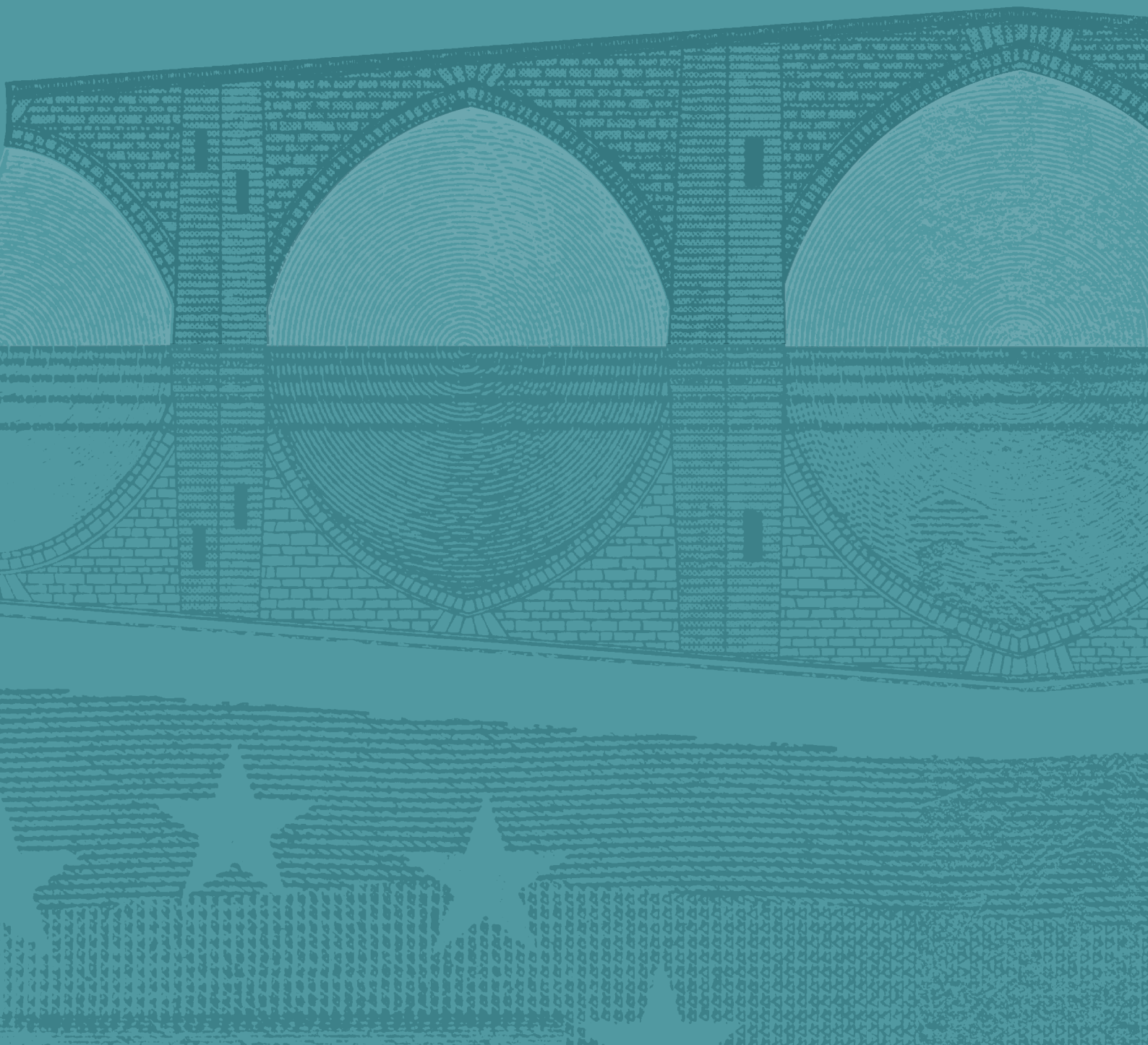
EUROPEAN CENTRAL BANK

EUROSYSTEM

BANKING STRUCTURES REPORT

OCTOBER 2014



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In 2014 all ECB publications feature a motif taken from the €20 banknote.

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CONTENTS

EXECUTIVE SUMMARY 5

1 THE MARKET STRUCTURE OF THE EURO AREA BANKING SYSTEM 7
Banking sector capacity 7
Consolidation and merger and acquisition activity 12
Concentration and competition 14

2 STRUCTURAL DEVELOPMENTS IN BANKING ACTIVITY 16
Balance sheet structure 16
Financial performance and cost structure 20
Capital and leverage 25

SPECIAL FEATURES
Structural features of the wider euro area financial sector 28
The relationship between structural and cyclical features of the EU financial sector 46

STATISTICAL ANNEXES 57

EXECUTIVE SUMMARY

This report reviews the main structural developments in the euro area banking sector in the period from 2008 to 2013[1] on the basis of a range of selected indicators. This time period includes the beginning of the financial crisis and the time when some euro area countries entered financial assistance programmes. Special attention is paid to the changes that occurred after the publication of the previous Banking Structures Report in November 2013.

The report first reviews developments relating to the "Market structure of the euro area banking system", i.e. the capacity, consolidation and concentration of the banking sector over time. In 2013 the euro area banking sector continued its consolidation process, driven by continued pressure to achieve cost containment, deleveraging and restructuring. This process resulted in a further reduction of the total number of credit institutions in the euro area to 5,948 (down from 6,100 in 2012 and from 6,690 in 2008). Market concentration increased at the euro area level in comparison with the pre-crisis period; however, developments were quite heterogeneous across individual countries. The rationalisation and resizing process in the euro area banking system suggests that the overall efficiency of the system continues to be enhanced. Merger and acquisition activity, especially cross-border (intra-euro area) and outward transactions (with euro area banks as acquirers) were following a declining trend, both in terms of number of transactions and total value.

The second chapter of the report looks at "Structural developments in banking activity". In particular, changes in banks' overall balance sheet structure, financial performance and capital position are reviewed. Total assets of the euro area banking sector declined to €26.8 trillion (down from €29.6 trillion in 2012 and from €33.5 trillion in 2008), largely driven by developments regarding large banks. This is attributable to ongoing balance sheet repair and the related deleveraging of (non-core) assets, with the reduction in derivative positions accounting for around half the total balance sheet shrinkage. As regards banks' liabilities and funding patterns, the gradual shift towards deposit funding continued in 2013, with the median share of customer deposits in liabilities rising to 52%. In parallel, euro area banks continued to reduce their dependence on wholesale funding from its peak in 2009. The subdued financial performance of the euro area banking sector observed since the onset of the financial crisis continued in 2013. Profitability continues to be challenged by the low interest rate environment, which puts pressure on margins, the ongoing deterioration in asset quality and, in some cases, by restructuring costs and litigation charges. In contrast to previous years, however, operating income increased marginally and banking sectors in all countries managed to avoid an operating loss. The capital positions of euro area banks continued to improve in 2013, due to both capital increases and risk-weighted asset declines, with the median Tier 1 ratio increasing to 13% from 12.4% in 2012.

Structural developments in bank intermediation and banking activity across euro area countries continued to differ widely in 2013. As in previous years, the banking sectors of those euro area countries most strongly affected by the financial crisis generally also experienced the most pronounced structural changes.

This publication includes two special feature articles. The first article, "Structural features of the wider euro area financial sector", reviews the different components of the non-bank euro area financial sector, notably shadow banks, insurance corporations and pension funds. More

1 Following its accession to the euro area, Latvia is covered for the first time in the 2013 report, including for the years prior to its accession to the euro area.

specifically, the article reviews the composition of assets as well as the liquidity and maturity mismatches inherent in the aggregate balance sheets of these non-bank components of the euro area financial sector, which have grown substantially over the past decade and often perform bank-like functions. This special feature is seen as the starting point for the envisaged regular analysis of structural features in non-bank financial market segments, to be commenced with next year's Banking Structures Report.

The second special feature article, "The relationship between structural and cyclical features of the EU financial sector", explores the relationship and potential interactions between certain structural features of the banking sectors in the EU Member States and the performance of the respective banking sectors over the financial cycle, also with the aim of providing guidance for policy-makers on the proper implementation of cyclical and structural measures to address the associated risks. The findings in this article suggest that the activation and calibration of policy measures such as the systemic risk buffer (SRB) should be mindful of the cyclical position of the banking system. In addition, the results confirm that the activation and calibration of counter-cyclical policy measures should not depend only on the cyclical situation but should also take structural characteristics of the banking sector into account.

The report makes use of a number of publicly available data sources. Aggregate banking sector statistics are compiled by the European Central Bank (ECB) with input from national authorities, and are published on an annual basis. Individual bank-level data derives from banks' published accounts or market data providers.

I THE MARKET STRUCTURE OF THE EURO AREA BANKING SYSTEM

This chapter provides an overview of the structure of bank intermediation in the euro area. It reviews the overall banking sector capacity by country, highlighting the main developments over the six years to the end of 2013. This time period includes the beginning of the financial crisis and the time when some euro area countries entered financial assistance programmes. The chapter looks, in particular, at developments during 2013, i.e. since the publication of the 2013 ECB Banking Structures Report.

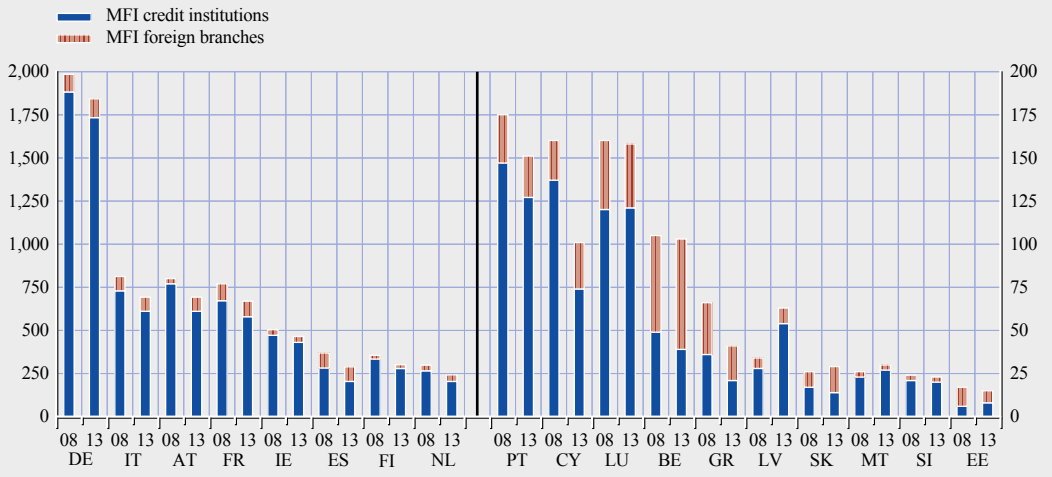
BANKING SECTOR CAPACITY

Since the inception of the financial crisis in 2008, the euro area banking sector has been going through a rationalisation process which has resulted in a reduction in the overall number of credit institutions. This banking sector consolidation process relates to pressures to achieve cost containment, deleveraging and restructuring, in particular in the banking sector of those euro area countries that were more severely affected by the financial crisis.

At the end of 2013, the total number of credit institutions,[2] including foreign branches, in the euro area was 5,948, down from 6,100 in 2013, if calculated on a non-consolidated basis (see Chart 1).[3] By comparison, at the end of 2008 there were 6,690 credit institutions, including foreign branches.

Developments over time reveal that there was a net decrease of 152 credit institutions in the year to the end of 2013 and a net decrease of 742 (11.1%) over the period from 2008 to 2013.

Chart 1 Number of credit institutions and foreign branches in 2008 and 2013



Source: ECB monetary financial institution (MFI) statistics.

2 Credit institutions account for the bulk of monetary financial institutions (MFIs) as defined in ECB Regulation ECB/2008/32 of 19 December 2008 concerning the balance sheet of the monetary financial institutions sector (recast).

3 MFI statistics are residence-based and compiled on an individual (as opposed to a consolidated) basis. Data on the number of credit institutions in each country include foreign subsidiaries operating in that country (as these are legal entities supervised by the local authorities).

In 2013, with respect to the previous year, all euro area countries but Belgium, Latvia, Luxembourg and Slovakia recorded a decrease in the number of credit institutions. After the onset of the crisis, Greece and Cyprus, followed by Spain, recorded the largest decrease, due to the restructuring and consolidation of their banking sectors in the context of the recent financial crisis. Pronounced declines over that period were also noticeable in Finland, France, Italy and Portugal.

Reflecting countries' size, but also structural features, at the end of the period under review Austrian, French, German and Italian credit institutions accounted for around 65% of euro area credit institutions, a share that was broadly unchanged since 2008.

The share of foreign branches in the total number of euro area credit institutions increased between 2008 and 2013 from 10.4% to 11.7% for the euro area as a whole, mainly due to the decrease in the total number of credit institutions. Half that increase was observed in 2013.

On a consolidated basis, the total number of credit institutions in the euro area amounted to 2,609 (domestic banks and banking groups) at the end of 2013, down from 2,920 in 2008 and from 2,645 at the end of 2012.[4] The number of foreign subsidiaries and branches decreased on a consolidated basis from 750 to 711 over the same period (compared to 708 in 2012).

Focusing on the resizing process, total assets of the euro area banking sector, including foreign subsidiaries and branches, stood at €26.8 trillion at the end of 2013 on a consolidated basis, reflecting a decline of 19.9% with respect to 2008 and a decline of 9.4% vis-à-vis 2012. The adjustment in 2013 was again driven by developments regarding large banks.[5] The largest reductions in the relative value of assets since 2008 were recorded in Estonia[6] and Cyprus, amounting to drops of 51% and 46% respectively. On the other hand, Finland and Malta recorded an increase in the total value of banking assets of 35% and 13% respectively. The largest reduction in the relative value of assets in 2013 was observed in Cyprus (40%) and Ireland (21%), followed by Finland (13%), Slovenia (12%), Germany (11%), Spain and Greece (both 10%).

At the end of 2013, Germany and France remained the largest banking sectors in the euro area, with total asset values of €6.7 trillion and €6.3 trillion respectively. The banking sectors in Spain and Italy were a considerable distance away, with total assets amounting to €3.5 trillion and €2.6 trillion respectively. At the other end of the spectrum, the assets of the Estonian and Latvian banking sectors amounted to €21 billion and €29 billion respectively.

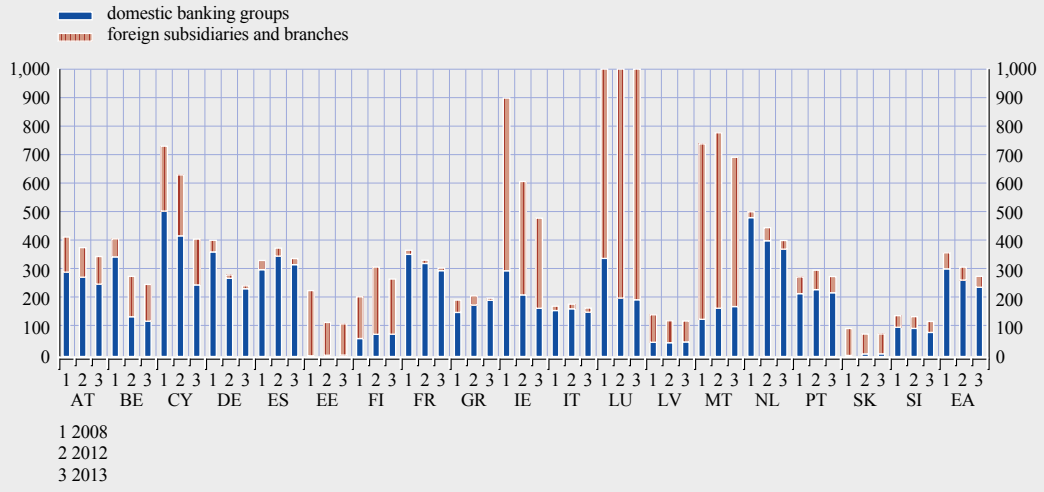
If the size of the different euro area banking sectors is measured in relation to GDP, the overall picture is radically different (see Chart 2). In terms of country GDP, Luxembourg stands out as the largest banking sector, with assets representing 1579% of GDP, followed by Malta, Ireland and Cyprus with banking assets representing 693%, 481% and 409% of GDP respectively. It is worth mentioning that these percentages decreased substantially after the end of 2012. Moreover, in Luxembourg, Malta and Ireland the vast majority of the banking assets are held by foreign-controlled subsidiaries and branches.

4 This figure refers to the number of credit institutions covered by the Consolidated Banking Data (CBD) statistics. In the case of some countries, the CBD statistics do not cover the entire banking sector (there are, notably, gaps in reporting on small banks). While this may raise concerns as to the accuracy of the total number of banking institutions, the coverage is very satisfactory in terms of banking systems' assets.

5 In absolute terms, the adjustment in 2013 was large, particularly in France, Germany, Ireland, Italy, the Netherlands and Spain. It is explained to a large extent by specific factors, such as the resolution of large banks and changes in the market value of derivative financial instruments.

6 The large reduction in the relative value of assets in Estonia was mainly driven by the restructuring in the ownership of a foreign banking group in 2011.

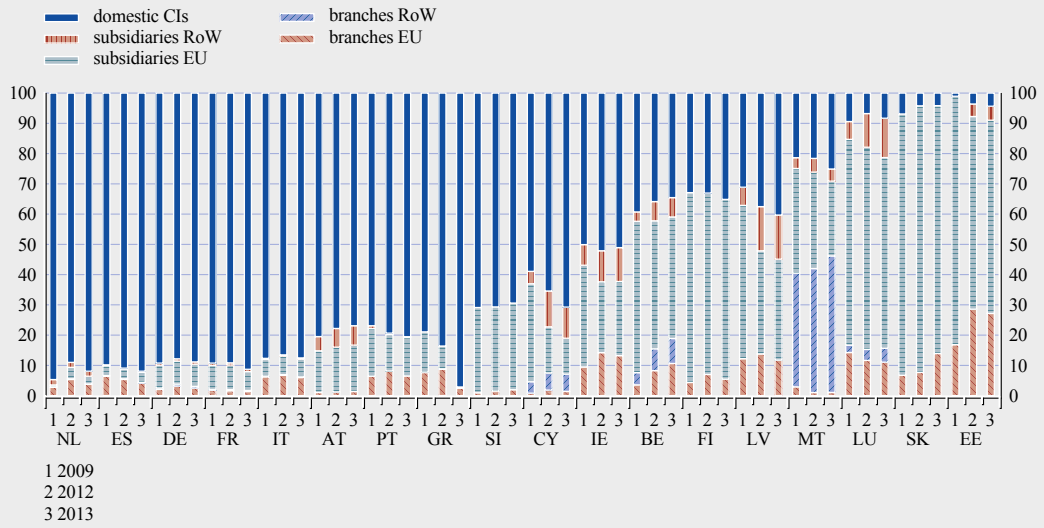
Chart 2 Total assets of domestic banking groups and foreign-controlled subsidiaries and branches in relation to GDP in euro area countries in 2008, 2012 and 2013



Sources: ECB/Financial Stability Committee (FSC) Consolidated Banking Data statistics and ECB calculations.

Banking sector asset sizes across euro area countries mask substantial differences when it comes to the presence of foreign banks (via bank branches or subsidiaries) and their relative weight with respect to domestic credit institutions (see Chart 3). Over the period 2009-2013, the size of domestic banking assets, as opposed to banking assets under foreign control, increased in Greece,[7] Ireland,

Chart 3 The composition of banking sector assets in euro area countries by type of credit institution (CI) in 2009,[1] 2012 and 2013



Sources: ECB/FSC Consolidated Banking Data statistics and ECB calculations.
1) Data for 2008 are not available for all countries.

7 In Greece the increase was particularly prominent in 2013 owing to the acquisition of most of the foreign subsidiaries and branches by two large domestic banks.

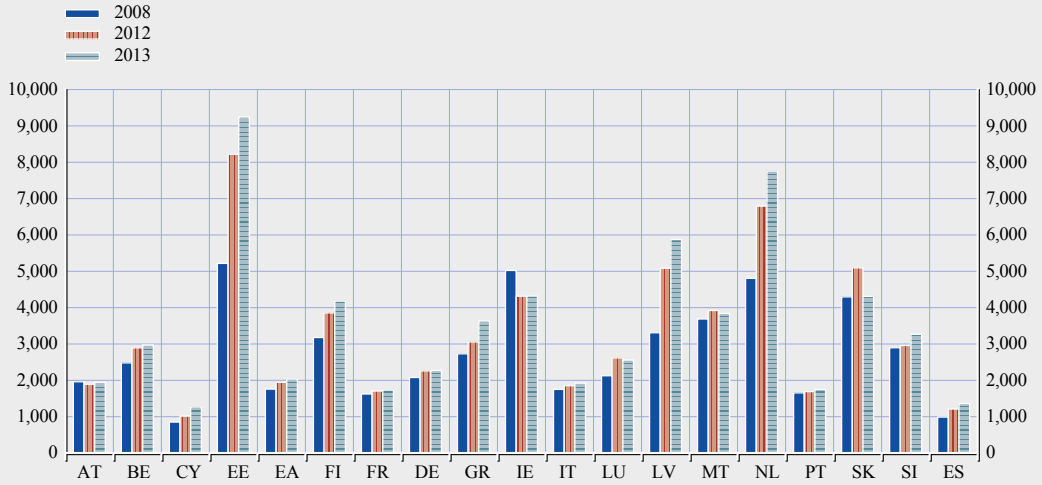
Portugal and Cyprus, which in the recent past all experienced a consolidation process in the banking sector under the EU/IMF financial assistance programmes. By contrast, it increased marginally in Spain (where financial assistance was provided to the financial sector only). These countries, like most euro area countries, are characterised by a predominance of domestic sector assets (from 50% to as much as 90% of all assets). Among the countries with predominantly foreign-controlled banking systems, Malta and Estonia recorded an increase in domestic banking sector assets over the same period.

A foreign presence in the form of bank subsidiaries supervised by the local authorities, as opposed to foreign branches, clearly prevailed in terms of euro area banking sector assets. However, activity conducted through bank branches increased slightly in Belgium and Estonia after 2008.

The processes of rationalisation and resizing in the euro area banking system documented in this section suggest that the overall efficiency of the system was enhanced over the period from 2008 to 2013. During that period, the number of local bank units (i.e. local branches) in the euro area declined by 12.7%. This represented a net decrease in absolute terms of 23,851 local branches for the euro area as a whole since 2008 and 7,614 since 2012. Germany, Italy, the Netherlands and Spain account for the bulk of that decrease over the entire period from 2008 to 2013, while Greece, Italy and Spain contributed to most of the decrease in 2013.

