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Non-bank financial institutions:  
Assessment of their impact  
on the stability of the financial system



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# Non-bank financial institutions: Assessment of their impact on the stability of the financial system

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## Glossary

ABCP	Asset Backed Commercial Paper
ALM	Asset-Liabilities Model
BCBS	Basel Committee on Banking Supervision
CCPs	Central Clearing Counterparties
CDS	Credit Default Swap
CGFS	Committee on the Global Financial System
ECB	European Central Bank
EMIR	European Market Infrastructure Regulation
ETF	Exchange Traded Funds
FSB	Financial Stability Board
FVCs	Financial Vehicle Corporations
MFIs	Monetary Financial Institutions (Banks)
MMFs	Money Market Funds
NAV	Net Asset Value
NBFIs	Non-Bank Financial Institutions
OFIs	Other Financial Institutions
OTC	Over The Counter
TR	Trade Repository

## Member State abbreviations

BE	Belgium	LU	Luxembourg
BG	Bulgaria	HU	Hungary
CZ	Czech Republic	MT	Malta
DK	Denmark	NL	Netherlands
DE	Germany	AT	Austria
EE	Estonia	PL	Poland
EL	Greece	PT	Portugal
ES	Spain	RO	Romania
FR	France	SI	Slovenia
IE	Ireland	SK	Slovakia
IT	Italy	FI	Finland
CY	Cyprus	SE	Sweden
LV	Latvia	UK	United Kingdom
LT	Lithuania		



## Executive summary

Over the past decade, and in particular since the crisis started, the sector of the non-bank financial institutions (NBFIs) of the EU27 has grown in importance in terms of financial stability, as reflected in its strong increase in size and growing interconnectedness with the banking sector. As result, policy-makers have proceeded in gaining a better understanding of the nature and the role of the various non-bank financial institutions and their potential impact on financial stability.

Part of the difficulty of assessing the impact of non-bank financial institutions on financial stability is the wide range of institutions involved. The study examines in great detail the (i) money market funds, (ii) private equity firms, (iii) hedge funds, (iv) pension funds and insurance undertakings, (v) central counterparties, and UCITS and exchange traded funds (ETFs).

The report addresses the risks run by each of the several types of non-bank financial institutions (credit, counterparty, liquidity, redemption, fire sales risk, etc.). These risks are magnified as a result of multipliers, a.o. size, inter-connectedness, but also regulatory features.

The proposed framework for analysing risks to the financial stability of NBFIs is intended to categorise a wide range of underlying and proximate causes and set out how these relate to a common set of risks to financial stability and impacts on the financial system. The framework may also be useful for policy development, analysis and tracking. For instance, in focusing on underlying causes as opposed to proximate causes of financial instability.

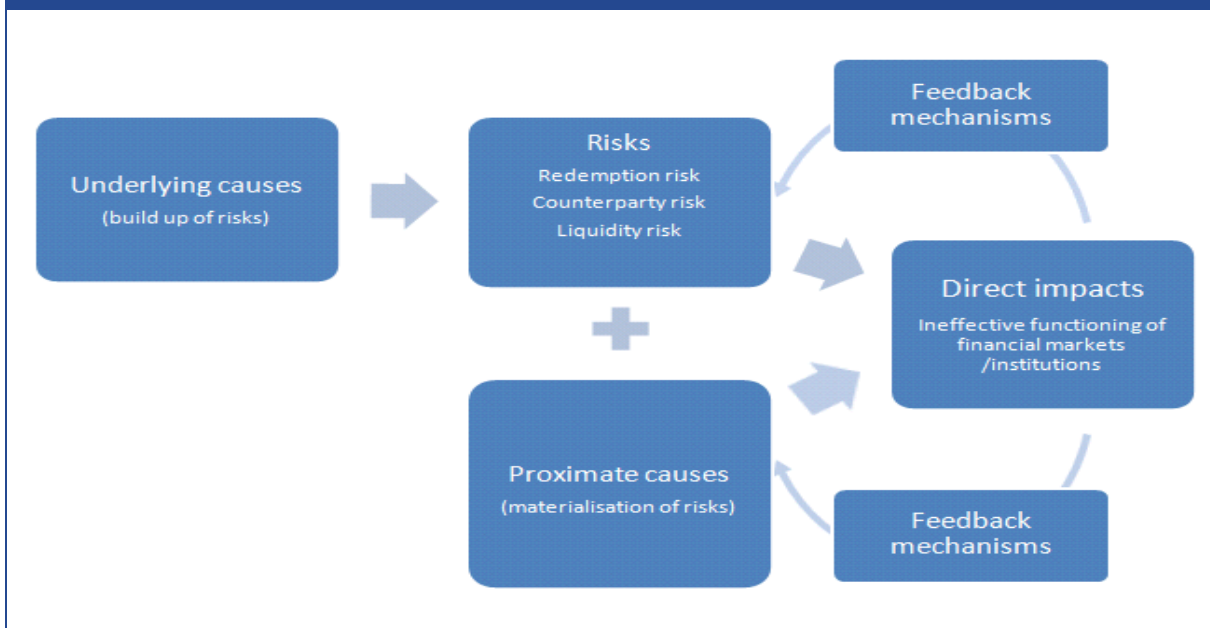
The framework distinguishes between causes and proximate causes. Underlying causes relate to the characteristics of individual non-bank financial sectors or connections between a non-bank financial sector and banks/other non-bank financial sectors that bring about the build-up of risks to financial instability. Meanwhile, proximate causes relate to factors that trigger the materialisation of these risks (see figure 1 below).

Risks to financial stability are broadly considered as risks to financial intermediation, or risks that threaten the flow of capital from investors to users of funds.

The impacts of risks are magnified as a result of multipliers. These include size and inter-connectedness particularly. That is, the larger the institutions involved, the bigger the effect of any risk to financial stability materialising. Similarly, the more inter-connected the institutions involved the bigger the effect insofar as there are likely to be a greater number of institutions involved. Regulatory features can also act as a multiplier.

Money market funds were not the primary cause of financial crisis but played an important role via second-round effects. The collapse of the market for asset-backed commercial paper, for instance, led investors to withdraw from money markets due to perceptions over the funds' exposures to asset backed commercial paper. The resultant contraction of assets held within these funds led to important feedback loops that exacerbated the impact of the financial crisis. Specifically, non-government or corporate issuers' exposure to funding liquidity risk increased substantially as money market funds were not intermediating in longer-dated money market instruments/prime money market instruments.

Figure 1: Analytical framework



The main risk to financial stability of the private equity sector relates to its role in the leverage loans market. However, it is unclear where the burden for the excessive rate of growth of the leveraged loans market should lie with private equity funds or banks.

The impact of hedge funds on financial stability during the financial crisis appears to be a story of the relationship between banks and hedge funds. Although comprehensive data is lacking, commentators point to excessive risk-taking by hedge funds, due to prime broker, trading or ownership relationships with banks, as major underlying causes for the build-up of risks. The impact of these risks materialising were viewed to be particularly deleterious to financial stability due to feedback loops involving, for example, liquidity constraints of hedge funds, exacerbated as a result of difficulties in markets for short-term funding.

Traditional insurance undertakings and pension fund activities appear not to have been relevant to the build-up and materialisation of risks to financial stability. The main effects on financial stability of this sub-sector are through the fire sale mechanism. As a consequence of asset devaluations, insurance undertakings and pension funds may have curtailed their purchasing activities on securities markets, which exacerbated already difficult conditions in these markets.

The key risk that central counterparties pose is the concentration of credit risk associated with their own failure or the failure of one of their very large members. Risk to financial stability arising from their activities is likely to increase as a result of their size, connectedness with bank and non-bank financial institutions, and connectedness between each other.

The threats to financial stability arising from ETFs include the grouping of tracking error risk with trading book risk by the swap counterparty, which could compromise risk management, collateral risk triggering a run on ETFs in periods of heightened counterparty risk, materialisation of liquidity risk when there are sudden and large investor withdrawals and increased product complexity and options on ETFs undermining risk monitoring capacity.

The report further highlights the risks arising from a number of activities frequently undertaken by these non-bank financial institutions, in particular securitisation, securities lending, and repos.

Regarding securitisation, the major risk, in addition to the typical credit and market risks, is the agency risk arising from a potentially very significant misalignment of the incentives faced by the various players in the securitisation value chain.

Repos are a critical source of short-term liquidity for financial institutions and experience has shown that the repo market can easily dry up in an environment of heightened concern about credit and counterparty risk, thus risking destabilising the financial sector as a whole.

In the case of securities lending, securities lenders face the risk that the borrower may be unable to return the security and that the collateral and the indemnity provided by the intermediary in the securities lending value chain are insufficient to acquire the non-returned security in the market place. Therefore, extensive and robust counterparty monitoring is typically undertaken by securities lenders. Cash collateral presents a particular risk as its investment by the lender may result in a loss and the shortfall has to be covered by the lender when the securities are returned by the borrower. Another key risk resulting from securities lending is that institutions having borrowed securities are under no obligations to provide information on their balance sheets on the extent to which the securities shown in their balance sheet are subject to a legal claim by a securities lender. This reduces the value of the balance sheet information for market transparency and makes the assessment of counterparty risk more complex and risky.

Finally, the report provides a selected overview of approaches for the measurement of financial instability and financial distress. It focuses on tools that have been developed for banks and that may be usefully applied to non-bank financial institutions in the future. The tools can be broadly grouped into 5 categories, namely (i) indicators of financial distress based on balance-sheet data, (ii) early-warning indicators, (iii) macro stress tests, (iv) methods for calculating the systemic importance of individual institutions, and (v) analyses of interconnectedness. However, the review of available non-bank financial institutions' data undertaken by the study and the discussions with stakeholders (about 30 non-bank financial institutions were surveyed for this study) identified a number of major data gaps, which, at the present time, preclude transposing the analysis undertaken so far for the banking institutions to the non-bank financial institutions.

Based on the findings from the literature and taking into account the limited range of relevant data, the study recommends that the following key risk-contributing factors should be regularly monitored as part of a broader risk monitoring system for both the various non-bank financial institutions segments and individual non-bank financial institutions: (i) an indicator of the appetite for risk-taking (e.g. rate of growth of the balance sheet items), (ii) an indicator of leverage, (iii) an indicator of liquidity risk, and (iv) an indicator of maturity mismatch. Missing from the set of indicators listed above are indicators related to credit and market risk. The sectoral and sub-sectoral data which are currently available are too aggregated to be able to construct credit and market risk indicators. While the annual statements and reports published by public financial institutions provide often information of the credit and/or market risk of a range of assets on their books, such information is typically available with a considerable lag so as to make it largely useless in a rapidly evolving financial environment. Missing is also an indicator of interconnectedness as, at the present time, the publicly available information can only be analysed



at a very aggregate level and provides only a picture, from the banking sector's perspective, of the connectedness of the latter with non-bank financial institutions but not, from the non-bank financial institutions' perspective, of connectedness of non-bank financial institutions with themselves or with the banking institutions.

The study advises to accompany the broad sectoral monitoring by a monitoring of the evolution of various asset classes or activities such as: (i) derivatives (using data from the BIS), (ii) securitised assets (using data from AFEME), (iii) repos (using data from ICMA), (iv) securities lending (using data from Data Explorer), and (v) central counterparties' exposures (using data from the central counterparties).

# 1 Introduction

## 1.1 Background

The financial crisis severely affected the financial system with the banking sector at the centre of the crisis, experiencing significant losses. In response to this, governments focused on providing substantial rescue measures with the aim of restoring financial stability.

However, non-bank financial institutions (NBFI) also played an important role in the build-up and transmission of risks leading up to the financial crisis. As a result, since the onset of the financial crisis, policy-makers have focused on gaining a better understanding of the nature and role played by NBFIs and their potential contribution to systemic risk. The literature identifies four key-risk originating and transmission channels.

Firstly, NBFIs generate product risk through the production of structured products, especially involving securitisation. The recent financial crisis has clearly shown that, due to a lack of understanding of the risks embedded in a number of securitised assets, many banks and NBFIs held assets that turned out to be much more risky than originally thought, such as for example various mortgage structure products. On the eve of the financial crisis, these holdings represented a substantial build-up of risks threatening financial stability.

Secondly, some NBFIs are highly inter-connected with banks and other non-bank financials. This inter-connectedness implies that financial distress at the level of an individual non-bank financial institution can transmit to other financial institutions (banks and non-banks), via counterparty risk, generating distress at the level of the financial system as a whole.

Thirdly, some NBFIs were very large. Any financial distress at one of these institutions (the 'distressed institution') may also result in financial distress at the level of the financial system. Market participants may be uncertain as to the *extent to which* the distressed institution is connected to other financial institutions and creates risks for the latter. As a consequence, uncertainty, or mistrust, affects the financial system as a whole as many financial institutions could pose counterparty risk.

Fourthly, in instances in which NBFIs experience distress or fail altogether, the liabilities of that non-bank financial institution held by other financial institutions have to be written down. For NBFIs such as pension funds and other investment funds, there are two consequences. Firstly, there is the direct effect of the loss in value of some of the assets held. Secondly, many pension funds will not invest in non-AAA-rated assets. Other funds may advertise to customers that they only hold high-grade assets. Thus, if these assets are downgraded, they have to be disposed of, which puts further downward pressure on their prices. This in turn will affect the balance sheets of all financial institutions holding such assets.

So-called fire sales of assets also occur when some financial institutions (banks or non-banks) find themselves liquidity constrained and dispose some of their assets rapidly. Typically, such a course of action tends to depress the price of these assets, and thus, generate a negative feedback loop to all institutions holding such assets if the latter are held for trading or are for sale (i.e., have to be marked to market).

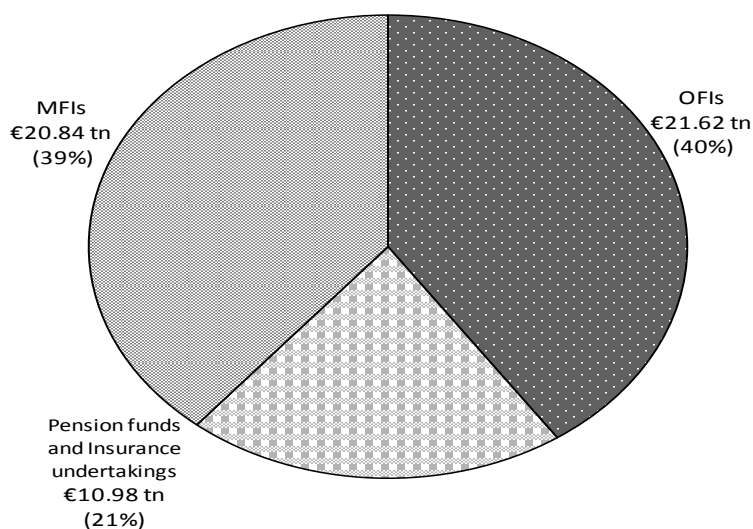
Under these circumstances, it is important to note that even if the banking sector does not hold problem assets, they are likely to be affected by the general downturn resulting from these events. The value of marked-to-market assets would fall, reducing their capital and limiting the extent to which they can lend or invest in new assets. This impacts the real economy and also influences wholesale funding conditions that places particular strain on highly leveraged financial and NBFIs (e.g., certain hedge funds and private equity firms).

Overall, NBFIs played important and multi-faceted roles in the build up and transmission of the recent financial crisis. As highlighted above, this could be through counterparty risk, as a consequence of size and inter-connectedness, excessive leverage and product risk, among other reasons.

Part of the difficulty of assessing the impact of NBFIs on financial stability is the wide range of institutions involved. The sector of NBFIs is defined as including insurance undertakings, pension funds and other financial intermediaries (OFIs). The latter group includes financial institutions engaged in the securitisation of assets, securities and derivatives dealers (operating on own account) and specialised financial institutions (e.g., hedge funds, venture capital firms, etc.). The definition of the NBFIs sector is very similar to the one used in a recent ECB Occasional Paper on the shadow banking in the eurozone (see Cerruti et al., 2012) but differs from the definitions used in recent US papers such as, for example, Adrian and Aschcraft (2012) who define shadow banking as comprising all institutions which undertake credit intermediation without direct, explicit access to public sources of liquidity and credit guarantees.

As a backdrop to the remainder of the report, Figure 2 and Figure 3 below provide some information on the importance of banks and NBFIs as a whole (including OFIs, insurance institutions and pension funds).

**Figure 2: Assets of MFIs, OFIs and pension funds and insurance undertakings in the EU27 at the end of 2011, € tn and percentage of total**



Source: Eurostat

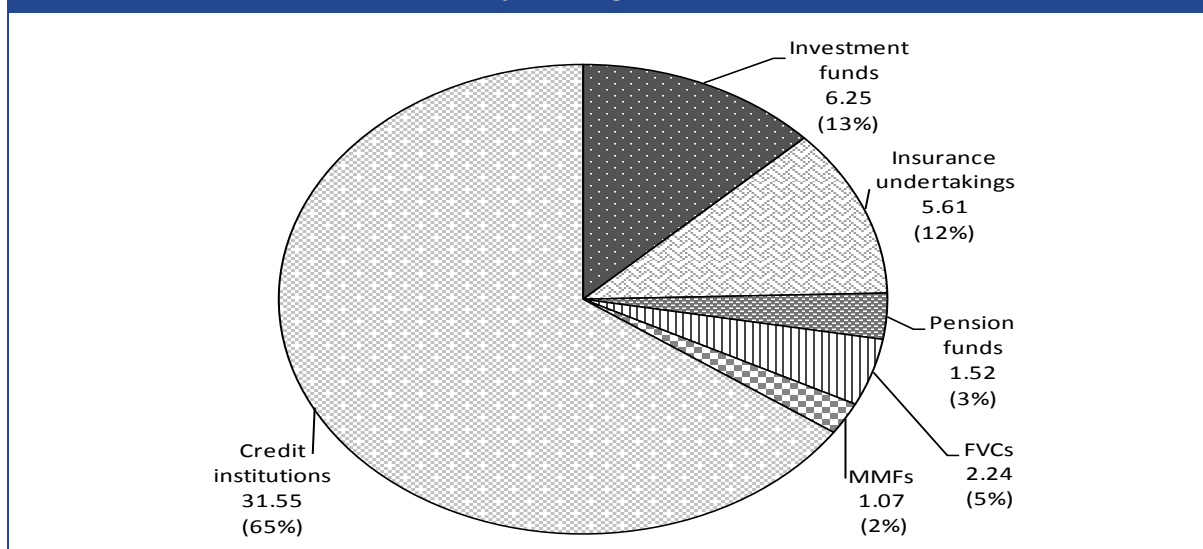
In the EU27, at the end of 2011, the assets held by NBFIs exceeded those held by monetary financial institutions (excluding central banks) (MFIs) – NBFIs held €32.6tn of assets while monetary financial institutions held €20.8tn.

Among NBFIs, OFIs (such as asset managers, hedge funds, etc.) accounted for slightly less than two-third of total assets.

A more detailed breakdown of the assets held by different OFIs is available for the euro area and shown in the figure below.

The makeup of the financial sector of the euro area is noticeably different from that of the entire EU27. Assets held MFIs accounted for 65% of the total assets held by euro-area financial institutions. This dwarfed the assets held by investment funds and financial vehicle corporations (FVCs) - 18% - at the end of 2011. Assets held by pension funds and insurance undertakings stood at around €7.1tn at the end of 2011, or 15% of the total assets held by euro area financial institutions.

**Figure 3: Assets of MFIs, OFIs and pension funds and insurance undertakings from the eurozone at the end of 2011, € tn and percentage of total**



Source: ECB

## 1.2 Definitions

NBFIs covered by the study include OFIs, insurance undertakings and pension funds as defined in Council Regulation (EC) No 2223/96.<sup>1</sup>

OFIs are defined as:

<sup>1</sup> Other financial intermediaries, insurance undertakings and pension funds as defined in Council Regulation (EC) No 2223/96 will be considered in this study. Alternative definitions, if used due to data limitations, will be referred to explicitly.

*“All financial institutions and quasi-institutions which are principally engaged in financial intermediation by incurring liabilities in forms other than currency, deposits and/or close substitutes for deposits from institutional units other than monetary financial institutions, or insurance technical services.”*

OFls consist of the following institutions:

- financial institutions engaged in the securitisation of assets
- security and derivative dealers (operating on own account)
- NBFIs engaged in lending
- central clearing counterparties
- specialised financial institutions (e.g., institutions that provide venture capital)

Insurance institutions and pension funds are defined as:

*“All financial institutions and quasi-institutions which are principally engaged in financial intermediation as the consequence of the pooling of risks.”*

For the purpose of the present study, we adopt the following definitions:

- **NBFIs:** NBFIs consist of OFIs, insurance undertakings and pension funds. The other financial intermediaries (OFIs) this report focuses on are: money market funds (section 3.1), private equity firms (section 3.2) hedge funds (section 3.3), and central clearing counterparties (CCPs) (section 3.6). Derivative dealers are covered in the discussion on CCPs.
- **Non-bank financial intermediation:** Non-bank financial intermediation involves the flow of capital from savers to borrowers. The chain of parties involved may be few, just like bank-based financial intermediation, but can also involve long chains of institutions. For instance, in place of banks as financial intermediaries are NBFIs such as investment funds (e.g., pension funds) that place the capital of savers in liabilities of other NBFIs (e.g., hedge funds) that offer a range of risk-return profiles. Through non-bank financial intermediation, final borrowers still access loans, leases and mortgages but these are, via a third set of NBFIs, engaged in lending rather than banks. As such, non-bank financial intermediation sees the functions of a bank split across different NBFIs.

Special financial activities undertaken by various financial institutions such as securitisation of assets and securities lending are discussed in section 5.1.

- **Risks to financial stability:** Risks to financial stability are broadly considered as risks to financial intermediation, or risks that threaten the flow of capital from savers to borrowers, with some emphasis placed particularly on the banking sector channel.

### 1.3 Study objectives

The objectives of this study are to provide a contribution to the European Commission's knowledge and information gathering capacity in connection with the impact of NBFIs on financial stability.

Specifically, on the basis of available literature and data, the study seeks to provide:

- An account of non-bank financials' market behaviour and performance over the past decade, by financial market segment
- An account of how NBFIs have interacted with the banking sector
- Details of how and via which channels NBFIs were affected by the crisis, and whether and how they contributed to the crisis.

And, as a consequence of this analysis, the study seeks also to provide:

- A didactical element through which the roles and risks of different NBFIs are outlined
- An understanding of the feasibility of a database of risk indicators and diagnostic tools to identify existing and the building up of risks in the various sub-sectors of NBFIs and in the financial market segments in which NBFIs play an important role

### 1.4 Report structure

The study objectives described above are addressed using a mix of secondary literature review, evidence provided from consultations with stakeholders and data analysis, thereby providing quantitative and qualitative results on the following.

The overall structure for the report is as follows:

- Chapter 2 provides background statistical information on the overall size of the non-bank financial sector, including data on balance sheet developments of the NBFIs.
- Chapter 3 describes the nature of financial intermediation carried out by the main non-bank financial sub-sectors considered in this study. These descriptions provide a sense for the impact on financial stability of any one of these sub-sectors ceasing to function effectively.
- Chapter 4 provides an overview of regulations relevant to each of the main non-bank financial sub-sectors. These play a key role in risks to financial stability per sub-sector, and are therefore important to understand in any assessment of risks to financial stability.
- Chapter 5 covers cross-cutting issues. These may be common risks to financial stability stemming from different sub-sectors of the non-bank financial system: redemption risk (section 5.5), counterparty risk (section 5.6) and liquidity risk (section 5.7) and potentially significant underlying causes of these risks such as securitisation (section 5.1), repos (section 5.2), securities lending (section 5.3) and fire-sales (section 5.4).

- Chapter 6 elaborates the framework within which to assess risks to financial stability of NBFIs. This allows for the capture of each of the elements covered in chapters 3-5 and, to group further aspects of risks to financial stability relevant to individual sub-sectors of the non-bank financial system, covered below.
- Chapters 7 to 11 are based on the different types of non-bank financial institution(s), including money market funds (chapter 7), private equity (chapter 8), hedge funds (chapter 9), insurance undertakings and pension funds (chapter 10) and centralised counterparties (chapter 11). These chapters focus on the risks to financial stability posed by the institution(s) and a description of developments in the sub-sector over the financial crisis.
- Chapter 12 brings risks of financial stability posed by UCITS and ETFs into focus.
- Chapter 13 covers approaches to measuring the risks posed by NBFIs on financial stability.
- Chapter 14 discusses knowledge gaps and how to monitor OFIs.
- Chapter 15 provides conclusions.



## 2 The size and evolution of the non-bank financial sector

The present chapter provides an overview of the evolution of the non-bank financial sector in the run-up to the 2007-08 financial crisis, during the crisis and the post crisis period.

The non-bank financial sector has attracted considerable interest on both sides of the Atlantic and in both the U.S. and Europe, a number of studies have aimed to quantify the size of the non-bank financial sector, often referring to the sector as the shadow banking sector (see, for example, Noeth and Sengupta (2011), Pozsar and Singh (2011), Pozsar et al. (2012), Tobias and Shin (2009), for the studies focusing on the USA and Bouveret (2011) for studies focusing on Europe). In addition policymakers and regulators on both sides of the Atlantic are reviewing how to strengthen the oversight of the sector and reduce its opacity (see, for example, Financial Stability Board 2011a and 2011b and European Commission (2012)).

Estimates of the size of the non-bank financial sector vary considerably, in part because of different methodologies (see table below) and the present report does not attempt to put a figure to the overall size of the sector. However, it will consider statistics on the whole sector published by Eurostat and various sub-sector statistics published by Eurostat, the European Central Bank (ECB), commercial data providers and trade associations.

Table 1: Estimates of the NBFI sector			
Source of estimate	Geographic area	Period	Estimate in US\$ (€) trillion
Pozsar et al. (2012)	US	March 2008	20 (12.9)
		2010	16 (12.1)
Pozsar and Singh (2011)	US	end 2007	25 (17.0)
		end 2010	18 (13.5)
Bouveret (2011)	Europe	March 2008	13 (8.4)
		end 2010	13 (9.7)
Financial Stability Board (2011b)	World	2002	27 (28.6)
		2007	60 (43.8)
		2010	60 (45.3)
	USA	2010	24 (18.1)
	Europe	2010	22 (16.6)

Source: Turner (2012). US\$ figures converted in Euros using period exchange rate from European Central Bank

As background information for the study, this section provides an analysis of developments in the non-bank financial sector by using data over the period 2000-11 from the sectoral balance sheets published by Eurostat data as part of the European Accounts.<sup>2</sup>

<sup>2</sup> For a precise description of the definition of each asset and liability variable, see Eurostat (2009).

The evolution of total assets and liabilities of bank and non-bank financial are described and compared below to give an indication of how the relative size of the two sectors has changed over time (section 2.1). Moreover, a more granular analysis is also provided and asset/liability developments are considered (section 2.2), as well as developments of different asset classes and of the constituent asset types of these asset classes. The approach taken is to distinguish passive balance sheet adjustments (due to price fluctuations) from active balance sheet adjustments (due to transactions).

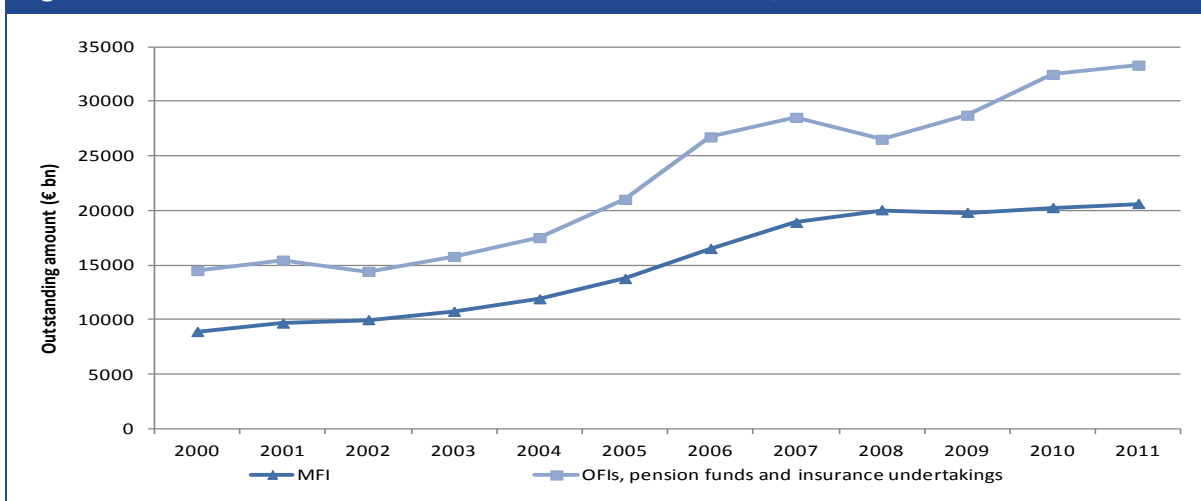
## 2.1 Comparisons of the bank and non-bank financial sectors

### 2.1.1 Evolution of the size of the bank and non-bank financial sectors in the EU27 from 2000 to 2011

Figure 4 shows the evolution of assets of the bank and non-bank financial sectors. The non-bank financial sector has been consistently larger than the banking sector over the period 2000-2011 and a more detailed analysis of the period 2000-2011 reveals four different phases concerning the relative performance of the two sectors:

- The two sectors expanded at roughly the same pace from 2000 to 2004;
- From 2004 to 2006, in the run-up to the financial crisis, total assets held by the non-bank financial sector grew much more rapidly than those held by the banking sector
- During crisis, the non-bank financial sector experienced a much more pronounced decline in total assets than the banking sectors
- Finally, during the post crisis period of 2009 to 2011, growth of non-bank financial balance sheets returned to close the growth experienced over the period 2002 to 2005 (before the sharp pre-crisis acceleration) while assets of the banking sector have barely grown since 2008

Figure 4: Total assets of EU27 MFI and NBFi sectors 2000-2011, €bn



Source: London Economics analysis of Eurostat sectoral account data

- While over the period 2000 to 2011, the value of assets held by the MFIs and NBFIs have increased by almost the same percentage, the rate of growth in the value of total assets held by the MFIs is much less volatile than that of the NBFIs with the standard deviation of the annual growth rate of the former standing at 6.6 percentage points while reaching 10.1 percentage points for the NBFIs over the period 2000-2011.
- The difference in volatility is especially apparent in 2008 and during the subsequent years with total assets of the NBFIs falling in 2008 and then growing again substantially while assets of the MFIs have remained essentially flat from 2009 onwards.

**Table 2: Key comparisons – assets of MFIs and NBFIs**

Indicator	MFIs	NBFIs
Level of total assets at the end of 2000	8 993 € billion	13 000 € billion
Level of total assets at the end of 2010	20 841 € billion	32 601 € billion
Cumulative rate of growth 2000 to 2007	111%	110%
Cumulative rate of growth 2003 to 2007	77%	87%
Annual rate of growth 2008	6%	-6%
Cumulative rate of growth 2008-2011	3%	27%

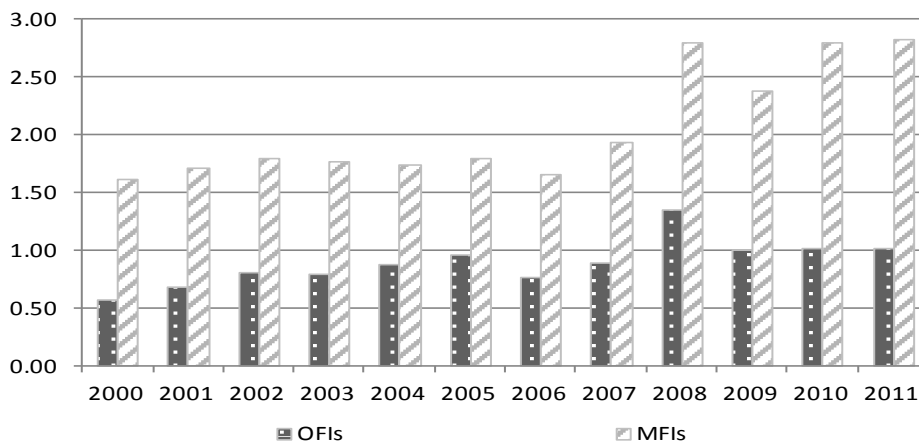
Source: London Economics analysis of Eurostat sectoral account data

### 2.1.2 Leverage of the bank and non-bank financial sectors in the EU27

As life insurance companies and pension funds have little debt, the leverage analysis below focuses on a comparison of debt-to-equity ratios of MFIs and OFIs.

- As a group, OFIs are much less leveraged than MFIs. At the end of 2011, the MFI's leverage ratio (defined as the ratio of loans and debt securities to shares and other equity) stood at 2.8 while it was only 1 for OFIs (Figure 5).
- While the high leverage ratio of MFIs in 2011 reflects to a large extent the impact of the financial crisis, it should be noted that, even before the crisis, the MFI's leverage ratio fluctuated in the range of 1.6 to 2.0 while the OFIs leverage ratio rose from just under 0.5 to slightly less than 1 in 2005 and exceeded 1 only once, in 2008 during the height of the financial crisis.

Figure 5: Leverage ratio of OFIs and MFIs EU27 2000-2011



Note: The leverage of EU27 other financial institutions and monetary financial institutions have been calculated as the sum of “loan” and “securities other than shares” liabilities of each institution type relative to total “shares and other equity” liabilities

Source: Eurostat

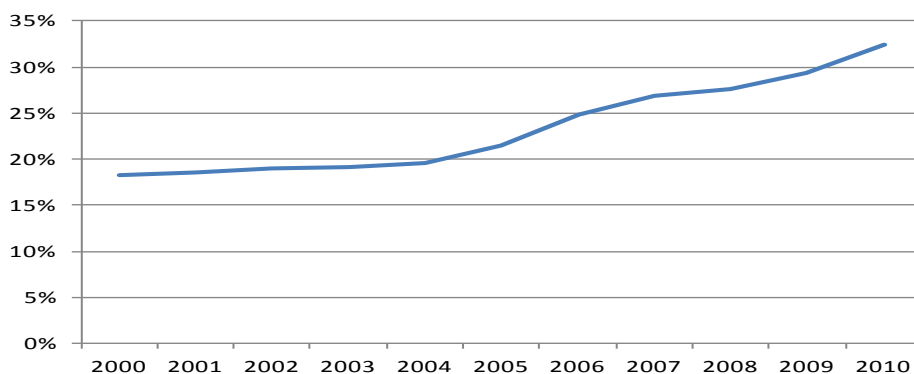
### 2.1.3 Connectedness of NBFIs with the banking sector

Besides growing considerably in size since 2000, the group of NBFIs has become also more connected with the banking sector. Connectedness is measured from the perspective of the banking sector and is proxied by the ratio of MFI claims on NBFIs.

As shown in Figure 6, the ratio of MFI claims on NBFIs in total MFI claims increased by slightly more than 50% over the period 2005–2010 to 32.5% after having grown only very marginally from 18.2% in 2000 to 21.4% in 2005.

In short, the connectedness of the EU27 banking sector to the NBFIs sector increased sharply and this increase occurred almost entirely during the financial crisis and post-crisis period.

Figure 6: interconnectedness of MFIs with NBFIs 2000-2010



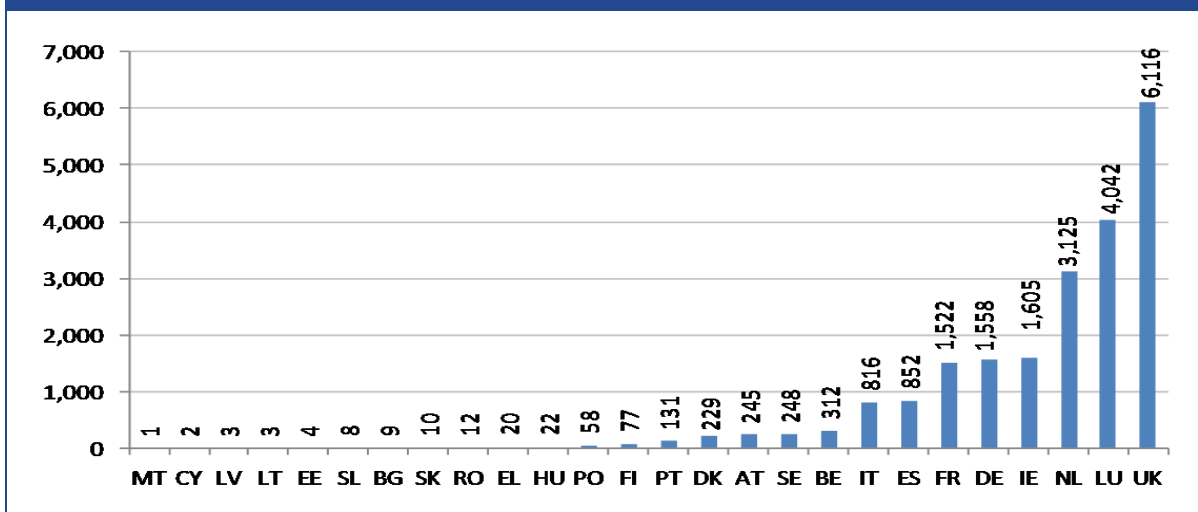
Note: The ratio is equal to loans and deposits of MFIs to/at OFIs, insurance undertakings and pension funds by total loans and deposits of MFIs.

Source: ECB; Eurostat

### 2.1.4 Variation in size of the OFI sector across the EU27

Within the EU27, there are appreciable differences in the size of the OFI sector across Member States (Figure 7). Overall, the level of assets held by OFIs is smaller than GDP in 23 Member States. The only exceptions are the UK, the Netherlands, Ireland and Luxembourg (Figure 8).

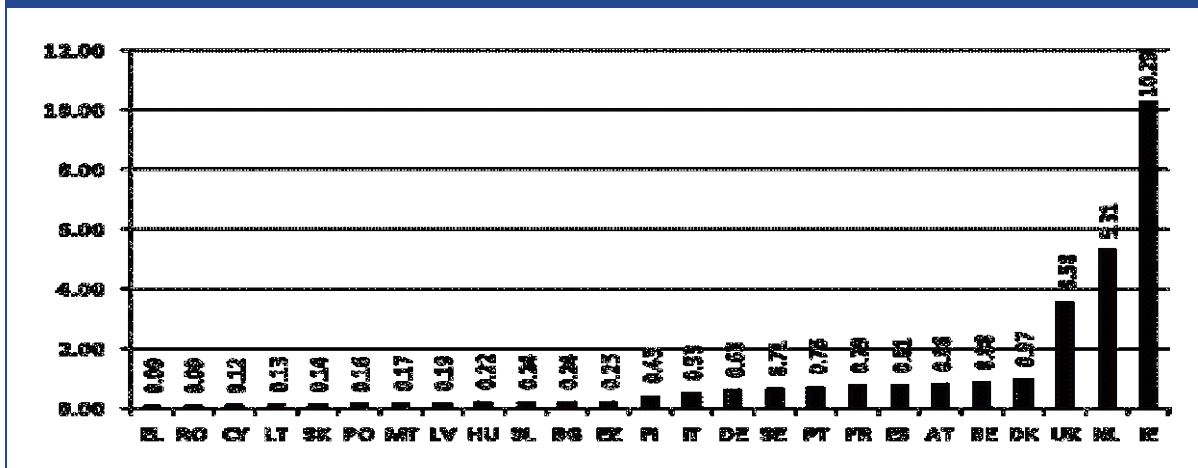
Figure 7: Size of the OFI sector across the EU27, December 2010, €bn



Note: Czech Republic not included as Eurostat do not provided information on the total assets held by other financial institutions for 2010.

Source: Eurostat

Figure 8: Size of OFIs sector as a percentage of GDP across the EU27, December 2010



Note: Czech Republic not included as Eurostat do not provide information on the total assets held by other financial institutions for 2010. Luxembourg is not shown on the chart because the ratio is much higher that it distorts the figure.

Source: Eurostat

## 2.2 Developments in assets and liabilities of NBFIs

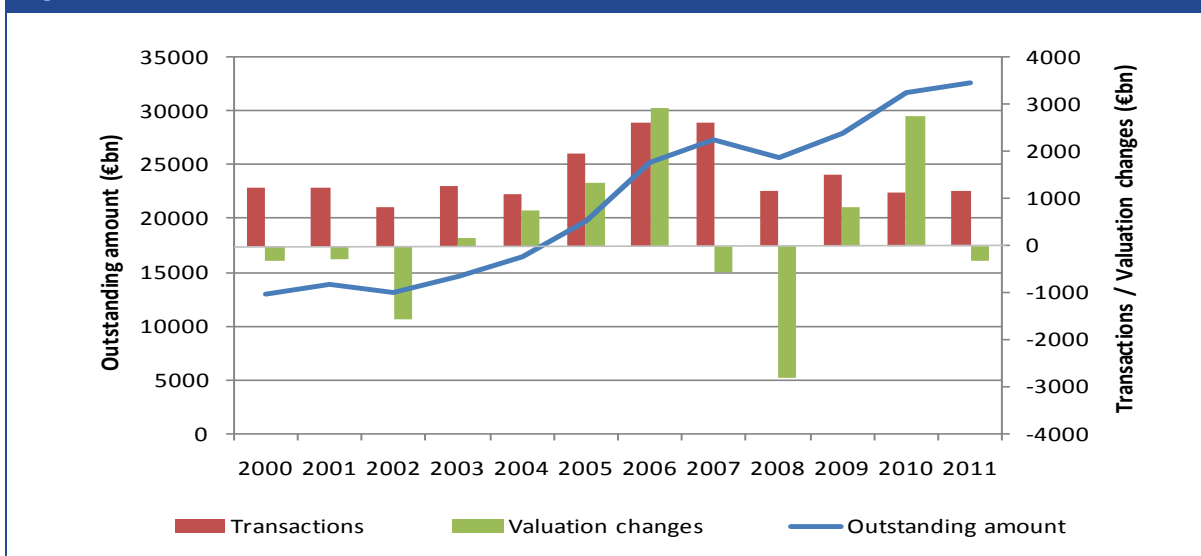
### 2.2.1 Total assets

Figure 9 shows EU27 non-bank financial sector assets over the pre-crisis (2000-2007) and crisis-post-crisis (2008-11) periods. 'Outstanding amounts' of assets are reported, as well as

'transactions' and 'valuation changes' that contribute to changes in outstanding amounts per year. Valuation changes are shown in order to distinguish *passive* balance sheet adjustments reflecting market price movements that institutions were exposed to and *active* balance sheet adjustments arising from asset transactions.

NBFI assets experienced substantial growth prior to the crisis, expanding from €13tn in 2000 to €27tn in 2007 (or 11% p.a.). Despite a one year fall in asset expansion in 2008 – in which the stock of assets in the non-bank financial sector contracted by €1.7tn (6%) – this trend has continued through the period 2009-2011. Asset growth over 2009-2011 was €4.7tn (or 8.1% p.a.).

Figure 9: EU27 NBFI sector assets, 2000-2011, €bn



Source: Eurostat – Financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets (*nasa\_f\_of*)

Changes in asset valuations are important drivers of the year-to-year change in the value of assets held by NBFIs, especially during the run-up to the financial crisis in 2004, 2005 and 2006, the financial crisis of 2008 and the asset market rebound of 2010.

However, over the whole period of 2000-2010, acquisitions of new assets account for slightly more than 85% of the growth in assets held by NBFIs and valuation changes for only 15%.

In particular, it is important to note that, as a group, NBFIs did not dump assets onto the market during the financial crisis but, in fact, continue to acquire assets, albeit at a slower pace than during the boom years of 2005 to 2007 but not very different from the pace observed prior to these boom years.

### 2.2.2 Different asset classes

Table 3 shows changes in balance sheet line items over the period 2001-2011, distinguishing again between active and passive balance components. The first section of the table shows the overall change for a given year per balance sheet item ('Δ outstanding amounts') while the second and third sections of the table break out changes resulting from active balance sheet adjustments ('transactions') and passive balance sheet adjustments ('Δ valuation').

Table 3: EU27 non-bank financial sector balance sheet developments, 2001-2011, €bn

	Assets											Liabilities										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Δ outstanding amounts</b>																						
Currency and dep.	289	-51	149	221	735	473	487	-113	117	387	98	-4	1	88	22	29	-121	6	7	1	28	2
Debt sec. + deri.	374	287	336	671	708	1061	478	1336	28	1905	256	165	120	195	524	578	668	887	1707	-385	1276	136
Loans	298	82	279	237	319	785	540	284	120	108	107	497	-48	155	221	761	812	556	-127	-327	320	110
Equity	-82	-1137	650	673	1487	3018	521	-3142	1980	1423	360	-10	-898	596	419	1094	3396	230	-2382	1925	1411	341
Insurance res.	24	8	2	3	14	64	10	8	3	8	5	257	-238	339	527	1013	851	140	-1195	956	675	247
Other	30	59	9	6	33	100	-8	-34	56	49	11	48	34	-6	17	23	119	-30	-16	39	22	10
Financial assets	933	-753	1425	1811	3296	5500	2028	-1661	2304	3880	838	953	-1030	1366	1728	3498	5724	1788	-2006	2208	3732	845
<b>Transactions</b>																						
Currency and dep.	249	39	215	244	626	545	619	-8	100	-42	-44	-3	0	4	20	26	19	6	13	-1	0	0
Debt sec. + deri..	240	379	545	362	564	684	648	681	751	658	675	208	234	331	294	519	658	943	1027	530	39	42
Loans	197	144	222	201	376	525	735	491	89	199	207	378	69	267	244	671	562	705	-110	-281	185	188
Equity	524	176	259	249	332	728	582	8	511	252	260	337	169	326	208	347	812	551	-98	871	640	661
Insurance res.	18	11	1	7	16	18	21	7	13	14	14	326	328	326	374	450	419	374	192	287	299	306
Other	13	57	22	12	41	94	7	-21	30	50	51	29	30	22	52	58	144	-14	-10	-25	14	16
Financial assets	1240	806	1263	1075	1954	2593	2611	1160	1494	1130	1162	1274	830	1277	1192	2070	2613	2566	1013	1381	1177	1213
<b>Δ valuation</b>																						
Currency and dep.	40	-90	-66	-22	109	-72	-132	-105	17	429	142	-1	1	84	2	3	-140	0	-6	2	28	2
Debt sec. + deri..	134	-93	-209	309	144	377	-170	655	-723	1247	-418	-43	-115	-136	229	59	11	-56	680	-915	1237	94
Loans	101	-62	58	36	-56	260	-194	-208	31	-91	-100	119	-117	-113	-24	90	250	-150	-17	-46	135	-79
Equity	-606	-1313	392	424	1155	2290	-61	-3150	1469	1170	100	-347	-1066	269	211	748	2584	-321	-2284	1054	770	-320
Insurance res.	7	-3	1	-4	-2	46	-10	1	-10	-5	-9	-69	-566	13	153	563	431	-234	-1387	669	376	-60
Other	18	2	-13	-6	-8	6	-15	-13	26	-1	-40	19	4	-28	-35	-35	-25	-16	-6	64	8	-6
Financial assets	-307	-1559	162	736	1342	2907	-583	-2821	810	2749	-324	-321	-1859	89	537	1428	3111	-778	-3020	827	2555	-369

Note: Deposits (dep.), Securities (sec.), Reserves (res.)

