (2012).

[41] In addition, MMFs are often structured to cater to different types of investors (ie some MMFs are marketed to individuals and intended for retail investors, while other MMFs that typically require high minimum investments are intended for institutional investors).

Exchange Commission (SEC) adopted amendments to rule 2a-7 in both 2010 and 2014, with the most recent of these amendments taking effect in October 2016 (SEC (2014)). The amendments required prime MMFs intended for institutional investors to "float" their NAVs. With a floating NAV, institutional prime MMFs (including institutional municipal MMFs) are required to value their portfolio securities using market-based factors and to sell and redeem shares based on the floating NAV. Government and retail MMFs are allowed to continue to seek to maintain a stable share price.[42] The amendments also authorised all MMF boards of directors to impose liquidity fees or suspend redemptions temporarily to address heavy redemptions. In addition, they included enhanced diversification, disclosure and stress testing requirements, as well as updated reporting by all MMFs. As these rule amendments came into effect, there was a shift of assets from prime MMFs to government MMFs (Exhibit 2-13), although in the aggregate, US MMF assets were largely unchanged between end-2014 and end-2016, and showed a modest increase in 2017.

MMFs in China have grown significantly over the past few years to become the second largest MMF market globally. This relates partly to MMFs' higher returns relative to bank deposits and investor's easier access to these funds through technological innovation (eg internet finance and the expansion of inter-company financial business).[43] To address the risks posed by MMFs, Chinese authorities introduced a number of policy measures in February 2016. These measures affected the accounting methods, valuation methods, liquidity management and responsibilities of fund management companies, and required fund managers to adjust the value of constant NAV (CNAV) funds should the fund NAV deviate by more than 0.25% from its stated, stable NAV. Although there remain some structural differences with MMFs in other large markets, these measures are bringing the regulation of Chinese MMFs more in line with reforms globally (for instance, the maximum leverage Chinese MMFs are allowed to employ was reduced from 40% to 20%).[44] Following the implementation of these changes and credit market developments, MMFs in China shrank by 3.6% in 2016.

Finally, the EU has adopted new rules on MMFs, which entered into force on 20 July 2017, aiming to ensure uniform prudential, governance and transparency requirements that apply to MMFs throughout the EU (EU (2017)). The rules will apply to new funds as of 21 July 2018 and existing funds from 21 January 2019. These rules distinguish between three categories of MMFs: variable NAV (VNAV), public debt CNAV and low volatility NAV (LVNAV) MMFs. Standard MMFs will continue to use variable NAV, while CNAV MMFs will be restricted to holding public debt. The new category of LVNAV MMFs will only be allowed to maintain a constant NAV under strict conditions, notably if the difference with the market NAV does not exceed 20 basis points.[45] CNAV and LVNAV fund managers will have, whenever the proportion of their funds' weekly maturity assets falls below a certain threshold, either to consider or to mandatorily apply liquidity fees or redemption gates, or suspension of the fund to address liquidity pressures. Sponsor support of MMFs is banned, in view of limiting the contagion risk between the MMF sector and the rest of the financial system. The new rules

[42] A government MMF is defined as any MMF that invests 99.5% or more of its total assets in cash, government securities and/or repurchase agreements that are collateralised solely by government securities or cash. A retail MMF is defined as a MMF that has policies and procedures reasonably designed to limit all beneficial owners of the MMF to natural persons.

[43] See PBoC (2017) and McLoughlin and Meredith (2017).

[44] For details, see McLoughlin and Meredith (2017).

[45] This is aimed at eliminating the contractual pledge of redemption at par.

also strengthen the requirements on eligible assets, liquidity, portfolio diversification, credit assessment and transparency. Finally, the rules introduce a common EU reporting framework including the type and characteristics of the MMF, portfolio indicators, information on portfolio holdings and stress tests results. To ensure consistency of the scenarios, stress tests will take into account common reference parameters set by the European Securities and Markets Authority (ESMA).

- **Hedge funds**' assets amounted to about $3.7 trillion, 3.8% of total OFI assets, based on data reported by 15 jurisdictions.[46] This aggregate amount is broadly in line with the amount calculated by IOSCO's fourth hedge fund survey which estimated the global hedge fund industry in 2017 as having $3.2 trillion in assets under management (AUM), although the methodology for calculating the amount and the geographic coverage differed from this monitoring exercise (for more details on the IOSCO hedge fund survey, see Box 2-3).[47] The Cayman Islands continue to be an apparent preferred domicile for hedge funds, accounting for about 87% of total hedge fund assets.[48] The reported AUM of hedge funds in the Cayman Islands grew by 12% in 2016.

Results of IOSCO's fourth hedge fund survey **Box 2-3**

On 23 November 2017, IOSCO published the results of its fourth survey on hedge funds, based on data as of 30 September 2016.[49] The survey both covered a larger share of the market (1,971 funds compared to 1,452 in IOSCO's third survey (as of September 2014)) and included a unique set of questions, such as on the use of special liquidity arrangements.

The hedge funds covered by the survey managed a total of $3.2 trillion assets in 2016. Most of them are established in the Cayman Islands (53% of total net asset value (NAV)) and the US (29%), with Ireland (6%), the British Virgin Islands (5%) and Luxembourg (4%) also having sizable hedge fund industries. By investment strategy, equity long/short was the most common strategy (21% of NAV) followed by other/multi-strategy (18%), macro (16%) and fixed income arbitrage (16%).

IOSCO's survey brought to light a number of aspects of hedge fund activity:

- The gross leverage[50] of the hedge funds captured in its survey increased from 5.1 times NAV in 2014 to 7.1 times NAV in 2016. While that appears to suggest a meaningful increase in leverage, on its own, it is a misleading figure. One of the factors

[46] Hedge funds typically have more flexible investment strategies than mutual funds. Since they are usually marketed by way of "private placement" to sophisticated, institutional or professional investors, they are often not subject to some regulations designed to protect retail investors. Hedge funds were reported by Canada, the Cayman Islands, France, Germany, India, Ireland, Italy, Luxembourg, the Netherlands, Russia, Singapore, South Africa, Spain, Turkey and the UK.

[47] See IOSCO (2017b). Results included in the IOSCO survey are not directly comparable with this Report's results as: (a) reporting in the FSB's monitoring exercise is based on the legal residence of the relevant entities to avoid double-counting of investment funds that are managed and/or marketed in multiple jurisdictions; (b) in the FSB exercise, where possible, the size of investment funds, particularly hedge funds, is reported based on total financial AUM without netting of any liabilities; and (c) the sample of jurisdictions differs between the FSB exercise and the IOSCO survey.

[48] There is no separate licensing category for hedge funds incorporated in the Cayman Islands, thus Cayman Islands Monetary Authority (CIMA) estimated their size based on certain characteristics (eg leverage).

[49] The survey uses data collected by authorities in France, Germany, Ireland, Luxembourg, the UK, Singapore, the US and Hong Kong, and with input from the CIMA.

[50] Defined as the sum of values of long and short positions (including interest rate and FX derivatives), divided by the NAV. The gross basis tends to provide the broadest measure of potential leverage.

impacting those numbers is the inclusion of notional values of interest rate and foreign exchange derivatives, which may exaggerate the level of exposure. For 2016, gross leverage excluding interest rate and foreign exchange derivatives was 3.1 times NAV and net leverage[51] was 1.1 times NAV.

- Total borrowing of hedge funds increased from 74.8% of NAV in 2014 to 77.9% in 2016, with primary brokers continuing to be the largest source of their borrowing. Almost all of this borrowing is secured, with secured borrowing amounting to 77.5% of NAV in 2016. Cash and equivalents made up almost a third of collateral posted by hedge funds, with securities and other credit support making up the remainder.
- Hedge funds were asked to estimate the aggregate liquidity of their portfolios at various time horizons, as well as the aggregate value of qualifying fund assets that are "locked in" for the same time horizons. The gap between these two measures represents a fund's liquidity buffer, and suggests that hedge funds hold sufficient portfolio liquidity to meet projected investor liquidity. These liquidity estimates, however, are based on self-assessment and generally assume "normal" market conditions.
- About 3.8% of NAV were under special liquidity arrangements in 2016, up from 2.9% in 2014. These special liquidity arrangements included the use of liquidity management tools such as suspensions (with 0.6% of global AUM under suspended redemptions), gates (1.9%) and side pockets (1.2%).

IOSCO's survey also provided an overview of some of the key recent changes in the external environment and regulatory regimes affecting hedge funds. One recent trend highlighted in the survey is the emergence of so-called liquid alternative funds in Europe, a type of regulated mutual fund (generally structured as UCITS) that implements alternative investment strategies often similar to those employed traditionally by hedge funds, albeit within certain constraints, while providing daily or weekly redemption terms or liquidity to investors. These funds can be marketed to retail investors, although some European jurisdictions have sought to apply marketing restrictions. The survey also highlighted increased regulatory reporting for hedge funds in the EU as well as in the US.[52]

[51] Net leverage is defined as the value of long positions minus the value of short positions, divided by the NAV. The net basis trends give a more reasonable estimate for the degree of market risk the funds are exposed to.

[52] For example, in the US, SEC staff has been publishing Private Funds Statistics on a quarterly basis beginning with the fourth quarter 2014, based on aggregated data reported to the SEC by registered investment advisers. SEC staff has included the new analyses about the use of financial and economic leverage by hedge funds and characteristics of private liquidity funds since its third quarter 2016 report (published in April 2017). The reports are available on the SEC website.

- **Captive financial institutions and money lenders'** (CFIMLs) assets totalled $20.4 trillion at end-2016, or about 20.5% of total OFIs. CFIMLs grew by 5.3% in 2016, largely as a result of growth in Luxembourg and Canada. Due to the participation of Luxembourg in this year's exercise and improved data submissions from other jurisdictions, CFIMLs now constitute a relatively large share of total OFI assets. Box 2-4 discusses CFIMLs in greater detail.

Captive financial institutions and money lenders (CFIMLs) **Box 2-4**

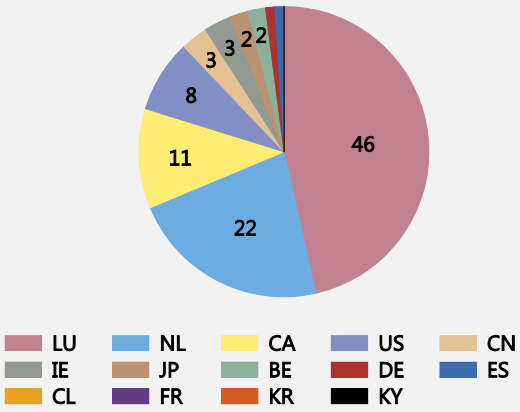
CFIMLs are institutional units that provide financial services, including entities transacting with subsidiaries of the same holding corporation or entities that provide loans from own funds provided by only one sponsor.[53] For example, they may be holding companies that own assets of subsidiaries and possibly raise funds on open financial markets, or they may be certain types of special purpose entities that qualify as institutional units and raise funds in open markets for use by their parent corporation. In some cases, they are set up for tax planning purposes.

The addition of Luxembourg to the 2017 monitoring exercise and improved data submission from other jurisdictions has resulted in substantially wider coverage than the 2016 exercise (14 jurisdictions compared to six for the 2016 monitoring exercise, (see LHS of Exhibit 2-14)).

CFIMLs Exhibit 2-14

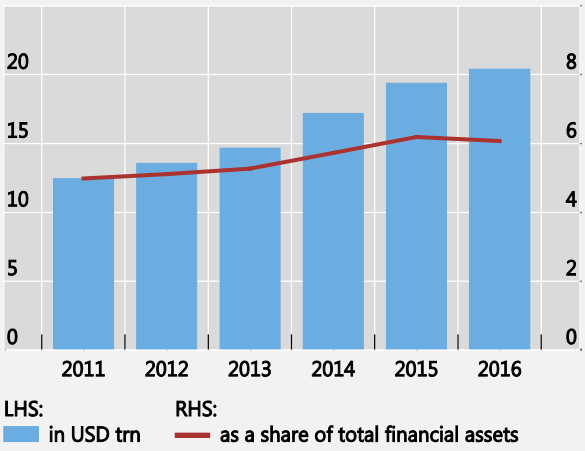
CFIMLs by jurisdiction at end-2016[1]

Percent of total reported CFIMLs



Total assets of CFIMLs

USD trillion Percent



[1] CFIMLs were reported by Belgium, Canada, the Cayman Islands, Chile, China, France, Germany, Ireland, Japan, Korea, Luxembourg, the Netherlands, Spain and the US.

Sources: National sector balance sheet and other data; FSB calculations.

Luxembourg's CFIMLs are typically affiliated with non-financial corporations and employ three main types of business models: (i) holding companies used to channel financial flows between group entities via Luxembourg, whose funding and assets are both from/issued by other group entities; (ii) financing companies that raise money in Luxembourg by issuing securities on behalf of the group to which they belong and then lending the proceeds to other affiliates; and (iii) treasury management companies that centrally manage the liquidity of

[53] See Box 2-2 of FSB (2017b) or EC et al (2009).

large corporations to increase financial profitability, by investing cash balances in a securities portfolio usually comprising short-term instruments (CRS (2017)).

The Netherlands had the second largest share of reported CFIMLs, which is mostly comprised of "special financial institutions". These institutions are subsidiaries of foreign multinationals with little or no physical presence in the Netherlands, and are almost exclusively used for the pass-through of capital (see Bross et al (2012) and Van der Veer et al (2015)). Most entities are not involved in credit intermediation or, when their parent company is a financial institution, they are included in the consolidated balance sheets of their parent companies and supervised on a prudentially consolidated basis.

Finally, China's CFIML sector is significantly larger in 2016 after Chinese authorities determined that a large fraction of their finance companies are economically more similar to CFIMLs than finance companies, and have categorised them accordingly. These entities are members of an enterprise group (ie they face certain ownership restrictions), can only provide a pre-determined set of services to other members of the enterprise group (ie pure intra-group treasury and cash management services), and are involved in very limited inter-bank borrowing and investment activities in open financial markets.

- **Broker-dealers** were the third largest identified sector with $9.2 trillion of assets corresponding to 9.3% of total OFIs. At end-2016, the sector was concentrated in the US (33%), the UK (31%) and Japan (17%). The assets of broker-dealers grew in 2016 by 6%, driven by growth in the UK and Canada.
- **Structured finance vehicles** (SFVs) stood at $4.4 trillion at end-2016, corresponding to 4.5% of total OFIs. The sector continued its decline since 2009, albeit at a slower rate, shrinking by 2% in 2016 in the *29-group*. The decline was largely driven by the US (-8%), while some jurisdictions like Korea saw an increase in its SFV sectors (+13%). The US accounts for 28% of the sector, followed by Ireland (9%) and the UK (8%).
- **Finance companies** stood at $3.9 trillion in 2016, equivalent to 4.0% of total OFIs, reflecting minor growth of 0.7% in 2016. The US reported the largest sector making up about 35% in the *29-group* while Japan had the second largest sector (13%). The composition of this sector changed relative to the 2016 monitoring exercise, as China re-categorised much of its finance companies into CFIMLs (see Box 2-4).
- **Trust companies**' assets under management stood at $3.4 trillion at end-2016, equivalent to 3.4% of total OFIs in the *29-group*, with about 86% of total sub-sector assets accounted for by China (see Box 2-5). In 2016, trust companies in China continued to grow rapidly (at a rate of 47%), and at a faster rate than in recent years (ie a 33% growth rate from 2011-2015).

Trust companies in China **Box 2-5**

Chinese trust companies are non-bank financial entities that conduct asset management businesses on their investors' behalf (see FSB (2015a) and PBoC (2017)). They are a notable feature of China's financial system, accounting for $2.9 trillion, or 6%, of total domestic financial assets. Trust companies manage different types of trusts by investing in financial assets such as bonds and equity, and by extending loans. These trusts can be broadly divided into three main categories:

- **Single money trusts** where trusts are set up based on the requirement of a single customer (over 99% of customers are qualified institutional investors, over 80% of which are banks). These trusts comprised $1,458 billion at end-2016 (or 51% of all trusts). Single money trusts usually invest in financial products or securities, or supply short-term financing for enterprises or individuals.
- **Collective investment trusts** (CITs) are trusts that manage CIVs or develop financial products which are marketed to more than one investor. CITs amounted to $978 billion (35% of all trusts) at end-2016. About 60% of CITs are closed-ended. For these closed-ended CITs, the lock-up period matches the agreed life of the fund, and most of them have a duration of greater than one year. The remaining CITs are open-ended, and about 70% of these invest in fixed income or mixed/balanced financial products.
- **Property trusts** are trusts that manage non-monetary assets on behalf of clients. These property trusts amounted to $397 billion at end-2016 (14% of all trusts). Property trusts are often used to achieve bankruptcy isolation, rather than to manage investments.

All of these trusts are regulated and supervised by the China Banking Regulatory Commission (CBRC), under a framework that includes capital supervision, qualified investor requirements, investor protection rules, corporate governance requirements, comprehensive risk management and internal controls. Trusts are subject to leverage requirements, and are limited to borrowing on the interbank market (with the amount of interbank borrowing limited to 20% of paid-in capital). The CBRC has recently enhanced its risk supervisory rules, by strengthening due diligence requirements for managers. Finally in December 2014, the CBRC introduced the trust protection mechanism, which established the Trust Protection Fund Management Company, which can provide liquidity support or capital injection to trusts that face pressure of large redemptions or become distressed.

- Assets of **real estate investment trusts and real estate funds** ("REITs"), amounted to $1.9 trillion in 2016, or 1.9% of total OFI assets. REITS grew by 8.8% in 2016, below the double digit average growth from 2011 to 2015. Most jurisdictions separately identified equity REITs and mortgage REITs,[54] with equity REITs exceeding mortgage REITs by a factor of two. Mortgage REITs exceeded equity REITs only in the US. Equity REITs grew 7.8% in 2016, driven by growth in Korea (which grew at a rate of 29%), Singapore (10%) and the US (8%). Mortgage REITS grew 2% in 2016.

[54] Equity REITs only invest in and own physical property and their revenues therefore come principally from their properties' rent. Mortgage REITs, in contrast, do not invest in physical real-estate but derive most of their income from investment and ownership of debt instruments (ie payments on mortgage loans). See Box 4-1 of FSB (2014).

- **Central counterparties** (CCPs) were the smallest OFI sub-sector, making up only $0.4 trillion, or around 0.4% of total OFIs. CCPs, however, saw the second largest growth of any OFI sub-sector (17.6%) in 2016, driven primarily by the UK, where a major CCP saw record volumes of interest rate derivatives cleared in 2016 (in part this increase in assets was due to exchange rate effects). This trend is consistent with post-crisis G20 reforms to encourage increased central clearing of standardised OTC derivatives (see FSB (2017c) and FSB (2017d)).

2.4 Credit intermediation and lending

To help identify which non-bank financial entities are involved in credit intermediation, data were collected on the "credit assets" and "lending" (a subset of "credit assets") of banks, insurance corporations, pension funds and the aggregate OFI sector. Data were also collected for several sub-sectors of OFIs: finance companies, hedge funds, fixed income funds, other funds and broker-dealers.[55] Together, these data provide the basis for analysing how credit and lending activities of various entity types have changed, including shifts between sectors.

Several jurisdictions made substantial improvements to the credit asset and loan data they submitted for the 2017 monitoring exercise. These improvements include providing data for the first time, providing a more extensive set of historical data than had been previously submitted, or providing a more refined dataset.

2.4.1 Credit assets

Credit intermediation by non-bank financial sectors largely grew faster than credit intermediation by banks, although the scale of this credit intermediation is much smaller (Exhibit 2-15). Credit intermediation by pension funds grew at a fast pace (7.1%), reflecting growth in the US and the euro area. Credit intermediation by insurance companies also grew fast (7.0%), largely driven by growth in the UK, the US and the euro area.[56, 57]

Bank credit intermediation, as measured by the aggregate bank holdings of credit assets, has increased in recent years. Since 2011, bank credit in the *21+EA group* has increased at an average, exchange rate-adjusted annual rate of about 3.6%, reaching $92 trillion at end-2016. Growth was stronger in China, the UK and the US, while the euro area, which comprises a large share of total bank credit intermediation (31%), grew only by about 1% in 2016. Despite the growth in gross bank holdings of credit assets, the ratio of credit assets held by banks to their total financial assets has declined slightly from 69% at the start of 2011 to 66% at end-2016.

The credit assets of OFIs grew by 5.3% in 2016, primarily driven by the largest jurisdictions (China, the euro area and the US), continuing the steady growth of OFI credit assets since 2011. In recent years much of this growth has been driven by growth in emerging market economies (EMEs) (in particular, in China). For instance, in 2016, OFI credit assets in EMEs grew by 15%, compared to 4% growth in advanced economies (where growth in the euro area

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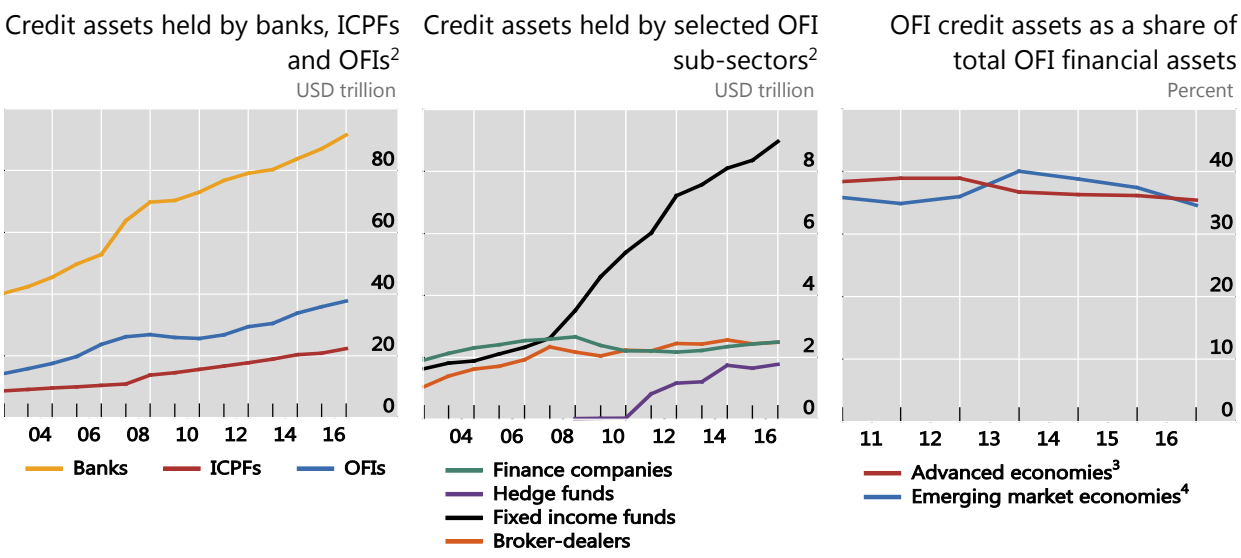
[55] "Credit assets" are defined as the amount of loans and receivables, investments in debt securities and other credit-related assets (eg government debt and other debt instruments, but excluding repo assets). "Loans" (or "lending") are defined as the amount of loans and receivables, excluding repo liabilities. Note that credit and lending to financial entities and the government are also included. OFIs in Sections 2.4, 2.5 and 3 do not include CFIMLs.

[56] According to EIOPA (2017), the relative amount of non-equity investments in European insurers' portfolio is unchanged. The absolute increase may be driven by growth of the entire insurance sector.

[57] For some jurisdictions, data on insurance corporations include separate accounts.

and US was offset by declines and moderate growth in other advanced economies). While to a large degree this reflects growth from a smaller base, OFI credit assets have grown slower than overall OFI assets in EMEs over the past few years.

Credit assets[1] Exhibit 2-15



ICPFs = Insurance corporations and pension funds; OFIs = Other financial intermediaries.

[1] Based on historical data included in jurisdictions' 2017 submissions. Increases of aggregated data may also reflect improvements in the availability of data over time at a jurisdictional level. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). [2] Sample of 21 jurisdictions and the euro area. [3] Advanced economies = Australia, Belgium, Canada, Cayman Islands, France, Gernany, Hong Kong, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, Singapore, Spain, Switzerland, the UK, and the US. [4] Emerging market economies = Argentina, Brazil, Chile, China, India, Indonesia, Mexico, Russia, Turkey, Saudi Arabia, and South Africa.

Sources: National sector balance sheet and other data; FSB calculations.

Within OFIs, the credit assets of fixed income funds and hedge funds grew the quickest, although this may be driven by an appreciation of asset prices. While the overall assets of broker-dealers increased by about 6.4% in 2016, their credit assets grew only 1.9%.

The increase in reported credit assets in these non-bank financial sectors is consistent with anecdotal evidence of some entities in these sectors becoming more active in providing loans directly or taking on more higher-yield fixed income exposures (including through investment in investment funds) in response to the prolonged period of low interest rates and other factors.[58] For example, insurance corporations, pension funds and, recently, other OFIs seem to be increasing their involvement in leveraged finance, which consists of leveraged loans and high-yield bonds (see Annex 7 of FSB (2017b). In some jurisdictions (eg India, Netherlands), non-bank financial institutions' role in providing lending to households directly or indirectly seems to be increasing, such as in long-term housing financing (see Annex 3.3).

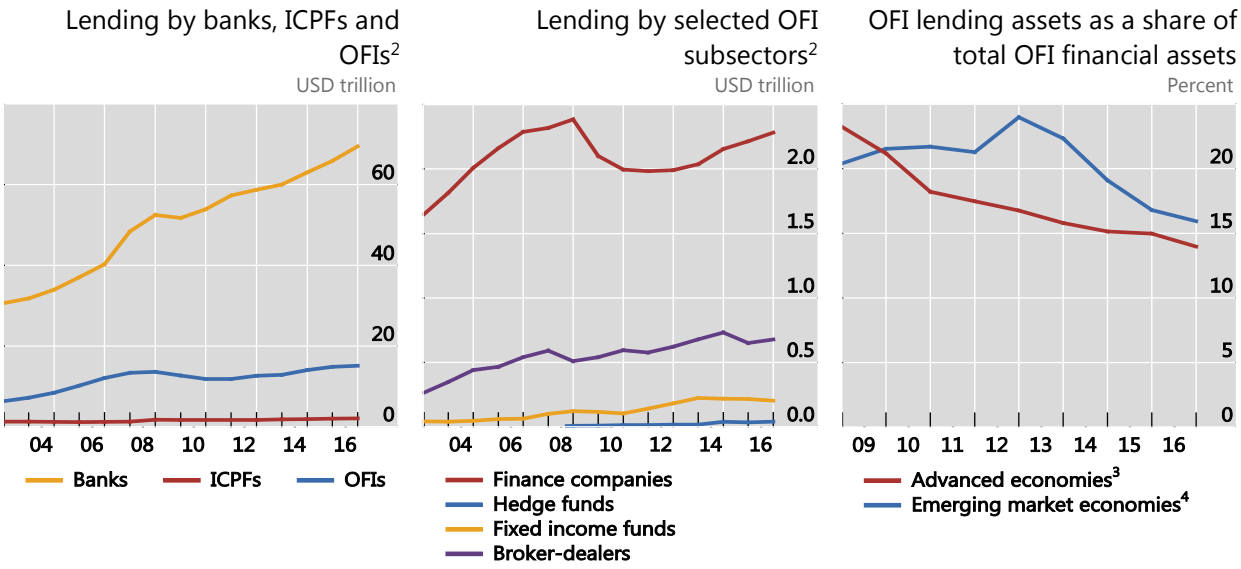
2.4.2 Lending

Lending assets (or loans) data were collected as a subset of credit assets (Exhibit 2-16). In 2016, most lending was done by banks (77% of total loans), with bank loans increasing by 5% to $69 trillion. This growth largely resulted from lending growth by banks in China, the euro area, the UK and the US. Although most jurisdictions saw growth in bank loans, some

[58] For example, the increase in leveraged loans may alternatively be due to expectations about future monetary policy.

jurisdictions saw declines such as in the Cayman Islands (-22%), Ireland (where bank loans fell 5.3%, continuing a multi-year decline) and Brazil (where such loans declined 4.5% due to an economic recession).

Lending[1] Exhibit 2-16



ICPFs = Insurance corporations and pension funds; OFIs = Other financial intermediaries.

[1] Based on historical data included in jurisdictions' 2017 submissions. Increases of aggregated data may also reflect improvements in the availability of data over time at a jurisdictional level. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). [2] Sample of 21 jurisdictions and the euro area. [3] Advanced economies = Australia, Belgium, Canada, Cayman Islands, France, Germany, Hong Kong, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, Singapore, Spain, the UK, and the US. [4] Emerging market economies = Argentina, Brazil, Chile, China, India, Indonesia, Mexico, Russia, Turkey, Saudi Arabia, and South Africa.

Sources: National sector balance sheet and other data; FSB calculations.

In aggregate, loans extended by OFIs grew by about 1.6% to $15 trillion in 2016. This growth largely occurred in EMEs, where loans grew by 18% (compared to a 0.5% decline in advanced economies). OFI loan growth in EMEs was largely driven by China, while for advanced economies, growth in some jurisdictions (Canada and the UK) was offset by declines in Belgium, Luxembourg and the US. As a result, advanced economies' share of total OFI lending assets has declined from 96% at the start of 2011 to 87% at end-2016. In both EMEs and advanced economies, however, the growth of lending by OFIs was less than the overall growth of OFI assets.

2.5 Wholesale funding and repos

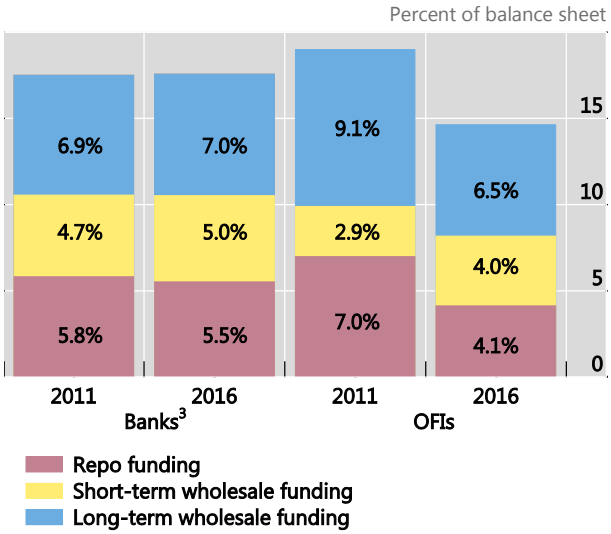
Wholesale funding instruments, which include repurchase agreements (repos), are important funding sources for banks as well as non-bank financial entities such as broker-dealers and hedge funds. While some wholesale funding instruments support price discovery and secondary market liquidity for a wide variety of securities, they can also be used by non-bank financial entities to create short-term, money-like liabilities, facilitating credit growth and maturity/liquidity transformation outside the regular banking system. This can pose financial stability risks by aiding the build-up of leverage and maturity transformation, especially where appropriate mitigants are not in place. Wholesale funding may also increase interconnections among financial institutions and contribute to pro-cyclicality.

In light of the FSB's regulatory framework for haircuts on non-centrally cleared securities financing transactions (FSB (2015c)), the FSB data collection template was expanded, starting in the 2016 monitoring exercise, to include items from the liability side of the balance sheet, so as to capture historical data on wholesale funding and repos of the main financial sectors.[59] The information presented in the 2016 Report has been greatly improved upon, as several jurisdictions have made substantial improvements to the wholesale repo and funding data they submitted for the 2017 exercise. These improvements included providing data on wholesale funding or repos for the first time, providing a more extensive set of historical data than had been previously submitted, or providing more comprehensive data.

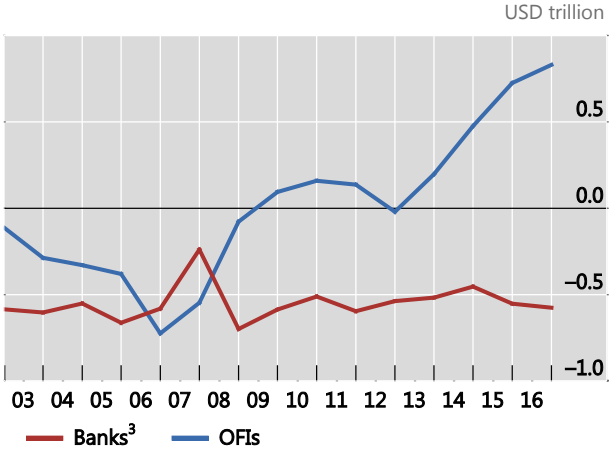
Together, short-term wholesale funding and repos comprise a meaningful portion of bank and OFI funding, at 10.5% and 8.1%, respectively (Exhibit 2-17, LHS). While banks' overall reliance on wholesale funding and repos as a source of funding has changed little over time, banks seem to have slightly shifted away from involvement in repo markets (for instance due to central bank liquidity) towards other wholesale funding (CGFS (2017)). Over the 2011 to 2016 period, OFIs became less reliant on wholesale funding and repos, except for an increase in reliance on short-term wholesale funding. A large portion of OFIs' reliance on long-term wholesale funding is related to OFIs in Luxembourg.[60]

Wholesale funding and repos — Exhibit 2-17

Funding of entities, by source[1]



Net repo position (Repo assets minus repo liabilities)[2]



[1] Bank funding data from Australia, Brazil, Canada, the Cayman Islands, France, Korea, Luxembourg, Mexico, the Netherlands, South Africa, Spain, Switzerland, the UK, and the US. OFIs funding data from Australia, Brazil, China, France, India, Italy, Korea, Luxembourg, Mexico, the Netherlands, Singapore, Spain, and the US. Short-term funding is defined as funding whose residual maturity is less than 12 months. [2] Data for banks' net repo positions from Argentina, Australia, Brazil, Canada, France, Indonesia, India, Japan, Mexico, Saudi Arabia, the UK, and the US. Data for OFIs' net repo positions from Australia, Brazil, France, Japan, India, Mexico, Singapore, Spain, and the US. Assets related to repo transactions on the buyer's (collateral-taker, cash-provider) balance sheet. Liabilities related to repo transactions on the seller's (collateral-provider, cash-taker) balance sheet. [3] All deposit-taking corporations.