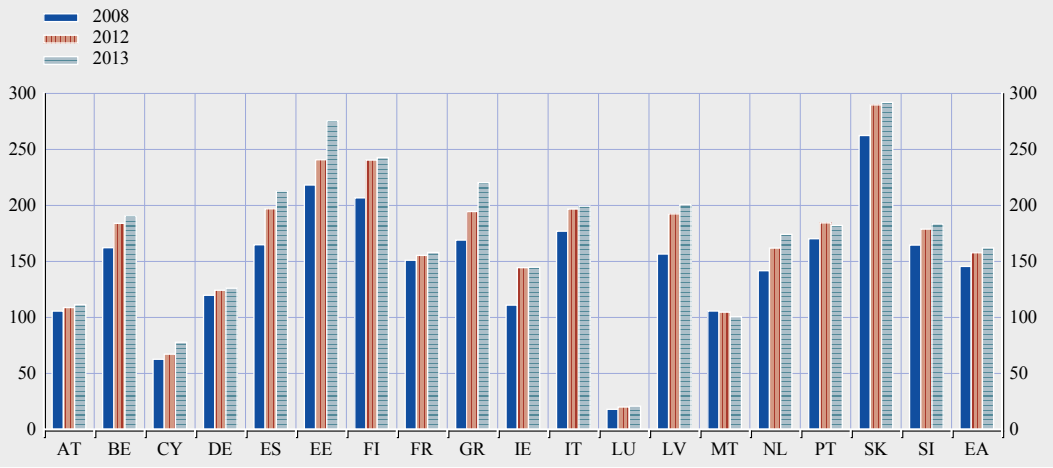
This decline was reflected in the increase of two key banking system capacity indicators: population per local branch and population per banking employee (see Chart 4 and Chart 5). This increase was common to most euro area countries over the years from 2008 to 2013, reflecting conjunctural factors such as pressure to reduce staff costs and branch networks in some countries. Compared to 2012, this trend was especially evident in countries that were participating in EU/IMF financial adjustment programmes in 2013. In particular, the increase in population per banking employee since 2008 was substantial in Cyprus (49%) and Spain (38%), while the population per local branch indicator showed the largest increases in Estonia (83%) and Latvia (77%).

Chart 4 Population per local branch in euro area countries in 2008, 2012 and 2013



Sources: ECB Structural Financial Indicators and ECB calculations.
Note: Branches refer to the local units of credit institutions.

Chart 5 Population per banking employee in euro area countries in 2008, 2012 and 2013



Sources: ECB Structural Financial Indicators and ECB calculations.

Differences across countries reflected structural factors, relating, inter alia, to banks' business models (e.g. the relative importance of investment banking) and country-specific preferences with respect to banking services as well as, to some extent, to population density.

The table below displays additional capacity indicators for the euro area and individual countries as of the end of 2013, in which structural and conjunctural factors play an important role. In the case

Euro area banking sector capacity indicators in 2013

Country	Population per credit institution	Population per branch	Population per ATM[1)]	Population per bank employee	Assets per bank employee	Population density
BE	107,816	2,971	706	191	17,525	336
DE	44,573	2,271	992	126	11,554	230
EE	76,132	9,245	1,618	276	4,104	30
IE	10,048	4,325	1,500	145	23,307	65
GR	282,252	3,631	1,333	220	7,937	86
ES	158,337	1,362	821	213	14,575	91
FR	105,523	1,736	1,118	158	18,169	119
IT	87,966	1,922	1,200	199	13,183	203
CY	8,585	1,271	1,231	78	8,103	94
LU	3,709	2,560	1,200	21	27,291	211
LV	31,973	5,873	1,601	201	2,911	31
MT	15,650	3,841	1,943	101	11,939	1,320
NL	66,402	7,760	2,213	174	23,318	411
AT	11,585	1,946	1,010	111	12,044	101
PT	69,414	1,751	637	182	8,908	114
SI	89,543	3,269	1,150	184	4,129	102
SK	186,655	4,310	2,156	292	3,292	110
FI	17,949	4,184	2,452	243	23,296	16
Euro area	56,932	2,039	1,054	162	14,327	128

Sources: Calculations based on figures in the Annex, the ECB Blue Book and United Nations data.
Notes: Assets per employee are measured in EUR thousands. Population density is expressed as inhabitants per square kilometre.
1) 2012 data.

of assets per employee, the upward trend since 2008 for the euro area as a whole was the product of different results across countries: while the effect of the deleveraging process dominated in some, leading to decreases in the ratio in recent years (not shown), large decreases in the number of employees dominated in others (e.g. in countries participating in financial assistance programmes), resulting in significant rises in assets per employee. In 2013 the ratio decreased somewhat compared to 2012, due to the higher reduction in total assets than in the number of employees. It remains, however, substantially above the ratio before the onset of the global financial crisis.

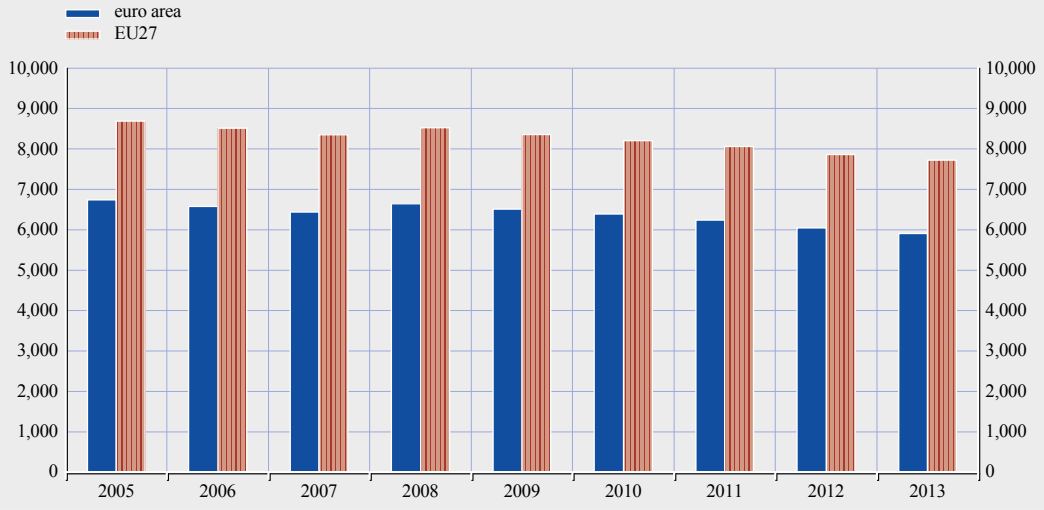
The continued development of these indicators suggests an increasingly more efficient use of resources in the euro area banking sectors. This is in line with developments in efficiency indicators (such as cost-to-income ratios) relating to the financial performance of banks, as discussed in the next section.

CONSOLIDATION AND MERGER AND ACQUISITION ACTIVITY

This section includes all EU countries rather than euro area countries only in order to allow for a distinction between intra- and extra-EU merger and acquisition (M&A) activity. As emphasised in the previous section, consolidation of the euro area banking sector has continued to progress since 2008, with the number of credit institutions declining at a steady pace for both the euro area and the EU as a whole (see Chart 6).

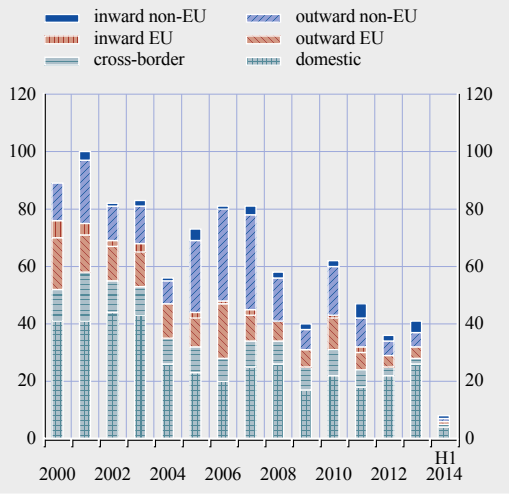
At the same time, total M&A activity in the EU banking sector has been on a declining trend since 2008, in terms of both the number of transactions and total value, especially in the case of non-domestic activity. In terms of the number of transactions, M&A activity in the euro area has been falling almost consistently since 2000. Amid some volatility in recent years and a small rebound in 2013, the number of M&A transactions is still much lower than in 2008, which in itself was already well below the peak in 2001. Cross-border transactions (within the euro area) and outward transactions (with euro area banks as acquirers) were most affected by this decline.

Chart 6 Number of credit institutions



Source: ECB MFI statistics.

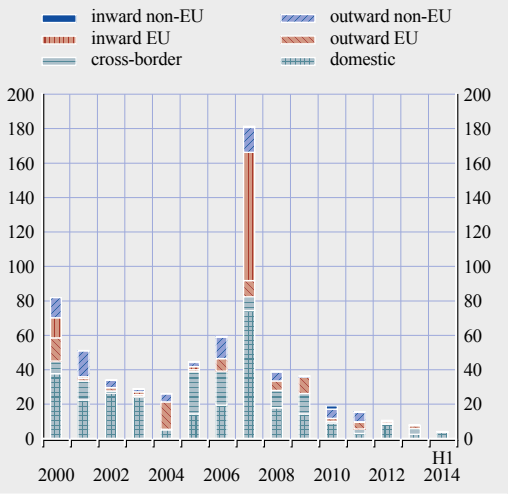
Chart 7 Bank M&As – number of transactions



Source: Dealogic M&A.
Notes: M&As include both controlling and minority stakes. The value of some of the transactions is not reported. "Cross-border" M&As refer to intra-EA18 transactions involving a non-domestic acquirer. "Inward" refers to M&As by non-EU or non-euro area EU28 banks in the euro area and "outward" indicates M&As of euro area banks outside the euro area.

Chart 8 Bank M&As – value of transactions

(EUR billions)



Source: Dealogic M&A.
Notes: M&As include both controlling and minority stakes. The value of some of the transactions is not reported. "Cross-border M&As" refer to intra-EA18 transactions involving a non-domestic acquirer. "Inward" refers to M&As by non-EU or non-euro area EU28 banks in the euro area and "outward" indicates M&As of euro area banks outside the euro area.

The number of domestic transactions[8] remained at roughly the same level in recent years, reflecting on-going consolidation, including in the form of intragroup transactions in Italy and Germany, and the restructuring of the banking sector in the EU-IMF programme countries.[9] The relative share of domestic M&As increased significantly as a result (see Chart 7). More conservative expansion strategies, the uncertainties relating to economic prospects, vulnerabilities in the banking sector and the efforts to strengthen capital positions and focus on risks all appear to have contributed to this decline.

The transaction value of M&A activity across all categories has decreased sharply since 2007, which was an exceptional year in that regard, and continued to follow a downward path in 2013 (see Chart 8). The peak in transaction values in 2007 reflected the acquisition of ABN Amro by the consortium of Royal Bank of Scotland, Fortis and Santander as well as the merger of Sanpaolo IMI and Banca Intesa.

From 2008 to 2013, the overall value of transactions decreased from €39 billion to just €8 billion. Significantly, only one domestic transaction, one cross-border (intra-euro area) transaction and one transaction by a euro area institution with a buyer from another EU country (outward EU) exceeding €1 billion took place in 2013 and in the first half of 2014. M&A activity is expected to remain subdued at least until the completion of the comprehensive assessment in October 2013. The low transaction value, especially of domestic transactions, reflects the fact that transactions

8 "Domestic transactions" denote transactions that take place within national borders. In this report, transactions within the euro area are referred to as cross-border M&As.

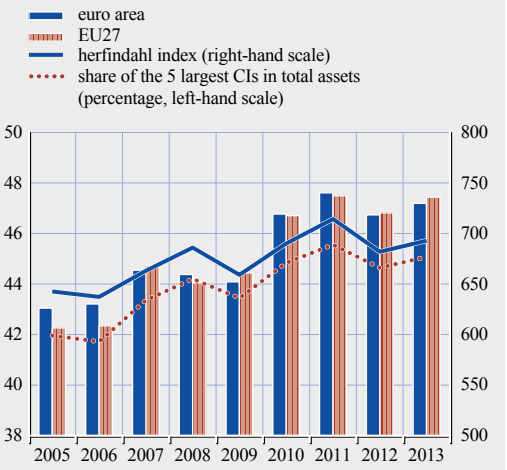
9 The data assessed in this section do not cover participation by governments or special legal entities in the restructuring or resolution of credit institutions.

include bank restructuring and resolution processes and other transactions conducted for disinvestment or deleveraging purposes, as well as the low market capitalisation. To summarise, the reduction in the overall number of credit institutions as a result of M&A activity appears to reflect primarily the results of within-group consolidation rather than actual mergers and takeovers.

CONCENTRATION AND COMPETITION

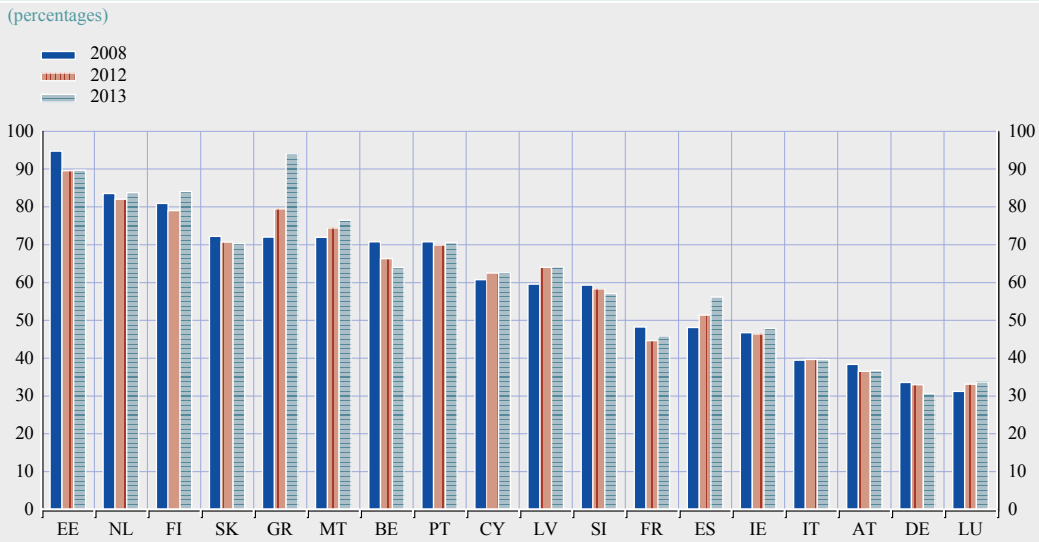
Market concentration, as measured by the share of total assets held by the five largest credit institutions or by the Herfindahl index,[10] has increased both at euro area and EU level since 2010 and in comparison with the pre-crisis period. This primarily reflects the decline in the number of credit institutions as M&A activity remained rather subdued (see Chart 9). For both the euro area and the EU as a whole, the indicators peaked in 2011, fell slightly in 2012 and increased again in 2013, remaining well above the pre-crisis levels.

Chart 9 Market concentration



Source: ECB Structural Financial Indicators.

Chart 10 Share of the five largest credit institutions in total assets



Source: ECB Structural Financial Indicators.
Note: Figures are reported on an unconsolidated basis.

10 The Herfindahl-Hirschman Index (HHI) is defined as the sum of the squares of the market shares of all firms within the industry, where the market shares are expressed as fractions. As a general rule, an HHI below 1,000 signals low concentration, while an index above 1,800 signals high concentration. For values between 1,000 and 1,800, an industry is considered to be moderately concentrated. Note that these indicators are calculated on a non-consolidated basis, meaning that banking subsidiaries and foreign branches are considered to be separate credit institutions.

The modest increase in 2013 was mostly driven by moves in the crisis countries where larger banks acted as consolidators in resolutions of non-viable entities – especially in Cyprus, Greece and Spain.

With regard to cross-country comparison, concentration indices reflect a number of structural factors. Banking systems in larger countries, such as Germany and Italy, are more fragmented and include strong savings and cooperative banking sectors. Banking systems in smaller countries tend to be more concentrated, with the notable exception of Austria and Luxembourg. In the case of Austria, this is on account of a banking sector structure similar to that which characterises larger countries, and in the case of Luxembourg it is due to the presence of a large number of foreign credit institutions.

At the end of 2013, market concentration (measured by the share of assets held by the five largest banks) ranged from close to 95% in Greece to just over 30% in Germany and Luxembourg (see Chart 10).[11] Regarding developments in the period from 2008 to 2013, the banking sector structure tended to become more concentrated in a number of countries, in particular those undergoing deep banking sector restructuring processes such as Cyprus, Greece, Ireland or Spain.

11 Market concentration indices, calculated by bank total assets on an individual basis, produce lower results than concentration indices calculated on a consolidated basis.

2 STRUCTURAL DEVELOPMENTS IN BANKING ACTIVITY

This chapter reviews structural changes in the activity of euro area banks since 2008, with particular focus on changes in 2013, and the broad implications for their balance sheet structure, financial performance, capital position and leverage. The focus is on the domestic banking sector. Findings for countries with a strong foreign bank presence thus need to be read with caution.

BALANCE SHEET STRUCTURE

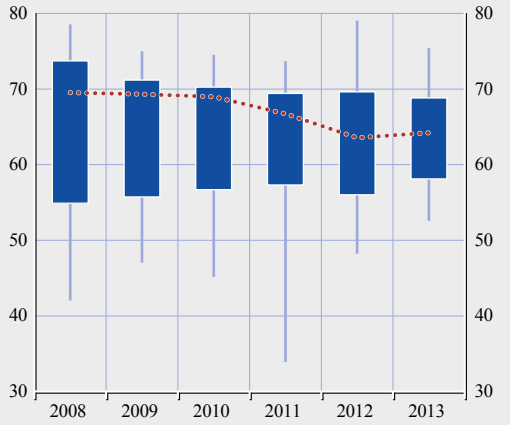
Mirroring developments in the years 2008-2012, the structure of euro area bank balance sheets continued to be shaped by both cyclical and structural developments in 2013. Most importantly, total assets of the euro area banking sector, including foreign subsidiaries and branches, stood on a consolidated basis at €26.8 trillion at the end of 2013, reflecting a decline of 9.4% vis-à-vis 2012. Domestic euro area banks' total assets dropped from €25.3 trillion in 2012 to €23.1 trillion in 2013. This was mainly due to the on-going balance sheet repair and the related deleveraging of (non-core) assets. By asset type, the reduction in reported derivative positions – in particular by banks in France and Germany – accounted for around half the balance sheet shrinkage on aggregate. This largely reflected the intensified use of trade compression and trade reconciliation as well as the implementation by some large banks of accounting rules which allow for derivatives netting in certain conditions. In addition, a cutback in total loans (including customer and interbank loans) accounted for around a quarter of the decline in euro area banks' assets. Against this backdrop, the share of total loans in bank assets increased in the majority of euro area countries as banks' total assets tended to fall more strongly than the size of the loan book, while the median value remained broadly unchanged. At the same time, cross-country heterogeneity decreased (see Chart 11).

Similarly, following a marked increase in the period between 2008 and 2012, the median share of debt securities in bank assets increased further in 2013 driven by the strong drop in total assets and despite the sizeable reduction of sovereign bond holdings in some countries (e.g. Italy and Spain) in the final quarter of 2013. However, this development masks different patterns across euro area countries (see Chart 12).

A more detailed breakdown of assets continues to reveal large cross-country differences in terms of the euro area banking sectors' asset structure (see Chart 13).[12] For instance, the share of loans and receivables in total assets, while increasing in the majority of countries in 2013, continued to vary strongly from 52% in France to 82% in Cyprus. By contrast, the share of trading assets in total assets decreased in almost all countries,

Chart 11 Share of total loans in total assets of euro area banking sectors

(all domestic banks; percentages; maximum, minimum, interquartile range and median across national banking sectors)

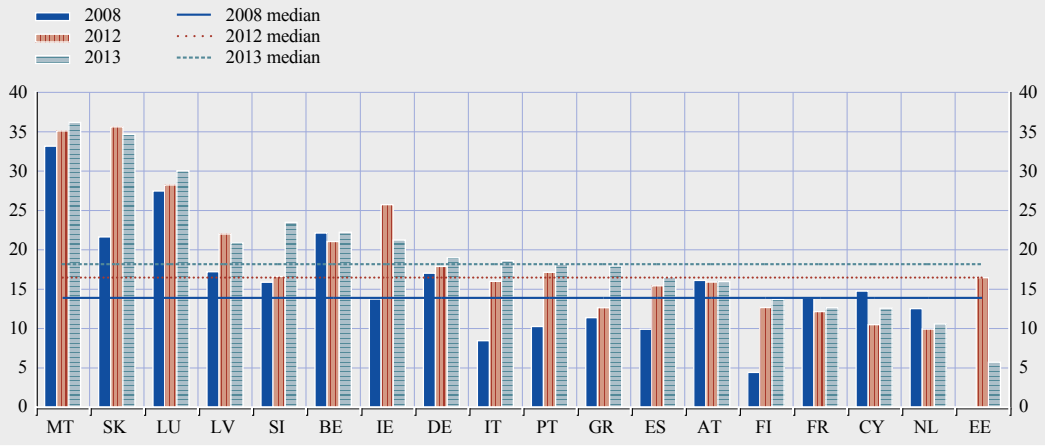


Source: ECB/FSC Consolidated Banking Data statistics.
Note: Total loans include both interbank loans and loans to non-banks.

12 A more detailed breakdown of assets is available only for banks reporting on the basis of the International Financial Reporting Standards (IFRS). Nonetheless, in 2013, IFRS reporting banks represented 88% of the full sample. However, cross-country comparisons need to be interpreted with caution, as, for example, IFRS reporting banks represent only 63% and 73% of total banking sector assets in Germany and Austria respectively.

Chart 12 Share of debt securities in total assets of euro area banking sectors

(all domestic banks; percentage of total assets)



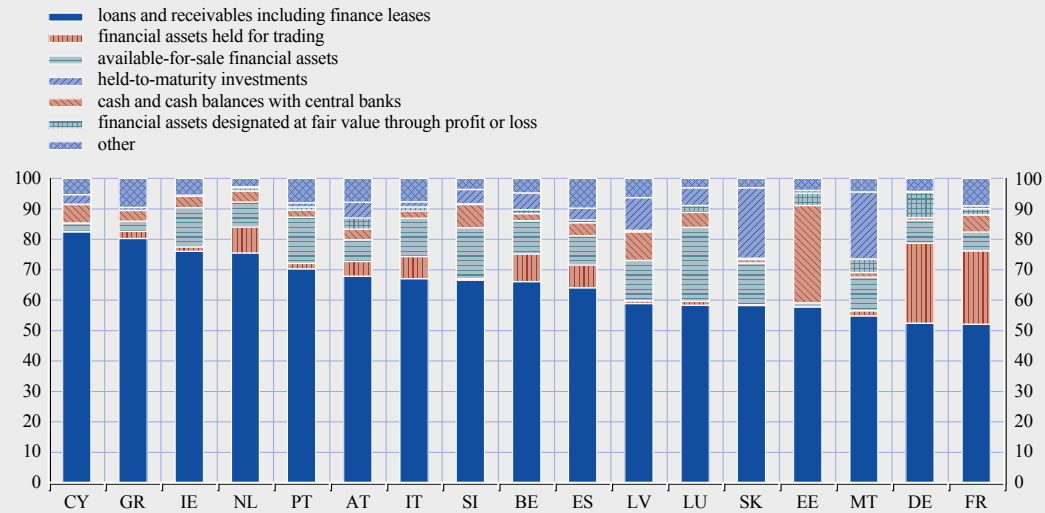
Source: ECB/FSC Consolidated Banking Data statistics.

while staying typically below 10%, with the notable exception of Germany and France where this figure is roughly 25%, given the presence of some large banks with sizeable investment banking activities.