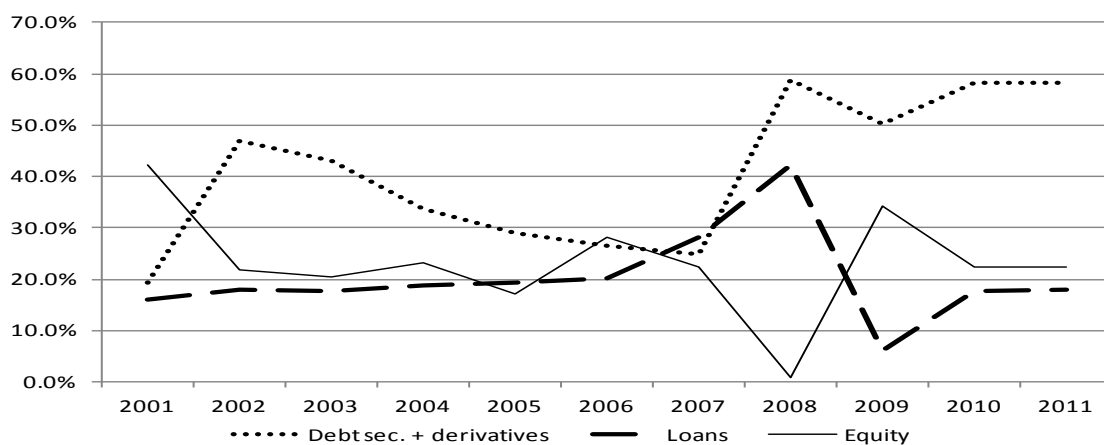
Source: Eurostat Financial balance sheet data (nasa\_f\_bs), financial transactions data (nasa\_f\_tr) and other changes in financial assets (nasa\_f\_of)



The three key points to note from the table are the following:

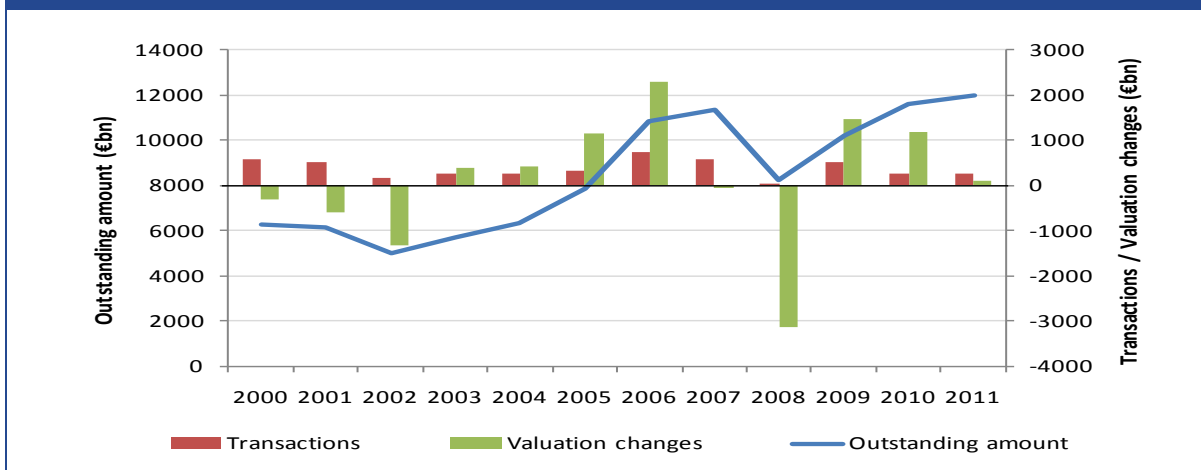
- As a group, the NBFIs did not dump any of the broad asset classes during the financial crisis. The only asset class showing occasionally negative values in the transaction part of the table is cash. Acquisition of equities dropped to almost zero in 2008 but then rebounded afterwards. However, this does not mean that, within the various asset classes, certain securities were not subjects of large sales by NBFIs (see Figure 11 to Figure 13 overleaf). As will be shown in the next section, NBFIs did in fact reduce their holdings of derivatives in 2009 and 2010 but not in 2008.
- Valuation changes were large drivers of year-to-year changes, especially in the case of equity and, to a somewhat lesser extent, debt securities. However, overall over the period 2000-2011, acquisitions of assets rather than valuation changes explain the bulk of the increase in the various asset classes (92% in the case of cash, 83% in the case of debt securities and derivatives and 67% in the case of equities).
- The composition of asset acquisitions by NBFIs has changed somewhat following the financial crisis with debt securities and derivatives playing a much more important role (Figure 10).

**Figure 10: EU27 share of debt securities and derivatives, loans and equities in asset acquisition by NBFIs 2000-2011, %**



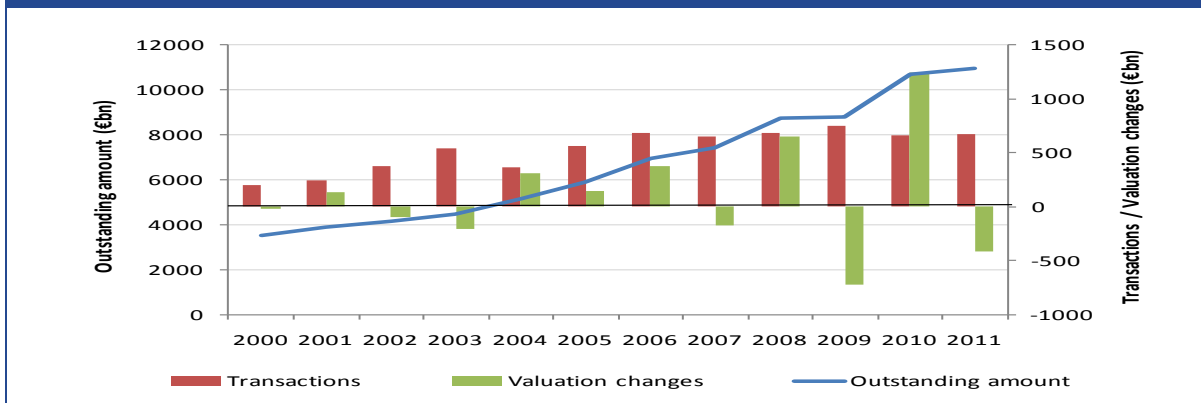
Source: Eurostat

Figure 11: EU27 NBFIs equity asset developments, 2000-2011, €bn



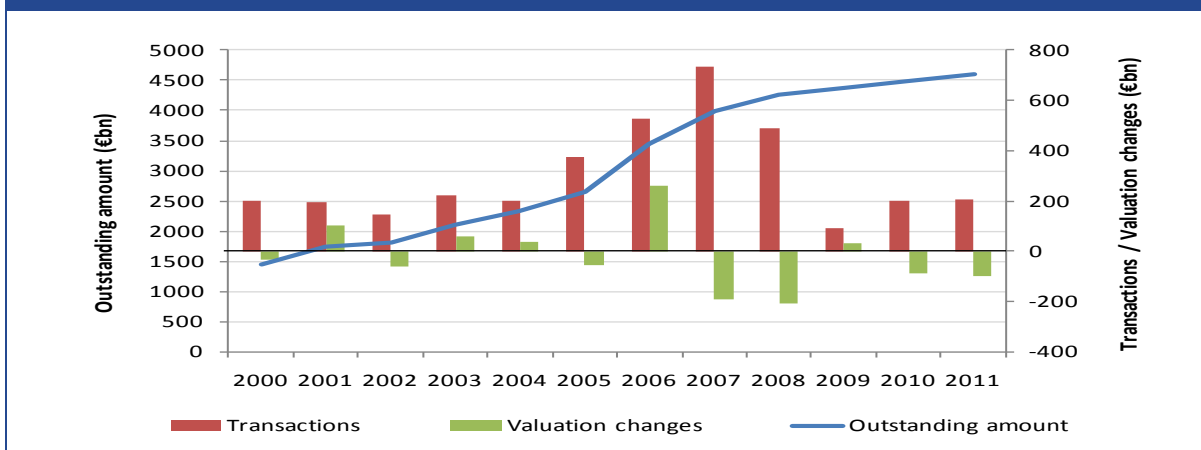
Source: Eurostat Financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets (*nasa\_f\_of*)

Figure 12: EU27 NBFIs debt securities and derivatives asset developments, 2000-2011, €bn



Source: Eurostat Financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets (*nasa\_f\_of*)

Figure 13: EU27 NBFIs loan assets, 2000-2011, €bn



Source: Eurostat Financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets (*nasa\_f\_of*)

### 2.2.3 Analysis of derivatives

The asset/liability group “Securities other than shares” comprise short- and long-term debt securities and financial derivatives. Over the entire period for which data were available, namely 2000-2010, each of these components experienced substantial growth, as shown in Figure 14.

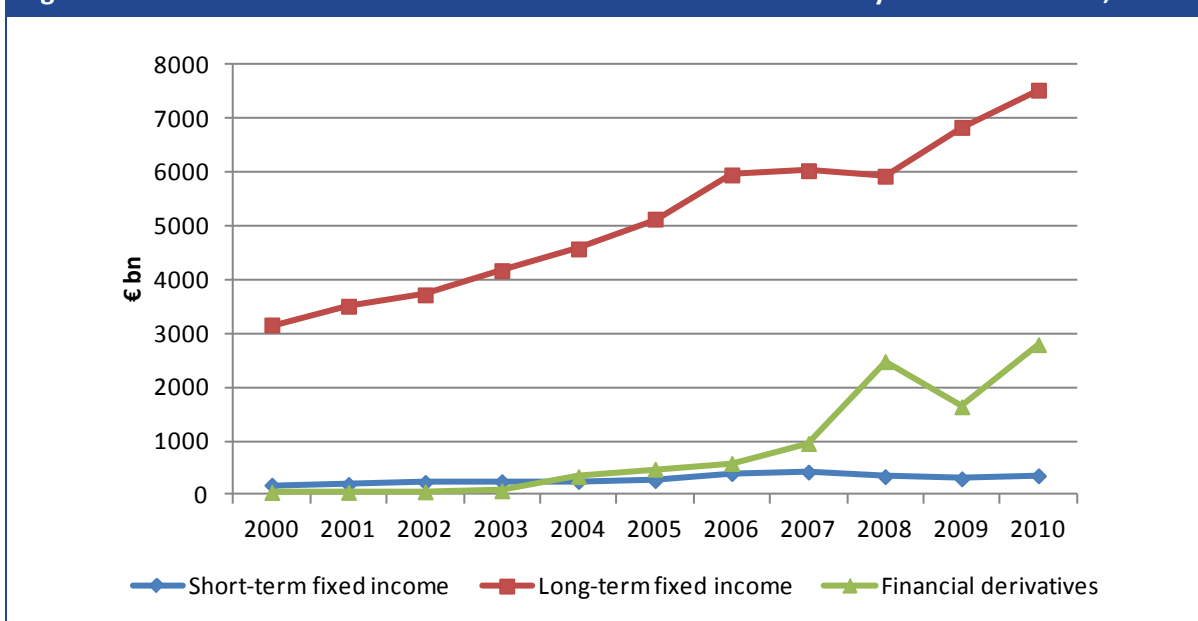
#### Assets

On the asset side of the NBFIs’ balance sheet, long-term securities other than shares (hereafter, long-term fixed income securities) more than doubled in size and derivatives expansion was astronomical, increasing over 60 times. Short-term securities other than shares (short-term fixed income securities) also more than doubled but constituted a relatively small fraction of overall exposures.

Growth in long-term fixed income securities was flat over 2006-2008 while growth in financial derivatives accelerated above its trend rate over the preceding four years. In the year preceding the crisis, growth of financial derivative assets was driven by valuation changes insofar as they grew by €1.04tn for the year while transactions rose by a comparatively small amount, €0.48tn.

In the year immediately after the crisis, financial derivative assets contracted. However, this one-year fall was reversed in 2010 and indeed financial derivative assets are a larger component of total assets than they previously were at their height, in 2008. The abovementioned findings are summarised in the Table 4 below.

**Figure 14: Securities other than shares and financial derivatives held by NBFIs 2000-2010, €bn**



Source: Eurostat Financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets (*nasa\_f\_of*)

Table 4: EU27 asset class “Securities other than shares” held by NBFIs 2001-2011, €bn

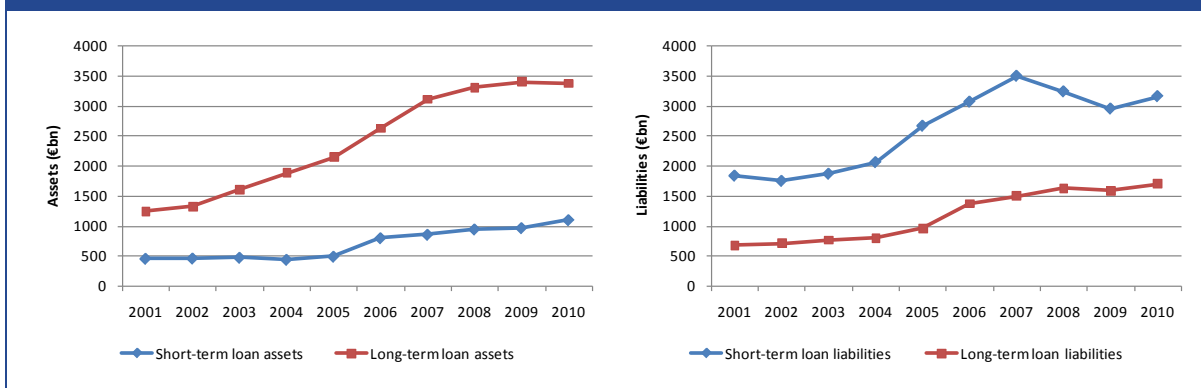
	Assets										Liabilities									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Δ outstanding amounts</b>																				
Securities other than shares, excluding financial derivatives	207	215	292	300	342	228	71	-126	333	251	1	-1	2	2	0	3	3	4	4	0
Short-term - Securities other than shares, excluding financial derivatives	12	25	7	6	6	4	4	-21	-27	-4	1	-1	0	0	0	0	0	0	0	0
Long-term - Securities other than shares, excluding financial derivatives	195	190	285	294	336	224	67	-105	361	255	0	0	2	2	0	4	3	4	4	0
Financial derivatives	4	1	9	48	-1	-2	32	155	-78	-4	2	-2	3	44	4	-5	47	87	-43	-12
<b>Transactions</b>																				
Securities other than shares, excluding financial derivatives	162	205	245	244	249	271	202	139	133	154	7	1	7	3	2	3	3	5	9	1
Short-term - Securities other than shares, excluding financial derivatives	11	28	10	4	5	-2	9	-9	-30	-5	-2	-1	-1	0	0	0	0	0	0	0
Long-term - Securities other than shares, excluding financial derivatives	150	177	235	240	244	272	193	148	164	159	9	2	8	3	2	4	3	5	9	1
Financial derivatives	-3	-4	-8	-8	-24	-19	-33	-59	-75	-83	0	0	-7	-4	-18	-22	-25	-84	-55	-85
<b>Δ valuation</b>																				
Securities other than shares, excluding financial derivatives	45	10	46	56	93	-42	-130	-265	200	97	-6	-1	-5	-1	-2	0	0	-1	-5	0
Short-term - Securities other than shares, excluding financial derivatives	1	-3	-3	2	1	6	-4	-12	3	1	3	1	0	0	0	0	0	0	0	0
Long-term - Securities other than shares, excluding financial derivatives	44	13	50	55	92	-48	-126	-253	197	96	-9	-2	-5	-1	-2	0	0	-1	-5	0
Securities other than shares, excluding financial derivatives	6	6	17	56	23	17	64	214	-3	79	2	-1	10	48	22	17	72	171	12	73
Financial derivatives	45	10	46	56	93	-42	-130	-265	200	97	-6	-1	-5	-1	-2	0	0	-1	-5	0

Source: Eurostat Financial balance sheet data (nasa\_f\_bs), financial transactions data (nasa\_f\_tr) and other changes in financial assets (nasa\_f\_of)

### 2.2.4 Analysis of loans

The non-bank financial sector as a whole is described by a maturity mismatch in its loan book, as shown in Figure 15 and Table 5. On the asset side, long-term loans dominate short-term loans, but the reverse is true on the liabilities side. In a large part, the dominance of long-term loans on the asset side reflects the preference of pension funds and insurance companies to invest in longer-life assets to match their long-term liabilities.

**Figure 15: EU27 short- and long-term loan assets and liabilities, 2001-2010, €bn**



Source: Eurostat Financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets (*nasa\_f\_of*)

Loan assets expanded relatively significantly in 2006. Short-term loan assets expanded more than long-term loan assets on a proportionate basis. However, this occurred more due to valuation changes than active loan expansion activity by NBFIs. The key consequence of the crisis on loan assets was a reduction in asset growth.

Loan liabilities display interesting variation. Of the four series shown in Figure 15, short-term loan liabilities underwent the largest adjustment over the periods immediately prior to and since the financial crisis. In the crisis and post-crisis period, particularly in 2008 and 2009, this reflects the drying up of liquidity in short-term funding markets. That being said, it is interesting to note that growth of short-term loan assets of NBFIs were relatively stable and even grew to some degree over 2009-2010.

## 2.3 Key message

The key points to note from this chapter are the following:

- The MFI and NBFi sectors expanded at roughly the same pace from 2000 to 2004. From 2004 to 2006, in the run-up to the financial crisis, total assets held by the non-bank financial sector grew much more rapidly than those held by the banking sector. During crisis, the non-bank financial sector experienced a much more pronounced decline in total assets than the banking sectors. Finally, during the post crisis period of 2009 to 2011, growth of non-bank financial balance sheets returned close to the growth experienced over the period 2002 to 2005 (before the sharp pre-crisis acceleration) while assets of the banking sector have barely grown since 2008.

- As a group, OFIs are much less leveraged than MFIs. At the end of 2011, the MFI's leverage ratio (defined as the ratio of loans and debt securities to shares and other equity) stood at 2.8 while it was only 1 for OFIs.
- The connectedness of the EU27 banking sector to the NBFIs sector increased sharply and this increase occurred almost entirely during the financial crisis and post-crisis period.
- The NBFIs did not dump any asset class on the market during the financial crisis. They reduced their holdings of derivatives in 2009 and 2010 after a substantial increase in 2008.

Table 5: EU27 non-bank financial sector breakdown of loans, 2001-2011, €bn

	Assets										Liabilities									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Δ outstanding amounts</b>																				
Short-term loans	60	4	13	-34	52	308	57	89	22	132	326	-86	118	191	601	398	427	-257	-284	205
Long-term loans	238.0	78.7	279.5	276.1	267.5	476.6	483.6	194.8	97.5	-26.9	170.5	37.4	51.8	31.5	159.7	414.0	129.0	130.8	-43.1	113.3
<b>Transactions</b>																				
Short-term loans	24.7	6.6	7.4	-28.4	62.0	157.9	59.4	101.4	45.6	125.6	245.6	14.7	207.9	235.3	507.8	343.8	583.8	-120.6	-182.6	162.1
Long-term loans	172.9	137.7	213.9	229.3	313.5	366.8	675.4	389.9	43.1	71.0	132.5	52.6	59.5	8.7	162.8	218.0	121.6	11.0	-98.2	20.8
<b>Δ valuation</b>																				
Short-term loans	35.3	-2.5	5.6	-5.8	-10.4	149.7	-2.5	-12.7	-23.3	6.8	80.6	-101.1	-90.0	-44.0	93.0	53.8	-157.1	-136.7	-100.9	42.7
Long-term loans	65.1	-58.9	65.7	46.9	-46.0	109.8	-191.7	-195.1	54.4	-98.2	38.1	-15.2	-7.7	22.7	-3.1	196.1	7.4	119.8	55.1	92.5

Source: Eurostat Financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets (*nasa\_f\_of*)



### 3 Sub-sectors of the non-bank financial system

This chapter describes the nature of financial intermediation carried out by the main non-bank financial sub-sectors considered in this study. These descriptions provide a sense for the impact on financial stability of any one of these sub-sectors ceasing to function effectively.

#### 3.1 Money market funds

Money market funds (MMFs), or money market mutual funds, are a form of open-ended mutual funds that invest in a diversified portfolio of money market instruments that are typically of short duration. A 'prime MMF' invests in money market instruments issued by prime creditors, notably bank deposits and commercial paper. A 'treasury MMF' invests in money market instruments issued by governments. And, a 'government MMF' invests in money market instruments issued by government agencies which enjoy varying degrees of support from their governments (IMMFA, 2011).

The objective of MMFs is to satisfy investor demand for security of capital, liquidity and yield, the latter (yield) often being contingent on the former (security of capital and liquidity) for some but not all MMFs (see discussion on 'enhanced' MMF below). Security of capital involves preserving and lowering volatility of capital (Macey, 2011). Liquidity involves providing investors with same day or next day access to capital. And, given security of capital and liquidity, MMFs seek to invest in higher yielding money market instruments, although the impact of the financial crisis on money markets has limited yields to a relatively low and narrow band.

EU-domiciled MMFs are regulated, at a European level, by the Undertakings for Collective Investments in Transferrable Securities Directives (UCITS Directives). The UCITS Directive does not impose detailed obligations on MMFs, as opposed to Rule 2a-7 of the US Investment Company Act of 1940. Therefore, in 2010, the Committee of European Securities Regulators (CESR, now succeeded by the European Securities and Markets Authority, ESMA) issued guidelines which sought to define MMFs more tightly. CESR's definition of a 'short term' MMF is somewhat similar to Rule 2a-7, though it remains significantly less detailed.

In the absence of a European definition of MMFs that is as detailed as Rule 2a-7, the Institutional Money Market Funds Association (IMMFA) maintains a Code of Practice, which is binding on its Members (50% of MMFs), and imposes obligations equivalent to 2a-7 on their EU-domiciled funds. In addition, certain Member States of the European Union impose detailed obligations on locally-domiciled MMFs, notably in France in relation to the 'fonds monétaires'.

Outside of these regulated or self-regulated markets are 'enhanced' MMFs, defined as funds that take more credit and/or duration risk than would be permitted by Rule 2a-7 or the IMMFA Code of Practice. Enhanced MMFs trade security of capital, and liquidity to some degree in return for higher yield than other MMFs.

The function of MMFs is articulated as follows (IMMFA, 2011). MMFs satisfy investor demand for security of capital among other things through diversification among strong counterparty credits. An investor, for instance, may hold cash assets as bank deposits with a handful of banks. Alternatively, an investor may hold a proportion of cash assets as bank deposits and the remainder

with a money market fund that invests within money market instruments issued by a wide range of counterparties. Switching from the former to the latter pattern of holdings transforms concentrated counterparty exposures (to a handful of banks) into diversified exposures (across the aforementioned banks and a wide range of issuers of money market instruments).

MMFs are compensated for carrying out money market investment activities on behalf of investors because investors face resource constraints in carrying out these tasks unilaterally, including assessing credit risks (to distinguish relatively strong from relatively weak banks) and operational issues (for example, matching the term of fixed deposits with cash flow needs, and rolling those deposits).

Investors in MMFs therefore, to some degree, outsource the risk management function, which is beneficial insofar as investors would otherwise be investing at suboptimal levels in money market instruments (due to their resource constraints), to their detriment and to the detriment of issuers of money market instruments.

Investors in MMFs can broadly be split into two types, retail (or individual) investors and institutional investors, such as bank trust departments, corporations and hedge funds. Due to state guarantees of retail deposits, retail investors face lower counterparty risk exposures through bank deposits than institutional investors, whose bank deposits are either uninsured or incompletely insured by state guarantees. For this reason, institutional investors and businesses rely on money market funds to a greater extent than retail investors.

MMFs also play an important role in facilitating demand for money market instruments because investors would invest at sub-optimal levels in their absence, as abovementioned. MMFs therefore facilitate liquidity provision to issuers of commercial paper and counterparties to repurchase agreements.

MMFs, through investments in commercial paper, play an important role in the economy. By providing short-term funding to commercial and municipal borrowers, MMFs enable an important alternative channel for credit to borrowing from banks thereby lowering the cost of capital (Macey, 2011).

MMFs also play an important role in the economy through the market for repos. From the perspective of the MMF, a repurchase agreement involves the purchase of securities from and resale of the same securities to a counterparty at a fixed price in exchange for an interest payment for the use of funds in the period in between asset purchase and resale. In effect, a repo is a short-term interest-bearing secured loan (Macey 2011), which is valuable to counterparties to repo transactions as a source of liquidity.

## 3.2 Private equity firms

Private equity firms intermediate between investors seeking to invest (indirectly) in companies through private capital markets and companies seeking external finance.

The economic functions of private equity firms are to undertake investment screening, contracting and monitoring activities. Screening involves conducting 'due diligence' activities such as collecting information about investment targets, the markets in which they operate and management teams. On the basis of due diligence activities, private equity firms establish the terms on which private

equity capital will be invested in investment targets, including price, fraction of ownership, collateral, restrictive covenants, maturity, etc. Monitoring activities are undertaken in order to ensure investment targets do not engage in activities that exploit private equity investors such as the misdirection of equity capital. This is achieved through assessing financial and compliance conditions within the firm through participation in managerial decision-making among others.

Private equity investments may be beneficial due to efficiency gains that investment targets achieve resulting from the size of the stake a private equity firm takes in investment targets and resources invested, particularly superior management expertise and corporate governance arrangements (BIS, 2008).

Private equity firms, through carrying out their function as financial intermediaries, may be beneficial because they make available a larger pool of capital than would be available in their absence (EVCA, 2009).

Additionally, private equity firms may improve the efficiency of firms engaging in capital markets and benefit other capital markets participants. Private equity firms' involvement with investment targets usually involves a transformation of investment targets' capital structures that reduces the overall cost of capital. Private equity firms, through investing resources in company valuation, also improve the price efficiency of capital markets.

### **3.3 Hedge funds**

Hedge funds are active investment vehicles that are lightly regulated with great trading flexibility (Fung et al., 2008). They can undertake a wider range of investment and trading activities than other funds and investors in such funds are typically high net worth individuals and some institutional investors.

A hedge fund is a fund that can take both long and short positions, use arbitrage, buy and sell undervalued securities, trade options or bonds, and invest in almost any opportunity in any market. The primary aim of most hedge funds is to reduce volatility and risk while attempting to preserve capital and deliver positive returns under all market conditions but their strategies vary enormously. For example, hedge funds may engage in short-selling (selling shares without owning them, hoping to buy them back at a future date at a lower price), arbitrage, trading options or derivatives, investing in anticipation of a specific event (merger transaction, hostile takeover, spin-off, exiting of bankruptcy proceedings, etc.), investing in deeply discounted securities of companies about to enter or exit financial distress or bankruptcy, often below liquidation value, etc.

### **3.4 Pension funds**

The nature of the role of pension funds in financial intermediation has changed over time.

Traditionally, pension funds invest long-term savings in long-term assets. The nature of the pension fund may determine the risk it poses to financial stability. Investment risk and portfolio management rests on the sponsoring employer (as in a defined benefits scheme), the employee (as in a defined contribution scheme) or some combination of the two. If, for instance, a defined benefits scheme faces a funding shortfall in times of market stress, the employer is responsible for ensuring employee benefit obligations are met. Either employers use company earnings or

employers change investment and portfolio management decisions to make-up the funding shortfall (or a mix of the two). The latter option may involve greater risk-taking (European Commission, 2009).

In addition, pension funds are large institutional investors. This implies that the securities transactions they undertake have the potential to increase or decrease financial instability through the fire sale mechanism (see section 5.4 for details).

Pension funds are also purchasers of fixed income securities. Therefore, changes in the transaction patterns of pension funds can have significant consequences for debt issuers.

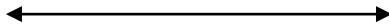
The above could be described as the traditional role of pension funds in financial intermediation. More recently and non-traditionally, pension funds have sought to increase their overall return by lending out some of their long-term securities for a fee through securities lending.

### **3.5 Insurance undertakings**

Insurance undertakings play a similar role to pension funds in financial intermediation, acting as large institutional investors and purchasers of fixed income securities.

However, as in the case of pension funds, the nature of the role of insurance undertakings in financial intermediation has also changed over time (Table 6). Insurance undertakings have engaged in non-traditional and non-insurance activities more recently. And, in the context of the financial crisis, some of these were causes of financial instability.

Table 6: Illustrative allocation of activities conducted by insurance-focused groups

		Traditional  Non-traditional		
Insurance	Underwriting	Most life and non-life insurance business lines	Life insurance and variable annuities Mortgage guarantee insurance Trade credit insurance	Alternative risk transfer (e.g., insurance-linked securities) Financial guarantee insurance Finite reinsurance
	Investments and funding	Proprietary investment function (ALM) Hedging for ALM purposes Funding through equity and debt issues, also securities lending	Proprietary and derivatives trading (non-ALM) Property management (related to investment portfolio)	Purely synthetic investment portfolios Cascades of repos and securities lending Scope and scale of activities beyond insurance remit
Non-insurance	CDS/CDO underwriting Capital market business Banking, including investment banking and hedge fund activities Third-party asset management Industrial activities			

### 3.6 Central counterparties

The role of central counterparties (CCPs) in financial intermediation is *inter alia* to reduce counterparty risks arising in bilateral transactions on OTC derivatives markets and, in turn, to reduce risks to financial stability stemming from these counterparty risks. CCPs carry out this function by acting as counterparty to every trade among clearing members, performing multilateral netting and undertaking risk management activities to ensure that the failure of a clearing member does not affect other members (Duffie and Zhu, 2011).

Absent CCPs, parties to bilateral OTC derivatives contracts manage the impact of counterparty risk through the use of bilateral master agreements. These agreements aggregate all exposures between two counterparties allowing for close-out netting in the event of default by one or the other party. Close-out netting serves to offset the derivative payables by the defaulting party against its derivative receivables vis-à-vis the non-defaulting counterparty (Singh, 2010).

Outstanding exposures between counterparties are also sometimes collateralised (after close-out netting between counterparties) to further reduce counterparty risks. However, contracts may be under-collateralised. Collateral is usually posted by end-users (non-dealers) to dealers but market practice does not involve dealer-to-dealer collateral posting. In addition, dealers do not request collateral from end-users such as sovereign entities and some corporates (IMF, 2010). Empirically, 22% of OTC derivative transactions are uncollateralised; and of the 78% of notional amounts that are collateralised, 16% are unilateral (ISDA, 2010).

Counterparty risk is further managed, to some degree, by multilateral compression and tear-up operations that seek to eliminate redundant contracts. For example, if party A owes party B a sum, say €100, and party B owes party C the same sum, say €100, then party B can be eliminated and party A will owe party C the €100. This shortens and simplifies inter-connections between bank and NBFIs with beneficial implications for risks to financial stability.

CCPs improve on current arrangements for managing counterparty risk. A bilateral OTC derivatives contract is transformed, through novation, into two new contracts, each with the CCP. This, combined with higher multilateral netting among clearing members than if the CCP were absent, reduce the level of counterparty risk present within the financial system, as shown below (Figure 16).

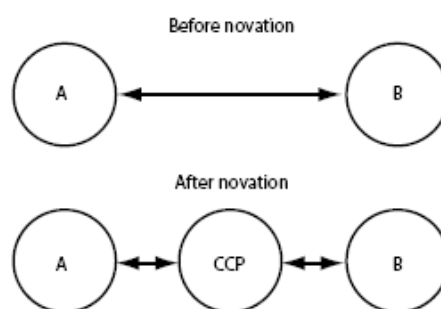
**Figure 16: Primer on novation and multilateral netting**

*This box provides a brief primer on the mechanics and counterparty risk reduction benefits of transferring bilateral derivative contracts to central counterparties.*

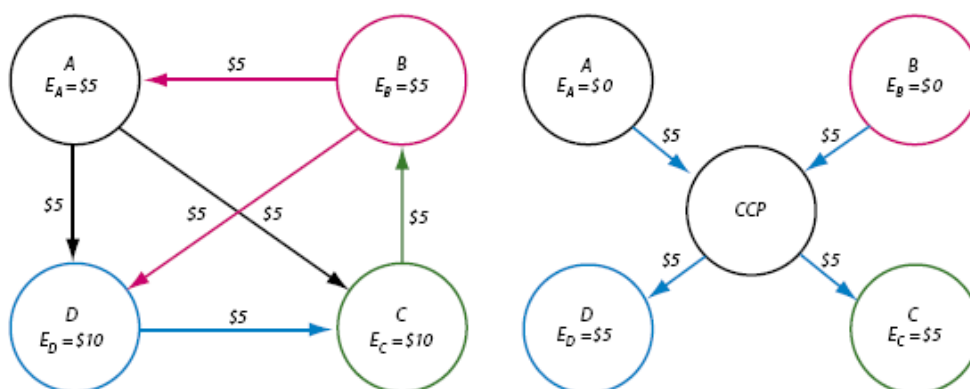
“Novation” discharges the original rights and obligations of the buyer and the seller and replaces their contracts with two new contracts with the central counterparty (see first set of figures). The assumption of counterparty risk can also be effected by an “open offer,” in which the central counterparty interposes itself at the time of the trade.

The second set of figures show how multilateral netting reduces the amount of counterparty risk in the system. The first figure of this second set shows contracts across four counterparties in a bilateral world (A, B, C, and D, clockwise from the top left corner). The numbers on the arrows indicate the net current replacement costs, so that, for example, if the contract between A and B were closed out immediately, B

Note: This box was prepared by John Kiff.



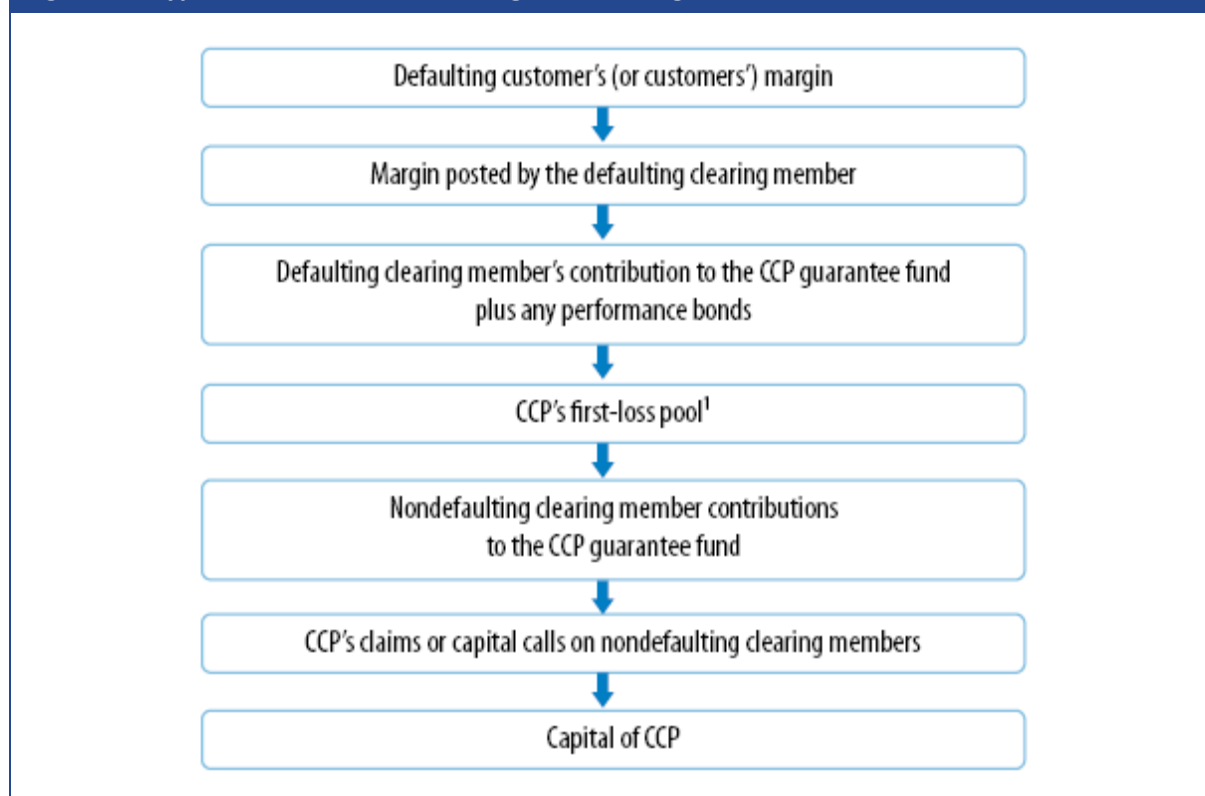
would owe A \$5. The E below those letters indicates the maximum counterparty exposure for the counterparty. Thus, for example,  $E_C = \$10$  because it will cost C \$10 to replace the contracts with A and D if they both fail, etc. If all of these contracts are novated to a central counterparty, all of A's and B's counterparty risk exposure is eliminated, leaving C and D each with \$5 of exposure to the central counterparty.



Source: IMF (2010)

CCPs also manage the impact of a default of a major counterparty through the mutualisation of losses across clearing members. The so-called lines of defence against a clearing member default are outlined in Figure 17 below.

**Figure 17: Typical CCP lines of defence against clearing member default**



Note: This is an illustrative example of lines of defence of a CCP. It should be noted that these structures, orders, and nomenclature vary in each CCP and there is not a legally mandated one (although their differences clearly have significant financial and operational implications). This figure assumes that a clearing member defaults because a customer fails to meet its obligations and its collateral is insufficient. Clearing member defaults may be triggered for other reasons, even ones unrelated to the derivative product involved in the transaction.

<sup>1</sup>The first-loss pool is an initial level of funds contributed by the CCP, which even if absorbed would still allow the CCP to continue to function.

Source: IMF (2010)

The nature of the role of CCPs in financial intermediation extends beyond managing counterparty risk. The collateral required to cover a set of OTC derivatives contracts through a CCP is likely to be lower than absent a CCP, all else equal. And, the ability to trade anonymously through a CCP may result in greater market participation. Reduction in counterparty risk combined with the abovementioned factors is beneficial to market outcomes (e.g., liquidity) and ultimately serve to increase the certainty of and reduce the cost of capital (Singh, 2010).

## 4 Regulatory overview

### 4.1 Money market funds

Money market funds will normally fall within the UCITS framework, covered below, while private equity funds will be regulated by the AIFMD, which is covered in chapter 8. This section does not seek to provide a comprehensive overview of regulations that will influence asset managers – either their own administration, or the types of assets they may hold. Rather it attempts to explain the development and nature of regulations that could prompt behavioural change that might have systemic implications.

#### 4.1.1 UCITS I-V

UCITS (Undertakings for Collective Investment in Transferable Securities) are investment funds that have been established in accordance with UCITS Directive (adopted in 1985). Once registered in one EU country, a UCITS fund can be freely marketed across the EU. Managing over €5 trillion in assets UCITS have proven to be successful and are widely used by European households. UCITS are also regularly sold to investors outside the EU where they are highly valued due to the high level of investor protection they embody.

The agreement of the Single European Act in 1985 reflected the enthusiasm for opening up markets and, in the financial services field, it seemed an easy “win” to liberalise the market for investment funds. They seemed to be a simple and fairly standard product so it should be an easy task to liberalise their cross-border sale. Accordingly, a directive for Undertakings for Collective Investment in Transferable Securities (UCITS) was proposed.

**UCITS I** was enacted in 1985 and carefully defined both the product and the role of the management company:

- The product was limited explicitly to “undertakings - the sole object of which is the collective investment in transferable securities of capital raised from the [at least in the EU] public and which operate on the principle of risk-spreading.”
- “The investments of a unit trust or of an investment company must consist solely of: (a) transferable securities admitted to official listing on a stock exchange in a Member State and/or; (b) transferable securities dealt in on another regulated market in a Member State...” Non-EU markets may be recognised as well.
- “A UCITS may invest no more than 10 % of its assets in transferable securities other than those referred to in paragraph 1...”
- The management company had to have sufficient resources and the directors and depositary are of “sufficiently good repute”. Importantly, it specified that “No management company may engage in activities other than the management of unit trusts and of investment companies.”

So the managers’ freedom of business was constrained at the very beginning as the potential growth of pension funds was only a gleam in the eye at that time. The listing requirement excluded money market instruments, derivatives and many debt instruments, though the rules were relaxed in 1988



to permit covered bonds – the only legal reference to them. Also, fund of funds were excluded explicitly.

**UCITS II** was proposed by the Commission in 1994 but it became deadlocked and was withdrawn in 1998 when a new proposal was made.

**UCITS III** was that new proposal and was enacted in 2001 and introduced the following key elements:

- Widened the investment possibilities but re-enforced the diversification rules. So the following will be permitted: funds of funds, money market funds (then not permitted in most states), cash funds, index tracker funds, and broader use of derivatives, including OTC derivatives. However, “alternative investments” have developed rapidly – such as hedge funds, real estate, private equity and venture capital and commodities. These collective investment vehicles use new and non-conventional strategies so could not be accommodated within the limits and criteria of the existing UCITS Directive.
- Broadened the range of possible activities for the management company. A manager will now be able to carry out other activities such as the management of the assets of pension funds.
- Introduced a fully harmonized and simplified prospectus. The industry had demanded this for years as it will give investors a clear and easily understandable description of the fund including its risk profile. Critically, it should simplify cross-border marketing because it can be used as a marketing tool in all Member States without alterations (except translation) and host countries will no longer be allowed to require further documents or additional information.

However, the high hopes of a genuinely single market were progressively dashed as regulators in different countries gave inconsistent interpretations of some of the key measures. The degree of dissatisfaction was such that a special group was set up as part of the review of the FSAP in 2004. Moreover, the introduction of the Lamfalussy Process gave the opportunity to move UCITS into the ambit of the newly-established Committee of European Securities Regulators (CESR) to resolve many of these inter-regulator conflicts.

**UCITS IV** was enacted in 2009 to update the UCITS framework. The necessary implementing measures were approved in 2010 and, after transposition into national legislation, UCITS IV came into force on 1 July 2011:

- Improve investor information by creating a standardised summary information document.
- Create a genuine European passport for UCITS management companies – this is the last piece missing from the internal market as regards UCITS management.
- Facilitate cross-border marketing of UCITS by simplifying administrative procedures: there will be immediate market access once the authorisation has been granted by the country of origin of the UCITS; the host country will be able to monitor the commercial documents but not to block access to the market;
- Facilitate cross-border mergers of UCITS, which will make it possible to increase the average size of European funds;

- Facilitate asset pooling by creating a framework for the system of "master-feeder" arrangements whereby a fund invests more than 85 % of its assets in another fund;
- Strengthen the supervision of UCITS and of the companies that manage them, by means of enhanced cooperation between supervisors

## UCITS V

In the light of the Madoff scandal and collapse of Lehman Brothers, it transpired that the depositary function was inadequate and the new AIFMD had toughened the depositary's liability so it seems likely that a corresponding regime will be applied to UCITS via an amendment to UCITS IV.

## 4.2 Private equity funds

Private equity and venture capital funds are generally regulated by the AIFMD. As previously mentioned, this section seeks to provide an explanation of the development and nature of regulations that could prompt behavioural change among private equity funds that might have systemic implications.

**February 2008:** The European Commission published a study on "investment funds in the European Union: comparative analysis of use of investment powers, investment outcomes and related risk features in both UCITS and non-harmonised markets". It fed into the Commission's preparatory work for the communication on non-harmonised investment funds published later in 2008.

**2 April 2009:** G20 Summit Communique in London - "We agree....to extend regulation and oversight to all systemically important financial institutions, instruments and markets. This will include, for the first time, systemically important hedge funds...."

**29 April 2009:** The European Commission proposed a Directive on Alternative Investment Fund Managers (AIFM). The proposed Directive is an important part of the European Commission's response to the financial crisis. It aims to create a comprehensive and effective regulatory and supervisory framework for AIFM in the European Union. AIFM, which include the managers of hedge funds and private equity funds, managed around €2 trillion in assets at the end of 2008. This is the first attempt in any jurisdiction to create a comprehensive framework for the direct regulation and supervision in the alternative fund industry.

**November 2010:** AIFMD agreed by co-legislators and transposition into national law must be complete by July 2013. For financial stability, the key issues include depositary liability and the third country recognition regime. The depositary issue is key because the same rules will probably be applied to UCITS and any loss of confidence in the basic safety of financial assets approximating to annual GDP would be highly de-stabilising. The issue of third country "equivalence" is a fundamental part of global trade negotiations that go far beyond depositaries. But, again, any loss of confidence in such foreign services by EU investors during a crisis might prompt a sudden repatriation of funds that would have systemic implication in the EU (as well as for its trading partners).

### Relevant extracts from DG Internal Market and Services FAQs:

#### What is an Alternative Investment Fund Manager ('AIFM')?

An AIFM is a manager of an alternative investment fund. The term alternative investment fund encompasses a wide range of investment funds that are not already regulated at European level by the UCITS Directive. They include hedge funds, private equity funds, real estate funds and a wide range of other types of institutional fund.

#### Why do we need the AIFMD? What is the link with the financial crisis?

A secure and stable financial system requires that all significant financial market actors are subject to appropriate regulation and supervision. This was a clear conclusion of the G20 leaders.

AIFM have grown to become very significant, accounting for a significant proportion of trading activity in financial markets, and constituting an important source of counterparty risk. AIFM have also contributed to the build-up of leverage in the financial system, the consequences of which for the stability of financial markets became apparent when leverage in the hedge fund sector was rapidly unwound during the crisis. In this context, it is essential that the risks that AIFM pose to their investors, the financial markets and the companies in which they invest are rigorously monitored and controlled.

#### What are the objectives of the AIFMD?

The overarching objective of the AIFMD is to create, for the first time, a comprehensive and secure framework for the supervision and prudential oversight of AIFM in the EU. Once the AIFMD enters into force, all AIFM will be required to obtain authorisation and will be subject to on-going regulation and supervision. In this way, the AIFMD will equip national supervisors, the European Securities Markets Agency ('ESMA') and the European Systemic Risk Board ('ESRB') with the information and tools necessary to monitor and respond to risks to the stability of the financial system that could be caused or amplified by AIFM activity;

#### When will the passport be made available to non-EU managers and funds?

Alternative investments are a global industry and it is important that European investors have access to the best that the global market has to offer. At the same time, it is imperative that all AIFM active in the EU are subject to the same high standards of transparency and conduct, irrespective of where they, or the funds they manage, are located.

Following a limited transition period of two years, and subject to the conditions set out in the AIFMD, the passport will be extended to the marketing of non-EU funds, managed both by EU AIFM and AIFM based outside the EU. In accordance with the principle of 'same rights, same obligations', this approach will ensure a level playing field and a consistently high level of transparency and protection of European investors.

Before the third country passport is introduced and for a period of three years thereafter, national regimes will remain available subject to certain harmonised safeguards. Once this period has elapsed and on the basis of conditions set out in the AIFMD, a decision will be taken to eliminate the parallel national regimes. At this point, all AIFM active in the EU will be subject to the same high standards and will enjoy the same rights.

#### How will the AIFMD protect investors?

A variety of operational and organisational requirements will help to ensure that investors are appropriately protected. For example, the AIFMD will require that:

- conflicts of interest are avoided or managed and disclosed;
- AIFM employ adequate systems to manage risks to which the fund is exposed, and to ensure that the liquidity profile reflects the obligations towards investors;
- a fund's assets are safe-kept by an independent depositary subject to a high liability standard;

- valuation is performed properly and independently; and
- strict conditions are met when AIFM delegate functions to third parties.

Due to their complexity and risk, investment in many types of alternative investment fund is limited to professional investors. Consequently, the AIFMD creates rights for marketing to professional investors only. Member States are not prevented from making certain types of alternative investment fund available to retail investors.

### **How will the depository rules help investors?**

The functions of the depository are critical for investor protection. When the entities charged with safeguarding the assets of the fund do not perform their duties effectively, investors stand to lose all or part of their investment. The experiences of Madoff and Lehman have highlighted the potential weaknesses in this area and the pressing need to clarify and strengthen investor protections.

Under the AIFMD, all AIFM will be required to ensure that the funds they manage appoint an independent and qualified depository, which will be responsible for overseeing the fund's activities and ensuring that the fund's cash and assets are appropriately protected. Depositories will be held to a high standard of liability in the event of a loss of assets and the burden of proof will reside with the depository.

The AIFMD will also introduce a robust mechanism for the delegation of depository functions and will regulate carefully the circumstances under which liability can be transferred to a sub-depository, including when the sub-depository is located outside the EU.

The venture capital and private equity industry is impacted by several regulatory measures relating to potential long-term investors such as insurance undertakings and pension funds. Moreover, EVCA estimates that about 60% of its funds come from outside the EU so any feeling by such investors that they are being discriminated against would not help the expansion of this sector within the EU.

## **4.3 Pension funds**

### **4.3.1 Solvency II**

The regulator is currently asking insurance undertakings to set aside regulatory capital at a level that could discourage them to invest in the asset class. However, the possibility of having lower regulatory capital is offered to insurance undertakings if they can prove that they understand the risk they are taking and consequently have developed internal models to measure their risk. These internal models need to be approved by regulators. The Guidelines are here to facilitate the dialogue between insurance undertakings and their regulators when the former seek authorization to use these internal models.

There are conceptual issues and misunderstanding in regulatory treatment beyond Solvency II. We can expect that if we do not address these issues at a time when institutional investors have to cope with re-regulation, we will be faced with a shrinking investor basis. The Guidelines aim at conveying a different message on these points.

