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Statistical work on shadow banking: development of new datasets and indicators for shadow banking[1]

Anna Maria Agresti and Rok Brence,
European Central Bank

[1] This paper was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.

Statistical work on Shadow banking: Development of new datasets and indicators for shadow banking

Anna Maria Agresti[1] and Rok Brence[2,3]

Abstract

This paper provides an overview of the statistical work on shadow banking in the EU context related to its size, existing data gaps and risks measures. It focuses in particular on the "macro-mapping" exercise as recommended by the Financial Stability Board, which represents an initial approach in addressing the mapping of shadow banking. The paper shows how data gaps and regulatory differences between the EU member states prevent full implementation of the framework and how new initiatives on macro and micro data might help overcome these issues also for risk assessment purposes.

The paper first presents the EU macro approach and underlying methodology employed by the ESRB in mapping the shadow banking sector as well as advantages and limitations in using aggregated data for shadow banking purposes. The second section describes how macro financial data help construct risk indicators and dispersion measures. The third section points to the current data gaps and presents initiatives taken by the ECB to address these gaps e.g. developing statistics on financial corporations involved in lending (FCLs). Finally, the usage of new granular data sets and regulatory data (such as AIFMD) might reduce identified data gaps and narrow informational gaps between micro and macro approaches in the shadow banking measurement.

JEL code: C82, G21

Keywords: Macroprudential analysis, Shadow banking

1 European Central Bank, DG-Statistics (anna_maria.agresti@ecb.int).

2 European Central Bank, DG-Statistics (Rok.Brence@ecb.europa.eu).

3 The views expressed in this paper are those of the authors and do not necessarily reflect those of the European Central Bank.

1. Introducing the macro approach to mapping shadow banking

Disruptive events in the financial system during the global financial crisis led international policymakers, through Financial Stability Board (FSB), to embark on a worldwide project to measure, monitor and regulate the shadow banking system and its inherent risks. The FSB defines the shadow banking system as "credit intermediation that involves entities and activities fully or partially outside the regular banking system". This approach allows the use of data from financial accounts and other related financial statistics, such as the balance sheet data of non-bank financial institutions, which ensures consistency on both a global and a regional level (e.g. the EU). On the European level, the ESRB is developing a monitoring framework for the European shadow banking system, which is broadly consistent with the definitions and approaches provided by the FSB. In particular, the ESRB framework distinguishes between risks stemming from financial institutions (entity-based approach) and their activities (activity-based approach).

The entity-based approach draws on the aggregated balance sheet data of financial institutions taken from financial accounts and monetary statistics, based on the ESA 2010 framework. In an initial step, the "broad measure" includes all entities of the financial sector except banks and insurance corporations and pension funds (ICPFs). The aim is to cover all areas where shadow banking-related risks to the financial system might potentially arise. In a second step, the focus is narrowed down to entities that have more specific potential to pose systemic risks, predominantly through their engagement in credit intermediation, liquidity and maturity transformation, leverage and interconnectedness with the banking system. However, the entity-based approach described above is incomplete due to the limitations of the available balance sheet data for the risk analysis. For example, off-balance sheet exposures and use of financial derivatives provide additional sources of risks or, if used prudently, may provide a valuable tool for risk mitigation.

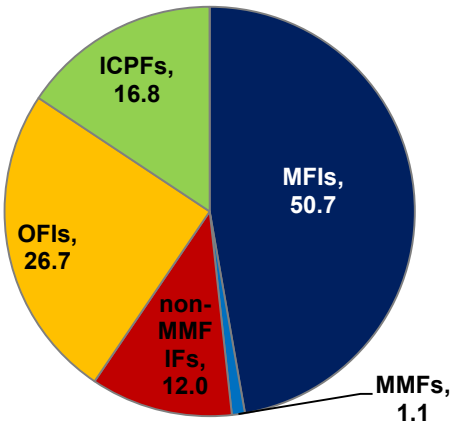
Therefore, the activity-based approach aims to complement the entity-based approach and to capture activities which are not restricted to specific entities or which contribute to interconnectedness between shadow banking system and regular banking system (e.g. through securities financing transactions (SFTs), derivatives and credit enhancements). In addition, entities which are not captured in the entity-based approach but engage in some shadow banking activities are captured with the activity-based approach (e.g. insurance companies engaging in the SFTs or providing credit enhancement). A full coverage of the shadow banking activities does however present particular challenges due to the data limitations. New datasets collected under European Market Infrastructure Regulation (EMIR), Securities Financing Transactions Regulations (SFTR), Alternative Investment Fund Managers Directive (AIFMD), the Money Market Statistical Reporting (MMSR) and the AnaCredit will provide highly standardized, high frequency and low latency data with wide coverage of market participants and activities.

Turning to the size of shadow banking sector in the EU, the "broad measure" captures all non-bank financial intermediaries other than insurance corporations and pension funds, i.e. it is based on investment funds and other financial institutions (OFIs)[4], as summarised in Table 1. This broad measure is useful as a harmonised basis for international comparisons and allows assessing interconnectedness across sectors based on available statistical data. However, such measure also includes entities which bear little relevance when assessing shadow banking risks to financial stability. Entities posing no shadow banking related risks include for instance holding companies of non-financial corporations, entities consolidated into banking groups and thus subject to prudential regulation, and specialised financial institutions which may be set up for the management of intra-group transactions.

4 See Grillet-Aubert, L., Haquin, J.-B., Jackson, C., Killeen, N. and Weistroffer, C., "Assessing shadow banking – non-bank financial intermediation in Europe", Occasional Paper Series, No 10, ESRB, July 2016 which provides methodological detail on the components of the EU shadow banking system.

The EU shadow banking sector according to the ESRB amounts to around 37% of the EU financial sector. Its size grew with an average annualized growth rate of 11% between 2003 and 2016, resulting in almost quadrupled size over the same period. Chart 1 shows total assets for subsectors in the EU financial sector and Chart 2 presents growth trends in the EU and euro area shadow banking, based on the broad measure.

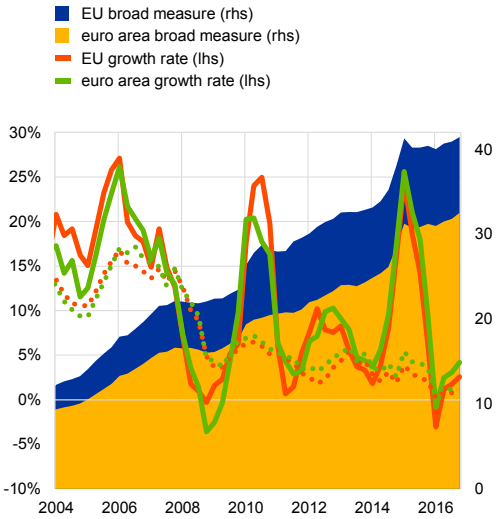
Chart 1
EU financial sector
(€ trillions; last observation: Q4 2016)



Source: ECB and ECB calculations.

Notes: Based on financial accounts data on the total financial assets of the financial sector of the euro area plus non-euro area EU Member States.

Chart 2
Broad measure of EU and euro area shadow banking (investment funds and other financial institutions)
(€ trillions and annual growth rates; last observation: Q4 2016)



Source: ECB and ECB calculations.