The asset structure of banks' balance sheet also differs by bank size. The share of trading assets (including derivatives held for trading) in large banks' assets fell considerably from 24% in 2012 to 19% in 2013, driven by the strong decline in reported derivative positions (see above). By contrast,

Chart 13 Asset breakdown of euro area banking sectors

(2013; all domestic banks; percentage of total assets)



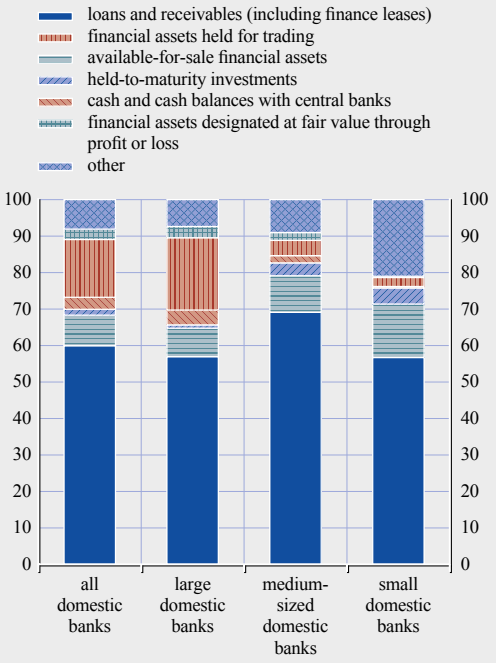
Source: ECB/FSC Consolidated Banking Data statistics.
Notes: IFRS reporting banks only. Data are not available for Finland. Other assets include, for instance, derivatives used for hedging purposes, tangible assets (e.g. property), intangibles and investments.

trading assets as a share of medium-sized and small banks' total assets were stable at 4% and 2% respectively (see Chart 14). The asset structure of medium-sized banks remained broadly unchanged in 2013, revealing a higher share of loans in total assets (69%) than is the case with large and small banks (up from 54% to 57% in both categories in 2013), indicating that banks in that size group tend to follow business models which are more geared to traditional banking activities.

As regards banks' liabilities and funding patterns, the gradual shift – at least in relative terms – towards deposit funding continued in 2013, with the median share of customer deposits in liabilities rising to 52%, taking the cumulative increase since 2008 to 12 percentage points (see Chart 15). In parallel, euro area banks continued to reduce their dependence on wholesale funding in 2013, with the median share of wholesale funding in total funding falling to 23%, well below its peak of 36% in 2009 (see Chart 16). The cross-country dispersion of wholesale funding reliance also decreased although it still accounted for at least one-third of bank liabilities in several countries.

Chart 14 Asset breakdown of euro area banks in different size groups

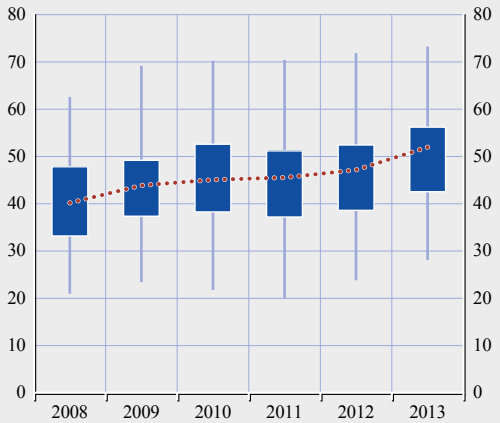
(2013; all domestic banks; percentage of total assets)



Source: ECB/FSC Consolidated Banking Data statistics.
Notes: IFRS reporting banks only. Other assets include, for instance, derivatives used for hedging purposes, tangible assets (e.g. property), intangibles and investments.

Chart 15 Share of customer deposits in total liabilities of euro area banking sectors

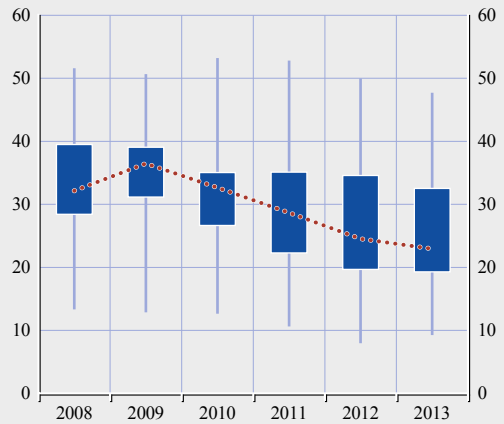
(all banks; percentage of total assets; maximum, minimum, interquartile range and median across national banking sectors)



Source: ECB/FSC Consolidated Banking Data statistics.

Chart 16 Share of wholesale funding in total liabilities of euro area banking sectors

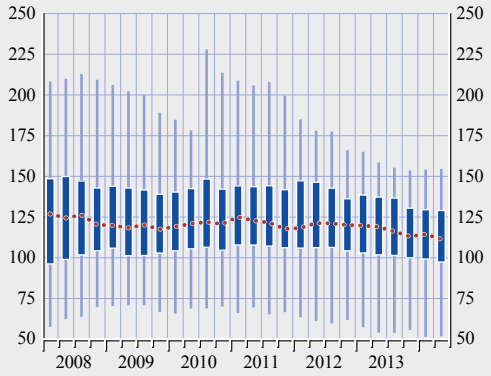
(all banks; percentage of total assets; maximum, minimum, interquartile range and median across national banking sectors)



Source: ECB/FSC Consolidated Banking Data statistics.
Note: Wholesale funding includes interbank liabilities and debt securities.

Chart 17 Loan-to-deposit ratios of euro area banking sectors

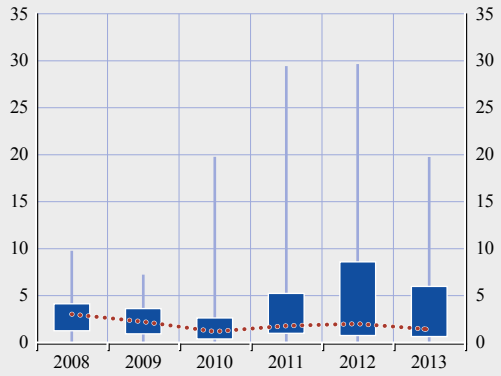
(Q1 2008-Q2 2014; percentage of total assets; maximum, minimum, interquartile range and median across national banking sectors)



Sources: ECB MFI statistics and ECB calculations.

Chart 18 Share of central bank funding in total liabilities of euro area banking sectors

(all banks; percentage of total assets; maximum, minimum, interquartile range and median across national banking sectors)



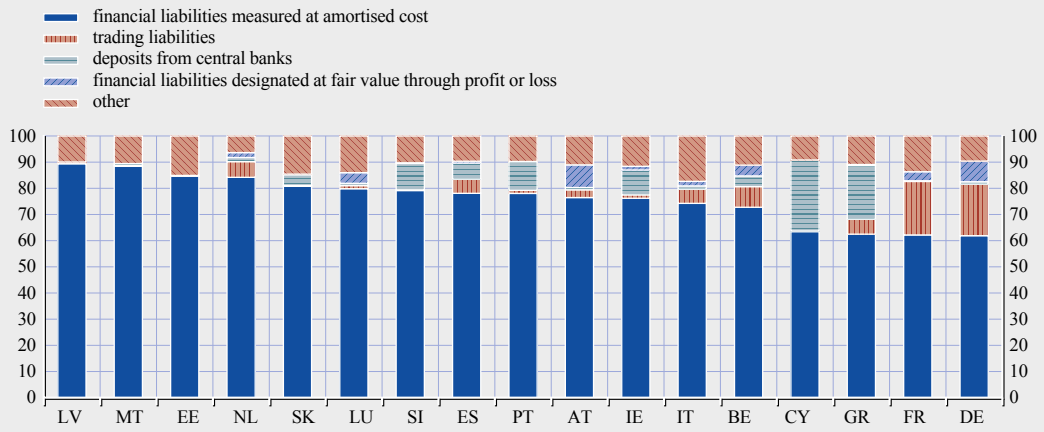
Sources: ECB MFI statistics and ECB calculations.

The steadily rising share of retail deposits combined with a decline in the extension of credit to the economy led to a further decrease in the median euro area loan-to-deposit ratio from around 120% in 2012 to 112% in mid-2014 (see Chart 17).[13]

A more granular breakdown of liabilities – available for IFRS reporting banks only – also reveals that banks in general reduced their reliance on central bank funding in 2013 compared with one year earlier (see Chart 18), mainly reflecting the repayments of funds borrowed through the three-year LTROs that started in early 2013.

Chart 19 Liability breakdown of euro area banking sectors

(2013; all domestic banks; percentage of total assets)



Sources: ECB/FSC Consolidated Banking Data statistics and ECB calculations.
Notes: IFRS reporting banks only. Data are not available for Finland. Other liabilities include, for instance, derivatives used for hedging purposes, financial liabilities associated with transferred financial assets, provisions and equity.

13 For the calculation of loan-to-deposit ratios, MFI data are used as non-bank loans cannot be separated out in the CBD data.

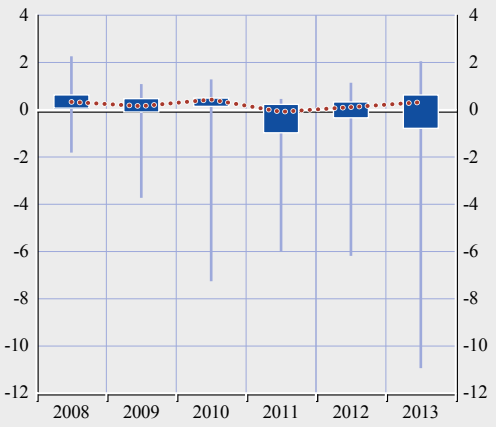
Looking at cross-country differences in the structure of banks' liabilities, at the end of 2013 the share of financial liabilities measured at amortised cost – a category largely consisting of deposits – ranged from 89% in Latvia to 62% in Germany (see Chart 19). Mirroring patterns on the asset side, the share of trading liabilities is the largest for banks in Germany and France, accounting for around 20% of total liabilities. Finally, the reliance on central bank funds continued to be most significant in more vulnerable euro area countries.

FINANCIAL PERFORMANCE AND COST STRUCTURE

The subdued financial performance of the euro area banking sector observed since the onset of the financial crisis continued in 2013. However, cross-country differences remained notable that year (see Chart 20), with an increasing downside skew in the profitability distribution across euro area countries. Banking sectors (domestic banks) continued to report losses in five euro area countries (Cyprus, Ireland, Italy, Portugal and Slovenia), although in Cyprus and Ireland the losses were lower than in 2012. By contrast, the Latvian and

Chart 20 Return on assets of euro area banking sectors

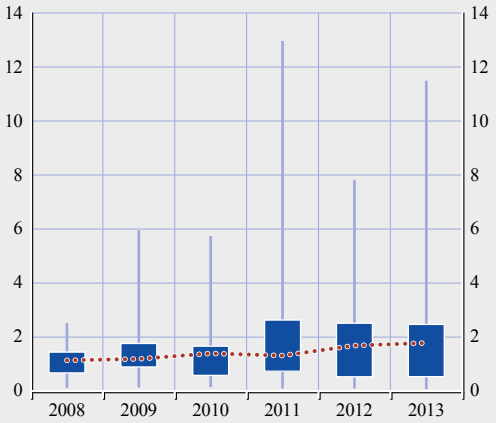
(all domestic banks; percentages; maximum, minimum, interquartile range and median across national banking sectors)



Source: ECB/FSC Consolidated Banking Data statistics.

Chart 21 Impairments and provisions of euro area banking sectors

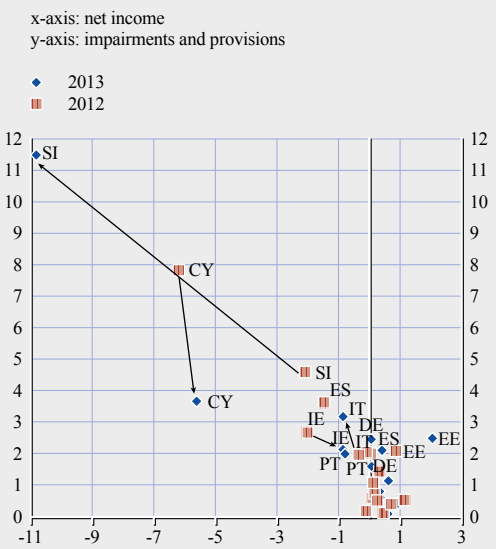
(all domestic banks; percentage of total assets; maximum, minimum, interquartile range and median across national banking sectors)



Source: ECB/FSC Consolidated Banking Data statistics.

Chart 22 Net income and impairments and provisions of euro area banking sectors

(all domestic banks; percentage of total assets)



Source: ECB/FSC Consolidated Banking Data statistics.

Spanish banking sectors regained profitability in 2013, in the latter case mainly due to the decrease in impairment losses following the substantial provisioning efforts by banks in the previous year.

In recent years, the profitability of the euro area banking sector has been mainly challenged by the on-going deterioration in asset quality, with ensuing increases in impairment charges and provisions (see Chart 21). In the period under review, the related impact on profitability did, however, differ across countries (see Chart 22). On the one hand, impairment charges and provisions declined – albeit from still rather high levels – in countries such as Cyprus, Ireland and Spain. On the other hand, increases were recorded in some euro area economies, including Italy and Slovenia.

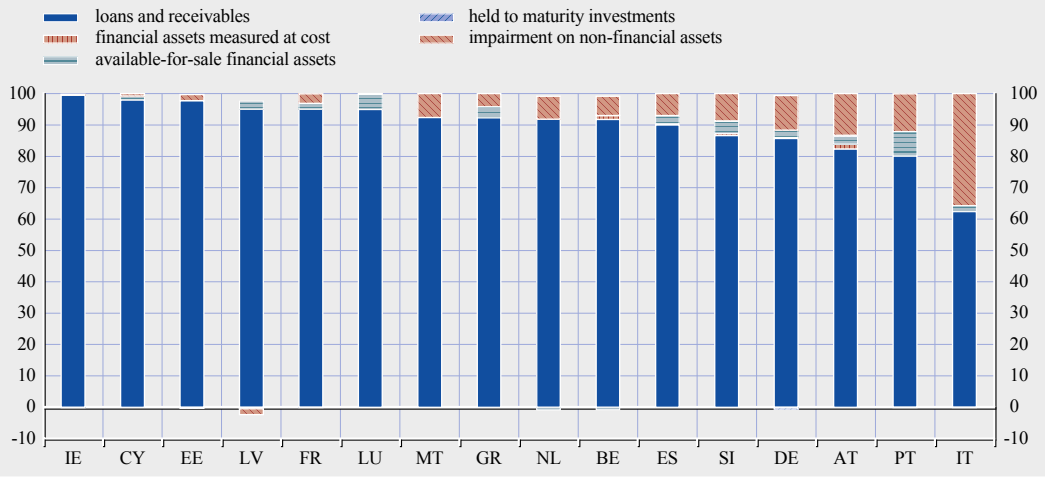
Most of the impairment charges during 2013 were attributable to losses on loans and receivables (see Chart 23). In some countries, sizeable impairments were also incurred on other financial assets as well as on non-financial assets. The latter mainly refer to goodwill write-downs associated with divestments and restructurings.

In addition to impairment charges and provisions, in some cases restructuring costs and litigation charges also had a negative impact on bank profitability.

Deteriorating loan quality resulted in a steady and broad-based increase in non-performing loans (NPLs) in many countries from 2008 onwards, with fairly pronounced further increases in some cases during 2013 (see Chart 24). Available country-level data suggest that the rise in NPLs was mostly driven by worsening credit quality in the corporate sector and less so in retail operations. First tentative signs of a levelling-off in the pace of NPL accumulation emerged in some countries, but the turning point does not yet appear to have been reached. That said, cross-country comparisons need to be made with caution, owing to continued underlying methodological differences across countries.

Chart 23 Impairment charges breakdown of euro area banking sectors

(2013; all domestic banks; percentage of total impairments)



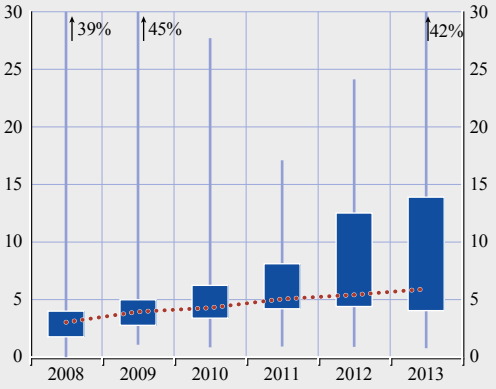
Source: ECB/FSC Consolidated Banking Data statistics.
Note: Data are not available for Finland or Slovakia.

Banks raised enough provisions to compensate for the increase in non-performing loans, with the average euro area coverage ratio increasing to 48% in 2013, up from 45% in 2012 (see Chart 25).[14] Nevertheless, coverage ratios declined significantly in some countries, where profitability developments would have been less favourable if coverage ratios had been kept constant.

Overall, operating profits across euro area banking sectors declined somewhat in 2013, as a marginal increase in underlying income was not enough to offset the increase in operating expenses. However, declines in operating profits were only reported in five countries (Austria, Greece, Malta, Portugal and Slovenia). In contrast to previous years, banking sectors in all countries managed to avoid an operating loss (see Chart 26).

Chart 24 Gross total doubtful and non-performing loans of euro area banking sectors

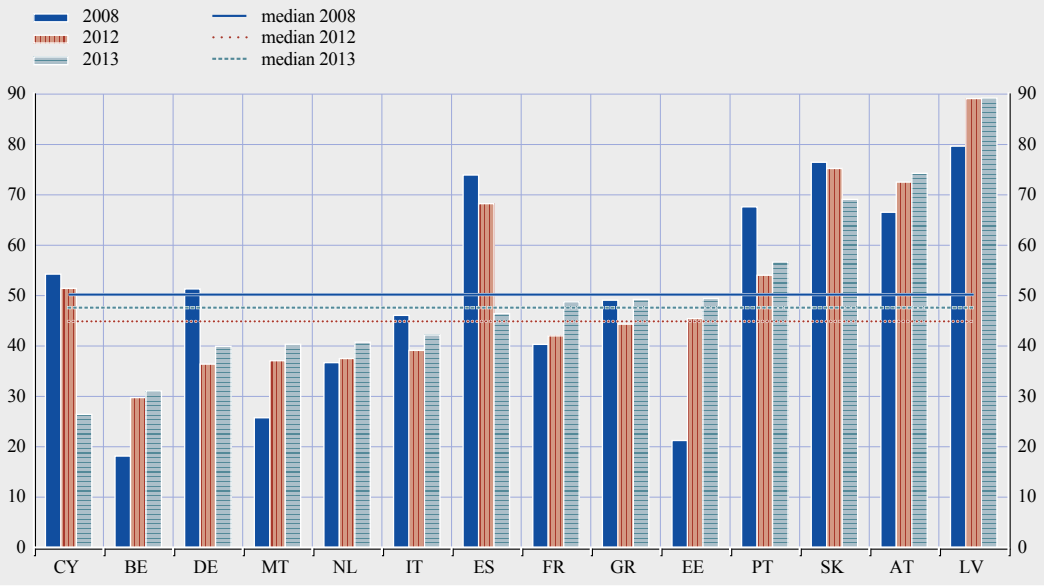
(all domestic banks; percentage of debt instruments and total loans and advances; maximum, minimum, interquartile range and median across national banking sectors)



Source: ECB/FSC Consolidated Banking Data statistics.
Notes: Data are not available for Ireland, Luxembourg or Slovenia. Data are not fully comparable across countries owing to different definitions of non-performing loans across countries.

Chart 25 Coverage ratios of euro area banking sectors

(all domestic banks; total loan loss reserves as a percentage of total gross doubtful and non-performing loans)

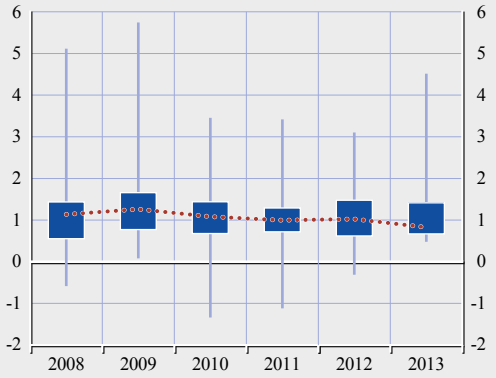


Source: ECB/FSC Consolidated Banking Data statistics.
Notes: Data are not available for Finland, Ireland, Luxembourg or Slovenia. Data are not fully comparable across countries owing to different definitions of non-performing loans across countries.

14 Data on coverage ratios of euro area banking sectors are not strictly comparable across euro area Member States owing to lack of harmonisation in the definition of non-performing loans. In addition, in some cases methodological changes affected the calculation of coverage ratios (most notably in the case of Spain).

Chart 26 Operating profits of euro area banking sectors

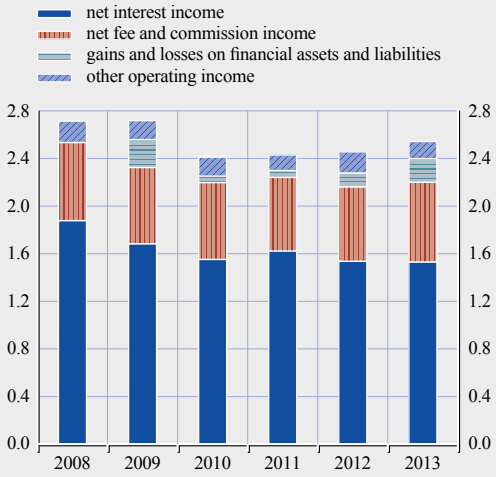
(all domestic banks; percentage of total assets; maximum, minimum, interquartile range and median across national banking sectors)



Sources: ECB/FSC Consolidated Banking Data statistics.

Chart 27 Operating income structure of the euro area banking sector

(all domestic banks; percentage of total assets)

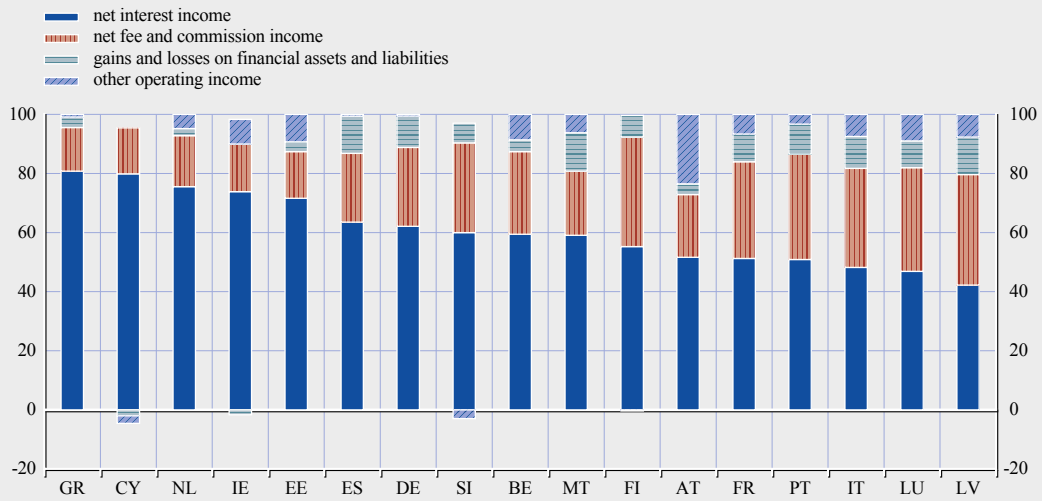


Source: ECB/FSC Consolidated Banking Data statistics.