Sources: National sector balance sheet and other data; FSB calculations.

[59] Wholesale funding includes all non-deposit on- and off-balance sheet funding sources, particularly market funding, but excluding non-redeemable equity. Deposits provided by retail customers and funding provided by small business customers are excluded.

[60] Long-term wholesale funding of OFIs in Luxembourg consists mostly of client investments in investment fund shares, loans received by captive financial institutions and debt securities issued by captive financial institutions.

OFIs continue to be net providers of cash to the financial system from repos, while banks remain net recipients of cash through repos, as reflected in net repo positions (repo assets minus repo liabilities) of these entities (Exhibit 2-17, RHS). This aggregate position for OFIs may, however, mask differences in the use of repos between different entity types amongst OFIs. For instance, a possible reason for the increase in OFIs' status as net cash providers is the role of MMFs as cash providers through repos. As MMF assets have grown over time, their provision of cash through repos may have also increased. Additional data will be collected in future exercises to investigate differences in the repo behaviour of OFI entity types.

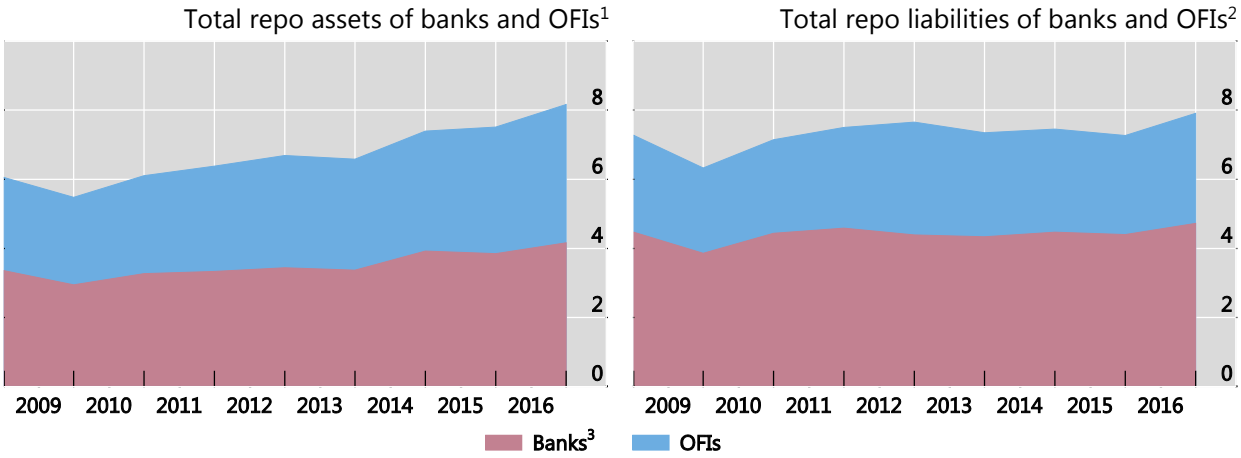
Meanwhile, there was considerable variation across jurisdictions with, for instance, banks acting as net providers of cash through repos in some jurisdictions and net recipients in others. Among the 29 reporting jurisdictions, about 50% of OFI repo assets are concentrated in the US at end-2016, followed by Japan (25%).

Across jurisdictions, total repo assets have increased by an average of 5.9% a year since 2009 and have now reached $8.2 trillion, while repo liabilities have increased by an average of 3.5% a year since the financial crisis, and reached $7.9 trillion at end-2016 (Exhibit 2-18). Among OFIs, growth in both repo assets and liabilities has been the most prominent in the Asia-Pacific region, largely as a result of growth in China and Japan, but also, to a lesser degree, Korea (Exhibit 2-19). The decline in OFI repo liabilities in the Americas since 2012 has resulted from declines in the largest jurisdiction (ie the US).

Total repo assets and liabilities

USD trillion

Exhibit 2-18



[1] Data for banks' and OFIs' total repo assets from Argentina, Australia, Belgium, Brazil, Canada, Cayman Islands, China, France, Indonesia, India, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Switzerland, Turkey, the UK, and the US. [2] Data for banks' and OFIs' total repo liabilities from Argentina, Australia, Belgium, Brazil, Canada, Cayman Islands, China, France, Indonesia, India, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Switzerland, Turkey, the UK, and the US. [3] All deposit-taking corporations.

Sources: National sector balance sheet and other data; FSB calculations.

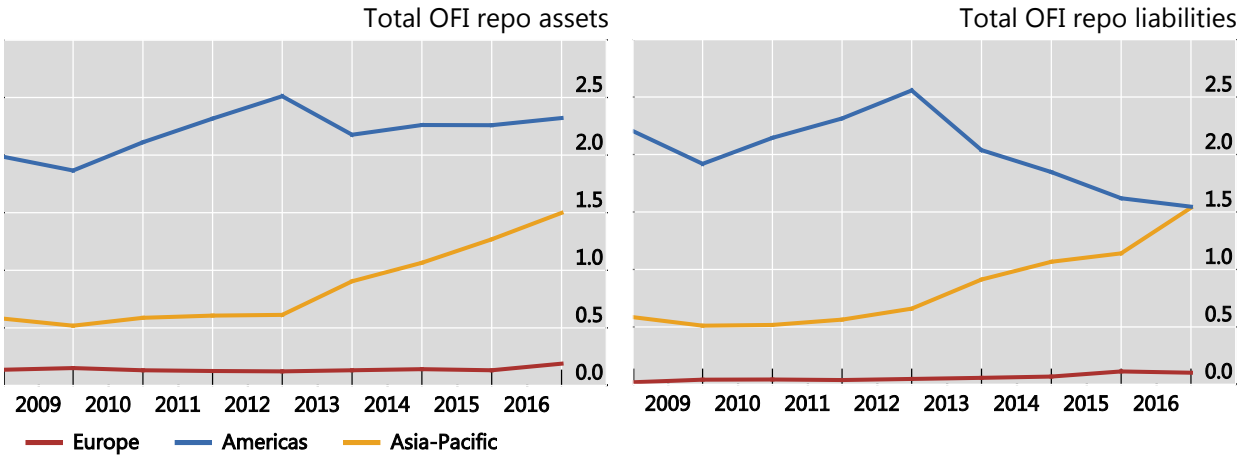
However, even though repo markets continue to grow in aggregate, there are some indications of changes in the functionality of these markets. For instance, banks in some jurisdictions appear less willing to intermediate repo markets, which has resulted in higher volatility in repo rates and may potentially limit the ability of repo markets to respond to users' needs in periods of stress (CGFS (2017)). These observations may differ across jurisdictions.

For instance, jurisdictions in which government bonds are typically used as collateral may be less likely to see a deterioration in repo market conditions during periods of stress.

The largest players in repo markets varied significantly by region and type of repos (Exhibit 2-20). A large driver of this is the difference in the share of broker-dealers that are prudentially consolidated into banking groups within jurisdictions (which is common, for instance, in many European jurisdictions but relatively less common in the Americas).

OFI repo assets and liabilities by geographical region

USD trillion | Exhibit 2-19

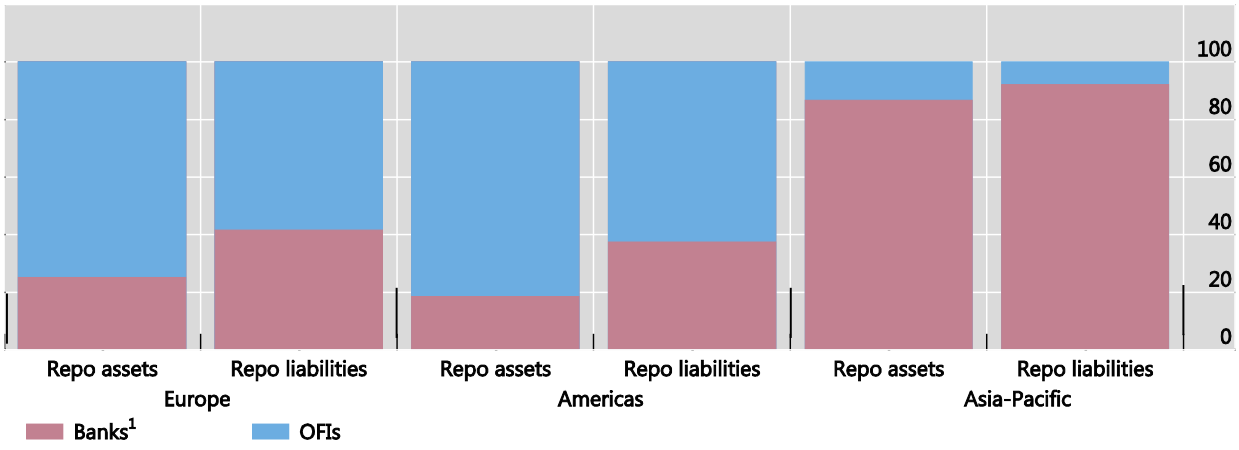


Europe = France, Ireland, Italy, Luxembourg, the Netherlands, Russia, Spain; Americas = Brazil, Mexico, US; Asia-Pacific = Australia, China, Japan, India, Korea, Singapore.

Sources: National sector balance sheet and other data; FSB calculations.

Break down of repo assets and liabilities across geographic areas[1]

End-2016, percent | Exhibit 2-20



Americas = Brazil, Mexico, US; Asia-Pacific = Australia, Japan, Korea, Singapore; Europe = France, Italy, the Netherlands, Russia, Spain.

[1] All deposit-taking corporations.

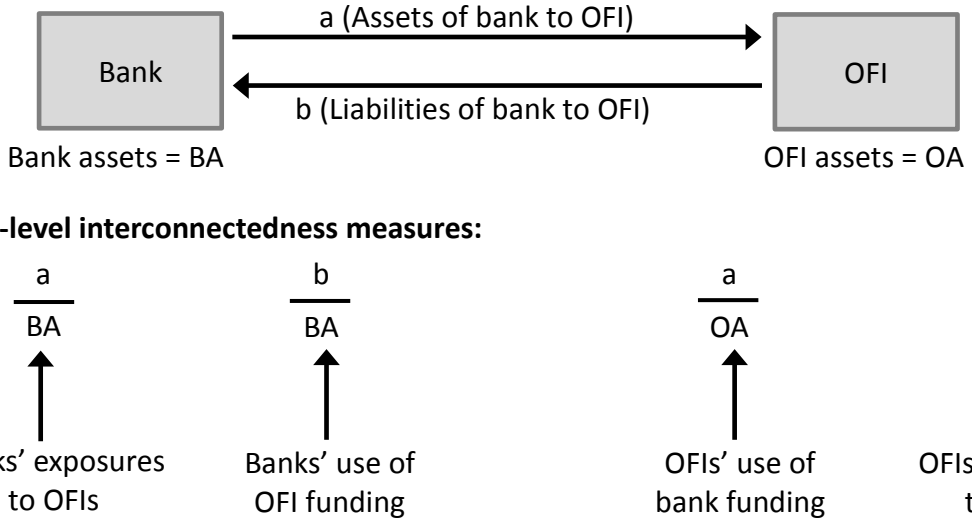
Sources: National sector balance sheet and other data; FSB calculations.

3. Interconnectedness among financial sectors

During periods of stress, both direct and indirect linkages between financial sectors can become channels of risk contagion. These linkages can take a variety of forms, including direct exposures such as funding interdependence or being part of a credit intermediation chain, as well as indirect exposures such as holding similar assets as collateral. To shed light on potential channels of contagion, this Section takes a closer look at the direct linkage between banks and OFIs, as well as their direct linkages with insurance corporations and pension funds.

To measure direct interconnectedness, the FSB compiles aggregate balance sheet data on the bilateral exposures between financial sectors (eg assets and liabilities of banks to OFIs and OFIs to banks).[61] This aggregate data is used to calculate high-level measures of interconnectedness (credit exposure and funding dependence) between different entity types (eg between banks and OFIs), as illustrated in Exhibit 3-1.

A framework to analyse interconnectedness between banks and OFIs — Exhibit 3-1



The data provided in 2017 improved significantly relative to previous exercises. While some jurisdictions provided data for the first time, others provided data covering a wider set of entities or over a longer historical period.[62] As a result, the overview of interconnectedness between financial sectors (Box 3-1) is more robust than the assessment provided in the 2016 Report. Nonetheless, interconnectedness results are not always comparable across jurisdictions as not all jurisdictions reported interconnectedness measures net of prudential

[61] The FSB also makes adjustments for assets and liabilities of OFIs that are prudentially consolidated into banking groups whenever jurisdictions provided the required granularity in their data submissions. Significant challenges remain with regard to the treatment of banks' partial ownership of an OFI entity. Most jurisdictions have followed their respective accounting rules and brought the full amount of an entity's assets back onto the bank's balance sheet, even in the case of partial ownership.

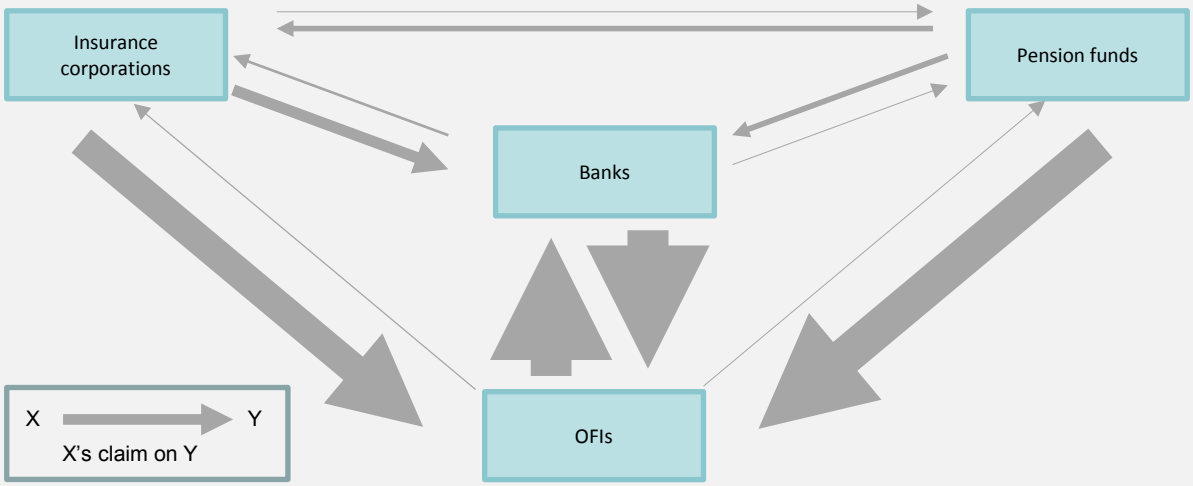
[62] Although improvements have been made, the direct interconnectedness measures currently do not capture derivatives and contingent exposures, such as bank lines of credit to OFIs. Limited data also prevents a comprehensive assessment of the interconnectedness between banks and OFIs across borders. The FSB is considering improvements to the measures and the analysis going forward.

consolidation for all entity types. In addition, some authorities only reported a subset of banks' assets and liabilities to OFIs, and the data is highly aggregated.[63]

Interconnectedness among financial sectors **Box 3-1**

The data provided by jurisdictions has improved substantially since the 2016 exercise, resulting in some changes to the interconnectedness map shown in Exhibit 3-2. This exhibit illustrates high-level observations from the analysis of interconnectedness between banks, OFIs, pension funds and insurance corporations. The thickness of the arrows reflects the absolute size of the exposures from a certain financial sector to the other.

Exhibit 3-2



Sources: National sector balance sheet and other data; FSB calculations.

The available data suggests that, in aggregate, banks and OFIs remain the most interconnected, with significant funding channels operating in both directions. In addition, while OFIs' combined use of funding from insurance corporations and pension funds substantially exceeded their use of bank funding, much of this funding use reflects pension funds' and insurance corporations' investments into funds rather than serving as a true funding channel through, for example, direct lending. Nonetheless, disruptions in the funding provided by insurance corporations and/or pension funds to certain OFIs could lead to some pressure on these OFIs and subsequent disruptions of the funding they provide to banks.

Across jurisdictions, the interconnectedness in the financial system varies quite substantially. Insurance corporations and pension funds, for instance, tend to be less interconnected with OFIs than banks are to OFIs in the Asia-Pacific jurisdictions and Europe, but considerably more interconnected in the Americas, where both insurance corporations' and pension funds' nominal exposures to OFIs exceed banks' exposure to OFIs.[64]

When analysing the financial stability implications of this interconnectedness, the degree to which the funding and credit risk associated with these exposures have the potential to affect

[63] For example, due to limitations in data availability, some jurisdictions only reported a subset of bank assets/liabilities (eg loans/deposits) to (some) OFI sectors, instead of all bank assets/liabilities to all OFIs.

[64] Increased interconnectedness between insurance corporations and OFIs may represent insurance corporations' increased use of asset managers and investments in funds, which has been a general trend for several years.

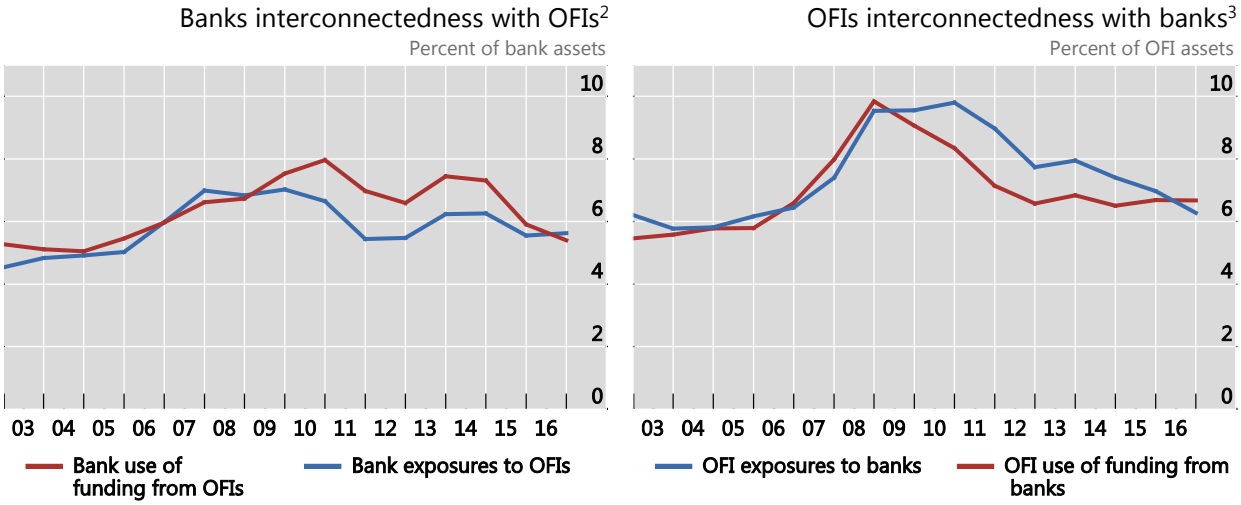
financial stability (for example, through the build-up of leverage, maturity/liquidity mismatches and contagion channels for risk propagation across financial sectors) may need to be considered carefully. Also, an analysis of how concentrated these exposures are, for example, in some large, complex and less substitutable intermediaries may be appropriate. Finally, the extent to which these interconnections have a cross-border element that could result in international spillovers may need to be further assessed.

3.1 General trends in interconnectedness between banks and OFIs

After several years of decline, aggregate funding and credit interconnectedness between banks and OFIs at end-2016 were still approximately at pre-crisis (2003-2006) levels (Exhibit 3-3).[65] Aggregated across jurisdictions, banks' claims on OFIs increased by $0.5 trillion to $6.3 trillion in 2016, or 5.6% of bank assets at end-2016, while banks' funding from OFIs declined by $0.2 trillion to $5.9 trillion, resulting in a 5.4% bank use of funding from OFIs.[66]

Interconnectedness between banks and OFIs

18 jurisdictions and the euro area[1] Exhibit 3-3



[1] Based on historical data included in jurisdictions' 2017 submissions. Changes in interconnectedness measures may also reflect improvements in the availability of data over time at a jurisdictional level. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). [2] Bank use of funding from OFIs = Banks' liabilities to OFIs as a share of bank assets. Banks exposure to OFIs = Banks' claims on OFIs as a share of bank assets. [3] OFIs use of funding from banks = OFIs' liabilities to banks as a share of OFI assets. OFIs exposures to banks = OFIs' claims on banks as a share of OFI assets.

Sources: National sector balance sheet and other data; FSB calculations.

3.2 Bank interconnectedness with OFIs

Banks may be directly connected with OFIs from lending to or investment in OFIs, from OFIs' providing wholesale funding, or custodian banks receiving the non-invested part of fund assets/operational deposits. In times of stress, both asset- and liability-side linkages may affect banks.

[65] The sample of jurisdictions reporting data on the interconnectedness between banks and OFIs increased in the 2017 monitoring exercise. The results presented here are based on historical data included in jurisdictions' 2017 submissions and are therefore not directly comparable to the 2016 exercise.

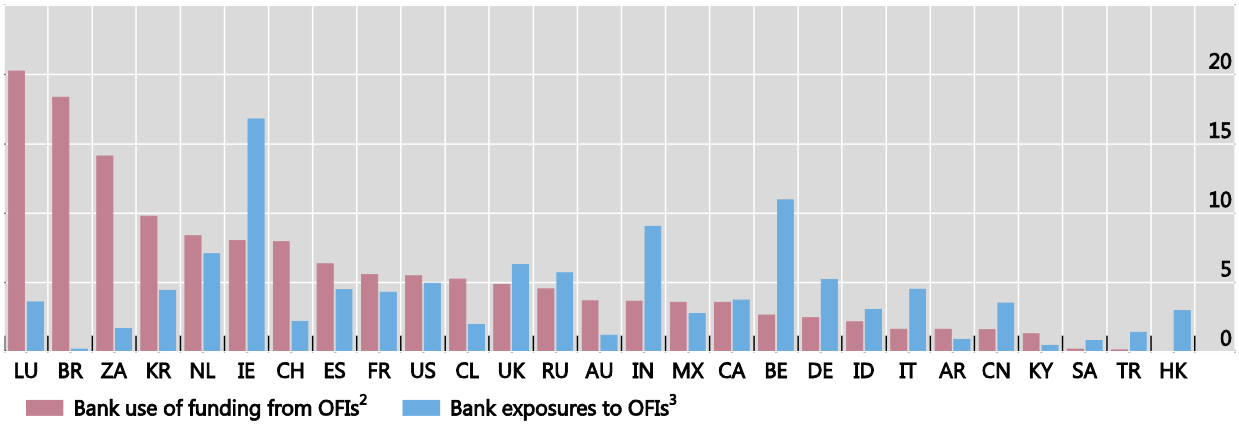
[66] See Exhibit 3-1 for the definition and interpretation of these interconnectedness measures.

Banks' exposures to OFIs were below 5% of total bank assets in most jurisdictions (Exhibit 3-4). Banks' exposures to selected OFI entity types (ie MMFs, other investment funds, broker-dealers) varied across jurisdictions (Exhibit 3-5), although the highest such exposure was only around 2% of total bank assets.

Banks' interconnectedness with OFIs[1]

End-2016 Exhibit 3-4

Percent of bank assets



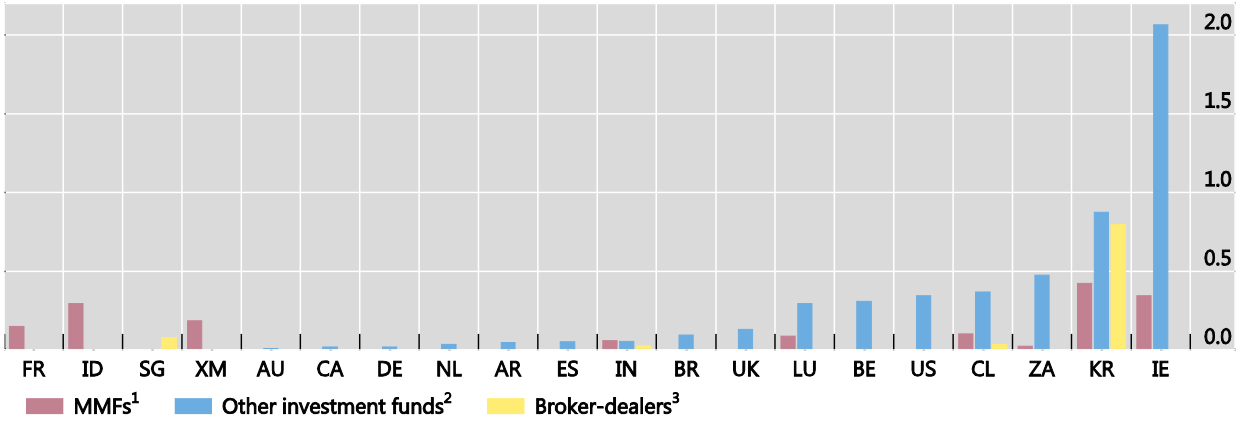
AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; KR = Korea; KY = Cayman Islands; LU = Luxembourg; MX = Mexico; NL = the Netherlands; RU = Russia; SA = Saudi Arabia; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa. [1] Some jurisdiction's exposure and funding links between banks and OFIs reflect the provision of data gross of prudential consolidation whereas other jurisdictions provided data net of prudential consolidation (ie a substantial part of this exposure reflects bank activity with related OFIs within a banking group). [2] Banks' liabilities to OFIs as a share of banks' assets. [3] Banks' claims on OFIs as a share of bank assets.

Sources: National sector balance sheet and other data; FSB calculations.

Banks' exposures to MMFs, other investment funds, and broker-dealers

End-2016 Exhibit 3-5

Percent of bank assets



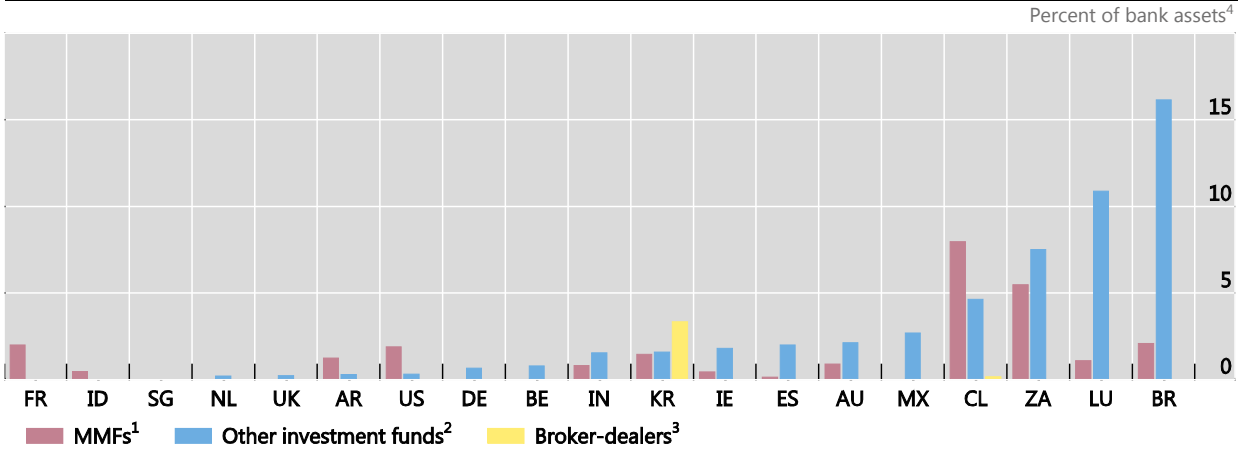
AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CL = Chile; DE = Germany; ES = Spain; FR = France; ID = Indonesia; IE = Ireland; IN = India; KR = Korea; LU = Luxembourg; NL = the Netherlands; UK = United Kingdom; US = United States; XM = euro area; ZA = South Africa. [1] Banks' claims on MMFs as a share of banks' assets. [2] Banks' claims on other investment funds (equity funds, fixed income funds, mixed funds) as a share of banks' assets. [3] Banks' claims on broker-dealers, net of prudential consolidation when available, as a share of banks' assets.

Sources: National sector balance sheet and other data; FSB calculations.

Similarly, in most jurisdictions banks' use of funding from OFIs was below 10% of total bank assets, with few exceptions (Exhibit 3-6). In Brazil and Luxembourg, this bank funding was primarily from other investment funds,[67] while in South Africa, bank funding is primarily from MMFs and other investment funds. However, even though bank funding from OFIs is low or moderate in most jurisdictions, funding exposures may vary significantly across individual banks within each jurisdiction.

Banks' use of funding from MMFs, other investment funds, and broker-dealers

End-2016 Exhibit 3-6



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CL = Chile; DE = Germany; ES = Spain; FR = France; ID = Indonesia; IE = Ireland; KR = Korea; LU = Luxembourg; MX = Mexico; NL = the Netherlands; UK = United Kingdom; US = United States; ZA = South Africa.

[1] Banks' liabilities to MMFs as a share of banks' assets. [2] Banks' liabilities to other investment funds (equity funds, fixed income funds, mixed funds) as a share of banks' assets. [3] Banks' liabilities to broker-dealers, net of prudential consolidation when available, as a share of banks' assets. [4] Data on this chart only reflect domestic exposures.

Source: National sector balance sheet and other data; FSB calculations.

3.3 OFI interconnectedness with banks

OFIs' interconnectedness with banks is the mirror image of banks' interconnectedness with OFIs.[68] Starting on the asset side of their balance sheets, OFIs' exposures to banks varied substantially across jurisdictions. OFIs' exposures to banks nonetheless make up over 20% of total OFI assets in only two jurisdictions (Brazil and South Africa), and above 15% in three others (Exhibit 3-7). As OFIs have grown in recent years, so has the degree to which they provide funding to banks (Exhibit 3-8).

This increasing link between OFIs and banks could result in benefits such as additional diversity in funding sources, but could also potentially be of concern. For example, if one or more large banks (particularly those with high leverage or significant maturity/liquidity transformation) are significant borrowers from OFIs, material credit deterioration of such banks could precipitate broader contagion across multiple OFIs, and possibly different OFI sub-sectors, especially in situations of general market stress. Similarly, if one or more large OFIs,

[67] In Luxembourg, this is primarily due to investment funds' operational deposits at their custodian banks. These operational deposits are the non-invested part of the fund's assets and are necessary for the fund to remain operational. As custodian banks are not credit-driven, this cash is not invested on the banks' assets side, but is rather placed on a short-term basis at central banks or other banks, leading to very low credit-to-deposit ratios.

[68] This Section uses the same data as in Section 3.2, but divides by the assets of OFIs rather than banks (see Box 3-1).

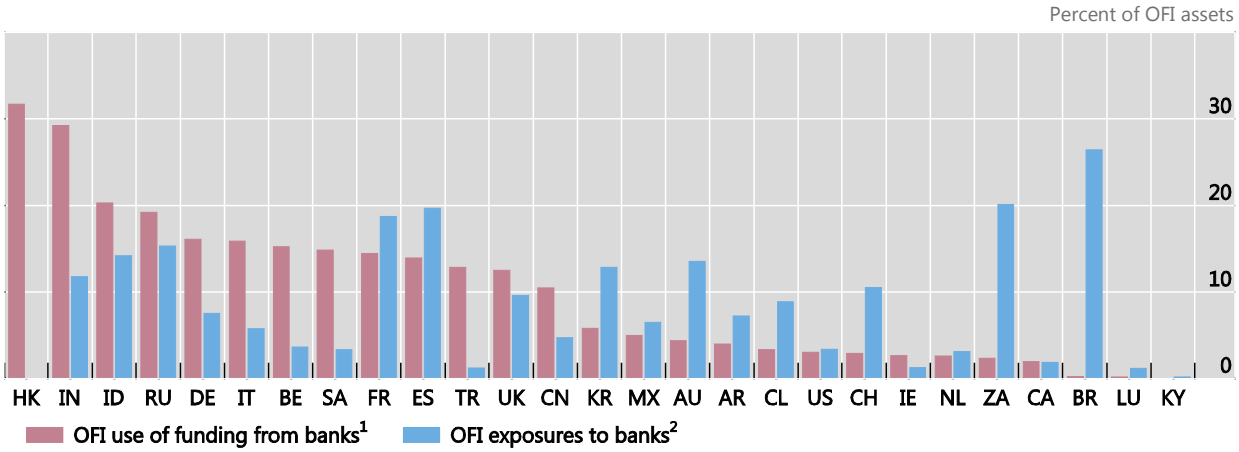
particularly those with high leverage or significant maturity/liquidity transformation, are significant borrowers from one or more banks, material credit deterioration of those OFIs could precipitate broader contagion to a large bank or across multiple banks, which may spread to the entire banking system or other financial intermediaries.