### 4.3.2 IORP Directive of 2003

The legislation is based on home country supervision of pension schemes, respect for national, social and labour legislation, and the “prudent person” principle. The Directive provides for the home state to lay down specific investment rules ensuring that the assets of the fund are invested in the best interests of the members, that the institution is registered and that it draws up an annual report and accounts. A limit of 70% of assets being invested in shares, negotiable securities treated as shares and corporate bonds is laid down, with the provision for a lower limit for pensions guaranteeing a long-term interest rate benefit.

- Article 15: Technical provisions - (b) the maximum rates of interest used shall be chosen prudently and determined in accordance with any relevant rules of the home Member State. These prudent rates of interest shall be determined by taking into account: — the yield on the corresponding assets held by the institution and the future investment returns and/or — the market yields of high-quality or government bonds;
- Article 16: Funding of technical provisions
  - 1. The home Member State shall require every institution to have at all times sufficient and appropriate assets to cover the technical provisions in respect of the total range of pension schemes operated.
  - 2. The home Member State may allow an institution, for a limited period of time, to have insufficient assets to cover the technical provisions. In this case the competent authorities shall require the institution to adopt a concrete and realisable recovery plan in order to ensure that the requirements of paragraph 1 are met again.
- Article 17: Regulatory own funds
  - 1. The home Member State shall ensure that institutions operating pension schemes, where the institution itself, and not the sponsoring undertaking, underwrites the liability to cover against biometric risk, or guarantees a given investment performance or a given level of benefits, hold on a permanent basis additional assets above the technical provisions to serve as a buffer.
  - 2. For the purposes of calculating the minimum amount of the additional assets, the rules laid down in Articles 27 and 28 of Directive 2002/83/EC shall apply.

In practice, these rather vague rules only impact the investment behaviour of Defined Benefit Schemes (DB) as they promise pensioners specified benefits (covering biometric risks), whereas Defined Contribution Schemes (DC) leave the investment risk on the individual member rather than the employer. The systemic implications flow particularly from the interest rate chosen to value the liabilities as a sharp decline (or narrowing of the spread of high quality versus governments) can balloon the liabilities. As the DB schemes are required to have sufficient assets to cover these liabilities, they create powerful financial effects on the plan sponsors – as is happening in the UK at present.

The interaction in recent years of IORPS and the pension accounting standard IAS19 has led to the closure of many DB schemes so these systemic risks to the financial system are reducing significantly. The rising social/political risk from the transfer to unsuspecting individuals of the investment risk is outside the purview of this study.

### **4.3.3 IORP Review**

The IORP review began in 2008 as the impact of the financial crisis hit pension funds very hard and required substantial top-ups for DB funds at a time their sponsors could ill-afford it. The review has exposed the central question of a comparison between IORPS and insurance undertakings. There seems to be an acceptance that a pension is a form of deferred remuneration so an employer can re-negotiate the terms with “employees”. That is very different from an insurance undertaking inviting members of the public to enter a contract for a promised payment. The inability of the insurance undertaking to honour its promise will result in a bankruptcy that might have broader systemic risks. A re-negotiation of deferred remuneration by the employer (even if by stealthy conversion to a DC scheme) will result in disgruntled employees but it is unlikely to have broader systemic risks.

The Commission’s call for advice from EIOPA made many of these issues clear – but also raised explicitly the issue of the discount rate to be used in valuing the liabilities.

### **4.3.4 April 2011: Call for Advice by the Commission from EIOPA**

.... there are currently less than 80 IORPs operating across different Member States, which represents a very small proportion of the around 140,000 IORPs existing in the EU.... while not very prevalent at the time of adopting the IORP Directive in 2003, today nearly 60 million Europeans rely on a defined contribution (DC) scheme for an adequate retirement income. DC schemes shift the risks – in particular market risk, longevity risk or inflation risk – to individual households.

Accordingly, the general layout of the supervisory system should, to the extent necessary and possible, be compatible with the approach and rules used for the supervision of life assurance undertakings subject to Directive 2009/138/EC (Solvency II). When reference is made to this directive, the EIOPA advice should however carefully take into account lessons learnt from the European regulatory discussions that took place after the adoption of this directive in 2009. This relates, in particular, to the illiquidity risk premium in the discount rate, to the need to better reflect long-term guarantees and possible simplifications.

## **4.4 Insurance undertakings**

### **4.4.1 Introduction**

According to DG Internal Market and Services' mission statement: “A single insurance market, promoting economic efficiency and market integration, requires a common framework, to allow insurers to operate throughout the EU and to establish and provide services freely. The legal framework must also protect customers, particularly individuals, where the safe delivery of promised benefits can be vital. This is achieved by a common prudential framework, founded on three generations of life and non-life directives, harmonising essential rules. This framework needs to be updated, revised, completed and – where possible – simplified to respond to market developments and product sophistication.”

### **4.4.2 Solvency I**

Solvency I was the name given to changes to the EU's insurer solvency regime made in 2002. The EU's insurer solvency regime was put in place in the 1970's. Solvency I did not fundamentally change these requirements, and through this process it became clear that a more wide-ranging reform was required – hence Solvency II.

### 4.4.3 Solvency II

In 2004, the Commission published a roadmap and framework for consultation. The Roadmap foresaw the preparation of a Commission proposal for the end of 2005 with the detailed legislation for implementing measures targeted for completion in 2008. The Commission requested advice on the development of a new solvency system to be applied to life insurance, non-life insurance and reinsurance. The objective of the new solvency system is to provide supervisors with the appropriate tools and powers to assess the “overall solvency” of an institution based on a risk-oriented approach via a three-pillar structure, formed of:

- Quantitative capital requirements consisting of two capital requirements: the Solvency Capital Requirement (SCR) and the Minimum Capital Requirement (MCR) to measure and properly manage risks. A breach of the MCR would trigger regulatory action.
- A supervisory review process that should increase the level of harmonisation of supervisory methods, tools and processes. In particular, it is aimed at identifying institutions with financial, organisational or other features susceptible to producing a higher risk profile.
- Disclosure requirements that enhance market discipline, complement Pillars I and II, and in line with those of the IAIS and IASB to reduce the administrative burden. Disclosure requirements are also intended to be compatible with disclosure requirements in the banking sector.

International convergence should be promoted via the IAIS and IAA (Actuaries), whilst the specific interaction with pension funds via the IORPs Directive was recognised. In July 2007, the Commission issued the Solvency II proposal which would replace 14 existing directives with a single directive that ran to nearly 400 pages. “We are setting a world-leading standard” Commissioner McCreevy said. Thomas Steffen, Chair of CEIOPS said, “It will certainly serve as mental impetus for a further fruitful dialogue with our supervisory partners around the globe.” The new framework would strengthen the role of the group supervisor in the home country that would have specific responsibilities to be exercised in close cooperation with the relevant national supervisors. In April 2009, Parliament and Council agreed on a common text.

### 4.4.4 Omnibus II

The insurance industry is subject to a “Lamfalussy Process” 4-level regulatory system so this changed when the De Larosière Group’s recommendation took effect in January 2011. The Omnibus I Directive covered many of the adjustments to a host of sectoral Directives but a number of technical matters were not resolved for EIOPA and Omnibus II rectifies these. However, it specified a number of tasks for EIOPA that have proved to be particularly contentious. Insurance Europe put it strongly “The discount rate is fundamental for the valuation of the Solvency II balance sheet as it is a significant driver of own funds and the SCR”. This amendment caused strong concerns for CEA members. “We do not agree with allowing supervisory authorities discretionary power to determine the illiquidity premium and when we could use it. Allowing EIOPA to apply subjective judgement within the calculation of the discount rate will cause significant uncertainty of undertakings and will make it impossible for capital planning and ALM strategies.”

There are clear systemic risks that flow from such apparently mechanical issues. The risk-free discount rate, its predictability, and its volatility will all have an influence on the choice of financial assets held by insurers, as well as the financial products they sell to the public. Given the long tail of



liabilities (i.e. products sold to the public) an abrupt change in the fundamental rate used to value the balance sheet could well create an abrupt change in the pattern of assets held.

Many observers are pointing to the potential interaction of Solvency II with the new capital and liquidity standards for banks, as well as the proposed bail-in of bank bondholders. Given the toughening of their own capital adequacy standards, insurers are questioning their willingness to buy such bank bonds, as well as the price they should charge. That may help explain the dearth of buyers for bank bonds. The potential for sudden changes in the deemed illiquidity premium could push insurers towards government bonds and away from corporate issues, thereby reducing their role as a provider of credit to the private sector. But there cannot be evidence of such effects yet, as the implementation date of Solvency II is January 2014.

#### **4.4.5 Other regulatory developments that may influence the asset choices of insurers**

##### **Third country equivalence**

Solvency II was designed from the outset to create a de facto global standard but the problem now is that many EU groups have major foreign operations. If the end result is that Solvency II requires higher capital - given that it applies to the worldwide assets of an EU-based insurer – then they might change domicile. However, Solvency II is an opportunity to encourage third countries to adopt a solvency regime based on the risks to insurers. EIOPA has just completed its assessment of the solvency regimes applicable in Switzerland, Japan and Bermuda. Though third countries are not expected to adopt a regime identical to Solvency II, equivalence is in the mutual interest of the EU and third countries, since it will streamline cross-border activities by insurance and reinsurance undertakings. Many third countries have already taken measures to adopt a risk-based regime without yet being able to meet the equivalence criteria.

##### **Financial Conglomerates**

Joint Forum “Principles”: The insurance industry is concerned that the revisions should be complementary to sectoral supervision and avoids duplication and multiple supervisory procedures. Insurance Europe believes that financial conglomerate supervision should be limited to the interconnectedness between sectoral activities. Sectoral legislation is designed to look at the operational activities of groups and financial conglomerates; compliance is assessed by the supervisor who is responsible for granting authorisation.

##### **G-SIFIs**

Nov 2011: The industry was pleased with the recognition by the International Association of Insurance Supervisors (IAIS) that there is little evidence of traditional insurance either generating or amplifying systemic risk within the financial system or the real economy.

##### **EMIR**

Issues include: Posting of non-cash collateral with CCPs; Intra-group transactions; Level playing field with IORPs.

##### **AIFMD/UCITS**

See separate comments under regulation relevant to asset managers.



## **IFRS**

Substantial issues include IAS 39/IFRS9 (hedge accounting) and accounting for insurance contracts.

### **Liabilities - dealing with customers**

A major wave of consumer legislation is coming over the horizon and is likely to affect the type of products that are “sold” to consumers and thus what they buy. If consumers turn out to be risk averse, insurers will need to change their asset allocation to match the new characteristics of their liabilities.

### **Insurance Mediation directive (IMD II)**

Commissioner Barnier on the revision of the Insurance Mediation Directive: “Despite the single passport for insurers and intermediaries, we face the challenge of a highly fragmented European insurance market. We must strengthen and harmonise the rules on consumer protection. The revision of the Insurance Mediation Directive, which we expect to submit in early 2012, should facilitate cross-border trade, enhance consumer confidence and improve the stability of the financial markets.

The revision of this Directive will level the playing field between the various sellers of insurance products: not only insurance undertakings, but also banks, brokers, car hire firms and travel agents. The Directive will also give a European passport to those providing specific services linked to insurance, such as claims assessments.

The new Directive will also bring significant improvements to consumer protection standards, particularly where sales of life assurance products combined with packaged retail investment products (PRIIPs) are concerned.”

### **Packaged retail Investment Products (PRIIPs)**

EIOPA Chairman Gabriel Bernardino called for a paradigm shift or a “progressive change in mind-set” on the way regulation deals with consumer expectations and to find the best way to evaluate markets from a consumer perspective. This confirmed that EIOPA will contribute to the work on the legislative proposals from the European Commission on the revision of the Insurance Mediation Directive (IMD); Packaged Retail Investment Products (PRIIPs); Insurance Guarantee Schemes (IGS); and response to call for advice on the review of the Directive on the activities and supervision of the institutions for occupational retirement provision (IORP Directive).

## **IORPS**

The insurance industry argues strongly for the principle of “same risks, same rules, same capital” and “substance over form” but this is hotly disputed by the Defined Benefit pensions industry. Commissioner Barnier commented on the revision of the Directive on Institutions for Occupational Retirement Provision “Now is the time to build a modern and innovative system founded on risk management, corporate governance and effective supervision, inspired by the Solvency II Directive and taking into account the special characteristics of institutions for occupational retirement provision. The Commission proposal, to be submitted at the end of 2012, will have the advantage of a technical opinion from EIOPA, which is expected in mid-February.”

## Guarantee schemes

The insurance industry argues that the new levels of capital adequacy introduced by Solvency II make such schemes unnecessary as the chances of an insurance undertaking failing in a systemically important way are now small.

## 4.5 Central counterparties

Central counterparties (CCPs) are commercial firms. There are currently about a dozen CCPs, all but one located in Europe or the USA, clearing interest rates, credit, equity and commodities OTC derivatives. There exists currently no CCP clearing foreign exchange (FX) OTC derivatives.

## 4.6 Relevant extracts from EBA discussion paper<sup>3</sup> of March 2012 on possible capital requirements for CCPs

CCPs are the Regulation's primary tool for mitigating the contagion – or, systemic – risk posed by one counterparty's default to the solvency of others within the derivatives market. The Regulation establishes organisational, conduct of business and prudential requirements for CCPs to ensure that those institutions have robust risk management and are financially sound irrespective of the financial instruments cleared, such that CCPs apply:

- robust margining requirements to all cleared transactions, ensuring that modelled future exposures are collateralised to a certain degree of confidence;
- pre-funded default management resources to mutualise losses between the surviving clearing members in case of the default of another member; and
- clearly defined default management processes to reallocate or liquidate positions in an orderly way in the event of a default.

Articles 39 to 41a of the Regulation prescribe the calculation of financial resources: margins, default fund and dedicated own resources. These articles also specify the requirements about the collection, maintenance and use of the collaterals. Under these Articles no additional capital is required to mitigate the CCP's credit exposures or the market risk of the collateral collected.

Additional capital is however required under Article 12(3) of the Regulation to mitigate, on the one hand against market risk, credit risk and counterparty credit risk arising from investment activities and other non-clearing activities; and, on the other hand, to mitigate against operational risk arising from all activities of a CCP (including non-clearing and clearing ones).

**Capital held to meet the CCP's regulatory capital requirement and the CCP's dedicated own resources are invested in cash and in financial instruments. Similarly collateral provided by**

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<sup>3</sup><http://www.eba.europa.eu/cebs/media/aboutus/News%20and%20Communications/EBA-DP-2012-01--Draft-discussion-paper-on-RTS-on-Article-12-3-EMIR-.pdf>

**clearing members in the form of cash is invested in financial instruments or deposited through highly secure arrangements with authorised financial institutions or central banks.** [LE emphasis] Collateral provided by clearing members in the form of financial instruments is deposited with operators of securities settlement systems or through highly secure arrangements with authorised financial institutions. The introduction of these capital requirements will also ensure that the risks inherent in these activities (investment or others) are monitored and adequately capitalised.

Our discussions showed that the structure that exists in the EU today, and is being enhanced, is based on a stand-alone analysis of each of the dozen CCPs rather than the aggregate of the system. The US system is fundamentally different as there is only one CCP and it is user-owned and directed, rather than a commercial entity. We were informed that the stress tests that CCPs apply to themselves simulate the failure of two clearing members. But this does not seem sufficient to tackle the interconnectedness that is now being concentrated to an ever greater extent. Each of the dozen CCPs in the global system will become inter-operable with some of the others. They share as clearing members many of the G16 dealer group that is responsible for over 80% of global OTC derivatives trades. However, most of those G16 will also be G-SIFIs so the chances of failure should be remote.

However, the entire thrust of regulatory action on banks is to ensure that if there is a failure, then it will not fall on taxpayers to bail them out. Indeed, DG Markt has just put out for consultation a non-paper on the “debt write-down tool” to enable creditors of EU banks to incur losses even before liquidation. There seems little reason to expect CCPs deposits (or holdings of “financial instruments” issued by such firms) to be exempted. **This implies that some portion of a CCP’s own capital resources or collateral can be expected to disappear at the moment of peak stress for the financial system.** It is not merely the default of a member on its specific obligations to the CCP. The EBA paper talks of holding “cash” but leaves open the possibility that this can be “commercial bank money” rather than “central bank money”. Given the scale of collateral holding it is inevitable that much of the cash will be liabilities of commercial banks. Does the stress testing include modelling the loss of the proportion of cash issued by the defaulting G-SIFI to all other members of the G16 and CCPs?

A recent BIS study (see box) suggests that the *additional* collateral requirement may not be all that great but the responses to the consultations that have been published so far are already suggesting a backlash from the industry about any need to provide initial margin on bilateral (so non-CCP) trades. What data will be gathered on this newly-intensified interconnectedness?

**BIS article on collateral requirement for mandatory central clearing of OTC derivatives<sup>4</sup>**

BIS' estimates are based on potential losses on a set of hypothetical dealer portfolios that replicate several aspects of the way that derivatives positions are distributed within and across dealer portfolios in practice. The results suggest that major dealers already have sufficient unencumbered assets to meet initial margin requirements, but that some of them may need to increase their cash holdings to meet variation margin calls.

BIS also finds that default funds worth only a small fraction of dealers' equity appear sufficient to protect CCPs against almost all possible losses that could arise from the default of one or more dealers, especially if initial margin requirements take into account the tail risks and time variation in

<sup>4</sup> <http://www.bis.org/publ/work373.pdf>

risk of cleared portfolios. Finally, BIS finds that concentrating clearing of OTC derivatives in a single CCP could economise on collateral requirements without undermining the robustness of central clearing.

In recent press reports, the European Association of CCP Clearing Houses (EACH) has cautioned that new rules that will define the regulation of OTC derivatives and clearing houses may create more onerous and costly reporting requirements than anticipated by policy makers.

EACH warned that if European standards were more onerous than global standards, the competitiveness of European clearing houses could be undermined by banks, investors and companies using jurisdictions that were both compliant and cheap. “CCPs in the EU may satisfy the safety but not the affordability tests, whereas those in other major financial jurisdictions may meet both tests”, EACH said. EACH also warned ESMA about onerous levels of disclosure of information, and argued that CCPs should be allowed to determine disclosure of information without undermining client confidentiality.

The market reactions to this data gathering exercise do not bode well for extending it to provide the raw material for the ESRB to understand any rising interconnectedness. Moreover, the ECB and EBA have just published a second edition of their reconciliation of their reporting framework for macro-economic statistics of the banking sector and supervisory reports systems. But the granularity of the data seems far short of what would be required to monitor the interconnectedness of CCPs and the G16 dealers. The paper refers to future improvements to permit consistency checks beyond “Securities other than shares”. That is vastly too general for the inter-connectedness analysis that is required.

#### **Second version of the classification system between EBA/ECB reporting frameworks**

The European Central Bank (ECB) and the European Banking Authority (EBA) have today published a second version of the classification system between their respective reporting frameworks. The first version of the classification system was published in February 2010. This second edition includes further enhancements and updates a series of reconciliation proposals which are in the process of being implemented.

The classification system is composed of two elements. The first element is a bridging manual linking the ECB’s monetary and financial statistics requirements with the supervisory reporting templates (FINREP, COREP and Large Exposures) developed by the EBA. The second element is a database that aims to help reporting agents and other users to identify similarities and differences between data for ECB statistical purposes and data for financial supervisors in the context of the EBA framework.

The ECB and the EBA will continue to maintain and further enhance the classification system over time, in particular in view of forthcoming amendments to the FINREP, COREP and Large Exposures templates as well as potentially relevant changes to the ECB statistical reporting framework.

## 5 Cross-cutting issues

This chapter provides information on cross-cutting issues relevant to the analysis of the risks of NBFIs to financial stability. Two financial sector activities which have attracted considerable attention in recent years are securitisation of assets and securities lending. These activities are discussed in greater detail below. In addition, repos and the fire sale mechanism are described, as are key risks that materialised for NBFIs during the financial crisis, namely: redemption risk, liquidity risk and counterparty risks.

### 5.1 Securitisation

#### 5.1.1 Background

Securitisation involves the bundling of a certain type of loans (consumer credit outstandings, car loans, mortgages, SME loans, etc) in a finite-life special financial vehicle and either selling debt securities in that specific financial vehicle to third parties and/or retaining the securities of the vehicle partially or fully on the books of the aggregator of the loans which may or may not be the originator of the loans. In the former case, the aggregator bought the loans from various originators.<sup>5</sup> The aggregator is the financial institution which sets up the special financial vehicle and bundles the loans into the financial vehicle. In many cases, different tranches of securities with different risk profile are created and sold to investors with different risk appetite. In some cases, the originator may provide a guarantee to investors in the special financial vehicle. For a more in-depth discussion of the nature of the securitisation process and its impact on financial stability, see Acharya et al. (2009), Acharya and Schnabl (2010), Basel Committee on Banking Supervision (2005 and 2009), Berndt and Gupta (2010), Coval et al. (2009), European Central Bank (2008), Fender and Mitchell (2009), Jobst (2008), Levitin et al. (2009), Shing (2009) and Stein (2010).

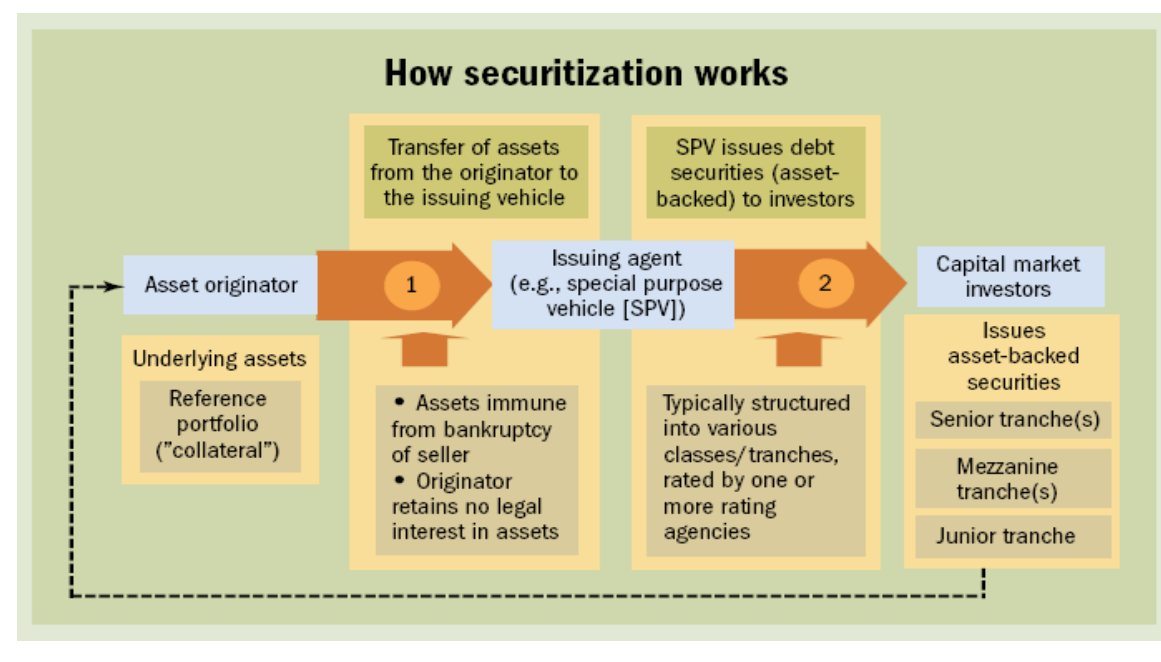
The two figures below provide a simple diagrammatic overview of a) the securitisation process and b) the various actors in the securitisation process.

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<sup>5</sup> In the present section, we do not discuss the alternative securitisation approach whereby the loans against which asset-based securities are issued remain on the books of the originator but are ring-fenced. Such asset-based securities are typically referred to as covered bonds and are common in certain European countries for the securitisation of mortgage loans. They include instruments such as the Pfandbriefe (Germany), Obligations foncières (France), Obbligazioni bancarie garantite (Italy), Lettres de gage hypothécaires and lettres de gage publiques (Luxembourg), Obrigações hipotecárias and obrigações hipotecárias sobre a sector público (Portugal), Cédulas hipotecarias and cédulas territoriales (Spain), and Realkreditobligationer (Denmark)

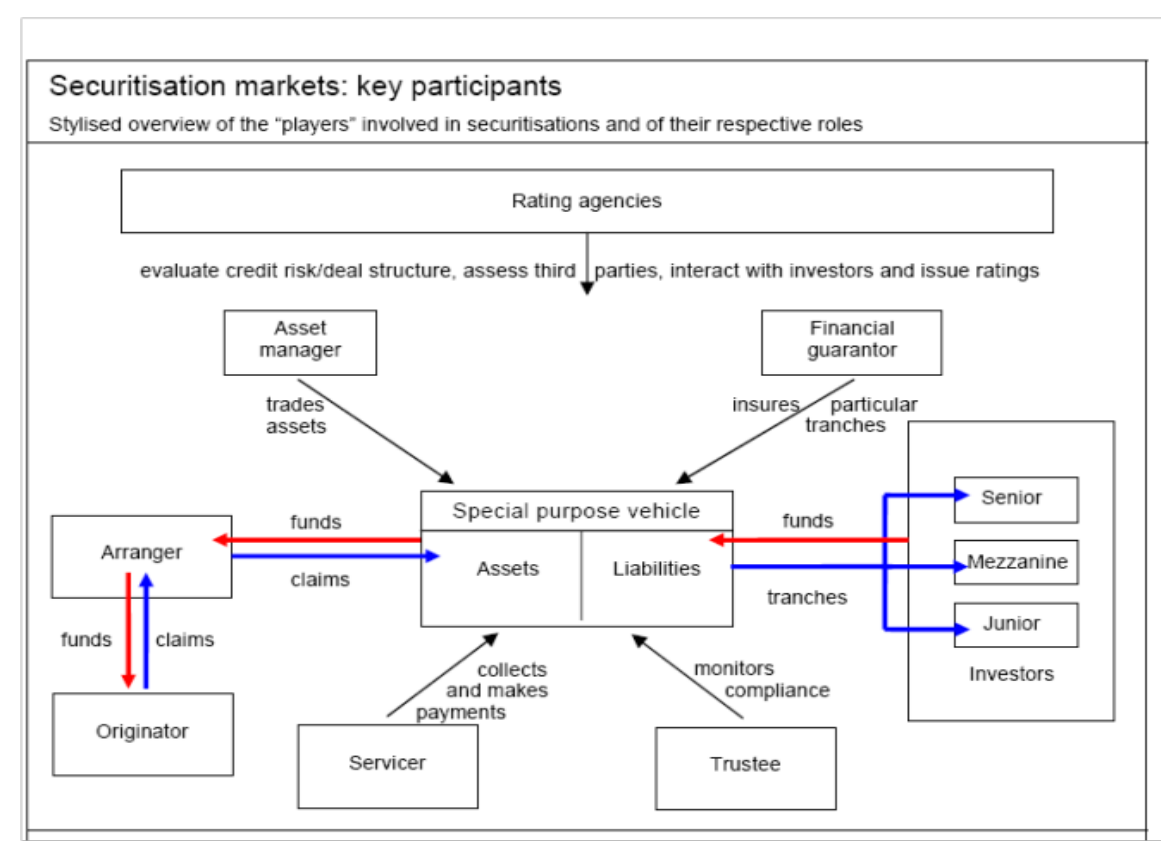
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Figure 18: The securitisation process



Source: Jobts (2008)

Figure 19: Various actors in the securitisation process



Source: Fender and Mitchell (2009)

While a large share of the securitisation involves the issue of medium-term and longer-term maturity securities, securitisation through commercial paper accounts for a significant share of the total securitisation (see discussion below). Obviously, both types of securitisation face a funding risk but the latter is particularly pronounced in the case of commercial paper securitisation as was shown during the financial crisis (Covitz et al. (2009), Gorton and Metrick (2010)).

### 5.1.2 Risks

As noted in a recent BIS report *“Securitisation transforms credit risk into market risk by pooling loans and issuing tradable claims against the pool. It is a risk management and funding tool that relies on the liquidity of primary markets for placing asset-backed securities.”* (Basel Committee on Banking Supervision, 2009). If properly priced, the credit and market risks are transferred from the originator of the loans to the acquirers of securities issued by special purpose vehicle, subject to any explicit or implicit guarantee provided by the originator or aggregator.

During the financial crisis, some originating banks felt that, for reputational reasons, they had to de facto guarantee the securities issued by special purpose vehicles they had set up even so at the time of the issue of securities of the special purpose vehicle (SPV) no guarantee had been provided.

A key issue for securitisation that the financial crisis highlighted, besides the mispricing of risk, understanding of the risk by some investors in such asset-based securities, and opacity of some of the asset based securities is that, in certain circumstances, *“incentive problems at various stages of the securitisation process can lead to severe mis-pricing and distorted investments. For example, if the incentives of originators are not sufficiently aligned with those of the holders of risk then banks’ intermediation function, including screening and monitoring of borrowers, can be severely impaired”* (Basel Committee on Banking Supervision, 2009).

Securitisation creates a potential misalignment of incentives faced by the originators and the purchasers of the securities issued by the SPV in which the assets are pooled as the originators shift the credit and market risk to the SPV and its investors. Thus, unless the originators retain a tranche of the securitised assets or take on their books subordinated tranches of the securities issued by the SPV, the originators do not have very strong incentives to a) undertake proper due diligence to assess the true risk of the securities being offered for securitisation and monitor the performance of the underlying assets during their life. In principle, credit rating agencies can overcome this agency failure but in practice they failed to do so in a number of cases.

Thus, in addition to the obvious credit and market risk faced by investors in securities issued by SPVs, they also face a major agency risk which can be mitigated by adopting risk-sharing mechanisms with the originator, as was the case in much of securitisation that took place before the few years of exuberance preceding the financial crisis.

To a large extent, the true causes of the sub-prime crisis were massive agency failures in the mortgage generation and securitisation value chain. In the absence of these agency failures, the credit and market risks would not have been underestimated by the buyers of SPV securities to the same extent that they actually were.

### 5.1.3 Trends in securitisation – AFME data

AFME publishes data on securitisation which show, on a quarterly basis:

- The total issuance amount and by type of collateral for Europe and the USA, issuance by retention for Europe, by country of collateral, by collateral and country, by rating and by deal size
- European and US outstandings by collateral, by country of collateral, European and US outstandings by Moody's rating, European outstandings by vintage and by collateral and country
- Ratings
- Spreads and prices for RMBS, CMBS, ABS
- ABCP historical Issuance total, by nationality of issuer, by programme type
- ABCP outstanding by nationality of issuer, outstanding by programme type, US by programme type, by country and US AA ABCP to AA Non-financial CP Spread

Below, we present European issuance data for asset-backed securities and asset-backed commercial paper (Figure 20 and 21).

In the first three quarters of 2011, European issues of asset-backed securities amounted to €243 billion and those of commercial-paper backed securities to €130.7 billion.

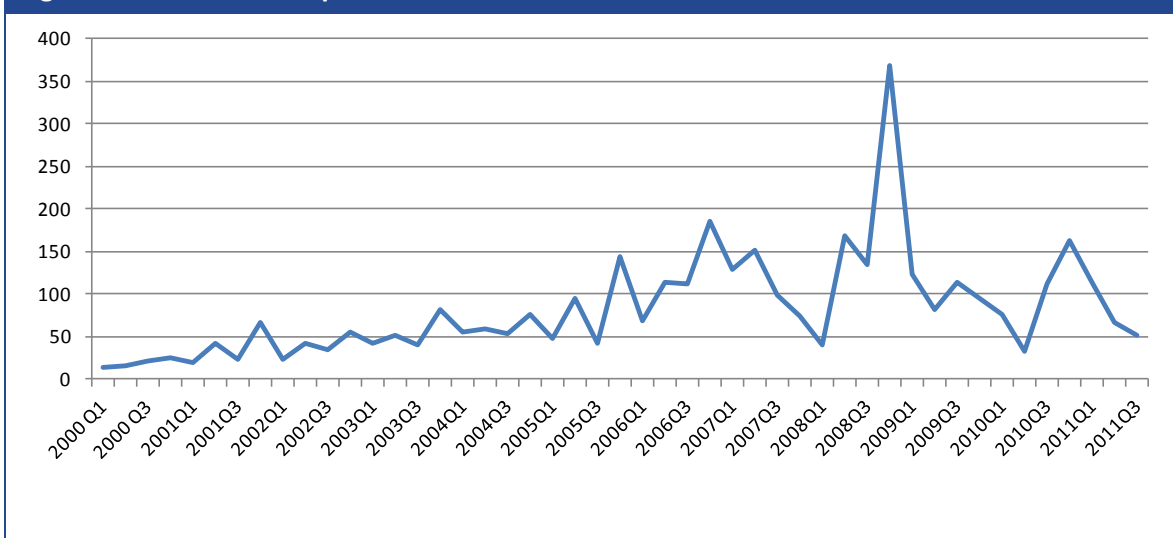
It is important to note that since the 2008Q4, a large proportion of asset-backed securities are retained by the originators/aggregators for participation in the various liquidity programs implemented by the European Central Bank, the Bank of England, etc.

Thus, the observed issuance figures do not reflect true underlying market activity and in order to assess and understand observed developments it is essential to consider market commentaries and the detailed account of activity in the market published with the data in the quarterly review.

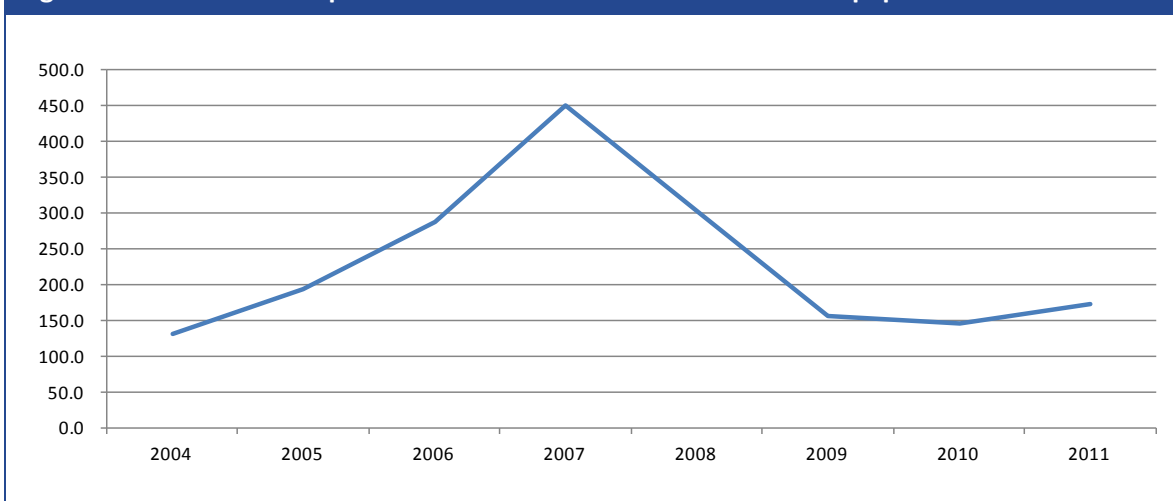
For example, the issuance figure of 2008Q4 stands at an all-time high of €368 billion during the quarter. However, as AFME's 2008Q4 Quarterly Review (p. 1) notes *"The primary issuance market remained closed in the fourth quarter, with over 95% of all issuance in Europe for 2008 retained for repo purposes, notably with the ECB and the BoE according to RBS"*.

Unfortunately, published data on retention go back to only early 2009. These retentions statistics show that in 2009, only 6% of all asset-backed securities issued in Europe were placed with third parties. In 2010, this figure rose to 23% in 2010 and 27% for the first three quarters of 2011.



**Figure 20: Trends in European issuance of asset-backed securities - € billion**

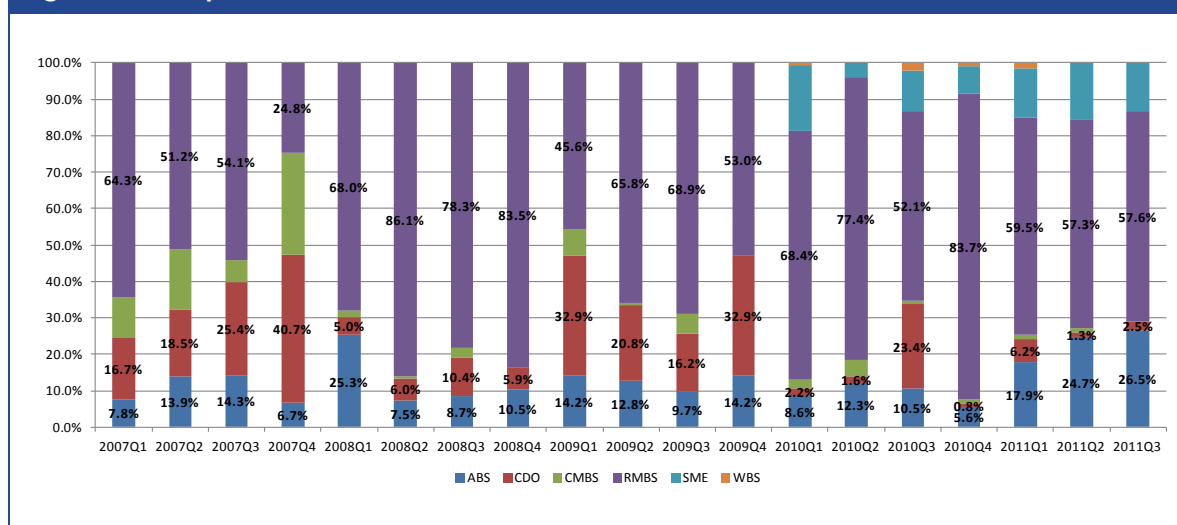
Source: AFME

**Figure 21: Trends in European issuance of asset-backed commercial paper - € billion**

Source: AFME

The AFME data also provides information on the types of loans being securitised. The figure below (Figure 22) shows that RMBS accounted for the majority of securitisation over the whole period (except 2007Q4 and 2009Q1).

Figure 22: Composition of securitisation issues 2007Q1 to 2011 Q3



Note: Prior to 2010Q1, no information is provided separately for SME and WBS securitisation

Source: London Economic analysis of AFME data

#### 5.1.4 Trends in securitisation – ECB data

Recently, the ECB has begun to collect information on securitisation through the provision of information on the balance sheets of so-called 'financial vehicle corporations' (FVCs).

FVCs are undertakings whose principal activity meets the following two criteria:

- to carry out securitisation transactions and which are insulated from the risk of bankruptcy or any other default of the originator;
- to issue securities, securitisation fund units, other debt instruments and/or financial derivatives and/or to legally or economically own assets underlying the issue of securities, securitisation fund units, other debt instruments and/or financial derivatives that are offered for sale to the public or sold on the basis of private placements.

The asset side of the financial vehicle corporation sector balance sheet are presented below and describe some interesting features about securitised loans (Table 7). The majority of securitised loan assets originate from MFIs, as may be expected. However, interestingly, close to 50% (or €0.58tn worth) of securitised loans remained on the balance sheets of MFIs on average, over 2010 and the first half of 2011.

**Table 7: Assets of euro area financial vehicle institutions by type, 2010Q1-Q2011Q4 (€bn)**

Year	Quarter	Total	Deposits and loan claims	Securitised loans							Securities other than shares	Other securitised assets	Shares and other equity	Other assets
				Total	Originated in the euro area					Originated outside euro area				
					MFIs	Remaining on the MFI balance sheet	Other financial intermediaries, insurance institutions and pension funds	Non-financial institutions	General government					
2010	Q1	2290.8	358.3	1440.7	1135.4	559.3	137.6	25.0	7.3	135.4	280.4	99.3	43.5	68.6
	Q2	2285.6	363.1	1437.2	1131.6	570.6	140.5	24.7	6.4	133.8	278.7	101.3	41.1	64.2
	Q3	2287.2	350.3	1469.72	11761.2	582.4	148.7	23.5	6.3	130.0	259.0	100.3	41.4	66.4
	Q4	2353.0	373.8	1525.8	1226.2	606.4	140.5	22.4	6.0	130.8	250.5	92.5	41.9	68.6
2011	Q1	2255.3	351.5	1484.5	1185.1	595.3	142.5	21.8	5.9	129.2	241.6	89.0	36.3	52.4
	Q2	2216.4	340.1	1461.2	1167.0	585.3	144.7	20.4	5.2	123.9	232.5	88.6	35.7	58.3
	Q3	2201.1	321.7	1465.6	1180.7	590.5	142.8	20.5	5.1	116.3	232.5	86.9	37.8	57.6
	Q4	2269.5	324.6	1530.3	1244.7	583.1	147.8	20.8	4.8	112.0	228.9	90.0	36.8	58.8

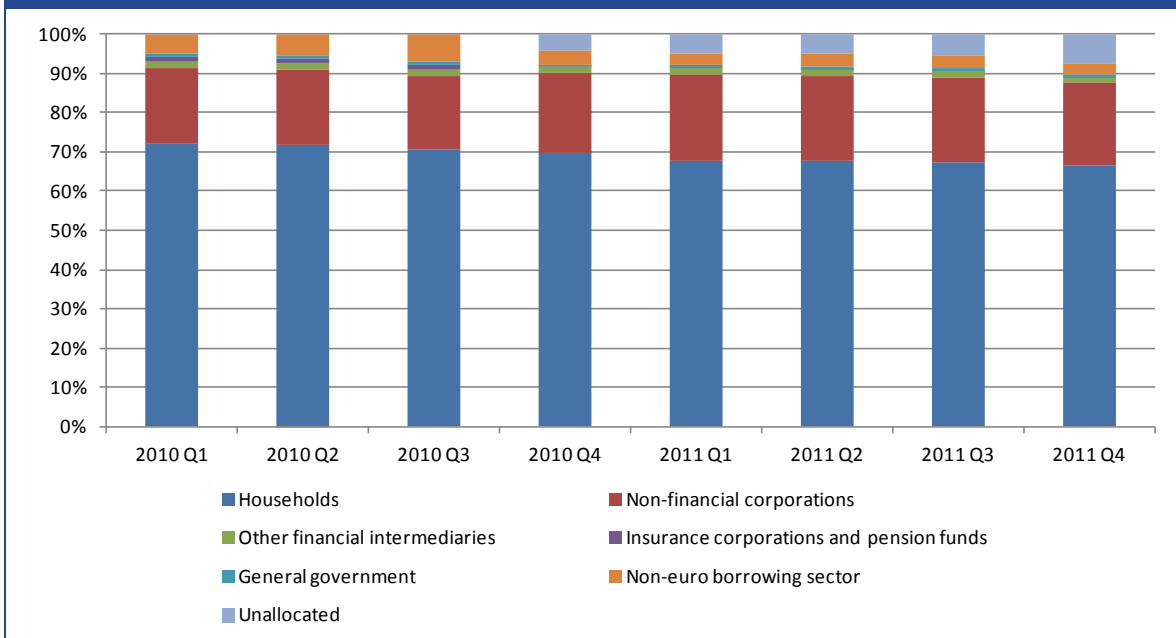
Note: Outstanding amounts at end of period

Transactions during period

Source: ECB Monthly Bulletin March 2012

The ECB data also provides information on the holders of securitised loans originated by euro area MFIs. At the end of 2011, households held the bulk of such loans (67%) followed by non-financial corporations (21%). Interestingly, the non-banking financial sector in total holds only 1.5% of such loans.

**Figure 23: Holdings of securitised loans originated by euro area MFIs in 2010Q1 to 2011Q4 – per cent of total holdings**



Source: London Economics analysis of data in table 2.10 of statistics published by the ECB in its Monthly Bulletin

### 5.1.5 Conclusions

In order to monitor developments in asset-backed securities and commercial paper, the data from AFME provides a good picture of the European market, albeit with a lag, while the ECB data provides more detailed information for the euro area, especially with regards to holdings of securitised loans.

Both data sets provide information on the volume of asset-based securities that remain on the books of the originating MFIs. While this could, in theory, provide useful information on the state of the underlying market for securitisation and risk appetite by non-MFIs, at the present time the figures are mainly driven by the MFIs' desire to produce collateral acceptable to the various liquidity programs undertaken by central banks.

## 5.2 Repos

### 5.2.1 Background

For an economic perspective, repurchase agreements (repos) are very similar to security lending. A repurchase agreement is the sale of a security coupled with an agreement to repurchase the security, at a specified price, at a later date. In both cases, title to a security is temporarily transferred to a third party (see Adrian et al. (2010) and Ruchin (2011) for further details on the functioning of the repo market).

However, they differ in the sense that repos have a fixed term. In contrast to securities lending where the transaction is typically driven by a borrower seeking temporary ownership of a security, repos are often driven by a lender seeking to obtain liquidity.

More recently, a particular form of repos and securities lending has emerged, namely collateral upgrade transactions whereby the two parties to the transaction exchange assets of substantially different quality. The borrower receives the higher quality assets and, in return for which, posts collateral while the lender provides the higher quality assets and, in return, receives poorer quality collateral (FSA, 2012). A particular form of such transactions are liquidity swaps *“which effect a liquidity transformation between an insurer (counterparty long liquidity) and a bank (counterparty short liquidity) by typically exchanging high-credit quality, liquid assets such as gilts held by the former with illiquid or less liquid assets, such as asset-backed securities (ABS) held by the latter”* (FSA, 2011).

### 5.2.2 Risks

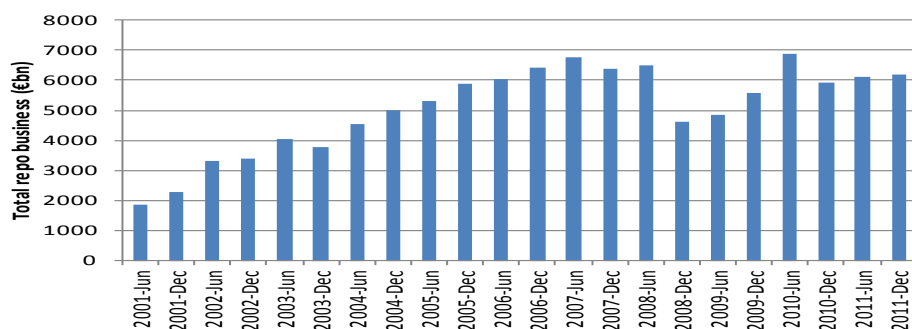
Repos are an important source of short-term funding for financial institutions, and experience has shown that the repo market can easily dry up in an environment of heightened uncertainty about counterparty and credit risk.

### 5.2.3 Trends in European repos

While, to the best of our knowledge, there exist no comprehensive data on repos undertaken by financial institutions in Europe, the International Capital Market Association undertakes regular surveys of the main market participants in Europe which provide a good picture of the overall situation.

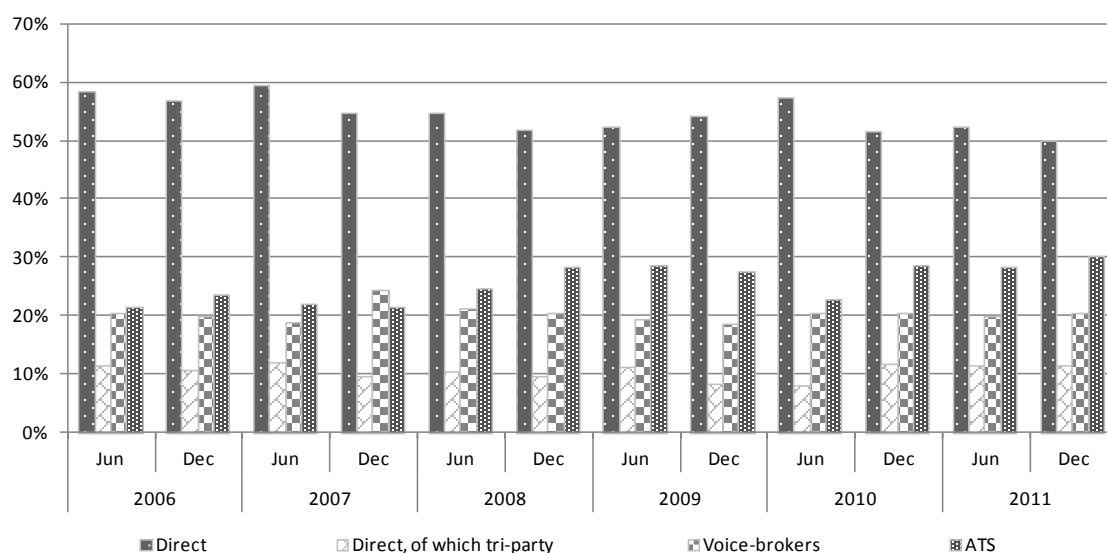
According to the latest survey (ICMA 2012a), the total value of repos and reverse repos at the close of 7<sup>th</sup> December 2011 stood at €6,124 billion up slightly from €6,204 billion in June 2011. As the figure below shows (Figure 24), the level of repos in 2011 has almost recovered to its pre-crisis peak. In the immediate aftermath of the failure of Lehman in the fall of 2008, the level of repos dropped by 29% from June 2007 to December 2008 and, since then, has gradually recovered.