Notes: Annual growth rates based on changes in outstanding amounts are indicated with the continuous lines. Dotted lines indicate annual growth rates based on transactions – i.e. excluding the impact of FX or other revaluations and statistical reclassifications.

Table 1: Overview of investment funds and OFIs (based on ESA 2010 classification)

Entities: sectors and subsectors			Description
Investment funds	Money Market Funds (S.123)		Part of the monetary financial institutions (MFI) sector
	Non-MMF investment funds (S.124)	Bond funds	Allocated to investment policy according to assets in which they primarily invest
		Equity funds	
		Mixed funds	
		Real estate funds	
		Hedge funds	
		Other funds	
		Exchange-Traded Funds (ETFs)	ETFs and private equity funds included within above types depending on the strategy of the fund
		Private equity funds	
Other Financial Institutions (OFIs)	Other Financial Intermediaries (S.125)	Financial Vehicle Corporations engaged in securitisations (FVCs)	i.e. securitisation special purpose vehicles
		Financial Corporations engaged in Lending (FCLs)	e.g. financial leasing, factoring, hire purchase
		Securities and Derivatives Dealers (SDDs)	i.e. dealers on own account
		Specialised financial corporations (SFCs)	e.g. venture capital, export/import financing, central clearing counterparties (CCPs)
		OFI residual	Calculated as the difference between total financial sector assets and the assets held by all known subsectors; the residual is usually classified under S.125
	Financial auxiliaries (S.126)		e.g. insurance or loan brokers, fund managers, head offices of financial groups, financial guarantors
	Captive financial institutions and money lenders (S.127)		e.g. SPVs not engaged in securitisation, 'brass plate' companies, holding companies

Due to the significant heterogeneity of entities within the broad measure and in the extent of their engagement in shadow banking activities, a distinction should be made with respect to the degree of shadow banking functions and risks – such as maturity and liquidity transformation, use of leverage, credit intermediation and interconnectedness with the regular banking sector. Based on this, a narrow measure of shadow banking can in principle be constructed, within which entities with greater level of engagement in risks are identified. The lack of granular information on some subsectors, especially the

residual OFIs, however, prevents a definitive assessment of risk. A number of initiatives have been undertaken by the Eurosystem and at the national levels in recent years to better identify types of entities within the non-bank financial sector, the "OFI residual" and its relevance for shadow banking.

In the narrowing down process the first step is to exclude equity investment funds from the broad definition as they do not primarily engage in credit intermediation, although some activities (e.g. the use of securities lending or derivatives) may have a modest impact on the assessment of these funds' shadow banking characteristics. Second, retained securitisations – i.e. securitisations where the asset-backed securities are held by the originating banks, generally for use as collateral in central bank refinancing operations – are excluded since there is no transfer of credit risk from the banking system. Furthermore, non-securitisation special purpose entities and holding companies might be excluded from a narrow view of shadow banking if they are not part of a credit intermediation chain. Similarly, a large part of the total assets of SDDs appears to be consolidated in large banking groups and, consequently, they may be subject to regulatory requirements on liquidity and capital and might be excluded from the narrow measure. In the described narrowing down process, the ERSB only partially endorsed this approach, as entities prudentially consolidated within banking groups are not excluded from the narrow perimeter of the shadow banking sector.

In addition, in its Global Shadow Banking Monitoring Report 2015[5] the FSB introduced the narrow measure of global shadow banking based on five economic functions through which non-bank credit intermediation may pose bank-like systemic risks to the financial system. Table 2 presents economic functions as defined by the FSB and lists entities that typically engage in activities related to each function.

While in principle the FSB and ESRB approaches are broadly in line, there are two main differences between the two approaches. Firstly, the FSB economic functions approach is not completely aligned with the ESRB methodology on the narrow measure. The FSB, for example, excludes entities prudentially consolidated within banking groups from the narrow perimeter of the shadow banking sector – an approach that was also followed by the European Banking Authority in its work in this area. The main reason why the ESRB measures do not exclude consolidated entities is the lack of data. Furthermore, in order to exclude consolidated entities, a stronger justification is needed based on supervisory and regulatory frameworks treating these entities (e.g. addressing intragroup liquidity and capital allocation). Additionally, the activity based approach is not flexible enough to allow for the exclusion of activities performed by the consolidated entities.

Besides the consolidation issues mentioned above additional difficulties exist in the implementation of the FSB approach on the EU level as it is not feasible to map OFI subsectors to the five economic functions as data breakdowns are not yet available, making a quantitative reclassification of the OFIs subsectors into the five economic functions groups. To assess the risks in EU shadow banking, it would be better to replace or complement the economic functions approach with an analysis of risk indicators of the broader OFI subsectors by finding relative benchmarks and critical values. This paper presents the progress on development of additional risk indicators for various OFI subsectors that could be potentially included in the ESRB's risk metrics framework.

[5] See section 2.1 Economic functions approach of the FSB Global Shadow Banking Monitoring Report 2015: http://www.fsb.org/wp-content/uploads/global-shadow-banking-monitoring-report-2015.pdf

Table 2: Classification by economic functions

Economic Function	Definition	Typical entity types
EF1	Management of collective investment vehicles with features that make them susceptible to runs	Fixed income funds, mixed funds, credit hedge funds, real estate funds
EF2	Loan provision that is dependent on short-term funding	Finance companies, leasing companies, 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
EF4	Facilitation of credit creation	Credit insurance companies, financial guarantors, monolines
EF5	Securitisation-based credit intermediation and funding of financial entities	Securitisation vehicles

2. Risk indicators and their dispersion measures

The FSB economic functions approach builds on competent authorities' assessment of potential sources of shadow banking risks arising from the activities of non-bank financial entities located in their jurisdictions. It takes the financial stability perspective, by either classifying an entity with reference to the above-mentioned five economic functions or excluding the entity based on the assessment that it does not pose shadow bank-like risks[6]. One critic of this approach is that it does not appear to be based on any quantitative assessment of risks across different entities and does not seem to improve the quantitative monitoring of risks associated with the shadow banking sector.

Similarly, also the risk metrics developed by the ESRB and included in its reports[7] are not tools that would give a quantitative assessment of shadow banking risks. The indicators proposed by the ESRB are a selection of financial ratios that represent measures of risk which characterize shadow banking activities and entities. As such, the framework is not intended to be necessarily forward-looking and does not provide early-warnings. Since there are no established definitions of critical values related to risk measures in any of the ESRB macroprudential policies, the interpretation of these indicators is difficult (e.g. if they are too high or too low).

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6 See FSB Global Shadow Banking Monitoring Report 2015 http://www.fsb.org/2015/11/global-shadow-banking-monitoring-report-2015/

7 See ESRB Assessing shadow banking –non-bank financial intermediation in Europe https://www.esrb.europa.eu/pub/pdf/occasional/20160727_occasional_paper_10.en.pdf and EU Shadow Banking Monitor https://www.esrb.europa.eu/pub/pdf/reports/20160727_shadow_banking_report.en.pdf?af1a2b4f032060dab0c5c3c8bcd2945b

While limitations exist in constructing a framework for risk assessment, this section presents some suggestions on the possible ways to construct benchmark values for the subsectors of the shadow banking. Without the objective to propose any metric for policy measures and possible related actions, the focus of this exercise is to provide an additional tool, based on the information available, for addressing the risks in the shadow banking subsectors. This paper presents a first investigation on the possible way to construct critical values (benchmarks) for some shadow banking entities such that they might also be used for the development of an heat map.