Looking at the liability side of OFIs' balance sheets, OFI funding from banks remains large in a number of jurisdictions, at over 10% of total OFI assets in thirteen jurisdictions and over 15% of total OFI assets in seven of these jurisdictions (Belgium, Germany, Hong Kong, India, Indonesia, Italy and Russia).

Although this use of funding from banks may not in itself raise risks, issues could arise when banks supply short-term funding to certain investment funds or leveraged non-bank financial institutions, a potential abrupt withdrawal of such funding could, under some circumstances, precipitate funds' asset sales and contagion, and raise going-concern challenges at more leveraged institutions with acute maturity mismatches.[69]

OFIs' interconnectedness with banks

End-2016 Exhibit 3-7



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; KR = Korea; KY = Cayman Islands; LU = Luxembourg; MX = Mexico; NL = the Netherlands; RU = Russia; SA = Saudi Arabia; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

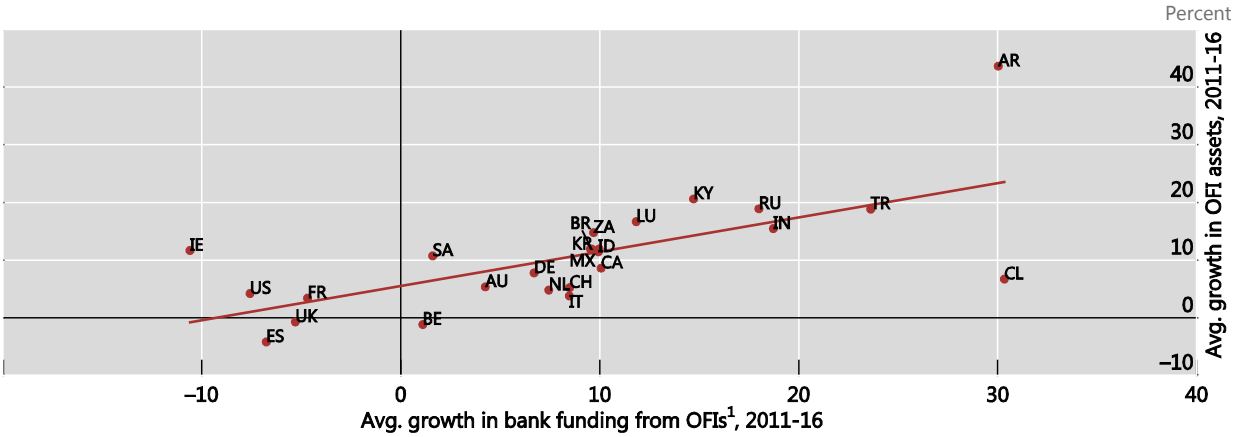
[1] OFIs' liabilities to banks as a share of OFI assets. Some jurisdictions' exposure and funding links between banks and OFIs reflect the provision of data gross of prudential consolidation whereas other jurisdictions provided data net of prudential consolidation (ie a substantial part of this exposure reflects bank activity with related OFIs within a conglomerate). [2] OFIs claims on banks as a share of OFI assets.

Sources: National sector balance sheet and other data; FSB calculations.

[69] On potential financial stability implications of leverage or use of funding from banks by certain investment funds or other non-bank financial institutions, see for example FSB (2017a).

Trend in bank funding from OFIs and OFI growth

25 jurisdictions Exhibit 3-8



Note: R-squared is 46%.

[1] Data used is net of prudential consolidation (including self securitisation), however some jurisdictions' banks' exposure and funding links between banks and OFIs reflect the provision of data gross of prudential consolidation. Chile's high growth rate in bank funding from OFIs is primarily due to a change in the underlying data (ie the adoption of SNA 2008 standards).

Sources: National sector balance sheet and other data; FSB calculations.

3.4 Interconnectedness of insurance corporations and pension funds to OFIs

Although insurance corporations and pension funds typically do not rely on funding from OFIs, they tend to lend or invest in OFIs in some jurisdictions (Exhibit 3-9), particularly where insurance corporations or pension funds have delegated the management of their assets.

In this regard, insurance corporations' exposure to OFIs was relatively large in two jurisdictions (Australia and Brazil), while pension funds' exposure to OFIs was relatively large in three jurisdictions (Brazil, India and the Netherlands) and the euro area in aggregate. Given the prominence of investment funds in OFIs in these jurisdictions, insurance corporations and pension funds may have sought the benefits of diversification through investing in funds.

Relatively high interconnectedness between insurance corporations, pension funds and OFIs can develop for a number of reasons, and accordingly can have different implications for indirect interconnectedness between insurance corporations, pension funds and banks. Several examples from jurisdiction's experiences are discussed below.

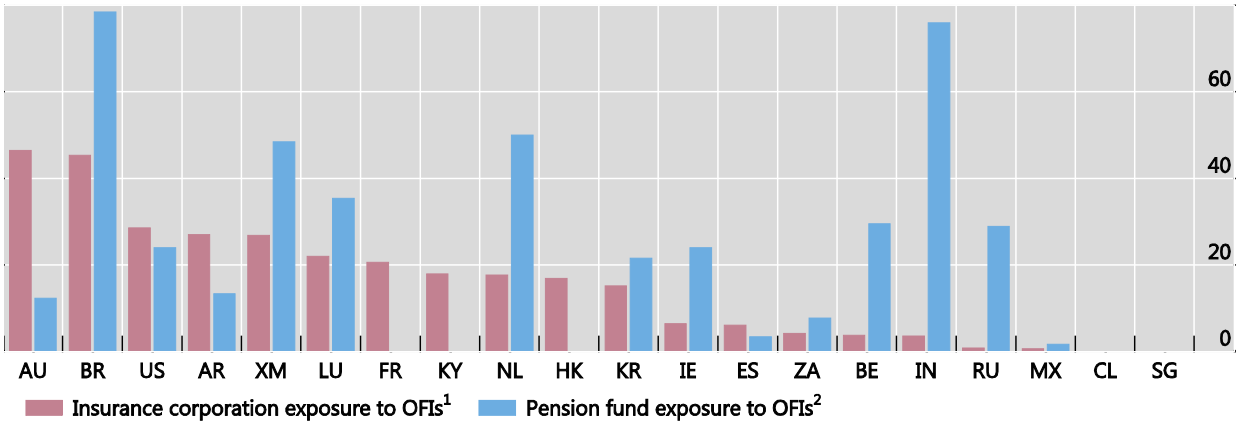
- In Australia, the links between insurance corporations and OFIs mainly reflect investments by insurers in equity issued by non-money market financial investment funds, in particular: (a) exposures by life insurers with affiliated fund managers, especially units in wholesale trusts managed by related fund managers; and (b) state government insurers' investments in non-money market investment funds.
- In Brazil, while insurance corporations and pension funds are highly interconnected with OFIs, and OFIs are highly interconnected with banks, there is little indirect interconnectedness between insurance corporations or pension funds and banks (see Box 3-3).
- In the Netherlands, both insurance corporations and pension funds use investment funds as a means for diversification in investment, including with respect to foreign

investments. However, the link with the banking system is relatively modest, as the interconnectedness between banks and OFIs is relatively low. This suggests that the potential for indirect spillovers from non-bank financial entities to the banking system via insurance corporations and pension funds is low.

Insurance corporations and pension funds: Interconnectedness with OFIs

End-2016 Exhibit 3-9

Percent of assets



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; KR = Korea; KY = Cayman Islands; LU = Luxembourg; MX = Mexico; NL = the Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; XM = euro area; ZA = South Africa.

[1] Insurance corporations' claims on OFIs as a share of insurance corporations' assets. [2] Pension funds' claims on OFIs as a share of pension fund assets.

Sources: National sector balance sheet and other data; FSB calculations.

Granular analysis of interconnectedness in Brazil[70] **Box 3-3**

The Central Bank of Brazil (BCB) has recently been working with other domestic authorities[71] to develop an extensive database that can provide a deeper analysis of entities' potential risks to financial stability. The deeper analysis of sectoral interconnectedness emphasises the benefits of collecting granular data and conducting detailed analysis based on such data.

This work initially highlighted the potential indirect interconnectedness between insurance corporations, pension funds and banks, through investment funds, that could pose (i) significant liquidity risk to banks and (ii) credit risk to pension funds and insurance corporations. As illustrated in Exhibit 3-10, a large portion of pension fund and insurance corporation assets are put into investment funds, which in turn provide a great deal of funding to banks.

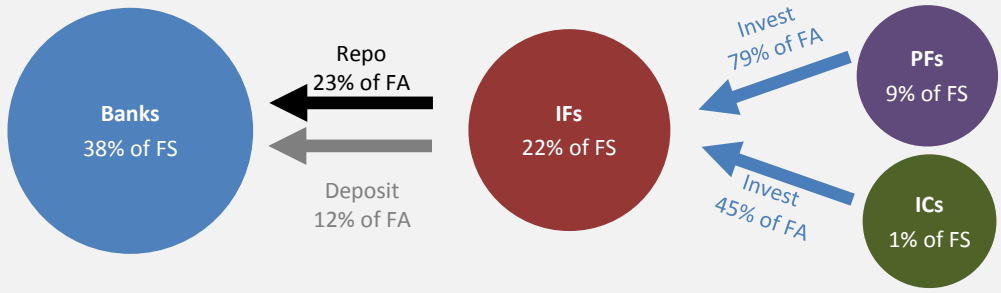
However, using granular data in their new database, Brazil's authorities have been able to take a closer look at these flows and found a very different story. Brazil's insurance corporations and pension funds invest much of their assets using exclusive investment funds

[70] This Box is based on a contribution by the financial system monitoring staff at the Central Bank of Brazil (BCB).

[71] Securities and Exchange Commission of Brazil (CVM), National Superintendence of Complementary Pension Funds (Previc) and Superintendence of Private Insurance (Susep).

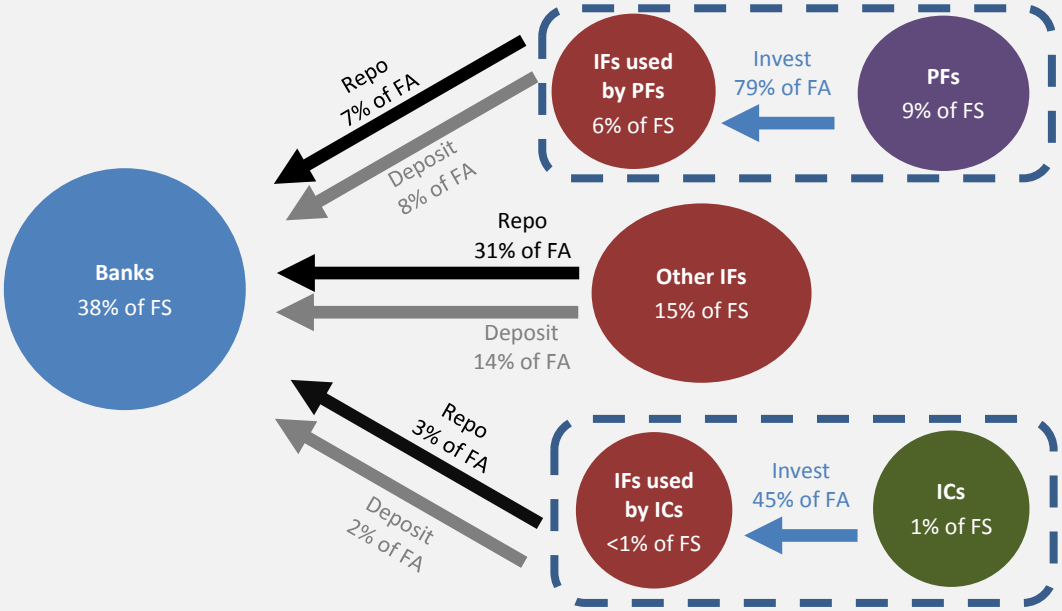
(ie no other entities can invest in these funds) with predetermined asset allocation mandates.[72] These exclusive investment funds mostly invest in long-term government securities, with a limited amount of cash provided to banks through deposits or repos backed by government securities. Therefore, while it initially appeared as though insurance corporations and pension funds could have been indirectly funding banks, little of the funding OFIs provide banks comes from insurance corporations or pension funds (Exhibit 3-11).

Preliminary view of interconnectedness in Brazil — Exhibit 3-10



ICs = insurance corporations; IFs = investment funds; PFs = pension funds; FS = total financial assets; FA = entity's own financial assets.

More precise view of interconnectedness in Brazil — Exhibit 3-11



ICs = insurance corporations; IFs = investment funds; PFs = pension funds; FS = total financial assets; FA = entity's own financial assets.

The granular data are also used by the BCB to better assess the funding risk embedded in the connections between investment funds and banks. Breaking these links down by instruments and maturity, and using liquidity risk metrics from the Basel III framework, two types of connections can be examined for each bank: runnable liabilities (using the Liquidity Coverage

[72] Pension funds and insurance corporations put their assets in investment funds mainly to segregate pension plans or to diversify investments, making use of asset managers' expertise.

Ratio (LCR)[73] methodology); and stable liabilities (using the Net Stable Funding Ratio (NSFR)[74] methodology). As most of these connections are overnight repos backed by sovereign bonds, which banks use to channel cash from investment funds to the BCB,[75] they have little impact in the liquidity risk metrics. The LCR indicates that the funding risk posed by investment funds to banks represents 9.3% of total bank runnable liabilities. On the other hand, the NSFR highlights that the interconnection between OFIs and banks accounts for only 7.7% of banks' total stable funding, as of December 2016. In conclusion, Brazil´s interconnectedness data shows that investment funds, pension funds and insurance corporations play a limited role in providing cash to banks.[76]

3.5 Cross-border interconnectedness

High-level interconnectedness data were collected on liabilities and claims from jurisdictions' banks and OFIs to and from all non-domestic financial sector counterparties (hereafter the "rest of the world").[77] While this dataset has improved, with several jurisdictions reporting data for the first time this year and several others providing additional observations, this dataset still has gaps and thus does not provide a consistent comparison across jurisdictions at the moment. Nonetheless, some preliminary observations can be made, including that banks and OFIs potentially display material interconnectedness with the rest of the world.

The banking systems of four jurisdictions that had relatively large OFI sectors in comparison to their domestic economies (the Cayman Islands, Ireland, Luxembourg and the Netherlands) display relatively high levels of interconnectedness with the rest of the world. In addition, the interconnectedness of the OFI sectors of these jurisdictions with the rest of the world is also pronounced, with the exception of the Cayman Islands, due to data differences (Exhibit 3-12).

In general, while the data on interconnectedness between OFI sub-sectors and the rest of the world are limited, the interconnectedness between OFIs in aggregate and the rest of the world seems largely driven by investment funds in several jurisdictions. This is likely due to the global nature of the investment funds sector with respect to fund investors and target investments.

Enhancements to data availability in this area would lead to a better understanding of cross-border interconnectedness risks and potential contagion channels. The FSB's July 2017 assessment of shadow banking activities and risks recommended a strengthening of the

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[73] LCR was developed to promote the short-term resilience liquidity of banks by ensuring that they have sufficient high quality liquid assets to survive a significant stress scenario lasting 30 calendar days. See BCBS (2013).

[74] NSFR was designed to require banks to maintain a stable funding profile in relation to the composition of their assets and off-balance sheet activities. For details, see BCBS (2014).

[75] Banks are the only security dealers authorised to operate with the Central Bank in repos using National Treasury securities as collateral aiming to adjust market liquidity to maintain the effective overnight rate close to its target (BIS MC (2009)).

[76] The BCB uses the same database to develop other relevant analyses regarding the risks that shadow banking can pose to financial stability, such as liquidity step-in risk and systemic stress test, strengthening the importance of collecting and analysing such granular data (BCB (2017)).

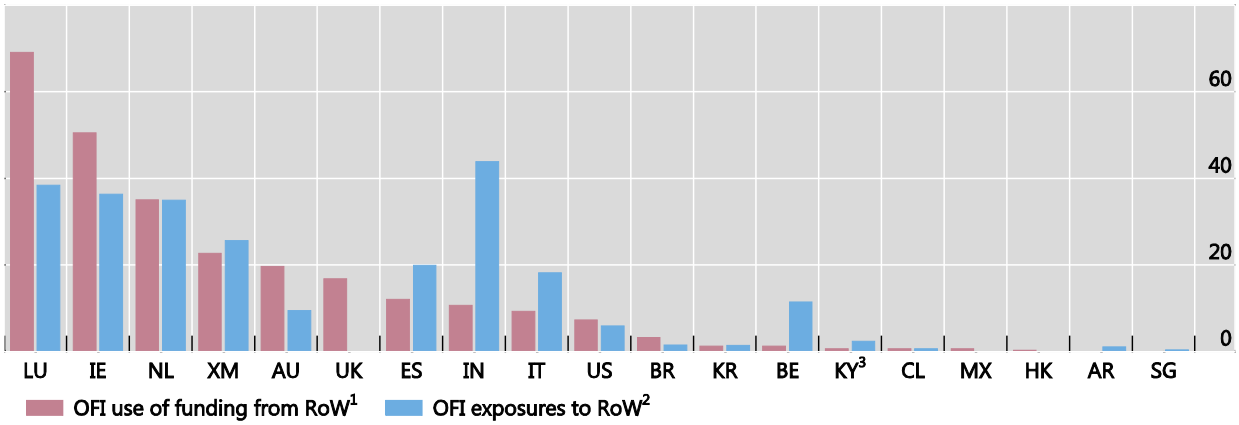
[77] Claims include exposures through lending or investment in equity, where possible. Nineteen jurisdictions (Australia, Belgium, Brazil, Canada, the Cayman Islands, Chile, Germany, Ireland, Italy, Korea, Luxembourg, Mexico, the Netherlands, Russia, Singapore, South Africa, Spain, Switzerland and the US) and the euro area provided data on banks' interconnectedness with foreign financial intermediaries. Sixteen jurisdictions (Australia, Belgium, Brazil, the Cayman Islands, Chile, Germany, Ireland, Italy, Korea, Luxembourg, Mexico, the Netherlands, Spain, Switzerland, the UK and the US) and the euro area reported data on OFIs' interconnectedness with foreign financial intermediaries. Some of these jurisdictions provided partial data.

monitoring of shadow banking activity and the data collection framework, including through improving data granularity on cross-border interconnectedness (FSB 2017e and Box 0-2).

OFIs' interconnectedness with the rest of the world

End-2016 Exhibit 3-12

Percent of OFI assets



AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IT = Italy; KR = Korea; KY = Cayman Islands; LU = Luxembourg; MX = Mexico; NL = the Netherlands; RU = Russia; SA = Saudi Arabia; TR = Turkey; UK = United Kingdom; US = United States; XM = euro area; ZA = South Africa.

[1] OFIs' liabilities to the rest of the world as a share of OFI assets. [2] OFIs claims on the rest of the world as a share of OFI assets. [3] The Cayman Islands' data do not include investment funds.

Sources: National sector balance sheet and other data; FSB calculations.

4. The narrow measure of shadow banking

The FSB's monitoring methodology involves two steps. The first casts a net wide to look at an aggregate measure of all non-bank financial intermediation, referred to as "MUNFI". MUNFI is composed of insurance corporations, pension funds, OFIs and financial auxiliaries. The second step narrows the focus to entities that may be engaged in credit intermediation that involves liquidity/maturity transformation and/or leverage, which results in the FSB's estimate of the "narrow measure" of shadow banking.

This narrow measure is based on the FSB Policy Framework (FSB (2013)), in which non-bank financial entities are classified with reference to five economic functions (EFs) (Exhibit 4-1), each of which involves non-bank credit intermediation that may pose risks to financial stability. Some entity types may be classified into more than one EF.[78]

Classification by Economic Functions (EFs) Exhibit 4-1

EF	Definition	Typical entity types[79]
EF1	Management of collective investment vehicles with features that make them susceptible to runs	MMFs, fixed income funds, mixed funds, credit hedge funds,[80] real estate funds
EF2	Loan provision that is dependent on short-term funding	Finance companies, leasing/factoring companies, consumer credit companies
EF3	Intermediation of market activities that is dependent on short-term funding or on secured funding of client assets	Broker-dealers, securities finance companies
EF4	Facilitation of credit creation	Credit insurance companies, financial guarantors, monolines
EF5	Securitisation-based credit intermediation and funding of financial entities	Securitisation vehicles, structured finance vehicles, asset-backed securities

This EF (or activity)-based approach to monitoring shadow banking allows for a refinement of the narrow measure of shadow banking through the exclusion of entities that are not typically part of a credit intermediation chain or, if they are, they are not involved in significant maturity/liquidity transformation and/or leverage. To do so, authorities from the 29 participating jurisdictions, including China and Luxembourg for the first time, consider non-bank financial entities' business models, activities and associated risks that may be posed to financial stability, and classify the relevant entity types into one (or more) of the five EFs, as they are defined in the FSB Policy Framework. The approach also incorporates authorities'

[78] In those limited cases where an entity type was classified into more than one EF, its value: (i) was only counted once towards the jurisdiction's narrow measure; and (ii) was proportionately allocated between the EFs into which it was classified.

[79] The FSB Policy Framework acknowledges that shadow banking may take different forms across jurisdictions due to different legal and regulatory settings as well as the constant innovation and dynamic nature of the non-bank financial sector. It also enables authorities to capture new structures or innovations that may create financial stability risks from shadow banking, by looking through to the underlying economic function and risks of these new innovative structures. Thus, the entity types listed should be taken as typical examples. For details, see FSB (2013).

[80] Credit hedge funds are hedge funds that invest primarily in credit assets (eg bonds, loans).

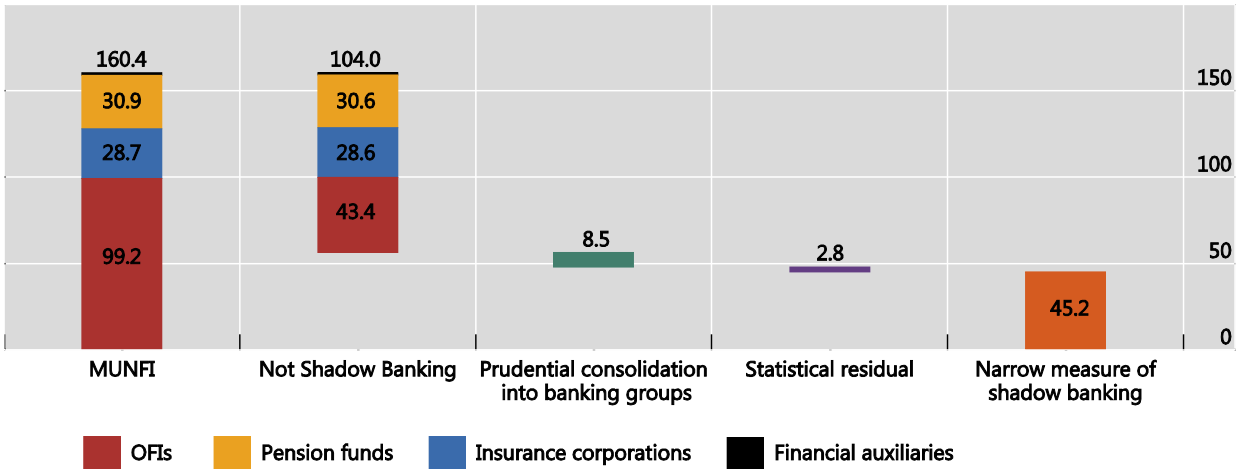
supervisory judgement (or qualitative information) given that data are sometimes not available.[81]

The FSB guidance on non-bank financial entity types' classification developed by and for participating jurisdictions, provides common criteria for consideration by authorities in their assessment of non-bank financial entities' involvement in the different EFs. This guidance draws on experiences gathered from previous monitoring exercises, and is both implemented and enhanced through a process of mutual review and discussion, which helps to both bring new issues to light and to resolve existing ones.[82] Achieving consistency of EF classification is an iterative process, with improvements in data availability and assessment of non-bank financial entities' involvement in the different EFs as authorities learn from collective information-sharing in successive exercises while, at the same time, new developments in financial markets result in additional areas in which guidance may be needed. Additional refinement to the classification guidance will help further improve consistency in the relevant authorities' assessments going forward, especially as financial entities often provide their services across jurisdictions.

4.1 Narrowing down towards an activity-based measure of shadow banking

Narrowing down to shadow banking from MUNFI

29 jurisdictions at end-2016, in USD trillions Exhibit 4-2



MUNFI = Monitoring Universe of Non-bank Financial Intermediation, includes OFIs, pension funds, insurance corporations, and financial auxiliaries; OFIs also includes captive financial institutions and money lenders; Prudential consolidation into banking groups = assets of classified entity types which are prudentially consolidated into a banking group; Statistical residual = reported residual OFIs generated by the difference between total OFIs and the sum of all known sub-sectors therein.

Sources: National sector balance sheet and other data; FSB calculations.

The relationship between the MUNFI measure of all non-bank financial intermediation and the EF-based narrow measure presented in this Section is illustrated in Exhibit 4-2. For the 29

[81] As stated in Section 1, the inclusion of non-bank financial entities or activities in the narrow measure is based on a conservative assessment of potential risks on a pre-mitigant basis and does not constitute a judgement that policy measures applied to address the financial stability risks that may arise from shadow banking of these entities and activities are inadequate or ineffective.

[82] The 2015-16 shadow banking peer review also stressed the importance of resolving material differences of view, thereby promoting greater consistency in the classification of non-bank financial entities. See Box 4-1 of FSB (2017b).

jurisdictions, the MUNFI estimate is $160.4 trillion, comprising OFIs ($99.2 trillion), insurance corporations ($28.7 trillion), and pension funds ($30.9 trillion). The narrowing down methodology involved the following steps:

(i) *Pension funds, insurance corporations, financial auxiliaries and OFIs not involved in any of the five EFs* are excluded. As of end-2016, a total of $104.0 trillion was subtracted in this narrowing-down step: $28.6 trillion of insurance corporations, $30.6 trillion of pension funds and $43.4 trillion of OFIs. The entities excluded from the narrow measure do not tend to directly engage in credit intermediation or exhibit financial stability risks from shadow banking. Examples include "pure" brokers that only act to fulfil orders and equity investment funds (see Annex 2). Most financial auxiliaries ($1.6 trillion) were also subtracted.

(ii) *Prudential consolidation into banking groups*. Entities that are consolidated into banking groups for prudential purposes are already subject to prudential regulation and supervision (ie Basel II/III framework), including for maturity/liquidity transformation, leverage, and imperfect credit risk transfer, and are therefore not included in the narrow measure. These banking group consolidated entities typically include bank-owned/affiliated broker-dealers, finance companies and structured finance vehicles. Self-securitisation (or retained securitisation) assets are also excluded from the narrow measure, as under prudential consolidation rules they are treated as banking groups' own assets.[83] The amount of prudentially consolidated assets, including self-securitisation, as of end-2016 was $8.5 trillion.

(iii) *Statistical residual*. This narrowing-down category consists of statistical residuals which are generated in some jurisdictions' financial accounts. These residuals are the difference between a jurisdiction's total financial assets of OFIs, as they are published in sector balance sheet statistics, and the sum of all known sub-sectors therein. While in theory this residual should be zero, in practice it is quite large in some jurisdictions. This may be the consequence of inconsistencies between "top-down" national accounts estimations and "bottom-up" coverage of OFI sub-sectors, as well as challenges in aligning these two layers and differences in data granularity.[84] The residual was about $2.8 trillion at end-2016. Residuals were reported by Germany, Ireland, Italy, Japan, Luxembourg, the Netherlands, Russia, Switzerland and the UK. Significant progress was made in the 2017 monitoring exercise to reduce the size of the residual. Following revisions to historical data and improved methodologies adopted for this year's exercise, the residual for 2016 is estimated to be $2.8 trillion (3% of OFI assets), compared with $5.3 trillion (7% of OFIs) reported as at end-2015 in the 2016 Report. While further understanding of the identified residuals is needed going forward, these residuals are excluded from the narrow measure in order to avoid major inconsistencies across jurisdictions.[85]

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[83] Self-securitisation/retained securitisation vehicles take loans from a bank and turn these into debt securities which are given back to the same bank for use as collateral for accessing central bank funding.

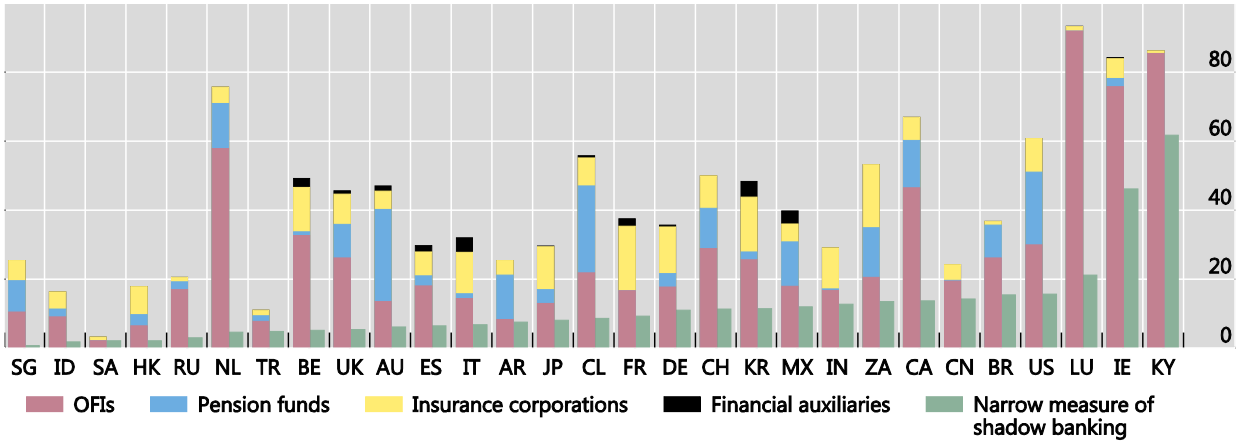
[84] See Annex 4 in FSB (2017b) for a discussion of the measurement of the OFI residual in the UK and Ireland.

[85] The $2.8 trillion also include assets of OFIs that were neither classified into any of the five EFs nor identified by jurisdictions as being outside of the five EFs. However, if conservatively assessed, this statistical residual of $2.8 trillion may be added to the $45.2 trillion of identified narrow measure. The statistical residual should be distinguished from the

The resulting narrow measure based on the EFs approach amounted to $45.2 trillion at end-2016 in 29 jurisdictions, a 7.6% annual increase. This represents approximately 28% of the MUNFI measure of all non-bank financial intermediation for the same set of jurisdictions, which is similar in magnitude to the 27% of MUNFI in the preceding monitoring exercise.[86]

Narrowing down by jurisdiction as a percent of total financial assets

29 jurisdictions at end-2016, in percent Exhibit 4-3



MUNFI = Monitoring Universe of Non-bank Financial Intermediation, includes OFIs, pension funds, insurance corporations, and financial auxiliaries; OFIs also includes captive financial institutions and money lenders.

AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = Cayman Islands; LU = Luxembourg; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

Source: National sector balance sheet and other data: FSB calculations.

In addition to the five EFs, the narrow measure also includes about $1.7 trillion of assets which capture an "unallocated" shadow banking category for some jurisdictions in which the relevant authorities were unable to clearly assign non-bank financial entities to a specific EF, but which were either assessed to be involved in credit intermediation or for which authorities were not able to determine that they should not be included in the narrow measure. Over time the size of this unallocated shadow banking category should ideally decrease as authorities, with better data and analysis, are able to allocate them to one of the five EFs or are able to obtain sufficient information to warrant their exclusion from the narrow measure.

The extent of narrowing-down varied significantly across jurisdictions, ranging from 28.4% to 96.7% of the MUNFI measure, with on average 71.9% of MUNFI assets being classified outside shadow banking. Exhibit 4-3 compares MUNFI as a percentage of total financial assets, with the narrow measure based on EFs, by jurisdiction as a percentage of total financial assets.

unallocated shadow banking category described below, through which authorities included entities in the narrow measure that could not clearly be assigned to a specific EF.