Obviously this sharp drop in the level of repos had major liquidity repercussions for the parties depending on repos as a major funding source. Larger haircuts and margins are thought, by some observers, to have been a major source of the decline in repo funding. While there is scarcity of data on such haircuts and margins, a recent simulation analysis by Comotto for ICMA (2012, b) suggests that the impact of larger haircuts and margins would likely have been very small. This suggests that more fundamentally repo participants reduced their participation or totally withdrew from the market.

**Figure 24: Total repo business, 2001-2011, €bn**

Source: ICMA European Repo Market Survey Dec 2011

The figure below (Figure 25) shows that the majority (50% to 60%) of repos involve directly negotiated business between the two parties to the trade.

**Figure 25: Counterparty analysis**

Note: ATS are automatic trading systems operating in Europe – BrokerTec, Eurex Repo and MTS.

Source: ICMA European Repo Market Survey Dec 2011

In terms of the credit quality of the collateral, information available from tri-party repos shows that slightly less than 50% is rated AAA and between 60% and 70% is rated AAA or AA. Moreover only a very small proportion of the collateral is rated less than A.

**Table 8: Tri-party repo collateral analysed by credit rating**

	June 2009	December 2009	June 2010	December 2010	June 2011	December 2011
AAA	46.4%	47.7%	51.4%	46.6%	49.8%	48.3%
AA	18.7%	15.9%	15.2%	19.7%	21.8%	15.3%
A	23.1%	24.2%	20.9%	20.1%	13.1%	23.1%
BBB	5.4%	6.9%	6.7%	4.3%	6.9%	3.2%

Below BBB-	1.6%	1.2%	2.2%	5.1%	2.2%	4.9%
A1/P1	4.0%	3.3%	3.4%	3.8%	4.7%	3.9%
A2/P2	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Non-Prime	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%
Unrated	0.7%	0.9%	0.1%	0.4%	1.5%	1.3%

Source: ICMA European Repo Market Survey Dec 2011

Table 9 shows that the main type of collateral is by far government bonds. Corporate bonds and equity come a distant second and third, respectively. Of note is the fact that asset backed securities account for only a minute fraction of the collateral in repos in Europe.

**Table 9: Tri-party repo collateral analysed by type of collateral**

	December 2010	June 2011	December 2011
Government securities	40.6%	37.8%	45.2%
Public agencies / sub-national	3.4%	5.6%	7.2%
Supranational agencies	1.8%	2.2%	2.8%
Corporate bonds	25.5%	23.3%	18.3%
Covered bonds	6.5%	9.1%	9.7%
Residential mortgage-backed	0.4%	0.3%	1.4%
Commercial mortgage-backed	0.2%	0.3%	0.2%
Other asset-backed	0.8%	0.6%	1.0%
CDO, CLN, CLO, etc	0.6%	0.7%	0.5%
Convertible bonds	0.0%	0.1%	0.2%
Equity	19.0%	19.2%	12.8%
Other	1.1%	0.9%	0.8%

Source: ICMA European Repo Market Survey Dec 2011

Finally, the repos have typically a short maturity –almost 50% of the repos had a maturity of less than 1 month in December 2011 (see Table 10 below).

**Table 10: Maturity of repos**

	December 2010	June 2011	December 2011
1 day	20.9%	16.2%	15.8%
2 days to 1 week	18.9%	16.2%	16.3%
1 week to 1 month	22.7%	18.4%	16.0%
>1 month to 3 months	15.2%	12.7%	16.5%
>3 months to 6 months	5.4%	4.4%	4.3%
>6 months to 12 months	3.6%	6.9%	2.9%
>12 months	1.0%	8.7%	12.7%
Forward-start	6.7%	9.5%	9.6%
Open	5.7%	6.9%	5.8%

Source: ICMA European Repo Market Survey Dec 2011

The repo activity is concentrated in Europe with the top 10 players accounting for almost two-thirds of all the activity. This is shown in Table 11, overleaf.

**Table 11: Concentration analysis**

	December 2010	June 2011	December 2011
Top 10	61.7%	65.5%	64.0%
Top 20	84.4%	85.5%	84.1%
Top 30	94.3%	94.9%	94.8%
Other	5.7%	5.1%	5.2%

Source: ICMA European Repo Market Survey Dec 2011

### 5.3 Securities lending

While securities lending has been a long-standing practice in financial markets, it has recently attracted policy attention, especially with regards to potential systemic risks that such activity could pose.

#### 5.3.1 Background

In essence, in a securities lending transaction, a beneficial owner of a security (for example, a pension fund, an insurance company or an investment fund) agrees to temporarily transfer the title of a security to a third party, such as prime brokers who use securities lending programmes to help them meet customer buy orders, finance short sales and hedge derivative exposures. Hedge funds often wish to temporarily avail themselves of the security for shorting a stock. (Adrian et al. (2010), Committee on the Global Financial System, (2010), Faulkner (2010), Dive et al. (2011)).

The lender receives a fee for the loan and collateral, typically in excess of the value of the security loan (the excess of the collateral relative to the value of securities loans is commonly referred to as the haircut). Such collateral may be in the form of other high quality security or cash which can then be re-invested by the lender. Cash collateral is a common practice.

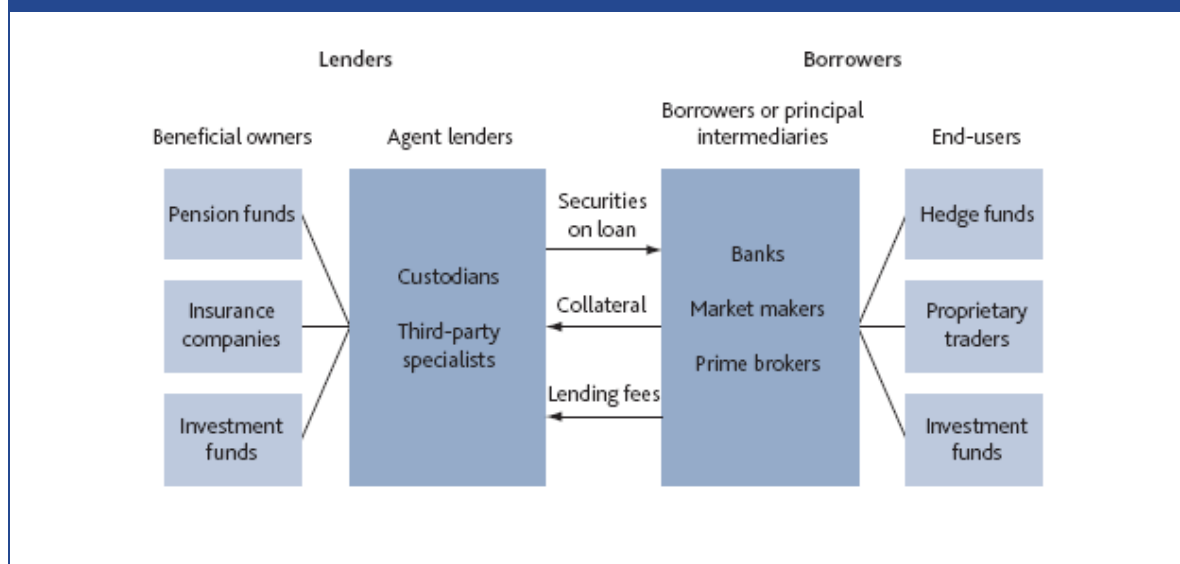
The borrower is contractually obliged to return the borrowed security on demand within the standard settlement period. Typically, the term of loan is overnight but is automatically rolled over until the lender requests the return of the security or the borrower returns the security spontaneously.

The borrower is also contractually obliged to pass on to the lender any dividends/interest received on the security and corporate actions that occur.

In order to actively use their portfolio for securities lending purposes, securities owners such as pension funds, investment funds and life insurance companies will often use an intermediary/agent (custodian) who will organise and manage the loan and, very frequently, provide an insurance that the lender will be kept whole should the borrower fail to return the security and the collateral fall short of the amount required to replace the security.

The figure below (Figure 26) presents the various interactions between all the parties in a security lending transaction.



**Figure 26: Participants and relationships in securities lending**

Source: Dive et al. (2011)

Dive et al. (2011) note that “According to *Data Explorers*, revenue from securities lending peaked at \$14.3 billion in 2008, falling to \$6.5 billion in 2010. This represents a small proportion of beneficial owners’ total returns but for some beneficial owners, such as exchange-traded funds (ETFs), their securities lending activities can represent a significant proportion of their revenue. According to *Deutsche Bank*, securities lending may account for up to a third of ETF providers’ revenue.”

For an economic perspective, repurchase agreements (repos) are very similar to security lending. A repurchase agreement is the sale of a security coupled with an agreement to repurchase the security, at a specified price, at a later date. In both cases, title to a security is temporarily transferred to a third party (see Adrian et al. (2010) and Ruchin (2011) for further details on the functioning of the repo market).

However, they differ in the sense that repos have a fixed term. In contrast to securities lending where the transaction is typically driven by a borrower seeking temporary ownership of a security, repos are often driven by a lender seeking to obtain liquidity.

More recently, a particular form of repos and securities lending has emerged, namely collateral upgrade transactions whereby the two parties to the transaction exchange assets of substantially different quality. The borrower receives the higher quality assets and, in return for which, posts collateral, while the lender provides the higher quality assets and, in return, receives poorer quality collateral (FSA, 2012). A particular form of such transactions are liquidity swaps “which effect a liquidity transformation between an insurer (counterparty long liquidity) and a bank (counterparty short liquidity) by typically exchanging high-credit quality, liquid assets such as gilts held by the former with illiquid or less liquid assets, such as asset-backed securities (ABS) held by the latter” (FSA, 2011).

### 5.3.2 Risks

Securities lenders face the risk that the borrower may be unable to return the security and that the collateral and the indemnity provided by the intermediary are insufficient to acquire in the market place the non-returned security. To mitigate against such risk, lenders engage typically in on-going robust counterparty risk assessment and directly or indirectly through their agent active collateral management, requiring larger haircuts if risks are deemed to have increased.<sup>6</sup>

In addition, those lenders choosing to receive cash as collateral face the so-called cash collateral reinvestment risk, i.e., the risk that the lender suffers a loss on the re-investment of the collateral.

According to Dive et al. (2011), prior to the financial crisis, in many instances, *“agent lenders managed the majority of these cash reinvestments. They often managed ‘pooled’ programmes that grouped cash collateral from a number of beneficial owners together and reinvested the cash according to a set of investment guidelines regarding credit and liquidity risks”*.

The issue of rehypothecation is sometimes mentioned as creating a particular risk but stakeholders consulted during the project noted that this is not an issue provided sufficient collateral of high quality is given by securities borrower.

Since the financial crisis, cash collateral is managed much more prudently and involves much less of a maturity transformation than before the crisis. For example, according to data from Data Explorers, the median maturity of cash reinvestment programs has fallen from a high of more than 150 days in 2007 to about 25 days in 2011.

Data Explorers also provide information on the volume of activity, cash collateral, etc. among the major institutions undertaking securities lending and provide information to Data Explorers on their activity. However, this is proprietary data which is not accessible to less informed participants who engage only episodically in securities lending. As a result, the latter may not always take the most appropriate decisions.

Another key risk resulting from securities lending is that institutions having borrowed securities are under no obligations to make provide information in their balance sheets on the extent to which the securities shown in their balance sheet are subject to a legal claim by a securities lender. This reduces the value of the balance sheet information for market transparency and makes the assessment of counterparty risk more complex and risky.

Securities lending also creates a wider systemic risk through increasing the interconnectedness of various segments of the financial industry. This may cause, or at least, facilitate contagion.

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<sup>6</sup> Unfortunately, in contrast to the detailed information available from the ISDA margin surveys for OTC derivatives (see for example ISDA 2012), there exist no public data on the size of the margin and the extent to which collateral is rehypothecated.

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### The case of AIG

AIG ran a particularly risky cash collateral reinvestment programme, with a significant maturity mismatch. It lent out securities owned by its insurance subsidiaries. At its height, AIG's cash collateral reinvestment portfolio was around \$76 billion. Around 60% of AIG's cash collateral was invested in residential mortgage-backed securities (RMBS). As the credit concerns about AIG deepened, borrowers of AIG's securities began terminating their transactions, demanding a return of cash collateral. As that collateral was tied up in illiquid securities, this meant that AIG had great difficulty meeting these requirements. Alongside a number of other issues, this contributed to the failure and subsequent bail out of the group.

Source: Dive et al. (2011)

Repos face, in addition, a very important funding risk as they are typically of short maturity (Martin and von Thadden, 2010).

The special collateral swaps and collateral upgrade swaps raise particular risk concerns *“because the limited disclosure around these transactions may add to issues around opacity; as a form of secured funding they add to the encumbrance of banks’ assets; and because the transactions are subject to margining, the value of the funding they provide may vary potentially introducing procyclicality to the provision of lending they support. In addition, their recent appearance means the robustness of these transactions during stress is untested as is the capacity of the lender of securities to manage a default in a way that does not entail costly externalities for the financial system”*. (Dive et al. 2011).

### 5.3.3 Recent trends

The data in the table below (Table 12) shows that the value of European securities available for lending among the institutions reporting to Data Explorer stood at US\$ 2,071 billion at the end of 2011Q4 and that US\$ 515 billion (about 25%) had actually been lent.

The utilisation rate (i.e. the amount lent to the amount actually available for lending) varies between 5% in the case of UK equity and 43% in the case of German government bond (Figure 27). More generally the utilisation rate of government bonds is considerable higher (see figure below) than that of equity even though generally the fees earned by lenders and the overall return on securities lending are lower.

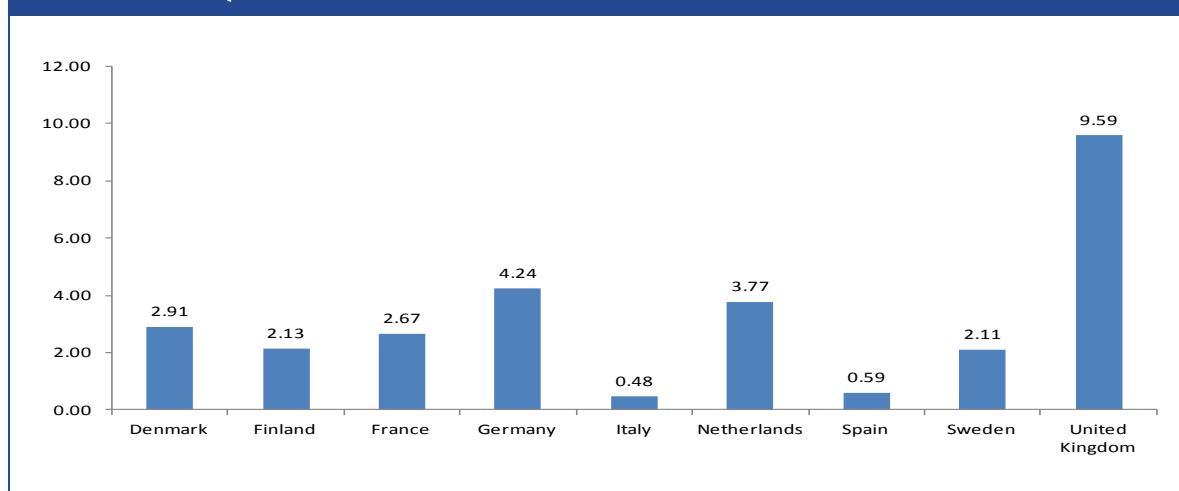
**Table 12: Key statistics on securities lending 2011 Q4**

Security	Lendable assets (US\$ M)	Total Balance (US\$ M)	Utilisation (%)	SL Fee (bp)	Securities lending to return to lendable (bp)	Total return to lendable asset (bp)
Denmark Equity	21128.71	2064.36	9.19	57.95	4.9	5.53
Denmark Government Bonds	6384.74	1777.64	26.7	11.64	3.11	5
Finland Equity	16676.27	3227.51	13.69	65.86	8.93	9.74
Finland Government Bonds	13768.37	4434.73	29.18	21.14	6.16	9

France Equity	167604.58	48712.82	11.54	828.32	16.09	16.7
France Government Bonds	189829.09	67226.12	30.76	21.76	6.97	10
Germany Equity	180054.59	29890.72	10.05	62.94	6.77	7.35
Germany Government Bonds	280771.62	127118	42.64	18.51	8	10.46
Italy Equity	38773.61	9380.25	13.36	134.77	20.02	20.76
Italy Government Bonds	43664.76	6928.07	6.39	-1.73	0.56	2.55
Netherlands Equity	64436.56	7482.15	8.57	50.67	4.67	5.05
Netherlands Government Bonds	88113.3	30622.27	32.32	18.4	6.04	8.4
Spain Equity	42716.5	10736.85	17.62	168.57	33.55	34.75
Spain Government Bonds	28840.03	6645.72	10.48	-10.33	2.16	3.51
Sweden Equity	70770.19	10252.86	11.23	24.96	2.85	3.38
Sweden Government Bonds	12122.65	2571.31	23.7	12.72	3.03	4.83
UK Equity	567055.35	27021.72	4.27	40.7	1.58	1.8
UK Government Bonds	260117.1	121563.3	40.93	12.61	5.07	8.21
Total	2,071,699	515,592	24.89			

Source: Data Explorer 2011Q4 Review

**Figure 27: Ratio of utilisation of government debt securities to utilisation of equity securities 2011 Q4**



Source: Data Explorer 2011Q4 Review

In many cases, the utilisation rate has dropped from pre-crisis levels, but there is considerable heterogeneity among EU Member States in terms of the magnitude of the decline in utilisation rate (Table 13).

Table 13: Utilisation rates 2007 to 2011Q4					
	2007	2008	2009	2010 Q4	2011 Q4
Denmark Equity	17.89	na	na	8.47	9.19
Denmark Government Bonds	27.57	na	na	30.79	26.7
Finland Equity	16.59	na	na	10.51	13.69
Finland Government Bonds	46.15	na	na	25.34	29.18
France Equity	25.18	24.1	24.16	29.03	11.54
France Government Bonds	53.05	44.86	31.77	29.88	30.76
Germany Equity	18.94	20.7	18.39	9.96	10.05
Germany Government Bonds	57.73	46.11	33.41	39.98	42.64
Italy Equity	22.33	16.39	13.47	8.37	13.36
Italy Government Bonds	41.44	34.16	20.23	12.83	6.39
Netherlands Equity	13.31	14.68	14.41	7.53	8.57
Netherlands Government Bonds	62.81	53.08	7.27	29.57	32.32
Spain Equity	30.04	23.22	21.02	18.7	17.62
Spain Government Bonds	55.56	41.57	31.42	15.07	10.48
Sweden Equity	12.38	na	na	8.71	11.23
Sweden Government Bonds	28.94	na	na	27.3	23.7
UK Equity	7.19	8.66	7.91	4.86	4.27
UK Government Bonds	62.78	63.94	55.4	40.66	40.93

Source: Data Explorer various Quarterly and Annual Reviews

Proprietary data provided by Data Explorer to London Economics shows that, overall, the weighted average securities lending fee of the total value of assets on loan expressed in basis points for European equities stood at slightly less than 100 basis points at the end of 2011 and shows no clear trend over the period 2007 – 2011. In contrast, the weighted average securities lending fee of the total value of assets on loan expressed in basis points for European government bonds is much lower, slightly more than 10 basis points at the end of 2011. Moreover, the data shows a small upward trend from about 5 basis points in 2007.

## 5.4 Fire sales

In the context of the present study, fire sales are defined as the forced sale of financial securities at a dislocated price.

Fire sales are forced in the sense that sellers, namely banks and NBFIs, are liquidity constrained and cannot pay creditors without selling securities. During the financial crisis, banks and NBFIs were liquidity constrained for a variety of reasons. The commercial paper and repo markets collapsed. These markets were therefore no longer available to fund the likes of dealer banks (Adrian and Shin, 2010; Gorton and Metrick, 2010). Hedge funds were subject to investor redemptions and withdrawal of prime broker funding and were thus also liquidating their holdings. Banks, insurance undertakings and pension funds also had to improve the quality of their assets for regulatory purposes, forcing them out of previously safe but now risky securities.

Prices are dislocated because many banks and NBFIs are liquidity constrained at the same time. During the financial crisis, this occurred due to the common shocks to these institutions outlined above. Therefore, many similar institutions are engaged in fire sales. Non-specialist institutions, who have less expertise with the financial securities in question, are left to buy at valuations much lower than banks and NBFIs, implying that prices are dislocated - market prices diverge from their fundamental values (Shleifer and Vishny, 1992).

The link between fire sales and financial instability is that a depletion in security values resulting from the fire sale of one institution has a knock-on effect on other institutions holding similar securities. That is, these securities lose value, leading other institutions into fire sales that brings about a downward spiral of security values and the net worth of institutions.

Several mechanisms have been identified for fire sales that materialised over the course of the financial crisis. Firstly, hedge fund arbitrage strategies, by exploiting mispricing, tend to have a stabilising effect on prices. However, hedge funds pursuing profitable arbitrage strategies may temporarily suffer losses that lead investors to withdraw these funds (as investors cannot verify the strategies as profitable). If this effect occurs on a large enough scale, then further mispricing will be realised, and hedge funds may be subject to losses that generate financial stability (Shleifer and Vishny, 1997).

Secondly, first-round price declines resulting from fire sales of financial securities to non-specialists may lead to second-round price declines, as prices of securities deviate from fundamental values when in the hand of non-specialists (Kiyotaki and Moore, 1997).

Thirdly, price falls resulting from fire sales may be associated to declining collateral values. This brings about forced deleveraging of banks and NBFIs that causes further deviations of prices from fundamental values (Gromb and Vayanos, 2002).

And fourthly, price falls resulting from fire sales may come about through two aspects of time-varying margins. One aspect involves declining collateral values, as a result of fire sales, precipitating de-leveraging and further fire sales, as described in Gromb and Vayanos (2002). Another aspect involves shocks to collateral resulting from fire sales creating uncertainty among borrowers and creditors as to the value of collateral, which tends to result in creditors requesting larger haircuts that brings about further fire sales.

The fire sale mechanism unifies several aspects of the propagation of the crisis. It describes the way in which hedge funds, dealer banks and other NBFIs such as pension funds suffered huge financial losses, largely from reductions in the value of their security holdings. And it explains why institutions most reliant on short-term financing were particularly exposed. The common theme in all these phenomena is the sidelining of natural buyers of distressed securities, generating financial instability through lack of activity in key parts of the financial system.

## 5.5 Redemption risk

Redemption risk, in the context of this study, is the risk to financial stability resulting from the correlated withdrawal of capital by investors from a non-bank financial institution/non-bank financial sector.

Among the NBFIs considered in this study, investment funds are affected by redemption risk. In itself, the materialisation of redemption risk can be deleterious to financial stability if large or large numbers of NBFIs are directly impacted. In addition, these impacts may have knock on effects on banks/other NBFIs.

In general, hedge funds and money market funds are particularly subject to redemption risk while private equity funds are affected to a lesser degree. The reason for this difference is that hedge funds and money market funds allow investors to withdraw their capital at short notice (in the case of money market funds, this is part of their *raison d'être*), whereas private equity funds require commitments for longer periods of time. In other words, a necessary condition for redemption risk to exist is that investors have the option to redeem funds at low cost.

Redemption risk can arise, for instance, due to a non-bank financial institution being highly leveraged. The non-bank financial institution may face liquidity risk if sufficient investor funds are withdrawn simultaneously. It may realise losses that also affect financial stability. In this instance, leverage is the underlying cause for the build up of redemption risk.

More interestingly, redemption risk can materialise in a non-bank financial sector in the absence of underlying causes relevant to that particular sector (and due to underlying causes elsewhere/proximate causes in the language of the framework for this study). As a result of some impetus, it may be individually rational for investors to redeem funds due to the belief that other investors are behaving in the same way. Collectively, this can lead to financial instability through a given non-bank financial sector without risks ever having built up there. During the financial crisis, for instance, problems arising within the banking sector fed through to prime MMFs due to the perceptions and actions of investors in response to falling net asset values (NAVs) (see Chapter 7 for details).

Redemption risk could further lead to substantial financial instability as a result of feedback loops. Among other things, counterparty risk may increase (or, may be perceived to increase) for banks/other NBFIs if an important non-bank financial institution fails as a result of redemption risk and is (or, is thought to be) connected to these banks/other NBFIs. Asset devaluations may come about as large, leveraged institutions dump assets to meet collateral calls in the face of redemptions, which goes on to affect the balance sheets of financial institutions holding the same assets (so-called, fire-sale externalities), etc.

## 5.6 Counterparty risk

Counterparty risk is the risk to each party of a contract that the counterparty will not live up to its contractual obligations.

The effect of counterparty risk materialising is for parties to securities contracts to suffer losses. During the financial crisis, the materialisation of counterparty risk through the failure of Lehman Brothers created financial instability as a number of important banks and non-bank financial intermediaries suffered losses, significantly affecting the overall level of financial intermediation taking place.

The effect of counterparty risk materialising, may be further counterparty risk as it creates uncertainty regarding the exposures of banks/NBFIs to a failed institution. This could have crippling effects on financial intermediation, as the institutions concerned may not be able to raise funding and thereby extend credit.

## 5.7 Liquidity risk

Liquidity is a major theme in the debate on risks to financial stability. There are two forms of liquidity that are important to analysing risks to financial stability posed by NBFIs – market liquidity and funding liquidity.

Market liquidity refers to the ability to sell or unwind positions quickly without affecting price. A lack of market liquidity is likely to have an impact on a large number of institutions, so is thought of as being an important source of risk to financial stability. An asset sale in an illiquid market may depress the price of that asset, affecting the balance sheets of all holders of that asset. This effect may be exacerbated if holders of that asset then seek to sell as well.

Moreover, in a leveraged setting and as a result of shrinking asset bases, funding conditions deteriorate insofar as lenders require higher margins to insure against borrower default, which, through limiting institutions ability to transact, further compounds the problem of market illiquidity. This effect is known as a margin spiral (King and Maier, 2009).

The other form of liquidity that is relevant in this discussion is known as funding liquidity. This refers to the ability of an investor to raise cash to meet its financial obligations and it is specific to individuals or institutions. A lack of this kind of liquidity is not in itself a risk to financial stability, however if the institution which is suffering from funding illiquidity is very interconnected, then the knock-on consequences that result could potentially be a threat to wider financial stability.

Funding illiquidity is a real risk to the continued existence of NBFIs, particularly hedge funds as if they fail to meet margin calls, they can be declared bankrupt. This can occur even if the fund has positive equity. Indeed it is usual for financial institutions that go bankrupt to do so as a result of funding illiquidity rather than insolvency (King and Maier, 2009).



## 6 Assessment of risks to financial stability of sub-sectors of the non-bank financial system

The previous chapters form the building blocks for assessing risks to financial stability of sub-sectors of the non-bank financial system.

Chapter 3 covered the nature of the roles of different sub-sectors of the non-bank financial system in financial intermediation. Therefore, Chapter 3 provides a sense for the impact on financial stability if any one of these sub-sectors ceased to function effectively.

Chapter 4 provided a regulatory overview, which conditions risks to financial stability relevant to different sub-sectors, and are therefore important to understand in any assessment of risks to financial stability.

And, chapter 5 covered cross-cutting issues. These may be common risks to financial stability stemming from different sub-sectors of the non-bank financial system: redemption risk (section 5.5), counterparty risk (section 5.6) and liquidity risk (section 5.7). Or, potentially significant underlying causes of these risks such as securitisation (section 5.1), repos (section 5.2) and securities lending (section 5.3).

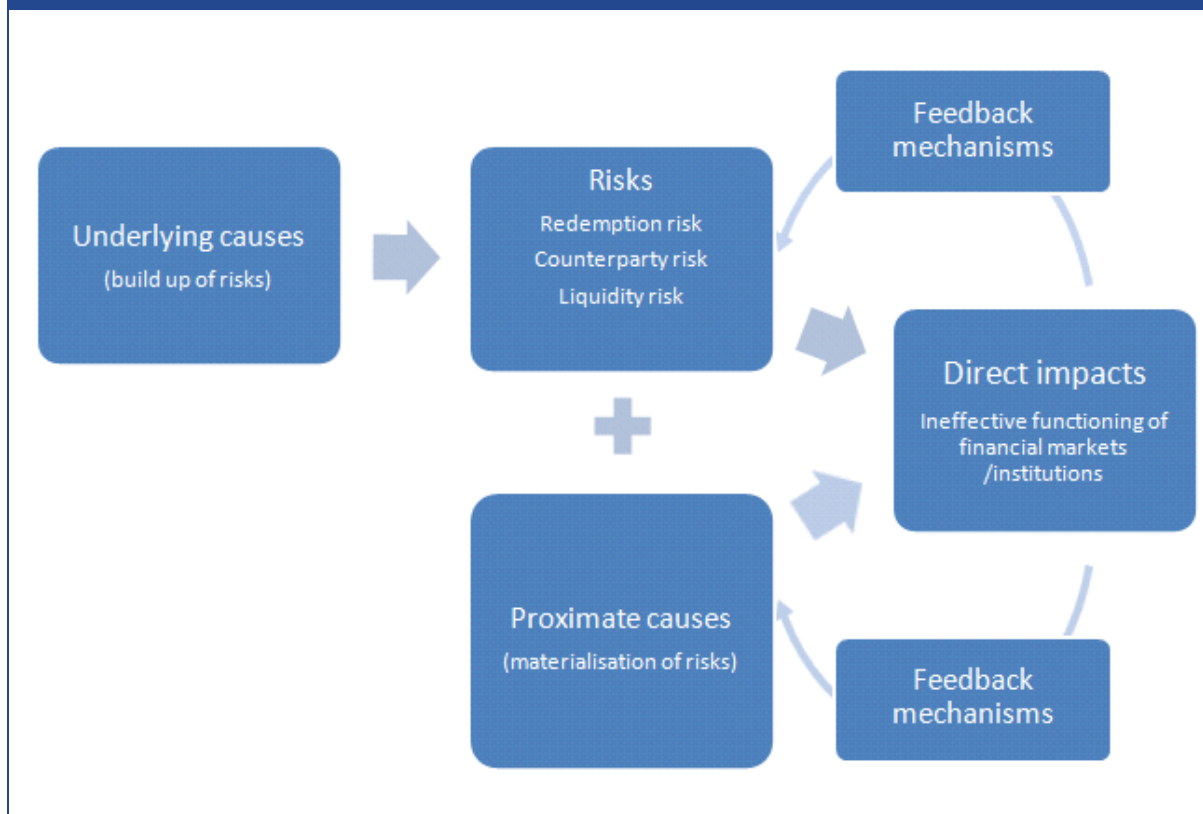
The aim of the current chapter is provide an analytical framework within which to capture each of the abovementioned elements. And, to group further aspects of risks to financial stability relevant to individual sub-sectors of the non-bank financial system, covered below.

### 6.1 Analytical framework

The framework for analysing risks to financial stability of NBFIs is intended to categorise a wide range of underlying and proximate causes and set out how these relate to a common set of risks to financial stability and impacts on the financial system. The framework may also be useful for policy development, analysis and tracking. For instance, in focusing in on underlying causes as opposed to proximate causes of financial instability.

The two main elements of the framework are: underlying causes and proximate causes. Underlying causes relate to the characteristics of individual non-bank financial sectors or connections between a non-bank financial sector and banks/other non-bank financial sectors that bring about the build up of risks to financial instability. Meanwhile, proximate causes relate to factors that trigger the materialisation of these risks.

Figure 28 below summarises the elements of the framework and their links.

**Figure 28: Analytical framework**

Risks to financial stability are broadly considered as risks to financial intermediation, or risks that threaten the flow of capital from investors to users of funds. There is some emphasis placed on the banking sector, as it represents a key credit channel. However, other non-bank financial sector channels can be equally important to financial intermediation (for example, the role of money markets in channelling investor funds into commercial paper that provides short-term funding to corporate and others borrowers).

The impacts of risks are magnified as a result of multipliers. These include size and inter-connectedness particularly. That is, the larger the institutions involved, the bigger the effect of any risk to financial stability materialising. Similarly, the more inter-connected the institutions involved the bigger the effect insofar as there are likely to be a greater number of institutions involved. Regulatory features can also act as a multiplier.

For information, the Basel Committee on Banking Supervision (BCBS) methodology for identifying systemically important institutions also includes the criteria of 'substitutability' and 'complexity' in their list of multipliers. Substitutability is the ability to replace the services a given bank/non-bank financial institution in the event of failure. And, the greater the complexity of an institution the more systemically important it is due to the uncertainty resulting from the cost and time needed to uncover its impact on the financial system. These are certainly important in the context of assessing risks to financial stability.

However, there is less emphasis placed on these two elements in the present study due inter alia to measurement issues. While substitutability is an important yardstick for how material risks to financial stability are, it is difficult measure as it is unclear how other institutions would substitute

its services if a failure did occur. The evidence base considered in this study is therefore not very informative with regard to substitutability. Similar challenges are associated with measuring complexity.

Finally, each of the mechanisms identified in this study, tracing through the build up of risks (conditioned by multipliers) and the materialisation of risks, and consequently their impacts on financial stability, involve significant feedback loops. In broad terms, whatever negative impacts of these first-round mechanisms are, they are exacerbated as a result of second-round effects.

#### **6.1.1 Summary statement for analytical framework**

The aim of the analytical framework presented above is to apply it to understand the risks of different sub-sectors of the non-bank financial system.

Despite a wide range of underlying and proximate causes relevant to the build up and materialisation of risks per institution, the analytical framework will help to clarify and summarise the common risks these related to and impact they had.

The framework will be applied to the money markets sector, private equity sector, hedge fund sector and insurance and pension funds sector below.

The risks of central counterparties will also be discussed but outside of the present framework.

## 7 Money market sector risks

### 7.1 Overview

The main finding of this chapter is that the activities of money market funds were not the underlying causes of financial instability during the financial crisis *per se*.

Money market funds were, however, subject to the proximate causes of the crisis. For instance, the collapse of the market for asset-backed commercial paper, led investors to withdraw from money markets due to perceptions over MMFs' exposures to asset backed commercial paper (ABCP).

The resultant contraction of assets held within MMFs, however, lead to important second-round effects (or, feedback loops) that exacerbated the impacts of the financial crisis. Specifically, non-government (or, corporate) issuers' exposure to funding liquidity risk increased substantially as MMFs were not intermediating in longer-dated money market instruments/prime money market instruments.

Table 18 presents an overview of the abovementioned factors.

**Table 14: Overview of risks to financial stability related to money market funds**

Underlying causes	Shocks/financial crisis events, e.g., declining securitised loan asset values
Multipliers	None relating to MMFs, per se.
Proximate causes	<b>Uncertainty or perceptions of uncertainty over MMF exposures</b> to securitised loan assets
Direct impacts	<b>Redemptions</b> leading to some losses and contractions of MMFs and attendant consequences: <b>poorer risk management of cash assets for investors</b> and <b>lack of short-term funding for users of funds</b>
Feedback loops	<p><b>Lack of intermediation in longer-dated money markets</b> in order to manage redemption risk, given lack of liquidity in longer-dated money market instruments</p> <p><b>Lack of intermediation in prime money markets, in part due to government guarantees of treasury money market instruments</b></p> <p><b>Funding risk</b> for all non-government institutions using short-term funding markets for capital</p>

## 7.2 Risk analytics

The share value of an MMF, as any other investment fund, is calculated by dividing its net asset value by the number of shares in issue. If initially the share value of an MMF is €1 (net asset value/shares in issue = 1) but subsequently falls to less than €1 (net asset value/shares in issue < 1), the MMF is said to have 'broken the buck'.

A large number of factors can lead to well-managed MMF share values to rise or fall below €1 (Macey 2011). A sharp rise in interest rates can reduce the NAV of portfolio securities. A class of assets could experience a decline in value due to exogenous reasons. Additionally, as the duration of portfolio securities increases, there is a greater likelihood of fluctuations in the NAV of portfolio securities. Each of these factors could contribute to MMF share values diverging from the €1 mark.

Nonetheless, a number of measures are in place for MMFs to maintain a share value of €1. MMFs value portfolio securities on an "amortised cost" basis. This involves valuing securities at acquisition cost rather than market value with accruals (interest earned and premiums paid/discounts received) apportioned uniformly over the remaining maturity of the purchase. By declaring accruals such as interest earned as daily dividends to shareholders, a €1 share value is maintained. "Penny rounding" is another procedure employed to maintain a €1 share value by so-called 'constant NAV' MMFs. Given that share values are rounded to the nearest penny, they can

vary up to 50bps and still, nominally be maintained at €1. Additionally, fund sponsors have purchased securities from MMFs in the past in order to maintain a €1 share value (Macey, 2011).

During the financial crisis the underlying cause for redemptions was *inter alia* declining securitised asset values, particularly where underlying loan assets were US subprime mortgages. What is interesting is that due to a lack of transparency of MMF assets, investors redeemed not only from funds known to hold these particular assets but also funds operating in the sector in case they held these assets (Bengtsson, 2011).

The reason that MMFs seek to maintain a share value of €1 is in order to manage redemptions, specifically under stressed market conditions. A given investor may believe that other investors respond to a share value of less than €1 by withdrawing capital, which may lead the first investor to withdraw also, and overall, a flood of redemption requests are observed (see, among others, McCabe, 2009).

Under normal market conditions, assets can be liquidated in order to honour these redemption requests and a share value of less than €1 persists only to the extent that it arose initially, e.g., due to a sharp rise in interest rates. Under stressed market conditions, however, it may not be possible to liquidate assets due to a lack of liquidity or to liquidate assets only at stressed market prices. Honouring redemption requests therefore precipitates further declines in share values through the fire sale mechanism (see section 5.4).

The best individual responses for MMFs under stressed market conditions is to hold money market instruments with short durations/cash or near-cash assets that can be easily liquidated. However, this action deteriorates liquidity and pricing of longer-dated money market instruments. This is a source of financial instability insofar as whatever pre-existing stress there was in longer-dated money markets is exacerbated. Moreover, insofar as banks relying on funding through longer-dated money market instruments or repos can no longer access them, is the extent to which they face increased funding risk. And finally, bank bail outs of money market funds may lead to a realisation of losses that affect bank balance sheets.

More generally, redemptions under stressed market conditions pose risk to financial stability insofar as money market funds are unable to carry out their economic functions at optimal levels. Investors are not able to manage credit risk as effectively in times of market stress. Issuers of commercial paper are under-funded, especially issuers of longer-dated commercial paper. And particularly, due to the thinner market for repos, traditional banking activities are hamstrung because of a lack of availability of credit in one of its key short-term funding markets (Macey, 2011).

However, in the context of the financial crisis, it must be noted that the underlying cause of risks to financial stability operating through money market funds did not originate in money markets. In particular, risks arose within the banking sector (due to securitised loan assets) that fed through to prime MMFs and due to the behaviour of investors in response to falling NAVs. Moreover, the impact on MMF investors in terms of realised losses were either zero or very small (Macey, 2011).

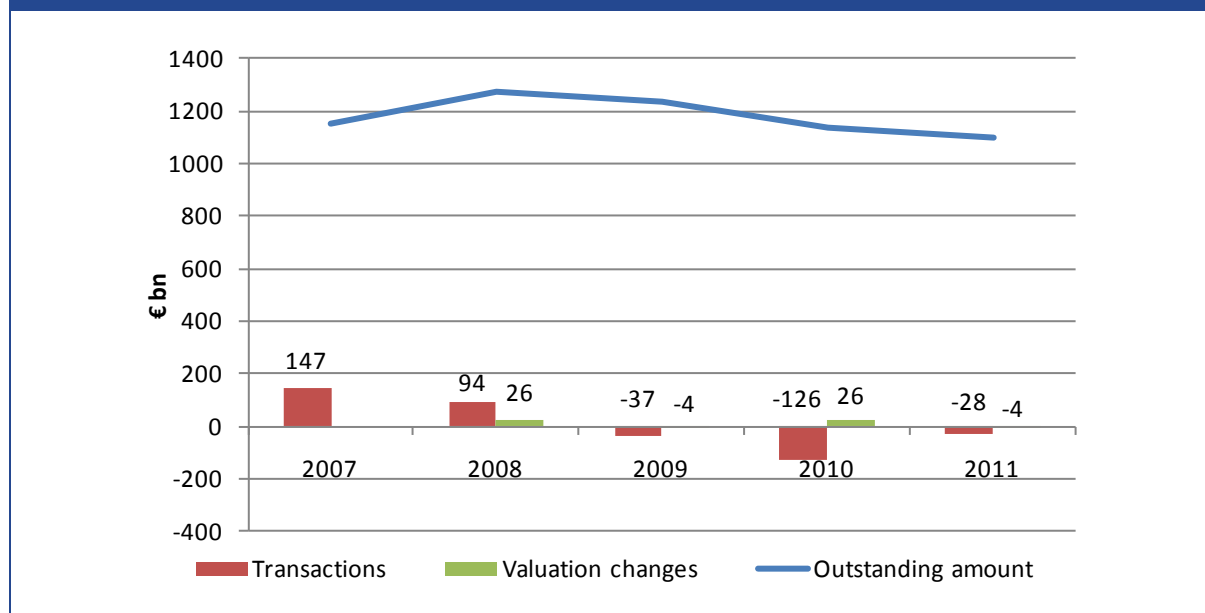
## 7.3 European money market developments around the financial crisis

### 7.3.1 Money market fund assets

The ECB provides data on the evolution of euro area money market fund assets over 2007-2011. This provides an insight into sector level changes experienced over the crisis period. The first observation to make is that prior to the crisis, MMF assets rose substantially, by 9.3%. However, after the crisis, assets fell by 5.9% p.a.

These changes reflect a mix of transactions and valuation changes and developments in each of these elements is interesting. Firstly, outflows resulting from transactions took place over 2009-2011, whereas inflows took place over 2007-2008. This may reflect MMFs having to liquidate assets in order to meet redemption requests. Secondly, the 2009-2011 outflows were taking place at a time when asset valuations were falling.

**Figure 29: Euro area money market fund assets, 2007-2011, €bn**



Note: Valuation changes not available for 2007; 2011 data reflects the first three quarters of the year; 2010 and Q1-Q3 2011 assets reflect an average over quarterly data

Source: ECB

### 7.3.2 Money market spreads

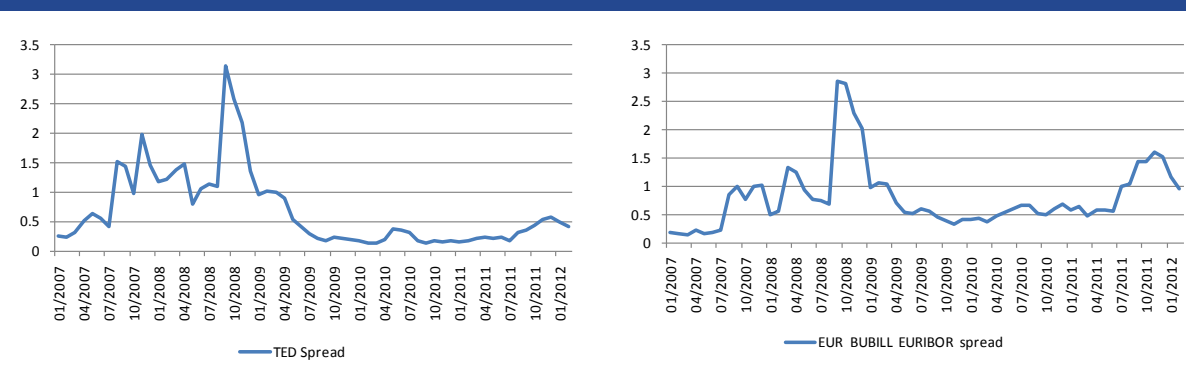
Stress within money markets materialised in the third quarter of 2007 due to investor uncertainty regarding exposures to asset-backed commercial paper (Bengtsson, 2011).

At this time, the market for senior tranches of asset-backed securities fell sharply. For instance, ABX AAA- and BBB-rated Home Equity Index for the first vintage of 2007 fell by 10% and 26% respectively in July 2007. These declines were accentuated due to major rating agencies downgrading or initiating reviews on a range of subprime transactions.

The combined effect was to increase money market spreads because it was unclear to investors whether any particular MMF had exposures within these markets, as shown in Figure 30. Figure 30

shows the TED spread and EUR-BUBILL EURIBOR spread over 2007-2012, which are major indicators used by market participants to monitor the health of money markets. They show that starting in July 2007, spreads rose steeply in relation to trends of the previous two quarters.

**Figure 30: TED spread and EUR-BUBILL EURIBOR spread, 2007-2012**



Source: Bloomberg

European money market funds experienced significant redemptions as a result. In particular, enhanced MMFs lost €29 billion (or 20.8% of AuM) due to their relatively higher yield and higher risk holdings. Other MMFs met redemptions in an orderly manner and a third group took actions to avoid outflows along the lines of fund sponsors purchasing assets, temporary redemption freezes and so on.

Following the collapse of Lehman Brothers in September 2008, short-term lending markets dried up, as reflected in the widening of spreads in Figure 30. This led to a reallocation of assets to short-dated instruments and government interventions.

### 7.3.3 Significant events

These significant events for European money market funds from summer 2007 till early-2009 are described in the timeline below (Table 15).



**Table 15: Significant events – European MMFs**

Date	Event
June – July 2007	Subprime MBS problems start to become evident. Some hedge funds report huge losses. Bear Sterns closes down two funds.
09/07/2007	In one week, S&P, Moody's, Fitch and Dominion initiate reviews and/or downgrades distressed subprime transactions amounting to a total value of more than \$138 billion.
23/07/2007	AXA Investment Management reports that two of its money market funds – World U.S. Libor Plus Fund and Investment Managers Fixed Income Investment Strategies U.S. Libor Plus Fund fell by around 13 percent between July 18 and July 19. Following the continued drop in value amounting to 21 %, AXA bails out clients in its AXA US Libor Plus Strategy and Investment Managers Fixed Income Strategies U.S. Libor Plus Fund by guaranteeing NAV by purchasing underlying assets.
27/07/2007	French asset manager ODDO dissolves its Cash Titrisation, Cash Arbitrages and Court Terme Dynamique funds.
03/08/2007	Germany's Union Investment closes its ABS-funds following a 10% run-off during the past month. HSBC Investments Germany suspends redemption in its Trinkaus ABS-fund.
06/08/2007	Trading activity in certain US securitized instruments evaporates completely. Frankfurt Trust closes Frankfurt fond ABS Plus. Sal Oppenheim freezes redemptions in its two ABS funds. WestLB Mellon Asset Management suspends redemptions in its Compass Fund: ABS Fund.
09/08/2007	To avoid a sharp increase in short-term lending rates and maintain liquidity, the European Central Bank injects EUR 94.8bn into European money markets followed by an additional EUR 61bn the next day. On Monday 13 August, a further EUR 47.7bn is provided.
13/08/2007	NAV and redemptions are suspended for three funds managed by BNP Paribas: Parvest Dynamic ABS, BNP Paribas ABS EURIBOR and BNP Paribas ABS EONIA.
13/08/2007	DWS restricts redemptions to below par value for investors in its ABS fund.
23/08/2007	ECB announces a supplementary liquidity-providing longer-term refinancing operation to support the functioning of the euro money market. BNP Paribas announces plans to re-establish NAV for its BNP Paribas ABS EURIBOR and BNP Paribas EONIA funds using a combination of mark-to-model techniques.
29/08/2007	BNP Paribas reopens its BNP Paribas ABS EURIBOR and BNP Paribas ABS EONIA funds for redemptions. Two days later, the NAV calculations are resumed for Parvest Dynamic ABS, which also is opened for redemptions.
01/11/2007	Credit Suisse transfers US\$6 billion of remaining money market fund assets onto its balance sheet to meet redemption claims.
09/09/2008	Lehman Brothers loses half its market capitalization. Six days later the bank is declared bankrupt. The Euribor-Eonia spread rises by 39 basis points.
September 2008	ECB announces several facilities to support European money markets.
19/09/2008	Lehman Brothers Liquidity Funds PLC suspends all dealings the three sub-funds the Euro Liquidity Fund, the Sterling Liquidity Fund and the US Dollar Liquidity Fund. US Treasury launches Temporary Guarantee Program for Money Market Funds.
13/10/2008	German Bundesbank announces special liquidity assistance to MMFs and near MMFs against collateral.
14/10/2008	The Luxembourg government and central bank grants liquidity assistance to MMFs against collateral.