The ESRB has developed a set of indicators for assessing shadow banking risks through a consistent risk mapping framework, which are presented in Table 3.

However, the benchmark values for risk intensities are not available and the ESRB continues to work on the enhanced monitoring of the EU shadow banking to provide more detailed analysis of risks. As a part of this work, some initial benchmark values for the purpose of constructing a heat map are currently under development. These benchmarks are based on the percentile distribution of indicators across the EU countries and on clustering of indicators' values in various buckets.

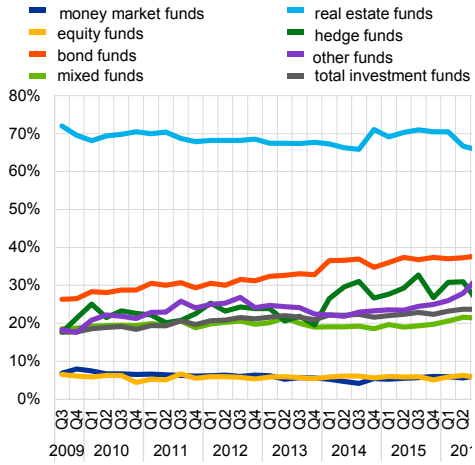
Shadow banking activities and entities are very heterogeneous, and consequently it is not possible to construct critical values for the consolidated shadow banking system. In order to construct meaningful critical values, it is necessary to separately analyse key subsectors (i.e. investment funds, FCLs and SDDs) for selected indicators (liquidity, leverage and maturity). Two approaches were chosen to build up the benchmark values, namely analysis with percentile distribution and the bucketing of indicators' values. In particular, the former approach analyses the distribution of indicator levels across countries by means of dispersion measures, to address differences between countries that are not visible in the aggregated EU wide indicators. The latter approach, builds on the EU legislative texts to construct risk buckets that are in line with legislation covering financial sector. This approach uses also results on the ESRB policy task force on liquidity and leverage and guidelines published by the FSB and the IOSCO on the risk indicators for the OFI sector.

Table 3: Framework of risk indicators for the shadow banking system

Risk indicator	Risk indicator metric	Ref.
Maturity transformation	Short-term assets / Total assets	MAT 1
	Long-term assets / Total assets	MAT 2
	Short-term liabilities / Short-term assets	MAT 3
	Long-term assets / Short-term liabilities	MAT 4
Liquidity transformation	(Total assets - Liquid assets) / Total assets	LIQ1
	Short-term liabilities / Liquid assets	LIQ2
	Short-term assets / Short-term liabilities (current ratio)	LIQ3
	Liquidity mismatch: Liquid liabilities less liquid assets, as share of total assets	LIQ4
	(Deposits with MFIs + Short-term debt holdings + Equity holdings) / NAV	LIQ5
Leverage	Leverage = Loans received / Total liabilities	LEV1
	Leverage multiplier = Total assets / Equity	LEV2
Credit intermediation	Loans / Total assets	CRE1
	"Credit assets" (loans and debt securities) / Total assets	CRE2
Interconnectedness with the regular banking system	Assets with credit institution counterpart / Total assets	INT1
	Liabilities with credit institution counterpart / Total assets	INT2

Chart 3

EU investment funds: Liquidity transformation
(LIQ1, percentages; last observation: Q4 2016)



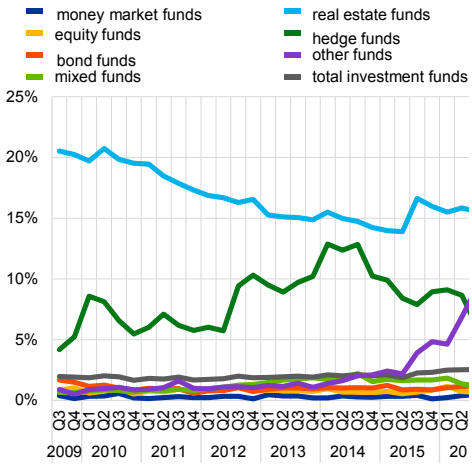
Source: ECB and ECB calculations.

Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Total assets minus liquid assets (deposits, sovereign bonds, debt securities issued by MFIs and equity and investment fund shares), as a share of total assets. Closed-ended funds are not included. Estimates are made for holdings of non-euro area securities and funds not resident in the euro area. During 2016, some hedge funds were reclassified as 'other funds' affecting the series for these types of funds.

Chart 4

EU investment funds: Financial leverage

(LEV1, percentages; last observation: Q4 2016)



Source: ECB and ECB calculations.

Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Leverage is calculated as the ratio of loans received to total liabilities. During 2016, some hedge funds were reclassified as 'other funds' affecting the series for these types of funds.

This analysis will start with the investment funds. The assessment made by the ESRB[8] shows that "part of the EU investment fund sector engages in maturity and liquidity transformation and may be subject to run risk, i.e. to the extent that fund shares are callable at short notice. Some funds, especially in the hedge fund sector, are significantly leveraged, while others have moderate leverage created through securities lending or derivatives exposure. Any metric based on aggregate statistics masks heterogeneity between various types of fund and risk at the entity level. A breakdown by investment focus, such as bond, equity and mixed funds therefore appears useful". This assessment is based on the metrics from the Table 3 and constructed with aggregated balance sheet statistics. Charts 3 and 4 present liquidity transformation and leverage indicators for the EU investment fund sector. These indicators give us a relative measure of exposures of investment funds across various investment policies. However, without absolute critical values for risk indicators we cannot conclude if investment funds, within the same investment policy, are over exposed towards particular risks. Furthermore, the EU aggregated indicators say nothing about national exposures, which can vary enormously.

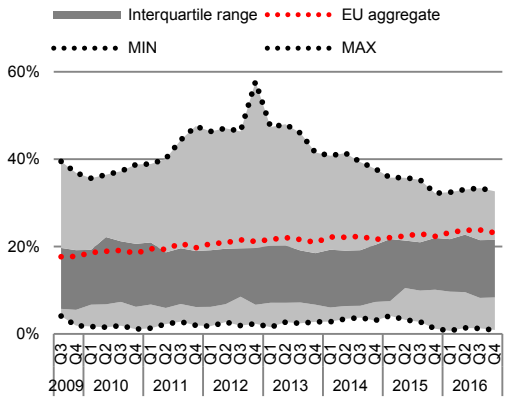
Dispersion measures can provide additional information on the cross country variations in risk intensities. Chart 5 shows dispersion of the liquidity indicator LIQ1 across countries together with the EU aggregated indicator for the whole investment fund sector. We can notice large variation of liquidity transformation between countries and that the EU aggregate lies above the interquartile range (i.e. difference between third and first quartile) and thus slightly overestimates the median

8 See Assessing shadow banking – non-bank financial intermediation in Europe https://www.esrb.europa.eu/pub/pdf/occasional/20160727_occasional_paper_10.en.pdf

value. Another interesting observation is that the EU aggregate is relatively stable during the time, while the maximum reached its peak in the late 2012 and decreased thereafter. Chart 6 shows the same indicator for the real estate funds sector, which, based on the Chart 3, engages in the most pronounced liquidity transformation. This should not be a surprise, since assets of these funds comprise mostly illiquid investments in the real estate properties. However, more surprising is the large variation between countries, especially the very low minimum, which states that around 85% of total assets of real estate funds comprise liquid assets. A possible explanation for this high variation could be differences in classification methodologies applied in different countries since there is no unified approach across the EU on how to classify investment funds. The EU aggregate in this case lies inside the interquartile range, which is however not very informative due to the large width of the interquartile range. Additionally, there is also no trend in the direction of liquidity transformation over the time neither in the variation of distribution (e.g. narrowing of dispersion measures).