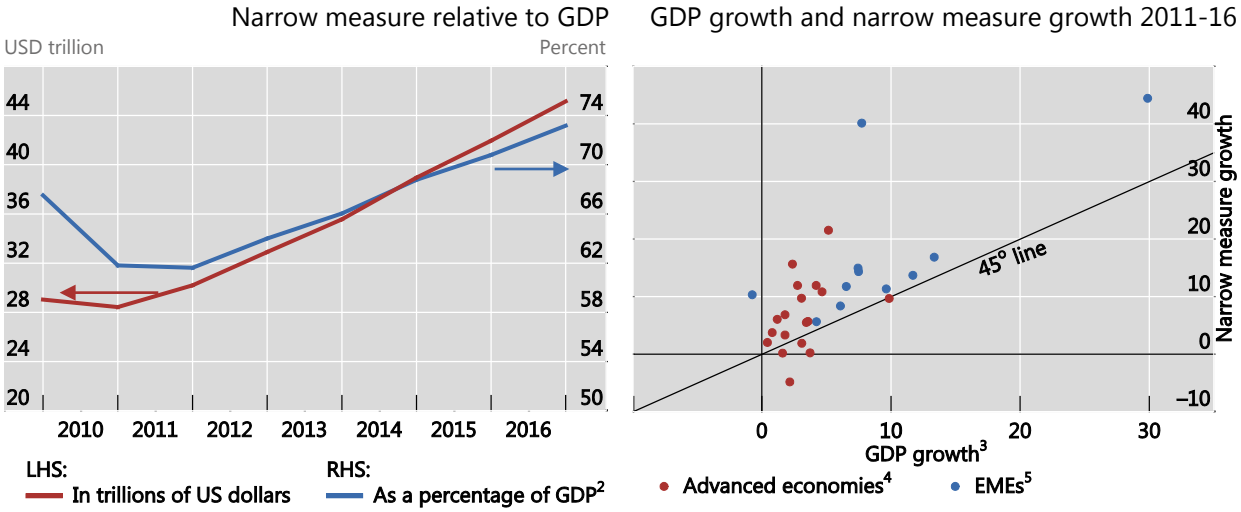
86 As a result of the progress since the 2016 monitoring exercise in improving and refining the narrow measure and the inclusion of additional jurisdictions, these figures may not be strictly comparable.

4.2 Global trends

Total financial assets of financial entities classified into the narrow measure in the 29 jurisdictions grew moderately in 2016, both in absolute terms and relative to GDP (Exhibit 4-4). Since 2011, aggregated narrow measures across all 29 jurisdictions increased at an average yearly growth rate of 8.3%.[87] This generally reflected growth in the Cayman Islands, China, and Luxembourg.

Narrow measure of shadow banking and GDP[1]

29 jurisdictions — Exhibit 4-4



[1] Based on historical data included in jurisdictions' 2017 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Increases of aggregated data may also reflect improvements in the availability of data over time at a jurisdictional level. [2] As a weighted average based on rolling GDP weights. [3] Compounded growth 2011-16 calculated from GDP levels converted into USD at constant 2016 exchange rates. [4] Australia, Belgium, Canada, Cayman Islands, France, Germany, Hong Kong, Ireland, Italy, Japan, South Korea, Luxembourg, Netherlands, Singapore, Spain, Switzerland, United Kingdom and United States. [5] Argentina, Brazil, Chile, China, India, Indonesia, Mexico, Saudi Arabia, South Africa and Turkey. For China's historical data, compounded growth rate is based on data from 2013–16 as well as estimated values for certain entity types. For Hong Kong, the growth rates are based on 2012–16, due to incomplete data for narrow measure in 2011 For Russia, the growth rates are based on 2014–16, due to incomplete data for narrow measure in prior years.

Sources: National sector balance sheet and other data; IMF *World Economic Outlook*; FSB calculations.

The narrow measure of shadow banking has grown from around 62% of all participating jurisdictions' GDP in 2011 to around 73% in 2016.[88] As indicated by the dots above the 45°-line in the right panel of Exhibit 4-4, the narrow measure grew somewhat faster than GDP since 2011 in most of the 29 jurisdictions. Strong growth in the narrow measure may occur from a low base in some jurisdictions and contributes to financial deepening, as the provision of financial services increases in particular in EMEs with relatively less developed financial systems. As a share of total global financial assets, the narrow measure has increased slightly from about 12.1% in 2011 to 13.4% at end-2016 for the 29 jurisdictions.

[87] Growth rates have been calculated based on historical data included in jurisdictions' 2017 submissions. In some cases, in particular prior to 2011, increases in the value of cross-jurisdiction aggregates may also reflect improvements in the availability of data over time at a jurisdictional level. Exchange rate effects have been netted out by using a constant exchange rate (from 2016).

[88] Using the same dataset, the narrow measure was around 72% of GDP in 2008, although this understates the true size of the narrow measure relative to GDP at this time due to historical data gaps.

4.3 Developments across jurisdictions

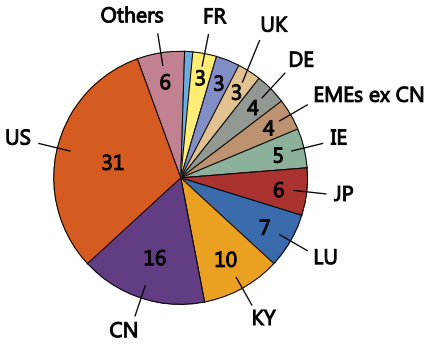
The relative importance and recent evolution of the narrow measure of shadow banking varies substantially across jurisdictions. As in previous years, the US had the largest narrow measure, at $14.1 trillion in 2016, representing 31% of the total narrow measure assets reported by the 29 jurisdictions (Exhibit 4-5). The eight participating EU jurisdictions comprised the next largest share (with a combined $10.1 trillion, 22%), followed by China ($7.0 trillion, 16%), the Cayman Islands ($4.7 trillion, 10%), and Japan ($2.8 trillion, 6%).

Share of the reported narrow measure of shadow banking[1]

29 jurisdictions — Exhibit 4-5

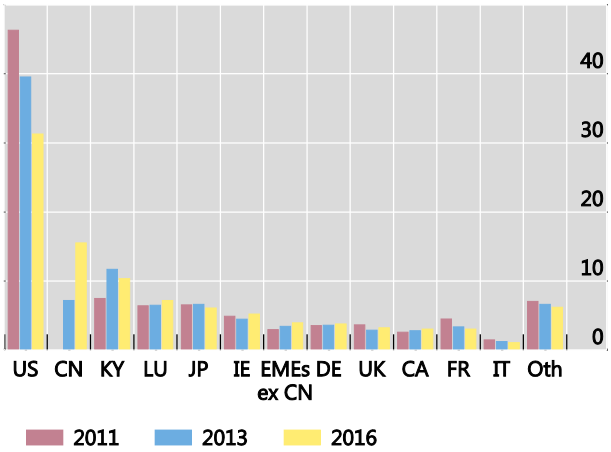
Composition at end-2016

Percent



Historical evolution of the shares by jurisdiction[2]

Percent



CA = Canada; CN = China; DE = Germany; EMEs ex CN= emerging market economies excluding China; FR = France; IE = Ireland; IT = Italy; JP = Japan; KY = Cayman Islands; LU = Luxembourg; UK = United Kingdom; US = United States.

[1] EMEs include Argentina, Brazil, Chile, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa and Turkey. Others include Australia, Belgium, Hong Kong, Italy, the Netherlands, Singapore, Spain and Switzerland. [2] Exchange rate effects have been netted out by using a constant exchange rate (from 2016). For China, due to breaks in the narrow measure, 2011 value is not shown.

Sources: National sector balance sheet and other data; FSB calculations.

Compared to 2011, the US share of the total narrow measure for 29 jurisdictions declined, whereas China's share and the Cayman Islands' share increased over the same period. It should be noted that the narrow measure for the 2017 monitoring exercise includes data from China and Luxembourg for the first time. Although their EF classifications have gone through mutual review and discussions through the FSB process as for other jurisdictions, the assessments tended to be conservative. The business models and risk profiles of non-bank financial entities in China are also relatively unique. The narrow measure for China will be further refined in future monitoring exercises as more granular data become available and SBEG conducts further analysis.

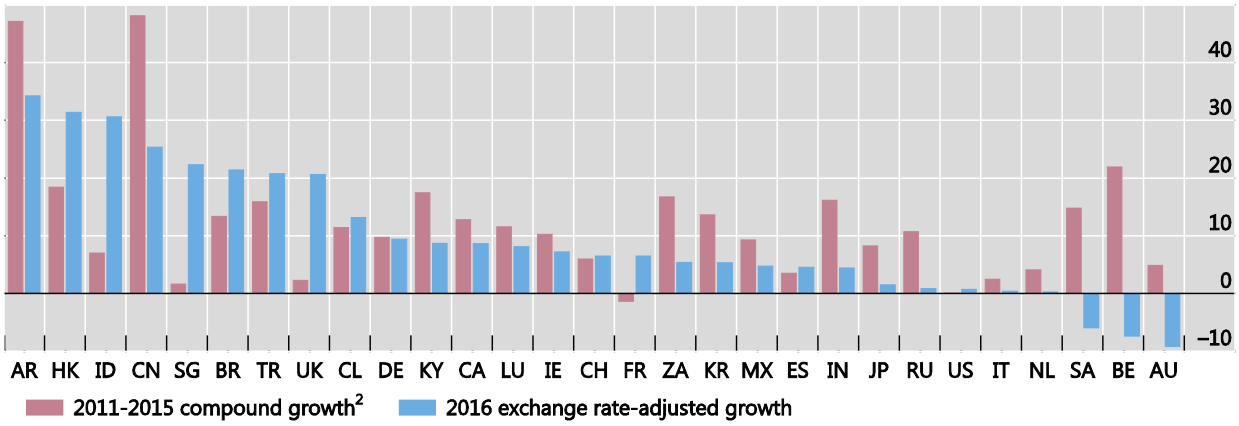
All but three jurisdictions saw their narrow measures rise in 2016. Several jurisdictions experienced an increase of over 10% (Exhibit 4-6), and eight jurisdictions saw their narrow measures increase by over 20% (Argentina, Brazil, China, Hong Kong, Indonesia, Singapore, Turkey and UK), for most jurisdictions reflecting base effects and/or relatively high inflation rates.[89]

[89] The increase in Hong Kong's narrow measure is also due to changes in the data sample over time.

Annual growth of the narrow measure of shadow banking[1]

29 jurisdictions, in percent

Exhibit 4-6



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = Cayman Islands; LU = Luxembourg; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

[1] Based on the economic functions approach. Calculated based on historical data included in jurisdictions' 2017 submissions. [2] For Russia, the compounded growth rate is based on 2014-2015 because prior data are incomplete. For Hong Kong, the compounded growth rate is based on 2012–15, due to incomplete data in 2011. For Belgium, the compound growth rate is based on 2014-2015 data due to incomplete data in prior years. For China, the compounded growth rate is based on data from 2013–15 as well as estimated values for certain entity types.

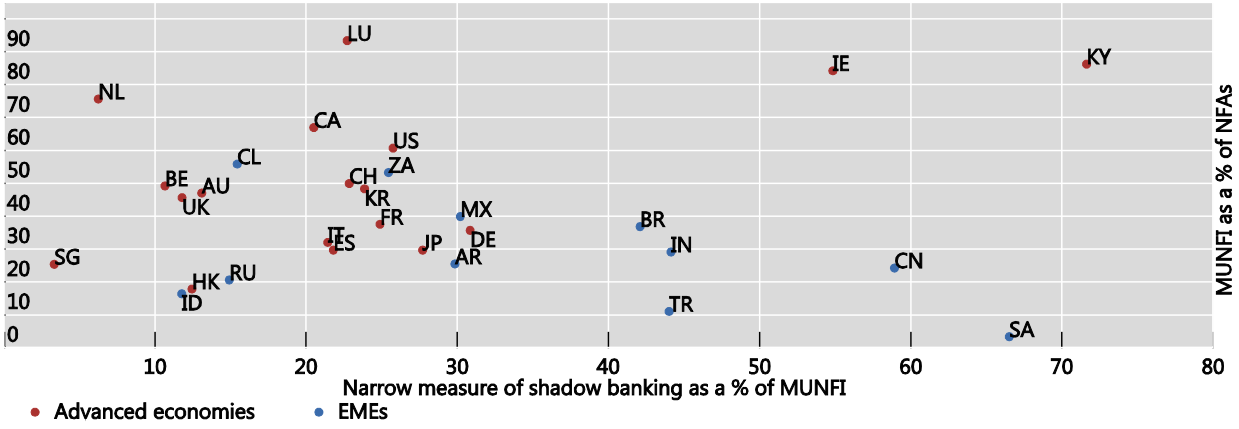
Sources: National sector balance sheet and other data; Bank for International Settlements; FSB calculations.

Exhibit 4-7 plots the narrow measure of shadow banking as a share of all non-bank financial intermediaries (MUNFI) against the size of MUNFI relative to total global financial assets in each jurisdiction. Dots further to the right indicate that jurisdictions' non-bank financial sectors are predominantly comprised of entities that are within the narrow measure. By contrast, dots further to the left indicate jurisdictions with non-bank financial sectors that are comprised predominantly of entities outside the narrow measure. Those jurisdictions that serve as hubs for international capital flows (eg the Cayman Islands) also have relatively large non-bank financial sectors that are classified into the narrow measure in their financial system.[90]

[90] For jurisdictions which act as hubs for international capital flows, a large share of domestically established shadow banking assets often do not have direct linkages to the domestic economy. As such, the financial stability risks associated with these activities within the jurisdiction are more directly linked to the international financial system rather than the jurisdiction's domestic system.

The narrow measure of shadow banking shares by jurisdictions

At end-2016 Exhibit 4-7



MUNFI = Monitoring Universe of Non-bank Financial Intermediation, includes OFIs, pension funds, and insurance corporations; NFAs =total national financial assets.

AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = Cayman Islands; LU = Luxembourg; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

Sources: National sector balance sheet and other data: FSB calculations.

5. The narrow measure of shadow banking by economic functions

This Section provides a breakdown of the narrow measure of shadow banking, according to the five economic functions (or activities).[91] This classification of non-bank financial entities into one or more of the five economic functions (EFs) is conducted by the relevant authorities in the jurisdiction based on the guidance agreed upon by participating jurisdictions. The mutual review and discussion by participating jurisdictions through the FSB process helps to enhance consistency in the classification of entities/activities and shed light on new issues. This Section first discusses the composition of the narrow measure by EF, followed by a more detailed discussion of trends in, and risks that may be posed to financial stability related to, each of the five EFs. The discussion of these risks, on a pre-mitigant basis, related to each of the five EFs is based on metrics (Box 5-1) which the participating jurisdictions have developed for analytical purposes using the on- and off-balance sheet data collected in relation to: maturity transformation, liquidity transformation, imperfect credit risk transfer, and leverage.

5.1 Composition of the narrow measure

Across the 29 jurisdictions, the narrow measure grew by 7.6% in 2016, resulting in a total of $45.2 trillion worth of assets at end-2016 (Exhibit 5-1).[92] This aggregate growth, however, masks divergent trends across EFs. On the one hand, collective investment vehicles with features that make them susceptible to runs (EF1) remained the largest economic function and had the greatest growth in 2016, resulting in overall growth in the narrow measure. On the other hand, facilitation of credit creation (EF4), again the smallest economic function in terms of assets, shrank at the quickest rate (Exhibit 5-2).[93]

While EF1 was the largest economic function in most jurisdictions at end-2016, loan provision that is dependent on short-term funding (EF2) was the largest in India, Russia and Turkey. Meanwhile, the intermediation of market activities dependent on short-term funding (EF3) was the largest economic function in Hong Kong and Japan (Exhibit 5-3).

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[91] In addition to the five EFs, the narrow measure also includes an unallocated shadow banking category, which captures OFIs that the relevant authorities assessed to involve financial stability risks that may arise from shadow banking, but which could not be assigned to a particular economic function.

[92] The results are not strictly comparable to those presented in previous Reports due to the addition of new jurisdictions, improvements in national sector balance sheet statistics, more granular reporting and revisions to historical data.

[93] As stated in Section 5.5, the size and the importance of EF4 relative to the other EFs may be significantly understated due to the difficulty of adequately capturing off-balance sheet exposures.

The narrow measure of shadow banking by economic functions

29 jurisdictions — Exhibit 5-1

	Narrow measure	EF1	EF2	EF3	EF4	EF5	Unallocated shadow banking[1]
Size in 2016 ($ trillion)	45.2	32.3	2.9	3.8	0.2	4.3	1.7
Share of total narrow measure (%)	100.0	71.6	6.4	8.4	0.4	9.6	3.7
Growth in 2016 (year-over-year, %)	7.6	11.0	-3.8	-3.0	-9.0	0.8	16.0
Growth 2011-15 (compounded, %)[2]	8.6	13.9	-1.7	2.2	-2.7	-1.0	1.2

Based on historical data included in jurisdictions' 2017 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). EF1 = Economic function 1; EF2 = Economic function 2; EF3 = Economic function 3; EF4 = Economic function 4; EF5 = Economic function 5; Unallocated SB = assets of entities that were assessed to be involved in shadow banking activities, but which could not be assigned to a specific economic function.

[1] The high growth rate of unallocated shadow banking in 2016 partly reflects improvements in the availability of data over time at a jurisdictional level. [2] Increases in the value of assets may also reflect improvements in the availability of data over time at a jurisdictional level (for example, if a jurisdiction only provided data from 2013-2015 for a specific entity type included in OFIs, the aggregate 2011-2015 growth rate of OFIs might be slightly affected).

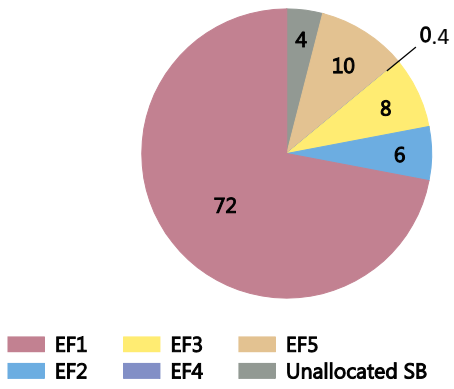
Sources: National sector balance sheet and other data; FSB calculations.

Classification by economic function[1]

29 jurisdictions — Exhibit 5-2

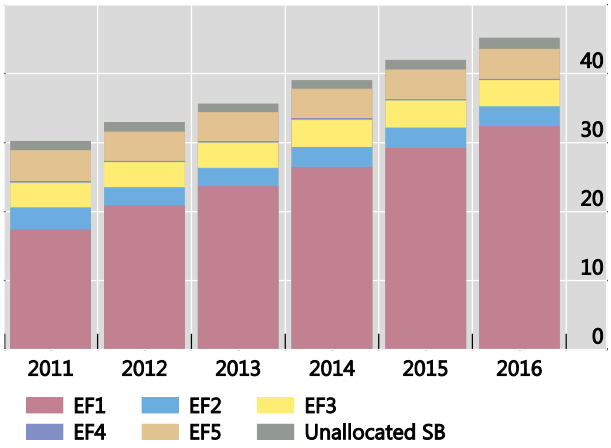
Relative size of economic functions at end-2016

Percent



Evolution of the narrow measure by economic function[2]

USD trillion



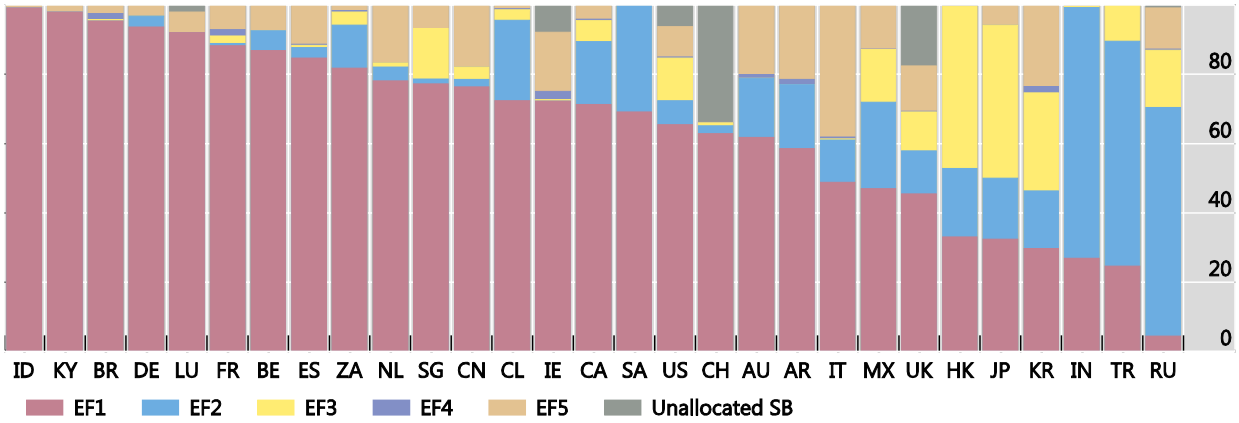
EF1 = Economic function 1; EF2 = Economic function 2; EF3 = Economic function 3; EF4 = Economic function 4; EF5 = Economic function 5; Unallocated SB = assets of entities that were assessed to be involved in shadow banking activities, but which could not be assigned to a specific economic function.

[1] Net of entities prudentially consolidated into banking groups. [2] Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Calculated based on historical data included in jurisdictions' 2017 submissions.

Sources: National sector balance sheet and other data: FSB calculations.

Economic function classification by jurisdictions[1]

29 jurisdictions at end-2016, as a percentage of the narrow measure in each jurisdiction Exhibit 5-3



EF1 = Economic function 1; EF2 = Economic function 2; EF3 = Economic function 3; EF4 = Economic function 4; EF5 = Economic function 5. Unallocated SB = assets of entities that were assessed to be involved in shadow banking activities, but which could not be assigned to a specific economic function. AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = Cayman Islands; LU = Luxembourg; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom;[2] US = United States; ZA = South Africa.

[1] Net of entities prudentially consolidated into banking groups. Sources: National sector balance sheet and other data; FSB calculations.

Financial stability risk metrics **Box 5-1**

To monitor and assess the potential risks associated with the entity types classified into the different EFs,[94] a set of on- and off-balance sheet data are collected in relation to: maturity transformation, liquidity transformation, imperfect credit risk transfer, and leverage.

Although the reporting of on-balance sheet data for classified entity types has improved compared to the 2016 monitoring exercise, there remain gaps in reported data particularly in relation to off-balance sheet data. Some jurisdictions also continue to face significant challenges collecting these data, in part because regulatory data collection of various non-bank financial entities are not sufficiently granular, and sector balance sheet data often do not provide specific breakdowns with respect to maturity and liquidity factors.[95] In some cases, jurisdictions are not able to break out credit intermediation and related risks where activities are mixed between credit and non-credit investment activities, so the resulting measures for these jurisdictions provide a conservative illustration of potential financial stability risks.[96]

In addition to data gaps, differences in the accounting standards and the treatment of certain aspects of risk data also posed challenges in comparing financial stability risks posed by similar entity types in different jurisdictions.[97]

[94] The sample size for calculating risk metrics represents jurisdictions rather than individual entities. Thus, one jurisdiction's data submission could include many individual entities that range from large to small entities.

[95] Where only some jurisdictions are able to provide risk metrics, the collected sample may reflect selection bias.

[96] For example, some jurisdictions reported data for all funds, rather than only funds involved in credit intermediation.

[97] For example, some risk metrics include data from entities prudentially consolidated into banking groups, as some jurisdictions' granular data do not distinguish between consolidated and non-consolidated entities. In addition, some jurisdictions classified the equity assets of funds as long-term assets, while some others treated them as short-term

Due to these data limitations, some of the exhibits and results presented in Section 5 come from a sub-sample of jurisdictions and may therefore not be extrapolated to describe the entire sample of jurisdictions. More specifically, any conclusion from the data related to the sub-sample may not apply to all of the jurisdictions that participated in this Report. However, to the extent possible, this Report discusses broad messages, observations, and trends that can be gleaned from the reported data as they may be broadly indicative of wider trends.

As discussed in Box 0-2, the FSB will continue to advance the work on the risk analysis in future monitoring exercises, through focused work to refine risk metrics so that they are better tailored to the business models of the entities in each of the EFs. The FSB will also seek to make better use of widely available data, minimise the challenges presented by significant data gaps, and better assess risks that shadow banking may pose to financial stability.

Exhibit 5-4 provides an overview of collected basic on- and off-balance sheet items and calculated risk metrics. For the largest three entity types classified into each economic function (where assets exceed the 1% of the total national financial assets), authorities were asked to report balance sheet items on a gross basis, ie reporting weighted-averages of all entities making up a particular entity type. However, if gross reporting was not feasible, authorities reported the weighted-averages of a sample pool (eg the largest three entities, by assets, for an entity type) for some entity types, or other relevant proxies.

assets. There were also differences which arose for example due to some jurisdictions reporting total financial assets, while others reported total net assets for EF1 entities. This contributes to the challenges in comparing calculated risk metrics. The FSB, through its SBEG, has been working on improving consistency and will continue to do so going forward.

On- and off-balance sheet items and risk metrics[1] Exhibit 5-4

Examples of risk metrics	Definition and range
Credit intermediation (CI) $CI1 = \frac{\text{credit assets}}{\text{total financial assets}}$ $CI2 = \frac{\text{loans}}{\text{total financial assets}}$	These metrics compare the amount of credit assets and loans held by a particular entity type to its total assets (**CI1** and **CI2**, respectively). As loan assets are part of wider credit assets, CI2 can be viewed as a sub-set of CI1. These metrics fall between 0 and 1, with higher values showing more involvement in credit intermediation while "0" indicating no involvement in credit intermediation.
Maturity transformation (MT) $MT1 = \frac{\text{long term assets} - (\text{long term liabilities} + \text{equity})}{\text{total financial assets}}$ $MT2 = \frac{\text{short term liabilities}}{\text{short term assets}}$	**MT1** is the portion of long-term assets (>12 month maturity) funded by short-term liabilities (≤ 30 days), scaled by the entity type's total financial assets. It falls between −1 and +1, with 0 indicating no maturity transformation, and negative values implying negative maturity transformation. **MT2** is the ratio of short-term liabilities (plus redeemable equity in the case of EF1 entity types) to short-term assets. A value of 1 indicates that short-term liabilities (plus redeemable equity for EF1) are fully covered with short-term assets. As the ratio moves towards 2, there could be short-term funding dependence. Ratios from 0 to 1 indicate negative maturity transformation.
Liquidity transformation (LT) $LT = \frac{\text{total financial assets} - \text{liquid assets} + \text{short term liabilities}}{\text{total financial assets}}$	**LT** measures the amount of less liquid assets (total financial assets minus liquid assets) funded by short-term liabilities (and/or shares redeemable for cash or underlying assets in the case of CIVs), approximated by short-term liabilities minus liquid assets.[98] Total financial assets are also added to the numerator to obtain interpretable results, with a value of "1" indicating no liquidity transformation (ie all near-term demands on liquidity are supported by liquid assets) and "2" indicating that assets are less liquid and are funded by short-term liabilities, including redeemable equity.
Leverage (L) $L = \frac{\text{total financial assets}}{\text{equity}}$	**L** is the ratio of total financial assets to equity (or AUM to NAV in the case of CIVs). The results can be interpreted as a financial leverage ratio or equity multiplier, however, these are not risk-based measures. Although this measure enables comparisons across entity types, it does not take into account non-bank financial entities' leveraging or de-leveraging through the use of derivatives and other off-balance sheet transactions (ie synthetic leverage).

[1] For EF1 entity types, the collected balance sheet data and calculated risk metrics were expanded to also include AUM (instead of total financial assets), Gross Notional Exposure and Net Asset Value (to calculate leverage ratios), and non-/redeemable equity (as a form of long-/short-term liability). Ratios related to imperfect credit risk transfer were also considered in the 2016 monitoring exercise. However, collected data were not sufficient to allow any meaningful conclusions. In particular, off-balance sheet data items such as off-balance sheet credit exposures were often not available across jurisdictions.

[98] Liquid assets are difficult to measure as the liquidity of an asset at any given time is contingent on a number of external factors. For the purposes of this exercise, liquid assets are considered to be all assets that can be easily and immediately converted into cash at little or no loss of value during a time of stress (see also characteristics and definition of High Quality Liquid Assets (HQLAs) in Part 1, Section II.A in BCBS (2013). In a broad definition, liquid assets include HQLAs. In a narrow definition, liquid assets only include cash and cash equivalents.

5.2 Economic Function 1

EF1 relates to collective investment vehicles (CIVs) with features that make them susceptible to runs. In many circumstances, CIVs can act as shock absorbers in the financial system as losses from an entity's distress or insolvency or from adverse financial market conditions are shared among a disparate group of investors. In extreme circumstances, however, some CIVs with maturity/liquidity transformation and/or leverage can be susceptible to runs.[99]

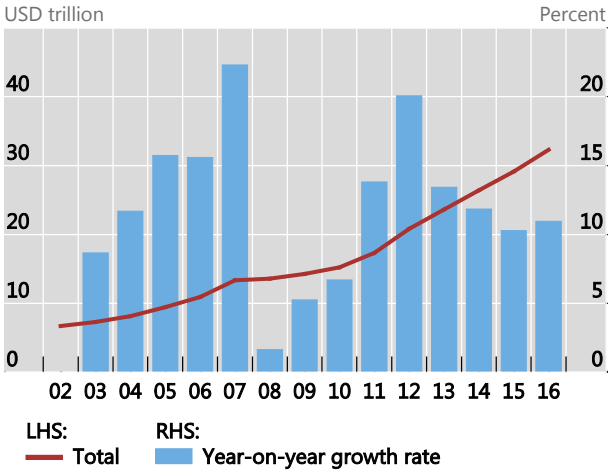
5.2.1 Trends in Economic Function 1

As stated earlier, the assets of CIVs classified into EF1 represent by far the largest share (72%) of the narrow measure. At end-2016, EF1 comprised $32.3 trillion, an 11.0% increase over the previous year, after controlling for exchange rate effects (Exhibit 5-5). The growth rate of EF1 entities' assets has slowed in recent years, but it remains higher than the growth rate of total assets included in the narrow measure, driving the overall growth of the narrow measure. EF1 entities were largely concentrated in the US (28.6%), China (16.6%), the Cayman Islands (14.1%), and Luxembourg (9.2%).

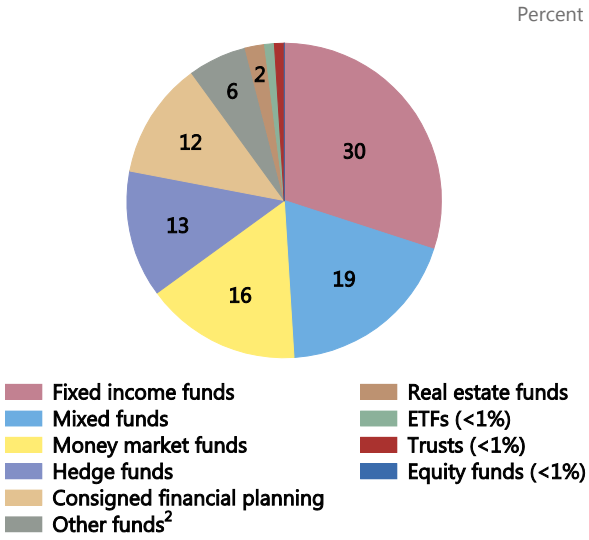
Economic Function 1 trends and composition

29 jurisdictions — Exhibit 5-5

Financial assets level and growth[1]



Breakdown by entity type



[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Calculated based on historical data included in jurisdictions' 2017 submissions. Increases in EF1 may also reflect improvements in the availability of data over time at the jurisdiction level. Net of prudential consolidation into banking groups. [2] Other funds include other investment funds, referenced investment funds, external debt investment funds, currency funds, asset allocation funds, other closed-ended funds, funds of funds, etc.

Source: National sector balance sheet and other data; FSB calculations.

There were a number of different types of CIVs that jurisdictions classified into EF1, including fixed income funds (30% of EF1), mixed funds (19%), MMFs (16%) and hedge funds (13%).[100]

[99] Investment funds focusing on other, illiquid asset classes might also be susceptible to runs. The focus on CIVs involved in credit intermediation results from the Report's focus on shadow banking.

[100] Mixed funds holding a mix of equity and credit assets were classified into EF1 based on their holdings of equities/credit assets. To ensure consistency in the assessment, in principle, funds holding 80% or more of their AUM in equities were considered not to be involved in credit intermediation and jurisdictions did not classify such funds into EF1. The remaining

Some jurisdictions also classified real estate funds (including REITs),[101] fund of funds, ETFs and various other types of funds into EF1, as such entities were judged to either be involved in credit intermediation or as being part of a credit intermediation chain, with potential risk of runs (Exhibit 5-5 right panel).