**Table 15: Significant events – European MMFs**

15/10/2008	ECB expands its collateral framework to secure longer-term financing for Euro-zone financial markets. The expanded list of eligible assets includes all CDs and certain subordinated debt instruments (with hair-cuts). The threshold for marketable and non-marketable assets is lowered from A- to BBB-.
16/10/2008	The Irish central bank relaxes the requirement for CNAV MMFs to conduct weekly reviews of discrepancies between market value and the amortised cost value for their AuM.
19/10/2008	US Federal Reserve Board announces the Asset Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), providing loans to banks to purchase ABCPs from US MMFs.
21/10/2008	US Federal Reserve Board launches Money Market Investor Funding Facility (MMIFF) purchasing CDs and CPs with minimum requirements for ratings and remaining maturities of 90 days or less from US MMFs.
November 2008	Several Luxembourg domiciled MMFs receive support from parent banks to meet redemptions.
12/11/2008	AVIVA alters its Sterling and Euro liquidity funds from constant (CNAV) to variable net asset value (VNAV) policy.
18/02/2009	SGAM reports losses resulting from the liquidity support measures to dynamic money market funds in Q1 08 and valuation adjustments on some assets in Q4.

Source: Bengtsson (2011)

### 7.3.4 Suspended redemptions

MMFs that operated in asset-backed securities markets and especially funds involved in US subprime mortgage securities markets faced substantial redemption risk, whether as a result of specific holdings or merely as a result of presence in the sector. In the context of stressed market conditions, redemptions are potentially associated with losses as MMFs seek to liquidate assets in illiquid markets. To stem declining share values, therefore, many MMFs suspended fund redemptions or permitted them given a haircut on NAVs.

AXA Investment Management was the first to report losses on two of its MMFs by approximately 13% in July 2009, thereafter increasing to 21%. These funds were 'enhanced MMFs' that emphasised the objective of maximising yield (relative to security of assets and liquidity), relative to other MMFs. Reflecting this, they were not subject to the conservative credit risk limits of IMMFA funds and so invested in relatively risky assets.

The funds had allocated 40% of assets under management to US subprime mortgages. However, interestingly, these assets experienced losses even though they were not the US subprime mortgage vintages that were downgraded (Johnson 2007; Tett 2007; and Burgess, 2007).

In any case, investors' response was to redeem capital. So in order to protect its reputation and stem losses, AXA purchased fund shares at the prevailing NAV, thereby saddling itself with outstanding market risk associated with the funds' holdings. Subscriptions to the funds were simultaneously suspended.

Another example in which suspension of redemptions (and subscriptions) was employed was by French asset manager ODDO in connection with its enhanced MMFs. The motivation for these actions were quoted as difficulties in valuing differences between securities' fundamental values

and values at which they were currently trading, due, it was claimed, largely to problems of liquidity. ODDO followed suspensions with the selling off of assets and guarantees of initial investments of non-professional clients.

German enhanced MMFs experienced similar outflows, for instance, Union Investment shrank by approximately €100 million; and also responded by suspending redemptions. Despite only having a relatively small proportion of its assets in securities related to subprime mortgage loans (Clarke 2007), it presumably was still facing redemption risk due to its presence in the asset-backed securities (ABS) market.

As mentioned earlier, in times of market stress redemptions can precipitate declines in fund share values and this can be irrespective of any particular fund's holding of risk assets. German WestLB Mellon's "Compass Fund ABS Fund" actually suspended redemptions despite not holding any US sub-prime RMBS or US ABS CDOs due to this problem (WestLB Mellon, 2007a; 2007b).

Other innovative responses to these issues was for funds to allow redemptions but for haircuts on the NAV. BNP Paribas, for instance, used an internally developed pricing mechanism for this purposes to substitute for the lack of suitable market prices (given illiquidity).

At this time, the ECB also undertook capital injections to avoid peaks in short-term lending rates.

### 7.3.5 Sponsor support of MMFs

Two strategies were employed along the lines of sponsor support of MMFs. The first was for fund sponsors to purchase assets to fund redemptions at prevailing NAVs. The second was for fund sponsors to guarantee the difference between mark-to-market and par share values. These strategies often result in losses to fund sponsors. However, credit rating agencies awarded premia to MMFs with a sponsor willing to preserve investor capital through these means, which may have helped to avert further losses to funds. Société Générale is an example of a fund that suffered writedowns as a result of purchasing assets to fund redemptions. These amounted to €552 million (S&P 2008; and Cobley, 2008). Barclays is an example of a fund sponsor that provided a guarantee, which cost £276 million (Standard & Poor's 2008).

### 7.3.6 Reallocation to short-dated assets

After the collapse of Lehman Brothers, twin effects were in operation that exacerbated difficulties to MMFs and within money markets. Firstly, due to a lack of liquidity in commercial paper markets MMF asset managers reallocated funds to short-term instruments for which reliable market prices were available. This effect was exacerbated by a second reallocation of funds to short-dated instruments due to investor redemptions. Money market fund managers were concerned that a run on their funds would outpace their ability to raise liquidity and for this reason they reallocated an even greater amount of capital to short-term instruments. These dynamics reinforced a lack of activity in commercial paper markets, i.e., through a dearth of liquidity and investor fears of redemptions (EFAMA, 2009).

### 7.3.7 Policy interventions

Finally, this period saw a range of policy interventions including a lowering of ECB interest rates and broadening of the range of eligible collateral for banks. It is interesting to note that

commentators, in contrasting the effects of EU versus US money market interventions, identified unintended consequences associated with the more far-reaching US interventions. Particularly, the guarantee of certain government money market instruments exacerbated problems in other, prime money markets.

## **7.4 Conclusion**

Euro money market funds are only about 5% of the total size of MFIs – though more concentrated in the larger banks. Moreover, any withdrawal of deposits from banks perceived as weak only mirrors what their underlying shareholders would do anyway at times of stress. So they should be seen more as a messenger of stress in the system rather than the underlying cause.

## 8 Private equity risks

### 8.1 Overview

The main risks to financial stability identified in connection with private equity funds relates to their role in facilitating the growth of the leverage loans market. Particularly large LBO transactions that banks held on their balance sheets at the height of the boom led to significant losses in value with the onset of the crisis. However, large buyout deals do not appear to have been as prevalent since the crisis as they were in the lead up to it. Additionally, given that banks were responsible for granting these loans to private equity funds, it is unclear where the burden for the excessive rate of growth of the leveraged loans market should lie.

Other than this, features of private equity (PE) are benign in regards to risks to financial stability. Funds do not face redemption risk as investor funds are committed contractually. While private equity investments may be leveraged and returns may be affected as a result of difficult refinancing conditions, these impacts, relating to the portfolio companies of individual funds, do not necessarily feed through to generate financial instability.

**Table 16: Overview of risks to financial stability related to private equity funds**

<b>Underlying causes</b>	Facilitating the <b>growth of the leveraged loans</b> market
<b>Multipliers</b>	<b>Size</b> , particularly large LBO transactions  <b>Inter-connectedness</b> with banks
<b>Proximate causes</b>	Events around the financial crisis bringing about the collapse of the leveraged loans market
<b>Direct Impacts</b>	Materialisation of <b>warehousing risk</b> for banks holding leveraged loans resulting in capital constraint of banks, impacting ability to lend
<b>Feedback loops</b>	Stress in leveraged loan market bringing about <b>liquidity risk</b> , thereby preventing banks from liquidating leveraged loan positions

### 8.2 Risk analytics

There are generally three types of PE investments: venture capital, growth capital and buyouts. Each of these brings with it different risks. However, it is leveraged buyouts that have received the

greatest attention in the context of risks to financial stability because of private equity firms' role in fundraising through leveraged loan markets (EVCA, 2009).

Prior to the financial crisis, banks participated in leveraged loan markets by holding loans originated by private equity firms through their portfolio firms (and that banks helped to arrange). Participation in leveraged loan markets grew due to the yield and high risk tolerance supported by favourable macroeconomic conditions (EVCA, 2009). Furthermore, derivatives markets that offered the possibility to hedge some of the risks of holding leveraged loans (i.e., to manage warehouse risk) also grew over this period.

### **8.2.1 Private equity in general**

It is argued that risks to financial stability are less likely to develop as a result of the private equity sector than through other sub-sectors of the non-bank financial system. This view is reflected in much of the secondary literature, as well as in stakeholder consultations with private equity.

#### ***Redemption risk***

Redemption risk (described in section 5.5) is not a material issue for private equity funds generally, insofar as funds operate for a fixed period without the opportunity to withdraw capital before the fund matures. This means that they are not exposed to a “bank run” scenario.

Although it is possible that, since the returns from private equity are no longer quite as much higher than the returns of other investments, some large investors may try to remove the fixed period rules in future contracts with private equity funds. This, in turn, would leave the private equity fund facing redemption risk (Payne, 2011).

#### ***Fire sales***

It is also argued that private equity funds are not particularly likely to be adversely affected by a fire-sale (described in section 5.4), unlike some other funds, due to the large variation in the assets that they tend to hold. This means that they would not necessarily be flooding the market with one type of asset, which could possibly lead to a large fall in the price of that asset, hence leading the fund to incur losses. On top of this, as PE funds tend to diversify across multiple industries, they lack the concentrated exposure to any one sector. This should further diminish the chance of creating financial instability (Payne, 2011).

#### ***Liquidity risk***

Liquidity risk (described in section 5.7), as a consequence of leverage, is not necessarily a material risk to financial stability through private equity funds, as it is for others, such as hedge funds. This is because debt is held on the balance sheets of private equity portfolio companies. In the event of a portfolio company default, therefore, returns to the private equity fund would be affected but this under-performance does not necessarily transmit into impacts on financial stability (Payne, 2011).

It should be noted that leveraged buyouts (LBOs) do not use as high a level of debt financing as is commonly thought to be the case. The EVCA Enterprise Capital Report 2011 shows that this proportion of leverage has been falling for European LBO deals worth under €100 million since

2005, from 48.3% to 22.0% in the first half of 2011. The percentage of leverage used for deals worth over €100 million tends to be higher, around 38% in the first half of 2011, but deals of this size are less frequent than those worth under €100 million.

### **8.2.2 Private equity and the leveraged loan market**

Since the financial crisis, the leveraged loan market has 'seized up' and this has generated risks to financial stability. To some degree, private equity-bank links are responsible for these risks (BIS, 2008).

#### ***Warehouse risk***

Warehouse risk has arisen because banks had committed to underwrite large leveraged loans immediately prior to the crisis that, subsequent to the unfolding of the crisis, were not taken up in the market place (BIS, 2008).

For banks, this implies that some portion of assets are warehoused on their balance sheets, which is costly in terms of increasing bank funding costs and capital requirements and, potentially, crowding out new lending. It also means that another portion of loans are distributed at a discount to manage warehousing risk, which translates into bank losses. Each of these scenarios represents risks to financial stability.

The impact of realised warehousing risk, particularly through discounted sales, appears at first blush not to have been significant, however. The Committee on the Global Financial System (CGFS) (2008) highlights that a 10% markdown of warehoused loans amounted to \$25 billion loss to the banking sector as a whole but that this is modest in comparison to aggregate losses through other channels.

#### ***Liquidity risk and valuation***

In general, the market for leveraged loans has increased over time since the financial crisis. Therefore, market prices are available for the purposes of loan portfolio valuations and risk management.

However, the fact that market prices reflect liquidity depth (or lack thereof) makes valuations cumbersome. This also affects fair values of leveraged loans. And a widening valuation gap between loans recorded at accrued book value and mark to market value during periods of general market stress may raise questions about the validity of book values. These factors are only exacerbated in times of market stress such as recently (BIS, 2008).

#### ***Refinancing risk***

Risks of leveraged loans relate to high default levels of borrowers in this market (BIS, 2008).

Past favourable market conditions led to greater levels of risk-taking. Firms were being extended loans on favourable terms due to low credit risk premia and lax lending standards. Favourable macroeconomic conditions supported these lending conditions and allowed borrowers to avoid default and carry out highly leveraged activities.

However, since the tightening of credit conditions, borrowers are faced with higher levels of refinancing risk. Factors exacerbating refinancing risk have been a further tightening of credit conditions, poor general market sentiment and specific lack of confidence in structured credit products.

Through refinancing risk, banks and other holders of leveraged loan assets face lower recovery rates.

### 8.3 European private equity developments around the financial crisis

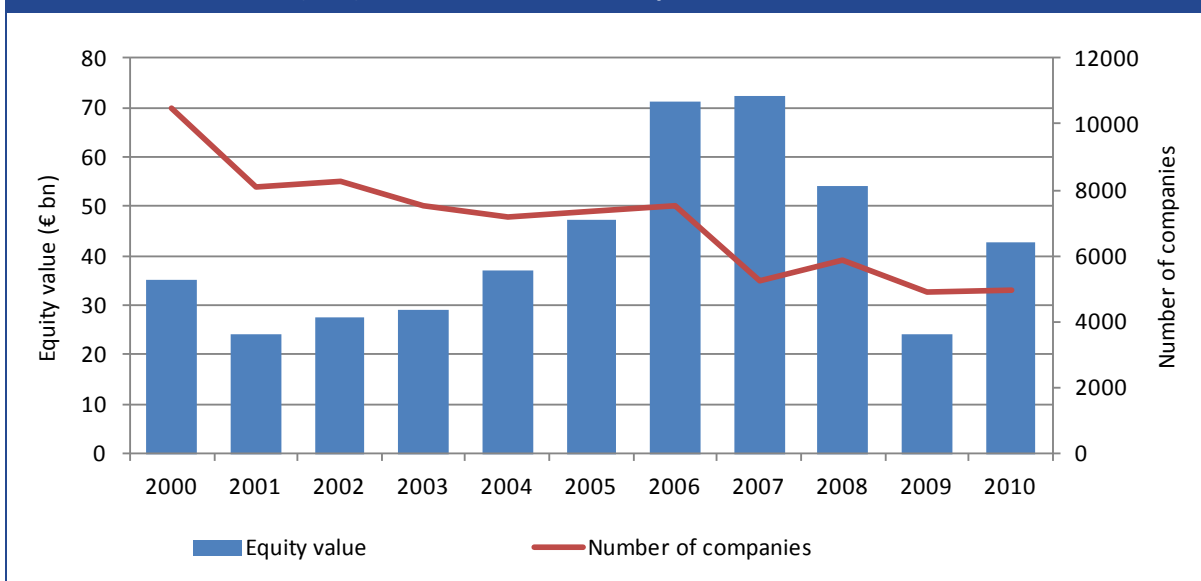
The value of investments made by European private equity funds increased each year between 2001 and 2007, with the overall equity value of investments increasing from €24.3 billion to €72.2 billion. The largest growth occurred in 2006, with an increase in the value of investments of over €24.1 billion, or a growth rate of 51.2%. However, the growth rate slowed to just over 1% in 2007.

One of the main reasons for this growth between 2003 and 2007 was the widespread access to cheap sources of funding. Banks in Europe were prepared to offer debt capital at debt-to-EBITDA ratios of as much as eight during this period, which was a departure from historical levels (Knowledge@Wharton, 2011).

Subsequently, a major slowdown of the growth of investments, in terms of equity value, took place followed by an absolute decrease in the value of investments in 2008. The full effects of the financial crisis do not appear to have hit the private equity industry in Europe until 2009, when the equity value of investments reached a low for the decade of €24 billion.

The value of investments in 2010 suggests that the industry has made a partial revival. However, it is still a long way from the peak levels experienced pre-crisis in 2006 and 2007. These findings are reflected in Figure 31 below.

**Figure 31: Evolution of European private equity investments, in terms of the equity value of investments (€bn) and the number of companies invested in, 2000-2010**



Source: EVCA Yearbook

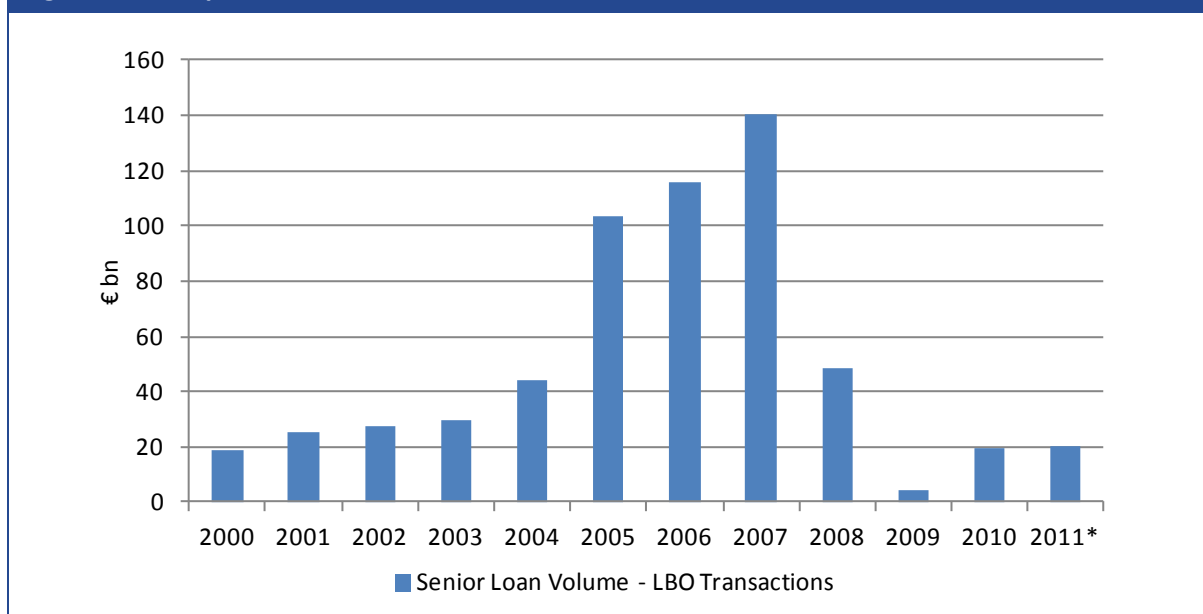


The story is not the same when one considers the number of companies in which private equity funds invested in. In the years 2001 to 2006, European private equity funds invested in around 8000 companies, however this figure fell sharply in 2007, down to around 5000. In 2008, this figure rose closer to 6000. However, in 2009 and 2010, it fell back to around 5000 companies.

Overall this suggests that the average size of investment was reduced in the wake of the recent financial crisis. This can be shown by the fact that, in 2008, there was an increase in the number of companies invested in. However there was also a decrease in the equity value of these investments.

The availability of cheap credit from banks is also apparent when the value of European LBOs is considered, as shown in Figure 32. The total value of LBOs rose from under €30 billion in 2003 up to over €140 billion in 2007. The tightening of the credit market after 2007 is likely to have been one of the underlying causes for the significant decrease in LBOs transactions in 2008. The market sank further in 2009, to a low of under €5 billion, but somewhat recovered in 2010 and the first half of 2011.

**Figure 32: European senior loan volume – LBO transactions, 2000 - 2011**

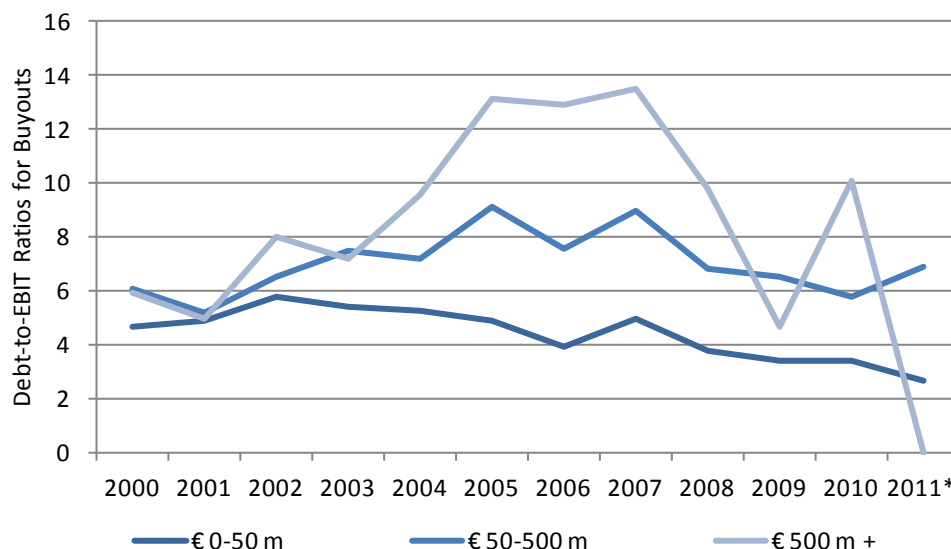


Note: 2011 data reflects the first half of the year

Source: EVCA Enterprise Capital Report 2011

The debt-to-EBIT ratio of buyouts is an indicator of the level of leverage used by private equity funds when purchasing other firms. Figure 33 shows the debt-to-EBIT ratios for European buyouts, broken down by the size of the buyout. It shows that the ratios are relatively consistent and lowest for buyouts that are worth less than €50 million, ranging from a high of just under 6 in 2002 to a low of under 3 in the first half of 2011.

Buyouts of €50-500 million in value had a debt-to-EBIT ratio of 9.1, 7.6 and 9.0 in 2005, 2006 and 2007, respectively. This suggests more easily available credit for deals of bigger value leading up to the recent financial crisis. The debt-to-EBIT ratio fell to under 7 in 2008, where it has remained.

**Figure 33: European debt-to-EBIT ratios for varying sizes of buyouts, 2000-2011**

Note: Includes all buyouts, not only private equity backed buyouts. However, as non-private equity backed buyouts are typically smaller in size (under €10 million deals), the data is still representative for private equity backed buyouts.

2011 data reflects the first half of the year

Source: EVCA Enterprise Capital Report 2011

One of the most fascinating findings that can be seen from Figure 33 is that the debt-to-EBIT ratio for buyouts valued at over €500 million was around the same as that for deals between €50-500 million in 2000; however the ratio for the largest sized buyouts grew much more rapidly in the years preceding the recent crisis. This further emphasises the point that credit markets were much more relaxed in the lead up to the crisis, particularly when it came to lending in order to finance large scale buyouts.

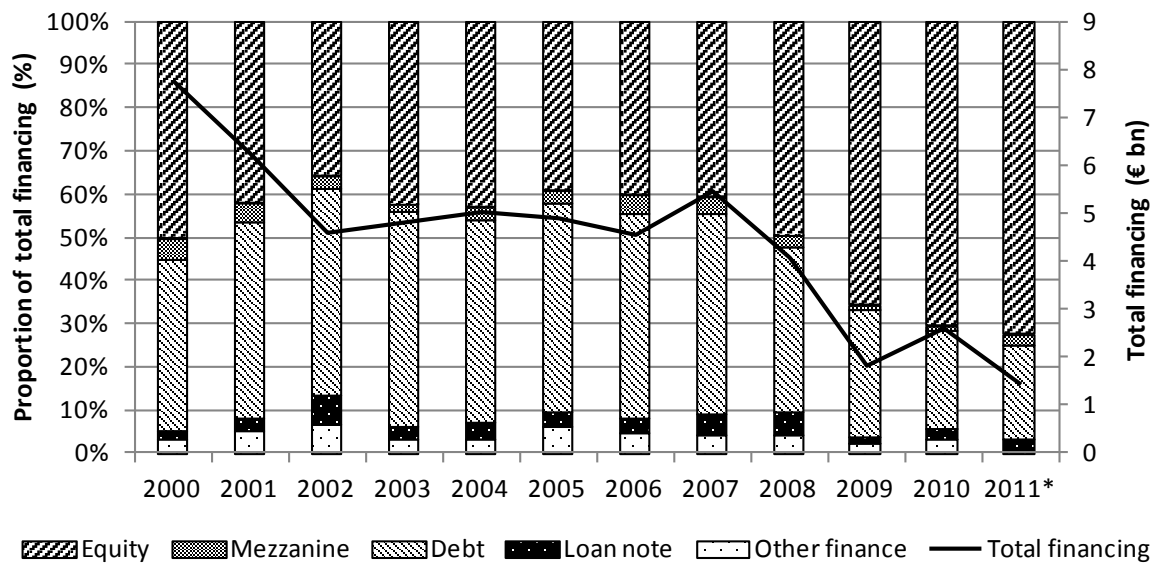
In 2003, the debt-to-EBIT ratio for the largest buyouts was 7.2 but this figure rose to 13.5 in 2007. This ratio fell somewhat in 2008 and this trend continued in 2009, reaching a low for the decade of 4.7.

Not only have the leverage levels of buyouts altered over time, but so have the other components of European private equity backed buyouts. Once again it has been possible to break up this analysis based on the size of the buyout.

Figure 34 shows the average deal structure of buyouts under €100 million during the period 2000 until halfway through 2011, whilst also depicting the total level of financing for these buyouts. The two largest components of total financing for each of the years are debt and equity. The three other categories of financing are relative small in comparison. Mezzanine, loan note, and other finance account for between 5-17% of total financing each year.

The total financing of smaller buyouts backed by European private equity funds has fallen a large amount from the high in 2000 of €7.74 billion. The level of total financing remained relative stable between 2002 and 2006, leading to a rise of around €1billion in 2007. However, after this spike in total financing for smaller buyouts, the level fell in both 2008 and 2009 to a low of around €1.8 billion.

**Figure 34: Average deal structures for European private equity backed buyouts (Deals <€100m), 2000-2011\***



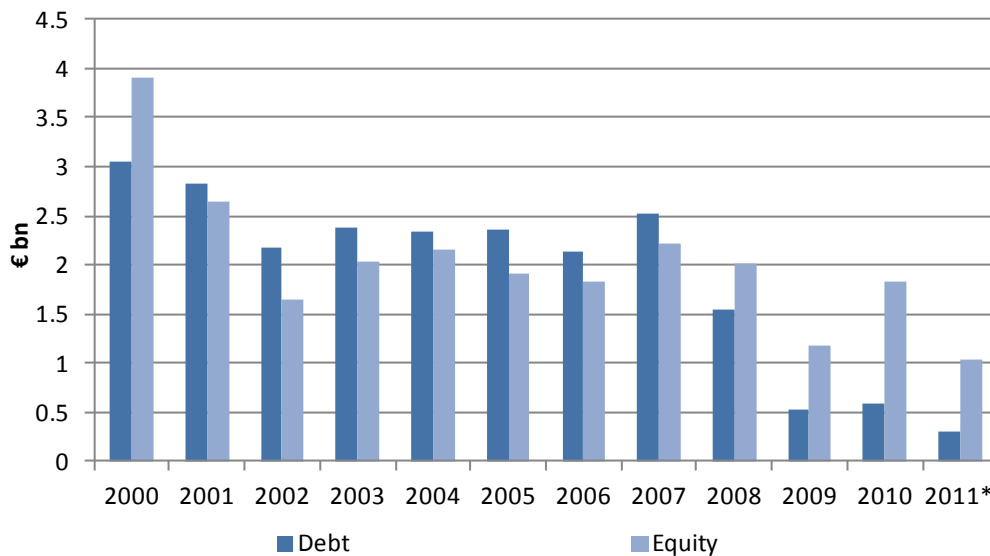
Note: 2011 data reflects the first half of the year

Source: *cmbor.com*; *Barclays Private Equity*; and *Ernst & Young in EVCA Enterprise Capital Report 2011*

As mentioned previously, debt and equity financing have been the largest components of European private equity backed buyouts over the last decade. The figure above reflects how the total levels of debt and equity financing have changed over the period. It shows that over the period 2001 until 2007, the total value of debt financing was greater than equity financing, on average by €330 million.

However, after 2007 this pattern reversed. The difference between debt and equity finance grew between 2008 and 2010, until equity outstripped debt by around €1.25 billion. This emphasises that in the wake of the recent financial crisis private equity firms moved away from debt financing, favouring equity financing. This is likely to be as a result of the drying up of the credit markets after the crisis.

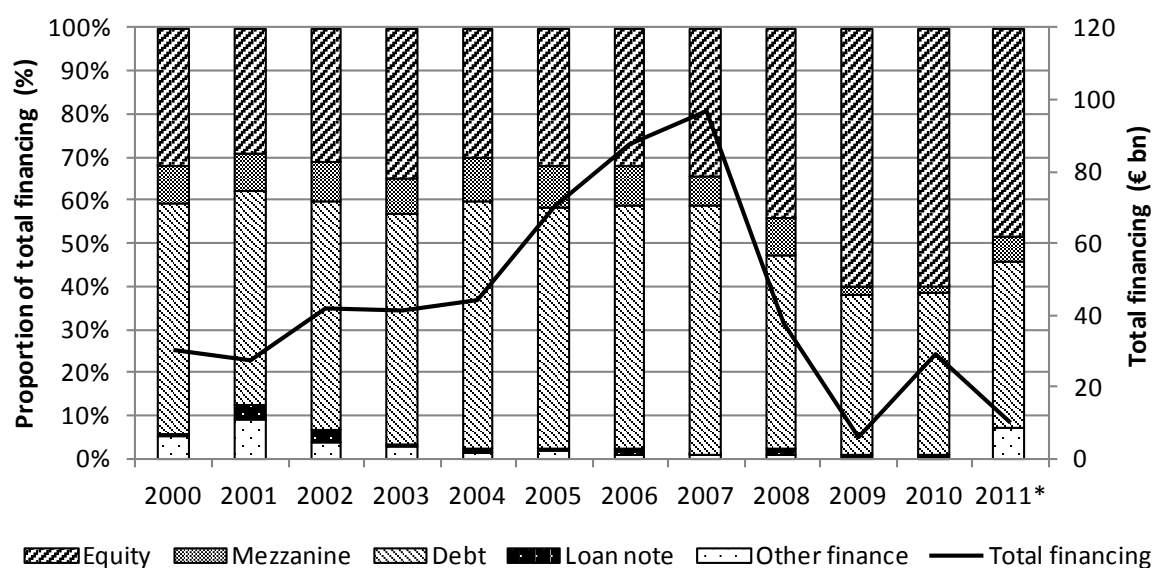
**Figure 35: Debt and equity financing levels for European private equity backed buyouts (Deals <€100m), 2000-2011**



Source: *cmbor.com; Barclays Private Equity; and Ernst & Young in EVCA Enterprise Capital Report 2011*

Debt and equity financing also dominate the makeup of larger European private equity backed buyouts (Figure 35). As regards the larger deals, Figure 36 shows that the three other components (mezzanine, loan notes, other finance) each makeup a relatively small fraction of total buyout financing. Figure 36 also shows the annual monetary value of the total financing for European private equity backed buyouts over the period. One interesting feature of this aspect of the figure is that from 2004 until 2007, total financing increases from €44.3 billion to €96.5 billion. However, after 2007 there is a two year period of steep decline in the volume of financing, reaching a low of just over €6 billion. This shows that since the recent financial crisis it has not been possible for private equity funds to back buyouts of large companies to the same extent that it did in the years preceding the crisis.

**Figure 36: Average deal structures for European private equity backed buyouts (Deals >€100m), 2000-2011H1**



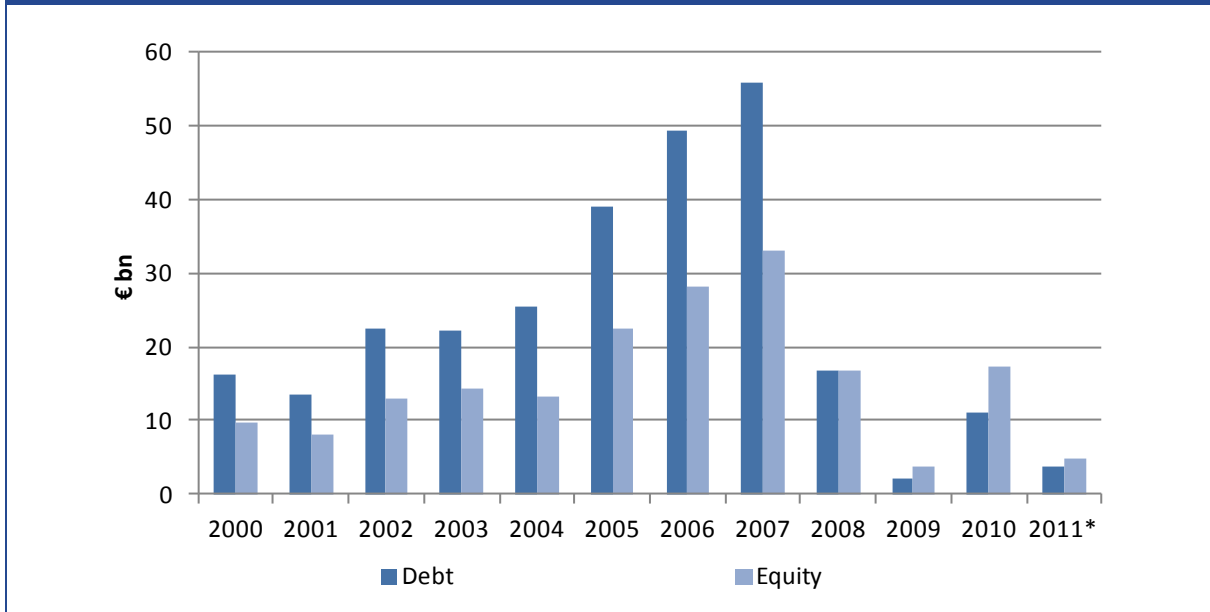
Note: 2011 data reflects the first half of the year

Source: *cmbor.com*; *Barclays Private Equity*; and *Ernst & Young in EVCA Enterprise Capital Report 2011*

Debt financing was greater than equity financing for larger buyouts in each year from 2000 to 2007 (Figure 37). The difference between debt and equity financing began to grow larger in 2004 and this trend continued to 2007. By 2007, the difference between debt and equity financing of large buyouts reached almost €23 billion.

This trend changed somewhat in 2008, when debt and equity finance both accounted for close to €17 billion. However, in the years following 2008 equity financing overtook debt financing as the predominate method of financing large private equity backed buyouts in Europe. This shows that one of the main reasons for private equity funds not being able to back the largest buyout, as they did before the recent crisis, is due to the diminished availability of debt financing. This results from the drying up of credit lines from banks, who are no longer willing to provide private equity firms with the same extent of leverage with which to back large buyouts.

**Figure 37: Debt and equity financing levels for European private equity backed buyouts (Deals >€100m) (2000-2011)**



Note: 2011 data reflects the first half of the year

Source: *cmbor.com*; *Barclays Private Equity*; and *Ernst & Young in EVCA Enterprise Capital Report 2011*

## 8.4 Conclusion

The main risk to financial stability of the private equity sector appears to relate to its role in the leverage loans market. However, it is unclear where the burden for the excessive rate of growth of the leveraged loans market should lie with private equity funds or banks.

Other than this, features of private equity are benign. Funds do not face redemption risk or fire sale risk. And, while portfolio companies of private equity funds may be highly leveraged, this is less likely to have impacts on financial stability compared to if, say, highly leveraged hedge funds.

## 9 Hedge fund sector risks

### 9.1 Overview

The impact of hedge funds on financial stability during the financial crisis appears to be a story of the relationship between banks and hedge funds. The underlying causes for the build-up of risks centres around excessive risk-taking by hedge funds, due to prime broker, trading or ownership relationships with banks.

**Table 17: Overview of risks to financial stability related to hedge funds**

<b>Underlying causes</b>	<p><b>Excessive risk-taking</b> due to:</p> <ul style="list-style-type: none"> <li>■ Procyclical margin requirements by prime brokers, implying leverage and therefore liquidity risk</li> <li>■ Market power of large hedge funds vis-à-vis prime brokers, implying leverage and therefore liquidity risk</li> <li>■ Bank ownership of hedge funds</li> </ul> <p><b>Concentration of holdings among few counterparties, especially banks</b></p>
<b>Multipliers</b>	<p><b>Size of funds</b></p> <p><b>Inter-connectedness of funds</b>, particularly to banks through prime brokerage or as major trading counterparties</p>
<b>Proximate causes</b>	Events around the financial crisis bringing about the materialisation of liquidity risk (e.g., asset devaluations)
<b>Direct impacts</b>	<p>Impact on hedge fund balance sheets/failure, including impact on bank owners and major trading counterparties of banks</p> <p>Capital withdrawal by hedge funds from prime brokers, affecting banks' ability to extend credit</p>
<b>Feedback loops</b>	<p>Market liquidity risk exacerbating hedge fund liquidity problems due to asset dumping by hedge funds, among others, to meet margin requirements</p> <p>Uncertainty regarding exposure to hedge fund failure leading to further financial instability, e.g., withdrawal of counterparties from certain banks and other non-bank financial intermediaries</p>

When these risks materialised banks were affected through one of these three channels. And finally, these mechanisms were magnified by feedback loops. For instance, liquidity constraints of hedge funds were exacerbated through stress in markets for short-term funding.

## 9.2 Risk analytics<sup>7</sup>

The hedge fund sector is closely linked to the banking sector through prime brokerage and trading counterparty relationships, as well as a result of several banks operating their own hedge funds or proprietary trading departments.

### 9.2.1 Prime brokerage

Prime brokerage encompasses a set of services offered by banks (namely, investment banks) to hedge funds. Among other things, prime brokerage services include the provision of credit and a securities clearing facility.

Prime brokerage relationships can be a transmission channel for risks to financial stability. Hedge fund failure may result in bank losses as a result of credit exposures.

In addition, in times of market stress, if a hedge fund is uncertain about the solvency of a bank acting as prime broker, it may withdraw collateral from that bank. This generates risk to financial stability in the following sense. Insofar as a bank has re-hypothecation rights over hedge fund collateral, collateral withdrawal implies that it can no longer be used for a bank's own liquidity management needs. Therefore, whatever pre-existing liquidity risk a bank faced is now magnified.

Liquidity risk is compounded if the withdrawal of a single hedge fund's collateral materially reduces the efficiency with which a prime broker manages other hedge fund collateral. For example, other hedge funds may face greater collateral costs as a consequence of prime brokers handling fewer transactions and having less scope for netting. A single hedge fund's collateral withdrawal, through the impact on collateral costs faced by other hedge funds, could therefore trigger a domino effect of withdrawals of collateral.

It is important to observe that prime brokerage relationships are a transmission channel for risks to financial stability rather than a source of risks (King and Maier, 2009). The impetus for collateral withdrawals could originate from within the banking sector (e.g., in connection with uncertainty regarding the solvency of a bank), from hedge funds (e.g., if it fails), elsewhere in the economy or purely due to perceptions.

In the latter case, hedge funds know that collateral withdrawals in general constrain a bank's ability to manage liquidity, which increases the risk of holding collateral with said bank. As such, hedge funds have an incentive to withdraw collateral from a bank earlier rather than later. This herding behaviour could crystallise perceptions of insolvency risk.

Empirically, a perspective on conditions of prime brokerage relationships is gained through an analysis of prime broker margin requirements. These are shown in Figure 38 below. One of the main features is that margin requirements are highly pro-cyclical. From the perspective of minimising risks to financial stability, it may be beneficial that margin requirements do not fall to unsustainably low levels during normal market conditions because hedge funds may expand their

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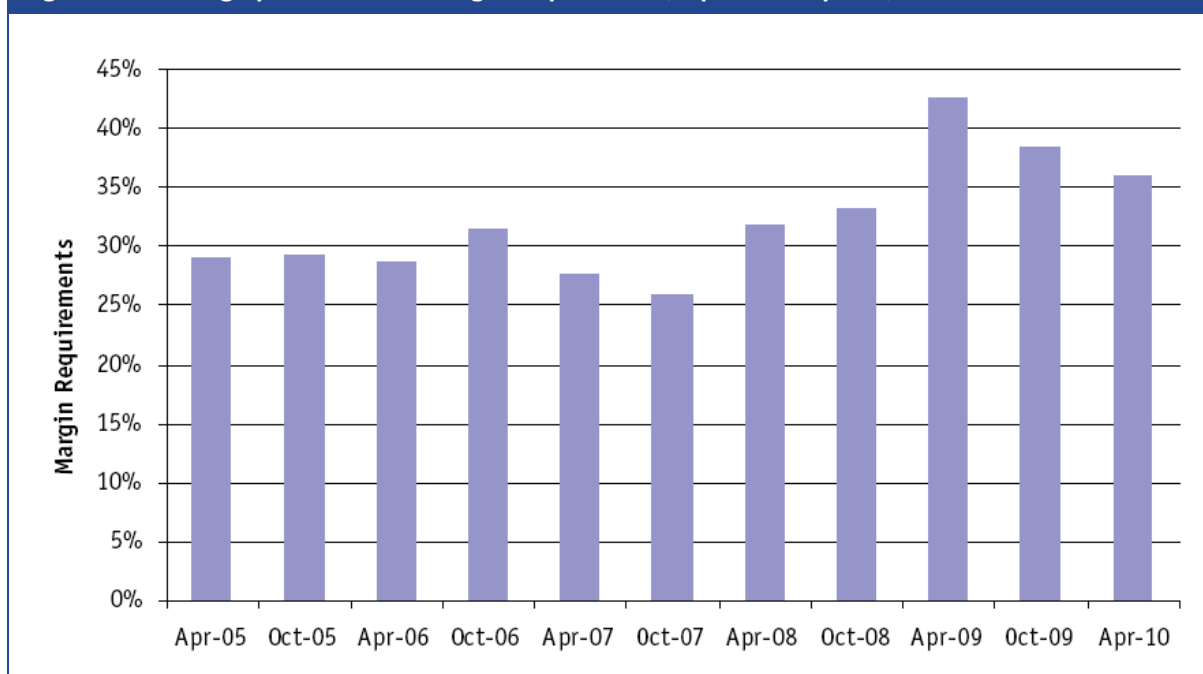
<sup>7</sup> The following section is based on King and Maier (2009). For further details on the roles of hedge funds in financial intermediation see paper.

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risk-taking in response that may be unsustainable during times of market stress. In this sense, the costs of prime brokerage relationships for hedge funds partially determine the sensitivity of the hedge fund sector to market conditions and in turn the stability of banks and the financial sector more generally.

**Figure 38: Average prime broker margin requirement, Apr-05 to Apr-10, %**



Source: FSA Hedge Funds as Counterparties Survey (April 2010)

### 9.2.2 Trading counterparties

Some hedge funds are so-called major trading counterparties. Banks and NBFIs transacting with or on behalf of major trading counterparties face risks to their stability if major trading counterparties default because of the sheer volume of exposures they have vis-à-vis major trading counterparties or due to the volume of business they represent. The direct effect a default of a major trading counterparty on banks and NBFIs could transmit to risks to financial stability in general.

Another mechanism through which major trading counterparties affect financial stability is if banks and NBFIs hold a larger proportion of a particular asset that major trading counterparties sell in times of stress. For instance, through the fire sale of assets to meet redemption requests asset values would depress affecting all other holders of said asset, which could have a knock-on effect on financial stability (King and Maier, 2009).

### 9.2.3 Owners and managers of hedge funds

A bank that owns or manages a hedge fund may decide that it is in their interest to save a failing hedge fund through an injection of capital. This approach may be preferable if the cost of loss of reputation to their undertakings in general exceeds the cost of preventing insolvency of their hedge fund. One important issue with this behaviour for financial stability, however, is that risk borne by the hedge fund is actually borne by the bank. Therefore any action, or result, of the

hedge fund that has a destabilising impact on the bank potentially transmits to risks to financial stability.

In addition to the above, four factors have been identified as multipliers of underlying causes of risk originating from the hedge fund sector: absolute size, excessive leverage, liquidity risk and inadequate counterparty risk management practices.

#### 9.2.4 Absolute size

Empirically, the hedge fund industry is highly concentrated, with the largest 100 hedge funds managing 75% of total industry assets in 2007 (King and Maier, 2009). The largest hedge funds therefore pose the greatest risk to financial stability, *ceteris paribus*.

Risks to financial stability arise or are accentuated as a result of the size of hedge funds. The larger the hedge fund, *ceteris paribus*, the greater the number and the higher the value of counterparty exposures it has. Hedge fund default could therefore impact on a wide range of bank and non-bank institutions, some to a greater and others to a lesser degree with attendant consequences for financial stability.

Another channel through which absolute size poses risks to financial stability is through market power. Large hedge funds can negotiate more aggressively with banks providing prime brokerage service such as through lower collateral requirements or haircuts (King and Maier, 2009). As a consequence of this, larger hedge funds may be undertaking the greatest risks, which exacerbate the impact of excessive leverage on financial stability.

#### 9.2.5 Excessive leverage

Leverage, in general, has the effect of magnifying the impact of asset price movements. Hedge funds that use excessive leverage may be particularly affected by relatively small asset price movements through liquidity risk insofar as they may not have cash assets or securities readily available to meet margin calls, or because markets in which they access liquidity are not functioning properly. As a consequence, hedge funds may have to liquidate other assets (King and Maier, 2009).

From a monitoring perspective, it is difficult to track hedge fund leverage because of the use of derivatives that sit off-balance sheet. However, even if hedge fund leverage can be calculated precisely, there remains the difficulty of determining whether leverage is excessive.

On the one hand, leveraged transactions have genuine economic value. High frequency trading firms, may, for example, provide large volumes of liquidity to markets on a leveraged basis, which is beneficial privately for individuals/institutions on either the buy or sell side of the transaction and socially insofar as liquid markets allow for more efficient price formation and securities valuation.

On the other hand, leverage may be excessive insofar as financial and economic shocks lead to leveraged institutions becoming illiquid. Fire-sales of assets in response, especially if they were relatively large, could have implications for risks to the financial sector if they depress asset prices, leading to losses for other holders of said assets such as banks or other systemically important institutions.

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But, it is difficult to know what size of shock hedge funds should be resilient to and in-fact, what the effect of shocks would be on hedge fund liquidity because this is also related to how markets for short-term funding respond to shocks.

In any case, empirically, several observations regarding the pattern of leverage of hedge funds have been made (FSA, 2010). Firstly, borrowing is financed through multiple channels including through collateralised loans under prime brokerage agreements, repo agreements or synthetic instruments such as swaps and contracts for difference.

Secondly, leverage varies by hedge fund strategies. Fixed income arbitrage, involving the exploitation of small price inefficiencies, are substantially more leveraged than other hedge fund strategies. This is to be expected in the sense that hedge fund managers expect trades made on this basis to be profitable with relative certainty and are therefore willing to take large, leveraged positions to maximise returns. A survey of large, FSA-authorised banks that have significant dealings with hedge funds through prime brokerage/trading counterparty relationships showed that hedge funds employing fixed income arbitrage strategies were borrowing up to 14 times the value of net equity in April 2010, while borrowing of hedge funds employing other strategies was in the region of two-to-four times the value of net equity.