Operating income increased marginally in 2013 after four years of steady declines (see Chart 27). The increase was attributable to higher net fee and commission income and larger gains on financial assets, while net interest income and other operating income continued their downward trend. However, the structure of operating income differed considerably across countries, with net interest income ranging from 42% to 80% of total operating income (see Chart 28). These cross-country

Chart 28 Operating income structure of euro area banking sectors

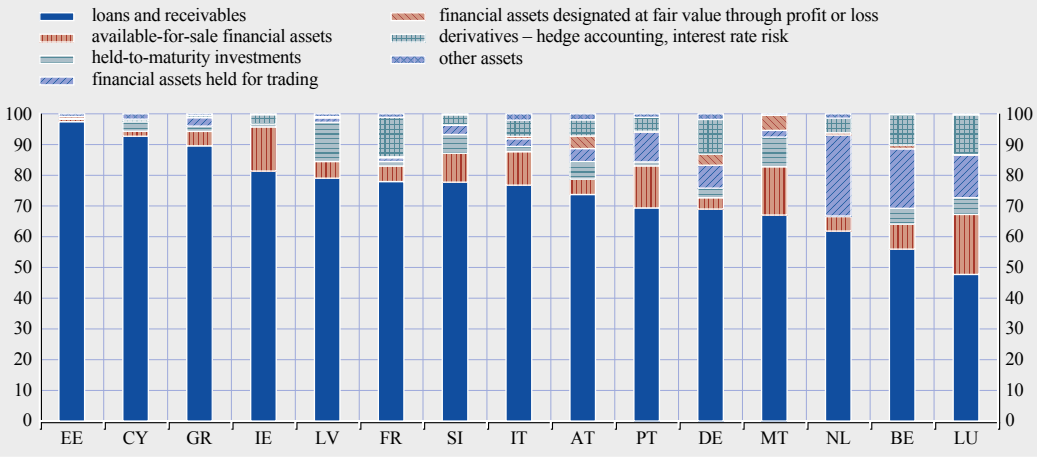
(2013; all domestic banks; percentage of total operating income)



Source: ECB/FSC Consolidated Banking Data statistics.
Note: Data are not available for Slovakia.

Chart 29 Interest income structure of euro area banking sectors

(2013; all domestic banks; percentage of total interest income)



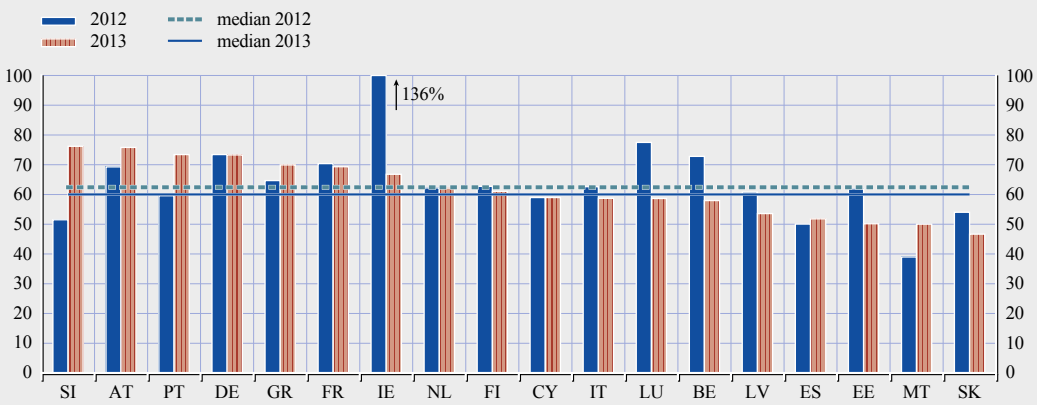
Source: ECB/FSC Consolidated Banking Data statistics.
Note: Data are not available for Finland, Slovakia or Spain.

differences can be explained by factors such as the relative importance of non-bank financial intermediation, among other things. For example, countries with more mature corporate bond markets tend to generate higher fee and commission income for banks from bond underwriting activities.

The sources of interest income also varied significantly across countries (see Chart 29). Although interest income from loans and receivables accounted for the bulk of total interest income in all countries but Luxembourg, the share varied strongly from around 47% to 97% of total interest income in 2013. Nevertheless, in some countries interest income from other financial assets – mainly bonds – reported as available for sale and/or held for trading was significant.

Chart 30 Cost-to-income ratio of euro area banking sectors

(all domestic banks; percentages)

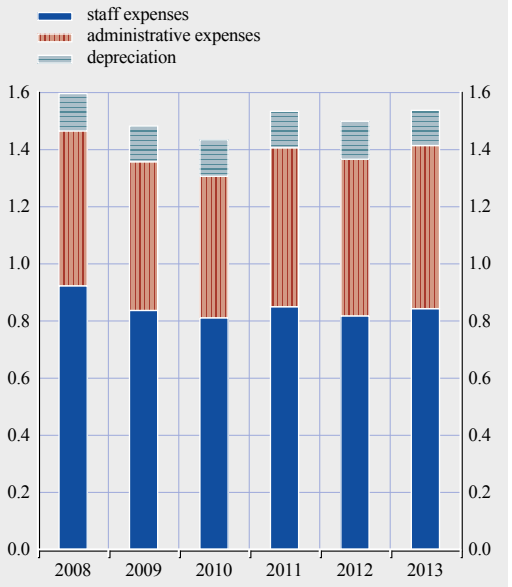


Source: ECB/FSC Consolidated Banking Data statistics.
Note: Data are not available for Luxembourg.

The median cost-to-income ratio for euro area banking sectors fell from over 62% in 2012 to 60% in 2013 (see Chart 30). Given the slight increase in revenues, this development suggests only limited cost cutting efforts by banks. Indeed, operating costs as a share of total assets increased slightly from 2012 to 2013, as cost cutting efforts did not keep pace with asset shedding in the banking sector (see Chart 31). Staff costs – which account for the largest share of total costs – actually increased slightly in 2013, suggesting that the banking sector as a whole did not make significant cost savings from lay-offs and declines in compensation, even though differences appear to be marked in terms of bank size. For large banks, staff costs increased in the three years from 2010 to 2013, reaching 0.78% of total assets or 35% of total operating income, up from 0.70% or 34% respectively in 2012. Staff costs for small banks remained lower than for large banks and fell even further over the course of 2013 to 0.15% relative to total assets and 4.7% of total operating income.

Chart 31 Composition of operating expenses of the euro area banking sector

(all domestic banks; percentage of total assets)



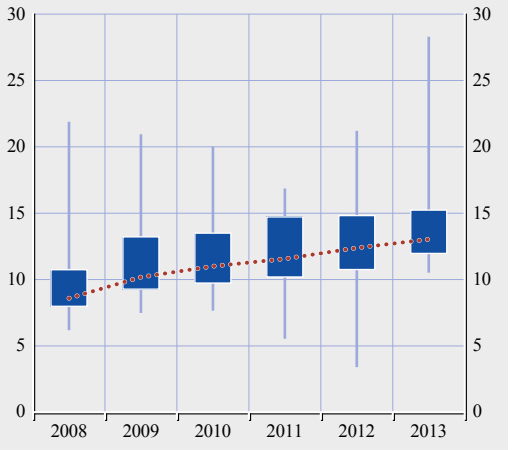
Source: ECB/FSC Consolidated Banking Data statistics.

CAPITAL AND LEVERAGE

The regulatory capital ratios of euro area banks (calculated on a Basel 2.5 basis) continued to improve in 2013, with the median Tier 1 ratio increasing to 13.0% from 12.4% in 2012 (see Chart 32). The improvement was helped by both capital increases and risk-weighted asset declines. The decomposition of changes in Tier 1 ratios shows, however, that, similar to 2012, a larger share of the improvement stemmed from the reduction in risk-weighted assets, which in turn resulted from deleveraging and the shift in banks' assets towards exposures with lower risk weights (see Chart 33).

Chart 32 Dispersion of Tier 1 ratios across national banking sectors in the euro area

(all domestic banks; percentages; maximum, minimum, interquartile range and median across national banking sectors)

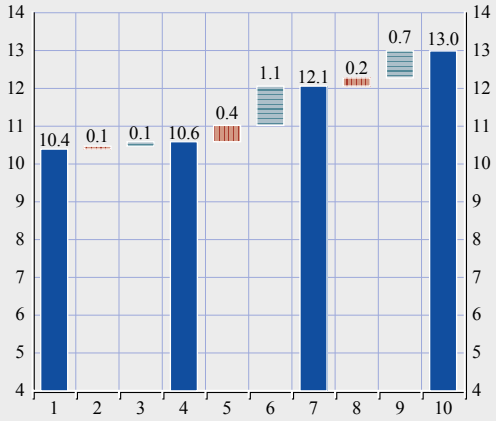


Source: ECB/FSC Consolidated Banking Data statistics.

The decline in risk-weighted assets (RWAs) in 2013 affected both credit risk-related RWAs (-6%) and market risk-related RWAs (-8%) as well as, to a lesser extent, operational risk-related RWAs (-3%) (see Chart 34). The continued decline in credit risk-related RWAs, which was most pronounced in some vulnerable countries, reflects reduced lending activity and the cleaning of balance sheets (including asset transfers to asset management companies and loans sales).

Chart 33 Decomposition of changes in the aggregate Tier I ratio of the euro area banking sector

(all domestic banks; percentage point changes; percentages)

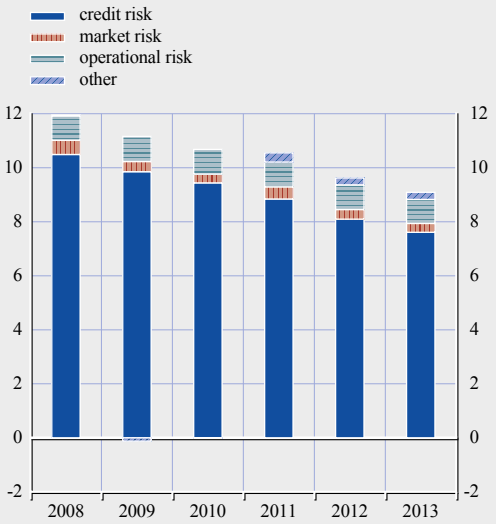


1 T1 ratio 2010
2 Increase in capital
3 Decline in RWA
4 T1 ratio 2011
5 Increase in capital
6 Decline in RWA
7 T1 ratio 2012
8 Increase in capital
9 Decline in RWA
10 T1 ratio 2013

Source: ECB/FSC Consolidated Banking Data statistics.

Chart 34 Breakdown of risk-weighted assets of euro area banks

(all domestic banks; EUR billions)



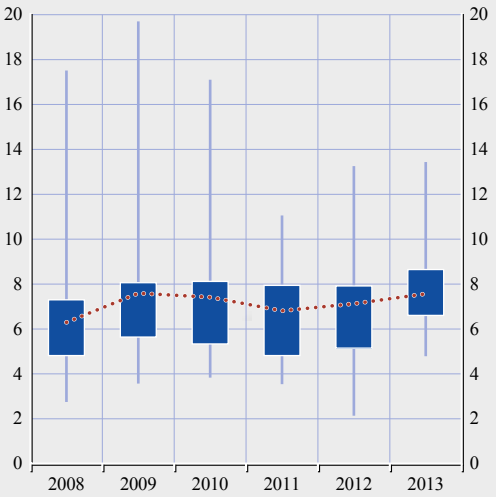
Source: ECB/FSC Consolidated Banking Data statistics.

The decrease in market risk-related RWAs slowed down in 2013, with Belgian, German and French banks accounting for nearly 70% of the overall decline. This reflects continued efforts by banks with significant investment banking operations to optimise their capital-market related activities as a response to regulatory changes, for instance by reducing more capital-intensive activities, such as fixed-income trading as well as efforts to further reduce their leverage.

Banks in most euro area countries improved their balance sheet-based leverage ratios in 2013, with the median equity-to-assets ratio increasing to 7.6% from 7.1% one year earlier (see Chart 35).[15] For the euro area banking sector as a whole, this was mainly driven by a decline in total assets (-8%) and, to a lesser extent, by an increase in total equity (2%). The improvement in leverage ratios was broad-based across euro area countries, as indicated by the upward shift

Chart 35 Equity-to-total assets ratios of euro area banking sectors

(all domestic banks; percentages; maximum, minimum, interquartile range and median across national banking sectors)

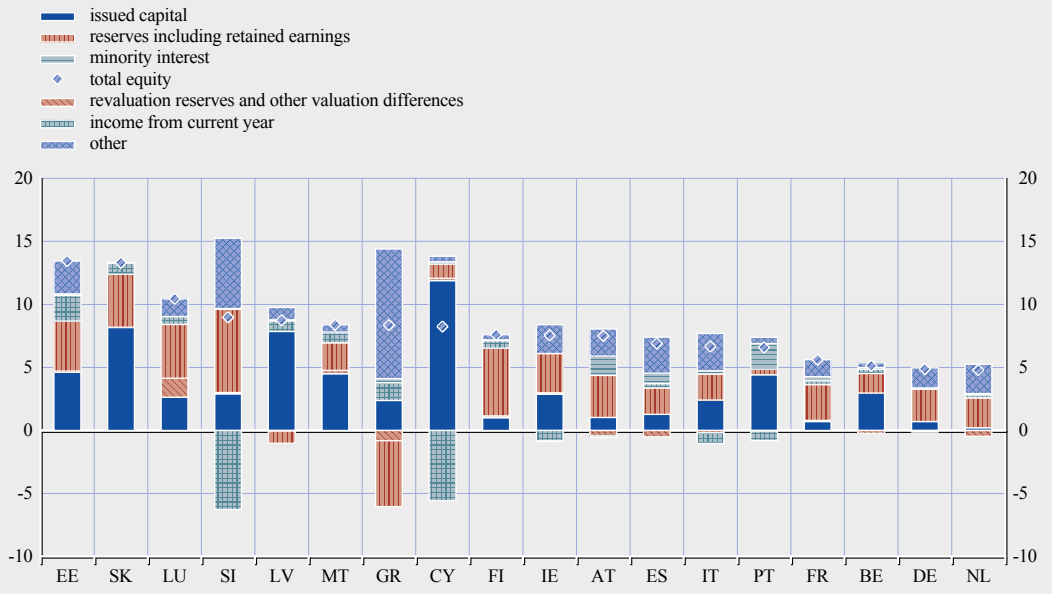


Source: ECB/FSC Consolidated Banking Data statistics.

15 Leverage ratios are proxied by equity-to-total asset ratios owing to the lack of publicly available data on Basel III leverage ratios.

Chart 36 Main components of total equity of euro area banks by country

(2013; all domestic banks; percentage of total assets)



Source: ECB/FSC Consolidated Banking Data statistics.

of the interquartile range of country values. However, dispersion across countries remained very significant, with equity-to-total assets ratios ranging from 4.8% to 13.4%.

Looking at the composition of banks' equity, for the euro area banking sector as a whole, income from the current year increased the most, due to a moderate profit in 2013 as opposed to a significant loss one year earlier, with reserves including retained earnings also contributing to the increase. At the same time, declines in issued capital (in particular in Greece) and revaluation reserves offset some of those increases. A decomposition of total equity at country level shows significant cross-country heterogeneity, with typically issued capital and reserves including retained earnings as the largest components (see Chart 36).

SPECIAL FEATURES

A STRUCTURAL FEATURES OF THE WIDER EURO AREA FINANCIAL SECTOR [16]

The size of the entire euro area financial sector has almost doubled over the past decade. Although the traditional banking sector expanded over this period, its growth did not keep pace with that of non-bank entities, in particular the shadow banks (entities that are structured to perform bank-like functions). This special feature discusses the structural features of the wider euro area financial sector. It reviews the different components of the non-bank euro area financial sector with a specific analysis of the composition of assets and the liquidity and maturity mismatches inherent in aggregate balance sheets. The analysis of the euro area financial sector is based on national accounts data and complemented by the more granular investment funds data. The analysis should provide a valuable starting point for the future regular surveillance of leverage, maturity and liquidity mismatches in the non-bank part of the euro area financial sector, as well as the interconnectedness between the non-bank financial sector and the banking sector.

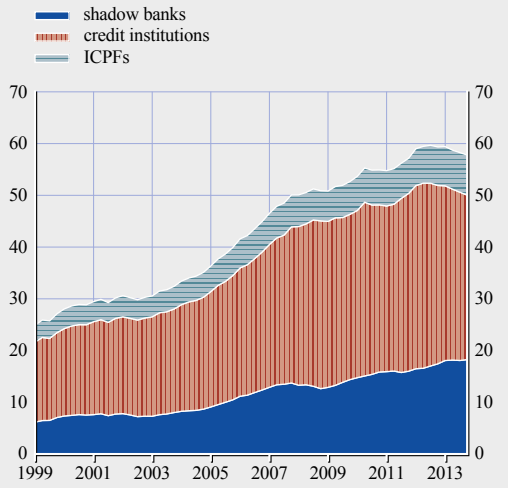
INTRODUCTION

Assets of the entire euro area financial sector – comprising banks, insurance corporations and pension funds (henceforth ICPFs) and shadow banking entities[17] – have almost doubled over the past decade, to reach €57 trillion (almost six times euro area GDP) in 2013. While all components of the financial sector grew over this period, the expansion of the shadow banking sector outpaced that of ICPFs and banks, with the result that its share in the euro area financial system increased from a quarter to a third (see Chart A.1).

Within the euro area financial sector, assets of ICPFs rose from €4 trillion at the end of 2003 to €8 trillion at the end of 2013, but their share in the financial system was almost unchanged at 14%. At the same time, assets of the banking sector (as measured by financial assets of monetary financial institutions (MFIs) resident in the euro area excluding money market funds (MMFs) and the Eurosystem) rose from €19 trillion to €30 trillion, but their share in the financial system fell from 59% to 52%, as the shadow banking sector more than doubled in size, with assets rising from €9 trillion to €19 trillion by the end of 2013. This shift in market share from banks to shadow banks has gathered pace since mid-2012 as banks began to reduce their assets while the OFI sector continued to expand.

Chart A.1 Main components of the euro area financial system

(Q1 1999 – Q4 2013; EUR trillions)



Source: ECB.
Notes: ICPFs refer to insurance corporations and pension funds. Shadow banks include investment funds and nonbank financial intermediaries other than ICPFs.

16 Prepared by Nicola Doyle, Lieven Hermans, Katri Mikkonen and Philippe Molitor.

17 The Financial Stability Board's (FSB) global shadow banking monitoring defines shadow banking as "credit intermediation that involves entities and activities outside the regular banking system". For the purpose of this special feature, the euro area shadow banking sector refers to money market funds (MMFs) and "Other Financial Intermediaries" (OFIs), which include all non-monetary financial institutions apart from insurance corporations and pension funds described earlier. This measure is akin to the broad measure proposed by the FSB in its mapping exercise.

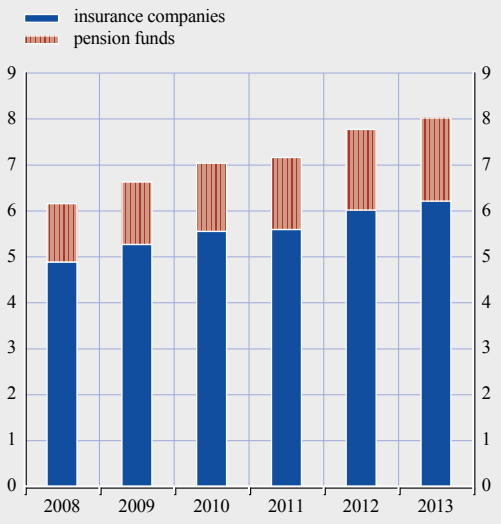
INSURANCE CORPORATIONS AND PENSION FUNDS (ICPFS)

The assets of euro area ICPFs have displayed steady growth during the recent financial crisis (Chart A.2). The country distribution of assets shows that the market is concentrated in few countries. This is particularly true for occupational pension funds, which feature prominently only in the Netherlands and in Germany (Chart A.3). The heterogeneity reflects the significant differences between the pension systems across euro area countries. In particular, many euro area countries rely largely on public sector provided pension schemes, which are not included in the ICPF statistics.[18]

Government and corporate bonds represent a large share of euro area ICPF investments (Chart A.4). A slight increase can be observed in investments in mutual fund shares. By contrast, investments in shares and other equity have declined in recent years. This decline is partly attributable to value declines in equity holdings during the financial crisis, but also to a change in investment strategies with the aim to de-risk investment exposures, a development which began before the financial crisis.

Chart A.2 Total assets of euro area ICPFs

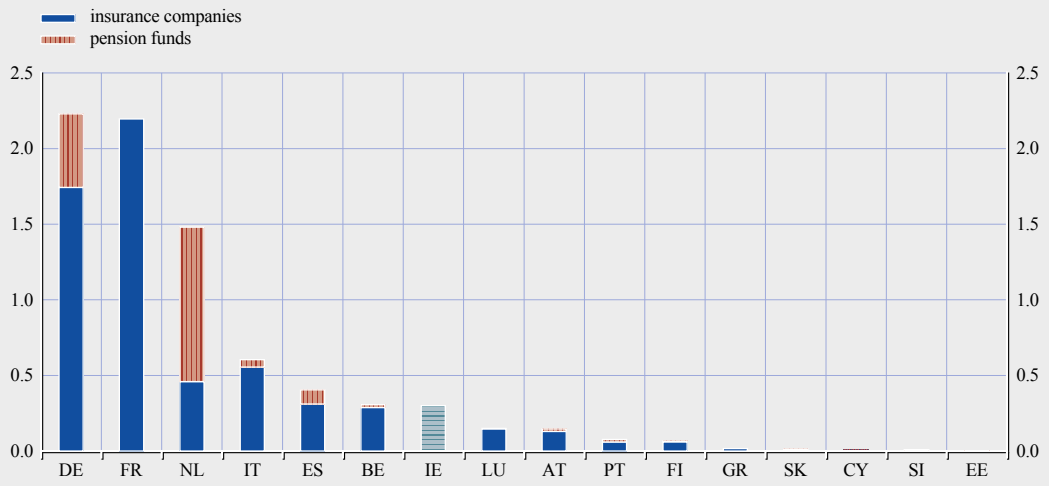
(2008 – 2013; EUR trillions)



Source: ECB data from balance sheets of ICPFs.

Chart A.3 Total assets of ICPFs in euro area countries

(2013; EUR trillions)

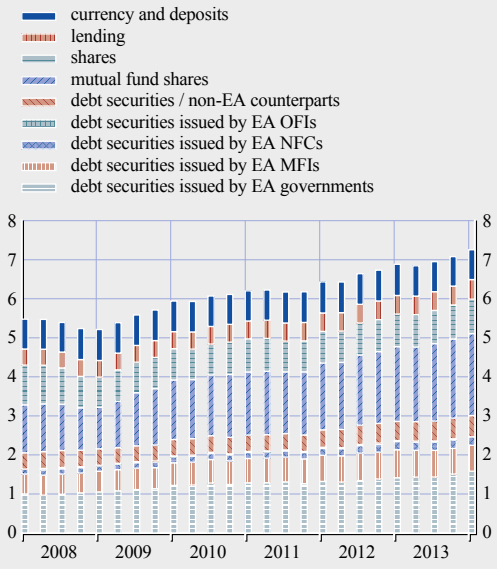


Source: ECB data from balance sheets of ICPFs.
Note: Data for Cyprus and Ireland refer to the aggregate assets of insurance companies and pension funds. Data for Ireland refer to 2012.

18 For a comparison, see Amzallag, A., Kapp D. and Kok C., "The impact of regulating occupational pensions in Europe on investment and financial stability", *ECB Occasional Paper No. 154*, July 2014.

Chart A.4 Assets of euro area insurance companies and pension funds

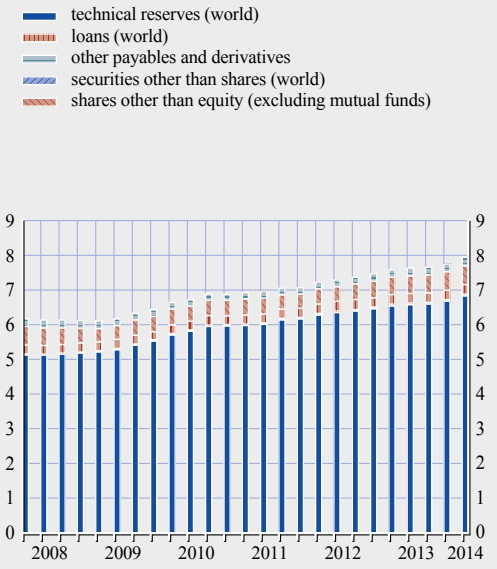
(Q1 2008- Q1 2014; EUR trillions)



Source: ECB data from balance sheets of ICPFs.