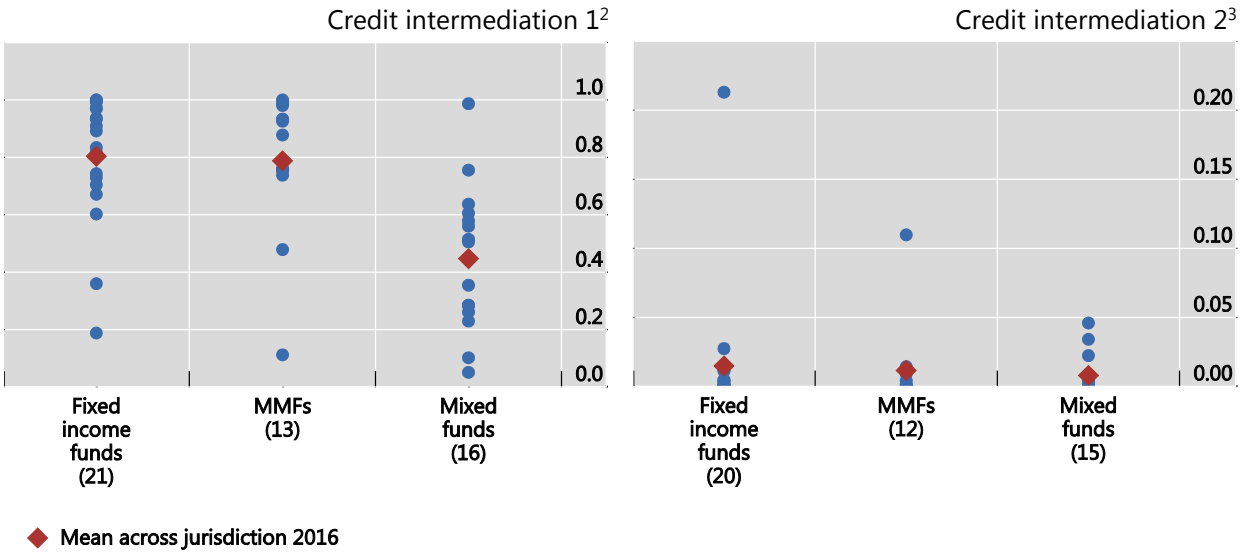
5.2.2 Financial stability risk metrics for EF1

For the 2017 monitoring exercise, more jurisdictions reported data related to risk metrics for some of their EF1 entity types compared to previous exercises. As explained below, the risk metrics for EF1 suggest that liquidity transformation tends to be high for fixed income funds in some jurisdictions with short-term liabilities and short-term redeemable equity in excess of liquid assets. The risk metrics indicate that some jurisdictions' funds have a combination of high liquidity and maturity transformation. If the portfolios have higher sensitivity to changes in interest rates, an abrupt rise in rates would impose greater marked-to-market losses and diminish fund returns, which in some circumstances could result in large investor outflows and greater potential for forced asset sales.

(i) Credit intermediation

Credit intermediation

Sample size in parentheses[1] Exhibit 5-6



[1] The sample size indicates the number of jurisdictions submitting the relevant data. Each jurisdiction's data submission reflects data from many individual entities within that jurisdiction. [2] Credit assets / AUM. [3] Loans / AUM.

Source: National sector balance sheet and other data; FSB calculations.

mixed funds were classified into EF1. The same assessment criteria are applied to other types of entities such as real estate funds, fund of funds and ETFs. MMFs, both CNAVs and VNAVs, were classified into EF1 based on their susceptibility to runs. Closed-ended funds were generally not classified into EF1 unless they were leveraged or a jurisdiction chose to classify them following a conservative approach. Some of these funds in certain jurisdictions were excluded from the classification based on the in-depth analysis of jurisdictions, where jurisdictions had an opportunity to present a case for demonstrating the absence of run risks for consideration by other jurisdictions (Annex 2).

[101] Only mortgage REITs (which derive most of their income from investment and ownership of debt instruments, such as property mortgages or MBS) are included in EF1. Equity REITs (which invest in or own physical properties and primarily receive rental income) are generally not classified into EF1 (see FSB (2014)).

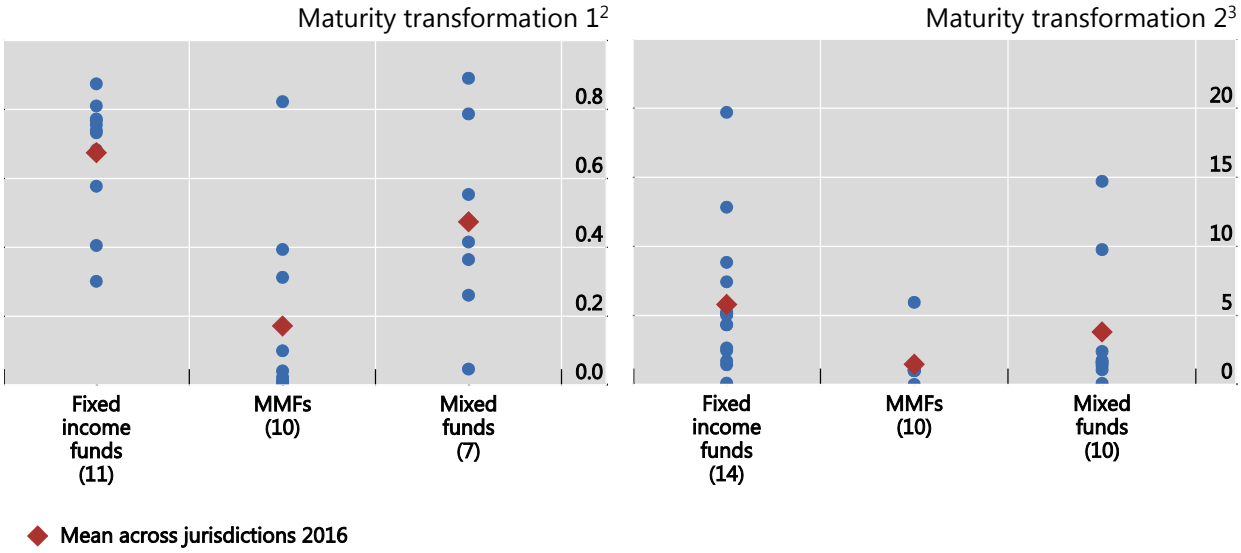
Exhibit 5-6 sets out the credit intermediation metrics for selected EF1 entity types. Reflecting their different business models, credit intermediation as measured through the risk metric CI1 (which measures the ratio of credit assets to AUM) was relatively higher for fixed income funds and MMFs than for mixed funds (with median values of 0.83, 0.82 and 0.48 respectively), for example because mixed funds hold non-credit assets (eg equity). When measured by the ratio of loans to AUM (CI2), credit intermediation was much lower for all three of these entity types (with near-zero median values for all three entity types), indicating very limited direct lending undertaken by most EF1 entity types. This is expected as EF1 entities are usually CIVs for investing in fixed income securities, rather than direct providers of credit/loans.

The risk metrics for similar entity types differed across jurisdictions, with the most pronounced differences being evidenced in the case of mixed funds, likely due to differences in the share of credit assets held by these types of funds in different jurisdictions.[102]

(ii) Maturity transformation

Maturity transformation

Sample size in parentheses[1] Exhibit 5-7



[1] The sample size indicates the number of jurisdictions submitting the relevant data. Each jurisdiction's data submission reflects data from many individual entities within that jurisdiction. [2] (Long term assets-long term liabilities - equity)/AUM. [3] (Short term liabilities + redeemable equity)/short term assets.

Source: National sector balance sheet and other data; FSB calculations.

For most EF1 entity types, maturity transformation as measured by MT1 (the portion of long-term assets funded by short-term liabilities and scaled by the entity type's total financial assets) is positive (with a median value of 0.74 for fixed income funds, 0.42 for mixed funds and 0.04 for MMFs) with considerable variance across jurisdictions (Exhibit 5-7), indicating that there is some degree of maturity transformation being undertaken by a subset of EF1 entity types in certain jurisdictions. MT2 (the ratio of short-term liabilities plus redeemable equity to short-term assets), which may highlight potential funding risks, tended to be higher

[102] See Footnote 100. These differences could also be due to different investment strategies.

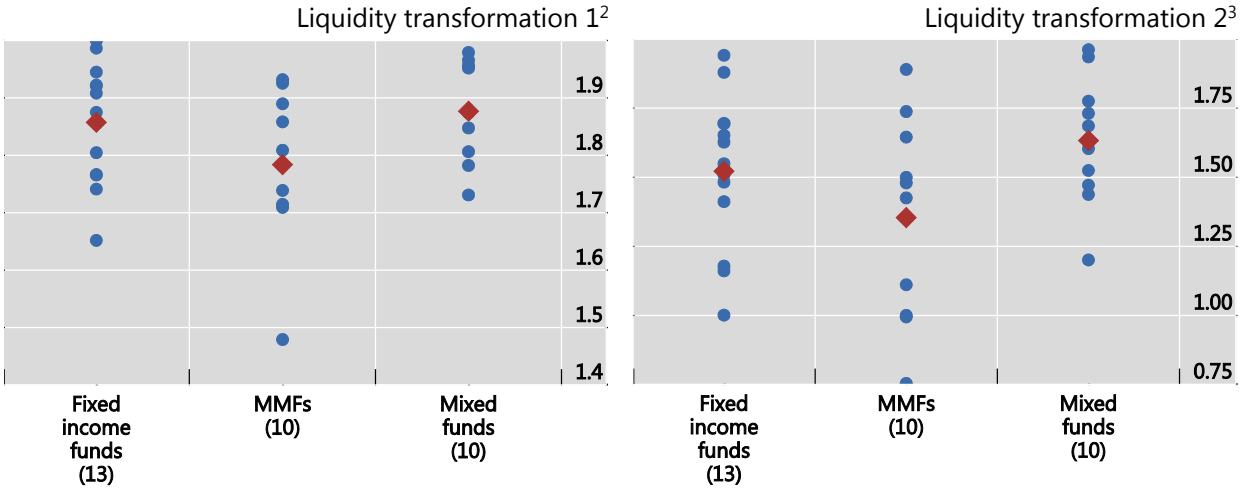
than the MT1 measure for most EF1 entity types (with a median value of 4.68 for fixed income funds, 1.66 for mixed funds and 1.02 for MMFs) indicating that some of these funds are funding a portion of their long-term assets with short-term liabilities and may be vulnerable to periods of diminished market liquidity.[103]

There are differences across jurisdictions in the inputs to the maturity transformation risk metrics for some of the entity types classified into EF1. Specifically, there are some inconsistencies in the treatment of equity assets[104] as well as in the treatment of assets in relation to the definitions of narrow and broad liquid assets[105] which if addressed in future monitoring exercises, would contribute to more meaningful cross-jurisdictional comparisons of the risk metrics. Finally, data were less available to calculate risk metrics for maturity transformation than for credit intermediation, with more data reported for fixed income funds on a relative basis.

(iii) Liquidity transformation

Liquidity transformation

Sample size in parentheses[1] Exhibit 5-8



[1] The sample size indicates the number of jurisdictions submitting the relevant data. Each jurisdiction's data submission reflects data from many individual entities within that jurisdiction. [2] (AUM - liquid assets [narrow] + short term liabilities [≤ 30 days] + redeemable equity [≤ 30 days]) / AUM. [3] (AUM - liquid assets [broad] + short term liabilities [≤ 30 days] + redeemable equity [≤ 30 days]) / AUM.

Source: National sector balance sheet and other data; FSB calculations.

The median LT1 measure (the amount of less liquid assets using a narrow definition of liquid assets funded by short-term liabilities) was well above one for reported fixed income funds (1.86), MMFs (1.79) and mixed funds (1.88), indicating that short-term liabilities and short-

[103] MT1 and MT2 are not comparable. However, in terms of values, MT2 seems to take larger values than MT1, possibly because for most funds other than MMFs, short-term assets are small compared to fund's redeemable equity.

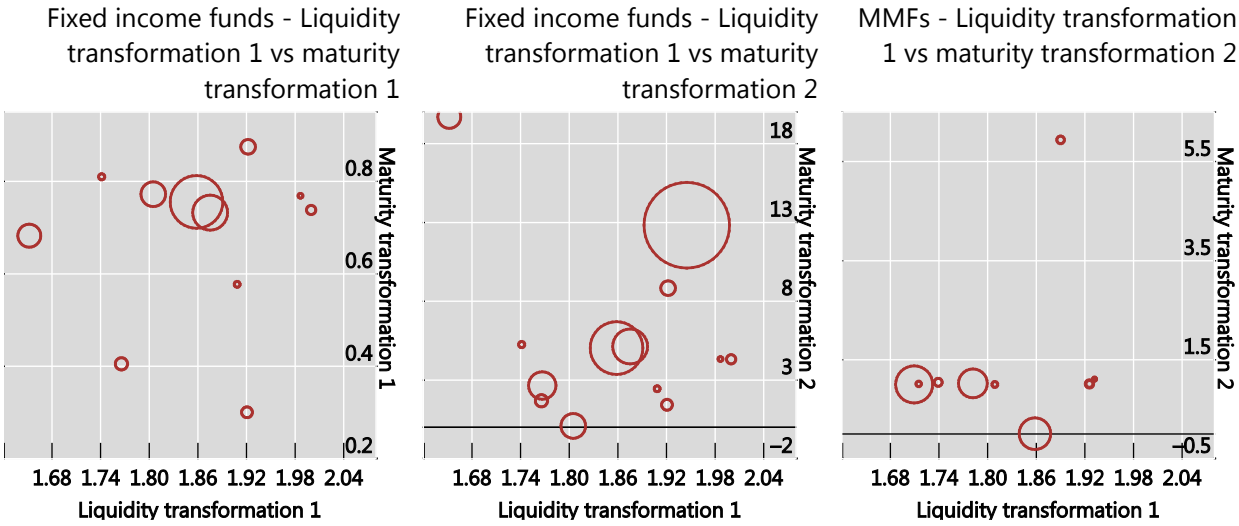
[104] For example, for hybrid funds, some jurisdictions report both equity and non-equity assets.

[105] Liquid assets are considered to be all assets that can be easily and immediately converted into cash at little or no loss of value during a time of stress (see also characteristics and definition of HQLAs in Part 1, Section II.A in BCBS (2013). For the monitoring exercise, two definitions of liquid assets were used. In the broad definition, liquid assets include HQLAs. In the narrow definition, liquid assets only include cash and cash equivalents.

term redeemable equity are in excess of liquid assets (Exhibit 5-8).[106] Similarly, the median LT2 measure (the amount of less liquid assets using the broad definition of liquid assets funded by short-term liabilities) was also above the minimum level (1.00) for fixed income funds (1.55), MMFs (1.40) and mixed funds (1.63). With regard to fixed income funds, jurisdictions with risk metrics that displayed higher levels of maturity transformation tended to be also associated with higher levels of liquidity transformation (Exhibit 5-9).

Risk metrics

At end-2016[1] Exhibit 5-9



Size of bubble denotes the sector's absolute size. MT1: (long term assets - long term liabilities - nonredeemable equity) / AUM. MT2: (short term liabilities [≤ 12 months] + redeemable equity [≤ 12 months]) / short term assets [≤ 12 months]. LT1: (AUM - liquid assets [narrow] + short term liabilities [≤ 30 days] + redeemable equity [≤ 30 days]) / AUM.

Source: National sector balance sheet and other data; FSB calculations.

(iv) Leverage

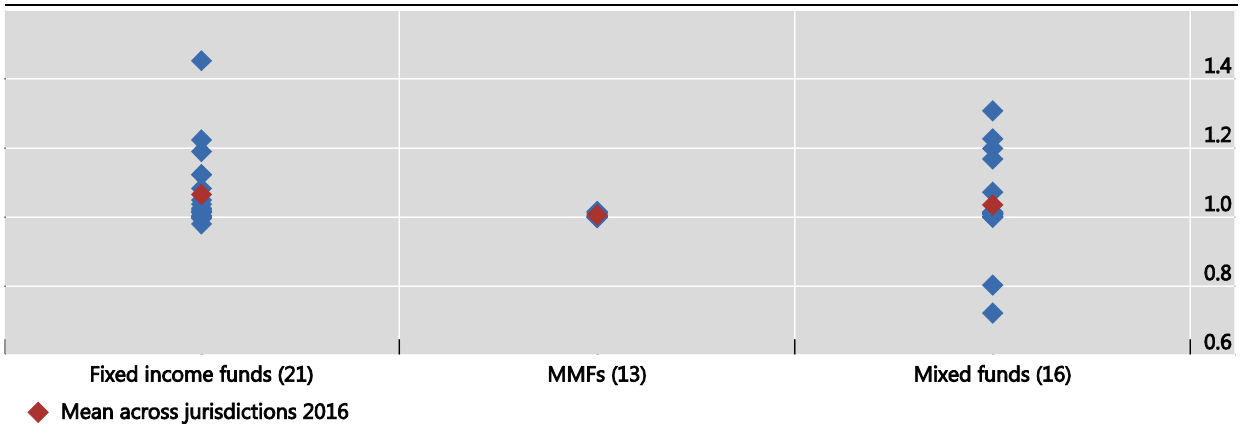
Reported balance sheet leverage, as measured by AUM divided by NAV, is relatively low across major EF1 entity types such as fixed income funds (with a median value of 1.02), mixed funds (1.01) and MMFs (1.00), albeit with some cross-jurisdictional variation (Exhibit 5-10). For these types of funds, leverage seems to be relatively low or limited, with a risk metric value of near 1, reflecting regulatory limits on balance sheet leverage in many jurisdictions.

As data on synthetic leverage were only provided by some jurisdictions, examining the potential impact of synthetic leverage continues to be a challenge. Data on synthetic leverage should become more widely available through IOSCO's operationalisation of the FSB's January 2017 *Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities* (see Recommendations 10-12 of FSB (2017a).

[106] This ratio will be biased upwards for jurisdictions that reported total NAV in the total assets field, instead of total AUM without netting of any liabilities.

Leverage[1]

Sample size in parentheses[2] Exhibit 5-10



[1] AUM/NAV. [2] The sample size indicates the number of jurisdictions submitting the relevant data. Each jurisdiction's data submission reflects data from many individual entities within that jurisdiction. Source: National sector balance sheet and other data; FSB calculations.

5.3 Economic Function 2

EF2 entities engage in loan provision that is dependent on short-term funding. This economic function captures a wide range of activities including consumer finance, auto finance, retail mortgage provision, commercial property finance, and equipment finance. Entities engaged in these activities tend to either compete with banks or offer services in niche markets where banks are not active players, and often concentrate their lending in specific sectors due to expertise and other reasons. This may create significant risks if the sectors they focus on are cyclical in nature. Such risk may be exacerbated if these entities are heavily dependent on short-term funding or wholesale funding, or are dependent on parent companies for funding and the parent companies are themselves in the same sectors that are cyclical in nature.

5.3.1 Trends in Economic Function 2

EF2 constituted 6% of the total narrow measure at end-2016. EF2 assets declined 3.8% in 2016 to $2.9 trillion. Most of this decline was attributable to data issues[107] and a decline in the assets of EF2 entities in the US. Finance companies comprised 82% of total EF2 assets (Exhibit 5-11). EF2 was relatively concentrated in the US (with 34% of the total EF2 assets), Japan (17%) and India (11%). Overall, 26 jurisdictions classified at least one entity type into EF2.[108]

Many EMEs saw notable growth in EF2 assets, although this growth occurred from a lower base and it appears to be slowing. The EF2 assets of EMEs excluding China grew by around 5% in 2016 (compared to over 10% in 2015).

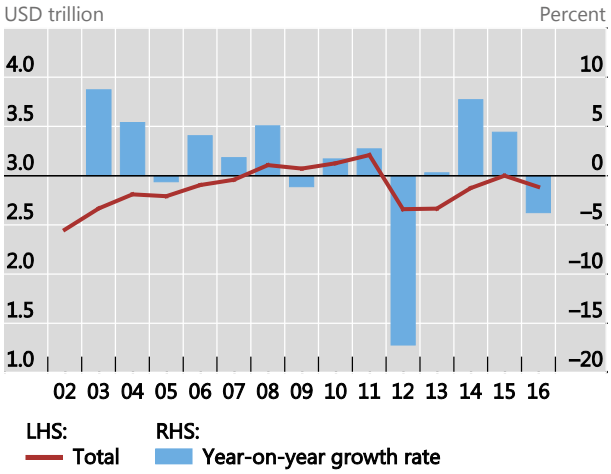
[107] Chinese authorities were only able to provide 2016 data on entities prudentially consolidated into banking groups, resulting in a relatively large structural break between 2015 and 2016 that contributes significantly to EF2's sharp decline in 2016. Excluding China, EF2 grew by 0.7% in 2016.

[108] Indonesia, Ireland and Luxembourg did not classify any entity types into EF2: no entity types in Indonesia and Ireland were identified as meeting EF2 classification criteria based on submitted data/information, and the result for Luxembourg was due to data unavailability.

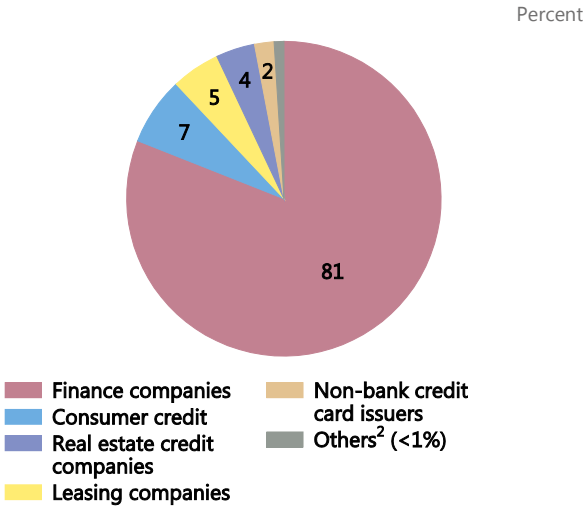
Economic Function 2 trends and composition

29 jurisdictions Exhibit 5-11

Financial assets level and growth[1]



Breakdown by entity type



[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Calculated based on historical data included in jurisdictions' 2017 submissions. Increases in EF2 may also reflect improvements in the availability of data over time at the jurisdiction level. Net of prudential consolidation into banking groups. [2] "Others" contains credit unions and venture capital.

Source: National sector balance sheet and other data; FSB calculations.

5.3.2 Financial stability risk metrics for EF2

Since finance companies account for most EF2 assets, the analysis of risk metrics focuses primarily on finance companies and on the risk metrics most relevant for these entities (Exhibit 5-12). Overall, as discussed below, EF2 entities undertake significant credit intermediation and have limited or negative maturity transformation and moderate liquidity transformation. EF2 entities employ a somewhat elevated degree of leverage, particularly when accounting for off-balance sheet exposures. In some jurisdictions, finance companies on average tended to have relatively high leverage and maturity transformation.

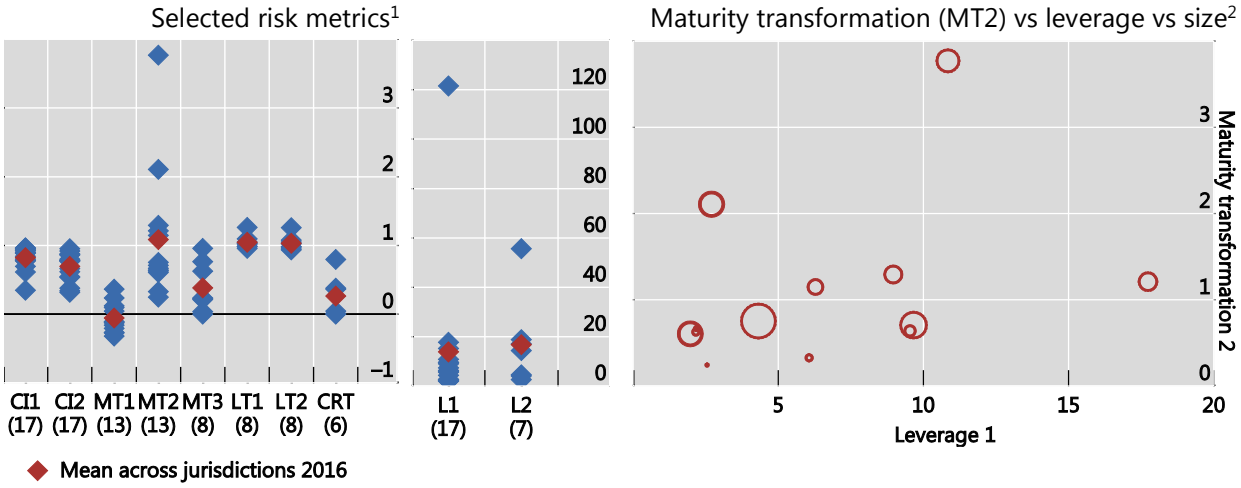
Looking more closely at the risk metrics:

- The median values for CI1 (ratio of credit assets to total financial assets) and CI2 (ratio of loans on the asset side of the balance sheet to total financial assets) were 0.89 and 0.77, respectively. As the maximum value of these ratio is 1, this suggests that finance companies engage in significant credit intermediation. This is perhaps not surprising as EF2 entities, and in particular finance companies, are involved in more traditional forms of lending.
- The median maturity transformation metric MT2 (the ratio of short-term liabilities to short-term assets) was 0.75 across the 13 jurisdictions that provided the relevant data, indicating negative maturity transformation (although the mean value of 1.29 illustrates that some jurisdiction had much higher metrics). Moreover, as the median value for MT1 (the ratio of long-term assets funded by short-term liabilities) was -0.12, only a negligible or negative portion of long-term assets have been funded through short-term liabilities, showing that the absolute amount of short-term liabilities is very small compared to long-term liabilities.

- The median liquidity transformation metric LT1 (the amount of less liquid assets funded by short-term liabilities) was slightly above 1 across the eight jurisdictions that provided it, indicating that short-term liabilities are roughly equivalent to liquid assets for these jurisdictions (ie no material liquidity transformation).
- The median L1 leverage ratio (ratio of total financial assets to equity) for finance companies was 6.3, indicating a moderate to low amount of leverage, while the median L2 ratio (ratio of total financial assets and total off-balance sheet exposures to equity) of 14.3 indicates that finance companies could also be taking on leverage through off-balance sheet exposures.
- The median credit risk transfer (ratio of credit off-balance sheet exposures to the sum of total financial assets and total off-balance sheet exposures) was moderate at about 20%. Nonetheless, in some jurisdictions, credit risk transfer was almost 80%, implying a relatively elevated degree of credit risk transfer.

Risk metrics for finance companies

At end-2016 Exhibit 5-12



[1] CI1 = credit assets / total financial assets; CI2= loans / total financial assets; CI3= (credit assets + credit off balance sheet exposures) / (AUM + total off balance sheet exposures); MT1= (long term assets - long term liabilities - equity) / total financial assets; MT2 = short term liabilities [≤ 12 months] / short term assets [≤ 12 months]; MT3 = short term liabilities [≤ 30 days] / short term assets [≤ 3 months]; LT1 = (total financial assets - liquid assets [narrow] + short term liabilities [≤ 30 days]) / total financial assets; LT2 = (total financial assets - liquid assets [broad] + short term liabilities [≤ 30 days]) / total financial assets; LT3= short term liabilities [≤ 30 days] / liquid assets [broad]; CRT = credit off balance sheet exposures / (total financial assets + total off balance sheet exposures); L1= total financial assets / equity; L2= (total financial assets + total off balance sheet exposures) / equity. Some risk metrics included data from entities prudentially consolidated into banking groups, as some jurisdictions' granular data do not distinguish between consolidated and non-consolidated entities. [2] Size of bubble denotes the sector's absolute size. Only jurisdictions which provided data for both the Leverage 1 metric and the Maturity Transformation 2 metric appear in this chart.

Source: National sector balance sheet and other data; FSB calculations.

5.4 Economic Function 3

EF3 involves the intermediation of market activities that is dependent on short-term funding, including activities such as secured funding of client assets and securities borrowing and lending. There were 23 jurisdictions that classified entities into EF3 which make up about 8% of total narrow measure, with China, India and South Africa newly classifying entities into EF3 in the 2017 Report. Broker-dealers and investment firms are the most prevalent entity types reported by jurisdictions in EF3. However, some jurisdictions reported other EF3 entity types,

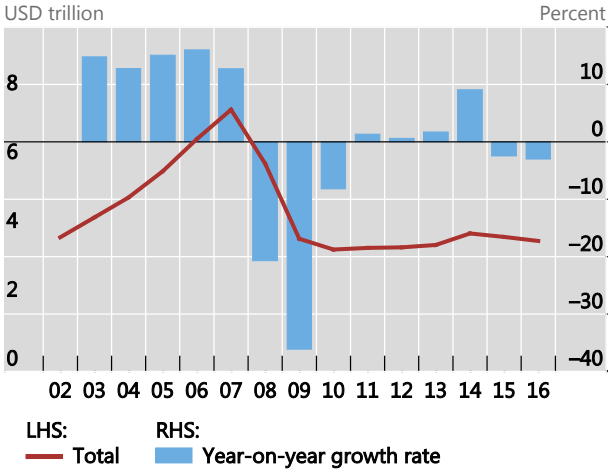
such as custodial accounts for reinvested collateral of securities lending operations and money market broker-dealers.

5.4.1 Trends in Economic Function 3

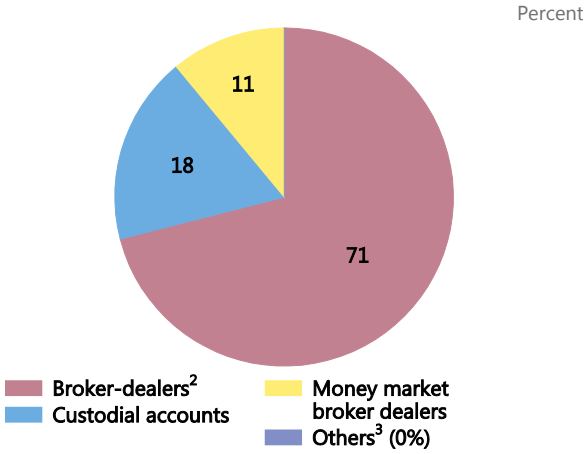
Economic Function 3 trends and composition

29 jurisdictions Exhibit 5-13

Financial assets level and growth[1]



Breakdown by entity type



[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Calculated based on historical data included in jurisdictions' 2017 submissions. Increases in EF3 may also reflect improvements in the availability of data over time at the jurisdiction level. Net of prudential consolidation into banking groups. [2] Also includes investment firms, securities dealers and securities finance companies. [3] "Others" contains pension funds.

Source: National sector balance sheet and other data; FSB calculations.

As at end-2016, total financial assets of EF3 entities was $3.8 trillion, declining by 3.0% net of exchange rate effects, from $3.9 trillion in 2015 (Exhibit 5-13). The immediate post-crisis decline in EF3 assets was to some extent due to the financial crisis, which led to changes in the regulatory status during the financial crisis of some large broker-dealers to bank holding companies or their consolidation into banking groups or regulatory/supervisory changes (leading to the increased use of leverage-based capital requirements at the parent bank or bank holding company that also indirectly applied to their broker-dealer subsidiaries).

Total EF3 assets continue to be concentrated in a handful of jurisdictions. In 2016, the top five jurisdictions with EF3 entities accounted for nearly 95% of the total size of EF3 assets (the US, Japan, China, Korea, and the UK).

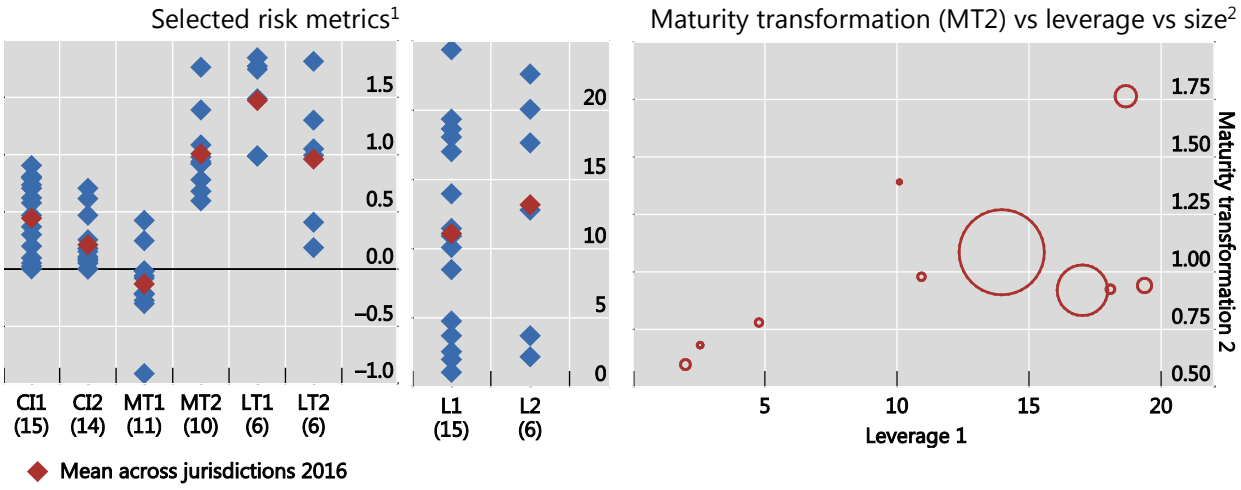
5.4.2 Financial stability risk metrics for EF3

Intermediation activity may include securities brokerage services (ie buying and selling of securities and derivatives on and off exchanges including in a market making role) as well as prime brokerage services to hedge funds. Depending on entities' funding model, these activities may involve liquidity risks, including intra-day liquidity risk. These entities may also be vulnerable to roll-over risk or runs by lenders if they are leveraged, particularly if their funding is primarily dependent on wholesale funding (eg repos). While engaging in market intermediation, entities such as broker-dealers may at times take on significant degrees of leverage and maturity transformation, which could exacerbate or result in runs if general market and asset price conditions deteriorate, and if funding providers become concerned

that the price deterioration of collateral supporting short-term borrowing could precipitate viability concerns.[109] Exhibit 5-14 shows the range of values for metrics reported by some jurisdictions that classified entities into EF3.