Chart 5

Liquidity transformation: total investment funds
(LIQ1, percentages; last observation: Q4 2016)



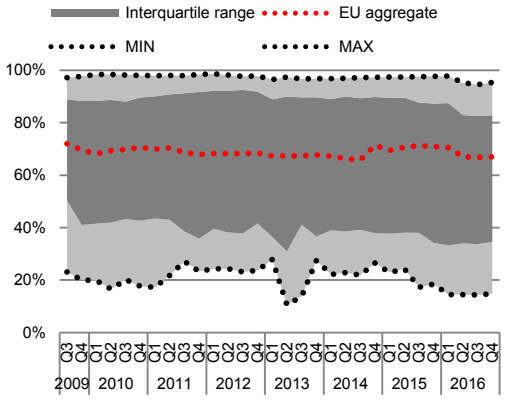
Source: ECB and ECB calculations.

Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Total assets minus liquid assets (deposits, sovereign bonds, debt securities issued by MFIs and equity and investment fund shares), as a share of total assets. Closed-ended funds are not included. Estimates are made for holdings of non-euro area securities and funds not resident in the euro area. During 2016, some hedge funds were reclassified as 'other funds' affecting the series for these types of funds.

Chart 6

Liquidity transformation: real estate funds

(LIQ1, percentages; last observation: Q4 2016)



Source: ECB and ECB calculations.

Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Total assets minus liquid assets (deposits, sovereign bonds, debt securities issued by MFIs and equity and investment fund shares), as a share of total assets. Closed-ended funds are not included. Estimates are made for holdings of non-euro area securities and funds not resident in the euro area. During 2016, some hedge funds were reclassified as 'other funds' affecting the series for these types of funds.

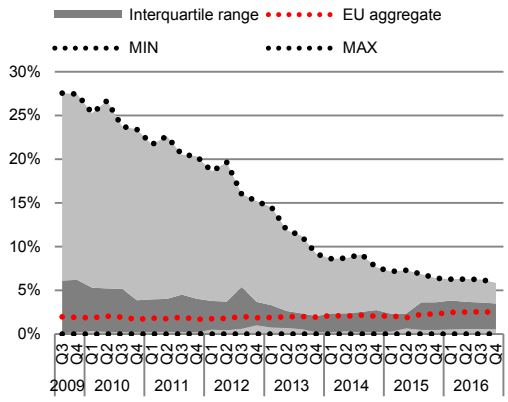
Similar analysis can be done for the financial leverage indicator LEV1. Chart 8 shows that stability of financial leverage indicator over time for the total investment funds can be confirmed by stability of interquartile range. Low difference between first and third quartile and the EU aggregate that lies in between indicates consistency of the aggregated measure. Apparent is also that the maximum has negligible effect on the EU aggregate. Chart 8 presents the same indicator for the real estate funds, which are, based on the Chart 4, the most leveraged type of funds. Chart 4 shows gradual deleveraging of the real estate funds, however, closer look to the country distribution does not provide so clear conclusion. First, the maximum exhibits clear decreasing trend, which has an effect on

the EU aggregated measure. This effect is more pronounced than in the case of total investment funds (Chart 7) because for the real estate funds the dispersion is much wider (interquartile range as well as the minimum and the maximum). On the other hand, the interquartile range and the median show slightly increasing trend, which is in contrast to the conclusion based on the EU aggregate.

Chart 7

Financial leverage: total investment funds

(LEV1, percentages; last observation: Q4 2016)



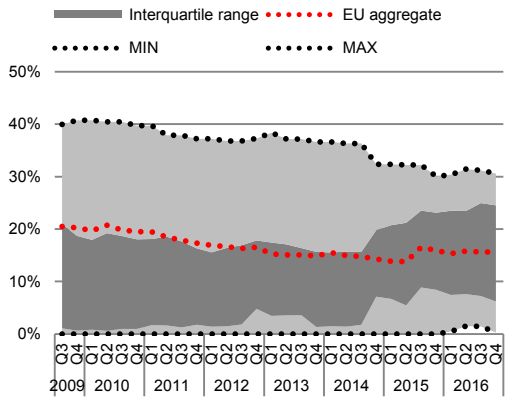
Source: ECB and ECB calculations.

Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Leverage is calculated as the ratio of loans received to total liabilities. During 2016, some hedge funds were reclassified as 'other funds' affecting the series for these types of funds.

Chart 8

Financial leverage: real estate funds

(LEV1, percentages; last observation: Q4 2016)



Source: ECB and ECB calculations.

Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Leverage is calculated as the ratio of loans received to total liabilities. During 2016, some hedge funds were reclassified as 'other funds' affecting the series for these types of funds.

Four examples presented above try to highlight the heterogeneity behind the aggregated risk measures. This heterogeneity can take many different shapes and can, if not taken into account, lead to deceiving conclusions. While the distribution approach showed that risk measures among countries vary considerably, it might be useful to obtain additional information on the intensity of risks. This can be achieved using the bucketing approach in conjunction with benchmark values. The aim of cluster analysis (Clustering of indicators' values in various buckets) is to identify groups of similar objects (Liquidity indicators of subsector of OFIs) according to selected variables (level of Liquidity indicators) that might represent larger and different level of risks.

In the EU, investment fund leverage and liquidity are regulated by the Undertakings for Collective Investments in Transferable Securities (UCITS) Directive and the Alternative Investment Fund Managers Directive (AIFMD). Regulations and supervisory practices can vary between the UCITS and non-UCITS funds. For instance, the UCITS Directive imposes direct restrictions on the use of balance sheet and synthetic leverage, whereas AIFMD does not place any hard limits but requires the asset manager to apply "reasonable" leverage limits to the funds it manages. For the purpose of risk monitoring, it may therefore be useful to distinguish between UCITS and alternative investment funds (AIFs). However, the official ECB investment fund statistics do not allow such differentiation, and this distinction cannot be made at the moment.

According to the UCITS Directive funds are required to be liquid, which in practice means they must be able to meet redemption requests twice a month and redemption proceeds have to be paid within a maximum of ten business days. In order to meet this liquidity requirements, the underlying investments in UCITS funds must also be liquid. In practice this is achieved by adherence to the eligible assets and diversification requirements. Redemptions on any trading day can be limited to 10% of the NAV of the fund with the balance carried over to the next trading day.