Chart A.5 Liabilities of euro area insurance companies and pension funds

(Q1 2008-Q1 2014; EUR trillions)



Source: ECB data from balance sheets of ICPFs.

The share of **direct lending by ICPFs** to counterparties has risen in some euro area countries although on aggregate the level remains low. Historically, lending by ICPFs has been concentrated towards households – in those jurisdictions where direct lending is allowed – and towards governments.[19]

Technical reserves, i.e. premiums paid by the policyholders, constitute the bulk of the liabilities of ICPFs (Chart A.5). The average maturity of liabilities is typically longer than that of the corresponding assets. This **inverted maturity structure** implies highly predictable, long-term outflows, in particular for life insurers and pension funds for which the average maturity of liabilities can amount to decennia. For non-life insurers, the underwriting risks related to insured claims are typically contained by the law of large numbers (e.g. motor insurance) or limited to an acceptable level through the use of reinsurance (e.g. natural catastrophes). Holding fewer interest rate sensitive investments than liabilities for long-term maturities makes the funding ratios of ICPFs sensitive to long-term interest rate movements. Liquidity, in contrast, rarely constitutes a problem for ICPFs, owing to the time lag between receiving premiums and disbursement for the policyholders, and as long as penalties deter policyholders from reneging easily from their policies.

ICPFs are **mainly interconnected with the banking sector**. Investments in debt securities issued by MFIs and indirect investments via mutual funds imply that ICPFs are an important source of funding for banks. In addition, insurance companies in particular are connected with the banking sector via direct ownership links.[20] In this context, the European Insurance and Occupational Pensions Authority (EIOPA) has in the past highlighted the risks related to liquidity swaps within

19 See ECB, "Lending by insurers", Box 11 in *Financial Stability Review,* Frankfurt am Main, June 2014, pp. 115-116.
20 For financial stability risks related to bancassurance groups, see ECB, "Financial stability and bancassurance groups – lessons from the euro area experience during the financial crisis", Box 7 in *Financial Stability Review,* Frankfurt am Main, May 2013, pp. 78-80.

bancassurance groups. However, the extent of such activity has remained low.[21] Apart from the banking sector, the use of reinsurance also implies a certain level of interconnectivity for traditional insurance business – albeit to a limited degree and with limited complexity.

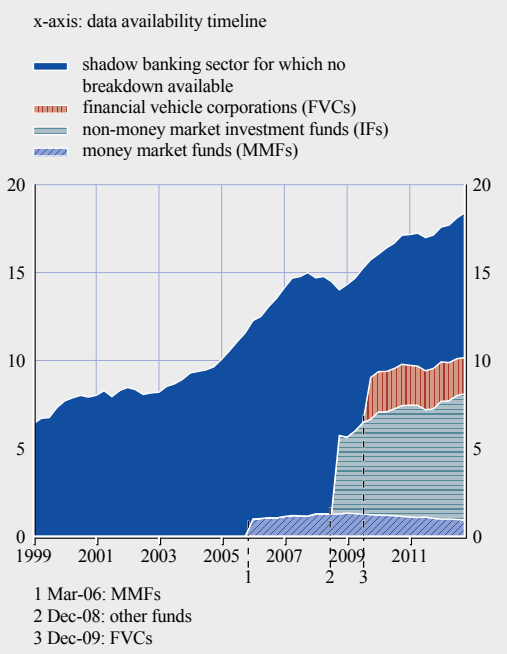
Finally, interconnectedness is inherent in **the business model of non-traditional activities**, i.e. activities that do not fall within core competences of insurers. Typically, non-traditional activities, such as credit default swap (CDS) selling, involve complex business relations with other financial institutions and, often, leverage. The CDS selling activities of insurers have materially decreased since the exit of AIG from the global market in 2008. All in all, available data suggest that the selling of CDS contracts by insurance companies is currently not on a material scale.[22]

THE COMPOSITION OF THE "SHADOW BANKING" SECTOR

The collection by the ECB, in recent years, of balance sheet data on investment funds (IFs) and financial vehicle corporations (FVCs) located in the euro area has shed some light on the composition of the shadow banking sector by allocating data to more specific OFI sub-sectors (see Chart A.6). Assets of non-money market IFs have almost doubled over the crisis period and account for 42% of all shadow banking assets. In contrast, assets of money market funds (MMFs) and FVCs engaged in securitisation transactions have fallen. Against a backdrop of house price collapses in key euro area markets and a fall in investor appetite for securitised products, the share of FVCs fell from 14% in 2009 to 10% by 2013. Over the same period, assets of the euro area MMF industry declined by over a third and its share in the shadow banking sector fell considerably from 7% to 4%.

Chart A.6 Assets of euro area shadow banks by entity

(1999 – 2013; EUR trillions)



Source: ECB.
Note: Data for MMFs only available from 2006, for IFs available from 2008, and for FVCs from 2010 onwards.

While the recent collection of balance sheet data on IFs and FVCs has enabled a better understanding of the structure of the euro area shadow banking sector, a significant proportion (44%) of this data remains allocated to a broad and unspecified sector. Based on data from euro area accounts and the ECB monetary statistics on non-MMF IFs and FVCs, it is estimated that entities located in the Netherlands and Luxembourg account for approximately two-thirds of the residual. In the case of the Netherlands, most are likely to be special financial institutions (SFIs), which comprise two-thirds of the Dutch shadow banking sector. SFIs are set-up by (mainly non-financial) corporations for tax purposes, to attract external funding and to facilitate intragroup

21 See EIOPA, *Financial Stability Report*, Second half-year (December) 2012.
22 See Bank for International Settlements, *OTC derivatives statistics*, available at http://www.bis.org/statistics/derstats.htm.

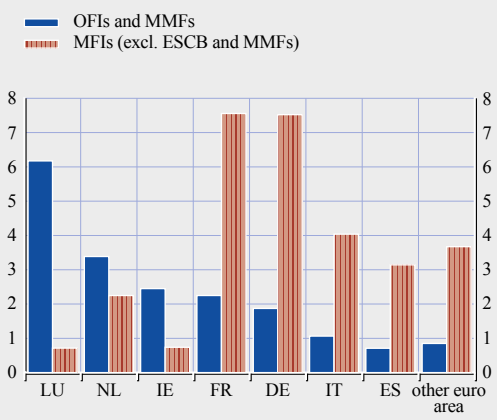
transactions and a significant part of these SFIs may not be engaging in shadow banking activities.[23] In the case of Luxembourg the residual includes holding companies and other entities. However, it is difficult to make comparisons between national banking and shadow banking sectors. The focus of the shadow banking entities located in Ireland, Luxembourg and the Netherlands is the euro area, or even global, rather than domestic.

While the relative importance of the euro area shadow banking sector in the entire euro area financial system has risen significantly, it remains smaller than the regulated banking system in most euro area economies. Luxembourg, the Netherlands, and Ireland are the exception: the shadow banking sector assets in these three countries are substantially larger than those of the regulated banking system (see Chart A.7)[24] and account for almost two-thirds of the entire euro area shadow banking system. As their size has increased over the crisis period, so too has their contribution to the financing of the real economy. The provision of credit by euro area shadow banks to other entities has increased significantly over the past eight years, in particular over the crisis period (see Chart A.8). At the end of 2013, euro area shadow banks held on their balance sheet more than €4.7 trillion in total loans, of which over €2 trillion were to the euro area non-financial sector, and more than €4.2 trillion of debt securities.[25]

"*Intermediating credit through non-bank channels can have important advantages and contributes to the financing of the real economy, but such channels can also become a source of systemic risk, especially when they are structured to perform bank-like functions (e.g. maturity transformation and leverage) and when their interconnectedness with the regular banking system is strong."*[26] These conditions apply as the euro area shadow banking entities are **structured to perform bank-like functions**, in part standing in for the declining role of the deleveraging regular banking system, and as their interconnectedness with the regular banking system is strong (see Box 1).

Chart A.7 Relative importance of the shadow banking and regular banking sectors

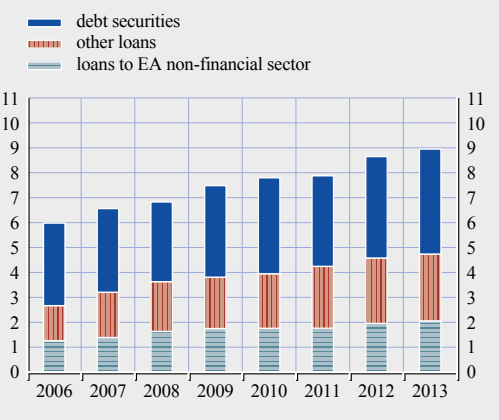
(2013; EUR trillions)



Source: ECB.

Chart A.8 Total loans and debt securities held by euro area shadow banks

(2006 – 2013; EUR trillions)



Source: ECB.

23 See DNB, "Shadow Banking: An Exploratory Study for the Netherlands", *DNB Occasional Studies*, Vol. 10, No 5, 2012 and Financial Stability Board, *Global Shadow Banking Monitoring Report 2012* (Annex 5), 18 November 2012.
24 While the shadow banking entities are located in those countries, they may be part of groups resident in other countries.
25 For which no breakdown (neither residency nor sector) of issuer are available.
26 Financial Stability Board, *Global Shadow Banking Monitoring Report 2013*, 14 November 2013.

Euro area shadow banks engage in maturity transformation, ...

At the end of 2013 the share of assets with a longer maturity – which include, inter alia, loans and securities with an original maturity of more than one year as well as equities and real assets – represented 90% of shadow banks' total assets.

... they take liquidity risk, ...

The liquidity mismatch between the assets and liabilities of euro area shadow banks could be the greatest concern from a financial stability perspective. The ratio of short-term liabilities (defined as shares/units issued, deposits and short-term loans received and short-term debt securities) over liquid assets (defined as currency, deposits, short-term debt securities and equities) shows that euro area shadow banking entities hold, on aggregate, sufficient liquid assets, partly as a result of large equities holdings, to cover short-term liabilities. However, this ratio has increased again during the crisis, suggesting that for the shadow banking sector as a whole the buffer of liquid assets that can absorb the equivalent of a "run" on shadow banks has shrunk in recent years.[27]

... are leveraged ...

Although the leverage of the euro area shadow banking entities has declined over the crisis period, it remains high. The amount of leverage, however, differs greatly among shadow banking entities.

... and are interconnected with the euro area banking system.

Non-bank financial institutions in the euro area are strongly interlinked with the euro area's MFI sector (see Box 1). First, shadow banks play a role in the funding of the MFI sector. At the same time, shadow banks are also reliant on MFIs for their own funding.

This birds-eye, aggregate view of the euro area shadow banking system conceals, however, the specific channels that can be considered a source of systemic risk. In particular, the various shadow banking entities differ significantly and a distinction needs to be made between them in order to identify potential risks. In the following sections we highlight the structural features of these different shadow banking entities – money market funds, non-money market IFs and FVCs engaged in securitisation transactions – and analyse the dynamics of the risks they may entail.

1 MONEY MARKET FUNDS

The assets of the euro area MMF sector shrank from a peak of nearly €1.3 trillion in early 2009 to €835 billion by mid-2014. Part of this shrinkage relates to a change in the definition of MFI.[28] The direct impact of this change in definition was an outflow from the MMF statistical population to other investment fund categories estimated to amount to around €180 billion for the euro area.[29] Along with this shrinkage, there was also a consolidation of the MMF sector as the number of funds has halved since 2006 from 1,641 to 807 in April 2014, and the average fund size increased by 67% over that period. Even with their smaller size, euro area MMFs continue to play an important

27 The macro view of the liquidity mismatch at an aggregate or sub-sector level ought, however, to be complemented by an analysis of structural features that are embedded in sub-sector IFs and that mitigate the run risk.

28 After a transitional period that ended on 31 January 2012, the definition of money market funds for euro area statistical purposes has been brought into line with the criteria applied for supervisory purposes under the "Guidelines on a common definition of European money market funds" issued on 19 May 2010 by the Committee of European Securities Regulators (CESR), the predecessor of the European Securities Market Authority (ESMA).

29 There is no general rule regarding the type of investment funds under which the MMFs not complying with the definition were classified after 1 February 2012. It depends on how MMFs changed their investment policy as a result of the change in definition and of other economic conditions. However, it seems that at the euro area level the highest inflows were indeed into "bond funds", followed by "equity funds" and "other funds".

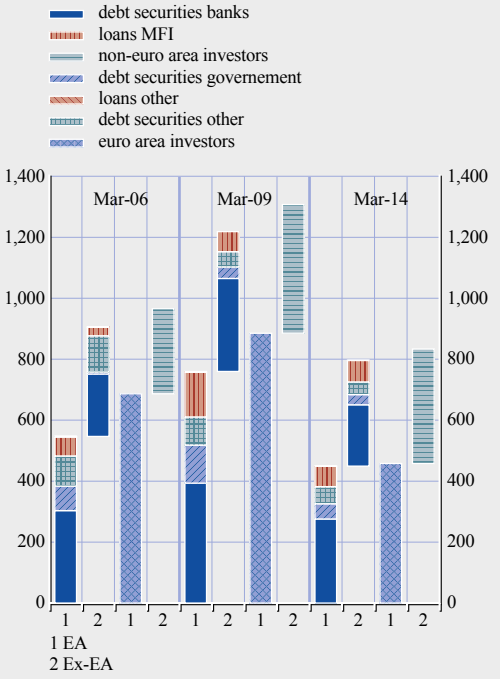
role in money markets as they hold a sizeable proportion of all short-term debt securities issued in the euro area and they remain highly interconnected with banks as around 73% of euro area MMF exposures are to MFIs.

The deleveraging of euro area MMFs has been broad-based in terms of assets and, as a result, the composition of the industry's balance sheet did not change a great deal during the crisis period. **Bank debt securities remain by far the most important asset class held**, accounting for three-quarters of the balance sheet. In the first quarter of 2014, euro area MMFs held €276 billion of euro area bank debt and €201 billion of non-euro area bank debt (see Chart A.9). They represent quite a sizeable proportion of the short-term debt securities issued by both euro area banks (40%) and non-financial corporations (NFCs) (25%).

The shrinkage since the peak of 2009 of money market fund liabilities, which mostly consist of shares/units issued, is largely attributable to a fall in shares held by euro area investors. While shares held by non-euro area investors have also declined, the non-euro area investor base has been more stable than the euro area investor base (see Chart A.9).

Chart A.9 Assets and investor breakdown of euro area money market funds

(Q1 2006 – Q1 2014; EUR billions)



Source: ECB.
Note: The category of remaining assets is not included as no regional breakdown is given.

This reflects important regional differences in investor base compositions and asset developments. Three countries – France, Ireland, and Luxemburg – constitute 96% of the total MMF sector. The contraction of the euro area MMF sector has been largely driven by funds located in France and Luxembourg. The investor bases of MMFs in those three countries differ significantly. Investors in French MMFs are almost exclusively euro area investors, while the investors in Irish funds and – to a lesser extent – Luxembourg funds are largely non-euro area residents. Importantly, **regional differences in the MMF investor bases are mirrored by regional differences in money market fund assets**. Irish money market funds – and to a lesser extent Luxembourg money market funds – mostly invest in non-euro area bank debt or loans to non-euro area MFIs, while French money market funds are almost exclusively invested in the euro area. On aggregate, somewhat more than 40% of the industry's assets under management (AuM) are invested by Constant Net Asset Value (CNAV) money market funds.[30] European CNAV funds are mostly based in Ireland and in Luxembourg. These funds also have a relatively larger non-euro area investor base than Variable Net Asset Value (VNAV) funds.

The maturity mismatch of euro area MMFs is limited by definition as both assets and liabilities are largely short-term in nature.[31] Furthermore, MMFs have only limited leverage as they are largely

30 Recommendation of the European Systemic Risk Board of 20 December 2012 on money market funds.
31 Regulation (EU) No 1071/2013 of the European Central Bank of 24 September 2013 concerning the balance sheet of the monetary financial institutions sector (recast) (ECB/2013/33) specifies in Article 2(d) the maturity restrictions of money market funds covered in the statistics on which this analysis is based.

funded by shares/units issued rather than debt. However, from a financial stability perspective, the **limited share of liquid** assets may be an issue as the liabilities of MMFs are almost entirely short-term in nature (units issued can be redeemed at very short notice) and MMFs may not hold sufficient liquid assets to meet possible redemptions if there were to be a run on MMFs. Under the most conservative measure – which would include deposits at MFIs, government debt securities and equity as liquid assets – only 22% of the balance sheet can be deemed liquid. Under a broad definition of liquid assets, which includes all debt securities, some of which may be illiquid in case of market stress, this would increase to 86%. The very **high degree of interconnectedness with the regular euro area banking system** is another important financial stability aspect, as more than 40% of MMF assets are in the form of loans to euro area MFIs or holdings of euro area MFI debt securities and, as mentioned previously, they are an important source of short-term funding for banks.

2 NON-MMF INVESTMENT FUNDS

The decline of the MMF sector from its 2009 peak contrasts with the rapid expansion of the non-money market IF sector in recent years. The assets of non-money market IFs have nearly doubled, from €4.5 trillion at the end of 2008 to €8.4 trillion in early 2014. The balance of assets between debt securities and equities remained relatively stable during that period. However, the balance between euro area and non-euro area assets has shifted towards non-euro area assets and only began to reverse in mid-2013.

The IF sector has expanded in all regions of the euro area, although the expansion has been most pronounced in Ireland and Luxembourg (see Chart A.10). Funds in these two countries tend to focus more on markets outside the euro area, which has contributed to the increase in holdings of non-euro area assets by the euro area IF sector.

While total holdings of euro area assets have increased by almost €2 trillion (160%), IFs' exposures to euro area MFIs have remained broadly stable. As a result, the share of claims on MFIs has fallen from over 30% of total claims on euro area residents at the end of 2008 to less than 25% more recently. At the same time, these funds have increased their exposures to the non-financial sector, claims on which now account for 23% of all euro area assets, compared to less than a fifth at the start of the crisis period. The shift may reflect on-going efforts by banks to deleverage and a shift in euro area NFCs from bank to market-based funding.

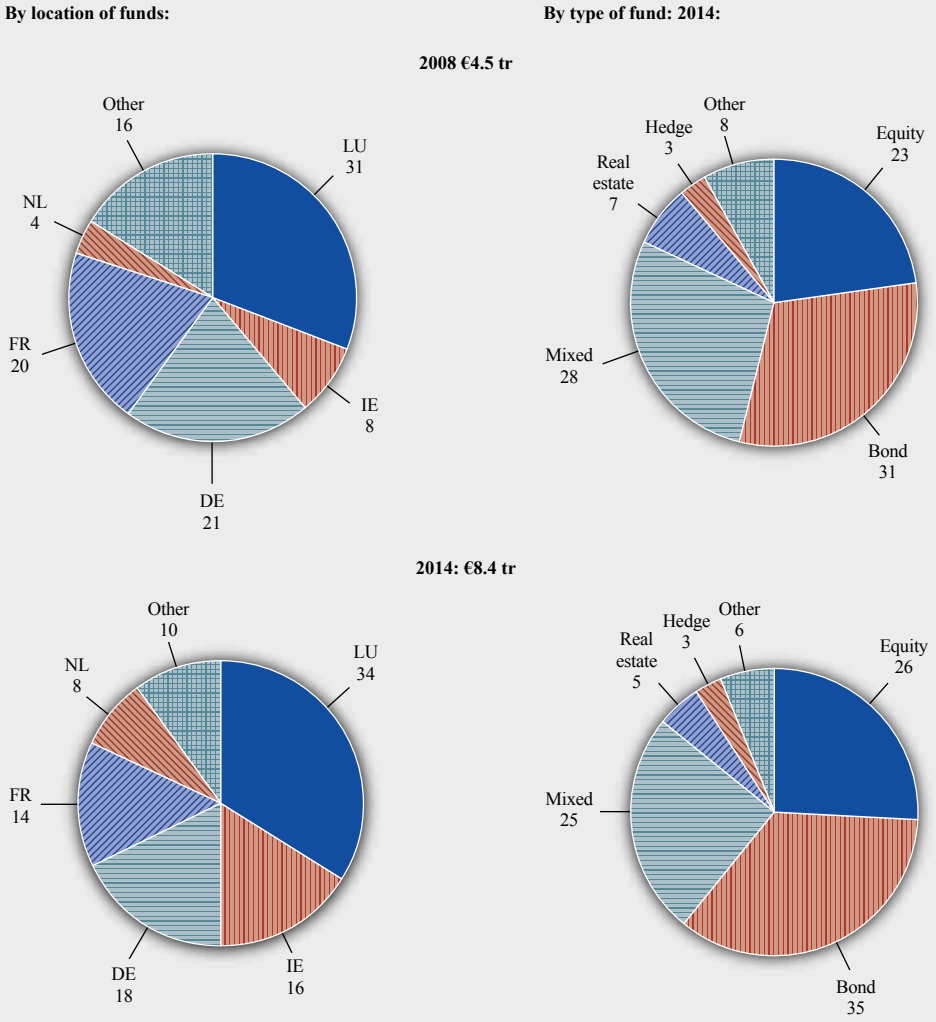
The number of non-MMF IFs in the euro area increased from 68,607 in 2009 to 94,823 at the end of 2013, 97% of which are open-ended funds.[32] The average size of funds also increased over that period from €68.5 million to €83.7 million.

Due to significant differences in the structure of assets and liabilities, we analyse the non-MMF IF segment of shadow banking in the euro area separately on the basis of investment mandates, i.e. bond funds, equity funds, mixed funds, real estate funds and hedge funds.

32 Based on name recognition, 1.5% of the total 94,823 euro area domiciled investment funds in Q4 2013 are exchange traded funds (ETFs). The highest relative shares in the number of IFs is observed for equity funds (2.7%) and mixed funds (2.0%).

Chart A.10 Assets of non-MMF IFs in the euro area

(Q4 2008 – Q1 2014; in percentages)



Source: ECB.