Risk metrics for broker-dealers

At end-2016 Exhibit 5-14



[1] CI1 = credit assets / total financial assets; CI2= loans / total financial assets; CI3= (credit assets + credit off balance sheet exposures) / (AUM + total off balance sheet exposures); MT1= (long term assets - long term liabilities - equity) / total financial assets; MT2 = short term liabilities [≤ 12 months] / short term assets [≤ 12 months]; MT3 = short term liabilities [≤ 30 days] / short term assets [≤ 3 months]; LT1 = (total financial assets - liquid assets [narrow] + short term liabilities [≤ 30 days]) / total financial assets; LT2 = (total financial assets - liquid assets [broad] + short term liabilities [≤ 30 days]) / total financial assets; LT3= short term liabilities [≤ 30 days] / liquid assets [broad]; CRT = credit off balance sheet exposures / (total financial assets + total off balance sheet exposures); L1= total financial assets / equity; L2= (total financial assets + total off balance sheet exposures) / equity. [2] Size of bubble denotes the sector's absolute size. Only jurisdictions which provided data for both the Leverage 1 metric and the Maturity Transformation 2 metric appear in this chart.

Source: National sector balance sheet and other data; FSB calculations.

Overall, as illustrated below and in Exhibit 5-14, EF3 entities undertake significant credit intermediation, have limited maturity transformation risk and moderate liquidity transformation risk. EF3 entities employ a somewhat elevated degree of leverage, particularly when accounting for off-balance sheet exposures. Looking more closely at the risk metrics:

- The median CI1 (ratio of credit assets to total financial assets) for broker-dealers was 0.52, although developments across jurisdictions displayed a somewhat higher dispersion than the median CI2 (ratio of loans to total financial assets)[110] which amounted to 0.15.[111]
- MT1 (ratio of long-term assets minus long-term liabilities minus equity capital to total financial assets) takes both positive and negative values with a median value of -0.1. The negative values, reported by nine of 14 jurisdictions, are not necessarily unexpected - long-term liabilities could be financing both long-term credit and non-credit (eg equity) assets.

[109] In some jurisdictions (eg the US), these risks in the broker-dealer are mitigated by the fact that the transactions are secured with liquid securities collateral (ie securities that have a ready market) and the balance sheet of the broker-dealer is comprised almost exclusively of cash and liquid securities.

[110] Excluding reverse repurchase agreements.

[111] Jurisdictions reporting total assets instead of financial assets may have biased these two risk metrics downwards.

- The median value of L1 (the ratio of total financial assets to equity capital) was over 11, indicating that broker-dealers took on some degree of leverage, which is expected given their business model and is considerably lower than the levels observed prior to the financial crisis. Total financial assets exceeded equity by more than 10 times for 9 of 14 jurisdictions, and by more than 15 times for 5 of 14 jurisdictions. Meanwhile, the median L2 (the ratio of total financial assets and short-term liabilities less liquid assets, divided by total financial assets) was 15, with a third of the 6 jurisdictions that provided this data having values over 20. This implies that broker-dealers may potentially be taking on further leverage through off-balance sheet exposures.

5.5 Economic Function 4

EF4 entities facilitate the creation of credit, for example, when financial guarantors or monoline insurers extend various forms of guarantees to bank and non-bank financial entities, such as off-balance sheet commitments and derivatives. Investors find this additional credit protection attractive as it increases the likelihood that investments will be repaid in full, even in the event the borrower is unable to meet its obligations. From the borrower's perspective, the principal's creditworthiness is improved by the credit quality of the financial guarantor, reducing funding costs for a given risk profile. Credit insurance providers and holders of credit derivatives facilitate credit creation through engagement in markets that offer insurance for credit instruments, thereby enhancing their marketability.

Credit facilitators played a significant role during the period leading to the financial crisis. For example, by enhancing the credit quality of subprime mortgages or tranches of mortgage-backed securitisation (eg collateralised debt obligations), they facilitated credit and boosted the build-up of excessive leverage in the financial system. The pricing of insurance protection should in principle reflect the creditworthiness of both borrower and guarantor. However, credit risk transfer might be imperfect in the presence of asymmetric information or other market failures as seen in the financial crisis. For instance, if credit, liquidity or counterparty risks are not properly priced, or the incentive structures not well designed, the entities facilitating credit enhancements may help create excessive risk-taking, potentially contributing to boom-bust cycles (FSB (2013)).

5.5.1 Trends in Economic Function 4

Facilitation of credit creation (EF4) was again a relatively small part of the narrow measure at end-2016, with assets classified into EF4 by 18 jurisdictions totalling $175 billion and representing only 0.4% of total narrow measure assets (Exhibit 5-15). EF4 assets declined about 9.0% in 2016, net of exchange rate effects mostly due to declines in Italy and, to a lesser extent, Ireland and Korea.

The size of this EF and its importance relative to the other EFs may be significantly understated due to the difficulty of adequately capturing off-balance sheet exposures. This is largely because the balance sheet assets of credit insurers, which are typically classified into this EF, are often modest due to the nature of their business, while they can still facilitate substantial volumes of credit extended by bank or non-bank financial entities.

Of the nine entity types most commonly reported as facilitating credit creation, over three quarters of assets consisted of insurance corporations (eg financial guarantors), mortgage

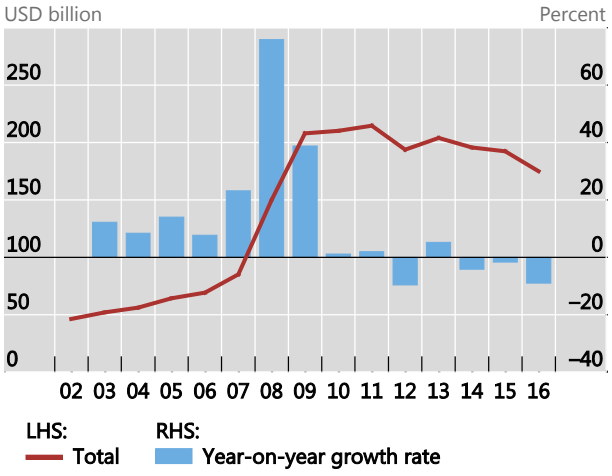
insurers, investment firms (making use of credit derivatives) and SPVs, although some of these were only reported by some jurisdictions indicating a potential need to address data gaps and/or concentration of certain business in these jurisdictions. Most EF4 activity appears to remain concentrated in advanced economies.

Economic Function 4 trends and composition

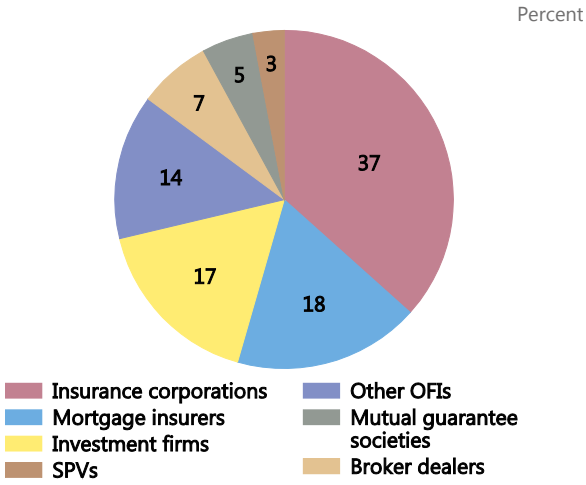
29 jurisdictions

Exhibit 5-15

Financial assets level and growth[1]



Breakdown by entity type



[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Calculated based on historical data included in jurisdictions' 2017 submissions. Increases in EF4 may also reflect improvements in the availability of data over time at the jurisdiction level. Net of prudential consolidation into banking groups.

Source: National sector balance sheet and other data; FSB calculations.

5.5.2 Financial stability risk metrics for EF4

More jurisdictions reported at least some risk data compared to the 2016 monitoring exercise. However, due to the small size of EF4 (jurisdictions do not need to report risk metrics if an entity type's aggregate size is below 1% of their jurisdiction's total financial assets), the relatively sparse risk data provided by jurisdictions[112] and the unique nature of EF4, it is difficult to infer broad conclusions about the risks posed by EF4 to the financial system.

5.6 Economic Function 5

The securitisation-based provision of funding to banks and/or non-bank financial entities, with or without the transfer of assets and risks from such financial entities, is usually an integral part of credit intermediation chains (or often the regular banking system). Both bank and non-bank financial intermediaries often use securitisation for funding purposes as well as for improving their lending portfolios and for capital management purposes. By facilitating the transfer of credit risk off-balance sheet, securitisation reduces funding costs for both bank and non-bank financial entities and facilitates the availability of credit to the real economy.

These beneficial effects could, however, also contribute to a build-up of excessive maturity/liquidity transformation, leverage, or regulatory arbitrage in the system, which

[112] Argentina, Brazil, Canada, Chile, France, Korea, Mexico, South Africa, UK and US provided enough data to calculate at least one risk metric.

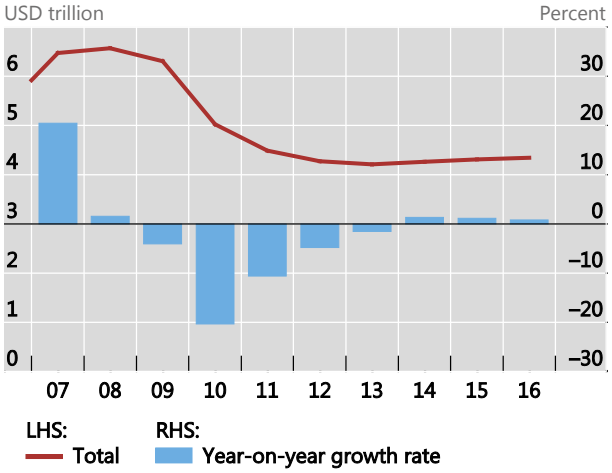
becomes a greater risk in financial systems with relatively less stringent lending standards. The securitisation market is sensitive to sudden reductions in market liquidity, particularly in the case of complex securitisations or securitisations that lack transparency to investors.

5.6.1 Trends in Economic Function 5

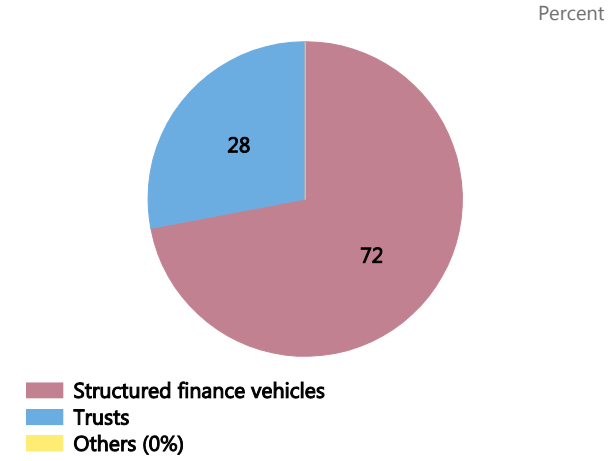
Economic Function 5 trends and composition

29 jurisdictions Exhibit 5-16

Financial assets level and growth[1]



Breakdown by entity type[2]



[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2016). Calculated based on historical data included in jurisdictions' 2017 submissions. Increases in EF5 may also reflect improvements in the availability of data over time at the jurisdiction level. Net of prudential consolidation into banking groups. [2] The classifications in this chart reflect labels provided by jurisdictions, with financial vehicle corporations, asset-backed commercial paper, mortgage REITs and funds, asset-backed short-term bonds, receivable investment funds, exchange-traded funds and others grouped into "Others". Mortgage REITs and funds are primarily classified in EF1, but jurisdictions may also classify mortgages REITs and funds into EF5 if they also meet the criteria for this economic function, in which case their value will be proportionately allocated between EF1 and EF5 (see Footnote 78).

Source: National sector balance sheet and other data; FSB calculations.

Securitisation-based credit intermediation and funding of financial entities saw a slight increase (0.8%) to $4.3 trillion at end-2016 for the 25 jurisdictions which classified entities into this economic function (Exhibit 5-16). The 2017 monitoring exercise saw the addition of two jurisdictions classifying entities into EF5 (China and Luxembourg), as well as an increase in the number of jurisdictions providing risk metrics. EF5 represents 9.6% of the total narrow measure. The composition of EF5 entities changed slightly this year, in particular with the addition of some type of trust entities that may be used for funding by financial institutions.

5.6.2 Financial stability risk metrics for EF5

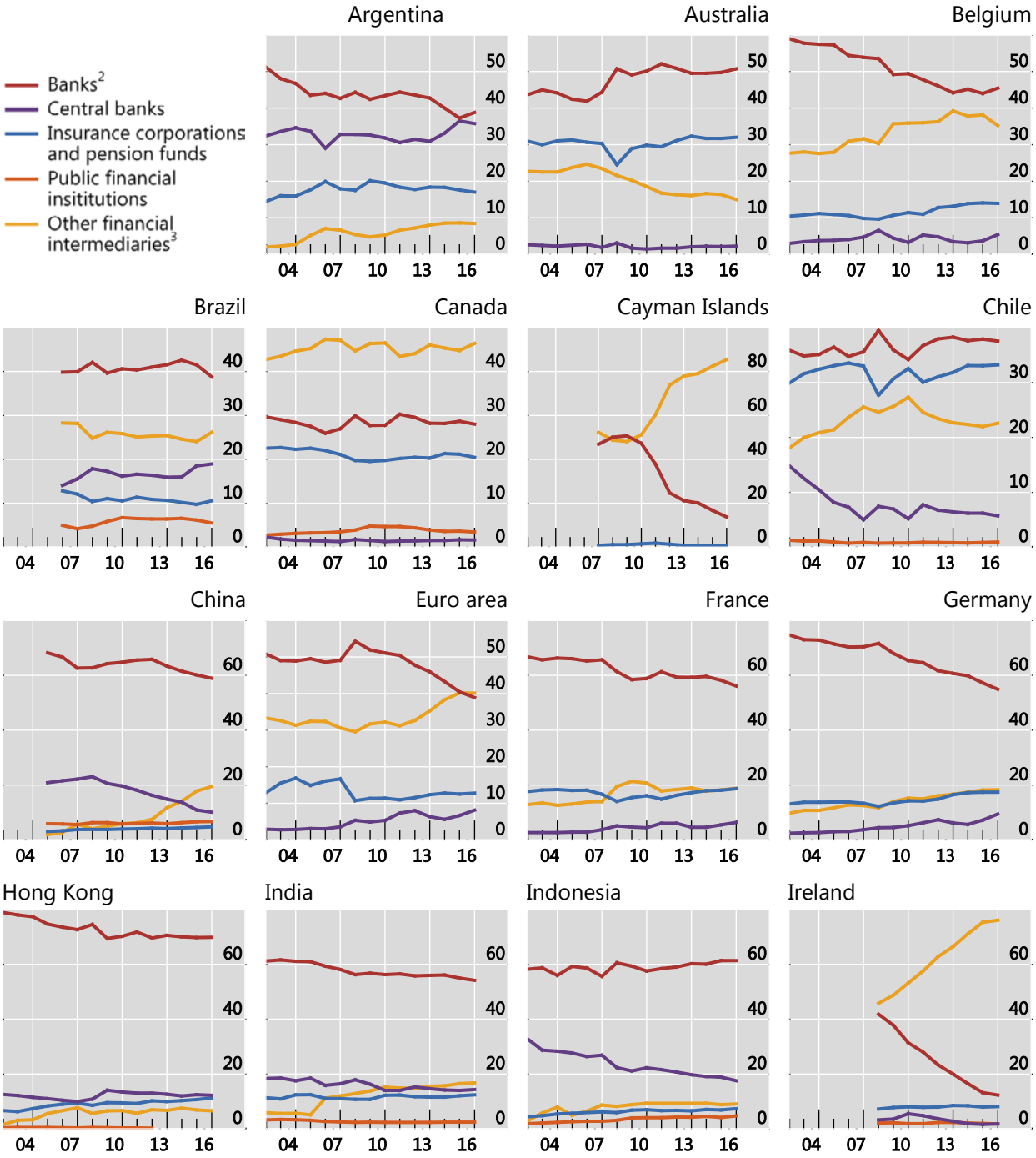
The EF5 risk metrics provided by jurisdictions[113] suggest that the risk associated with credit intermediation is the largest risk faced by structured finance vehicles in the 15 jurisdictions for which either CI1 and CI2 metrics could be calculated, although there was some variance across jurisdictions (CI1 ranged from 0.67 to 0.94 with a median value of 0.87, while CI2 ranged from 0.11 to 0.94 with a median value of 0.72). The median LT1 for the three jurisdictions that provided it was 0.96.

[113] Some risk metrics included data from entities prudentially consolidated into banking groups, as some jurisdictions' data do not distinguish between consolidated and non-consolidated entities.

Annex 1: Jurisdiction-specific summaries

Share of total national financial assets by jurisdiction

Percent[1] Exhibit A1-1

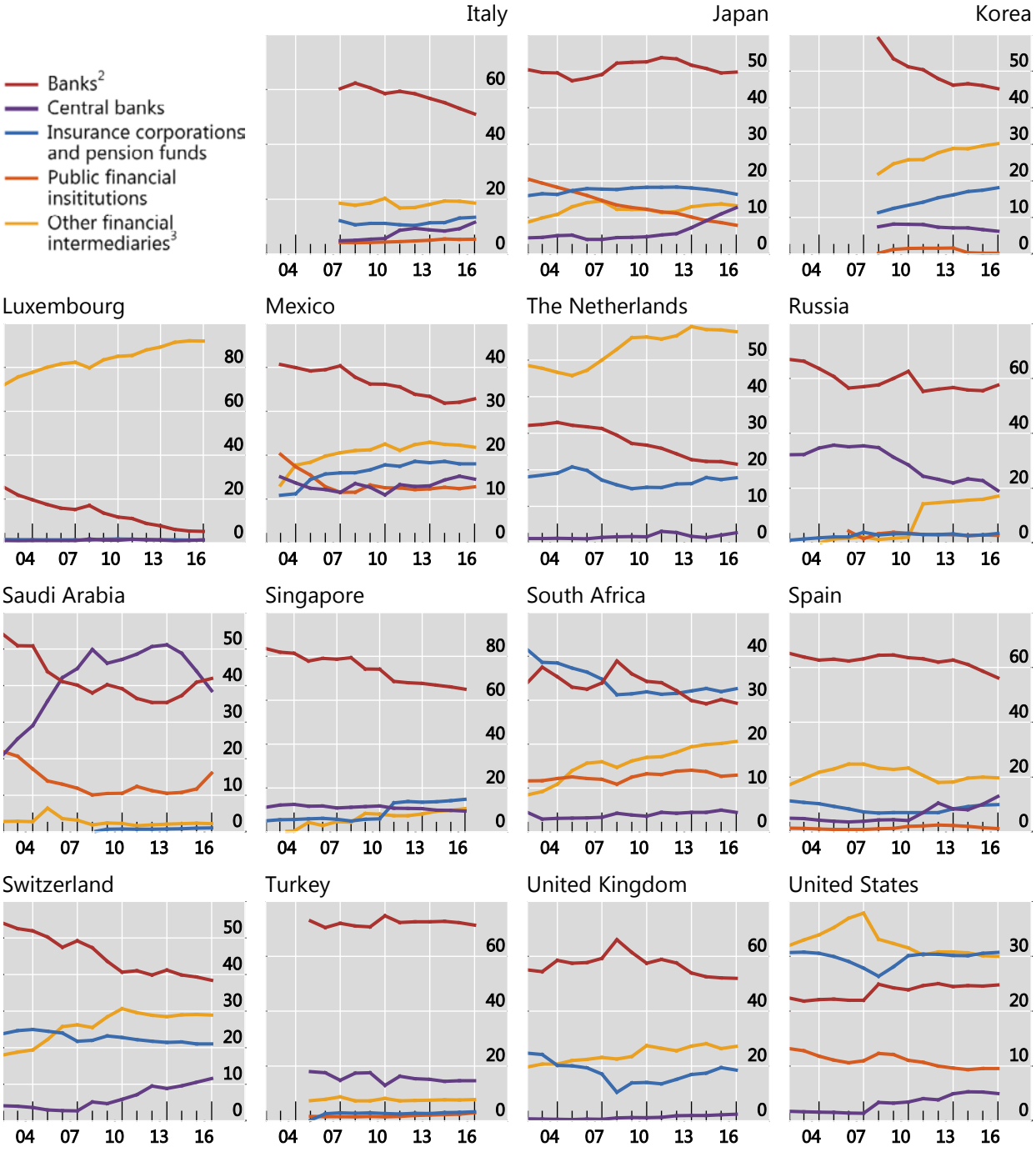


[1] Based on historical data included in jurisdictions' 2017 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). [2] All deposit-taking corporations. [3] Also includes captive financial institutions and money lenders, and financial auxiliaries. Increases in the value of OFI assets may also reflect improvements in the availability of data for some OFI sub-sectors over time.

Sources: National sector balance sheet and other data; FSB calculations.

Share of total national financial assets by jurisdiction

Percent[1] Exhibit A1-2



[1] Based on historical data included in jurisdictions' 2017 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2016). [2] All deposit-taking corporations. [3] Also includes captive financial institutions and money lenders, and financial auxiliaries. Increases in the value of OFI assets may also reflect improvements in the availability of data for some OFI subsectors over time.

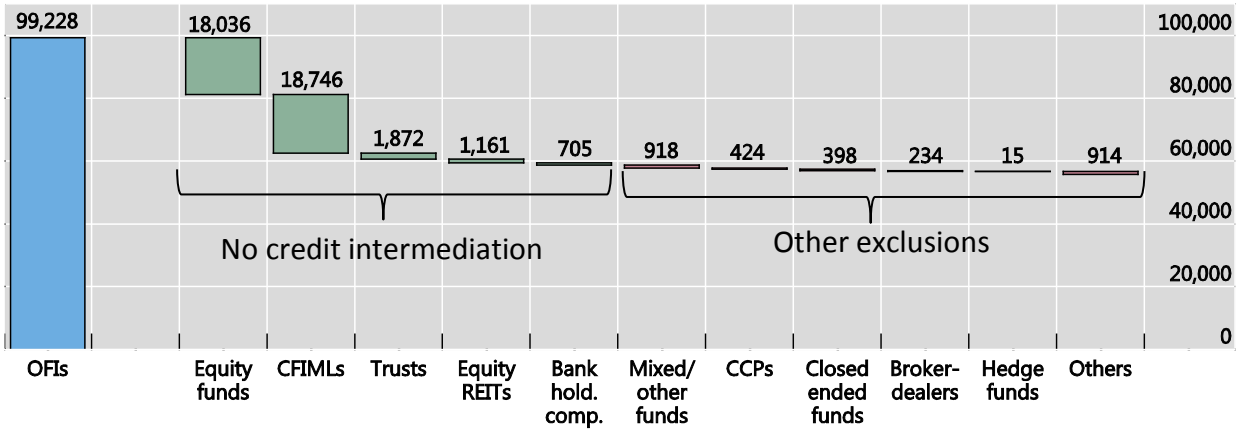
Sources: National sector balance sheet and other data; FSB calculations.

Annex 2: Exclusion of OFI entity types from the narrow measure of shadow banking

Through the process of narrowing down, authorities collectively removed $43.4 trillion of OFI assets from the MUNFI measure. Authorities determined that certain entity types did not engage in credit intermediation, or where they did engage in credit intermediation they were excluded for other reasons (eg they were consolidated within a banking group), based on the information submitted for the 2017 monitoring exercise (see Section 4.1). This Annex seeks to provide a more detailed breakdown of which non-bank entity types were excluded from the narrow measure and why.

Exclusion of OFI entity types from the narrow measure of shadow banking

USD billion, for 29 jurisdictions, end-2016 Exhibit A2-1



OFIs also includes CFIMLs; SFI = special financial institutions; CFIMLs = captive financial institutions and money lenders; REITs = real estate investment trusts and RE funds; Bank hold. comp. = bank holding companies; Trusts = trust companies; CCPs = central counterparties.

Sources: National sector balance sheet and other data; FSB calculations.

- **Equity funds** that invest principally in equity securities are not involved in credit intermediation. To ensure sufficient liquidity in their portfolios to meet redemptions, equity funds often hold a modest amount of cash and highly liquid fixed income assets for cash management purposes. Thus equity funds and ETFs referencing equity indices that hold no more than 20% of their AUM in fixed income assets have been assessed as outside of the narrow measure.
- **Captive financial institutions and money lenders (CFIMLs)**. This segment is dominated by captive financial institutions (See Box 2-4 for details). These entities are not included in the narrow measure as they are either linked to non-financial corporations (ie used for the pass-through of capital) or consolidated into banks.
- **Trust companies** in Singapore and South Africa provide a range of administrative and advisory services to individual clients, but are not CIVs and thus not classified into EF1. Korean trust accounts are separately managed (not CIVs) and closed-ended with limited leverage, and are thus excluded from EF1. Several types of Chinese trusts were excluded from the narrow measure including property trusts (which can only invest in non-cash assets), some non-bank-affiliated single money trusts and collective

investment trusts (unlevered, closed-ended and/or invest primarily in equity assets).

- **Equity REITs** and real estate funds that invest into equities or directly into properties (ie no credit intermediation) have been assessed outside the narrow measure.
- **Bank holding companies**. Although UK bank holding companies are included in the UK's OFI statistics, they are a part of prudentially regulated banking entities and hence are not classified into the narrow measure.
- **Mixed/other funds**. Authorities have determined that a portion of mixed and/or other funds in Canada, France, Hong Kong, India, Indonesia, Ireland, Korea, Luxembourg Netherlands and Turkey either do not engage in material credit intermediation, or present only negligible liquidity and maturity transformation risks with immaterial leverage, or are exclusive investment funds. For example, Discretionary Funds in Indonesia have been assessed not to be CIVs as they are separately managed and invest mostly in equities. Similarly, precious metal funds (eg in Turkey) invest at least 80% of their assets in precious metals.
- **CCPs** were generally excluded from the narrow measure due to the absence of credit intermediation. With both sides of the balance sheet typically matched, CCPs are not engaged in bank-like activities such as leverage or liquidity/maturity transformation. However, they take on counterparty risk and their collateral policies may involve elements of liquidity and maturity transformation.
- **Closed-ended funds** with limited maturity and liquidity transformation, and which are not leveraged, are not considered susceptible to runs in the same way as open-ended funds, and have been generally assessed as outside of the narrow measure unless a jurisdiction chose to include them following a conservative approach. For example, in Brazil, a portion of investment funds are closed-ended funds with negligible leverage or are exclusive investment funds (ie conceptually similar to a single fund), and hence have not been classified into the narrow measure.
- **Broker-dealers**. Certain types of broker-dealers in some jurisdictions (Belgium, Hong Kong, Indonesia, Ireland, and the Netherlands) were excluded from the narrow measure as these entities are not engaged in credit intermediation (ie they act as "pure" brokers/agents for clients). Broker-dealers in these jurisdictions that were seen to be involved in credit intermediation were classified into EF3.
- **Hedge funds** in, for example, Canada and India that largely do not engage in credit intermediation are excluded from the narrow measure. These funds may engage in equity or certain derivatives strategies, but do not provide credit directly.
- **Others** is comprised of relatively small OFI entity types, including: the European Financial Stability Facility (Luxembourg); non-securitisation SPVs (Ireland); microfinance entities and peer-to-peer lending (China); venture capital and private equity entities that are not or only marginally engaged in credit intermediation (Belgium, Indonesia, Italy, Mexico, Spain and Turkey); government-guaranteed mortgage-backed securities (Korea); central mortgage bond institution (Switzerland); non-deposit-taking development banks (Turkey); and an asset management company in Spain. Finance companies in Indonesia and India took on short-term funding of less than 10% of overall assets and were thus excluded from the narrow measure.

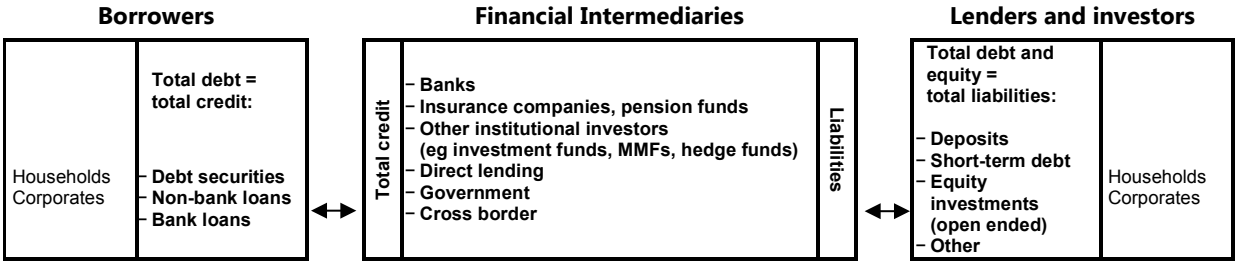
Annex 3: Case studies

A3.1 The non-bank credit cycle[114]

This case study examines the importance of non-bank credit across several jurisdictions based on historical data and an empirical analysis of the non-bank credit cycle for these jurisdictions.

A3.1.1 Introduction

A broad perspective on credit intermediation — Exhibit A3-1-1



In this Report, the FSB has focused on credit intermediation involving entities and activities (fully or partially) outside the regular banking system. This system of credit intermediation can be analysed by focusing on:

- Non-bank financial intermediaries that are considered by authorities to be involved in credit intermediation where financial stability risks from maturity and liquidity transformation and leverage may be implicated. This is the main approach followed in the FSB's annual monitoring exercise (see Sections 4 and 5 of this Report).
- Lenders and investors, and the funding sources that reside outside the regular banking sector (ie RHS of Exhibit A3-1-1).[115]
- The aggregate credit to borrowers from non-bank funding sources (ie LHS of Exhibit A3-1-1). This approach captures credit from any non-bank lender including insurance companies, pension funds, OFIs, the government and foreign non-bank credit providers. It differs from the approach followed by the FSB, but complements it by taking a macro approach that captures all non-bank credit sources to the private non-financial sector, even if it does not involve financial stability risks related to the individual entities that provide the credit. Maintaining a focus on non-bank credit to end-borrowers is important due to the link between credit cycles and asset prices (ie the financial cycle) and risks to financial stability (eg Claessens et al (2011), Drehmann et al (2012), Schüler et al (2015)). By focusing on non-bank credit, this case study

[114] This case study was contributed by Esti Kemp (South African Reserve Bank (SARB)), Alexandros Vardoulakis (Board of Governors of the Federal Reserve System (FRB)) and Peter Wierts (De Nederlandsche Bank (DNB)). Statistical support was provided by René de Sousa van Stralen (DNB) and useful comments were provided by Yusuke Masegi (Bank of Japan (BoJ)). The views expressed here are those of the authors and do not necessarily reflect the views of the BoJ, DNB, FRB, SARB or the FSB.

[115] This approach is also followed in the case study on corporate cash holdings (Annex 3.2).

takes a first step towards complementing the literature on this topic, which instead mainly focuses on bank or total credit.[116]

A3.1.2 Definitions and data

The measures of non-bank and bank credit used in this case study are from the publicly available BIS long series database on private non-financial sector credit.[117] The database contains quarterly series of private credit data for more than 40 economies for a period covering at least 30 years. The database's measure of total private credit covers all loans and debt securities to non-financial corporations, households and non-profit institutions serving households.

The first step for estimating non-bank credit is to subtract bank credit from total credit, with bank credit defined as all loans and debt securities held by domestic banks (subsidiaries and branches).[118] What remains encompasses loans provided, and debt securities held, by all other sectors of the economy (eg insurance companies, pension funds, investment funds, non-financial firms, households) and, for some jurisdictions, direct cross-border lending by foreign banks. The inclusion of direct cross-border lending by foreign banks calls for a second step, ie to subtract direct cross-border credit by foreign banks. What results is the measure of non-bank credit used in this case study:

Non-bank credit to private non-financial sector (PNF) ≈ All sector credit to PNF – (Domestic) Bank credit to PNF – Total cross-border liabilities of non-financial sector (=Non-resident bank credit to PNF)

The total cross-border liabilities of the non-financial sector are based on data from the BIS locational banking statistics, which are available as of end-2013. Although this correction is not possible for earlier years, non-resident bank credit is generally relatively small, with a median of 2.9% of GDP across the averages of the jurisdictions.[119]

A3.1.3 A first look at the data

The size of non-bank credit differs widely across jurisdictions (Exhibit A3-1-2). Generally, non-bank credit plays a larger role in advanced economies than in emerging market economies (EMEs)[120] (ranging from around 200% of GDP in Ireland and Luxembourg to almost zero in jurisdictions like Malaysia and Thailand). The relatively large size of non-bank credit in some advanced economies are partly due to the role played by captive financial institutions and money lenders (see Box 2-4), which channel funds to other parts of their own firm, which may be abroad. Hence, even if the credit is registered in a given jurisdiction, the end borrowers could be in different jurisdictions.

Comparing non-bank credit to the size of bank credit also confirms the substantial size of non-bank credit relative to bank credit across jurisdictions (Exhibit A3-1-2). Moreover, in five

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[116] A notable exception is Herman et al (2017). In contrast to their focus on US data, this case study builds on a large global dataset for non-bank and bank credit.

[117] *BIS total credit statistics*. See also Dembiermont et al (2013).

[118] This approach for measuring non-bank credit is based on Cizel et al (2016).