These considerations suggest construction of a liquidity indicator in line with the UCITS methodology, i.e. to construct the ratio of liquid assets (deposits with MFIs + short term debt holdings + equity) to the NAV. The proposed critical value for this indicator is 10% of NAV, which is equal to the maximum amount of redemptions on any trading day, as specified in the UCITS Directive. It is easy to observe that according to this criterion, the funds that appear more risky are the bond funds followed by the real estate funds, as presented in the Chart 9. For the other investment fund types the data does not point to any liquidity risks also according to the bucketing.[9]

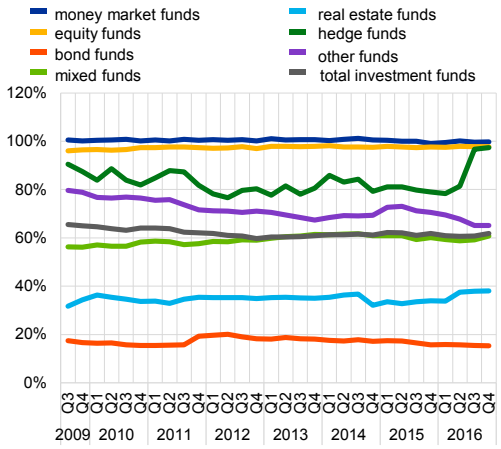
Regarding leverage, some initial help in calculating the benchmark values at the fund level can be found in the EU Directives. As for liquidity, the key legislations that govern leverage in the investment fund sector are the UCITS Directive and the AIFMD Directives. In most cases the leverage is measured as a ratio between the fund exposure and its net asset value.

UCITS funds can invest in a wide range of assets, including shares, corporate and government bonds, units in other UCITS, other types of approved securities and derivatives. They can place deposits with banks and invest in money market instruments. Under the commitment approach, UCITS exposure relating to derivative instruments cannot exceed the total net value of the portfolio. Leverage is strictly limited for UCITS funds: they can borrow only up to 10% of their assets provided that such borrowing takes place on a temporary basis. This legal requirement can be taken as a limit for leverage. In particular, our suggestion is to use the leverage indicator defined as loans received to total assets, where the critical value can be the one from the UCITS Directive. From the Chart 4 above it is possible to see that, hedge funds and real estate funds are above the threshold of 10%, showing high level of leverage compared to the chosen benchmark.

[9] Bucketing has been made on some qualitative assessment and results are available upon request.

Chart 9

EU investment funds: Liquidity transformation
(LIQ5, percentages; last observation: Q4 2016)



Source: ECB and ECB calculations.

Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the United Kingdom are not included. Deposits with MFIs plus short-term debt holdings plus equity holdings, as a share of net asset value, approximated by the total equity. During 2016, some hedge funds were reclassified as 'other funds' affecting the series for these types of funds.

The leverage ratio indicators used by the UCITS are also in line and consistent with the IOSCO and the FSB. The IOSCO calculated leverage as the gross notional exposure (GNE) over NAV, where the GNE is the absolute sum of all long and short positions, including gross notional value (delta-adjusted where applicable) for derivatives. Unfortunately, the data on these exposures for the EU are not available within the current statistics. On the other side, the FSB proposed a leverage indicator defined as market value of total assets to NAV. While it is possible to construct this indicator using the EU wide available statistics, the FSB does not provide any benchmark value based on which risks in funds could be assessed.

Additional suggestions can be made in assessing the risks of other entities, such as FCLs and SDDs. The data for these entities are not yet available, however, they will be soon published by the ECB for the euro area aggregate.[10] According to different surveys conducted by the ECB and the EBA, FCLs and SDDs are present in most of the euro area countries and in some countries are consolidated in banking sector.[11] As these entities are consolidated in banking groups, it might be appropriate to apply the regulatory requirements in the banking sector for leverage and liquidity as benchmark values for SDDs and FCLs. Furthermore, data on leverage and liquidity for banks are available from the ECB statistics of consolidated banking data and from the ESRB risk dashboard[12]. The proposal for macro prudential purposes is to apply the same benchmark values for the shadow banking entities already applied to banks for consolidated entities.

In conclusion, some initial work on the intensity of risks for shadow banking entities is currently ongoing. Legal frameworks, international initiatives and entities consolidated in banking sector, might give some guidance on how to construct benchmark values. However, lack of data and lack of macro prudential setting prevent a complete analysis and assessment on these issues.

[10] See the next section.

[11] See also https://www.esrb.europa.eu/pub/pdf/occasional/20160727_occasional_paper_10.en.pdf

[12] See https://www.esrb.europa.eu/pub/rd/html/index.en.html

3. Data gaps and data initiatives to improve the measurement of shadow banking

While the use of macro data is acknowledged to be suitable for macro assessment of non-bank financial intermediation, data gaps might prevent an adequate assessment of all the risks related to shadow banking. The ESRB made an assessment of the data gaps on the euro area level. Results show that "A significant part of the euro area financial sector however is not covered by detailed balance sheet statistics – specifically OFIs other than FVCs (so called OFI residuals)"[13]. Data gaps have been identified with respect to the entities not covered by the ECB statistical regulations, i.e. OFIs other than FVCs. These entities are mainly financial corporations involved in lending (FCLs) and securities and derivatives dealers (SDDs).

Consequently additional data initiatives are in place to fill these gaps for monitoring purposes. The aim of this section is to present the ECB initiative of the new aggregated data set to address these data gaps (i.e. FCLs). It has to be emphasised that considerable work on data collection, especially on the residuals, has been done also at the national levels. In context of the overall monitoring of OFIs there is a specific need to focus on SDDs and FCLs, as these entities play a relevant role in the financial intermediation and might constitute an important part of the shadow banking system in many developed economies.

FCLs are defined as financial corporations principally specialised in asset financing for households and non-financial corporations. This includes financial leasing, factoring, mortgage lending and consumer lending companies. While for some countries only leasing or factoring corporations are covered, in other countries finance companies that provide credit to consumers are also included. As the first step, the ECB conducted a survey across the Eurosystem with an aim to better harmonize data collection practices across countries. Furthermore, since the FCLs may be regarded as a part of the shadow banking system if they engage in credit intermediation outside the regulatory perimeter and since their business is highly interconnected with the regular banking system, the survey also investigated different business models. The results showed that a large part of the total assets of these entities appears to be consolidated in banking groups, although this varies among countries. However, according to the survey, funding from banks does not appear to be the main source of financing for FCLs.

SDDs classified as OFIs are financial corporations authorised to provide investment services to third parties by investing in financial instruments on their own account as their business and principally engaged in the following financial intermediation activities: a) Trading on their own account and/or risk, as 'securities and derivatives dealers', in new or outstanding financial instruments through the acquisition and sale of those financial instruments for the exclusive purpose of benefiting from the margin between the acquisition and sale price. This also includes market-making activities. b) Underwriting financial instruments and/or placing financial instruments on a firm commitment basis. c) Assisting firms in issuing new financial instruments through the placement of new financial instruments involving either a firm underwriting commitment or standby commitment to issuers of new issues[14].

Regulatory regime plays an important role in ensuring consistency in the definition. Definition and regulatory regimes are similar in all the respondent countries for the SDDs. The reason for this homogeneity is that countries use Markets in Financial Instruments Directive to classify SDDs at national level.