2.1 BOND FUNDS

Bond funds made up more than a third of the euro area's €8.4 trillion non-MMF IF sector in early 2014. Concentration in the euro area bond funds sector has increased both on average (i.e. AuM of bond funds divided by the number of bond funds in a geographic area) and geographically. While the number of funds increased significantly for the main domicile countries, larger average bond fund sizes can be observed in Germany and Ireland, while fund sizes have decreased significantly in Italy.[33]

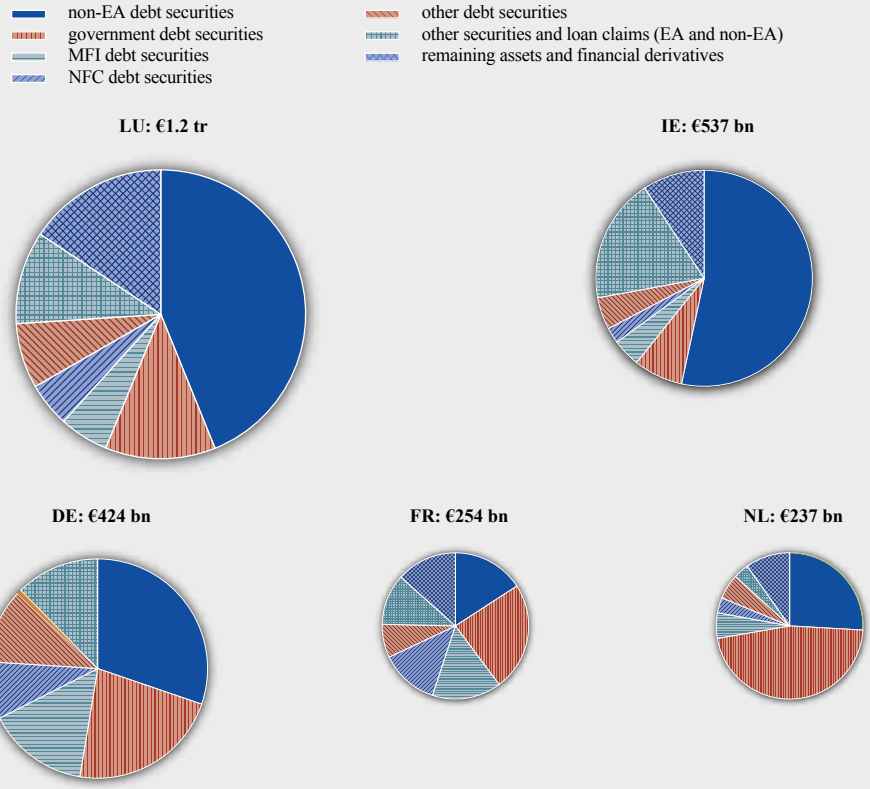
33 The 2014 Q1 list of investment funds (IFs) was used for deriving for each country the number of IFs broken down by investment policy and subsequently for calculating the corresponding average IF balance sheet size by investment policy. Regular checks on reporting entities carried out by De Nederlandsche Bank (DNB) to ensure that the statistical reporting population on IFs is complete and homogeneous have revealed that the published lists of IFs (in particular bond funds and hedge funds) fail to account for recent liquidations within the Dutch IFs sector. The resulting average IF size figures in the Dutch case hence in particular understate the average bond funds and hedge funds sizes and are therefore disregarded in the corresponding comparisons. The result of the data cleansing exercise carried out by DNB will be reflected in IF lists at a later stage.

The assets of euro area bond funds have more than doubled from €1.4 trillion at the end of 2008 to €2.9 trillion in the first quarter of 2014 (see Chart A.10). Euro area bond funds' holdings of both euro area and non-euro area debt securities have increased but there has been a **shift towards non-euro area debt securities**. In 2008, holdings of euro area debt securities were twice as large as holdings of non-euro area debt securities. By early 2014 they were almost equal in size owing to a substantial increase in non-euro area holdings. Similarly, on the liabilities side, while both euro area and non-euro area investors increased their investments in euro area bond funds during this period, the **share of non-euro area investors increased** from 18% to 28%.

The structure of bond funds' assets varies depending on jurisdiction (see Chart A.11). However, at euro area level, they hold more government debt securities (€559 billion) than any other euro area asset class. As regards non-euro area assets, debt securities issued by US residents (€438 billion or 40% of non-euro area assets) dominate.[34] Euro area bond funds hold close to 10% of euro area MFI debt securities, more than 10% of euro area government debt and almost a quarter of all outstanding debt securities issued by euro area NFCs. The latter share has risen steadily from 15% in 2009. While bond funds' holdings of MFI debt securities rose by 43% to €247 billion,

Chart A.11 Assets of euro area bond funds

(Mar. 2014; in percentages)



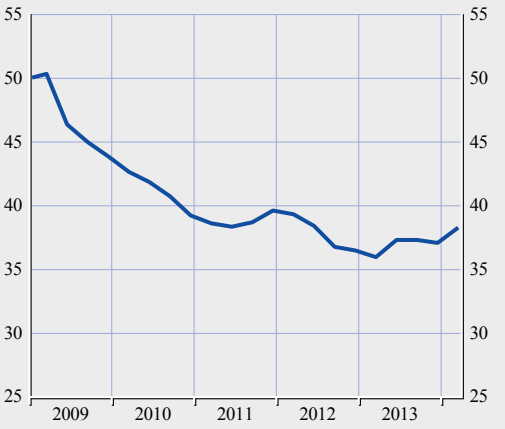
Source: ECB.

34 Euro area bond funds also held €247 billion of euro area MFI debt securities, €165 billion of euro area non-financial corporate (NFC) debt and €247 billion of non-euro area EU debt securities.

holdings of euro area NFC debt securities trebled to €165 billion. The **increasing role of bond funds in the non-financial corporate bond markets** reflects the declining role of banks. As a result the investor base in euro area non-financial corporate debt has experienced an important shift: the share of euro area NFC debt held by banks has fallen from 40% to 12%, while that of IFs has increased from 8% to 25%.

Chart A.12 Euro area bond funds' holdings of liquid assets, as a share of shares/units issued

(Q4 2008 – Q1 2014; in percentage)



Source: ECB.
Note: Liquid assets include government debt securities, securities issued by EA residents with an original maturity of under one year and equities.

Leverage is not a major concern as most of the holdings are financed by the issuance of units/shares in the fund. The most pressing concerns are, however, the significant maturity and liquidity mismatches. Bond funds are, by nature, involved in credit intermediation as part of their mandate is to invest in credit-related fixed income securities. Bond funds engage in significant maturity transformation as they invest in long-term assets while a significant part of their liabilities (units issued) are redeemable at very short notice. The **maturity mismatch** is reflected by the observations that around 80% of bond fund assets are long-term assets (defined as having an original maturity exceeding one year), while over 95% of shares/units issued are open-ended and therefore have the same fire-sale properties as short-term debt funding.

The liabilities of bond funds are almost entirely very short-term in nature. The **holdings of liquid assets to cover short-term liabilities has been declining throughout the crisis** and has fallen to below 40% over the past three years (see Chart A.12).

2.2 EQUITY FUNDS

Equity funds constituted just over a quarter of the euro area's €8.4 trillion non-MMF IF sector in early 2014 (see Chart A.10). Assets of euro area equity funds have more than doubled, from €1 trillion at the end of 2008 to €2.2 trillion in early 2014. At the same time the average size of equity funds domiciled in the euro area has increased by 37%.

In terms of assets composition of euro area equity funds, a **noticeable increase in holdings of non-euro area equities** can be observed. While in 2008 euro area equity funds held 26% more non-euro area equities than euro area equities, by early 2014 this had increased to 72%. On the liabilities side, the **role of non-euro area investors has increased** for equity funds as well, rising from 28% at the end of 2008 to 35% in the first quarter of 2014.

Equity holdings of euro area non-financial corporates are equity funds' biggest asset class (€480 billion or a fifth of total assets). These funds also held €66 billion of euro area MFI equities, which represent the main channel of interconnectedness with regular banks (see Chart A.13).

Two features of euro area equity funds require particular monitoring from a financial stability perspective. First, while equity markets in advanced economies are highly liquid, exposures to

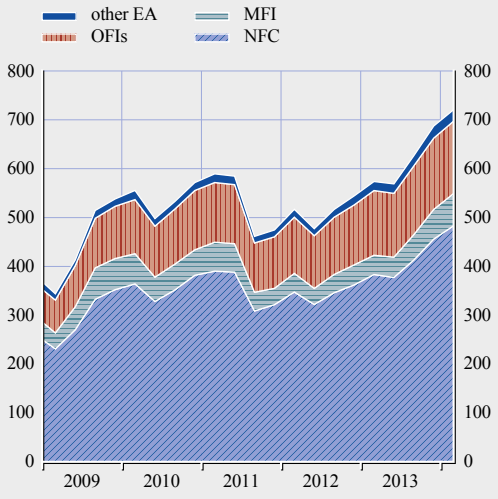
markets outside the EU, the USA and Japan (almost 25% of assets in Q1 2014) **may include significant exposures to emerging economies and be less liquid than their advanced economies counterparts**. Second, equity funds[35] **engage in credit intermediation.**[36] Balance sheet data show that, while the bulk of the €2.2 trillion of equity fund assets are equities, euro area equity funds also hold €255 billion of other assets on their balance sheet, of which €84 billion are deposit and loan claims and €62 billion debt securities.

2.3 MIXED FUNDS

Mixed IFs accounted for a quarter of the euro area's €8.4 trillion non-MMF IF sector in early 2014 (see Chart A.10). Two-thirds of all mixed fund assets are held by funds domiciled in Luxembourg and Germany (see Chart A.14). Both the number of funds and the average assets of mixed funds have increased since

Chart A.13 Equity funds' holdings of euro area equities

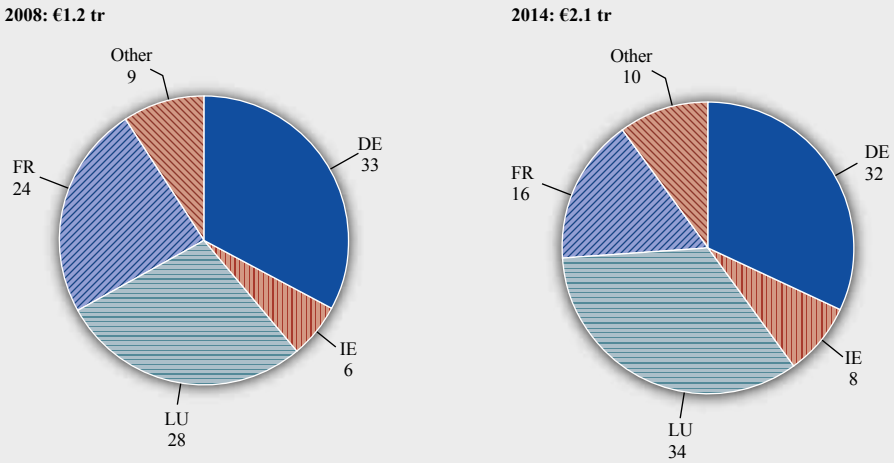
(Q1 2009 – Q1 2014; EUR billions)



Source: ECB.
Note: Liquid assets include government debt securities, securities issued by EA residents with original maturity under 1 year and equities.

Chart A.14 Assets of euro area mixed investment funds

(Q4 2008 – Q1 2014; percentages)



Source: ECB.

35 Euro area investment funds are classified according to the type of asset in which the investment portfolio is primarily (not entirely) invested. For example, while the bulk of the assets of euro area equity funds comprise equities, these funds may also hold debt securities and non-financial assets. The criteria for classifying investment funds are derived from the public prospectus, fund rules, instruments of incorporation, established statutes or by-laws, subscription documents or investment contracts, marketing documents or any other statement with similar effect.

36 In its Global Shadow Banking Monitoring Report 2013, the FSB, notes that equity funds may also indirectly be part of a credit intermediation chain, particularly if they conduct securities lending against cash collateral.

mid-2009. The assets of euro area mixed funds have risen from €1.2 trillion in the final quarter of 2008 to €2.1 trillion in the first quarter of 2014. The relative importance of holdings of debt securities versus equities and euro area versus non-euro area investors has been relatively stable.

On aggregate, euro area mixed funds hold just under half their assets as debt securities, although mixed IFs' asset type composition varies significantly across countries. There is also a significant variation among jurisdictions in terms of exposures to non-euro area assets. With the exception of funds domiciled in France and Ireland, the share of mixed funds' holdings of non-euro area assets has been rising. Mixed funds **have become increasingly exposed to the OFI sector** over the crisis. Securities issued by OFIs comprise half their holdings of euro area securities, compared to 34% in 2008.

2.4 REAL ESTATE FUNDS

Real estate funds accounted for only 5% of the euro area's €8.4 trillion non-MMF IF sector in early 2014 (see Chart A.10) and concentration in the euro area real estate funds sector has decreased since mid-2009.

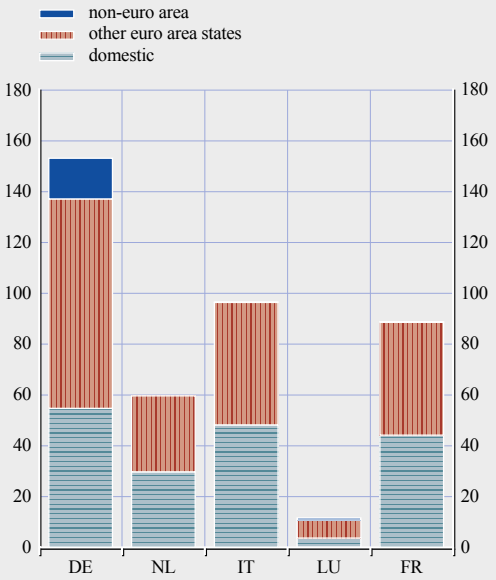
The assets of euro area real estate funds increased from €296 billion at the end of 2008 to €439 billion at the start of 2014, most of which are euro area assets and, unsurprisingly, non-financial assets. Nonetheless, holdings of non-euro area assets, particularly equity, rose during this period. The investor base of euro area real estate funds is mostly euro area based, with non-euro area investors only representing €22 billion compared to a €326 billion euro area investor base.

Real estate funds are predominantly located in Germany, the Netherlands and Italy. The bulk of real estate funds' assets are domestic assets or assets of other euro area states (see Chart A.15). This is important in view of **potential overvaluations** of real estate in those countries **where real estate funds have large exposures,** although further analyses would be needed in order to assess whether there is any causal relationship.

The relatively **higher leverage** of real estate funds compared to other euro area fund sectors may prove problematic: the majority of real estate funds are open-ended funds (80% according to assets) and the short-term nature of liabilities is a substantial risk in view of the significant maturity transformation and mismatch of liquidity. Real estate funds' **inherent liquidity mismatch** has even increased further during the crisis as their short-term liabilities have risen faster than their liquid assets.

Chart A.15 Real estate investment fund non-financial assets

(Mar. 2014; EUR billions)



Source: ECB.

2.5 HEDGE FUNDS

The hedge fund sector in the euro area accounted for only 3% of the euro area's €8.4 trillion non-MMF IF sector in early 2014 (see Chart A.10). Hedge funds domiciled in Ireland and Luxembourg dominate the euro area hedge fund sector. Assets of hedge funds operating in Ireland have increased fourfold since 2008 and now account for 65% of the entire sector (see Chart A.16). The number of hedge funds in the euro area has increased by 56% and in particular the number of hedge funds in Ireland increased strongly.[37] The average hedge fund size has also increased.

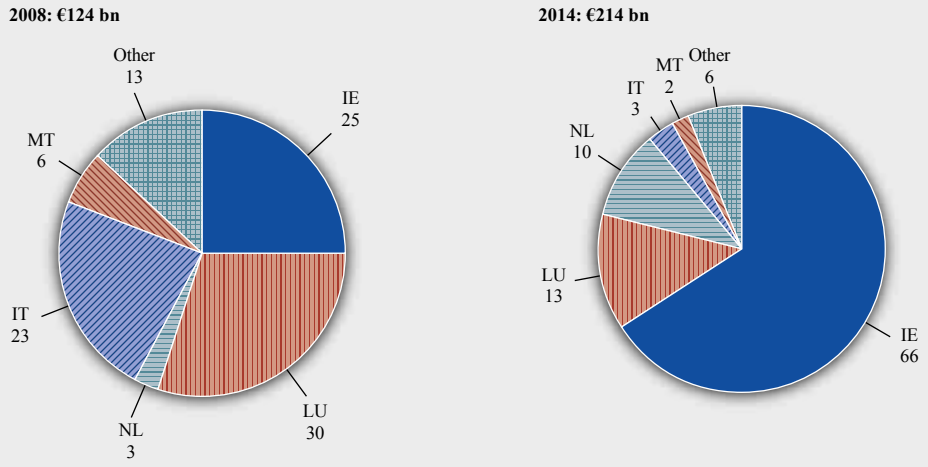
Total assets of euro area hedge funds increased from €124 billion at the end of 2008 to €214 billion in the first quarter of 2014. Holdings of debt securities and non-euro area assets account for most of the growth of hedge fund assets. Hedge funds' most important asset classes in early 2014 were holdings of non-euro area equities (amounting to €71.1 billion), non-euro area debt securities (€39.5 billion), non-MFI euro area equities (€28.8 billion), and loans to non-euro area entities (€24.5 billion). On the liabilities side, investments into euro area hedge funds (referring to holders of shares/units issued) have risen substantially: euro area investors from €49 billion to €83 billion and non-euro area investors from €42 billion to €79 billion.

For the euro area hedge fund sector as a whole, leverage is still fairly limited as only a limited part of the aggregate balance sheet is funded by liabilities other than shares/units issued. Leverage has been volatile, however, and increased somewhat to above 130% in early 2014. Nonetheless, the **aggregate measure of hedge fund leverage may be misleading** as it differs across jurisdictions as well as being structurally dependent on the hedge fund size and investment strategy.

The **liquidity mismatch** between the assets and liabilities of hedge funds in the euro area has increased measurably during the crisis. Hedge funds' short-term liabilities exceed liquid assets.

Chart A.16 Hedge fund assets by jurisdiction

(quarterly transactions; Dec. 2008 to Mar. 2014 ; EUR billion; percentages)



Source: ECB.

37 See footnote 33 for additional information regarding developments in the Netherlands.

Moreover their liquid/short-term liabilities (defined as shares/units issues, deposits and short-term loans received and short-term debt securities) have been rising much faster than liquid assets (defined as currency, deposits, short-term debt securities and equities).

3 FINANCIAL VEHICLE CORPORATIONS

FVCs involved in securitisation transactions play an important role in the transfer of credit risk. In contrast to the remarkable increase in the size of IFs, FVCs have shrunk by more than 20% since the end of 2009 (the earliest point in our sample).[38] Nonetheless, with €1.9 trillion in assets, this sector is still a sizeable and important component of the euro area's shadow banking system.

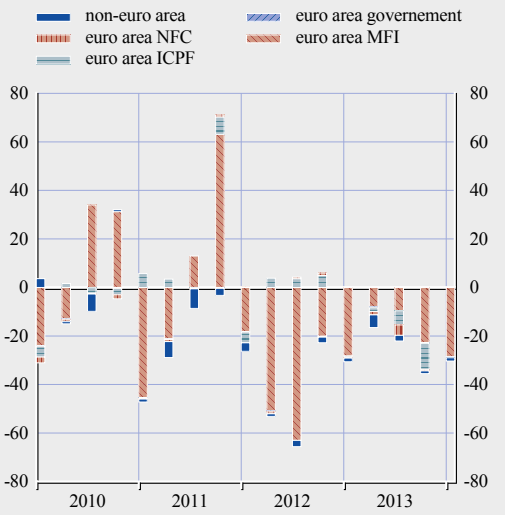
FVCs are **strongly interlinked with euro area banks**. Loans originated by a euro area credit institution account for 71% (nearly €1 trillion) of the FVC balance sheet. Securitised loans originated by euro area non-MFIs amounted to €279 billion in early 2014. By assets, most FVCs are located in countries that have experienced either a banking sector crisis or a house price collapse, or both. The decline in FVC assets has been driven by a decline in securitised loans originated by credit institutions (see Chart A.17), which in turn was largely driven by loans to households.

Nonetheless, FVCs remain an **important channel of intermediating credit to euro area households**. More than 12% of all MFI loans granted to euro area households are securitised through euro area FVCs. For the Netherlands and Ireland, nearly a third of domestic MFI loans to households are securitised through domestic FVCs. However, these securitisations are partly retained by MFIs and consolidated on MFI balance sheets.

A large – and throughout the crisis relatively stable – share of FVC total assets (approximately 75%) are longer-term assets. Most of the FVC balance sheet (€1.4 trillion) is by construction financed with the issuance of longer-term debt securities (with an original maturity of more than one year) and the maturity mismatch of assets and liabilities on FVC balance sheets is therefore limited. FVCs stand out among other shadow banking entities on account of their **very high, and rising, leverage**. Capital and reserves represent less than 2% of the FVC balance sheet, while 8% of funding comes from loans and the remainder from the issuance of debt securities, most of which have an original maturity exceeding one year.

Chart A.17 FVC securitisation transactions

(quarterly transactions; Q1 2010 to Q1 2014; EUR billion)



Source: ECB.

38 See the joint Bank of England/ECB discussion paper, "The case for a better functioning securitisation market in the European Union", for a discussion of possible drivers of the sharp contraction in securitisations, the barriers to a well-functioning securitisation market in the EU post-financial crisis, and policy options to transform securitisation markets in the EU (see: https://www.ecb.europa.eu/pub/pdf/other/ecb-boe_case_better_functioning_securitisation_marketen.pdf).

The **transformation of liquidity** is an important feature of the functioning of FVCs, which take illiquid loans on their balance sheet and issue securities which are marketable or can be pledged by the holders of these securities as collateral to obtain liquidity. Only 12% of FVCs assets – comprising deposits at MFIs, debt securities with an original maturity of less than one year or equity (excluding securitisation fund units issued by other FVCs) – can be considered liquid assets, but an even smaller share of FVC liabilities is short-term in nature.

Box 1

LINKAGES BETWEEN THE EURO AREA BANKING SECTOR AND THE OFI SECTOR

Prepared by Maciej Grodzicki

Financial distress in the non-bank financial sector may affect the banking sector through a number of transmission channels. First, the banking sector may be directly exposed to non-bank financial institutions through equity investment or credit claims. Credit exposures of banks to non-bank financial firms often arise in connection with prime brokerage relationships, through which non-bank financial firms obtain the leverage necessary to execute their trading strategies. In addition, the liquidity credit lines that provide non-financial firms with a backstop against an outflow of their short-term liabilities could give rise to a significant exposure vis-à-vis the banking sector. As seen during the 2007-2008 market turmoil, banks which have committed to such lines may find themselves under considerable pressure when the lines are called.

Second, non-bank financial institutions may play a significant role in the funding of the banking sector, often by investing in bank debt securities and providing liquidity through secured money markets, as well as – less directly – through provision of collateral which banks may re-hypothecate in exchange for funding.

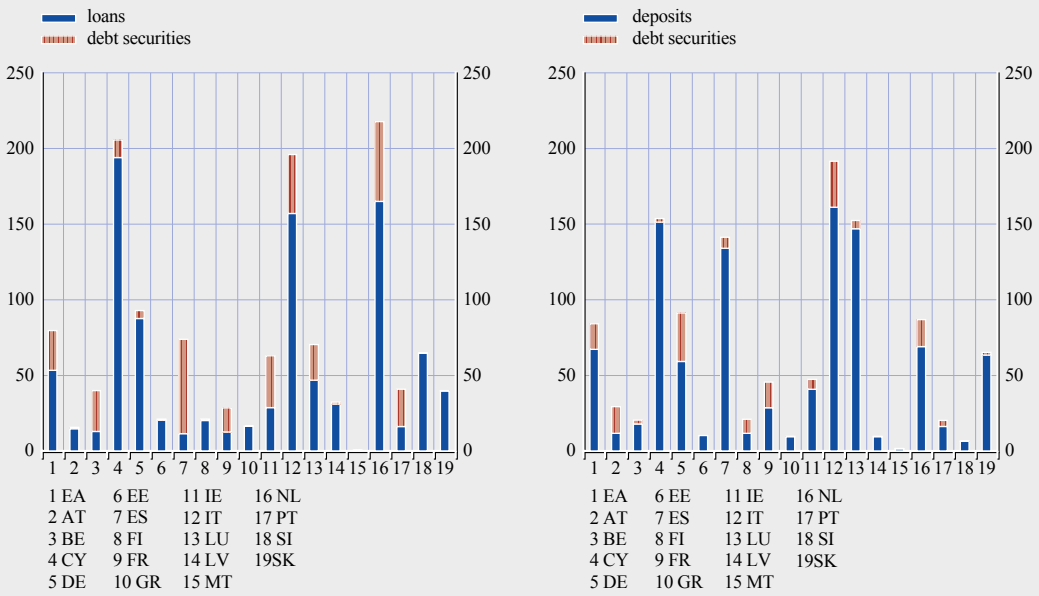
Further to the transmission mechanisms which involve direct exposures, banks and non-bank financial institutions may be interconnected through common exposures to assets. Distress in one of these sectors may give rise to asset fire sales, which would depress the prices of assets held by the other sector, and through mark-to-market accounting impact profits and capital.