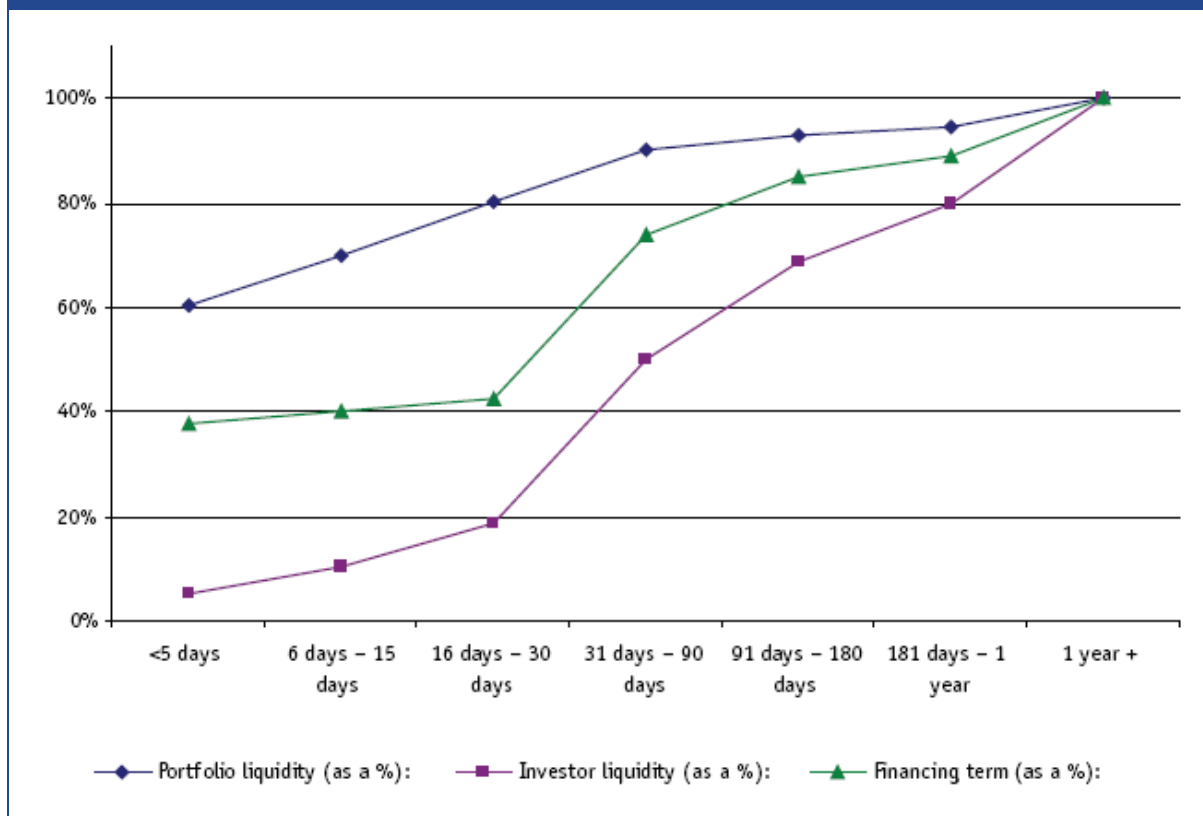
Highly levered funds could pose risks to financial stability if risks are not properly accounted for. For instance, tail risk, associated with times of market stress, may imply that a fixed income pricing inefficiency rather than narrowing may unexpectedly widen. Among other things, a highly leveraged fixed income arbitrage fund would therefore be faced with substantial liquidity risk. However, in order to insure against this, these funds also had the largest levels of unencumbered cash assets for liquidity management purposes, in the order of 85% of net asset values.

### **9.2.6 Liquidity risk**

The hedge fund survey, carried out on a bi-annual basis by the UK Financial Services Authority, provides an indication of the magnitude of liquidity risk through an analysis of the liquidity of 50 hedge funds for which net asset values were in excess of \$500m. Figure 39 shows that fund assets can be liquidated more rapidly than liabilities.

However, there are two caveats to this finding. Firstly, in relation to portfolio liquidity there is a degree of subjectivity as to the market liquidity funds face in unwinding their positions, which they may not be able to gauge accurately in times of market stress. Secondly, on the funding side, investor liquidity may fall in times of market stress because of conditions of term financing arrangements that allow investors to redeem with greater immediacy at these times.

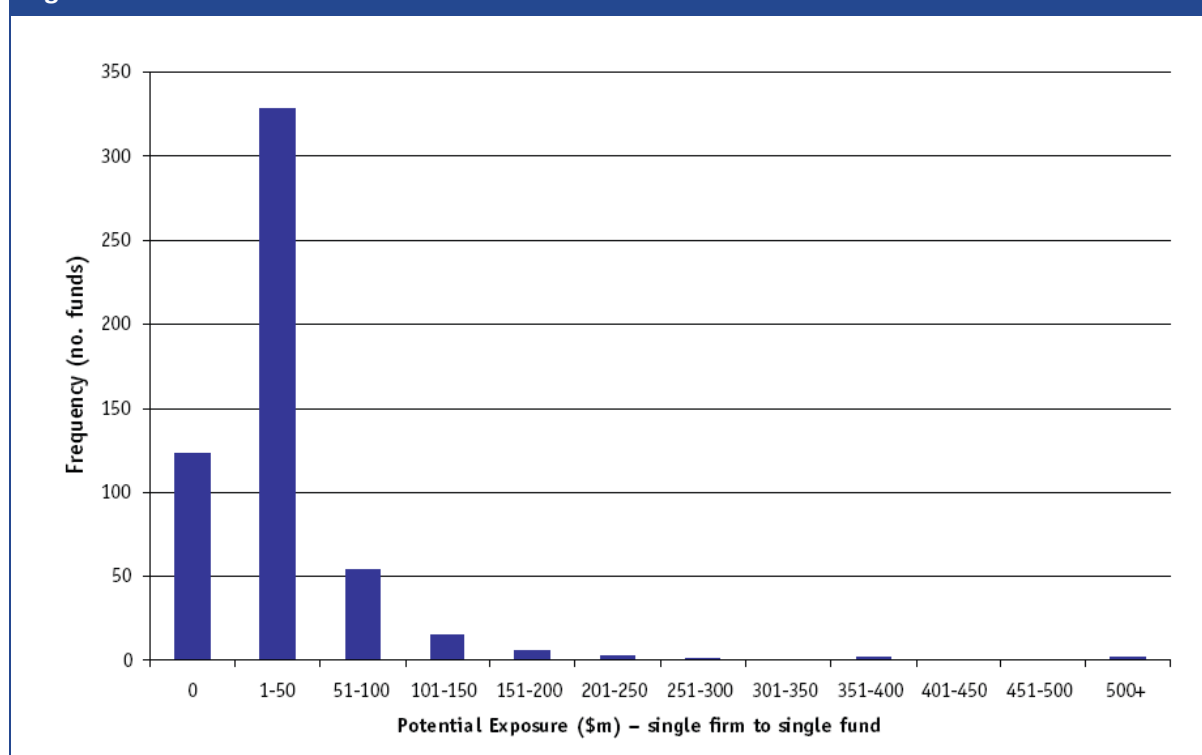
Figure 39: Liquidity of assets and liabilities



Source: FSA Hedge Fund Survey (April 2010)

### 9.2.7 Inadequate counterparty risk management practices

Banks face counterparty risk through hedge funds, among other things, arising through their credit relationships. The April 2010 Hedge Funds as Counterparties (FSA, 2010) showed that most potential credit exposures of single banks to single hedge funds were in the order of \$51 million. But, in one case, a single bank was exposed to a single hedge fund through credit exposures in the order of \$600 million (Figure 40).

**Figure 40: Distribution of funds**

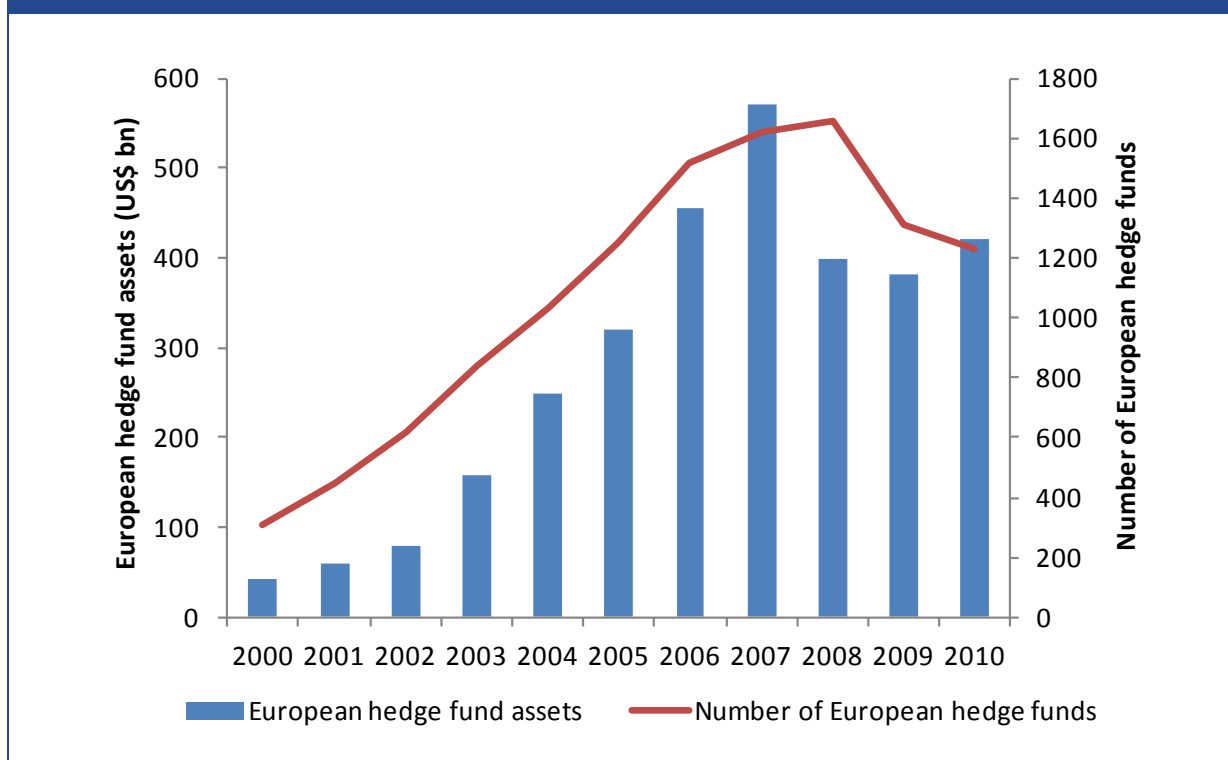
Source: FSA HFACS (April 2010)

Counterparty risk management refers to actions that reduce the exposure of a financial intermediary in the event of default of its counterparties. As a result of the LTCM affair, the Counterparty Risk Management Policy Group (CRMPG) highlights best practices in this area including the use of collateral, the requirement to post margin based on actual or projected mark-to-market valuations, the use of netting, the use of counterparty exposure limits, and the use of stress-testing of counterparty exposures. These measures along with greater knowledge of hedge fund positions are viewed as the primary mechanism for preventing the collapse of a hedge fund from becoming a systemic event.

### 9.3 European hedge fund developments around the financial crisis

#### 9.3.1 Size

Figure 41 shows the development in the size of the European hedge fund industry from 2000 to 2010. Prior to the recent financial crisis, the industry grew by approximately five-fold in terms of number of funds and ten-fold in terms of assets. In the first six months of 2006, the overall assets under management in the European hedge fund industry grew by 23% to over \$400 billion. Year-on-year, this represented a rise of more than 44% from the mid-year stage in 2005, when overall assets were just \$280 billion. A substantial contributor to this growth was the new investor inflows. Over the preceding 12 months, several of the bigger firms experienced asset growth of at least 50% and, in some cases, of more than 100% (Evans, 2007). This underlines the high level of concentration in the industry with the big firms growing at a fast pace, and hence posing a greater risk to financial stability.

**Figure 41: European hedge fund assets (US\$ bn) and number of hedge funds, 2000-2010**

Source: EuroHedge

The first half of 2007 also saw a strong flow of new fund launches, with the introduction of 124 new funds in the UK alone, which produced \$10.6 billion of assets. Moreover, a number of funds entered 2007 on the back of an outstanding performance in 2006. For example, Parvus, the long/short equity fund, was the overall fund of the year in the 2006 EuroHedge Awards, reaching a size of around \$800 million, a return of 48% on the year and a Sharpe ratio of over 4; whereas in its first 15 months, it had a size of under \$300 million, a return of 31% and a Sharpe ratio of just over 2 (Evans, 2007).

In Europe, the hedge fund industry contracted sharply as a result of the financial turmoil in 2008. As shown in Figure 41, European hedge fund assets fell to just below \$400 billion in 2008, down by 31% from the peak in 2007. Although the total number of funds rose slightly in 2008 when compared to the previous year, the number of new fund launches was at a seven-year low. The trend continued into 2009 with launches hitting a ten-year low, and assets falling a further 12% to just over \$350 billion by the end of June (Evans, 2008). However the industry showed signs of recovery in the second half of the year. Total assets in European hedge funds grew by over 10% to put the industry on similar ground as it was at the end of 2008, whilst over 80 new funds appeared compared to just 47 in the first half of the year (Evans, 2010). The industry continued its recovery into 2010.

### 9.3.2 Returns

The first few months of 2007 witnessed some dramatic changes in the nature and structure of the hedge fund industry in Europe with acquisitions, buyouts, IPOs and fund flotations playing a major role. The overall performance of the industry in 2006 had been the strongest ever with the

EuroHedge Composite Index producing its best return for six years with a net annual gain of roughly 10% (Evans, 2007).

However, by the end June 2007, the EuroHedge Composite Index return stood at 6% for the year and by the end of the year, it had risen to just 7%, underlining the difficult market conditions that arose following the collapse of the US sub-prime mortgage market. In January 2008, hedge funds suffered further with violent market gyrations resulting in the worst month for long/short equity funds in Europe for many years. Yet it was the collapse of Peloton's \$2 billion ABS fund at the end of February 2008 that sent shockwaves through the hedge fund industry, as it had performed remarkably in 2007 with a return of 87% (Evans, 2008). The fund experienced severe liquidity constraints and could not find the money to cover its liabilities, including creditors' demands for more collateral (Independent, 2008). This highlights the dangers of leverage, especially in illiquid markets, and the ability of banks and other counterparties to change their margin and financing terms with potentially damaging effects.

Overall, the median return of the EuroHedge Composite Index was slightly over -5% in 2008, highlighting a long period of redemptions and investor outflows. However, the industry recovered in terms of performance in 2009 with the median return of the EuroHedge Composite Index coming in just under 9% (Evans, 2009).

### **9.3.3 Strategies**

In 2006, several strategy areas, such as European long/short equity, global equity, event driven, credit and convertible arbitrage, produced their best median returns for several years with many hitting their highest levels since recordings began. In addition to this, the choice of strategies and asset classes being explored and exploited was growing by the day, with hedge fund managers moving into some exotic and less-congested areas, such as carbon trading, asset-backed securities and film finance (Evans, 2007). By 2007, many leading hedge fund groups made bold moves to launch new strategies that diverged from their traditional strategic area (HedgeFund Intelligence, 2007). This shows that firms were willing to be exposed to greater counterparty risks.

In the midst of the crisis in 2008, many strategy areas that suffered huge losses, such as convertible arbitrage, collapsed, while many long/short equity strategies transpired to be no more than leveraged long-equity funds. Other types of strategies that relied on leverage became all but impossible to execute. However, some strategies performed well, such as CTAs and managed futures funds, where the median return was up by over 23% on the year. But European long/short equity funds did not perform well in aggregate with the EuroHedge mean return for these funds down by nearly 11% (Evans, 2009).

In 2009, the industry fared better and this was reflected with every strategy area producing positive returns (with the exception of managed futures). The strength of this recovery was underlined by the mean average return in convertible arbitrage being over 40% (Evans, 2010). The crisis caused the industry to go back to basics as a majority of the investors focussed on core liquidity strategies and did not buy into any strategy involving illiquidity or leverage. Moreover, new funds were difficult to get off the ground as counterparty risk was more carefully considered. Prime brokers that could not guarantee the safe custody of assets began to lose out and investors demanded managed accounts as they did not want to be exposed by the actions of other investors in a pooled fund vehicle (Evans, 2009).

## 9.4 Conclusion

The impact of hedge funds on financial stability during the financial crisis appears to be a story of the relationship between banks and hedge funds. Although comprehensive data is lacking, commentators point to excessive risk-taking by hedge funds, due to prime broker, trading or ownership relationships with banks, as major underlying causes for the build-up of risks.

The impact of these risks materialising were viewed to be particularly deleterious to financial instability due to feedback loops involving, for example, liquidity constraints of hedge funds being exacerbated as a result of difficulties in markets for short-term funding.



## 10 Insurance and pension fund sector risks

### 10.1 Overview

This section presents an overview of the risks to financial stability related to insurance undertakings and pension funds, with the remainder of the chapter providing more detailed descriptions of the elements of this overview.

In general, traditional insurance undertakings and pension fund activities appear not to have been relevant to the build up and materialisation of risks to financial stability.

Arguably, the main effects on financial stability of this sub-sector of NBFIs relate to its size. That is, as a consequence of asset devaluations, insurance undertakings and pension funds have curtailed their purchasing activities on securities markets, which exacerbated already difficult conditions in these markets. While there is no direct evidence of this, balance sheet developments show that insurance undertakings' and pension funds' asset purchasing behaviour changed after the onset of the financial crisis.

In the context of the crisis, the main focus on insurance undertakings and pension funds has been their entry into non-traditional business lines. In the case of insurance undertakings the notable case is AIG writing CDS contracts and, in the case of pension funds, their participation in securities lending markets (e.g., Pozsar and Sing, 2011). However, stakeholder consultations with European insurance and pensions associations suggest that these underlying causes of risks to financial instability are relatively peripheral relative to the activities of the sub-sectors as a whole.

Looking forward, associations highlight regulatory requirements as a key source of risk to financial stability insofar as they may force institutions into correlated responses to events, which may exacerbate stressed market conditions (or, generate feedback loops).

The main elements of risks to financial stability related to insurance undertakings and pension funds are summarised in Table 18 below.

**Table 18: Overview of risks to financial stability related to insurance undertakings and pension funds**

<b>Underlying causes</b>	<p><b>Excessive risk-taking</b> by insurance undertakings and pension funds due to:</p> <ul style="list-style-type: none"> <li>■ Pension fund sponsor faced with investment risk, e.g., in defined benefit schemes</li> <li>■ Insurance undertakings faced with investment risk by carrying out non-traditional/non-insurance activities</li> </ul> <p><b>Liquidity risk</b> of insurance undertakings and pension funds financial derivatives activity.</p> <p><b>Regulatory requirements</b> that may lead to correlated sales of assets as a result of asset downgrades.</p>
<b>Multipliers</b>	<p><b>Size</b> of insurance undertakings and pension funds</p> <p><b>Inter-connectedness</b> of insurance undertakings and pension funds to banks and other NBFIs (due partly to their size)</p>
<b>Proximate causes</b>	Events around the financial crisis bringing about <b>asset devaluations</b> either directly or through heightened perceptions of counterparty risk.
<b>Direct impacts</b>	<b>Balance sheet impacts</b> on insurance undertakings and pension funds.
<b>Feedback loops</b>	<p><b>Impacts on securities markets</b> in general and specifically <b>fixed income markets</b> and <b>securities lending markets</b>.</p> <p><b>Price effects</b> on abovementioned markets due to fire sale externalities.</p>

## 10.2 Risk analytics

### 10.2.1 Liquidity risk

In times of market stress, liquidity risk can arise among insurers and pension funds, despite the long-term nature of their liabilities providing insulation against this.

Sources of liquidity risk include downgrade of asset ratings combined with regulatory capital requirements leading insurers/pension funds having to change the mix of assets that they hold.

Collateral calls on derivatives positions arising, say, due to ratings downgrades of insurance undertakings and pension funds are an additional source of liquidity risk during stressed market conditions (OECD, 2009).

Liquidity problems involve a further, cross-border aspect for insurance undertakings insofar as national regulations/other legal restrictions constrain the transfer of liquid funds cross-border within insurance groups (Radice, 2010).

### 10.2.2 Counterparty risk

In general, counterparty risk arises due to common exposures in collateral, securities and derivatives, and exposure to other banks and NBFIs, particularly through over-the-counter (OTC) markets (Booth, Milne and Pickles, 2011).

Counterparty risk may also arise as a result of insurance undertakings in particular offering non-traditional credit risk protection through products such as financial guarantees and credit default swaps.

### 10.2.3 Securities lending

A relatively new source of risk to financial stability arising in the insurance and pensions sector is the use of assets for the purposes of securities lending (IMF, 2011). The key point to note here is that insurance undertakings and pension funds through securities lending increase the level at which NBFIs as a group are inter-connected to each other and to the banking sector (see the discussion of securities lending in section 5.3 for a more in-depth analysis of the risks entailed by such an activity).

### 10.2.4 Fire sale externalities

The fact that a large quantity of an asset is sold can drive prices down, meaning that other institutions that also hold this asset will have some of the value of their assets reduced. This fire-sale externality can have particularly strong consequences for institutions that have to ensure that they maintain a certain capital or liquidity ratio, as they may need to undergo other adjustments. In the short run, the most viable way to correct any balance sheet imbalances would be to sell assets. However, this may serve to accentuate problems as further asset sales apply further downward pressure on asset values.

The pension fund and insurances sectors may bring about financial instability through fire sales. The fact that the pension fund and insurance sectors are large increases the likelihood of any problems which affect their industries, could lead to adverse consequences for other institutions within the financial sector. One mechanism for fire sales particularly highlighted through consultations with stakeholders was regulatory requirements forcing pension funds and insurance undertakings out of asset classes in order to improve the quality of their assets. For further details on fire sales, see section 5.4.

## 10.3 European insurance and pensions sectors developments around the financial crisis

### 10.3.1 Aggregate balance sheet developments

Figure 42 shows EU27 insurance and pension fund assets over the pre-crisis (2000-2007) and crisis-post-crisis (2008-11) periods. 'Outstanding amounts' of assets are reported, as well as 'transactions' and 'valuation changes' that contribute to changes in outstanding amounts per year. Valuation changes are shown in order to distinguish *passive* balance sheet adjustments from actual transactions reflecting *active* balance sheet adjustments.

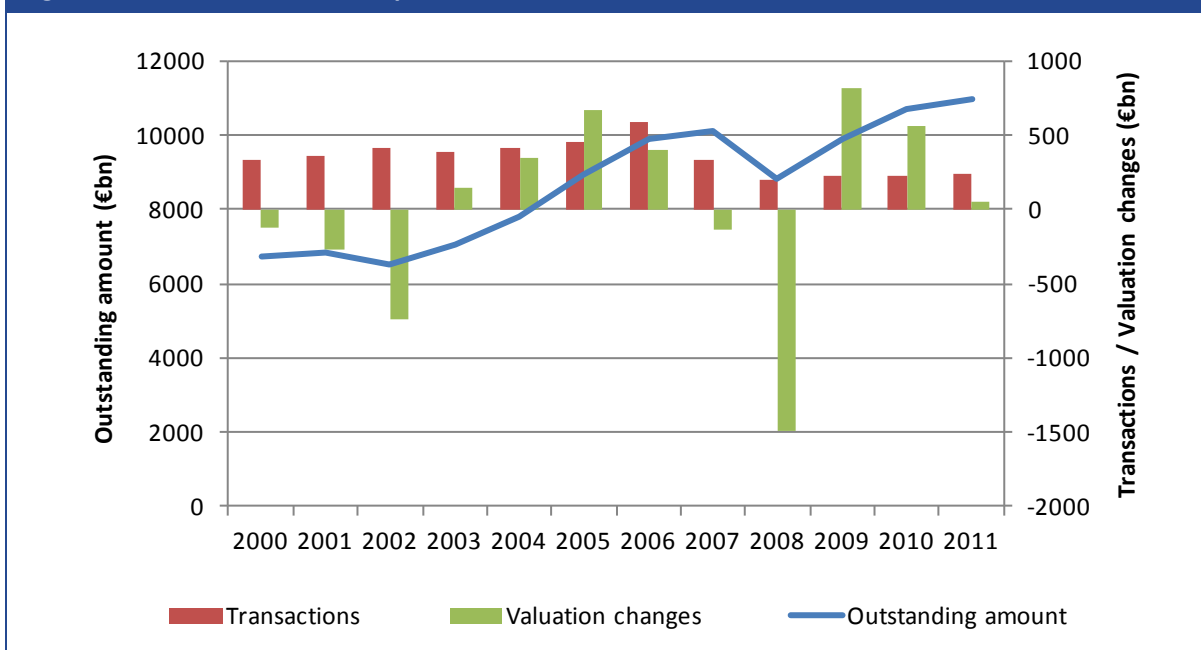
Overall, EU27 insurance and pension fund assets grew over 2000-2011. Pre-crisis, assets grew from €6.7 trillion to €10.1 trillion (representing 6% p.a. growth – or close to twice nominal GDP growth). In absolute terms, this reflects the size of insurance undertakings and pension funds segments as large institutional investors.

In the context of risks to financial stability, the sheer growth in value of assets may indicate the build-up of asset bubbles. It is interesting to note, for example, that as early as 2005 valuation changes reached a peak of €0.68 trillion but that over 2005-2006, growth in valuation changes turned negative. This implies that the contribution of price increases to asset growth had begun to diminish. However, transactions continued to fuel asset growth, reaching a peak in 2006 of €0.59 trillion.

Insurance and pension fund assets experienced a sharp decline over 2007-2008 (of €1.3 trillion or 13% p.a.). These declines were largely accounted for by passive rather than active responses to market developments (through valuation changes rather than transactions). Over 2007-2008, valuation changes led to a €1.49 trillion reduction in asset values while transactions offset this by €0.20 trillion. Insurance undertakings and pension funds may have been transacting in order to limit the impact of valuation changes over this period.

Over 2008-2011, assets recovered fully and beyond their 2007 level (by €2.1 trillion or 7% p.a.). Valuation changes accounted for a major portion of this recovery, constituting over two-thirds of the growth of assets over the period, with transactions accounting for the remainder.

**Figure 42: EU27 insurance and pension fund sector assets, 2000-2011, €bn**

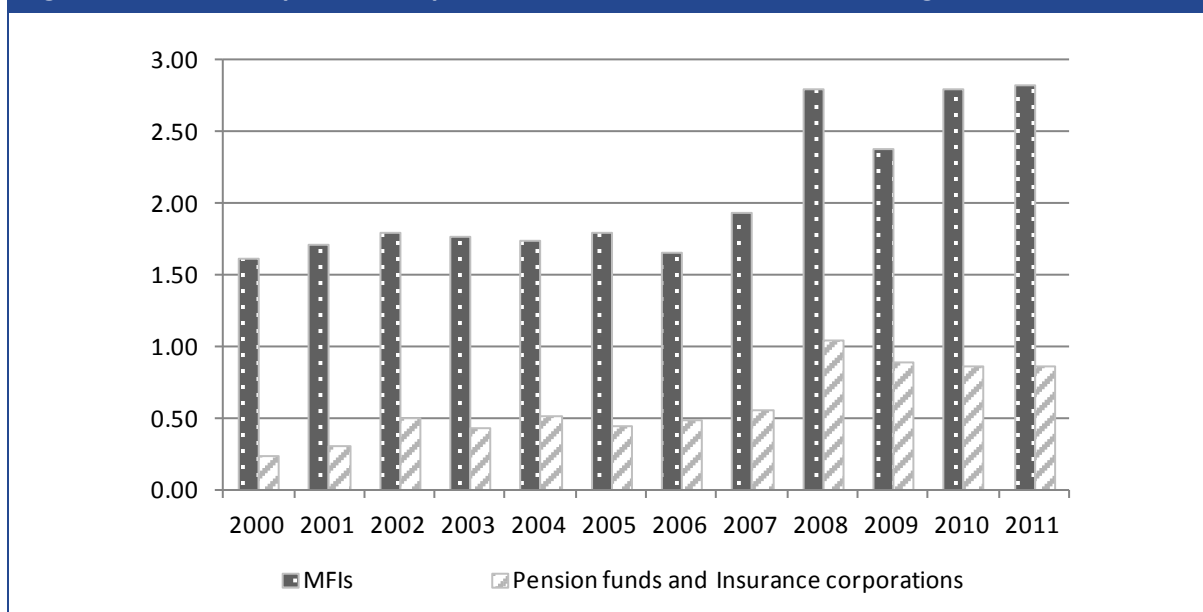


Source: Eurostat – Financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets (*nasa\_f\_of*)

Debt positions of insurance undertakings and pension funds were generally contained, particularly in comparison with MFIs. From Figure 43, it is can be seen that the leverage levels of monetary financial institutions were much higher than those of pension funds and insurance undertakings over the period 2000-2011, with the largest difference coming in the most recent years. Pension

funds and insurance undertakings had leverage levels of between 0.23 and 1.04 over the period. These levels were also lower than those of other financial institutions over the period.

**Figure 43: EU27 debt positions of pension funds and insurance undertakings vs MFIs, 2000-2011**



Note: The leverage levels of EU27 pension funds and insurance undertakings and monetary financial institutions have been calculated by combining the "loan" and "securities other than shares" liabilities of each institution type and dividing by the total "shares and other equity" liabilities.

Source: *London Economics*

In general, it is interesting to observe trends in transactions and valuation changes. Transactions were relatively stable while valuation changes were erratic. Transactions rose steadily over 2003-2006, declined sharply in 2007 and have remained at a relatively low level since. In part, this reflects diminished active adjustments on the asset side of balance sheets on the part of insurance undertakings and pension funds. However, it also reflects stressed market conditions (to which insurance undertakings and pension funds contribute significantly), insofar as fewer transactions can take place and those that take place are of smaller value. Valuation changes tend to recover sharply after a trough, as over 2002-2003 and 2008-2009, and are otherwise highly cyclical.

Table 19 describes disaggregated EU27 insurance and pension fund balance sheet developments over 2001-2011 for the purpose of decomposing annual changes into their component active and passive components. The first section of the table gives overall changes for a given year per balance sheet item (' $\Delta$  outstanding amounts') while the second and third sections of the table break out changes resulting from active balance sheet adjustments ('transactions') and passive balance sheet adjustments (' $\Delta$  valuation').

Quantitatively, shares and other equity assets were struck particularly hard at the height of the financial crisis in 2008, with the sectoral balance sheet for insurance undertakings and pension funds shrinking by €1.3 trillion largely due to valuation changes.

Over the preceding three years, however, shares and other equity assets rebounded, growing by €0.77 trillion, €0.46 trillion and €0.13 trillion in 2009, 2010 and 2011, respectively. Interestingly, these changes were largely driven by transaction-based asset growth, perhaps suggesting renewed

interest long-term equity asset allocation. Insurance technical reserve liabilities rebounded over this period as well.

Securities other than shares (e.g., bonds) on the asset side grew slowly during the height of the crisis in 2008, by €0.03 trillion. This may be a function of a lack of issuance on fixed income markets but also (and partly as a consequence) of the perceived level of counterparty risk associated with segments of fixed income securities such as banking sector bonds.

This pessimism appears to have reversed in 2009 and 2010, when insurance undertakings and pension funds began investing in securities other than shares once more, in the order of €0.25 trillion p.a. More recently, i.e., in 2011, growth in these asset classes has slowed down to some degree, which may inter alia relate to difficulties in sovereign debt markets and costs to related markets.

Finally, it is interesting to note developments in currency and other deposits, pre-crisis and in the post-crisis periods. In essence, insurance undertakings and pension funds had large pools of liquid assets available up to the crisis. But, currency and other deposits have subsequently diminished significantly. In part, this may be due to cash requirements rising over the latter period in relation to insurance and other payouts. It may also reflect an active adjustment of liquid assets, as insurance undertakings and pension funds exited derivatives markets, in which collateral-based transactions were carried out (e.g., OTC derivatives).

### **10.3.2 Decomposition analysis, by asset class**

Insurance undertaking and pension fund assets fell considerably in 2008, predominantly in equity assets, but also in securities other than shares and financial derivatives. In part, this reflects market valuation pressures faced by life insurance undertakings. While these firms may have had limited exposures to low quality RMBS or structured financial instruments (CDOs), they experienced valuation falls as a result of being significant institutional investors with exposures to equity and debt markets where valuation pressures were faced in general (OECD, 2009). On the liabilities side, falls in government bond interest rates had the effect of markedly increasing insurers' actuarial liabilities (OECD, 2009) as well as those of defined benefit pension funds.

Developments over the crisis period were also considered to have given rise to asset-liability management challenges. On the liabilities side, variable annuities impose credit risk on insurers either by guaranteeing a minimum level of income or income streams contingent on low capital market valuations or interest rate environments. The events of the crisis led to the realisation of this credit risk - implying larger than expected liabilities. Moreover on the asset side, market stress implied a greater level of risk was being borne through insurers' investments.

These effects were compounded by the fact that insurers faced difficulties in hedging risks through derivative instruments. Due to volatility over the period, counterparties to hedging contracts charged larger premia. This is reflected in a blip in derivatives due to negative valuation changes.

In a forward-looking sense, there is an additional risk to insurers and pension funds resulting from their operations in derivatives markets stemming from the risk of ratings downgrades. Namely, if an insurance undertaking or pension fund is downgraded then the amount of margin it needs to post in order to access derivatives would increase, increasing liquidity requirements.

It is interesting to note that these market developments have led insurers to price variable annuities less aggressively and provide individuals with less attractive insurance terms and conditions, in response to greater awareness of credit risk and costs of hedging.

Further, this is significant as far as the interaction of the pensions and insurance sector goes. Prior to the crisis, the insurance sector through products such as variable annuities was stepping in to substitute the decline in defined benefits pension schemes and funding shortfalls. However, it now appears that these developments are being reversed (OECD, 2009).

The relative volatility of equity versus non-equity securities over the period around the financial crisis, with valuations plummeting initially in 2008, is noteworthy. In part, this reflects difficulties of mark-to-market accounting in times of market stress (OECD, 2009). Namely, as markets became illiquid, it became difficult to use market-based prices to value securities and institutions switched to model-based valuations. However, potential counterparties to trades face uncertainty regarding these valuations and are therefore less likely to transact, withdrawing further liquidity from financial markets. Similarly, the recovery in 2009 also reflects the interaction between mark-to-market accounting and increased market liquidity. Some observers have argued that insurance undertakings and pension funds should be subject to different accounting standards to reflect the long-term nature of their balance sheets and to assuage volatility (and consequently, financial instability) resulting from mark-to-market accounting.

Table 19: EU27 insurance and pension fund balance sheet developments, 2001-2011, €bn

	Assets											Liabilities										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Δ outstanding amounts</b>																						
Currency and dep.	30	27	26	75	46	84	71	27	-1	-20	25	0	0	0	0	0	0	0	0	0	0	0
Non-share sec.	217	238	183	348	341	226	103	28	255	247	100	3	-2	5	46	4	-2	51	91	-40	-11	4
Loans	38	11	36	38	0	30	-17	-29	25	87	21	19	4	21	22	16	70	-10	43	-20	15	11
Equity	-234	-638	263	301	707	518	65	-1272	765	462	130	-140	-253	124	42	141	83	-42	-231	27	22	16
Insurance res.	24	8	2	3	13	64	11	8	3	8	5	257	-238	339	527	1013	850	139	-1195	955	675	247
Other	9	39	24	-7	26	71	-29	-43	-1	10	5	35	17	5	8	17	52	-21	-11	-7	19	6
Financial assets	85	-315	533	758	1133	992	204	-1281	1046	794	286	175	-472	494	645	1190	1055	117	-1303	916	720	284
<b>Transactions</b>																						
Currency and dep.	25.7	42.6	46.4	71	36.6	110.7	100.9	46.7	-17.3	-19.5	-20.6	0	0	0	0	0	0	0	0	0	0.1	0.1
Non-share sec.	164.9	215.9	237.6	236.2	225.1	251.3	169.1	79.6	58	70.9	70.8	7.6	0.4	0.2	-1.1	-16.6	-18.5	-21.7	-78.5	-46.3	-84.2	-87.2
Loans	26	11.8	32.3	18.9	6.2	8.7	-44	21.5	-2	48.7	49.8	21.9	14	41	27.9	17	69.4	-16.6	39.8	-28.8	14.9	15.3
Equity	110	99.4	52.8	75.7	146.7	126.8	102.9	42.7	168.3	113.2	117.3	13.1	12.1	20.9	18.8	17.4	31.9	9.7	4.9	9	12.1	12.5
Insurance res.	17.6	10.7	1	7.5	15.4	17.6	20.9	6.8	12.6	13.5	13.9	326.2	328.1	325.9	374	449.8	419.1	373.5	192.1	286.8	298.5	306.3
Other	15.9	38.6	18.7	2.4	27.9	70.4	-14.8	8.9	3.2	5.2	5.4	35.3	43.6	14.7	6.1	49	57.2	-15.4	26.1	-49.4	15.6	15.4
Financial assets	360.2	419.1	388.9	411.7	457.9	585.3	335	206.3	222.8	232	236.5	404.1	398.1	402.8	425.7	516.6	559.1	329.4	184.4	171.4	257	262.4
<b>Δ valuation</b>																						
Currency and dep.	4	-16	-20	4	10	-27	-30	-20	16	-1	46	0	0	0	0	0	0	0	0	0	0	0
Non-share sec.	53	22	-55	112	116	-25	-66	-51	197	176	30	-4	-3	5	47	20	17	72	169	7	73	91
Loans	12	-1	4	19	-7	21	27	-51	27	39	-29	-3	-10	-20	-6	-1	1	6	3	9	0	-5
Equity	-343	-738	210	225	560	391	-38	-1315	597	349	12	-153	-265	103	23	124	51	-51	-236	18	10	4
Insurance res.	7	-3	1	-4	-2	46	-10	1	-10	-5	-9	-69	-566	13	153	563	431	-234	-1387	669	376	-60
Other	-7	1	5	-10	-2	0	-14	-52	-4	4	-1	-1	-27	-10	2	-32	-5	-5	-37	42	4	-9
Financial assets	-275	-734	144	346	675	407	-131	-1488	823	562	49	-230	-870	91	219	674	496	-212	-1488	745	463	21

Note: Deposits (dep.), Securities (sec.), Reserves (res.)

Source: Eurostat



### 10.3.3 Asset allocation and portfolio rebalancing

Asset allocations were considered to gain insights into the balance of portfolios across asset classes over time.

This is important from the perspective of categorising insurance and pension fund sub-sectors as multipliers of risks to financial stability or otherwise. Traditionally, insurance undertakings and pension funds have been viewed as *dampeners* of the fire sale mechanism through portfolio rebalancing activities. In broad terms, in order to maintain a certain asset allocation (e.g., a 50-50 split between equities and bonds), institutions have to increase their holdings of assets with falling valuations, all else equal. This means that insurance undertaking and pension fund behaviour serves to alleviate financial instability, for instance, reducing price volatility by carrying out purchases when prices are falling. If instead, pension funds take up alternative investments in times of stress for particular asset classes, they may act as a multiplier for the fire sale mechanism and therefore financial instability.

The data suggests that insurance undertakings and pension funds are shifting toward alternative investments and may therefore act as a multiplier for the fire sale mechanism in the future. This is evidenced through the Eurostat sectoral balance sheet data shown below for insurance undertakings and pension funds as a whole.

Evidence from other sources is consistent with the view that insurance undertakings and pension funds have reasonable portfolio holdings of non-equity, non-bond assets. Table 20 describes the asset allocations of four relatively conservative pension funds in Denmark and the Netherlands, among others, in which one observes a relatively high take-up of alternative investments after the crisis.

**Table 20: Asset allocation of selected pension funds**

	ABP	PFZW	PFA	Metaal Bedrijven
Equities	33.1	31.7	8.6	23.5
Bonds	40.3	29.9	84.3	54.7
Real estate	9.4	14.5	5.0	8.2
Hedge funds and PE	9.9	7.4	2.1	12.3
Commodities	2.9	6.3	0.0	0.4
Cash and deposits	0.7	4.1	0.0	0.0
Other	3.7	6.2	0.0	0.9

Source: Source: OECD Pensions Markets in Focus (2010)

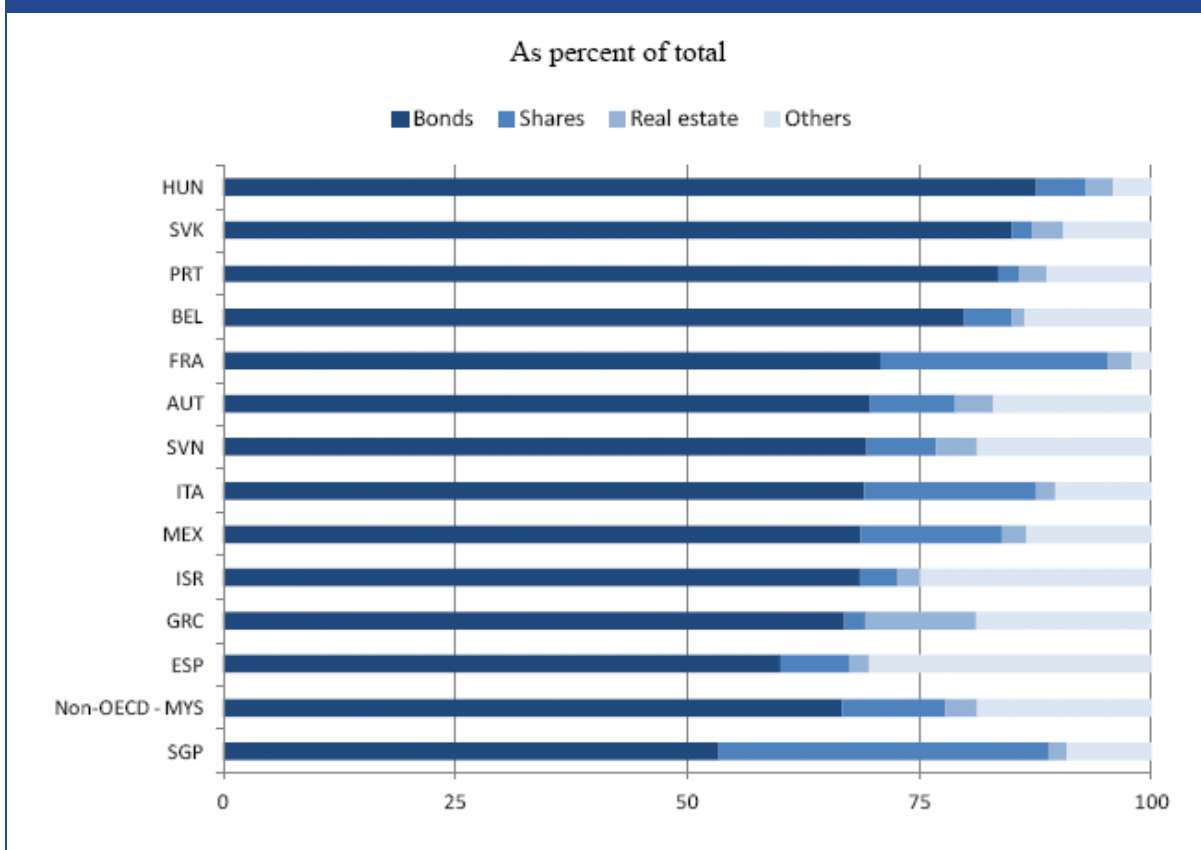
This is complemented by statistical information suggesting a growing appetite for alternative investments (hedge funds, private equity and commodities), as well as emerging-market bonds and emerging-market equities, as described in Antonin, Schich and Yermo (2011). For instance, allocations to hedge funds and private equity have increased in recent years in countries such as Ireland (from 0.8% in 2005 to 2.4% in 2008).

Moreover, one stakeholder described how this move towards alternative investments had occurred prior to the crisis among pension funds in Finland, a major reason for which was a loosening of regulations regarding eligible investments for pension funds.

Some commentators have suggested the move towards alternative investments may be a trend for the future (OECD, 2008). For instance, individual participants in DC schemes may shift out of struggling asset classes if they take a short-term view of, say, returns to equity. Managers of DB schemes may also move into alternative investments if asset values are too far below liability values and regulatory requirements force them to sell equities at a loss.

Figure 44 below also shows reasonable asset allocations in non-equity and non-debt securities for insurance undertakings in OECD countries in 2010.

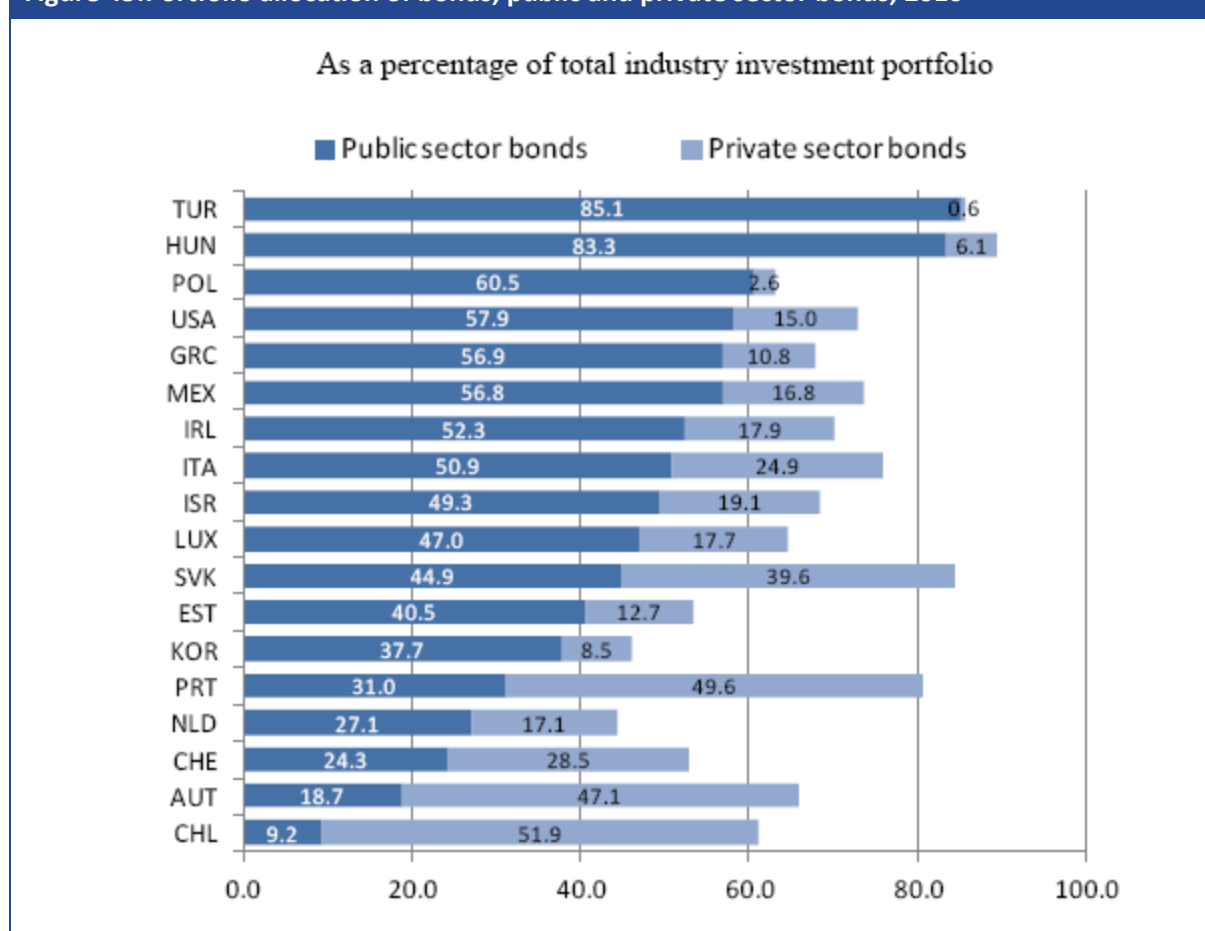
**Figure 44: Insurance undertaking asset allocations for selected investment categories in selected OECD countries, 2010**



Source: OECD Pensions Markets in Focus (2011)

### 10.3.4 Asset allocations of the insurance sector and the sovereign debt crisis

Overall, the insurance industry's allocation to public sector debt is important, with the portfolio share typically exceeding 30 percent for those countries reporting data. Based on OECD data, it can be observed that, within the bond category, insurance undertakings in a large number of countries allocated a substantial portion of their bond holdings to bonds issued by the public sector. A worsening of government bond valuations therefore potentially has an important impact on the financial position of the insurance sector (Figure 45).

**Figure 45: Portfolio allocation of bonds, public and private sector bonds, 2010**

Source: OECD Global Insurance Statistics

## 10.4 Conclusion

Traditional insurance undertakings and pension fund activities appear not to have been relevant to the build up and materialisation of risks to financial stability.

The main effects on financial stability of this sub-sector are through the fire sale mechanism. That is, as a consequence of asset devaluations, insurance undertakings and pension funds may have curtailed their purchasing activities on securities markets, which exacerbated already difficult conditions in these markets.

Activities such as securities lending and firms engaging in non-traditional activities within the sub-sectors have gained a lot of attention. However, many commentators claim that these cases are not representative of the state of the sub-sectors as a whole.

## 11 Central counterparties and risks to financial stability

The role of central counterparties (CCPs) in financial intermediation is *inter alia* to reduce counterparty risks arising in bilateral transactions on OTC derivatives markets and, in turn, to reduce risks to financial stability stemming from these counterparty risks. CCPs carry out this function by acting as counterparty to every trade among clearing members, performing multilateral netting and undertaking risk management activities to ensure that the failure of a clearing member does not affect other members (Duffie and Zhu, 2011).