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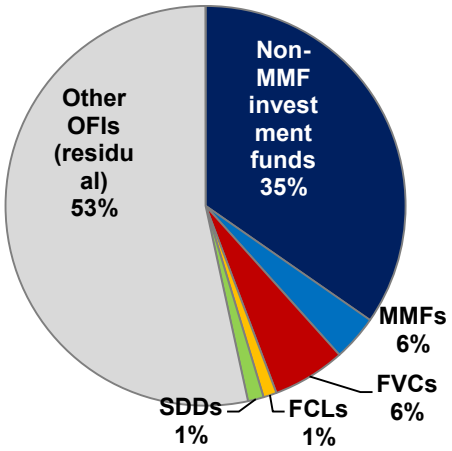
[13] See https://www.esrb.europa.eu/news/pr/date/2016/html/pr160727.en.html. Over half of the OFI residual is in just two countries, Luxembourg and the Netherlands.

[14] The definition is consistent with the Guideline of the ECB on monetary and financial statistics (recast) (ECB/2014/15) (2014/810/EU) https://www.ecb.europa.eu/ecb/legal/pdf/oj_jol_2014_340_r_0001_en_txt.pdf

The significance of SDDs and FCLs in terms of total assets of the OFIs at the euro area aggregated level is almost the same for the two subsectors and relatively significant (2.4% of OFI total assets). However not all euro area countries provide the information required. Work is on-going to improve the data collection.

Chart 10

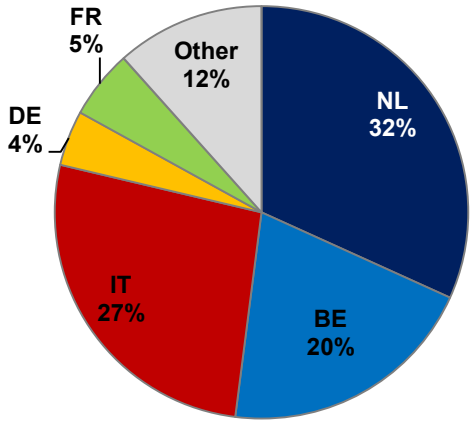
Breakdown of euro area investment funds and OFIs by type
(percentages; last observation: Q3 2016)



Source: ECB and ECB calculations.

Chart 11

Breakdown of euro area FCLs by total assets
(percentages; last observation: Q3 2016)



Source: ECB and ECB calculations.

Notes: Other includes Austria, Cyprus, Estonia, Greece, Lithuania, Latvia, Malta, Portugal, Slovenia and Slovakia.

On the funding side, the ECB survey showed that bank funding does not represent the major source of funding for the SDDs. A similar pattern is observed for the FCLs. However, some differences among countries exist on the way FCLs are funded by credit lines provided by banks as in some cases FCLs are controlled or consolidated in the banking groups. Percentages of SDDs assets consolidated in the banking sectors vary among countries. While in several euro area countries SDDs assets and activities are fully consolidated (e.g. France), this is not the case for all countries. The percentage is larger for those countries, whose share of SDDs total assets in the euro area is larger. For the FCLs the assets consolidated in the banking sector vary among the countries and only in two countries are fully consolidated in banking sector.

In general, business models of SDDs and FCLs are not very well known. Their activities typically fall within one of the shadow banking activities, i.e. maturity transformation, liquidity transformation, use of leverage, and credit risk transfer (through securitisation and/or credit derivatives). Regarding the involvement in the specific activities of shadow banking, qualitative and quantitative information is very limited. Furthermore the allocation of the FCLs in the shadow banking sector cannot be conclusively agreed.

The ECB is in the process to publish the euro area aggregated balance sheet data for the FCLs. However, the national breakdowns will not be available since data are not collected. The data will be published annually and available on the quarterly frequency. Outstanding amounts (on aggregated basis, i.e. positions between FCLs will not be netted out) and differences in outstanding amounts adjusted for reclassifications will be made available. On asset side four categories will be presented: 1) Loans, granted by the FCLs to other institutions. Breakdown on loans to MFIs and non-MFIs will be available as well; 2) Equity, which includes FCLs' holdings of shares and other equity (investment fund shares/units are not included); 3) Debt securities held; and 4) Remaining assets for FCLs defined as "assets not included elsewhere". The liability side will present the following four categories: 1)

Deposits and loans taken; 2) Debt securities issued; 3) Capital and reserves; and 4) Remaining liabilities.

Breakdown of total assets for euro area FCLs is presented in Chart 11. It follows that over three quarters of the euro area FVC total assets are concentrated in just three countries, namely the Netherlands, Belgium and Italy.

4. The role of micro data

While the work on closing the macro data gaps is ongoing in terms of aggregated data collection on the OFI subsectors, which will improve the monitoring of shadow banking under the entities approach, the scope of available micro data is widening as well. Micro data will allow further analysis of risks based on the activities approach. The aim of this section is to show how several methodological and information gaps in the shadow banking can be solved with the use of micro data.

As clarified in section one, an important issue in narrowing down the perimeter of shadow banking is whether to include or exclude entities consolidated in the banking groups. In this respect, additional granular data coming from the supervisory database will provide more information on the entities consolidated in the banking groups. Assessment of shadow banking entities consolidated in banking groups using supervisory data can thus shed some light on the risks and characteristics of these entities.

Another important aspect in mapping the perimeter of shadow banking is the banking activities carried outside the banking sector. The EBA has already worked on this aspects and follow-up to the report on the perimeter of credit institutions[15] is also expected. As Register of Institutions and Affiliates Database (RIAD) collects lists of financial institutions maintained for statistical purposes it might be useful to map the EBA results with the RIAD database to asses possibility of capturing entities that undertake credit activities outside the banking perimeter and their consolidation within banking groups.

Furthermore, several ECB initiatives as well as EU market regulations and directives including AIFMD, EMIR[16] and SFTR will increase data availability permitting the further development of risk metrics for the shadow banking sector. Data for securities financing transactions (SFTs) might come from the Money Market Statistical Reporting (MMSR). The MMSR micro data on activities might allow to match money market entities that carry out these activities with their counterparties, which are often OFI entities. By combining new databases the ECB might help to improve the measurement of the riskiness of shadow banking as for example the interconnectedness with the regular banking system and its systemic risk. Starting with data to be collected via AnaCredit[17], more information on loans to FCLs, SSDs, IFs and other OFIs will be available. This will in turn permit a better assessment of MFIs interconnectedness with the OFIs subsectors.

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[15] Opinion addressed to the European Commission, relating to the perimeter of credit institutions and namely to the different approaches across the EU Member States on the interpretation of the definition of 'credit institution' in the Capital Requirements Regulation. See https://www.eba.europa.eu/-/eba-publishes-an-opinion-on-the-perimeter-of-credit-institutions

[16] See ESRB Occasional Paper, "Shedding light on dark markets: First insights from the new EU-wide derivatives dataset": *https://www.esrb.europa.eu/pub/pdf/occasional/20160922_occasional_paper_11.en.pdf?c067e1f68ae0fe23925b88c613c546a8*

[17] AnaCredit should provide high-quality and timely information on debtors and their respective credits (i.e. type of credit, outstanding debt, number of days past due date, date of origination and contractual maturity, type of interest rate and currency of the credit).