An illustrative ranking of the relevance of the direct linkages between banks and non-bank financial institutions can be made on the basis of the quarterly national financial accounts data. These data present the balance sheets of the main economic sectors, including the monetary financial institutions (MFI) as well as other financial institutions (OFI), by country and instrument. The OFI sector consists of a large variety of non-bank financial firms – including in particular financial vehicle corporations (or special-purpose vehicles) engaged in securitisations – investment funds and leasing companies. Given the lack of actual data, the maximum entropy technique presented in Castrén and Kavonius[1] (2009) is used to construct a matrix of bilateral inter-sectoral domestic claims.

1 Castrén, O. and Kavonius, I.K., "Balance Sheet Interlinkages and Macro-Financial Risk Analysis in the Euro Area", *ECB Working Paper 1124*, Frankfurt am Main, December 2009.

Exposure of euro area MFIs to OFIs and funding of euro area MFIs by OFIs

(end-2013; left-hand side indicates exposure of euro area MFIs to OFIs as a percentage of percentage of MFI equity; right-hand side – funding of euro area MFIs by OFIs)



Source: ECB.

The data yield a diverse picture of the euro area banking sector. On average, the on-balance sheet exposures of the euro area MFIs to OFIs amount to about 80% of their equity capital, while funding received from OFIs is slightly higher at 92% of equity. That aggregate masks significant country heterogeneity, as Cypriot, Dutch and Italian banks hold an equivalent of about 200% of their capital in exposures to the OFI sector, mainly in form of loans. On the contrary, the exposure of Austrian, French and Greek banks to OFIs is rather limited. As regards funding, Cypriot, Italian, Luxembourg and Spanish banks appear to use OFI deposits to a relatively large degree,[2] while banks in the Baltic countries, Greece, Malta and Slovenia hardly receive any domestic OFI funding.

The results presented below should be interpreted with some caution, owing to three important caveats. First, the data capture only domestic transactions as cross-border transactions are not reported with sector granularity. Therefore, the relevance of the linkages between banks and OFIs may be underestimated. Second, the data are not consolidated and some of the reported transactions may refer to intragroup operations which would cancel out from a prudential perspective. Third, the data do not capture off-balance sheet items and therefore omit substantial liquidity and credit exposures of banks to OFIs.

2 To some extent, this finding may be driven by the statistical practice of classifying retained securitisations. The loan from the special-purpose vehicle is treated as a long-term deposit liability of the originating MFI.

CONCLUDING REMARKS

During the recent financial crisis, the role of the non-bank euro area financial sector has grown significantly. Intermediating credit through non-bank channels can have important advantages as it contributes to the financing of the real economy and the distribution of risk exposures within the financial system becomes wider. However, its expansion can also be accompanied by risks that need to be identified, monitored and managed. Similar to that of traditional banks, shadow bank credit intermediation involves maturity and liquidity transformation as well as in some cases the use of leverage.

This special feature has reviewed the different components of the non-bank euro area financial sector with specific analysis of the composition of assets and the liquidity and maturity mismatches inherent in aggregate balance sheets. The analysis is based on national accounts data and complemented by more granular investment funds data. The analysis provides a starting point for the future regular surveillance of leverage, maturity and liquidity mismatches in the non-bank part of the euro area financial sector and illustrates the interconnectedness between the non-bank financial sector and the banking sector.

B THE RELATIONSHIP BETWEEN STRUCTURAL AND CYCLICAL FEATURES OF THE EU FINANCIAL SECTOR[39]

This special feature explores the relationship and potential interactions between certain structural features of the banking sectors in the EU Member States and the performance of the respective banking sectors over the financial cycle, also with the aim of providing guidance for policy-makers on the proper implementation of cyclical and structural measures to address the associated risks.

INTRODUCTION

The 2007 global financial crisis drew particular attention to the analysis of systemic risks associated with changes in the cyclical and structural features of financial sectors around the world. At the same time, the crisis also triggered a range of policy actions and regulatory measures that aim at addressing cyclical and/or structural risks. A key regulatory initiative in this regard was the development of the new Basel capital and liquidity framework (Basel III), the implementation of which is accomplished in the EU through the Capital Requirements Regulation (CRR) and Capital Requirements Directive (CRD IV). Both Basel III and the new European regulatory framework include a new set of macro-prudential tools, such as the capital conservation buffer, the counter-cyclical capital buffer and the capital surcharge for systemically important financial institutions, as well as other instruments, such as the systemic risk buffer in Europe. Although the combined impact and possible interactions of these buffers and the underlying risk factors are highly relevant from a macro-prudential policy perspective, the empirical evidence of these interactions is limited. Currently, policy-makers are exploring appropriate ways of implementing structural and cyclical policy measures, including their proper design, the timing of their activation, their (relative) calibration and their combination.

The objective of this special feature is to explore the relationship and potential interactions between certain structural features of the banking sectors in the EU Member States and the performance of the respective banking sectors over the financial cycle, with the aim of providing guidance for policy-makers on the proper implementation of cyclical and structural measures to address the associated risks.

This special feature is related to different strands of literature. First, it connects to the finance and growth literature, which has found evidence that countries with a more developed financial system tend to grow faster, although there are limits to this relationship. In this regard, the ESRB ASC (2014) presents evidence that high levels of bank credit are associated with higher levels of systemic risk and argues that the European banking system has already reached a size at which its marginal contribution to real economic growth is likely to be nil or negative.

Second, it relates to the literature on the impact of the financial structure on output. For instance, Gambacorta et al. (2014) show that the financial structure is an important driver for output volatility and ESRB ASC (2014) finds also that bank-based systems have a more volatile credit supply and amplify the business cycle. In view of these findings, the understanding of cyclical patterns within the banking system becomes a key issue for the proper design of financial regulation and the effective implementation of macro-prudential policy measures.

39 This special feature was prepared by Hanno Stremmel (WHU – Otto Beisheim School of Management) and Balázs Zsámboki (European Central Bank) and is based on the research papers "Capturing the Financial Cycle in Europe" (Stremmel, 2014) and "The Relationship between Structural and Cyclical Features of the EU Financial Sector" (Stremmel and Zsámboki, 2014).

Third, in recent decades researchers have conducted multiple research endeavours to obtain a better understanding of empirical regularities of the "financial cycle". It quickly became widely accepted that cyclical dynamics in the financial sector, such as expansions (or booms) and contractions (or busts), are fraught with risk and may lead to serious financial and macroeconomic tensions. The global financial crisis in 2007 provided further impetus for the analysis of financial cycles (see Aikman et al. (2010, 2014), Claessens et al. (2011a, b) and Drehmann et al. (2012)). Although these studies employ different approaches to and measurements of financial cycles, they all conclude that financial cycles tend to have a higher amplitude and lower frequency than business cycles.

Lastly, this special feature is closely related to analytical work on the macro-prudential policy framework. Borio (2013) elaborates on the relevance and implications of understanding the financial cycle for macro-prudential policy purposes. Recent literature mainly links patterns of financial indicators to the implementation of the counter-cyclical capital buffer (CCB). Detken et al. (2014) provide an extensive overview of the studies that use different approaches and indicators for counter-cyclical capital buffer purposes. For instance, the credit-to-GDP gap is used to capture cyclical movements and is employed in early warning systems as a leading indicator to identify the build-up of imbalances in credit supply, also making it suitable for providing a signal for the activation of the counter-cyclical capital buffer.

This special feature contributes to the analytical work and policy discussion on both financial cycles and macro-prudential frameworks. First, we determine various synthetic financial cycle measures to derive the most appropriate one in a European context. Second, we relate these financial cycles to certain structural banking sector characteristics. This allows us to gain insights into the longer-term relationship between cyclical and structural features of the banking systems across EU countries and to draw relevant policy conclusions regarding the design and implementation of cyclical and structural policy measures, such as the counter-cyclical capital buffer (CCB) and the systemic risk buffer (SRB).

MEASURES OF FINANCIAL CYCLES

In a first step, we search for an indicator that appropriately captures the cyclical movements of the financial sector in the EU.[40] Following Drehman et al. (2012) and the arguments presented therein, we use frequency-based filter techniques to isolate cyclical movements from the trend of the underlying time series.[41] We consider seven different potential indicators that are combined in different financial cycles for eleven countries (Sample 1 in Table B.1) for the 1980-2012 period using quarterly data. Four measures describe developments within the financial sector (asset and credit price developments), whereas the other three variables characterise the behaviour of banking institutions directly using bank balance sheet data.

As an illustrative example, Chart B.1 shows the cyclical components of different financial indicators for Sweden.[42] This figure helps to characterise the underlying indicators and to assess

40 To ensure consistency within the macro-prudential literature, we rely on the recommended settings for frequency-based filters. In detail, we transfer the HP filter settings by BCBS (2010), Borio (2012) and Detken et al. (2014) to the band-pass filter. The resulting parameter choice is in line with recent financial cycle literature (Drehmann et al., 2012). Recent literature argues that the length of the financial cycle is four times the length of a business cycle. Using this band-pass methodology, the duration of a financial cycle hence spans between 32 and 120 quarters (or between 8 and 30 years).

41 We use the band-pass filter developed by Christiano and Fitzgerald (2003). This is basically a two-sided moving average filter isolating certain frequencies in the time series. We also cross-checked our results using other settings. For more details, see Stremmel (2014).

42 In this special feature, we use Sweden as an example to illustrate the graphical investigations of the financial cycle and financial indicators. Figures for other countries can be found in the underlying paper and its Annex. For more detail, see Stremmel (2014).

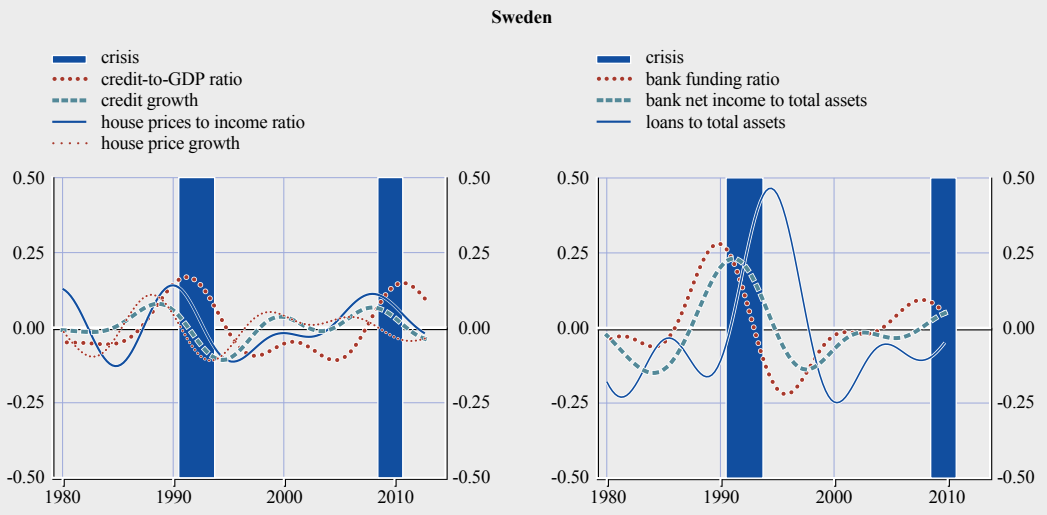
their potential usefulness. An obvious caveat of the investigation is that the number of full cycles covered in the chosen time frame is limited. This is due to the fact that a long time period is needed to complete a full financial cycle. The left-hand panel reveals that cyclical components of credit and asset (house) prices are closely correlated and that the frequencies of the time series are very similar, whereas the amplitudes seem to be different. All asset and credit indicators tend to peak around the outbreak of financial distress indicated by the shaded areas in the chart.[43] In the right-hand panel the peaks of the banking sector variables are less closely aligned than in the left-hand panel. Combining the interpretations of both panels, we conclude that credit and asset price variables are more suitable to visualise cyclical patterns of financial variables than banking sector variables.

Table B.1 Country coverage and sample classification

Country	Sample 1	Sample 2
Austria		✓
Belgium	✓	✓
Denmark	✓	✓
Finland	✓	✓
France	✓	✓
Germany	✓	✓
Great Britain	✓	✓
Greece		✓
Hungary		✓
Ireland	✓	✓
Italy	✓	✓
Latvia		✓
Lithuania		✓
Luxembourg		✓
Malta		✓
Netherlands	✓	✓
Poland		✓
Portugal		✓
Slovakia		✓
Spain	✓	✓
Sweden	✓	✓

Individual cyclical measures may, however, neglect important developments in other financial market segments. Accordingly, it appears more sensible to construct cycle measures for the whole financial sector. Since no obvious "natural" financial cycle measure is available, we derive synthetic measures which, however, need to be checked for their appropriateness.

Chart B.1 Cyclical movements of financial indicators



Source:

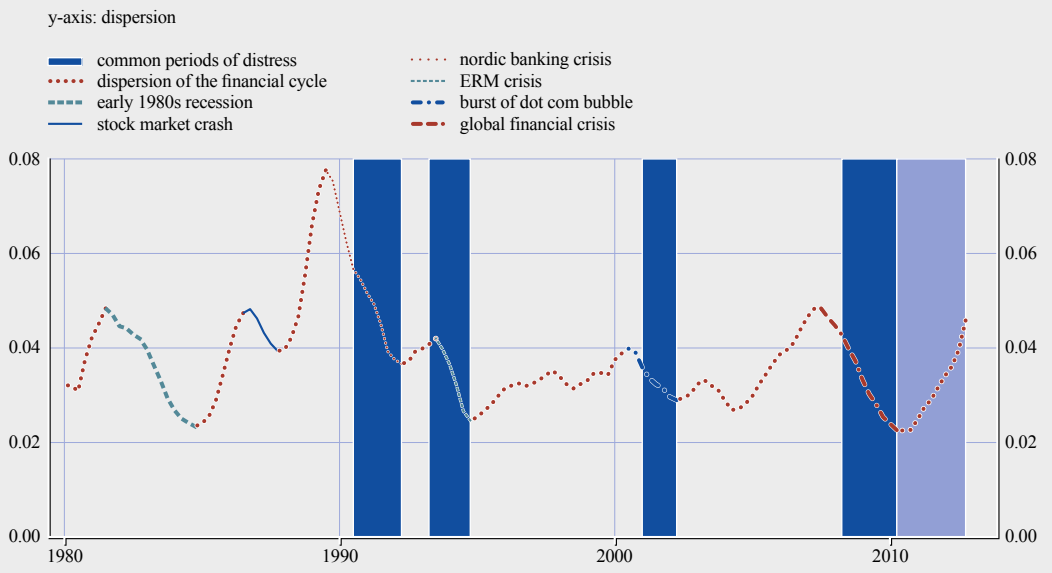
43 We employ the European System of Central Banks (ESCB) Heads of Research Group Banking Crises Database as described in Detken et al. (2014).

We use various graphical and statistical examinations to assess and evaluate the accuracy of synthetic cycle measures, including different combinations of credit, asset price and banking sector indicators. We identify a synthetic financial cycle measure containing the credit-to-GDP ratio, house prices-to-income ratio and credit growth as the best choice.[44] This synthetic financial cycle measure for Sweden is illustrated in Chart 3. Although we believe this measure to have the best-behaving characteristics, in the regression analysis we cross-check our findings and results by also employing all other financial cycle measures.

Before exploring the relationship between structural features of the financial system and financial cycles in the EU, we analyse the dispersion of financial cycles across 11 European countries using Sample 1. We define the cycle dispersion as a rolling window of the one-year standard deviation for the filtered time series. The dispersion measure can then be used to evaluate whether cycles converge or diverge over time. A lower dispersion measure represents a higher synchronicity and vice versa. Chart B.2 exhibits the patterns in the synchronicity of financial cycles across sample countries.

Chart B.2 reveals that during cross-border financial stress events and/or banking crises (blue shaded area) financial cycle dispersion tends to decrease and financial synchronicity tends to increase.[45] To put it the other way around, financial cycles are less synchronised in good times. This increased divergence of financial cycles in boom periods calls for differentiated and well-targeted policy

Chart B.2 Dispersion of financial cycles



Note: The cycle dispersion metrics are cacluated each quarter as the one-year cross-country standard deviation of each filtered time series for the 11 European countries.

44 The choice is based on the comparison of AUROC curves of the various synthetic financial cycle measures. According to the AUROC curves, our preferred measure tends to give the most reliable signal three years ahead of the crisis events across sample countries. For further information, see Stremmel (2014)

45 The crisis periods reflect times in which at least two countries have faced distress within the banking sector as defined in the ESCB Heads of Research Group Banking Crises Database (Detken et al., 2014). The second half of the global financial crisis is considered to be specific to a subset of EU countries and therefore shaded differently.

responses that are properly tailored to individual jurisdictions in order to address specific emerging risks in those countries. At the same time, in stress periods when countries seem to be impacted in a similar manner at the same time (as reflected in the increased co-movement of financial cycles), a higher level of coordination and harmonisation of policy actions may be warranted. Importantly, policy actions both in boom and stress periods should also take account of cross-border externalities and differences in the cost-benefit assessment of specific courses of action for macro-prudential measures in individual countries.

FINANCIAL CYCLE AND STRUCTURAL BANKING SECTOR CHARACTERISTICS

In the next step, we explore the relationship between the amplitude of the financial cycle and certain banking sector characteristics. We explore this by pursuing the following estimation strategy. We construct the above-mentioned synthetic financial cycle measure for the period 1980-2012 for two different country samples using quarterly data (Table B.1). The ten additional countries in Sample 2 are characterised by more limited data availability, only from the end of 1990s onwards. We date turning-points of the cycle by identifying peaks (local maxima) and troughs (local minima) which are used to calculate the amplitude. These turning points enable us to split up the financial cycles into financial cycle phases. A financial cycle phase lasts from one turning point to the next and corresponds to an expansion or contraction phase of the financial cycle. The amplitude measure $FinCyclPhaseAMP_A$ reflects the absolute difference of the start and end value of the financial cycle phase. In addition, we also account for differences in the duration of financial cycles by incorporating a time-adjusted parameter ($FinCyclPhaseAMP_A$), calculated as $FinCyclPhaseAMP_A$ divided by the duration of the respective financial cycle phase. In the next step, we calculate the various dependent and independent variables for each phase of the financial cycle (Table B.2).

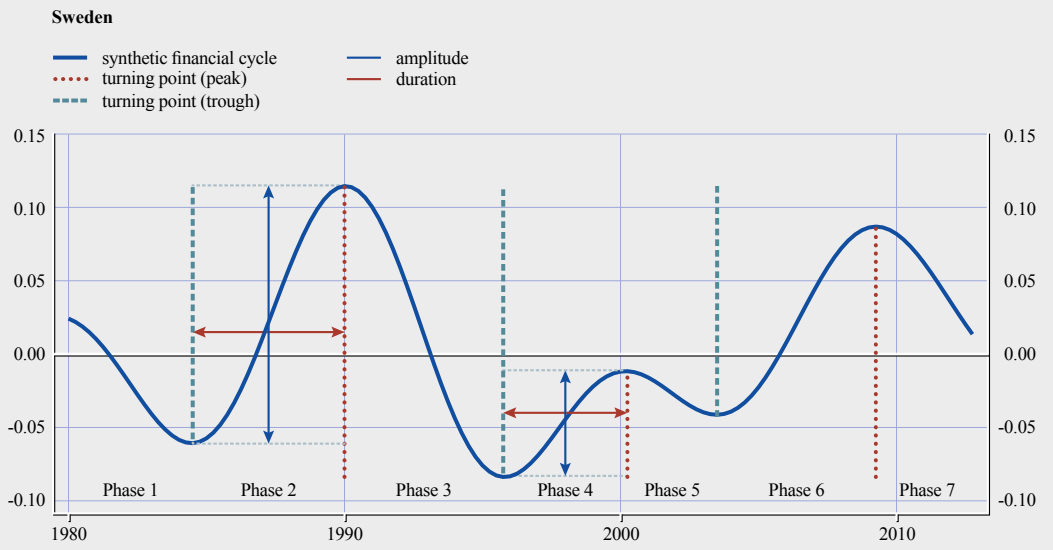
Chart B.3 provides the intuition for using two different amplitude measures. This figure reveals that phases of the cycle may differ on the basis of various distinctions such as amplitude, duration, intervals or speed. To demonstrate the intuition behind the time-adjusted measure, we compare two upswings: Phase 2 and Phase 4.

Both phases are quite similar in terms of their duration but their amplitudes are different. We believe that the relation between duration and amplitude also has important implications for financial

Table B.2 Description of the variables

Variable	Description	Source
	Left-hand side	
$FinCyclPhaseAmp_A$	Non-time-adjusted amplitude measure	Authors' calculation
$FinCyclPhaseAmp_B$	Time-adjusted amplitude measure	Authors' calculation
	Right-hand side	
Concentration	Assets of the three largest banks as a share of total banking assets (%)	Bankscope
Foreign banks	Foreign banks among total banks (%)	Claessens and van Horen (2014)
Credit/Deposits	Bank credit to bank deposits (%)	IMF IFS
Deposits/GDP	Bank deposits to GDP (%)	IMF IFS
Bank assets/GDP	Deposit money banks' assets to GDP (%)	IMF IFS
Market cap./GDP	Stock market capitalisation to GDP (%)	IMF IFS
FX loans/Loans	Share of foreign currency loans to total loans (%)	ECB SDW
Credit/GDP	Domestic credit to private sector (% of GDP)	IMF IFS
Foreign claims/GDP	Consolidated foreign claims of BIS reporting banks (% of GDP)	BIS/ IMF IFS

Chart B.3 Financial cycle phases



Source:

stability. In particular, a rapid increase may be more of a stability concern than a long-term gradual build-up of the cycle as such a rapid increase, possibly supported by looser lending standards, may swiftly reveal vulnerabilities in the financial sector, narrowing the scope and shortening the available time for policy action.[46]

The explanatory variables are based on a set of structural banking sector features which are expected to have an influence on the financial cycle and its amplitude. Overall, we employ nine structural banking sector variables grouped into six categories. Many of the incorporated variables are used as standard metrics to benchmark financial systems (Cihak et al., 2013). Most data for the measures are sourced through the Global Financial Development Database (GFDD) which is compiled by the World Bank. Each variable is obtained on the individual country level. There is a wide variety of potential statistical methods to model the developments. However, we use two simple approaches to capture the developments of the structural features. For rather slow-moving variables (banking concentration, foreign bank market share) we obtain the medians across all observations in the corresponding cycle-phase. For the remaining indicators (institution size and stability, financial depth, bank loans and financial integration), we calculate the absolute differences in each phase (difference of start and end value of each cycle phase) in percentage points.

The descriptive statistics suggest that banking sector characteristics have an influence on the amplitude of the financial cycle phase. This in turn provides a basis for employing an econometric model to explore the influence of banking sector variables on the financial cycle phase amplitude in more detail.

Table B.3 shows the descriptive country-level statistics for our selected financial cycle phases for each country. This table provides insights into the amplitude of financial cycle phases among

46 It has to be acknowledged, however, that a policy-maker acting on a real time basis will not necessarily have the knowledge of the significant divergence between past financial cycle amplitudes and future ones.