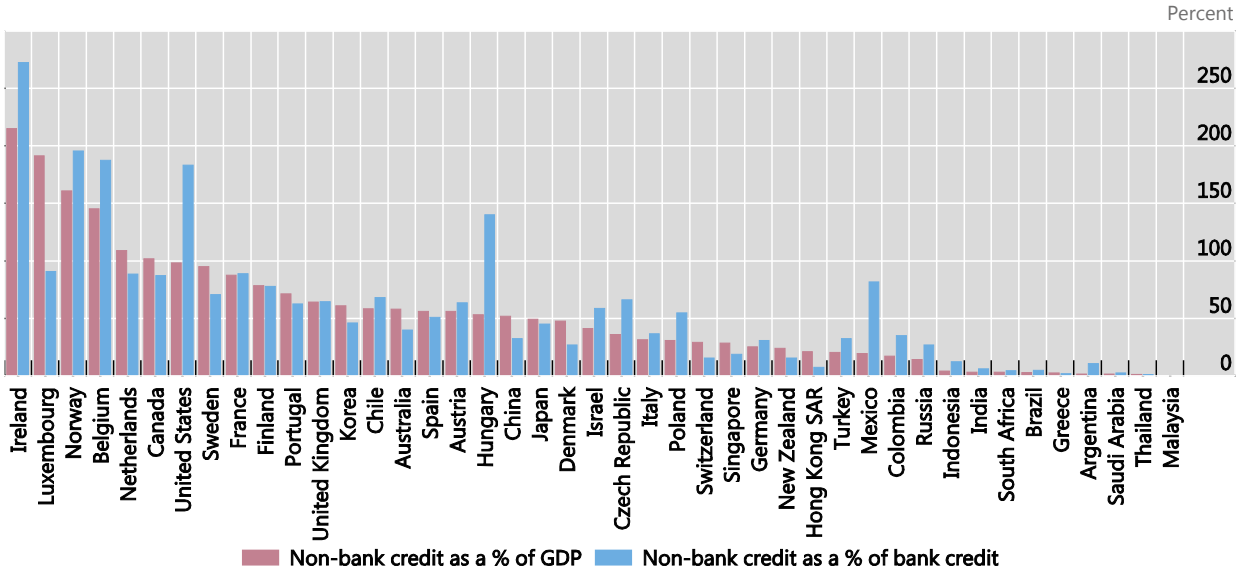
[119] Except some jurisdictions, such as Luxembourg (103% GDP) and Ireland (30% GDP), which have relatively high non-resident bank credit.

[120] For this case study, the working definition of "non-bank credit" includes foreign direct investment (FDI) in the form of loans and bonds held by foreign investors.

jurisdictions (ie Belgium, Hungary, Ireland, Norway, and the US), non-bank credit is larger than the size of bank credit. Again, the general picture of a larger role for non-bank credit in advanced economies can be observed (with some exceptions, such as in Germany and Italy, where non-bank credit is around 30-35% of bank credit).

The size of non-bank credit as a fraction of GDP, and bank credit

By jurisdiction, as of 2017 Q2. Exhibit A3-1-2



Source: BIS total credit statistics, available at https://www.bis.org/statistics/totcredit.htm.

A3.1.4 The non-bank credit cycle

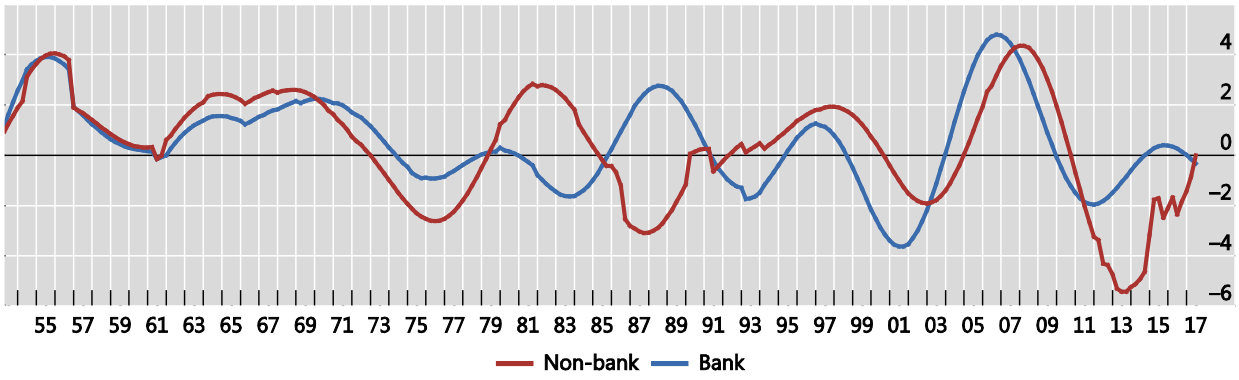
In order to empirically isolate credit cycles, various approaches can be used, including traditional turning point analyses, frequency-based filter analyses and model-based approaches (Farrell and Kemp (2017) and Aikman et al (2015)). In this case study, the Christiano-Fitzgerald (2003) filter was applied to non-bank and bank credit data with the aim of isolating the cyclical component in the frequency range between 32 and 120 quarters (ie to identify the credit cycles with a duration of between 8 and 30 years). Outstanding credit in domestic currency data was deflated by the Consumer Price Index (CPI) for each respective jurisdiction and expressed in logs, with the filter applied to the 4-quarter log changes (ie effectively growth rates). In order to arrive at global non-bank and bank credit cycles the averages of the various jurisdictions' non-bank and bank cycles were calculated.

Cycles in bank and non-bank credit growth were very much correlated from the 1950s until the early 1970s (Exhibit A3-1-3). In contrast, between roughly 1975 and the early 1990s they moved in opposite directions, suggesting a substitution-effect between bank and non-bank credit (ie when bank credit is in a cyclical expansion and non-bank credit experiences a cyclical contraction, and vice versa). Prior to the onset of the financial crisis, both bank and non-bank credit were in expansionary phases. The higher amplitude observed during this period is possibly a result of bank and non-bank credit cycles reinforcing each other given that the cycles were synchronised. Results for recent years indicate that the credit cycle in non-bank credit has bottomed out and has been increasing for several years now. This is confirmed by the underlying data, which show higher real growth rates for non-bank credit than for bank

credit in recent quarters, even though growth rates are still well below those seen prior to the financial crisis.[121]

Bank and non-bank credit cycles

Percent, 4-quarter changes Exhibit A3-1-3



Source: BIS total credit statistics, available at https://www.bis.org/statistics/totcredit.htm and authors' calculations.

A3.1.5 High-level conclusions

The contribution of banks and non-banks to non-financial private sector credit varies across time and jurisdictions. Although non-bank credit can act as a substitute for bank credit when banks curtail the extension of credit, non-bank and bank credit can also move in lockstep, potentially amplifying credit booms and busts.

The initial analysis performed for this case study found that the importance of non-banks differs across jurisdictions, and in general non-bank credit is currently more prominent in advanced economies. Further, non-bank credit has generally been growing faster since the financial crisis for some EMEs and jurisdictions with relatively small non-bank sectors. This could potentially suggest a shift in the relative importance of non-bank financial institutions. Next, growth rates in bank and non-bank credit frequently moved in opposite directions at a global level since the 1970s, but exhibited a high degree of positive co-movement at the onset of the financial crisis. Finally, after bottoming out after the financial crisis, the non-bank credit cycle is again moving upwards and opposite to the bank credit cycle.

This case study has only scratched the surface of the importance of non-bank credit globally. Further ongoing analysis includes: (i) employing alternative methods to compute credit cycles and strengthen the robustness of our analysis (eg computing non-bank credit-to-GDP gaps using the HP filter methodology as suggested by the BIS to inform the activation of countercyclical capital buffers for banks); (ii) studying the synchronisation of bank and non-bank credit cycles across time and across jurisdictions depending on the structure of the financial system; (iv) examining the link between the non-bank credit cycle (and in particular the recent upturn), the monetary policy stance and other explanatory variables; and (v) examining from a global perspective whether excessive non-bank credit and/or its interaction with bank credit can act as leading indicators for crisis episodes.

[121] Further research could investigate the drivers of this development in non-bank versus bank credit (eg monetary policy conditions and differences in the intensity of regulation). Particularly interesting would be to test the argument by the IMF that the risk-taking channel of monetary policy transmission is relatively strong in the non-bank sector (IMF (2016)).

A3.2 Corporate cash holdings as a demand factor for non-bank financial instruments[122]

A3.2.1 Introduction

One approach to assess the scale and associated financial stability risks of non-bank credit intermediation or shadow banking as defined in this Report, or non-bank financial instruments (or intermediation) more broadly, is to focus on the *supply* aspect by looking at bank-like activities of non-bank financial entities. This has been the approach adopted in the FSB's annual monitoring exercise and the 2017 results are set out in this Report. Another approach is to focus on the *demand* aspect by looking at the levels of funds (or cash holdings) that may benefit from credit intermediation activities similar to those provided by banks. Some researchers have emphasised the importance of focusing on such demand aspects or factors, highlighting for example the level of cash (or cash equivalent assets) built up in the non-financial corporate sector (hereafter corporates) which could be invested in deposit (or money-like) financial instruments that offer slightly better yield than bank deposits.[123]

In general, corporates hold cash to meet any short-term obligations (eg debt and interest payments) or operational needs. Cash management by corporates aims to minimise the amount of cash held relative to what is necessary to meet the estimated requirements over a relevant time horizon and to invest it in *safe* and *liquid* financial products, with *yield* considerations playing a secondary role. However, some corporates choose to hold additional cash ("excess cash") that exceeds the level of foreseeable short-term operational needs and which may be used for other purposes, such as for investments. In this regard, corporates have recently accumulated large cash holdings to provide sufficient reserves in a time of heightened uncertainty and to manage tax payments.[124]

This case study explores the demand aspect of non-bank credit intermediation or non-bank financial instruments more broadly, by looking at cash held by corporates in the US, UK and Japan. It first discusses how corporate cash holdings in these three jurisdictions have evolved, and then assesses whether and how the composition of corporate cash holdings shifted between bank and non-bank financial instruments in recent years. Finally, some innovative elements in corporate cash management practices identified through discussions with corporate treasurers are highlighted. The assessment in this case study should be treated as preliminary as its focus is limited to corporate cash holdings in the three jurisdictions. Further analysis, using more granular data that cover other jurisdictions and other institutional cash pools, is needed to fully understand the demand aspect of non-bank credit intermediation or non-bank financial instruments more broadly.

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[122] This case study was contributed by Benjamin Dennis (US Department of the Treasury), Steven Dodkins (Bank of England (BoE)), Yasushi Shiina and Cornelius Kuth (FSB Secretariat). The views expressed here are those of the authors and do not necessarily reflect the views of the US Department of the Treasury, BoE or the FSB.

[123] For example, Pozsar (2011) and Claessens et al (2012) have argued that the demand for safe liquid assets by "institutional cash pools" (ie large, centrally-managed, short-term cash balances of global corporates and institutional investors) has facilitated the growth of wholesale funding markets, in particular of alternatives to bank deposits or money-like instruments that offer slightly better yield than bank deposits.

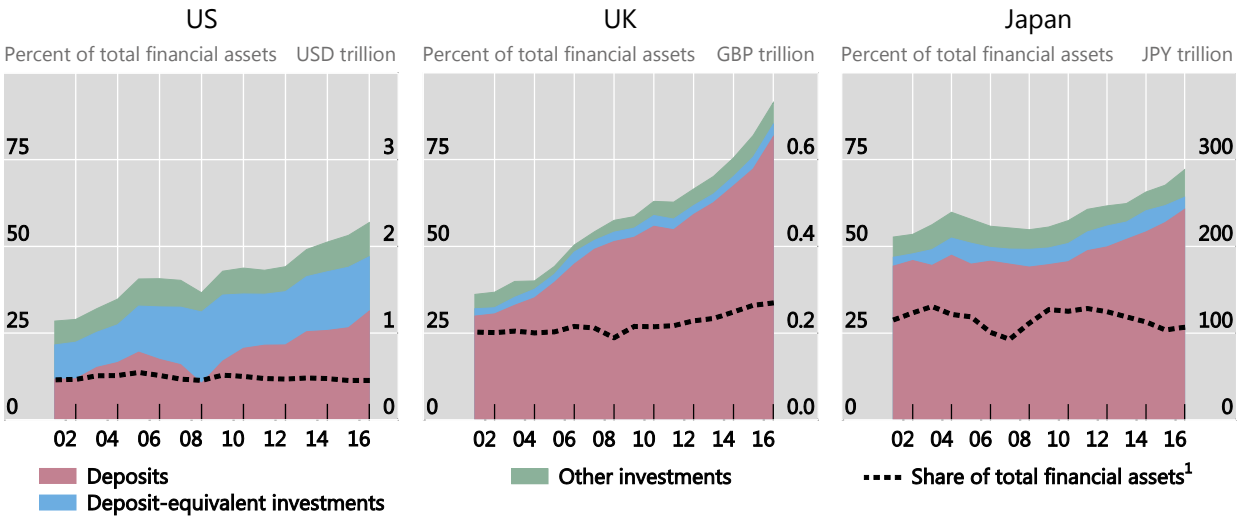
[124] The rise of large global corporations and their large pools of cash holdings has recently led to some interest in the level of such pools, especially in large technology-related firms. For example, see The Economist (2017) and Financial Times (2017). Standard & Poor's (2017) also stated that these cash holdings are concentrated in a handful of corporates, with the top 1% of US corporates holding half of the cash and investments held by all US corporates in 2016.

This case study finds that, although corporate cash holdings have risen in absolute terms, they have not increased appreciably as a share of assets with perhaps a few exceptions. This, alongside informal discussions with corporate treasurers, suggests that corporates currently adopt a conservative approach to managing cash and have not been tempted to reach for higher yields through non-bank financial instruments. A preliminary assessment of the composition of corporate investments shows that, except for investments in MMFs, corporates seem to favour direct investments over non-bank credit intermediation alternatives in their investments considerations. Nevertheless, corporate cash holdings represent an increasingly large pool of funds that potentially remain to be tapped should a suitable non-bank financial instrument be developed in the future. Thus, monitoring trends in the composition of corporate cash holdings will provide information relevant to assessing the potential sources of demand for non-bank credit intermediation or non-bank financial instruments more broadly and may help track innovations in the non-bank financial space.

A3.2.2 Evolution of corporate cash balances

To understand the historical evolution of corporate cash holdings in the US, UK and Japan, data from national sector balance sheet statistics (Flow of Funds) are used for *all* corporates. Cash holdings are defined as the sum of: (i) deposits, including currency; (ii) deposit-equivalent investments, including highly liquid instruments;[125] and (iii) other investments.[126] Investments in equities and loans are excluded for consistency and also because they are usually long-term and often used for pure strategic investment purposes.

Evolution of **all** non-financial corporates' cash holdings — Exhibit A3-2-1



[1] Calculated as the sum of deposits, deposit-equivalent investments and other investments over total financial assets.

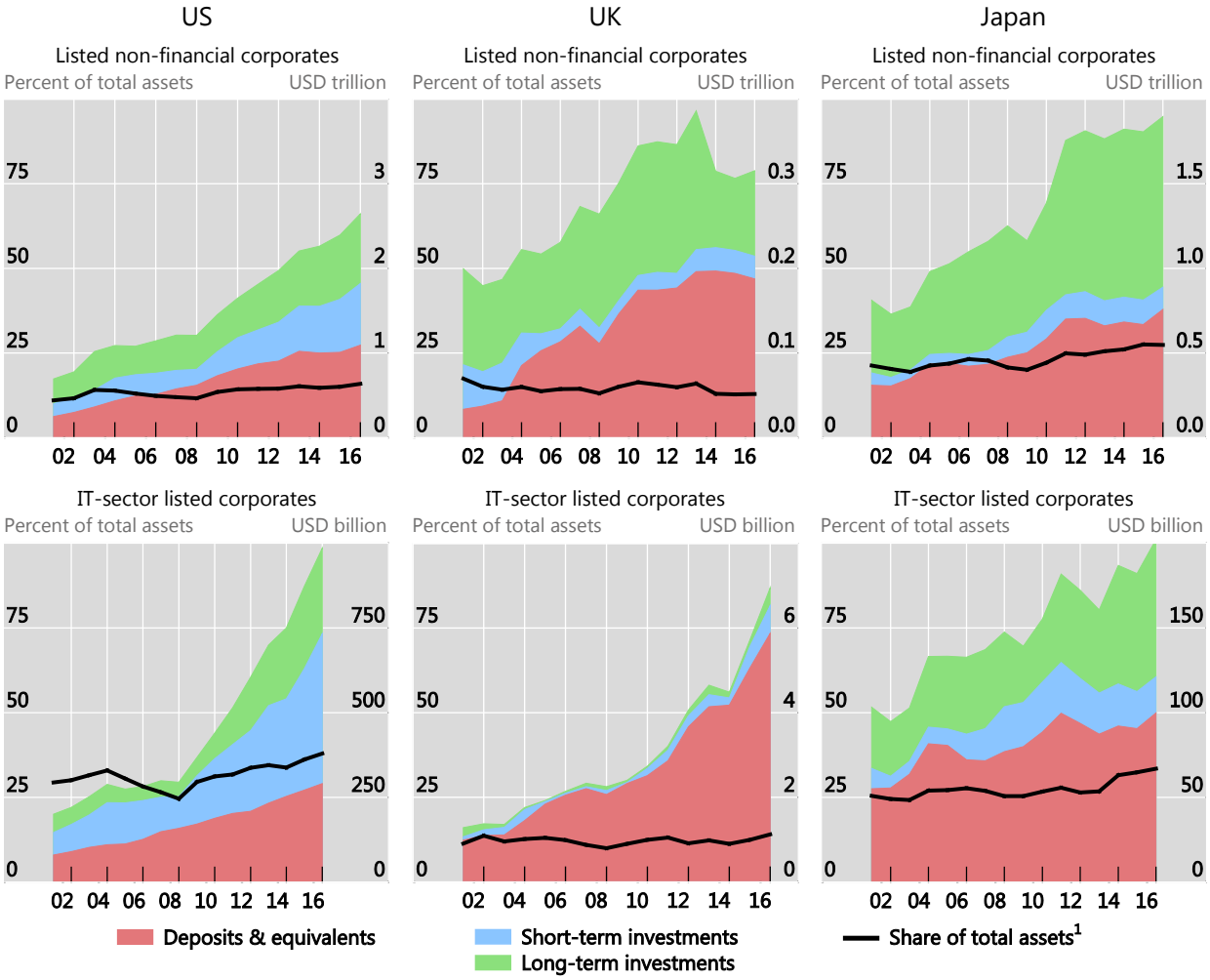
Source: National sector balance sheet statistics (residence basis).

[125] "Deposit-equivalent investments" include MMF shares, repos, commercial paper (CP) and treasury securities for the US; money market instruments and short-term debt for the UK; repos, securities lending, CP, government securities and call loans/bills for Japan.

[126] "Other investments" include municipal securities, agency- and GSE-backed securities, mortgages, consumer credit and mutual fund shares for the US; long-term debt, long-term debt securities and UK mutual funds' shares for the UK; local government securities, public corporations securities, bank debentures, industrial securities, structured financing instruments and trust beneficiary rights/certificates for Japan.

As shown in Exhibit A3-2-1, at the national level, cash holdings of all corporates have grown substantially since 2001 in the US, UK and Japan. However, their share within total financial assets remained relatively stable since 2001, reflecting the fact that corporates tend to keep their cash holdings proportional to their growing balance sheet, though there have been small increases in the UK share in recent years.

Evolution of **listed** non-financial corporates' cash holdings — Exhibit A3-2-2



[1] Calculated as the sum of deposits & equivalents, short-term investments and long-term investments over total assets.

Source: S&P Capital IQ (group consolidated basis).

This trend is similar for the subset of *listed* corporates, based on data from Standard & Poor's Capital IQ. While national sector balance sheet statistics are based on the residence of the entity, Capital IQ statistics show data on a globally consolidated basis.[127] Due to the lack of data granularity, cash holdings of listed corporates are defined as: (i) deposits and equivalents;

[127] National sector balance sheet statistics (EC et al (2009)) are typically based on the legal residence of each corporate. Foreign units of corporates are considered as separate units resident in the jurisdiction in which they are located. Capital IQ statistics, by contrast, show data on a consolidated basis, such that foreign units are included in their respective parents' data and therefore attributed to the jurisdiction in which the parent is resident.

(ii) short-term investments; and (iii) long-term investments. Investments in equities and loans are included in (ii) or (iii) depending on their maturity.[128]

Although the definitions are broader and include pure investments (eg investment in equity), the general trend for listed corporates is similar to that for all corporates. According to Capital IQ data, cash holdings of listed corporates have increased significantly since 2001 (Exhibit A3-2-2). In the US, they have grown to 281% of their 2001 value, compared to 58% in the UK and 134% in Japan.[129] Here too, the ratio of cash holdings to total assets remained relatively stable.

However, the trend seems to differ across sectors. For example, in the IT-sector,[130] the ratio of corporate cash holdings to total assets exceeded the overall ratio across all listed corporates, particularly in the US where the ratio for the IT-sector is almost three times greater than the share of all listed corporates and has grown from 25% in 2008 to 38% in 2016.

A3.2.3 Preliminary assessment of the composition of corporate cash holdings

To understand whether increases in corporate cash holdings have led or relate to the growth of non-bank financial activities, a preliminary assessment was conducted of whether and how the composition of corporate cash holdings shifted between bank financial instruments ("deposits") and non-bank financial instruments ("deposit-equivalent investments" and "other investments").[131] An increase in corporate investments in non-bank instruments (excluding equity and loans) relative to bank instruments may indicate more corporate demand for non-bank credit intermediation or non-bank financial intermediation more broadly that can offer safe and liquid instruments, like deposits, but with slightly better yield or lower cost.

Data from national sector balance sheet statistics are used for all corporates in the US, UK and Japan to obtain a high-level understanding of how the composition of corporate cash holdings shifted between bank and non-bank instruments.

In the run up to the crisis and during the crisis, when credit risk related to bank counterparties grew, corporates in the US and Japan reduced their cash allocation into bank instruments relative to non-bank instruments (Exhibit A3-2-3). However, after the crisis, corporates in these jurisdictions increased the allocation of their cash to bank instruments more than to non-bank instruments, suggesting that the crisis incentivised them to be more conservative with their cash holdings despite very low interest rates offered on these instruments. Meanwhile, for the UK, corporate allocations of cash holdings towards bank instruments increased relative to non-bank instruments before the crisis and remained relatively stable thereafter. However, this trend may be partly due to data constraints as, for example, UK corporates' investments in MMFs issued outside of the UK (eg in Ireland or Luxembourg) are

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[128] "Deposits & equivalents" include currency, deposits, and securities and instruments having maturities of less than three months (eg treasury bills, money market investments, call money, banker's acceptances and letters of credit). "Short-term investments" include investments that are relatively liquid and have maturities between three months and one year (eg CP, marketable securities, repos, investments in debt/equity). "Long-term investments" include investments with maturities greater than one year (eg investment in debt/equity, mortgage-backed securities, municipal securities).

[129] Changes of cash holdings (in US dollars) over time in the UK and Japan may also be driven by exchange rate movements. With equity investments included in the investments categories, some of this growth may also reflect valuation effects.

[130] The IT-sector comprised about 16% of listed corporates' total assets in the US in 2016, 2% in the UK and 9% in Japan.

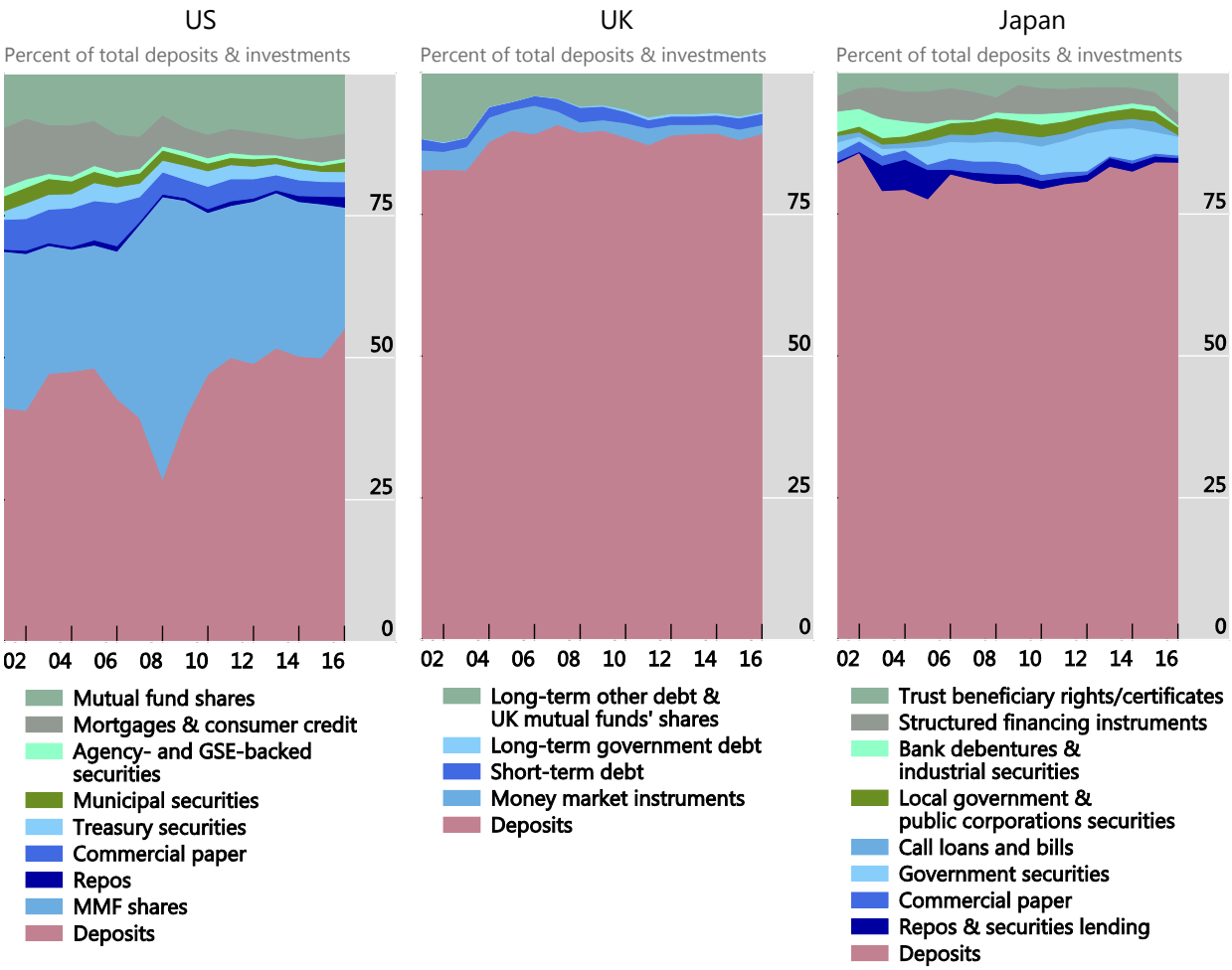
[131] "Deposit-equivalent investments" and "other investments" may include CPs or other debt instruments issued by banks and thus should be treated only as a proxy for non-bank financial instruments.

not included, although UK corporates often seem to invest a portion of their cash in MMFs based on informal conversations with corporate treasurers.

A more detailed assessment of the composition of corporate cash holdings, in particular the composition of non-deposit investments (or non-bank instruments) since 2001, suggests that, except for investments in MMFs, corporates seem to favour direct investments over non-bank credit intermediation alternatives for their investment considerations. There are a number of differences across jurisdictions. In the US, MMFs make up about half of corporates' non-deposit investments (48%), followed by mutual fund shares (23%). Investments in MMFs also increased substantially in the run-up to the crisis, but declined in the years following it. This is consistent with the overall trend in MMF assets discussed in Section 2 of this Report. Investments in repos also increased notably in recent years; however they are still small in size.

Composition of non-financial corporates' investments in bank- and non-bank financial instruments

Exhibit A3-2-3



Source: National sector balance sheet statistics (residence basis).

In the UK, corporates' non-deposit investments are dominated by long-term debt (64%), the majority of which are issued by UK entities. Money market instruments and short-term debt issued by UK banks each account for a smaller share (around 17%).

In Japan, the share of cash holdings invested in government securities has increased following the crisis (21%). Investments in repos and securities lending have declined relative to other investments during the crisis and remained comparatively small since then (5%). Recently, there has been an increase in trust beneficiary rights and certificates (44%).

A3.2.4 Recent developments in cash management practices

As shown above, corporate cash holdings have significantly risen in absolute terms in the US, UK and Japan. However, there have not been similar increases in terms of their share of total assets nor a significant shift of cash investments towards non-bank financial instruments, especially after the crisis. This preliminary assessment suggests that, in general, corporate treasurers have *not* been tempted to reach for higher yields through non-bank financial instruments. This observation was also underlined by informal discussions with corporate treasurers conducted over the period September to November 2017 as well as industry surveys.[132] Many corporates seem to use bank deposits and/or MMFs (in particular government MMFs) as their primary means for managing cash, implying that cash *safety* and *liquidity* are more important factors than generating *yield*. Nevertheless, some corporates generally seem not to maintain cash in jurisdictions where yields are negative. Other corporates reportedly leverage their overall relationship with their banks to offset the impact from low, or negative, yields.[133]

New product ideas or innovations in corporate cash management seem to be somewhat limited at the moment. This is likely due to the conservative approach taken by many corporate treasurers. However, some corporate treasurers highlighted the increased use of different instruments: separately managed accounts; money market demand accounts (MMDA)[134] and other structured bank deposit products; repo and bank collateral products (eg direct repos, evergreen repos); bond and cash-strategy ETFs; ultra-short funds; and dynamic discounting.[135] A number of corporate treasurers also highlighted that they are closely examining recent technological innovations (FinTech) as potential means to improve their cash management operationally.

Based on the assessment above, the use of new products or innovations in corporate cash management is not currently widespread. Nevertheless, corporate cash holdings represent an increasingly large pool of funds that could shift from bank deposits to non-bank instruments should suitable non-bank financial instruments be developed going forward. Monitoring trends in the composition of corporate cash holdings, therefore, will provide information relevant to assessing the potential sources of demand for non-bank credit intermediation or non-bank financial instruments (or intermediation) more broadly and may help track any innovations in the non-bank financial space.

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[132] For example, see AFP (2017).

[133] For example by obtaining other bank services at a reduced fee.

[134] MMDA is a structured bank deposit product that offers a higher interest rate in return for certain restrictions.

[135] Dynamic discounting may help corporate cash management when suppliers proactively offer early payment discounts on approved invoices awaiting payment.

A3.3 Developments and adaptations in the housing finance markets[136]

Housing finance markets help individuals and families purchase and build homes, pay for home improvements and smooth consumption over time. These markets are often subject to considerable political attention. Due to their size and connections to both financial institutions and households, they are often closely linked to financial stability.[137] Since the financial crisis, there have been notable changes in these markets, including changes in the share of non-bank lenders and in the development and use of macroprudential tools. Key points of the analysis:

- While banks, credit unions and the public sector are the main players in most mortgage markets, non-bank financial institutions play a relevant role in some jurisdictions, both as underwriters of new mortgages and as holders of outstanding mortgage claims.
- Purchases by foreign non-residents have been important in certain jurisdictions and even in certain cities. Yet there is little information on the share of foreign buyers across jurisdictions, or in their use of debt financing.
- Macroprudential tools in mortgage markets often apply only to bank lending. This may give an incentive for greater non-bank financing in the future. Lack of data may hamper the ability of authorities to monitor and respond to financial stability risks.

A3.3.1 Non-bank mortgage underwriting, facilitation, and credit assessment

Banks and, to a lesser extent, credit unions are the main players in most mortgage markets, but due to various jurisdiction-specific housing policies, public sector financial institutions may also underwrite mortgages, hold mortgages or provide mortgage guarantees. In most of the jurisdictions studied for this case study,[138] non-banks underwrite less than 5% of new mortgages, and hold only a small proportion of the stock of outstanding mortgages.[139]

Yet in some jurisdictions, non-bank financial institutions account for a significant share or even a majority of mortgage underwriting (Exhibit A3-3-1):

- In Canada, 11.3% of outstanding mortgages were held by non-banks in July 2017, including through securitisations and direct holdings by pension funds, insurers, mortgage finance companies (MFCs) and mortgage investment companies (MICs).[140]
- In India, housing finance companies and other non-bank financial institutions are key underwriters of mortgages, and held 46.5% of the outstanding mortgage stock in March 2017 (see Gandhi (2014).

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[136] This case study was contributed by Hitomi Nakai (BoJ), Cristina Luna and José Alonso Olmedo (Bank of Spain), Guillaume Bedard-Page (Bank of Canada (BoC)) and Jon Frost (FSB Secretariat). The views expressed here are those of the authors and do not necessarily reflect the views of the BoJ, Bank of Spain, BoC or the FSB.

[137] BoE (2017); Stanley Fischer (2017); Crowe et al (2011).

[138] This analysis was based on questionnaire responses from authorities in Australia, Brazil, Canada, Japan, the Netherlands, Spain and the UK. Data for Belgium have been provided separately by the National Bank of Belgium. Data for France, Germany, India, Italy, Korea, Mexico, Switzerland, Turkey and the US have been collected from public sources.