Conclusion

The ECB and the ESRB are closely following developments in the EU shadow banking sector and recognize the increasing need for more granular statistical data. Several initiatives on the Eurosystem level as well as on the national levels are ongoing with an aim to close the existing data gaps, especially the ones in relation to the OFI sector. Entities consolidated in the banking groups and relation between entity-based and activity-based approaches still remain open methodological issues that make complete assessment of shadow banking risks a difficult task. New micro datasets developed by the ECB and/or made available through various EU legislations may offer rich data sources that can in future be used to derive additional indicators, complementing existing aggregated datasets, allow for a more detailed assessment of risks in this part of the EU financial system and overall enhance macroprudential analysis. Additional efforts are required, however, to close data gaps so as to enable a consistent mapping of cross-border and cross-sector risks and provide a more holistic view of other financial institutions and their engagement in shadow banking activities.

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Irving Fisher Committee on
Central Bank Statistics

BANK FOR INTERNATIONAL SETTLEMENTS

IFC-National Bank of Belgium Workshop on "*Data needs and Statistics compilation for macroprudential analysis*"

Brussels, Belgium, 18-19 May 2017

Statistical work on shadow banking: development of new datasets and indicators for shadow banking[1]

Anna Maria Agresti and Rok Brence,
European Central Bank

[1] This presentation was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.

EUROPEAN CENTRAL BANK

EUROSYSTEM

Statistical Work on Shadow Banking: Development of new Datasets and Indicators

Anna Maria Agresti

Rok Brence

DG-Statistics/MFS

Irving Fisher Committee Workshop – National Bank of Belgium

Brussels, 18-19 May 2017

Overview of presentation

Introduction

- **Macro-mapping"** exercise recommended by the Financial Stability Board as *methodological framework* **broadly** endorsed at EU level by the European Systemic Risk Board (ESRB)
  - Use of aggregated data and some differences might be observed
- Macro data help construct *risk indicators*
- **Intensity of risks** assessed via *dispersion measures* and *bucketing of indicators' values*
- Current data gaps and on-going initiatives by ECB to address them
  - e.g. new statistics on *financial corporations involved in lending* (FCLs)
- **New granular data sets** and regulatory data (such as AIFMD) might also reduce data gaps

Macro measurement: FSB and JEGS approach

Practical two-step approach by FSB for **monitoring Shadow Banking System (SBS) -** implementation (so far) mainly entities-based:

1. **Broad measure:**
   - *"System of credit intermediation that involves entities and activities outside the regular banking system"*
   - Approximated by financial assets of *Other Financial Intermediaries* (OFIs, S.125) sector *plus Money Market Funds* (MMFs, S.123)

2. **Narrowing down** the broad measure in the *Global Shadow Banking Monitoring Report 2015*:
   - The FSB introduced a narrow measure: via *economic concept*

Two-Step approach of ESRB

- ESRB framework distinguishes between *risks stemming from financial institutions or "**entity-based approach**" or their activities or "**activity-based approach**"*

ESRB approach: Macro measurement

- "**Broad measure**" includes **all entities in the financial sector** except *banks*, *insurance corporations* and *pension funds*

- The **entity-based approach** focuses on aggregated balance sheet data of financial institutions *based on ESA 2010 framework*
  - Limitations of ESA-based balance sheet statistics *for risk analysis*
  - Off-balance sheet exposures and data on trade in financial derivatives provide *additional information on sources of risks*

- The **activity-based approach** aims to capture activities contributing to *interconnectedness* between shadow and regular banking system
  - e.g. through secured financing transactions (SFTs), derivatives and credit hedging or enhancements

ESRB approach: narrowing down

- FSB **narrowing down approach** excludes *equity investment funds* from the broad definition as they do not primarily engage in credit intermediation

- **Retained securitisations** – i.e. securitisations where the asset-backed securities are held by the originating banks
  - are excluded as no transfer of credit risk from the banking system.
  - *Non-securitisation special purpose entities* might be excluded if they are not part of a credit intermediation chain

- The **FSB** excludes *entities prudentially-consolidated* within banking groups from the narrow perimeter of the shadow banking

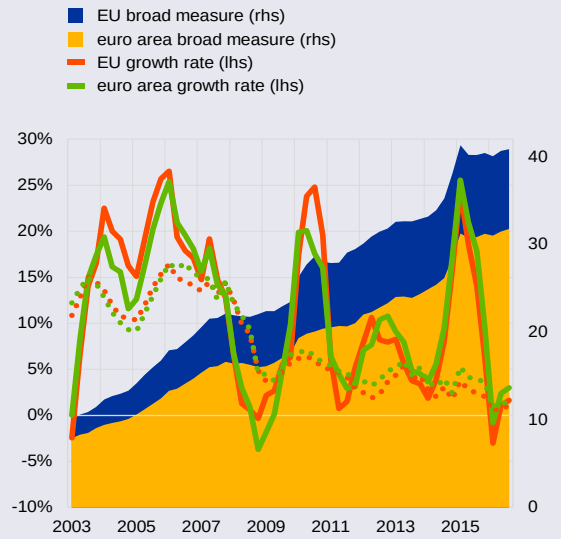
- The main reason why ESRB measures do not exclude consolidated entities is the *lack of reliable data*

ESRB approach: Macro measurement (4/4)

- Broad measure comprises the **OFI sector plus IFs**
- Total assets amount *in Q3 2016*
  - EU-wide to **€ 39 trillion**
  - Euro area to **€ 30 trillion**
- Outstanding amounts grew **300%** over the past decade; **upward trend** is clear
- Share is **37%** of EU financial sector assets
- ESRB decided **not to apply** FSB criterion for narrowing down focus on risks

Chart: Broad measure of EU and euro area shadow banking (investment funds and other financial institutions)
(*€ trillions and annual growth rates; last observation: Q3 2016*)

Source: ECB and ECB calculations.



Notes: Annual growth rates based on changes in outstanding amounts are indicated with the continuous lines. Dotted lines indicate annual growth rates based on transactions – i.e. excluding the impact of FX or other revaluations and statistical reclassifications.

Risks measure : ESRB indicators (1/4)

Risk indicator	Risk indicator metric	Ref.
Maturity transformation	Short-term assets / Total assets	MAT1
	Long-term assets / Total assets	MAT2
	Short-term liabilities / Short-term assets	MAT3
	Long-term assets / Short-term liabilities	MAT4
Liquidity transformation	(Total assets - Liquid assets) / Total assets	LIQ1
	Short-term liabilities / Liquid assets	LIQ2
	Short-term assets / Short-term liabilities (current ratio)	LIQ3
	Liquidity mismatch: Liquid liabilities less liquid assets, as share of total assets	LIQ4
	(Deposits with MFIs + Short-term debt holdings + Equity holdings) / NAV	LIQ5
Leverage	Leverage = Loans received / Total liabilities	LEV1
	Leverage multiplier = Total assets / Equity	LEV2
Credit intermediation	Loans / Total assets	CRE1
	“Credit assets” (loans and debt securities) / Total assets	CRE2
Interconnectedness with the regular banking system	Assets with credit institution counterpart / Total assets	INT1
	Liabilities with credit institution counterpart / Total assets	INT2

Risks measure : Different approach (2/4)

- ESRB continues to work on the enhanced monitoring of the EU shadow banking to provide **more detailed analysis of risks**.
  - **ESRB *risk metrics*** does not provide benchmark values for risk intensities
- **FSB *economic approach*** does not appear to be based on any quantitative assessment of risks
- As a part of this work, some initial benchmark values
  - Activities and entities **are very heterogeneous**, not possible to construct critical values for the entire shadow banking.
- **Two approaches were chosen** to build up the benchmark values,
  - analysis with ***percentile distribution***
  - ***bucketing of indicators' values*** (on clustering of indicators' values in various buckets)

Risks measure : Dispersion measure (3/4)

- ***Dispersion measures*** of liquidity indicator LIQ1 show large variation of liquidity transformation between countries
- ***EU aggregate*** lies above interquartile range (i.e. difference between third and first quartile) and thus slightly overestimates median value.