### 11.1 Recent Developments and influences on CCPs

The Financial Stability Board's *Third Progress Report* on OTC Derivatives Reform sets out some details for global markets on their progress towards achieving the basic goals of standardising contracts sufficiently so that they can be cleared by a CCP – the chosen mechanism for risk reduction, but also a mechanism that has the effect of concentrating the interconnectedness of OFIs with the banking system. For this purpose, the banking system can be regarded as the “G-14” group of reporting dealers as they handle upward of 80% of all derivatives. (The reporting group may often be larger than 14 for specific asset classes).

The first step towards this goal is for contracts to be structured so that they can be processed electronically and reported to a trade repository. The FSB reports good progress in some asset classes but by no means all.

Table III.a.1 Metric 1: % (G-14 Volume:Electronic / G-14 Volume:All)

Asset class - product type	Electronically processed volume		
	as of June 2010	as of June 2011	as of December 2011
Interest Rates	78.0%	84.1%	87.6%
Credit	98.8%	98.8%	97.8%
Equity	27.0%	35.7%	36.8%
Commodities-Energy	79.1%	76.5%	70.3%
Commodities-Metals	64.2%	69.1%	60.8%
Commodities-Others	37.1%	25.4%	17.1%
FX-Non-Deliverable Forwards	75.6%	89.2%	86.0%
FX-Vanilla Non-Deliverable Options	46.5%	69.6%	69.4%
FX-Simple Exotic Options	8.9%	22.6%	32.9%

The next metric to consider is the extent to which different asset classes are in fact reported to trade repositories – even after such a relatively short time of effort to achieve the goal. About 78% of all OTC contracts are on interest rates and more than 95% are “reported”. Nearly all CDS are reported.

For the purpose of assisting financial stability, the key question is how much of this data is accessible to the authorities. The FSB states that “Within the EU, it is anticipated that the majority of interest rate, credit and equity derivatives transactions will be reported, but reporting of

commodity and foreign exchange is likely to take slightly longer even though TRs in those asset classes should be operational by end-2012..... Authorities' effective and practical access to data is being addressed in the new CPSS-IOSCO work-stream, which aims to be substantially complete by end-2012. The objective of this initiative is to facilitate authorities' effective and practical access to data, while taking into account confidentiality and security of data."

### Global OTC derivatives market

Estimated notional amounts outstanding, in billions of US dollars  
31 December 2010

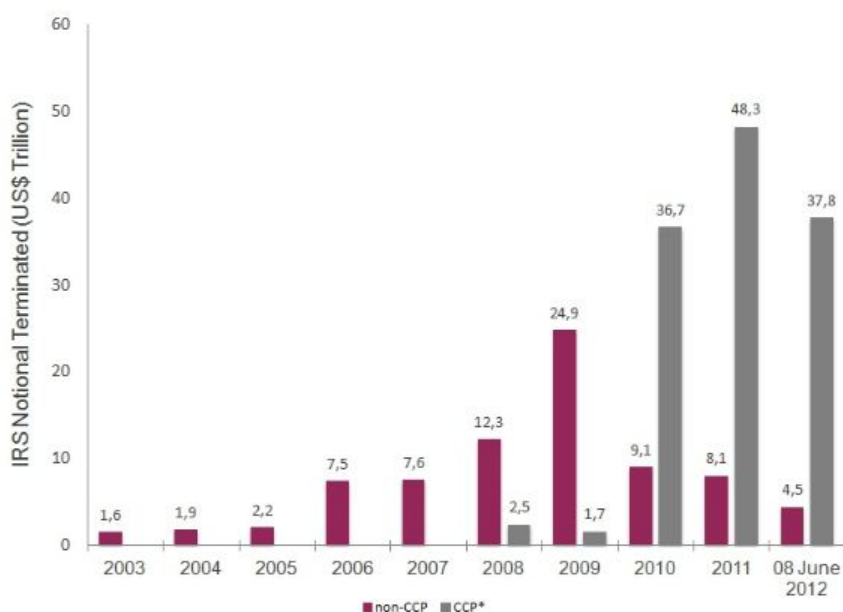
	BIS	Trade repository	%
<b>Grand total</b>	<b>707,569</b>		
Foreign exchange contracts	64,698	...	...
Currency swaps	22,228	10,363 <sup>1</sup>	47%
Interest rate contracts	553,880	529,417	96%
FRAs	55,842	53,924	97%
Swaps	441,615	425,416 <sup>2</sup>	96%
Options	56,443	50,077 <sup>3</sup>	89%
Equity-linked contracts	6,841	...	...
Commodity contracts	3,197	...	...
Credit default swaps	32,409	32,240 <sup>4</sup>	99%
Single-name instruments	18,105	15,650 <sup>5</sup>	86%
Multi-name instruments	14,305	13,237 <sup>5</sup>	93%
Unallocated	46,534 <sup>6</sup>	...	...

The next step is to move standardised contracts into CCP clearing and the FSB data is much less encouraging about progress to date. Only 50% of interest rate swaps are cleared – despite having the highest proportion of plain vanilla contracts. The proportion of CDS that are cleared is quite small. The data below is adjusted to avoid the double counting of both sides of a contract. But there is a stark message: if the great bulk of existing OTC derivative contracts is moved to a CCP-cleared basis, then the scale of CCPs can be expected to triple from today. If regulatory measures such as a possible exemption of derivatives from the risk of bailing-in of failing banks make derivatives even more attractive, then the scale of CCPs will rise dramatically.

### Estimated percentages of major OTC derivatives asset classes and products on CCPs

	Total notional outstanding (USD equivalents in billions)	Notional outstanding on a CCP (USD equivalents in billions)	Percentage of total on a CCP
<b>Interest rate derivatives<sup>1</sup></b>	<b>362,323</b>	<b>125,601</b>	<b>35%</b>
– Interest rate swaps	205,581	102,692	50%
– Basis swaps	20,692	3,985	19%
– Overnight index swaps	33,081	17,649	53%
– Forward rate agreements	49,338	1,276	3%
– Other	53,632	NA	NA
<b>Credit default swaps<sup>2</sup></b>	<b>23,719</b>	<b>2,872</b>	<b>12%</b>
– Multi name	9,526	1,746	18%
– Single name	14,193	1,126	8%
<b>Equity<sup>3</sup></b>	<b>5,982</b>	<b>NA</b>	<b>NA</b>
<b>Commodity<sup>3</sup></b>	<b>3,091</b>	<b>NA</b>	<b>NA</b>
<b>Foreign exchange<sup>3</sup></b>	<b>63,349</b>	<b>NA</b>	<b>NA</b>

However, there is something of an offsetting trend: IRS Compression. Compression involves the tearing up of matched trades or trades that do not contribute risk to a dealer's portfolio. Great strides continue to be made in compression in IRS which began in 2003 among groups of banks organized by TriOptima. In 2010, compression began in earnest at LCH.Clearnet's SwapClear. According to TriOptima, by year-end 2011, IRS compression has reached a gross amount of \$240 trillion, including \$64 trillion in 2011 alone<sup>8</sup>. Gross compression figures need to be reduced by 50%, which produces cumulative net compression of \$120 trillion and 2011 net compression of \$32 trillion. IRS compression for the first four months of 2012 totalled \$33 trillion on a gross basis. As explained in ISDA's recent paper, "Interest Rate Compression: A Progress Report", the industry is devoting more resources and more effective techniques to IRS compression. It is hoped these improved results will enable adjusted notionals to continue the decline experienced since 2007.



Because the OTC derivatives market is global, the data are usually presented on a global basis, rather than broken down into regions. However, the BIS produce statistics that underline the importance of the euro in the interest rate sector – by far the biggest. The euro sector is bigger than that of the US dollar, underlining the significance of a market that in this sector alone is about 80% of euro area GDP. However, euro-area CCPs are active in clearing trades in many currencies so their systemic significance is even higher.

<sup>8</sup> TriResolve reconciles approximately 75% of all non-cleared OTC derivative transactions globally on its service. triResolve has a diverse range of global clients including investment banks, asset managers, hedge funds, energy houses and asset servicing firms, reconciling a wide range of OTC derivative asset classes including both vanilla and structured trades. Currently TriOptima offers triReduce Rates termination cycles in 25 currencies with over 200 regional and global institutions participating worldwide.

<http://www.trioptima.com/resource-center/statistics/triResolve.html>



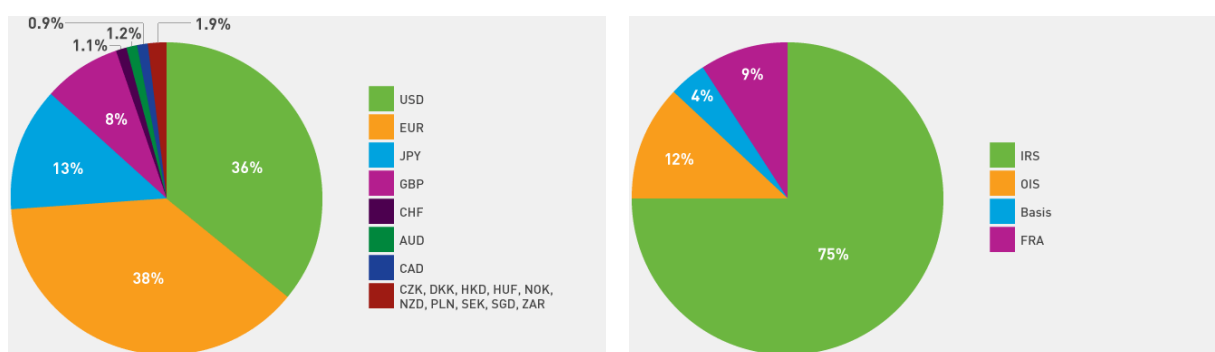
European central counterparty clearing houses formed a trade association (EACH<sup>9</sup>) in 1991. EACH's participants are senior executives specialising in clearing and risk management from European CCPs, both EU and non-EU. Increasingly, clearing activities are not restricted exclusively to exchange-traded business. But the business is dominated by two players: LCH.Clearnet and Eurex.

**Table 21B: Amounts outstanding of OTC single-currency interest rate derivatives**  
**By currency**

In billions of US dollars

Currency	Notional amounts outstanding					Gross market values				
	Dec 2009	Jun 2010	Dec 2010	Jun 2011	Dec 2011	Dec 2009	Jun 2010	Dec 2010	Jun 2011	Dec 2011
<b>All currencies</b>	<b>449,875</b>	<b>451,831</b>	<b>465,260</b>	<b>553,240</b>	<b>504,098</b>	<b>14,020</b>	<b>17,533</b>	<b>14,746</b>	<b>13,244</b>	<b>20,001</b>
Canadian dollar	3,427	4,411	4,247	6,905	6,397	102	102	90	113	205
Euro	175,790	161,515	177,831	219,094	184,702	6,073	7,043	5,827	4,795	8,023
Japanese yen	53,855	55,395	59,509	65,491	66,819	843	980	1,022	1,012	1,132
Pound sterling	34,257	36,219	37,813	50,109	43,367	1,038	1,146	1,016	970	1,655
Swedish krona	4,696	4,461	5,098	5,832	5,844	99	98	71	64	120
Swiss franc	4,807	4,650	5,114	6,170	5,395	128	138	140	144	193
US dollar	153,373	164,119	151,583	170,623	161,864	5,347	7,573	6,177	5,745	7,993
Other	19,669	21,061	24,064	29,017	29,709	389	451	404	402	682

LCH.Clearnet describes itself as Europe's largest clearer of fixed income, playing an important role in the facilitation of interbank liquidity. Concerns about counterparty risk and liquidity are driving demand for an expansion of the service and €152 trillion in notional cleared during 2011, giving a 70%+ market share in cleared European fixed income. Its SwapClear is the world's leading Interest Rate Swap (IRS) clearing service. It clears over 50% of the world's interest rate swaps and the regulatory push to clear more OTC is bringing more OTC asset classes and new clients to clearing. It has \$283 trillion in IRS notional outstanding, equivalent to a 95%+ market share in cleared IRS globally. LCH's currency and product distribution is set out below.



<sup>9</sup> EACH has 23 members: CC&G (Cassa di Compensazione e Garanzia S.p.A.); CCP Austria; CME Clearing Europe Ltd; CSD and CH of Serbia; ECC (European Commodity Clearing AG); EMCF (European Multilateral Clearing Facility); Eurex Clearing AG; EuroCCP (European Central Counterparty Ltd); HELEX AS; ICE Clear Europe; IRGIT S.A. (Warsaw Commodity Clearing House); KDPW\_CCP S.A.; KELER CCP Ltd; LCH.Clearnet Ltd; LCH.Clearnet SA; MEFF; NASDAQOMX; National Clearing Centre (NCC); NOS Clearing ASA; NYSE Liffe; OMIClear; Oslo Clearing ASA; SIX x-clear AG

The systemic significance for Europe becomes clear when the LCH's annual volumes are set against the EU-27's annual output of a mere €13 trillion – IRS turnover alone is more than 17 times EU GDP. LCH's year-end 2011 balance sheet total was €541 billion (equivalent to 4% of EU GDP/ 31% of LCH's host state - the UK) and about three times the size of its nearest rival – Eurex.

Eurex and NYSE-LIFFE have a dominant position between them in exchange-traded derivatives but the BIS show that this category is less than 10% of OTC notionals. Futures and options in Europe total €20 trillion – itself a staggering number – but dwarfed by the OTC market.

## **11.2 Risks to financial stability**

While CCPs bring benefits to trading on OTC derivatives markets, particularly through improvements in the management of counterparty risk, CCPs concentrate credit risk associated with their own failure, which could pose substantial risk to financial stability (Scott, 2009).

### **11.2.1 Concentration of risks**

The process of novation concentrates counterparty risk on CCPs. If a CCP should fail, therefore, the impact on bank and other NBFIs would be very widely felt with the potential for deleterious effects on financial stability. In terms of CCP structure, risks to financial stability arising as a result of their activities are likely to increase as a result of their size, connectedness with bank and NBFIs and connectedness with other CCPs (IMF, 2010).

### **11.2.2 Single versus multiple CCPs**

Risk considerations apart, having a single CCP maximises its economic benefits. Firstly, the value of CCP services varies positively with the number of participants and contracts cleared. Due to these network externalities, the fewer the number of CCPs servicing a given number of clearing members/contracts the better.

Secondly, there are important economies of scale in the services of CCPs, insofar as the average cost per transaction reduces as the number of transactions increases. Economies of scale arise, among other reasons, due to the fixed costs of IT infrastructure, networks and interfaces, as well as due to the character of multilateral netting efficiency -- that is, multilateral netting efficiency falls with the number of CCPs clearing a given product (Duffie and Zhu, 2011).

Consideration of risk also suggests a benefit of single over multiple CCP clearing insofar as the latter may involve relatively high collateral requirements and therefore greater costs in the event of CCP failure (Scott, 2009).

Arguments against a single CCP suggest that economies of scale exist only in clearing specific asset classes due to different risk profiles requiring different risk management techniques, and therefore some benefits of multiple CCPs with different specialisations (Scott, 2009).

### **11.2.3 Direct CCP access**

Direct access to CCPs is important to containing risks to financial stability. If access is too restrictive, and institutions only gain access through indirect clearing arrangements, risks become concentrated among clearing members.



A particular aspect to be considered is the impact of the failure or near-failure of a large dealer-cum-clearing member on market liquidity. This could be an important channel of risk to financial stability insofar as clearing and trading activities could become constrained. However, if other dealers could substitute for the capital and functions of a particular dealer's failure or near-failure, these effects would be assuaged.

#### **11.2.4 Domestic versus global CCPs**

Risks to financial stability of CCPs arise due to different CCP configurations across jurisdictions, currencies and products. CCPs limited along jurisdictional (or currency or product) lines are more likely to be able to insulate domestic markets from global shocks. However, equally, the impacts of domestic shocks are likely to be concentrated (BIS, 2011).

Domestic CCPs may better reduce risk concentrations than global CCPs in general. If domestic CCPs permit more direct access to local market participants than global CCPs (under which access would be obtained through global dealers) then risks to financial stability that would be concentrated among global dealers would instead be dissipated over local market participants (BIS, 2011).

Under certain conditions, domestic CCPs may have a comparative advantage in the provision of clearing services in comparison to global counterparts. As a consequence, some domestic trades that would have been cleared bilaterally may be cleared through a CCP, with associated costs/benefits in terms of risks to financial stability. This could be because domestic CCPs have a comparative advantage in monitoring local market conditions and because domestic CCPs are able to provide more appropriate clearing services to local market participants (BIS, 2011).

#### **11.2.5 Links between CCPs**

Links between CCPs are beneficial insofar they increase opportunities for multilateral netting but they also redistribute outstanding counterparty risk and other risk exposures between CCPs. This generates new risk prorogation channels, including knock-on effects of the failure of one CCP's clearing member affecting other CCPs and its clearing members. Additionally, links between CCPs reduce transparency of the clearing system because clearing members do not only have to monitor its CCP and other clearing members but the CCPs and clearing members to which its CCP is linked. As a result, a linked network of CCPs could recreate some of the counterparty risk linkages that central clearing is intended to mitigate (BIS, 2011).

### **11.3 Conclusion**

The key risk that central counterparties pose is the concentration of credit risk associated with their own failure (or the failure of one of their very large members), which could pose substantial risk to financial stability (Scott, 2009). In terms of CCP structure, risks to financial stability arising as a result of their activities are likely to increase as a result of their size, connectedness with bank and NBFIs and connectedness with other CCPs (IMF, 2010).

## 12 Focus on UCITS and ETFs

UCITS are investment funds which are created complying with a set of requirements laid out in a European Commission Directive. The Directive specifies common requirements for the organisation, management and oversight of the fund. The fund must also abide by rules regarding the fund diversification, liquidity and the use of leverage in order to be considered a UCITS. There is a list of eligible assets in which the fund can invest (BNP Paribas, 2011).

Once a fund is established as a UCITS fund and Member states have been notified, it can be marketed to the public across the EU (EC, 2006).

Non-UCITS is an all-encompassing term that refers to all investment funds that do not conform to the specifications set out in the EC Directive (EC, 2006).

Irrespective of their complexity, UCITS are classified as non-complex products, by definition, under MiFID. Due to the evolution of certain types of funds and particularly their increasing level of complexity and associated risks, there is a growing feeling that more scrutiny of these funds is necessary, in order to prevent future financial crisis (ESMA, 2011).

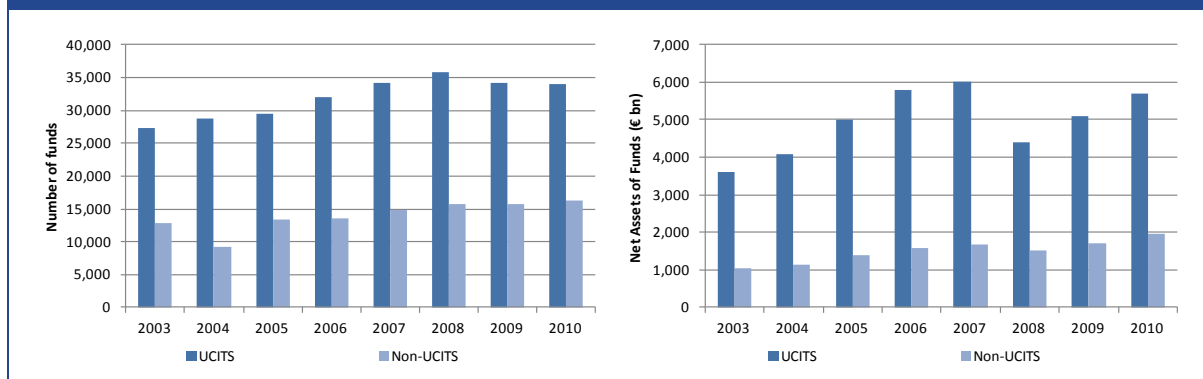
Regulation of UCITS is described in chapter 4. This section provides a description of the evolution of UCITS and ETFs.

### 12.1 Evolution of UCITS

UCITS funds were created in 1985 and are viewed as a global brand which has proved attractive to investors all over the world. The Directive was altered in the early 1990s before these alterations were abandoned for being too ambitious and obsolete by the time the new Directive was ready. The UCITS III Directive came in 2001, before the most recent alteration to the UCITS Directive which was approved by the European Parliament and Council of Ministers in 2009. UCITS Directive IV aims to improve the efficiency and flexibility of the European fund sector and at the same time lowering cost. This would enable these funds to compete more effectively with those from the US, which tend to be fewer in number but on average larger in terms of asset value.(BNP Paribas, 2011).

Figure 46 shows the development of UCITS and non-UCITS within the EU between 2003 and 2010. It shows that each year the number of UCITS funds has been more than double that of non-UCITS funds. This difference in size is even more pronounced when, rather than considering the number of funds, the net assets of the funds are considered. This shows that not only are there more UCITS funds than non-UCITS funds in the EU, but also that on average they are bigger.

The net assets held by UCITS in the EU fell quite dramatically after 2007, from almost €6,000 billion in 2007 to just over €4,400 billion in 2008. This result was not replicated in the number of UCITS fund in the EU, which rose by over 1500 in 2008. However, the number of UCITS funds did fall in both 2009 and 2010, whilst the net assets held by those funds rose.

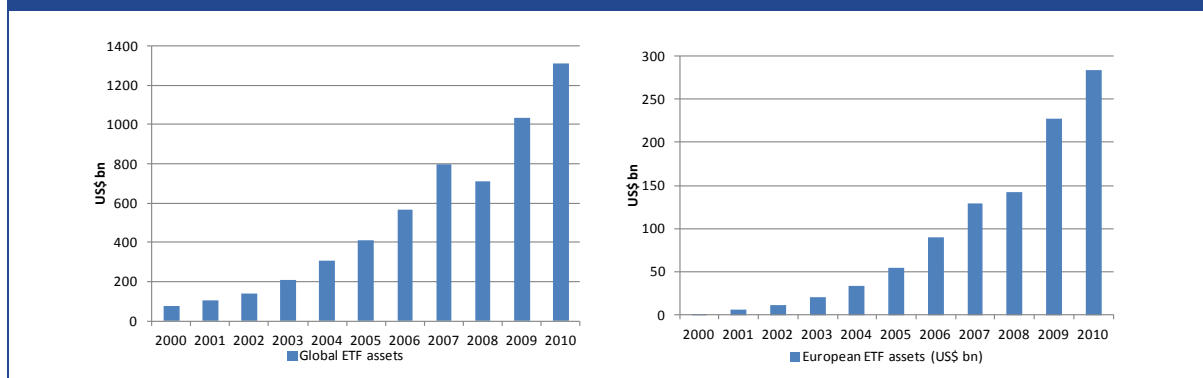
**Figure 46: Comparison of EU27 UCITS and non-UCITS markets**

Source: European Capital Markets Institute

A CESR report to the Commission on the MiFID review recognised that there was a case for considering treating structured UCITS and UCITS which employ complex portfolio management techniques as complex financial instruments. One particular type of fund that has been viewed by some as adding to the risk of financial instability is exchange-traded funds (CESR, 2009).

## 12.2 Exchange-traded funds (ETFs)

The origins of ETFs are in the early 1990s and they were seen as a cost- and tax-efficient alternative to mutual funds. Their underlying index exposure was gained through buying physical stocks and securities in the index; however this has evolved over time. As the demand for more complex products that could offer higher returns increased over time, ETFs moved away from being a plain vanilla alternative to mutual funds, to becoming a more complex and diverse collection of products (BIS, 2011).

**Figure 47: Size of assets in Exchange-traded funds, 2000-2010 (US\$ bn)**

Source: Blackrock- ETF Landscape, Industry Review End Q1 2011

As Figure 47 above shows, the size of ETFs grew dramatically over the 2000s. They held very few assets in Europe in 2000, whilst they were somewhat more popular elsewhere in the world.

They grew rapidly after 2000 and up until the crisis in 2007, both globally and in Europe particularly. In 2008, the total assets held by ETFs in Europe also rose compared to the previous year, however not as sharply as in the preceding years. However, globally the value of assets held by ETFs fell in 2008.

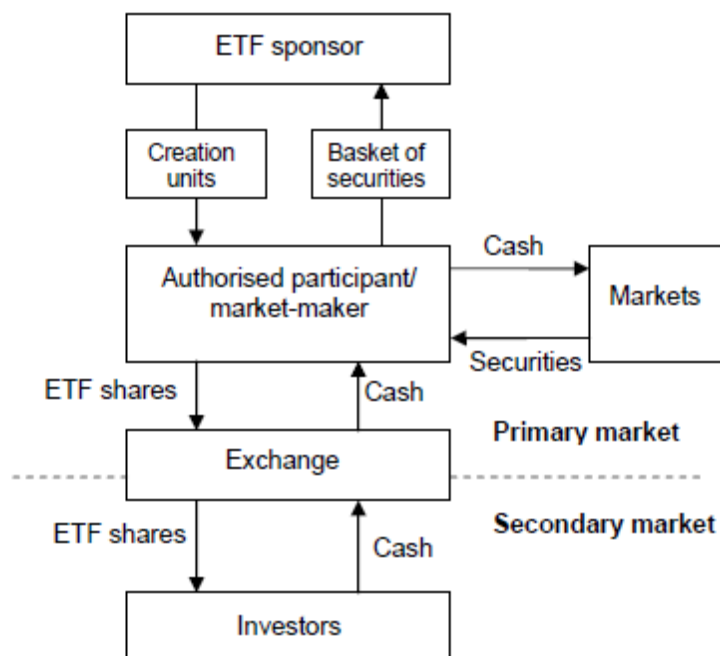
This setback to the rapid growth of ETFs did not last though, as both globally and in Europe, after 2008 the value of assets held by ETFs continued to rise both in 2009 and 2010.

The potential risks to financial stability associated with certain types of ETFs have been raised by several organisations including the Bank for International Settlements, the Financial Stability Board and the European Securities and Market Authority (BIS, 2011; FSB, 2011 and ESMA, 2011).

The lengthening of the financial intermediation chain leads to greater risk due to the fact that it becomes more complicated to assess the risks of financial products due to the lack of transparency of how risks are managed at different stages along the intermediation process (BIS, 2011). ETFs are structured as open-ended mutual funds that allow investors to gain diversified exposure to financial assets across geographical regions, sectors or asset classes (BIS, 2011).

The operational structure of ETFs that use physical replication schemes to gain replicate indices are shown below in Figure 48. Authorised participants, who act as market-makers, purchase baskets of securities in the market that replicate the ETF index and deliver them to the ETF sponsor and in return they receive ETF creation units. This transaction between sponsor and market-maker occurs in the primary market, whilst investors who buy and sell the ETF then trade in the secondary market through brokers on exchanges. Investors purchasing in the secondary market are not subject to subscription or redemption charges. The market value of the basket of securities held by the ETF sponsor form the basis of determining the net asset value (NAV) of the ETF held by investors (FSB, 2011).

**Figure 48: Operational structure of ETFs**



Source: BIS Working Paper No. 343

The evolution of ETFs has involved moving from simply buying all of the underlying securities comprising the index, to holding an optimised basket of the underlying securities in the index and generating additional income by lending the securities out (BIS, 2011).

Examples of more complex funds include synthetic and leverage ETFs. Synthetic ETFs allow replication of the index through holding derivatives rather than owning physical assets, with one motivation for this being reduced costs. Leverage ETFs deliver returns which are a multiple of the daily performance of the index or benchmark that they track. Another similar product in existence is a leveraged inverse ETF, which deliver a return which is a multiple of the inverse performance of the underlying index (BIS, 2011).

Synthetic ETFs transfer the risk of any deviation in the ETF's return from its benchmark to the swap provider, which is effected by entering into a derivatives contract to receive the total return of the benchmark. The result of this is to protect investors from the tracking error risk which physical replication schemes would otherwise expose them to. The cost of this lower tracking error risk is that there is increased counterparty risk to the swap provider (BIS, 2011).

Further cost savings are found by combining the investment banking activities of the parent bank with the asset management subsidiary, which acts as the ETF sponsor (BIS, 2011).

#### **The flash crash of May 6, 2010 and ETFs**

According to the CFTC/SEC report on the flash crash, equity-based ETFs were disproportionately affected by the extreme price volatilities. This was in large part due to the fact that many ETF market makers, particularly those that value underlying stocks as part of their normal market making activities, paused their market making for considerable periods of time during that day.

The CFTC/SEC report also notes that the result of their analysis of order books on May 6<sup>th</sup> *“are consistent with the hypothesis that relative to the liquidity of large-cap stocks, much more of the liquidity in ETFs is provided by market professionals, such as market makers and HFTs, who tend to quote much closer to the inside of the market than do non-professional investors who may have price targets much further from the mid-quote. Therefore, when professionals pulled out because of data-integrity concerns, ETFs may not have had the same level of resting liquidity far from the mid-quote as did large-cap stocks, allowing a disproportionate number of ETF orders to hit stub-quote levels”*.

### **12.3 Risks to stability**

The increased growth of ETFs and particularly their increased complexity and synthetic replication schemes may threaten the stability of the financial system. These threats include the grouping of tracking error risk with trading book risk by the swap counterparty, which could compromise risk management; collateral risk triggering a run on ETFs in periods of heightened counterparty risk; materialisation of liquidity risk when there are sudden and large investor withdrawals; and increased product complexity and options on ETFs undermining risk monitoring capacity (BIS, 2011).

### 12.3.1 Tracking error risk

Synthetic replication schemes transform the underperformance risk to the swap counterparty. The risk associated with this behaviour is that it leaves the counterparty more liable to experience tracking error for index-tracking ETFs. As this underperformance or tracking error might be intertwined with the rest of the trading book risk of the counterparty, this could undermine the oversight function and compromise sound risk management.

The capacity of the counterparty to bear this tracking error risk whilst still maintaining the market liquidity needed were there to be a sudden and large liquidation of ETFs is untested. The opportunity to “gate”, meaning to restrict investor withdrawals, is not available to ETFs currently. This is a method used by some hedge funds to manage liquidity risk, so the use of such a tool may also be beneficial for ETFs (BIS, 2011).

### 12.3.2 Counterparty risk

It has been shown in the recent financial crisis that institutional investors are likely to be the first to run when markets question the solvency of a fund provider. This is liable to trigger an even broader run on the industry (BIS, 2011).

In the event of a default by the derivative counterparty, an ETF has to liquidate the collateral received from the counterparty, for counterparty risk mitigation purposes. They then need to complete a new derivative transaction to ensure the continuity of the product. There is a risk to investors that the proceeds of the collateral sale do not cover the loss that arises as a result of the default of the counterparty.

It is likely that the collateral assets will include illiquid assets, as it is in the interest of funds to shift to this type of collateral over time. Given the fact that there may be very little overlap between the assets in the collateral basket and the index basket, there will be an incentive for institutional investors to liquidate synthetic ETFs in periods of heightened counterparty risk (BIS, 2011).

Large withdrawals from ETFs could raise correlation across asset classes sharply. The consequences of this may lead to an adverse feedback loop that further increases counterparty risk.

### 12.3.3 Liquidity risk

Whether triggered by market events or counterparty risk, unexpected and large investor withdrawals can lead to funding liquidity risk. This risk can spread through the investment banking function, which may take for granted the access to cheap funding which is available to the ETF sponsor as a result of the innovation in ETFs (BIS, 2011).

Due to the fact that ETF redemptions will need cash to be paid against collateral assets that might be illiquid, market-making activities could be severely hampered, due to the priority of funding these assets.

The difficulties experienced by individual institutions could then spread across the financial system as a whole, leading to a liquidity crisis.

### 12.3.4 Product complexity and opacity

The development of these products seemed to spread the risk-bearing capacity away from banks to the broader investor community, suggesting lower borrowing costs for firms and individuals. The original plain vanilla-type structured products, which packaged physical assets in special purpose vehicles, were popular with investors and were reasonably transparent (BIS, 2011).

As their popularity grew, a lack of liquidity and supply of the underlying assets that delivered the returns investors targeted, led to the structuring of synthetic products. The development of these more complex products meant that the funds lost some of their transparency (BIS, 2011).

By including a variety of markets and players in the process of replicating the desired benchmark indices, ETFs add to the complexity of monitoring the level of risk associated with the fund. There is little transparency on the underlying assets backing many structured products and it is not possible for investors to monitor the index replication process when this function is completed by the swap counterparty (BIS, 2011).

Further developments of ETFs, such as through the use of leveraging, add further layers of complication to the mix when trying to complete a risk assessment.

## 12.4 Conclusion

The threats to financial stability arising from ETFs include the grouping of tracking error risk with trading book risk by the swap counterparty, which could compromise risk management, collateral risk triggering a run on ETFs in periods of heightened counterparty risk, materialisation of liquidity risk when there are sudden and large investor withdrawals and increased product complexity and options on ETFs undermining risk monitoring capacity

## 13 Measures of OFIs' impact on financial stability

### 13.1 Introduction

In order assist the review of literature below on identifying financial stability risk indicators for non-bank financial, it is important to adopt a specific operational definition of financial stability.

Consider the following definitions for financial distress and financial instability.

**Financial distress**

*"An event in which substantial losses to financial institutions and/or the failure of these institutions cause, or threaten to cause, serious dislocations to the real economy, measured in terms of output foregone"*

**Financial instability**

*"A set of conditions that is sufficient to result in the emergence of financial distress/crises in response to normal-sized shocks. These shocks could originate either in the real economy or the financial system itself. Financial stability is then defined as the converse of financial instability."*

Despite these definitions being rough, they provide a starting point for our investigation for two reasons. Firstly, they focus on the performance of financial institutions, which is relevant in the context of this study. And secondly, financial distress is generated in response to a shock that is not of extraordinary size, as is unreasonable to expect the financial system to function effectively regardless of the size of exogenous shocks that hit it.

The notion of financial stability is closely related to systemic risk and interconnectedness/contagion. For instance, De Bandt and Hartmann (2000) provide a thorough survey of the systemic risk literature and provide the following definition of systemic risk, with interconnectedness/contagion at its core.

*"A systemic crisis can be defined as a systemic event that affects a considerable number of financial institutions or markets in a strong sense, thereby severely impairing the general well-functioning of the financial system. While the "special" character of banks plays a major role, we stress that systemic risk goes beyond the traditional view of single banks' vulnerability to depositor runs. At the heart of the concept is the notion of "contagion", a particularly strong propagation of failures from one institution, market or system to another."*

The key idea of both financial stability and systemic risk is that a small shock, due to a set of financial sector conditions, propagates from institution to institution and into financial crisis.



This chapter provides a selected overview of approaches for the measurement of financial instability and financial distress. The focus is on tools that have been developed for banks that may be usefully applied to NBFIs in the future.

Analogous research directly relating to NBFIs is, to our knowledge, not yet available.<sup>10</sup> This point is confirmed in a recent BCBS working paper (see BCBC, 2012) which states that *“the role of non-bank financial institutions is almost universally ignored”* by studies on systemic risk and risk indicators and *“this appears to be one of the most serious gaps in the literature...”*

Moreover, the same working paper notes that *“currently, there is no widely accepted model for comprehensively measuring systemic risk. Instead, researchers have tended to use a wide range of models and methodologies to examine one or a few specific aspects of systemic risk.”*

In part, the lack of focus on NBFIs in systemic risk analysis may be due to the fact that a) there is not yet a clear understanding of the role of NBFIs in the process of financial intermediation in recent years and b) their role has been evolving. Existing institutions are undertaking activities that they previously were not involved in, and altogether new institutions have emerged undertaking new activities in the process of financial intermediation (see previous chapters).

Additionally, there is a lack of data available on NBFIs in comparison to banks.

This chapter provides an overview of the main tools used for measuring the impact of banks on financial stability and financial distress as many could be applied as well to NBFIs if the required data were available.

These tools can be classified into four categories:

- Indicators of financial distress based on balance sheet variables
- Early warning indicators
- Macro stress tests
- Methods for calculating the systemic importance of individual institutions
- Analyses of interconnectedness.

A comprehensive review of various indicators focusing on these different aspects can be found in Bisias et al. (2012). Our review of the literature and the one undertaken by Bisias et al. (2012) shows that the work on such indicator is still very much work in progress with no conclusive and robust findings as to the best approach.

Moreover, as the work by Danielson et al. (2011) shows, many of the more sophisticated indicators (such as CoVaR, SES, Shapley, banking stability measures) are more contemporaneous indicators of stress than predictive indicators.

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<sup>10</sup> There are two exceptions to this statement. The Solvency II work for insurance undertakings and the various regulatory work on pension funds. However, even in these cases, the knowledge base remains weak.

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As well, all empirical indicators are subject to the Lucas critique as market participants are likely to adjust their behaviour once it is known that certain models are used by supervisory authorities, regulators, etc to monitor risk.

In one sense, indicators of financial distress and early warning indicators, as well as being relevant to measuring financial instability in their own right, form the building blocks for the analyses undertaken through more complex tools such as macro stress tests. These building blocks explain the linkages between aspects of the financial sector and financial stability and in relation to banking they have been elaborated. However, as abovementioned, research on the links between the OFI sector and financial stability has not been elaborated, and therefore our focus is on the so-called building blocks first.

Secondly, the emphasis on indicators of financial distress and early warning indicators is, in part, driven by data considerations discussed elsewhere in this report. That is, suitable data to calculate the systemic importance of individual institutions, for instance, are not widely available.

Finally, methods for calculating the systemic importance of individual institutions and to some extent macro stress tests also, are relatively new areas of research (see Borio and Drehmann (2009) and Galati and Moessner (2011) for discussions). Therefore, while it is important to flag this body of work to future research on the NBFIs sector, it is not clear at this early stage how suitable it is.

With these introductory comments in mind, each of the abovementioned categories is described in detail below.

### **13.2 Indicators of financial distress based on balance sheet variables**

Indicators of financial distress based on balance sheet variables are widely used to assess risks to financial stability (e.g., IMF Financial Soundness indicators). The key merit of these indicators is that the information required to construct them are readily available through publicly available financial statements. (The detailed frameworks adopted by the IMF and the ECB are provided at Annex A7.1))

However, the properties of these indicators limit their use as a tool for the supervision of risk (Galati & Moessner, 2011). Firstly, as balance sheet variables are backward-looking they do not help to identify the building up of risks of OFIs in a timely fashion. Secondly, some risks may be captured by off-balance sheet items (e.g., contingent liabilities). And thirdly, as balance sheet variables are OFI-specific they do not properly relate individual indicators of financial distress to vulnerabilities to financial stability as a whole. As a consequence, these indicators, inter alia, do not inform how likely shocks are to occur or the potential impact of shocks on financial stability.

Another challenge is evaluating indicators of financial distress, as in many cases there are no benchmarks as regards desirable values (an exception is measures of capital adequacy that are set by regulatory requirements). Given these difficulties, the main approach adopted by supervisors of risk is to measure developments of indicators over time and in relation to comparison groups.

The above considerations notwithstanding, indicators of financial distress based on balance sheet variables are considered in greater detail below.

## 13.3 Early warning signals

### 13.3.1 Background

The IMF Financial Stability Indicators and the ECB macro-prudential indicators assess financial distress through balance sheet variables (i.e., particularly the core set of indicators among the FSIs and the internal factors of the MPis). In addition, however, they highlight indicators in the non-bank financial sector and the non-bank sector that serve as early warning signals of financial distress.

The approach of early warning signals is to estimate reduced-form relationships between a set of explanatory variables and an indicator of financial distress, and to use the resulting estimates combined with projections for explanatory variables to assess future developments of the indicator, and in turn, financial stability.

The benefits and costs of early warning signals are elaborated in Borio and Drehmann (2009). The benefits of this approach are twofold. Firstly, early warning signals represent efforts to establish basic relationships through rigorous statistical analysis. While based on historical data, the approach is forward-looking in terms of the way information on basic relationships is used to provide forecasts for indicators of financial distress. And secondly, insofar as the statistical analysis undertaken is grounded in theory or some view of the inter-relationships between variables, early warning signals are useful for examining qualitatively or providing a narrative of factors underlying financial distress.

However, from a policy perspective, the time horizon of early warning signals is often too short. In practice, early warning signals may be developed with too much of a data-driven focus that leads to model over-fitting at the cost of out-of-sample performance. Moreover, it has been found that the approach is subject to type II error, insofar as crises are predicted that do not actually materialise. Finally, and more generally, the basis of early warning signals on historical relationships, may not hold true in the future, and particularly at pertinent points in time ahead of financial crises.

Below we review a set of early warning signals highlighted by Borgy et al. (2009) that overcome some of the difficulties they face outlined above.

### 13.3.2 Indicators based on asset and credit markets

Early warning indicators based on asset and credit markets are based on the view that excessively strong growth in credit and financial asset prices reflect a build-up of financial imbalances, which have the potential to unwind and disrupt financial stability.

There is a long standing literature on early warning indicators based on asset and credit markets. This tends to contain macroeconomic variables, credit and monetary variables and variables relating to global economic and financial conditions (Borgy et al., 2009), as shown in Table 21.

Below, we discuss the transmission mechanisms through which developments of these factors relate to growth of asset and credit prices. The main finding of this discussion is that OFI variables may inform on credit conditions that could therefore serve as effective early warning indicators.

**Table 21: Early warning indicators**

	Indicator
<i>Macroeconomic variables</i>	
	Housing prices
	Stock prices
	Real GDP
	Residential investment
	Residential investment-to-GDP ratio
	Investment
	Total investment-to-GDP ratio
<i>Credit and monetary variables</i>	
	Credit (real)
	Credit
	Credit-to-GDP ratio
	Money (real)
	Money
	Money-to-GDP ratio
	Nominal long-term rate
	Nominal short-term rate
	Real long-term rate
	Real short-term rate
	Spread
<i>Global economic and financial variables</i>	
	Current account-to-GDP ratio

Source: Borgy et al. (2009)

### **Macroeconomic variables**

Macroeconomic variables capture the impact of real activity on asset and credit price growth, and asset price growth in particular, specifically through the income and expectations channels.

The income channel involves greater incomes leading to greater demand for assets, thereby bringing about asset price growth.

The expectations channel entails asset demand resulting from economic actors' expectations of asset price growth, which subsequently brings about asset price growth.

### **Credit variables**

Credit variables reflect the "credit view", that is, banks' (or OFIs') balance sheet characteristics may have macroeconomic implications.

For instance, monetary policy is likely to be transmitted through credit (i.e., bank loans) as well as through money (i.e., bank deposits), as shown in Bernanke and Blinder (1992). In addition, other bank balance sheet characteristics may be relevant such as collateral, as in Bernanke, Gertler and Gilchrist (1999). Indeed, several studies show that credit variables serve as good early warning indicators of asset-price busts (Gerdesmeier et al., 2009; Alessi and Detken, 2009; and Borio and Lowe, 2002).

Research on the credit view has highlighted the role of financial intermediation in explaining asset and credit bubbles. Given growing role of OFIs in the financial sector, it may be that early warning indicators based on their activities may now also play a role in highlighting financial instability. These linkages are explored in Adrian and Shin (2008) and are detailed below.

### ***Monetary variables***

Monetary aggregates capture the "money view" that the level of money supply influences short-term output and asset prices. This emphasises the importance of liquidity to asset price developments through aggregate bank liabilities.

### ***Current account variables***

Current account variables summarise the role of capital inflows and global imbalances in the growth of asset price bubbles, and explain the discrepancy between broad monetary aggregates and credit developments.

### ***Interest rate variables***

Interest rates reflect the behaviour of central banks or monetary authorities. As described in Borgy et al. (2009), "These serve to assess the extent to which historically low level of interest rates may be prone to asset price bubbles. This stems from the fact that a lower level of interest rates tends first to increase the level of future expected dividends, in the case of stocks, or rents, in the case of housing, while at the same time decreasing the values of discount factors, thereby resulting in an increase in asset prices. In addition, interest rate increases in response to asset price growth may suggest financial instability insofar as with them may come about adverse selection and moral hazard problems and increased defaults of over-indebted households or firms."

## **13.3.3 The CISS model**

Very recently, Holló et al. (2012) put forward a new indicator model, the Composite Indicator of Systemic Stress, which is based on a very large range of observable variables from the money market, the bond market, the equity market, financial intermediaries and the foreign exchange market. While their approach is very comprehensive, it is a contemporaneous indicator and not a leading one. Therefore, it is of limited use for the present exercise.

## **13.3.4 Assessment of early warning signals' performance**

### ***Methodologies***

Assessments of early warning signals involve, inter alia, carrying out non-parametric and parametric tests to determine whether they were effective in predicting episodes of financial instability (see, for example, Borgy et al., 2009).

Non-parametric tests involve determining whether early warning indicators behave differently during episodes of financial stability and instability, as measured by indicators of financial distress.

For example, credit-to-GDP ratios may have been higher in the lead up to the financial crisis and lower during the financial crisis. And in particular, credit-to-GDP ratios lagged a given number of periods may be especially closely related to the financial crisis.

The results of non-parametric tests may be used to undertake parametric tests. Namely, early warning indicators identified through non-parametric tests can be used in a regression model of financial instability.

In a discrete-choice framework, i.e., the dependent variable is an indicator for episodes of financial stability or otherwise, the coefficients on a given early warning indicator can be interpreted as the marginal increase in the probability of financial instability resulting from an increase in the early warning indicator.

### **Results**

The results of this exercise place emphasis on the importance of credit variables. Borgy et al. (2009), for instance, show the importance of credit variables in explaining stock price booms. Across four methods of identifying stock price booms, a one standard deviation increase in credit variables (lagged three periods) increases the likelihood of a boom in the range 1.1-8.7%.

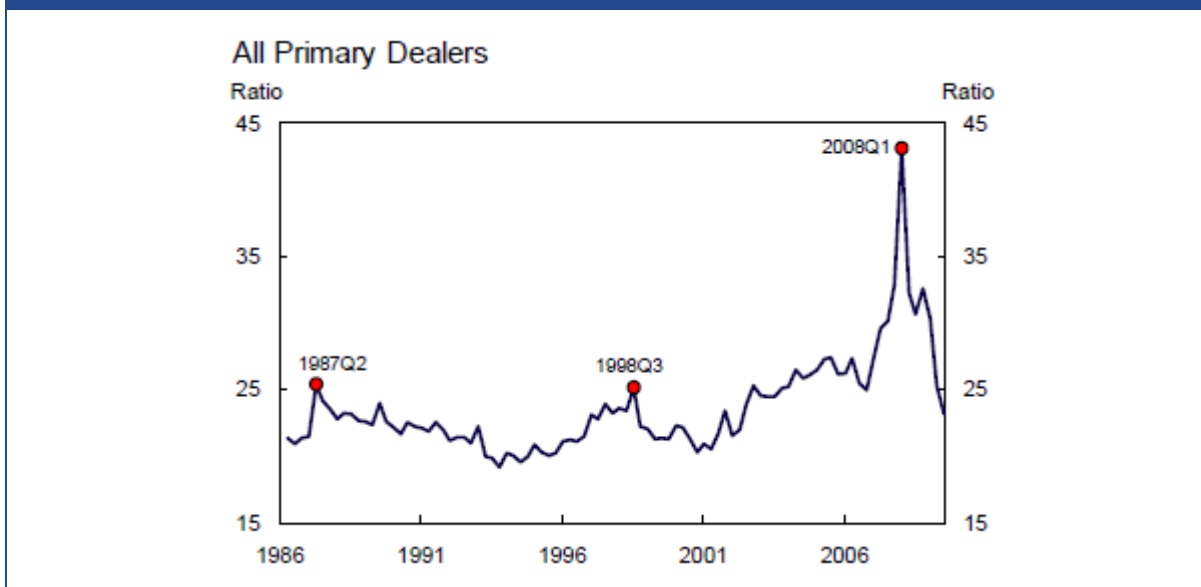
In the context of the present study, this may suggest that OFI variables that inform on credit conditions may serve as effective early warning indicators.

However, it must be emphasised that early warning signals may be relevant in explaining past episodes of financial instability but not necessarily future ones.

#### **13.3.5 The relationship between NBFIs and credit conditions**

NBFIs are important to the credit channel. Growth in the balance sheets of NBFIs provides a sense of the availability of credit while contractions have tended to precede financial instability (Adrian and Shin, 2009).

NBFI leverage is strongly procyclical (as shown in Adrian and Shin, 2007). This suggests that NBFI leverage can be used as an early warning indicator. Indeed, Figure 49 shows that NBFI leverage in the USA reached a peak two quarters prior to the financial crisis.