Table B.3 Financial cycle phases across countries[1)]

Phases / Country / Amplitude measure	All phases		Upswing phases		Downswing phases	
	A	B	A	B	A	B
Austria	0.043	0.0020	0.036	0.0020	0.050	0.0020
Belgium	0.032	0.0017	0.033	0.0019	0.029	0.0015
Denmark	0.095	0.0047	0.106	0.0047	0.084	0.0048
Finland	0.083	0.0037	0.100	0.0042	0.066	0.0033
France	0.076	0.0030	0.096	0.0033	0.062	0.0029
Germany	0.052	0.0014	0.048	0.0012	0.059	0.0019
Great Britain	0.158	0.0059	0.191	0.0042	0.141	0.0067
Greece	0.056	0.0027	0.088	0.0028	0.023	0.0025
Hungary	0.133	0.0070	0.176	0.0065	0.091	0.0075
Ireland	0.085	0.0037	0.106	0.0030	0.065	0.0043
Italy	0.116	0.0051	0.150	0.0054	0.094	0.0049
Latvia	0.364	0.0199	0.412	0.0172	0.316	0.0226
Lithuania	0.393	0.0197	0.587	0.0196	0.199	0.0199
Luxembourg	0.107	0.0043	0.167	0.0034	0.046	0.0051
Malta	0.063	0.0036	0.085	0.0038	0.041	0.0034
Netherlands	0.052	0.0021	0.062	0.0025	0.042	0.0017
Poland	0.175	0.0099	0.322	0.0129	0.027	0.0068
Portugal	0.042	0.0022	0.055	0.0025	0.029	0.0019
Slovakia	0.072	0.0057	0.111	0.0074	0.033	0.0041
Spain	0.145	0.0059	0.163	0.0051	0.128	0.0067
Sweden	0.103	0.0052	0.125	0.0058	0.082	0.0046
Total	0.080	0.0035	0.092	0.0057	0.048	0.0057

1) Amplitude A refers to the non-time-adjusted amplitude measure and Amplitude B refers to the time-adjusted amplitude measure. For more information on the calculation and interpretations of the amplitude measures, see Stremmel and Zsámboki (2014).

the 21 EU Member States covered in Sample 2. The grey shaded rows indicate countries for which both amplitude measures (normal and duration-adjusted) are higher than their respective median. The table suggests that for countries such as Great Britain, Italy and Spain as well as for most Central Eastern European countries in the sample, the amplitude is larger than for other countries. Indeed, for countries such as Austria, Belgium, France, Germany, the Netherlands, and Portugal the financial cycle amplitude seems to be smoother. The non-time-adjusted amplitude measure (Amplitude A) seems to be more marked in up phases than in down phases, whereas with the alternative time-adjusted amplitude measure (Amplitude B) the distinction is less pronounced.

In addition to these descriptive statistics, we also conduct an econometric analysis to investigate the relationship between the structural banking features and the financial cycle amplitude. Because of the low number of overlapping observation among the groups, we need to analyse the influence of each variable group separately. We employ different estimation techniques and model specifications. This special feature only reports the results for time-adjusted financial cycle amplitude measures using a general linear model (GLM) with robust standard errors (see regression results for Sample 2 in the Annex.)

According to the results of the econometric analysis, banking concentration, the share of foreign banks and the share of foreign currency loans (Models 1, 2 and 5) seem to have the highest positive impact on the amplitude of the financial cycle.[47] Model 6 suggests that international financial linkages, measured by the foreign claims/GDP ratio are also important drivers for the amplitude.

47 A detailed discussion of the regression results is provided in Stremmel and Zsámboki (2014).

The impact of financial depth, approximated by the stock market capitalisation/GDP and bank assets/GDP ratios (Model 4), tends to be limited, although the components of this measure need to be differentiated. In comparison to the depth of stock market, the relative size of the banking sector seems to be the main driver of the financial cycle. This variable also performs better in terms of explanatory power. Finally, the credit/deposits and deposits/GDP ratios (Model 3) are also able to explain a notable part of the variation of the amplitude measures, although their total explanatory power is lower in comparison to other groups.

Overall, our regression results suggest that structural features of national banking sectors have a significant impact on the amplitude of the financial cycle. Although all banking sector indicators used in the analysis have some explanatory power, the magnitude of the impact varies significantly. In particular, banking concentration, the share of foreign banks, the share of foreign currency loans and the foreign claims/GDP ratio offer considerably high explanatory power.

We conduct several robustness checks such as splitting the sample into down phases and up phases in order to check whether the magnitude of the impact of these structural features varies across different phases of the financial cycle or analysing the influence of monetary policy by incorporating country-specific Taylor-rule residuals in the regressions.[48] Furthermore, we also employ other potential financial cycle measures (based on different combinations of variables characterising asset and credit price developments as well as the behaviour of banking institutions) and re-run all regressions. The robustness checks confirm that the structural banking characteristics have a significant impact on the phases of the financial cycle, although the coefficients of structural variables vary somewhat depending on the specification. Furthermore, structural banking features seem to matter more than the monetary policy stance for building up of the financial cycle phase amplitude over the medium term.

Despite these strong findings, we would also like to point to potential caveats in our investigation. This study draws its conclusions from a small number of observations reflecting the underlying data availability issue, which led us to use financial cycle phases instead of complete financial cycles. The constraints of the RHS variables prompted us to employ the structural indicators stepwise in uni- or bivariate estimations. In our view, these are reasonable ways to deal with the data constraints.

CONCLUSIONS

We believe that our findings contribute to the on-going discussion on the implementation of macro-prudential measures, in particular as regards certain structural and cyclical policy instruments. Based on the identified differences in financial cycles across EU countries as well as the impact of certain structural banking characteristics on the amplitude of the financial cycle, we can conclude that the implementation of macro-prudential measures should be differentiated across EU Member States. The timing of activation and the relative calibration of the policy measures should take into consideration the differences both in financial cycles and banking structures.

In particular, our results suggest that the activation and calibration of structural policy measures, such as the systemic risk buffer (SRB), should be mindful of the cyclical position of the banking system. On the one hand, if a structural measure is activated and phased-in in a boom period, it may also mitigate the upward swings in the financial cycle, in particular if it coincides with the

48 For details on the impact of monetary policy, see Stremmel and Zsámboki (2014).

implementation of counter-cyclical measures, such as the counter-cyclical buffer (CCB). On the other hand, if a structural measure is activated in a recessionary phase, it may actually amplify the downward cyclical swings and/or counteract other policy measures, such as the release of the CCB.

The regression results also confirm the intuition that the activation and calibration of counter-cyclical policy measures (e.g. CCB) should not only depend on the cyclical situation of the banking sector, but it should also take into consideration structural characteristics of the banking systems in individual Member States. Concretely, in the absence of structural measures in place, in countries where the banking sector is more concentrated, more integrated and/or dominated by foreign banks and foreign currency lending, the calibration of the CCB may need to be more stringent, given that those banking systems are found to be more exposed to cyclical swings. However, if systemic risk buffers or other structural measures are in place, these measures may also contribute to reducing the amplitude of the cycle, provided that the underlying structural risks are addressed effectively.

Nonetheless, further analyses are needed to achieve a better understanding of the combined impact of cyclical and structural policy measures that may ultimately affect their relative calibration and the proper timing of their activation.

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ANNEX

Regressions of selected financial cycle measures

Sample 2	(1)	(2)	(3)	(4)	(5)	(6)
Banking concentration	0.0074***					
Foreign banks		0.0093***				
Credit/Deposits			0.0046*			
Deposits/GDP			0.0067**			
Market cap./GDP				0.0021*		
Bank assets/GDP				0.0071***		
FX loans/Loans					0.0925***	
Credit/GDP					0.0098***	
FX loans/Loans						0.1229***
Foreign claims/GDP						0.0058***
No of observations	60	26	62	51	34	33
Constant	yes	yes	yes	yes	yes	yes
Adjusted R^2 (from OLS)	0.48	0.33	0.22	0.23	0.55	0.51
BIC	-464.00	-201.71	-480.98	-391.34	-271.45	-261.76

Notes: * p<.1, ** p<.05, *** p<.01.

STATISTICAL ANNEXES[1]

Table 1 Number of credit institutions and foreign branches

	Number of MFI credit institutions						Number of foreign branches					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
Belgium	49	48	48	47	44	39	56	55	58	61	59	64
Germany	1,882	1,840	1,819	1,789	1,762	1,734	103	104	108	110	108	109
Estonia	6	7	7	7	8	8	11	10	11	10	8	7
Ireland	472	468	461	448	442	431	32	33	34	38	36	34
Greece	36	36	36	34	30	21	30	29	26	23	22	20
Spain	282	271	255	249	230	204	87	89	88	87	85	85
France	672	660	635	611	596	579	99	98	95	92	87	91
Italy	729	717	697	672	635	611	84	82	77	79	78	81
Cyprus	137	130	127	116	110	74	23	25	25	25	27	27
Latvia[1)]	28	29	29	22	20	54	6	6	8	8	9	9
Luxembourg	120	118	118	114	112	121	40	37	37	35	36	37
Malta	23	23	26	26	28	27	3	3	3	3	3	3
Netherlands	266	262	254	250	224	204	32	33	33	35	36	39
Austria	771	760	750	736	721	701	30	29	30	30	29	30
Portugal	147	139	133	131	129	127	28	27	26	24	23	24
Slovenia	21	22	22	22	20	20	3	3	3	3	3	3
Slovakia	17	15	15	14	14	14	9	11	14	17	14	15
Finland	334	328	318	305	290	279	22	22	24	24	22	22
Euro area	5,992	5,873	5,750	5,593	5,415	5,248	698	696	700	704	685	700
EU	8,525	8,360	8,208	8,060	7,861	7,726	982	975	983	990	967	978

Sources: ECB Structural Financial Indicators and ECB monetary financial institution (MFI) statistics.
1) The reclassification of credit unions as credit institutions in Latvia resulted in a significant increase in the overall number of credit institutions in 2013.

Table 2 Total assets of domestic banking groups and foreign-controlled subsidiaries and branches

(EUR billions)

	Domestic banking groups						Foreign subsidiaries and branches					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
Belgium	1,201	590	590	556	520	469	219	600	561	591	528	491
Germany	9,005	7,767	7,517	7,577	7,257	6,457	1,005	861	379	419	309	278
Estonia	0	0	0	1	1	1	37	33	30	19	20	20
Ireland	538	517	448	381	352	275	1,083	822	732	812	647	514
Greece	358	386	395	343	346	356	100	104	98	82	63	13
Spain	3,287	3,404	3,498	3,604	3,595	3,271	350	328	309	309	289	217
France	6,874	6,101	6,173	6,451	6,583	6,154	276	215	212	223	227	189
Italy	2,522	2,475	2,536	2,547	2,603	2,405	236	236	229	247	252	227
Cyprus	87	96	100	86	74	41	39	48	44	40	38	26
Latvia	11	10	10	10	11	12	22	19	19	16	17	17
Luxembourg	133	91	62	98	90	90	875	783	704	697	650	628
Malta	8	9	10	10	12	13	36	34	41	41	42	38
Netherlands	2,874	2,530	2,364	2,514	2,415	2,252	121	118	349	318	273	181
Austria	830	868	857	874	848	788	345	272	274	293	316	301
Portugal	376	401	414	399	385	368	101	109	118	114	112	94
Slovenia	38	41	41	38	35	30	15	15	15	15	14	13
Slovakia	2	3	4	6	6	7	60	49	50	49	49	50
Finland	116	118	126	140	149	150	270	264	337	494	450	372
Euro area	28,261	25,407	25,143	25,636	25,280	23,138	5,190	4,912	4,504	4,777	4,297	3,670

Source: ECB Financial Stability Committee (FSC) Consolidated Banking Data statistics.

1 For comparability reasons, euro area and EU aggregates are based on a fixed composition of 18 and 28 countries.

Table 3 Total assets of domestic banking groups and foreign-controlled subsidiaries and branches in relation to GDP

(in percentages)

	Domestic banking groups						Foreign subsidiaries and branches					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
Belgium	347	173	166	151	138	123	63	176	158	160	141	128
Germany	364	327	301	290	272	236	41	36	15	16	12	10
Estonia	3	2	3	7	4	5	227	234	211	114	114	109
Ireland	299	319	283	234	214	168	601	506	463	499	395	314
Greece	154	167	178	164	179	196	43	45	44	39	33	7
Spain	302	325	335	344	349	320	32	31	30	30	28	21
France	356	324	319	322	324	299	14	11	11	11	11	9
Italy	160	163	163	161	166	154	15	16	15	16	16	15
Cyprus	506	570	573	480	420	249	226	287	254	222	212	159
Latvia	50	52	55	49	48	51	96	105	106	81	76	73
Luxembourg	356	254	159	234	211	198	2,341	2,202	1,791	1,669	1,514	1,381
Malta	129	148	150	156	168	174	611	565	634	618	611	519
Netherlands	483	441	403	420	403	374	20	21	60	53	46	30
Austria	294	314	300	292	276	252	122	99	96	98	103	96
Portugal	219	238	240	233	233	222	59	65	68	66	68	57
Slovenia	102	116	114	106	98	84	40	44	41	40	41	38
Slovakia	4	5	5	9	9	9	94	78	77	71	69	69
Finland	63	68	71	74	77	78	145	153	189	262	234	192
Euro area	305	284	274	271	266	241	56	55	49	51	45	38

Sources: ECB Financial Stability Committee (FSC) Consolidated Banking Data statistics and ECB calculations.

Table 4 The composition of banking sector assets by type of credit institution[1)]

(in percentages)

	Domestic credit institutions				
	2009	2010	2011	2012	2013
Belgium	39	40	35	36	35
Germany	89	89	88	88	89
Estonia	1	6	11	4	4
Ireland	50	56	52	52	51
Greece	79	80	81	84	97
Spain	90	90	91	91	92
France	89	90	90	89	91
Italy	88	87	86	87	88
Cyprus	59	69	65	65	71
Latvia	31	32	35	38	40
Luxembourg	9	6	6	7	8
Malta	21	19	20	22	25
Netherlands	95	85	87	89	92
Austria	80	81	79	78	77
Portugal	77	78	79	79	81
Slovenia	71	72	72	71	69
Slovakia	7	7	5	4	4
Finland	33	29	28	33	35

Table 4 The composition of banking sector assets by type of credit institution[1] (cont'd)

(in percentages)

	Subsidiaries of credit institutions from EU countries					Branches of credit institutions from EU countries				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Belgium	50	48	47	42	40	4	4	7	8	11
Germany	8	8	8	8	7	2	2	2	3	2
Estonia	82	65	62	64	64	17	27	28	29	27
Ireland	34	27	26	23	24	9	10	12	14	13
Greece	13	13	8	8	0	8	7	11	9	3
Spain	3	3	3	3	3	6	6	6	5	4
France	8	8	7	8	6	2	2	2	2	1
Italy	6	6	6	6	6	6	7	7	7	6
Cyprus	32	25	20	15	12	1	1	1	2	1
Latvia	51	48	36	34	33	12	12	13	14	12
Luxembourg	68	71	68	67	63	14	13	11	12	11
Malta	35	36	35	32	25	3	2	1	1	1
Netherlands	1	10	7	4	3	3	3	4	5	4
Austria	14	14	14	15	15	1	1	1	1	1
Portugal	16	14	13	12	13	6	7	8	8	6
Slovenia	28	27	27	28	29	1	1	1	2	2
Slovakia	86	86	88	88	82	7	6	7	8	14
Finland	63	66	65	60	59	4	5	6	7	5

	Subsidiaries of credit institutions from rest of the world					Branches of credit institutions from rest of the world				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Belgium	3	3	5	6	6	4	4	6	7	8
Germany	1	1	1	1	1	0	0	1	1	1
Estonia	0	2	0	4	5	0	0	0	0	0
Ireland	7	7	10	10	11	0	0	0	0	0
Greece	0	0	0	0	0	0	0	0	0	0
Spain	0	0	0	0	0	0	0	0	0	0
France	1	1	1	1	1	0	0	0	0	0
Italy	0	1	0	0	0	0	0	0	0	0
Cyprus	4	0	9	12	10	4	5	5	6	6
Latvia	6	8	16	15	15	0	0	0	0	0
Luxembourg	6	8	10	11	13	2	2	5	4	5
Malta	4	5	6	5	4	38	38	38	41	45
Netherlands	2	2	2	2	2	0	0	0	0	0
Austria	5	5	5	6	6	0	0	0	0	0
Portugal	1	1	1	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0	0
Slovakia	0	0	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0	0	0

Sources: ECB/FSC Consolidated Banking Data statistics and ECB calculations.
1) Data for 2008 are not available for all countries. The numbers displayed have been rounded.

Table 5 Population per credit institution and local branch

	Population per credit institution						Population per local branch					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
Belgium	101,971	103,750	102,670	101,648	107,320	107,816	2,481	2,568	2,739	2,829	2,894	2,971
Germany	41,287	42,030	42,383	43,087	43,829	44,573	2,077	2,107	2,070	2,160	2,260	2,271
Estonia	78,876	74,467	74,450	78,835	83,731	76,132	5,218	6,293	6,634	7,529	8,219	9,245
Ireland	54,830	9,115	9,325	9,536	9,725	10,048	5,024	3,696	3,924	4,165	4,314	4,325
Greece	169,492	169,502	179,895	191,780	213,323	282,252	2,730	2,743	2,785	2,891	3,057	3,631
Spain	125,949	130,481	136,715	137,687	147,016	158,337	990	1,034	1,067	1,150	1,210	1,362
France	88,095	90,532	94,433	98,659	102,400	105,523	1,625	1,683	1,670	1,694	1,706	1,736
Italy	73,144	75,147	77,742	80,535	85,302	87,966	1,751	1,769	1,798	1,809	1,853	1,922
Cyprus	4,826	5,213	5,457	6,035	6,306	8,585	852	869	910	943	1,016	1,271
Latvia	64,051	57,892	53,777	66,414	70,126	31,973	3,310	3,433	3,573	3,750	5,084	5,873
Luxembourg	3,218	3,389	3,476	3,684	3,770	3,709	2,127	2,204	2,246	2,288	2,618	2,560
Malta	17,799	17,185	15,941	16,010	14,986	15,650	3,688	3,618	3,668	3,890	3,921	3,841
Netherlands	54,437	56,020	57,283	58,162	62,976	66,402	4,806	5,268	5,800	6,292	6,793	7,760
Austria	10,363	10,559	10,719	10,951	11,220	11,585	1,961	2,002	2,005	1,893	1,889	1,946
Portugal	60,700	64,051	66,483	68,527	69,597	69,414	1,655	1,628	1,615	1,634	1,690	1,751
Slovenia	84,249	81,666	81,953	82,114	89,425	89,543	2,897	2,892	2,952	2,988	2,959	3,269
Slovakia	207,918	208,375	187,240	174,133	193,080	186,655	4,297	4,405	4,436	5,221	5,095	4,310
Finland	14,883	15,298	15,868	16,478	17,297	17,949	3,178	3,471	3,636	3,726	3,856	4,184
Euro area	53,228	51,047	52,165	53,549	55,396	56,932	1,759	1,802	1,819	1,883	1,945	2,039

Sources: ECB Structural Financial Indicators and ECB calculations.

Table 6 Population per bank employee and assets per bank employee

	Population per banking employee						Assets per bank employee					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
Belgium	162	169	176	179	184	191	19,258	18,133	18,313	19,550	18,052	17,525
Germany	120	122	122	123	124	126	11,488	11,023	12,419	12,634	12,470	11,554
Estonia	218	235	244	243	241	276	3,591	3,748	3,700	3,448	3,536	4,104
Ireland	111	119	125	129	144	145	34,863	34,669	32,055	28,808	27,463	23,307
Greece	169	170	176	186	195	220	6,986	7,474	8,103	7,942	7,743	7,937
Spain	165	172	176	188	197	213	12,229	12,840	13,248	14,690	15,255	14,575
France	151	155	154	153	155	158	17,019	17,169	17,570	18,833	18,302	18,169
Italy	177	186	188	192	197	199	10,752	11,412	11,707	12,754	13,607	13,183
Cyprus	63	65	66	66	67	78	9,411	11,138	10,675	10,264	9,969	8,103
Latvia	157	173	182	184	192	201	2,319	2,420	2,647	2,613	2,674	2,911
Luxembourg	18	19	19	19	20	21	34,239	30,189	29,299	29,841	27,800	27,291
Malta	106	108	106	103	105	101	10,920	10,731	12,749	12,700	13,304	11,939
Netherlands	142	150	154	158	162	174	19,216	20,132	20,917	23,006	24,024	23,318
Austria	106	108	107	107	109	111	13,462	13,336	12,532	12,936	12,592	12,044
Portugal	170	173	173	177	184	182	7,729	8,445	9,086	9,568	9,691	8,908
Slovenia	165	168	171	174	179	184	3,990	4,382	4,420	4,438	4,417	4,129
Slovakia	262	289	298	293	290	292	3,180	2,999	3,188	3,145	3,201	3,292
Finland	207	215	230	232	241	243	14,939	15,581	20,131	27,296	26,524	23,296
Euro area	146	150	152	154	158	162	13,475	13,533	14,181	15,022	14,977	14,327

Sources: ECB Structural Financial Indicators and ECB calculations.

Table 7 Herfindahl index[1] for credit institutions and share of total assets of five largest credit institutions

(index ranging from 0 to 10,000 and share of the five largest credit institutions in percentage)

	Herfindahl index for credit institutions						Share of total assets of five largest credit institutions[2]					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
Belgium	1,881	1,622	1,439	1,294	1,061	979	81	77	75	71	66	64
Germany	191	206	298	317	307	266	23	25	33	34	33	31
Estonia	3,120	3,090	2,929	2,613	2,493	2,483	95	93	92	91	90	90
Ireland	794	881	700	647	632	674	50	53	50	47	46	48
Greece	1,172	1,184	1,214	1,278	1,487	2,136	70	69	71	72	79	94
Spain	497	507	528	596	654	757	42	43	44	48	51	56
France	681	605	610	600	545	551	51	47	47	48	45	46
Italy	307	298	410	407	410	406	31	31	40	39	40	40
Cyprus	1,019	1,089	1,124	1,027	996	1,486	64	65	64	61	63	63
Latvia	1,205	1,181	1,005	929	1,027	1,037	70	69	60	60	64	64
Luxembourg	309	310	343	346	345	357	30	29	31	31	33	34
Malta	1,236	1,250	1,181	1,203	1,313	1,458	73	73	71	72	74	76
Netherlands	2,167	2,034	2,049	2,067	2,026	2,104	87	85	84	84	82	84
Austria	454	414	383	423	395	405	39	37	36	38	36	37
Portugal	1,114	1,150	1,207	1,206	1,191	1,196	69	70	71	71	70	71
Slovenia	1,268	1,256	1,160	1,142	1,115	1,045	59	60	59	59	58	57
Slovakia	1,197	1,273	1,239	1,268	1,221	1,215	72	72	72	72	71	70
Finland	3,160	3,120	3,550	3,700	3,010	3,080	83	83	84	81	79	84
Euro area	686	659	690	714	682	693	44	44	47	48	47	47
EU	655	636	671	689	666	677	44	44	47	47	47	47

Source: ECB Structural Financial Indicators.
1) The Herfindahl index (HI) refers to the concentration of banking business. The HI is obtained by summing the squares of the market shares of all the credit institutions in the banking sector. The exact formula according to which data must be transmitted to the ECB is reported in the ECB Guideline on monetary financial institutions and markets statistics (recast) (ECB/2007/9).
2) Banking sector and individual figures are reported on an unconsolidated basis.