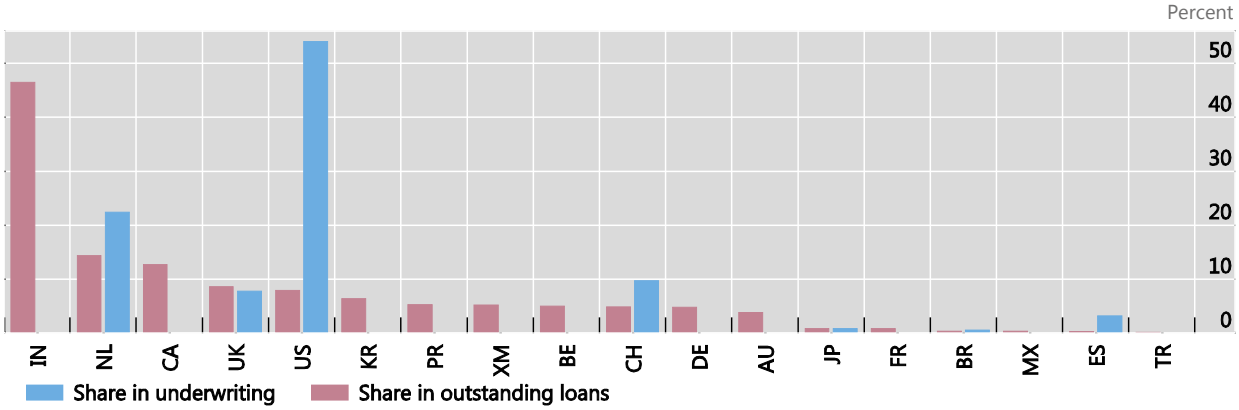
[139] In this study, "non-bank financial institutions" include all financial institutions except banks, credit unions and public sector entities. Non-bank financial institutions may directly provide mortgages, or may hold them through whole loan purchases or securitisations.

[140] For the purpose of this study, non-banks in Canada comprise life insurance companies, pension funds, other non-depository lenders and securitisation vehicles (Coletti et al (2016)).

- In the Netherlands, insurance companies, pension funds and investment funds are large underwriters of new mortgages (22.4% in 2016), and held a substantial share of the mortgage stock (14.4%) in June 2017.[141]
- In the UK, non-banks make up 7.8% of new underwriting, and held 8.6% of the outstanding stock of mortgages in December 2016. However, the vast majority of these non-banks (6% of the underwriting and 7% of the overall stock) were subsidiaries of banks. Furthermore, the stock of mortgages included buy-to-let mortgages, which were not offered to retail borrowers and were more commonly originated by non-banks.
- In the US, non-bank mortgage underwriters accounted for 54% of mortgage underwriting in the first half of 2017. Since most of these are sold on to the government-sponsored enterprises, non-banks held only 7.9% of outstanding US mortgages.[142]

Non-bank underwriting and lending share in mortgage markets

In percent of overall mortgage market, as of latest available quarter — Exhibit A3-3-1



Note: For the UK, non-banks include subsidiaries of a banking group. For Canada and the Netherlands, the share in outstanding loans includes off-balance sheet securitisation. For the Euro area, France, Germany and Portugal, the data refer to all long-term credit to households. Data on underwriting are not available for Australia, Belgium, Canada, Euro area, France, Germany, India, Korea, Mexico, Portugal and Turkey.

Sources: Reserve Bank of Australia; National Bank of Belgium; BCB; BoC Banking and Financial Statistics; ECB; Reserve Bank of India; BoJ; Bank of Korea; Banco de Mexico; DNB; Spanish Property Register; Swiss National Bank; BoE; Federal Reserve Financial Accounts.

The share of non-banks in underwriting new loans should be distinguished from the share of non-banks in financing final loans since non-bank originators can sell mortgage claims to banks and other institutions in the secondary market. Historically, non-banks have played a much larger role in financing mortgage extension than they currently do (Exhibit A3-3-2). In Canada and the Netherlands, for example, life insurance companies, securitisation vehicles, and other non-bank lenders have been large holders of mortgages for decades (Kakes et al (2017)), although this share has come down over time as banks have become more dominant.[143]

[141] Some non-bank entities underwrite mortgages for institutional investors, and some insurance groups originate mortgages for both insurance and banking units (see ECB (2017) and DNB (2016)).

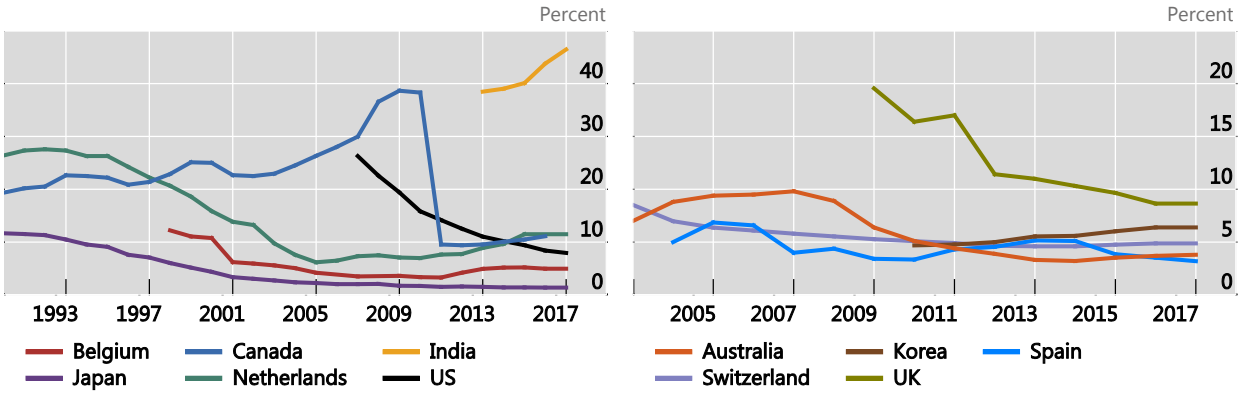
[142] For a discussion of the growth of these lenders, see Buchak et al (2017).

[143] In Canada, the rise in the non-bank share between 2002 and 2011 was driven by the strong growth of insured mortgages securitised in government sponsored programs; before 2011, a large share of these mortgages was held in off-balance sheet vehicles. Starting in 2011 with the implementation of IFRS in Canada, these mortgages were brought back onto banks' balance sheets, leading to the sharp decline shown for Canada in this period in the LHS of Exhibit A3-3-2.

Similar trends are apparent in Japan and the UK, where the non-bank lending share has fallen since the asset price bubble in the 1990s, and the financial crisis, respectively.

Non-bank lending share in mortgage markets over time

In percent of overall mortgages outstanding (stock), for selected jurisdictions Exhibit A3-3-2



Note: "Non-banks financial institutions" or "non-banks" are defined as all financial institutions except banks, credit unions and public sector entities. For the UK, this includes non-banks that are part of a banking group. For Canada and the Netherlands, this includes securitisation. For Spain, the percentages refer to the share of non-banks in new mortgages, rather than mortgages outstanding.

Sources: Reserve Bank of Australia; DNB; BoC Banking and Financial Statistics; Reserve Bank of India; BoJ; Bank of Korea; Spanish Property Register; Swiss National Bank; BoE; Federal Reserve Financial Accounts.

The underwriting business models of non-bank lenders vary across jurisdictions. For example:

- Dutch insurance companies and pension funds are active in mortgage origination, in part in direct lending or underwriting, either through traditional distribution channels or through broker-like companies that cater to institutional investors. In the latter case, insurance companies and pension funds only provide the funding for mortgages on their balance sheets. The entire underwriting process is performed by the "broker," which is responsible for issues related to business conduct and consumer protection (eg compliance with maximum debt-service-to-income (DSTI) and loan-to-value (LTV) ratios). Insurers and pension funds also invest in mortgages through investment funds, in which case their outstanding exposure is towards a pool of mortgages.
- In Canada, MFCs are prime mortgage lenders with an originate-to-sell business model not directly subject to prudential regulation. The mortgages of MFCs – typically facilitated through brokers – are primarily funded through securitisation programs with government-backed insurance and whole loan sales to Canada's major banks. MICs are high-yield investment funds that provide customised mortgage products not available through traditional channels, including non-prime loans, second mortgages, mezzanine construction loans and very short-term mortgages. Due to a lack of data, the share for MICs is difficult to measure, but is likely less than 2 per cent of outstanding mortgages.

Of course, institutional differences may favour non-bank financing in some jurisdictions in contrast to others. Further analysis could explore these differences and their effects.

The main players in the underwriting market (in particular banks) also seem to be the main players in credit assessment and the facilitation of mortgages. In some jurisdictions, specialised service providers focus on one part of the mortgage origination chain, but they are

usually owned by banking groups. While lenders outsource some parts of the credit assessment process, they may be reluctant to share confidential information, and therefore tend to develop this type of activity internally. Regarding the facilitation of mortgages, brokers in some jurisdictions act as intermediaries that arrange and advise on mortgages. In the UK, for example, the approximately 5,500 regulated mortgage broker firms arrange approximately two-thirds of first charge regulated mortgages (ie excluding buy-to-let mortgages). In Canada, mortgage brokers facilitate a large and rising share of mortgage loans (about half of the market for purchases in 2017). In the Netherlands, one dominant firm services about one-third of all mortgages.

As elsewhere in credit markets, FinTech firms are also becoming more important in both mortgage underwriting and various mortgage facilitation services (CGFS and FSB (2017)). It is difficult to distinguish FinTech players from all the other participants in mortgage markets, as data about them is scarce. Where data are available, such as in China, it appears that FinTech credit platforms are growing rapidly.[144] In other jurisdictions, there are new FinTech entrants in market segments such as real estate investment, mortgage servicing and funding, mortgage facilitation or valuation through big data. Some FinTech companies provide simulation services of future mortgage payments (eg in Japan), use artificial intelligence such as neural networks for credit assessment (eg in the UK), and are developing automatic tools for aggregating data and documentation (eg in the Netherlands).[145]

Finally, non-banks can play a role in land acquisition, development and construction (ADC) and income-producing real estate (IPRE). While banks are also the main players in many markets, investment funds (such as REITs) also play a role, as do insurers and pension companies. Here, too, there are recent innovations. For instance, in the Netherlands, some platforms allow private individuals to buy shares in rented properties. In the UK, some firms provide buy-to-let mortgages and funds for property development. In Canada, MICs have long played an active role in this space, as well. These new players are generally small in absolute terms but growing rapidly. A lack of data restricts a deeper analysis.

A3.3.2 Cross-border housing purchases and other cross-border issues

Since the financial crisis, there has been anecdotal information that foreign non-resident buyers are playing a larger role in some residential real estate markets, including in large cities,[146] either for investment purposes or in the expectation of future residence.[147] Nonetheless, official data remain scarce across jurisdictions on cross-border or non-resident housing purchases, making it difficult to track the prevalence and growth of foreign housing purchases across jurisdictions. There is empirical evidence that international capital flows may influence real estate developments more generally, including through funding for mortgage credit (Richter and Werner (2016)).

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144 In China, regulations allow borrowing by an individual up to a limit of CNY 200,000 (~$30,000) from one platform and CNY 1 million (~$150,000) across various platforms. See CGFS and FSB (2017), p. 38. For a comparison of the structure of the Chinese mortgage market with other jurisdictions, see Zhihua (2015).

145 See FSB (2017f), pp. 12-13.

146 See ABC News (2017), The Guardian (2017) and Forbes (2017).

147 Indeed, in some jurisdictions, the purchase of real estate or other investments above a threshold amount entitles buyers to a residence permit. An example is the Golden residence permit programme in Portugal, which is open to non-residents that invest more than €350,000 in real estate.

To the extent that foreign buying has been increasing, there is significant heterogeneity across and within jurisdictions. In Australia, for instance, the number of approvals for foreign purchases tripled between 2012 and 2016, making up 17% of building approvals in 2015-6 (although this growth may have subsequently slowed).[148] In Spain, although purchases by foreign residents are increasing, and accounted for 16% of the number of new transactions in 2016 and early 2017, foreign non-resident or cross-border buyers accounted for less than 1% of new transactions in the same period.[149] In the Netherlands, the proportion of non-resident buyers was less than 2% in 2016, representing an increase since the financial crisis, albeit from a very low base. In some Canadian cities, the share of foreign transactions has shrunk in recent years following the imposition of taxes on real estate transactions (in 2016 in British Columbia and 2017 in Ontario). For instance, the share of foreign transactions reached roughly 10% in the Vancouver metropolitan area in 2016 before dropping to 3-3.5% in 2017, and 7.2% in the Toronto area in May 2017 before dropping to 5.6% in June-August 2017.[150]

The limited information available on the source of funding for foreign purchases seems to indicate that such purchases have a significant cash component, with the balance predominantly sourced from domestic funding sources.[151] While cross-border banking has declined post-crisis as global conglomerates reassessed foreign operations under new banking regulations, regulations may provide incentives for cross-border lending, including in mortgage markets.[152]

A3.3.3 The perimeter of regulatory tools

(i) Policy options to address systemic risks from non-bank intermediation

Macroprudential tools pertaining to housing financing markets can apply either at the *lender* level or *borrower* level.[153] Tools targeted at lenders are generally implemented through entity-based regulation, eg additional bank capital buffers or higher risk weights for real estate exposures. Since the financial crisis, entity-based macroprudential tools in most jurisdictions have been focused on the banking sector, eg banks are now expected to comply with retention requirements even after the selling of credit loans in the secondary market.[154] In contrast, macroprudential tools targeted at borrowers are usually implemented through activity-based regulation, eg LTV limits, debt-to-income (DTI) limits, DSTI limits and interest coverage ratios (ICR). Although *borrower-based instruments* are often seen as applying consistently to all borrowers regardless of the source of their loan, they often only apply to loans provided by banks. Therefore, both borrower-based instruments and lender-based instruments may

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148 Commonwealth of Australia (2017).

149 Source: Spanish Ministerio de Fomento

150 The foreign transaction share in Toronto prior to the tax may be underestimated, as the tax was announced almost concurrently with the monitoring of foreign buyers. In terms of volume, foreign involvement transactions totalled around CAD 1 billion per month in the month prior to the announcement of the tax in British Columbia, and CAD 160 million per month on average after the tax. Source: British Columbia Ministry of Finance and Ontario Ministry of Finance.

151 For example, according to the National Association of Realtors, non-resident foreign buyers in the US had a down payment of 72% on average while resident foreign buyers used a lower amount of cash at 35%.

152 See Reinhardt and Sowerbutts (2015). In the EU, such cross-border leakages of policies are being addressed through reciprocity arrangements between macroprudential authorities (ESRB (2016a)).

153 This section draws on ESRB (2016b).

154 In many jurisdictions, authorities have introduced or are introducing incentive alignment regimes for the asset management and insurance sectors, as well (IOSCO (2017d)).

encourage a shift to other forms of financing, and may be inadequate to successfully address financial stability risks in all parts of mortgage markets.

(ii) Existing macroprudential policy tools on the mortgage market

Borrower-based macroprudential policy tools have been adopted in a large number of jurisdictions (Exhibit A3-3-3). However, while 15 jurisdictions have activated LTV and/or DTI limits in the banking sector, only eight have activated borrower-based tools that capture loans provided by non-banks in addition to traditional banks. Also, 12 jurisdictions have implemented bank capital buffers for real estate credit, often for macroprudential purposes. In some jurisdictions, there are separate regulatory requirements for non-bank financial institutions such as finance companies or asset managers holding mortgages, but these are much less commonly used. While non-bank financing is small in most of these jurisdictions, the tightened regulatory requirements for banks – both borrower-based and lender-based – can create incentives for greater non-bank activities in mortgage markets in the future.[155]

(iii) Monitoring tools for mortgage-related activities

Although the need for more granular data on mortgage markets became clear from the financial crisis (Serena and Tissot (2017)), data on non-bank lending activities are scarce. The "Database" column of Exhibit A3-3-3 shows whether a jurisdiction has property registers, a type of database with granular mortgage-related data that allow the relevant authorities to assess the potential risks stemming from non-banks' mortgage-related activities. For example, Belgium has a loan-level credit register, covering a variety of non-bank entities that provide mortgage loans, while in the Netherlands the Dutch central bank has been extending the scope of regular reporting on loan-level data to include non-banks. In Spain, the property register covers both public and private properties located in the jurisdiction and discloses detailed registration information to those who request access with legitimate interest. The UK has the Product Sales Database, which covers all regulated mortgage transactions, and the Financial Conduct Authority has monitored mortgage-related transactions using the Mortgages and Home Finance: Conduct of Business database. In several jurisdictions, there are private sector databases, although they are not always available for supervisory purposes.

[155] These policy effects may amplify incentives for the growth of non-bank financing of mortgages due to low real interest rates. For a theoretical discussion, see Pool (2017).

Exhibit A3-3-3: Classification of macroprudential policy tools in the mortgage market[1]

SBEG member jurisdictions	Borrower-based			Lender-based	Database (eg registries)	
	LTV limit	DTI/DSR limit[2]	Limits for non-banks	Capital buffer for RE credit	Database of mortgages	Incl. non-bank
Argentina	-	-	-	X	-	-
Australia	-	-	-	-	-	-[3]
Belgium	-	-	-	X[4]	X	X
Brazil	X	-	X (LTV)	-	X	X
Canada	X	X	X (LTV/DSR)[5]	X	X	X[5]
Cayman Islands	-	-	-	-	-	-
Chile	X	X	-	-	-	-
China	X	X	-	-	X (private)	X
France	-	-	-	-	-	-
Germany	-	-	-	-	X (private)[6]	-
Hong Kong	X	X	-	X	X[7]	-
India	X	-	X (LTV)	X	-	-
Indonesia	X	-	-	-	-	-
Ireland	X[8]	X	X	X	X	X
Italy	-	-	-	-	X	X
Japan	-	-	-	-	-	-
Korea	X	X	X (LTV/ DTI)	-	X (private)	-
Luxembourg	-	-	-	X	-	-
Mexico	-	-	-	-	-	-
Netherlands	X	X	X (LTV)	-	X	In process
Russia	-	-	-	X	-	-
Saudi Arabia	X	X	X (LTV)	-	-	-
Singapore	X	X	-	-	-	-
South Africa	-	-	-	-	-	-
Spain	-	-	-	-	X	X
Switzerland	X	-	-	X	-	-
Turkey	X			X[9]	X	-
United Kingdom	X	X	X (DTI)	X	X	X
United States	-	-	-	X	X (private)	-

Notes: [1] For borrower-based and lender-based tools, an "X" is marked if each jurisdiction has activated the tools, and "-" if the jurisdiction does not have such tools available or has not activated them. [2] A number of jurisdictions (including Ireland and the UK) have implemented loan-to-income (LTI) limits or DSTI limits instead of DTI limits. [3] The Australian Prudential Regulation Authority (APRA) is making progress on the data collection on non-bank credit activities. In 2017, the Australian Government announced it will give APRA new reserve powers for regulating the provision of credit by institutions other than banks and other authorised deposit-taking institutions (ADIs) where those non-ADIs pose a risk to financial stability. [4] The National Bank of Belgium (NBB) introduced a 5 per cent point add-on to IRB banks' risk weights on mortgage loan exposures in 2013. The measure expired in May 2017, but a new measure will be designed by the NBB. Moreover, there is a legal basis for LTV and DTI limits for all credit providers. [5] Non-banks in Canada are subject to the same regulations and data requirements as banks when issuing insured mortgages [6] Does not include comprehensive loan-level data. [7] Does not include comprehensive loan-level data. [8] The Irish LTV limits apply to all supervised institutions. Moreover, loan level data are collected from any institution that extends more than €50 million in mortgages over a six-month period. This could include non-banks. [9] The Turkish capital buffer was removed after 2016.

Sources: Cerutti et al (2015); Cerutti et al (2016); and other publications from authorities.

A3.4 Loan funds in the European Union[156]

Loan funds are defined herein as investment funds that invest in loans as their main strategy. While loan funds remain a small segment of the global fund industry, IOSCO has highlighted that they seem to be increasingly more relevant in some jurisdictions (IOSCO 2017b). It is a nascent but growing industry in the EU and thus poses new issues to the relevant authorities.

A3.4.1 Scope

The scope of this case study is EU loan funds. A distinction can be made between different types of loan funds. In the IOSCO Report *Findings of the Survey on Loan Funds* of February 2017:

- A loan originating fund is defined as: "any type of fund that is, according to its investment strategy, allowed to grant and restructure loans (eg subsequent amendment of loan conditions such as prolongation or deferral). Therefore it does not matter whether the investment in a loan is only a small part of the fund's investment strategy or the sole asset in which the fund can invest".
- A loan participating fund is defined as: "a fund that is allowed to acquire and restructure partially or entirely existing loans originated by banks and other institutions, either directly or on secondary markets (…). To avoid doubt, a fund whose investment strategy allows it to both grant and acquire loans is also considered to be a loan originating fund".

It is worth noting that funds other than loan funds can also invest in loans, but not as their main strategy. Especially, EU alternative investment funds (AIFs) with a focus on credit products invest in a variety of assets including loans, high-yield debt, securitised products or any other credit-structured vehicles in order to benefit from changes in credit quality, credit spreads, and market liquidity.

Box A3-4-1 Methodological note

This case study is based on the combination of two datasets.

1. *Euro area investment fund statistics published by the ECB*.[157] All investment funds established in the euro area are legally obliged to report data on their assets and liabilities. Funds are classified on the basis of the asset types in which they primarily invest such as equity or bonds. This breakdown does not identify loan funds as a separate category, but it is possible to aggregate euro area fund investment in loans, following a 2-step approach: (i) we selected the asset category "deposits and loans", which include any loans that the funds may have granted or purchased from the secondary market but also all deposits the funds have placed in other institutions, in particular in banks; and (ii) then subtracted "deposits and loans to

[156] This case study was contributed by Anna Maria Agresti (ECB), Irene Tagliamonte (Commissione Nazionale per le Società e la Borsa (CONSOB), Italy) and Jean-Baptiste Haquin (ESMA). The views expressed here are those of the authors and do not necessarily reflect the views of the ECB, CONSOB, ESMA or the FSB.

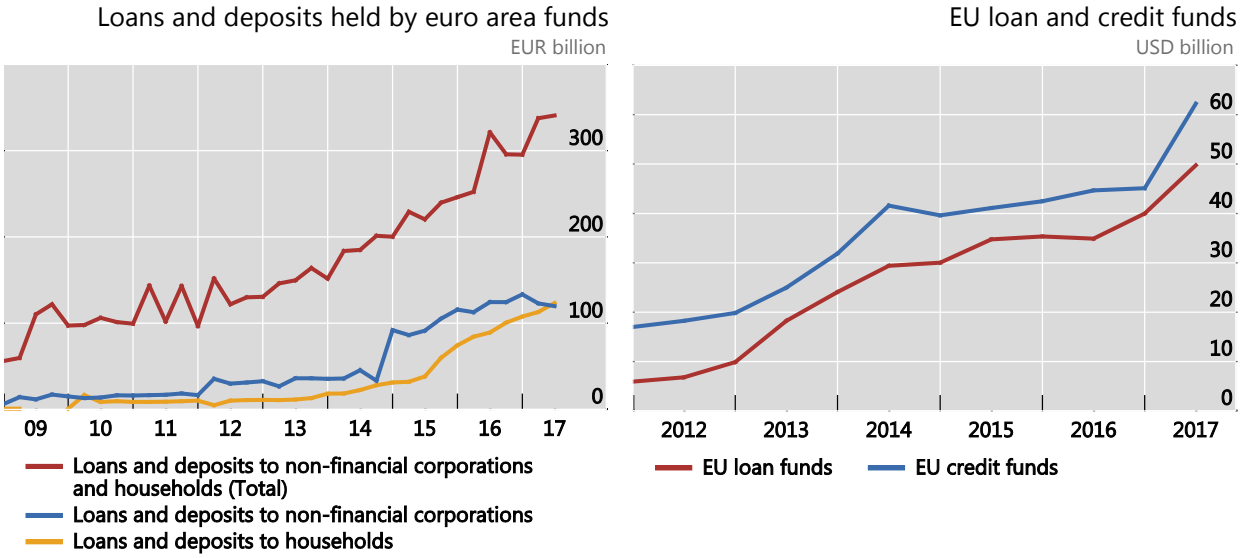
[157] ECB, *Investment fund statistics*.

monetary financial institutions"[158] in order to remove most deposits and get as close as possible to loans.

2. A commercial database that relies on information self-reported by fund managers operating in the EU. They are more comprehensive than ECB data in terms of scope (including all EU countries and not only the euro area) but are only reported voluntarily, thus excluding a number of EU funds. This data lacks a distinction between loan participation and loan origination funds, but provides information related to investment holding characteristics, such as maturity, rating and the identification of some interesting trends.

A3.4.2 Market developments

Loans and deposits from euro area funds, and assets of EU loan and credit funds Exhibit A3-4-1



Source: ECB data; Lipper, ECB and ESMA calculations.

According to ECB statistics, deposits and loan claims held by all euro area investment funds have tripled since 2011 and represented almost 3% of the total AUM of the euro area as of end-June 2017 (Exhibit A3-4-1). This growth was largely driven by the deposits and loan claims held towards non-financial corporations (which have grown 7x since 2011) and households (which have grown 14x).

In that context, commercial data suggest that the assets under management (AUM) of loan funds in the EU have doubled since 2013 and now amount to $50 billion (less than 1% of all EU funds). By comparison, EU alternative investment funds with a focus on credit products have experienced a similar growth, with AUM now amounting to $61 billion.

The increasing EU fund investment in loans takes place in a context of a low interest rate environment and the potential for a resulting "search for yield". However, EU loan funds often invest in floating rate assets and their performance has been weakly correlated with other

[158] Monetary financial institutions are institutions, such as banks and MMFs, whose business is to receive deposits and/or close substitutes for deposits from entities other than monetary financial institutions and, for their own account (at least in economic terms), to grant credits and/or make investments in securities. See ECB, *Lists of financial institutions*.

asset classes in recent years (except high-yield bonds) thus providing diversification benefits to investors (ESMA (2015)).

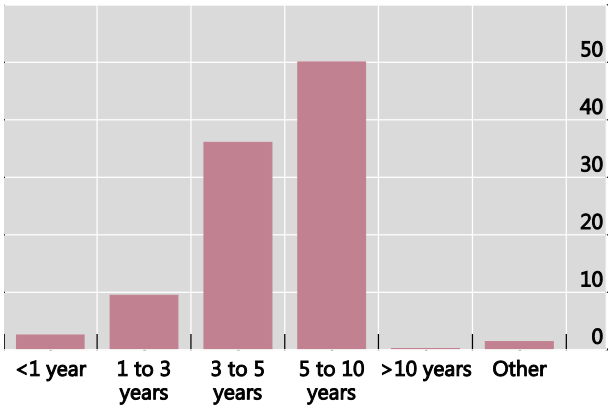
A3.4.3 Risks

Recent regulatory and international standard setting work on loan origination (eg IOSCO (2017b); CBoI (2013); and ESRB (2014)) and loan funds in the EU has focused on the risks and the specific issues that might arise with their growth (ESMA (2015)), such as liquidity risk (especially for open-ended funds), credit risk and regulatory arbitrage.

Loan Fund holding characteristics — Exhibit A3-4-2

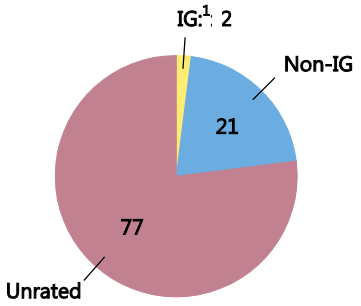
EU loan fund assets by maturity

Percent of the portfolio



EU loan fund assets by rating

Percent of the portfolio



[1] IG = Investment grade.
Source: ECB data; Lipper, ECB and ESMA calculations.

Loan funds in the EU may take on a degree of *credit risk* (Exhibit A3-4-2). In the EU, loan fund assets in 2017 were comprised of unrated assets (77% of total assets), assets rated below investment grade (21%) and rated investment grade (2%). As credit risk is heightened if funds concentrate exposures to a certain sector or collection of borrowers with similar economic characteristics, EU loan funds may diversify their exposures for risk management purpose.

The vast majority (83%) of EU loan funds are open-ended and may be involved with *liquidity transformation*, generated by the mismatch between the liquidity of their assets and their redemption policy. Moreover, loan funds in the EU are exposed to maturity mismatches, with 50% of their assets featuring effective maturities between 5 and 10 years. In theory, in a stress situation, early redeemers in an EU loan fund may potentially benefit from a "first-mover" advantage, and significant fund outflows could result in funds selling assets into a declining market, leading to increasingly lower asset prices. Potential spillovers to other funds and/or the banking system are however very unlikely at the moment, considering the small size of this market. Against this risk, EU loan funds hold liquid assets in their portfolio, including 6.1% in cash at end-2016. EU loan funds also have the possibility of borrowing to meet redemptions, although access to external funding may decline during periods of market stress.

EU authorities may consider monitoring potential *regulatory arbitrage* and *imperfect credit risk transfer*. EU banks could increase regulatory arbitrage or imperfect credit risk transfer by establishing loan originating (or loan participating) EU funds in a manner linked to their own balance sheets, similar to how securitisation vehicles were used prior to the financial crisis to circumvent applicable regulatory (and especially capital) requirements. Related to this is

imperfect credit risk transfer. Where loan risks are transferred from originators to investors, there is a potential for a decline in loan quality and lack of due diligence. For example, in the case of underwriting of loans by banks in the course of securitisations, the underwriters may have less incentive to ensure that the loans are of appropriate quality if they are not going to suffer if the loans are not repaid.

A3.4.4 EU legal framework for loan origination by investment funds

The growth of loan origination in the EU fund industry can help to develop a more diversified financial system, complementing bank financing with deep and developed capital markets. At the same time, the regulation of these funds would need to adequately address any risks they might pose.

There are two overarching frameworks for collective investment schemes in the EU: the directive on undertakings for collective investment in transferable securities (UCITS) is the main European framework; the alternative investment fund managers directive (AIFMD) covers managers of funds that are not regulated by the UCITS directive. Loan origination is only permitted for AIFs within the AIFMD framework.

AIF managers must either be authorised or simply registered, depending on their size. Authorised AIF managers are fully subject to operating conditions (such as internal organisation and risk management requirements, including on proper and independent valuation of the assets and liquidity management) and other provisions of the AIFMD (eg AIF managers must set and comply with leverage limits for each AIF they manage and demonstrate that such limits are reasonable), while registered AIF managers are subject to reporting requirements according to AIFMD and national legislation.

Under EU rules AIFs can originate loans without additional diversification or investment limits, unless they are also authorised under a specific EU common legislation such as the European Venture Capital Fund (EuVECA), the European Social Entrepreneurship Fund (EuSEF) and the European Long Term Investment Fund (ELTIF) Regulations. The above regulations allow loan origination subject to certain conditions. For instance, ELTIFs are only permitted to originate loans, according to legally defined portfolio diversification and investment constrains.[159] They are required by the regulation to invest at least 70% of their capital in eligible investment assets, including loans and debt instruments,[160] and are prohibited from investing more than 10% of their capital in instruments issued by, or loans granted to, any single qualifying portfolio undertaking.

Finally, AIFs willing to originate loans may have to comply with additional requirements at the national level. As highlighted in the ESMA opinion of 11 April 2016, some member states have introduced bespoke national regimes to frame the conditions under which AIFs can originate loans (ESMA (2016)). The ESMA mapping exercise highlights the various national approaches towards entry requirements, diversification limits and liquidity management, and set out "key principles" for a possible EU framework for loan origination funds. For instance:[161]

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[159] See Regulation on European Long-term Investment Funds (PE-CONS 97/14, 20 March 2015).

[160] However, only those loans with maturity no longer than the life of the ELTIF, granted to so-called qualifying portfolio undertakings, and those instruments issued by such undertakings. ELTIFs are also prohibited from using financial derivative instruments, except for hedging purposes.

[161] For more details see ESMA (2016).

- in several jurisdictions, loan originating funds are required to be structured as closed-ended funds;
- some member states limit the potential degree of leverage in loan originating funds, especially for funds marketed to retail investors, or in some cases prohibit leverage completely; and
- several national frameworks have introduced concentration limits.

A3.4.5 Loan origination and loan funds within the FSB monitoring framework

At the moment, data on loan funds are not separately collected in the macro-mapping template used for the FSB's annual shadow banking monitoring exercise (although jurisdictions can include it as a separate category if they so choose). As noted by IOSCO, further analysis and work on this particular asset class may be warranted should loan funds become more significant.[162]

In particular, while IOSCO noted that many jurisdictions consider their general rules for funds to be sufficient to address the specificities of loan funds, and that further work on loan funds is not warranted at this stage, IOSCO committed to continue to monitor the issue with a view to revisiting it if called for by market developments.

Therefore, if there is a call for a closer follow-up, it may be useful to consider whether appropriate statistical and regulatory information on loan funds should be added in the FSB's annual monitoring exercise going forward.

[162] IOSCO (2017b) concluded that "[a] global view of the Loan Funds market shows that Loan Funds are a relatively new product/asset class in an early stage of development and with a limited market so far".

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