- Same indicator for the **real estate funds** sector, shows sector engages in the most ***pronounced liquidity transformation***.

Chart 5

Liquidity transformation: total investment funds (LIQ1, percentages; last observation: Q4 2016)

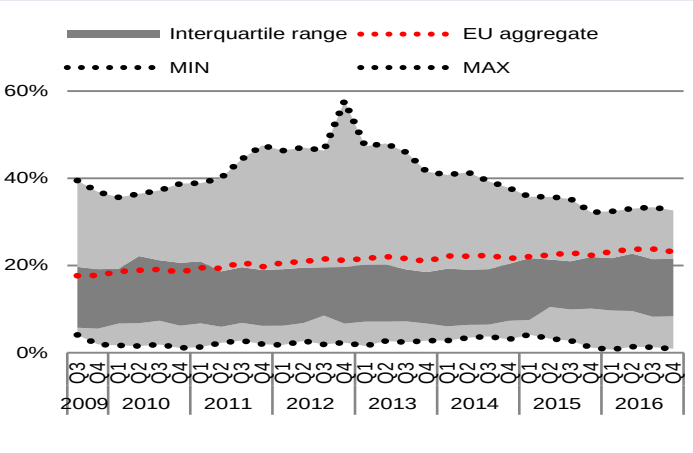
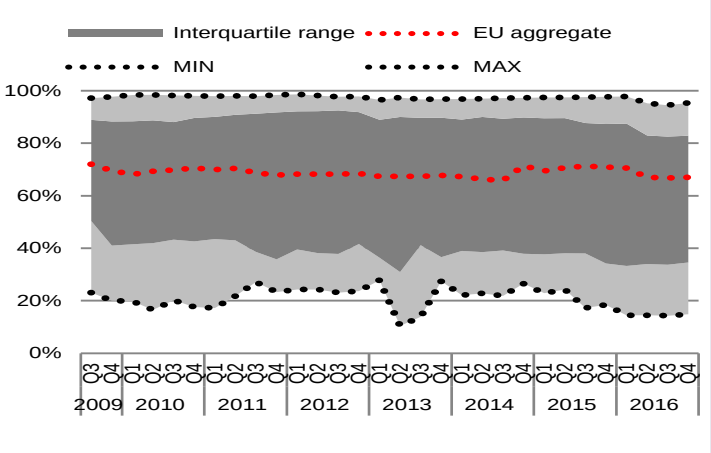


Chart 6

Liquidity transformation: real estate funds (LIQ1, percentages; last observation: Q4 2016)



Risks measure : Liquidity indicator for IF (4/4)

The aim of **cluster analysis** is to identify groups of similar objects (Liquidity indicators of subsector of OFIs)

- ***according to selected variables*** (level of Liquidity indicators that might represent larger and different level of risks).
- Clustering of indicators' ***values in various buckets***

UCITS. Redemptions on any dealing day can be limited to ***10% of NAV*** of the fund with the balance carried over to the next dealing day.

- If a UCITS opts for bi-monthly liquidity, the maximum redemption pay out in any one month can be limited to **20% of NAV**

Under ***10% and 15% scenarios*** (total net outflow/total net assets expressed in %), corporate bond and securitisation markets might be under stress.

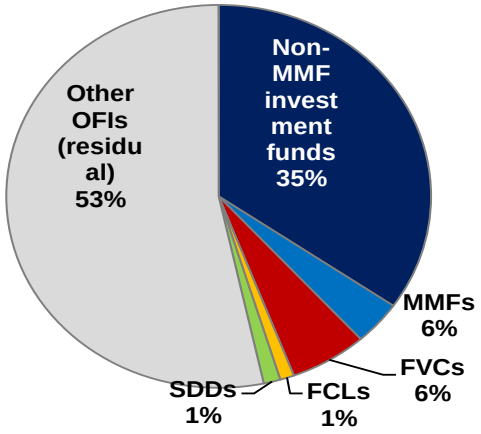
- (Result from ESRB *JEGS policy task force*)

Macro measurement: New data sets

- **Additional data initiatives** in place to fill gaps for monitoring purposes.
- ECB initiative to publish new aggregated data set to address these data gaps (**i.e.** ***Financial Corporation engaged in Lending*** **FCLs**).

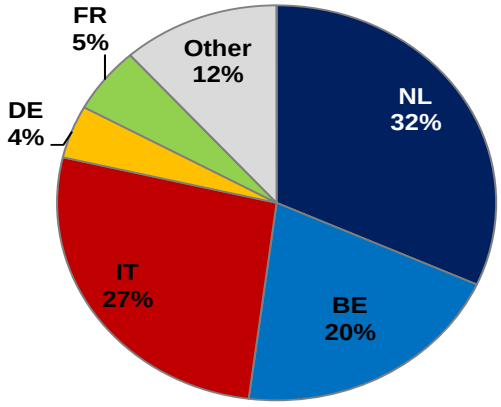
- **ECB survey showed** some differences among countries exist on the way **FCLs** are funded by credit lines provided
  - ➢ Some cases FCLs are ***controlled*** or ***consolidated*** in the banking groups

Chart 8
Breakdown of euro area investment funds and OFIs by type
(percentages; last observation: Q3 2016)



Source: ECB and ECB calculations.

Chart 9
Breakdown of euro area FCLs by total assets
(percentages; last observation: Q3 2016)



Source: ECB and ECB calculations.

Notes: Other includes Austria, Cyprus, Estonia, Greece, Lithuania, Latvia, Malta, Portugal, Slovenia and Slovakia.

Micro approach: Granular data

- **Micro data** will allow further analysis of risks based on activities approach.

- *Supervisory database* will provide more information on the entities **consolidated in the banking groups**.
  - Assessment ***using supervisory data*** can thus shed some light on the risks and characteristics on these entities.

- ESCB *Register of Institutions and Affiliates Database* (**RIAD)** collects lists of financial institutions maintained for statistical purposes

- Possible to map **entities that undertake credit activities *outside the banking perimeter*** and their consolidation within banking groups.

- EU market regulations and directives including **AIFMD, EMIR and SFTR** will *increase data availability* and further development of risk metrics

Conclusions and way forward

- **ECB and the ESRB** closely follow developments in EU shadow banking sector
  - recognize increasing need for more granular statistical data.

- Several initiatives at Eurosystem level and at national level ongoing with aim to close existing **data gaps**

- **Entities consolidated in the banking groups** and relation between entity-based and activity-based approaches still remain open

- **New micro datasets** developed by the ECB and/or made available through various EU legislations are offering new data source
  - Can be used to derive **additional indicators**, allow for more detailed assessment of risks
  - **overall enhance** macroprudential analysis.