**Figure 49: Mean leverage of primary dealers**

Source: SEC

Based on the analysis above, candidate early warning indicators for OFIs should be selected on the basis of informing of developments in credit markets. The rationale for this is that OFI variables could inform developments of credit conditions and strong growth in credit, through a build-up of financial imbalances, has the potential to unwind and disrupt financial stability.

### 13.4 Macroeconomic stress tests

Macroeconomic stress tests are used to determine how, in the present context, financial stability would be affected as a result of shocks to the financial system.

Despite a wide range of methodologies employed, macroeconomic stress tests all share the attribute of having a macroeconomic model underlying them that generates shocks or describes the scenarios for macroeconomic variables (Drehmann, 2008). This may be based on a model linking indicators of financial distress and early warning indicators or other types of models (e.g., vector auto regressions). These shocks or scenarios are then used to assess how sectoral balance sheets respond.

The benefits of macro stress tests are that they are explicitly forward-looking and have the potential to cover a broad range of scenarios. One can also trace shocks in such a way to consider potential transmission mechanisms across individual institutions and policy responses in relation to areas of balance sheet fragility.

However, in the context of the banking sector, and prospectively, in relation to non-bank financials, macro stress tests are subject to a number of important shortcomings.

Firstly, the macroeconomic models do not properly incorporate financial variables. Secondly, data availability, e.g., of important off-balance sheet items, is lacking. More generally, Borio and Drehmann note that "greater granularity and relevance are bought at the expense of ruling out interactions and feedback effects [but] it is these interactions, within the financial system and

between the financial and the real economy, that lie at the heart of the dynamics of financial distress."

Within the present context, therefore, even if suitably rich data did become available on the balance sheets of non-bank financials, significant empirical research would need to be carried out to determine the linkages between the sector, the financial system and the real economy more broadly as well.

### **13.5 Calculating the systemic importance of individual institutions**

Our discussion of the definition of financial stability emphasised the role of inter-connectedness/contagion. That is, individual institutions/'herds' of institutions could be so inter-connected that they are in a position to cause negative spill-over effects on others that leads to financial distress. On this basis, it is important to calculate the systemic importance of individual institutions.

Billio et al. (2010) highlight that empirical measures of the systemic importance of individual institutions can be categorised into three broad types. The first group concentrates on bank contagion, which analyses the autocorrelation of bank variables (e.g., defaults, bank returns and fund withdrawals). In principle, similar measures could be constructed for non-bank financials. The second group looks at developments of aggregate variables that have predictive power for financial crises as per the discussion of early warning indicators and macroeconomic stress tests above. The third group considers contagion on the basis of correlations, extreme dependence of market returns and co-movements of market returns not explained by fundamentals.

Three measures for calculating the systemic importance of individual institutions in the spirit of the third group are reviewed in the literature review presented at Annex A7.2. However, in the present context, the difficulty of applying them to OFIs is that they rely on market data, which are not available for non-quoted OFIs and only on a limited basis for quoted OFIs.

Measures for calculating the systemic importance of individual institutions based on a response by the Basel Committee to the Financial Stability Board's Recommendations described in BIS (2011) are also presented.

### **13.6 Conclusion**

This chapter provided an overview of selected approaches to measure the impact of banks on financial stability that may be relevant in the context of assessing the impact of non-bank financials' impact on financial stability.

The focus was on indicators of financial distress, early warning indicators, and to a lesser degree, macro stress tests and measures for calculating the systemic importance of individual institutions. The motivations for this focus were twofold.

Firstly, as the connections between NBFIs and financial stability are not yet fully understood, we focus on indicators of financial distress and early warning indicators as these form the building blocks for more complex analyses undertaken through other measures.



Secondly, due to data limitations, i.e., many NBFIs do not have market-based variables relating to their performance, we cannot implement measures for calculating the systemic importance of individual institutions.

Thirdly, research in the area of indicators of financial distress have highlighted that attention should be paid to balance sheet variables.

## 14 Knowledge gaps and how to monitor OFIs

The previous chapter described a number of different measures for assessing the impact of non-bank financial institutions on financial stability. This analysis highlighted the following knowledge gaps.

- **Indicators of financial distress:** A set of balance sheet variables may inform the relationship between OFIs and financial stability in relation to the financial crisis but may not inform this relationship in connection with potential future crises. As a starting point, therefore, this suggests "casting the net wide" with a broad and periodic focus on developments of all balance sheet variables from a statistical perspective. Qualitatively, any balance sheet variables that grow in size and especially at a fast rate should be considered through consultations with experts (e.g., market participants, regulators, etc.).
- **Early warning indicators:** There is a lack of information on the basic relationships between non-bank financial intermediary sector and financial stability. In part, this is due to the role of NBFIs only having grown in recent years. However, it has also perhaps to do with a lack of differentiation among the functions NBFIs can undertake in the process of financial intermediation. And, how the process of financial intermediation does not include a fixed step of steps as it does in the traditional banking sector. A deeper investigation of the links between NBFIs and financial stability could therefore be undertaken.
- **Macro stress tests:** The lesson in relation to macro stress tests builds on the lessons learnt through early warning indicators. That is, without an understanding of basic relationships between NBFIs and financial stability, more in depth empirical studies using macro stress tests, for instance, cannot be undertaken effectively. That is, it is advised in the literature that there should be some theoretical link between variables established first before empirical investigation is undertaken.
- **Calculating the systemic importance of individual institutions:** The approaches reviewed for calculating the systemic importance of individual institutions relate to banks for which there is market data available. Analogous market data is not available for many NBFIs and therefore alternative measures for calculating the systemic importance of individual NBFIs is required.

During the consultation exercise, many stakeholders noted that, while the aggregate information available from commercial sources, trade associations, etc. was of value, much more important to them was the private information obtained as part of the establishment of counterparty relationships and the on-going monitoring of such counterparties through a steady flow of private information.

Of note is the fact that stakeholders were of different views on the value of risk reflecting market instruments such as, for example, CDSs. While some stakeholders noted that that CDSs do provide useful information on the market perception of the riskiness of a particular institution and make use of such information, others were more skeptical about the added value of CDSs relative to their in-house monitoring and assessment based on private information.

## 14.1 Database development

There are three major issues currently in relation to developing aggregate data for market segments.

- **Lack of EU27 geographic coverage:** The ECB has recently begun to collect and publish data on different segments of the non-bank financial intermediary sector. However, there is not presently coverage of the EU27.
- **Lack of time-series:** Even the ECB data that is available only spans a few quarters in some cases. This restricts the types of analysis feasible, for instance, analysing the relationship between particular NBFIs and the financial crisis.
- **NBFIs include large, diversified firms:** Activities of firms such as insurance institutions in the non-bank financial intermediation space may not be properly captured through current balance sheet data due to the wide range of other activities they undertake.

In relation to individual institutions, the following challenges exist.

- **Identification of all non-bank financials:** From a static perspective, i.e., in relation to the current known non-bank financials, there is limited public information as regards to the largest actors, for instance, by assets under management.

Further, and from a dynamic perspective, new institution types may emerge that are relevant to non-bank financial intermediation.

Efforts should therefore be made in connection with identifying the largest existing institutions and monitoring of potentially new institution types emerging.

- **Data for the largest non-bank financials:** Data on the largest non-bank financials, especially needed for calculating measures of systemic importance are not available. In the future, these should be collected for the proper monitoring of risk.

## 14.2 Going forward – how best to monitor OFI

While there is still a lack of consensus on the precise reasons why the problems with the sub-prime mortgages in the USA turned into a very severe recession, it is commonly accepted that a number of key factors were at play. Abstracting from fraud, etc., the key factors contributing to the crisis and exacerbating it while it was unfolding include:

- Incorrect assessment of credit risk of certain securities and of market risk for certain classes of assets. Opacity and complexity of some assets and general exuberance exacerbated the general problem.
- High reliance on leverage, especially short-term debt funding.
- General opacity about “true creditworthiness” of various counterparties and different more complex assets not traded in deep, liquid markets.

- Lack of appreciation of how interconnectedness between MFIs and between MFIs and NBFIs had developed during the period preceding the crisis.
- Lack of appreciation of how fallacy of composition had become a real issue in the financial system.

In assessing how best to go forward, a recent study by Christiansen et al. (2012) gives some guidance. It provides an extensive analysis of the extent to which volatility in financial markets can be predicted by economic and financial variables. The authors find that three key financial indicators, namely credit risk, leverage and funding illiquidity, are much better predictors of financial volatility than macroeconomic variables

As it will not be possible for the DG to access the type of private information that can be obtained by individual NBFIs as part of their regular operations, we recommend adopting a relatively high level monitoring system if the DG can only rely on publicly available data and does not gain access to the more detailed data, which henceforth will have to be provided to monetary authorities, regulators and/or financial stability institutions. Obviously, if the DG were to gain access to such data, a very different monitoring system could be implemented.

The key risk contributing factors that should be regularly monitored as part of a broader risk monitoring system include at the level of the various NBFi segments and individual NBFi:

- An indicator of the appetite for risk-taking
- An indicator of leverage
- An indicator of liquidity risk
- An indicator of maturity mismatch

First, the **appetite for risk-taking** can be indirectly monitored by focusing on the rate of growth of the balance sheet and of certain asset classes in the detailed sectoral balance sheets produced by Eurostat and the European Central Bank. Any rapid acceleration in the growth of the aggregate balance sheet or in certain class is likely to be associated with a loosening of credit standards as an institution or institutions are likely to chase quantity over quality. This sectoral monitoring can be complemented by a monitoring of the balance sheet and on/off balance sheet positions and assets. Obviously such monitoring is only feasible in the case of institutions which release periodically balance sheet and income statement information. Private companies, such as hedge funds, typically do not make such information publicly available.

Second, the same balance sheet information can be used to monitor **leverage** at the sectoral and sub-sectoral level where leverage is defined as the ratio of total debt to equity and shareholders' funds.

Third, an indication of the **liquidity risk** can be obtained by computing the ratio of short-term debt to total assets or to total debt.

Fourth, to complement the set of indicators, it would be useful to construct an indicator of **maturity mismatch** to gain a better understanding of the sector's or sub-sectors' exposure to interest rate movement risk.

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Missing from the set of indicators listed above are indicators related to credit and market risk. The sectoral and sub-sectoral data which are currently available are too aggregated to be able to construct credit and market risk indicators. While the annual statements and reports published by public financial institutions provide often information of the credit and/or market risk of a range of assets on their books, such information is typically available with a considerable lag so as to make it largely useless in a rapidly evolving financial environment.

Missing is also an indicator of interconnectedness as, at the present time, the publicly available information can only be analysed at a very aggregate level (as was shown in section 2.1.3) and provides only a picture, from the MFIs' perspective, of the connectedness of MFIs with NBFIs but not, from the NBFIs' perspective, of connectedness of NBFIs with themselves or with MFIs.

This is unfortunate as the lack of such data does not allow one to establish whether the rapid expansion of the balance sheet of a particular NBFI sub-sector or the rapid growth in certain asset class or financial activity results in increased risk for the sub-sector or the originator of the product itself, for other financial sub-sectors of the NBFIs, the MFIs and/or real economy. Without good information on the distribution of risk it is not possible to ascertain whether systemic risk has increased or not.

It is not possible to examine how these proposed indicators did behave in the run-up to the crisis and during the crisis as the historical data required for such an analysis does not exist. However, going forward, such data will be regularly available.

The broad sectoral monitoring should be accompanied by a monitoring of the evolution of various asset classes or activities such as:

- derivatives (using data from the BIS)
- securitised assets (using data from AFEME)
- repos (using data from ICMA)
- securities lending (using data from Data Explorer)
- CCP exposures (using data from the CCPs)

The latter set of data is useful for deriving an overall perspective on how the market is developing - fast growth in a particular activity/asset class should be viewed as a red flag requiring further, more detailed examination and potentially discussions with industry expert.

It would be useful to explore with Eurostat and the ECB whether it would be possible to expand the sub-sectoral balance sheets so as to list separately for each type of asset and liability the amount originating from the sub-sector itself, other OFI sub-sectors (ideally by sub-sector), from MFIs and the real economy. The balance sheet of the MFIs would have to be similarly broken down in order to provide a comprehensive picture of all the linkages between MFIs and OFIs and within OFIs. Moreover, it would also be useful to encourage the ECB to produce the sub-sectoral OFI information for the EU as a whole and not just the euro-zone.

Trade depositories covering trading in a very wide range of products could help alleviate such information gap for supervisory authorities. However, it is not clear whether such data would be or should be made available to financial market participants and the public more generally.

In terms of individual institutions, we recommend to monitor closely the largest entities in each sub-sector, provided such entities publish regularly balance sheet information. This recommendation is based on Drehmann and Tarashev (2011) who note in their discussion of simple indicators for monitoring systemic importance that “bank size is a reliable proxy of systemic importance”. To that end, Annex 5 provides a list of the largest institutions in a number of OFI sub-sectors. This information is sourced from a number of financial publications producing such lists regularly.

## 15 Conclusions

The financial crisis which started in 2007 has clearly shown that non-bank financial institutions (NBFIs) played important and multi-faceted roles in the build-up and transmission of the financial risk and financial distress. As result, policy-makers throughout the world aim to gain a better understanding of the nature and role of the various non-bank financial institutions and their potential impact on financial stability.

Part of the difficulty of assessing the impact of non-bank financial institutions on financial stability is the wide range of institutions involved. The sector of non-bank financial institutions is defined as including insurance undertakings, pension funds and other financial intermediaries (OFIs). The latter group includes financial institutions engaged in the securitisation of assets, securities and derivatives dealers (operating on own account) and specialised financial institutions (e.g., hedge funds, venture capital firms, etc.).

In the EU27, at the end of 2011, the assets held by non-bank financial institutions stood at €32.6 tn., well above the €20.8 tn. held by monetary financial institutions (excluding central banks) (MFIs). Among non-bank financial institutions, OFIs (such as asset managers, hedge funds, etc.) accounted for slightly less than two-third of the total assets.

The MFI and NBFI sectors expanded at roughly the same pace from 2000 to 2004. From 2004 to 2006, in the run-up to the financial crisis, total assets held by the non-bank financial sector grew much more rapidly than those held by the banking sector. During the crisis, the non-bank financial sector experienced a much more pronounced decline in total assets than the banking sectors. Finally, during the post crisis period of 2009 to 2011, growth of non-bank financial balance sheets returned close to the growth experienced over the period 2002 to 2005 (before the sharp pre-crisis acceleration), while assets of the banking sector have barely grown since 2008.

As a group, OFIs are much less leveraged than MFIs. At the end of 2011, the MFI's leverage ratio (defined as the ratio of loans and debt securities to shares and other equity) stood at 2.8 while it was only 1 for OFIs.

The connectedness of the EU27 banking sector to the NBFIs sector increased sharply and this increase occurred almost entirely during the financial crisis and post-crisis period.

The NBFIs did not dump any asset class on the market during the financial crisis. They reduced their holdings of derivatives in 2009 and 2010 but in 2008 they had substantially increased their holdings of derivatives.

The proposed framework for analysing risks to the financial stability of NBFIs is intended to categorise a wide range of underlying and proximate causes and set out how these relate to a common set of risks to financial stability and impacts on the financial system. The framework may also be useful for policy development, analysis and tracking. For instance, in focusing on underlying causes as opposed to proximate causes of financial instability.

The framework distinguishes between causes and proximate causes. Underlying causes relate to the characteristics of individual non-bank financial sectors or connections between a non-bank financial sector and banks/other non-bank financial sectors that bring about the build up of risks to

financial instability. Meanwhile, proximate causes relate to factors that trigger the materialisation of these risks (see figure below).

Risks to financial stability are broadly considered as risks to financial intermediation, or risks that threaten the flow of capital from investors to users of funds.

The impacts of risks are magnified as a result of multipliers. These include size and inter-connectedness particularly. That is, the larger the institutions involved, the bigger the effect of any risk to financial stability materialising. Similarly, the more inter-connected the institutions involved the bigger the effect insofar as there are likely to be a greater number of institutions involved. Regulatory features can also act as a multiplier.

The following NBFIs segments are examined in greater details: money market funds, private equity firms, hedge funds, pension funds, insurance undertakings and central counterparties. All these types of institutions face credit or counterparty risk and to a different degree liquidity risks, redemption risks, and fire sales risk in the case of a general deterioration in market conditions.

The report also addresses the risks arising from a number of activities that are frequently undertaken by NBFIs. These activities include securitisation, securities lending and repos.

Regarding securitisation, the major risk, in addition to the typical credit and market risks, is the agency risk arising from a potentially very significant misalignment of the incentives faced by the various players in the securitisation value chain.

Repos are a critical source of short-term liquidity for financial institutions and experience has shown that the repo market can easily dry up in an environment of heightened concern about credit and counterparty risk, thus risking destabilising the financial sector as a whole.

In the case of securities lending, securities lenders face the risk that the borrower may be unable to return the security and that the collateral and the indemnity provided by the intermediary in the securities lending value chain are insufficient to acquire the non-returned security in the market place. Therefore, extensive and robust counterparty monitoring is typically undertaken by securities lenders. Cash collateral presents a particular risk as its investment by the lender may result in a loss and the shortfall has to be covered by the lender when the securities are returned by the borrower. Another key risk resulting from securities lending is that institutions having borrowed securities are under no obligations to provide information on their balance sheets on the extent to which the securities shown in their balance sheet are subject to a legal claim by a securities lender. This reduces the value of the balance sheet information for market transparency and makes the assessment of counterparty risk more complex and risky.

The report also focuses on exchange traded funds (ETFs) which, as a result of the rapid growth and growing complexity of synthetic replication schemes, have attracted considerable policy attention. The threats to financial stability arising from ETFs include the grouping of tracking error risk with trading book risk by the swap counterparty, which could compromise risk management, collateral risk triggering a run on ETFs in periods of heightened counterparty risk, materialisation of liquidity risk when there are sudden and large investor withdrawals and increased product complexity and options on ETFs undermining risk monitoring capacity.



Derivatives were identified by the G20 as being of critical importance to the stability of the financial system and the EU has now enacted the European Market Infrastructure Regulation (EMIR) to create the framework for observing and managing these risks. But this starts from the perspective of the micro-regulation of individual financial institutions (and their customers to some extent). In particular, it seems that risk management of non-centrally cleared over-the-counter (OTC) derivatives – the most complex – will be based on a requirement to post initial margin/collateral or hold appropriate capital.

The Financial Stability Board (FSB) noted in its Third Progress Report in June 2012 that data from trade repositories requires more work on the scope of the data needed by authorities as well as on technical issues, such as reporting formats and data aggregation. The FSB wants more discussion on this as access by authorities to trade repositories (TR) data is critical for assessing systemic risk and financial stability; conducting market surveillance and enforcement; supervising market participants; conducting resolution activities; as well as for monitoring progress toward meeting the G20 commitments on OTC derivatives.

For the EU, it is not apparent that the data will be gathered in a format that will enable a macro-economic analysis to be undertaken to check the magnitude and direction of the bets inherent in the aggregate of the reported positions. That would remove a major opportunity to observe a bubble developing.

The report also provides a selected overview of approaches for the measurement of financial instability and financial distress. The focus is on tools that have been developed for banks that may be usefully applied to NBFIs in the future. Analogous research directly relating to NBFIs is, to our knowledge, not yet available. This point is confirmed in a recent working paper by the Basel Committee on Banking Supervision (BCBS) which states that “the role of non-bank financial institutions is almost universally ignored” by studies on systemic risk and risk indicators and “this appears to be one of the most serious gaps in the literature...”

In part, the lack of focus on NBFIs in systemic risk analysis may be due to the fact that a) there is not yet a clear understanding of the role of NBFIs in the process of financial intermediation in recent years and b) their role has been evolving. Existing institutions are undertaking activities that they previously were not involved in, and altogether new institutions have emerged undertaking new activities in the process of financial intermediation.

Additionally, there is a lack of data available on NBFIs in comparison to banks.

Moreover, the same BCBS working paper notes that “currently, there is no widely accepted model for comprehensively measuring systemic risk. Instead, researchers have tended to use a wide range of models and methodologies to examine one or a few specific aspects of systemic risk”.

These various studies can be broadly grouped into 5 categories, namely 1) indicators of financial distress based on balance sheet variables; 2) early warning indicators; 3) macro stress tests; 4) methods for calculating the systemic importance of individual institutions; and 5) analyses of interconnectedness.

The review of available NBFI data undertaken as part of the study and the various discussions with stakeholders identified a number of major data gaps which, at the present time, preclude transposing the analysis undertaken so far for the MFIs to the NBFIs.

- **Indicators of financial distress:** A set of balance sheet variables may inform the relationship between OFIs and financial stability in relation to the financial crisis but may not inform this relationship in connection with potential future crises. As a starting point, therefore, this suggests "casting the net wide" with a broad and periodic focus on developments of all balance sheet variables from a statistical perspective. Qualitatively, any balance sheet variables that grow in size and especially at a fast rate should be considered through consultations with experts (e.g., market participants, regulators, etc.).
- **Early warning indicators:** There is a lack of information on the basic relationships between non-bank financial intermediary sector and financial stability. In part, this is due to the role of NBFIs only having grown in recent years. However, it is also perhaps to do with a lack of differentiation among the functions NBFIs can undertake in the process of financial intermediation.
- **Macro stress tests:** The lesson in relation to macro stress tests builds on the lessons learnt through early warning indicators. That is, without an understanding of basic relationships between NBFIs and financial stability, more in depth empirical studies using macro stress tests, for instance, cannot be undertaken effectively. That is, it is advised in the literature that there should be some theoretical link between variables established first, before empirical investigation is undertaken.
- **Calculating the systemic importance of individual institutions:** The approaches reviewed for calculating the systemic importance of individual institutions relate to banks for which there is market data available. Analogous market data is not available for many NBFIs and therefore alternative measures for calculating the systemic importance of individual NBFIs is required.

Based on the findings from the literature and taking into account the limited range of relevant data, we recommend that the following key risk-contributing factors should be regularly monitored as part of a broader risk monitoring system for both the various NBFI segments and individual NBFIs:

- An indicator of the appetite for risk-taking
- An indicator of leverage
- An indicator of liquidity risk
- An indicator of maturity mismatch

First, the appetite for risk-taking can be indirectly monitored by focusing on the rate of growth of the balance sheet and of certain asset classes in the detailed sectoral balance sheets produced by Eurostat and the European Central Bank. Any rapid acceleration in the growth of the aggregate balance sheet or in certain class is likely to be associated with a loosening of credit standards as an institution or institutions are likely to chase quantity over quality. This sectoral monitoring can be complemented by a monitoring of the balance sheet and on/off balance sheet positions and assets. Obviously such a monitoring is only feasible in the case of institutions which release periodically balance sheet and income statement information. Private companies, such as hedge funds, typically do not make such information publicly available.

Second, the same balance sheet information can be used to monitor leverage at the sectoral and sub-sectoral level where leverage is defined as the ratio of total debt to equity and shareholders' funds.

Third, an indication of the liquidity risk can be obtained by computing the ratio of short-term debt to total assets or to total debt.

Fourth, to complement the set of indicators, it would be useful to construct an indicator of maturity mismatch to gain a better understanding of the sector's or sub-sectors' exposure to interest rate movement risk.

Missing from the set of indicators listed above are indicators related to credit and market risk. The sectoral and sub-sectoral data which are currently available are too aggregated to be able to construct credit and market risk indicators. While the annual statements and reports published by public financial institutions provide often information of the credit and/or market risk of a range of assets on their books, such information is typically available with a considerable lag so as to make it largely useless in a rapidly evolving financial environment.

Missing is also an indicator of interconnectedness as, at the present time, the publicly available information can only be analysed at a very aggregate level and provides only a picture, from the MFIs' perspective, of the connectedness of MFIs with NBFIs but not, from the NBFIs' perspective, of connectedness of NBFIs with themselves or with MFIs.

This is unfortunate as the lack of such data does not allow one to establish whether the rapid expansion of the balance sheet of a particular NBFI sub-sector or the rapid growth in certain asset class or financial activity results in increased risk for the sub-sector or the originator of the product itself, for other financial sub-sectors of the NBFIs, the MFIs and/or real economy. Without good information on the distribution of risk it is not possible to ascertain whether systemic risk has increased or not.

Moreover, the broad sectoral monitoring should be accompanied by a monitoring of the evolution of various asset classes or activities such as:

- derivatives (using data from the BIS)
- securitised assets (using data from AFEME)
- repos (using data from ICMA)
- securities lending (using data from Data Explorer)
- CCP exposures (using data from the CCPs)

The latter set of data is useful for deriving an overall perspective on how the market is developing - fast growth in a particular activity/asset class should be viewed as a red flag requiring further, more detailed examination and potentially, discussions with industry expert.

In terms of individual institutions, we recommend to monitor closely the largest entities in each sub-sector, provided such entities publish regularly balance sheet information. This recommendation is based on Drehmann and Tarashev (2011) who note in their discussion of simple indicators for monitoring systemic importance that "bank size is a reliable proxy of systemic importance".

In considering the NBFIs sector, it is important to take account of the fact that many of the NBFIs are not a set of free-standing independent sectoral players. For example, many asset managers are owned by banks and links with insurance companies are substantial since the bancassurance enthusiasm of two decades ago. The banks are at the centre of a web of ownership of managers, as well as asset categories held by all sectors. Any analysis of interconnectedness will need to take account formally of such linkages which differ from those that arise from asset/liability linkages between two independent MFI and NBFIs institutions.

Public debt as a percentage of GDP fell slightly in the pre-crisis period (from 62% in 2000 to 59% in 2007) but rose nearly 40% to 82% of GDP in 2011. In cash terms, it rose from €5.4 trillion to €10.4 trillion. Most of this will have been absorbed by MFIs and NBFIs, especially the €3.1 trillion issued during the crisis (though some of this was funded by expanded central bank loans to MFIs or outright purchases as in the UK)

The abrupt changes in the scale, and then perceived creditworthiness, of public debt will have been a common (and sharply rising) linkage across the financial system.

The dramatic decline in interest rates was a major shock to the NBFIs that are obliged to hold assets to match liabilities calculated by reference to a risk-free interest rate on government bonds. This means defined benefit pension schemes and life insurance companies where any guarantee is offered. De-risking their asset-liability model (ALM) would lead to reductions in equity holdings and reduced purchases of fixed income securities such as bank bonds. Another route would be managing risk via derivatives.

But, the data is insufficiently granular to be able to track such changes in real time. In fact, lack of pertinent and timely data is recurring theme in the discussion of the type of information that we recommend to monitor.

In this regard, we view the data gathering required by EMIR is a golden opportunity to fill in many gaps – and in real time.

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# Annex 1 Aggregate balance sheets of EU27 OFIs, insurance corporations and pension funds

## A1.1 Assets

Table 22: EU27 assets by type, 2000-2009, €bn

Year	Currency and deposits	Securities other than shares	Loans	Shares and other equity	Insurance technical reserves	Other accounts receivable / payable	Financial assets
<b>Outstanding amount</b>							
2000	1506.3	3494.3	1437.3	6247.2	95.5	219.1	12999.7
2001	1795.3	3868.2	1734.9	6165.7	119.7	249.1	13932.9
2002	1744.4	4154.8	1817.1	5028.9	127.6	307.6	13180.4
2003	1893.2	4490.3	2096.2	5679.2	129.7	316.9	14605.5
2004	2114.4	5161.2	2333.0	6352.3	132.8	322.7	16416.4
2005	2849.5	5869.4	2652.0	7839.6	146.4	355.5	19712.4
2006	3322.4	6930.6	3436.5	10857.3	210.2	455.5	25212.6
2007	3809.4	7408.5	3976.8	11377.8	220.6	447.6	27240.8
2008	3696.7	8744.3	4260.3	8236.2	228.2	414.1	25579.8
2009	3813.9	8772.3	4380.2	10215.8	231.1	470.0	27883.4
2010	4201.1	10677.7	4488.1	11638.3	239.2	518.7	31763.1
2011	4299.4	10934.0	4595.4	11997.9	244.3	529.8	32600.8
<b>Transactions</b>							
2000	216.2	201.8	198.8	588.8	5.9	27.1	1238.6
2001	248.7	240.2	197.1	523.9	17.6	12.5	1240.0
2002	38.9	379.3	143.9	176.3	10.7	56.8	806.0
2003	215.1	544.9	221.5	258.5	1.0	22.2	1263.2
2004	243.5	361.6	200.9	249.4	7.4	12.1	1074.8
2005	626.2	563.8	375.5	332.4	15.7	40.8	1954.4
2006	545.1	684.3	524.6	727.5	17.5	94.0	2593.0
2007	618.7	647.9	734.6	581.6	20.6	7.3	2610.7
2008	-7.5	681.2	491.3	8.4	6.9	-20.6	1159.7
2009	100.3	751.2	88.8	510.7	12.6	29.9	1493.6
2010	-42.3	658.4	198.9	252.1	13.5	49.6	1130.4
2011	-44.0	674.7	206.8	259.8	13.9	50.7	1161.9
<b>Other changes in financial assets</b>							
2000	13.8	-15.5	-33.2	-307.5	-3.6	4.5	-341.5
2001	40.4	133.7	100.5	-605.5	6.6	17.6	-306.7
2002	-89.9	-92.8	-61.7	-1313.1	-2.8	1.7	-1558.6
2003	-66.3	-209.4	57.6	391.8	1.1	-12.9	161.9
2004	-22.2	309.4	35.9	423.7	-4.3	-6.4	736.1
2005	108.9	144.3	-56.4	1154.8	-2.0	-7.9	1341.6
2006	-72.2	377.0	259.8	2290.3	46.3	6.0	2907.2
2007	-131.7	-170.0	-194.3	-61.1	-10.2	-15.2	-582.5
2008	-105.2	654.5	-207.8	-3150.0	0.6	-12.9	-2820.7
2009	16.9	-723.2	31.0	1468.9	-9.7	26.0	809.9
2010	429.4	1247.0	-91.0	1170.4	-5.4	-1.0	2749.4

Table 22: EU27 assets by type, 2000-2009, €bn

Year	Currency and deposits	Securities other than shares	Loans	Shares and other equity	Insurance technical reserves	Other accounts receivable / payable	Financial assets
2011	142.4	-418.4	-99.5	99.8	-8.8	-39.6	-324.1

Note: Intermediaries include 'other financial intermediaries, except insurance corporations and pension funds' and 'insurance corporations and pension funds' as defined in Council Regulation (EC) No 2223/96.

Source: Eurostat – financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets data (*nasa\_f\_of*)

## A1.2 Liabilities

**Table 23: EU27 liabilities by type, 2000-2009, €bn**

Year	Currency and deposits	Securities other than shares	Loans	Shares and other equity	Insurance technical reserves	Other accounts receivable / payable	Financial liabilities
<b>Outstanding amount</b>							
2000	20.5	741.5	2050.9	5395.1	6022.2	243.8	14474.0
2001	16.7	906.2	2547.7	5384.9	6279.2	292.1	15426.9
2002	17.3	1025.7	2499.9	4487.1	6041.2	326.0	14397.3
2003	105.1	1220.5	2654.5	5082.7	6379.9	320.3	15763.0
2004	127.0	1744.1	2875.0	5501.3	6906.7	337.2	17491.3
2005	155.6	2322.3	3635.6	6595.2	7919.8	360.3	20988.9
2006	34.6	2990.5	4447.3	9990.7	8770.4	479.6	26713.2
2007	40.5	3877.6	5003.0	10220.2	8910.1	449.6	28500.9
2008	47.3	5584.4	4876.5	7837.9	7714.9	433.6	26494.6
2009	48.1	5199.2	4549.8	9762.7	8670.5	472.6	28703.0
2010	76.4	6475.4	4870.2	11173.2	9345.2	495.0	32435.3
2011	78.1	6611.3	4979.8	11513.8	9591.9	504.9	33279.8
<b>Transactions</b>							
2000	4.1	170.7	409.9	447.0	321.8	-41.9	1311.7
2001	-3.2	207.6	378.1	336.6	326.2	29.1	1274.3
2002	-0.3	234.1	68.9	168.7	328.1	30.0	829.5
2003	4.2	331.2	267.2	326.4	325.9	22.3	1277.1
2004	19.7	294.2	244.1	207.7	374.0	51.9	1191.6
2005	25.6	519.3	670.6	346.5	449.9	57.6	2069.7
2006	18.7	657.7	561.8	812.0	419.3	143.8	2613.2
2007	6.3	943.3	705.4	550.8	373.7	-13.8	2565.6
2008	12.7	1026.7	-109.6	-98.2	192.1	-10.4	1013.3
2009	-1.3	529.7	-280.8	871.3	286.8	-24.6	1381.1
2010	0.2	39.4	185.2	640.1	298.6	14.0	1177.4
2011	0.2	41.6	188.4	660.5	306.4	15.8	1213.0
<b>Other changes in financial assets</b>							
2000	1.0	-32.4	-6.5	-47.4	-122.2	65.9	-141.6
2001	-0.6	-42.9	118.8	-346.8	-69.1	19.2	-321.3
2002	1.0	-114.6	-116.8	-1066.4	-566.1	3.9	-1859.1
2003	83.7	-136.4	-112.5	269.2	12.7	-28.1	88.5
2004	2.1	229.4	-23.6	210.9	152.8	-34.9	536.7
2005	3.0	58.9	89.9	747.5	563.2	-34.6	1427.9
2006	-139.7	10.5	249.9	2583.5	431.4	-24.6	3111.1
2007	-0.4	-56.2	-149.7	-321.4	-234.1	-16.2	-777.9
2008	-5.9	680.1	-16.9	-2284.2	-1387.2	-5.6	-3019.6
2009	2.1	-914.9	-45.8	1053.5	668.8	63.7	827.3
2010	28.1	1236.9	135.1	770.4	376.2	8.4	2555.0
2011	1.5	94.3	-78.8	-319.9	-59.7	-5.9	-368.5

Note: Intermediaries include 'other financial intermediaries, except insurance corporations and pension funds' and 'insurance corporations and pension funds' as defined in Council Regulation (EC) No 2223/96.

Source: Eurostat – financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets data (*nasa\_f\_of*)

## Annex 2 Disaggregated balance sheets of EU27 OFIs, insurance corporations and pension funds

### A2.1 Assets, other financial intermediaries

Table 24: EU27 assets by type, 2000-2011, €bn

Year	Currency and deposits	Securities other than shares	Loans	Shares and other equity	Insurance technical reserves	Other accounts receivable / payable	Financial assets
<b>Outstanding amount</b>							
2000	910.0	1409.7	992.7	2854.7	1.2	86.0	6254.3
2001	1169.1	1566.1	1251.9	3006.7	1.2	107.5	7102.4
2002	1091.2	1614.8	1322.7	2508.3	1.2	126.7	6664.9
2003	1213.7	1767.6	1566.0	2896.0	1.3	112.3	7556.9
2004	1359.7	2090.3	1764.8	3268.4	1.2	125.4	8609.7
2005	2048.3	2457.3	2084.2	4049.0	1.5	132.7	10773.1
2006	2437.8	3292.4	2838.9	6548.7	1.5	162.0	15281.3
2007	2853.9	3667.2	3395.8	7004.0	1.3	182.9	17105.1
2008	2714.6	4974.6	3708.4	5134.2	1.1	192.5	16725.5
2009	2833.2	4747.6	3803.2	6348.9	1.2	249.3	17983.5
2010	3240.4	6406.5	3823.8	7309.1	1.3	288.4	21069.4
2011	3313.5	6562.3	3910.5	7539.2	1.1	294.8	21621.3
<b>Transactions</b>							
2000	173.9	109.6	179.8	413.7	~0	23.9	900.9
2001	222.9	75.3	171.1	414.0	~0	-3.5	879.8
2002	-3.7	163.4	132.1	77.0	~0	18.2	387.0
2003	168.7	307.3	189.1	205.6	~0	3.5	874.3
2004	172.5	125.4	182.0	173.7	-0.1	9.7	663.1
2005	589.6	338.7	369.3	185.7	0.3	12.9	1496.5
2006	434.4	433.0	515.9	600.7	~0	23.6	2007.7
2007	517.7	478.9	778.6	478.7	-0.2	22.1	2275.7
2008	-54.3	601.6	469.9	-34.4	0.1	-29.5	953.4
2009	117.5	693.2	90.8	342.4	~0	26.8	1270.8
2010	-22.8	587.5	150.3	138.9	~0	44.5	898.4
2011	-23.4	603.9	157.0	142.5	~0	45.3	925.3
<b>Other changes in financial assets</b>							
2000	17.0	-51.3	-18.3	-160.9	-0.1	-2.7	-216.4
2001	36.2	81.1	88.1	-262.0	~0	24.9	-31.7
2002	-74.2	-114.7	-61.3	-575.3	~0	1.0	-824.6
2003	-46.2	-154.5	54.2	182.0	0.1	-17.9	17.7
2004	-26.5	197.4	16.8	198.7	~0	3.3	389.7
2005	99.1	28.2	-49.9	594.9	~0	-5.5	666.8
2006	-45.0	402.1	238.7	1898.9	0.1	5.7	2500.6
2007	-101.6	-104.1	-221.7	-23.3	~0	-1.2	-451.9
2008	-85.1	705.9	-157.3	-1835.4	-0.3	39.2	-1333.0
2009	1.1	-920.3	4.0	872.2	~0	30.1	-12.8
2010	429.9	1071.4	-129.8	821.4	~0	-5.4	2187.6



**Table 24: EU27 assets by type, 2000-2011, €bn**

2011	96.4	-448.1	-70.3	87.6	-0.2	-38.9	-373.5
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Note: Intermediaries include 'other financial intermediaries, except insurance corporations' as defined in Council Regulation (EC) No 2223/96.

Source: Eurostat – financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets data (*nasa\_f\_of*)

## A2.2 Liabilities, other financial intermediaries

**Table 25: EU27 liabilities by type, 2000-2011, €bn**

Year	Currency and deposits	Securities other than shares	Loans	Shares and other equity	Insurance technical reserves	Other accounts receivable / payable	Financial liabilities
<b>Outstanding amount</b>							
2000	20.2	728.1	1872.0	4571.4	~0	78.9	7270.6
2001	16.3	889.3	2349.8	4700.9	~0	92.8	8049.0
2002	17.1	1011.2	2297.5	4055.9	~0	109.8	7491.4
2003	105.0	1200.9	2430.8	4527.3	~0	99.2	8363.3
2004	126.8	1678.5	2629.5	4903.8	0.1	108.3	9447.0
2005	155.4	2253.0	3374.2	5856.8	0.3	114.7	11754.4
2006	34.4	2922.8	4115.6	9169.4	0.5	181.6	16424.2
2007	40.3	3759.4	4681.6	9440.5	0.7	172.3	18094.7
2008	47.0	5375.5	4512.4	7289.2	0.5	167.0	17391.6
2009	47.8	5029.8	4205.6	9186.7	0.7	213.2	18683.8
2010	76.0	6317.4	4511.1	10574.8	0.9	216.3	21696.4
2011	77.7	6449.4	4610.2	10899.1	0.9	220.0	22257.2
<b>Transactions</b>							
2000	4.1	164.5	391.9	419.8	~0	-55.7	924.7
2001	-3.3	200.1	356.1	323.4	~0	-6.2	870.2
2002	-0.3	233.8	55.0	156.5	~0	-13.6	431.4
2003	4.1	331.0	226.1	305.4	~0	7.6	874.3
2004	19.7	295.3	216.2	188.9	0.1	45.9	765.9
2005	25.6	535.9	653.6	329.1	0.1	8.7	1553.0
2006	18.7	676.2	492.4	780.1	0.2	86.7	2054.2
2007	6.3	965.0	722.0	541.1	0.2	1.6	2236.2
2008	12.7	1105.2	-149.4	-103.0	~0	-36.6	828.9
2009	-1.3	575.9	-252.1	862.4	~0	24.8	1209.7
2010	0.1	123.6	170.3	628.0	0.1	-1.6	920.4
2011	0.1	128.8	173.1	648.1	0.1	0.5	950.6
<b>Other changes in financial assets</b>							
2000	1.0	-33.2	1.5	-44.7	~0	69.1	-6.2
2001	-0.6	-38.8	121.6	-194.0	~0	20.1	-91.8
2002	1.0	-111.9	-107.3	-801.5	~0	30.6	-989.0
2003	83.8	-141.3	-92.7	166.0	~0	-18.2	-2.4
2004	2.1	182.3	-17.6	187.6	~0	-36.8	317.8
2005	3.0	38.7	91.1	623.9	~0	-2.3	754.4
2006	-139.7	-6.5	249.0	2532.6	~0	-19.8	2615.6
2007	-0.4	-128.4	-156.0	-270.1	~0	-10.9	-565.7
2008	-6.0	510.9	-19.9	-2048.3	-0.1	31.3	-1532.0
2009	2.1	-921.6	-54.7	1035.1	0.2	21.4	82.5
2010	28.1	1164.0	135.2	760.1	0.1	4.7	2092.2
2011	1.6	3.2	-74.0	-323.8	-0.1	3.3	-389.8

Note: Intermediaries include 'other financial intermediaries, except insurance corporations' as defined in Council Regulation (EC) No 2223/96.

Source: Eurostat – financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets data (*nasa\_f\_of*)

## A2.3 Assets, insurance corporations and pension funds

**Table 26: Assets held by insurance corporations and pension funds in the EU27 by type, 2000-2011, €bn**

Year	Currency and deposits	Securities other than shares	Loans	Shares and other equity	Insurance technical reserves	Other accounts receivable / payable	Financial assets
<b>Outstanding amount</b>							
2000	596.3	2084.7	444.6	3392.5	94.3	133.1	6745.4
2001	626.2	2302.1	483.0	3159.0	118.5	141.7	6830.5
2002	653.1	2540.0	494.4	2520.6	126.4	181.0	6515.5
2003	679.4	2722.7	530.2	2783.2	128.4	204.6	7048.6
2004	754.8	3070.9	568.2	3083.9	131.5	197.3	7806.7
2005	801.2	3412.1	567.8	3790.6	144.9	222.8	8939.4
2006	884.7	3638.2	597.6	4308.6	208.7	293.5	9931.4
2007	955.5	3741.4	581.0	4373.8	219.4	264.7	10135.7
2008	982.1	3769.7	552.0	3102.0	227.0	221.6	8854.3
2009	980.7	4024.7	577.0	3866.9	229.9	220.7	9899.9
2010	960.7	4271.3	664.4	4329.2	238.0	230.3	10693.7
2011	986.0	4371.7	684.9	4458.7	243.2	235.0	10979.5
<b>Transactions</b>							
2000	42.3	92.2	19.1	175.1	5.9	3.1	337.7
2001	25.7	164.9	26.0	110.0	17.6	15.9	360.2
2002	42.6	215.9	11.8	99.4	10.7	38.6	419.1
2003	46.4	237.6	32.3	52.8	1.0	18.7	388.9
2004	71.0	236.2	18.9	75.7	7.5	2.4	411.7
2005	36.6	225.1	6.2	146.7	15.4	27.9	457.9
2006	110.7	251.3	8.7	126.8	17.6	70.4	585.3
2007	100.9	169.1	-44.0	102.9	20.9	-14.8	335.0
2008	46.7	79.6	21.5	42.7	6.8	8.9	206.3
2009	-17.3	58.0	-2.0	168.3	12.6	3.2	222.8
2010	-19.5	70.9	48.7	113.2	13.5	5.2	232.0
2011	-20.6	70.8	49.8	117.3	13.9	5.4	236.5
<b>Other changes in financial assets</b>							
2000	-3.2	35.8	-14.9	-146.6	-3.5	7.2	-125.1
2001	4.2	52.6	12.4	-343.4	6.6	-7.3	-275.0
2002	-15.7	21.9	-0.5	-737.7	-2.8	0.7	-734.0
2003	-20.1	-54.9	3.5	209.8	1.0	5.0	144.2
2004	4.3	112.0	19.1	225.0	-4.3	-9.7	346.4
2005	9.8	116.1	-6.5	560.0	-2.1	-2.4	674.8
2006	-27.2	-25.1	21.1	391.3	46.3	0.3	406.7
2007	-30.1	-65.9	27.4	-37.7	-10.2	-14.0	-130.6
2008	-20.1	-51.3	-50.5	-1314.5	0.9	-52.1	-1487.7
2009	15.8	197.1	27.0	596.6	-9.8	-4.1	822.7
2010	-0.5	175.6	38.7	349.0	-5.4	4.4	561.8
2011	45.9	29.7	-29.2	12.3	-8.6	-0.6	49.3

Note: Intermediaries include 'insurance corporations and pension funds' as defined in Council Regulation (EC) No 2223/96.

Source: Eurostat – financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets data (*nasa\_f\_of*)

## A2.4 Liabilities, insurance corporations and pension funds

**Table 27: Liabilities held by insurance corporations and pension funds in the EU27 by type, 2000-2011, €bn**

Year	Currency and deposits	Securities other than shares	Loans	Shares and other equity	Insurance technical reserves	Other accounts receivable / payable	Financial liabilities
<b>Outstanding amount</b>							
2000	0.3	13.5	178.8	823.7	6022.2	164.9	7203.4
2001	0.3	16.9	198.0	684.0	6279.2	199.4	7377.9
2002	0.3	14.6	202.4	431.2	6041.2	216.3	6905.9
2003	0.2	19.6	223.7	555.3	6379.8	221.0	7399.7
2004	0.2	65.6	245.5	597.4	6906.6	229.0	8044.3
2005	0.2	69.3	261.4	738.4	7919.6	245.7	9234.5
2006	0.2	67.7	331.7	821.3	8770.0	298.0	10289.0
2007	0.3	118.2	321.3	779.7	8909.4	277.3	10406.2
2008	0.3	208.9	364.1	548.7	7714.4	266.5	9103.0
2009	0.3	169.4	344.2	576.0	8669.8	259.5	10019.2
2010	0.4	158.0	359.1	598.4	9344.4	278.7	10738.9
2011	0.4	161.8	369.6	614.8	9591.0	284.9	11022.6
<b>Transactions</b>							
2000	~0	6.3	18.0	27.1	321.8	13.8	387.1
2001	~0	7.6	21.9	13.1	326.2	35.3	404.1
2002	~0	0.4	14.0	12.1	328.1	43.6	398.1
2003	~0	0.2	41.0	20.9	325.9	14.7	402.8
2004	~0	-1.1	27.9	18.8	374.0	6.1	425.7
2005	~0	-16.6	17.0	17.4	449.8	49.0	516.6
2006	~0	-18.5	69.4	31.9	419.1	57.2	559.1
2007	~0	-21.7	-16.6	9.7	373.5	-15.4	329.4
2008	~0	-78.5	39.8	4.9	192.1	26.1	184.4
2009	~0	-46.3	-28.8	9.0	286.8	-49.4	171.4
2010	0.1	-84.2	14.9	12.1	298.5	15.6	257.0
2011	0.1	-87.2	15.3	12.5	306.3	15.4	262.4
<b>Other changes in financial assets</b>							
2000	~0	0.8	-8.0	-2.8	-122.2	-3.2	-135.3
2001	~0	-4.1	-2.8	-152.8	-69.1	-0.8	-229.6
2002	~0	-2.8	-9.5	-265.0	-566.0	-26.7	-870.1
2003	-0.1	4.9	-19.8	103.2	12.7	-9.9	90.9
2004	~0	47.0	-6.0	23.3	152.8	1.8	218.9
2005	~0	20.2	-1.2	123.6	563.2	-32.3	673.5
2006	~0	17.0	0.9	51.0	431.3	-4.8	495.5
2007	~0	72.1	6.3	-51.3	-234.1	-5.3	-212.2
2008	~0	169.3	3.0	-235.9	-1387.1	-36.9	-1487.6
2009	~0	6.7	8.8	18.4	668.6	42.3	744.8
2010	~0	72.9	-0.1	10.3	376.1	3.6	462.8
2011	-0.1	91.0	-4.8	4.0	-59.7	-9.1	21.3

Note: Intermediaries include 'insurance corporations and pension funds' as defined in Council Regulation (EC) No 2223/96.

Source: Eurostat – financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets data (*nasa\_f\_of*)

## Annex 3 Balance sheets of EU27 other monetary financial institutions

### A3.1 Assets, other monetary financial institutions

**Table 28: Assets held by other monetary financial institutions in the EU27 by type, 2000-2011, €bn**

Year	Currency and deposits	Securities other than shares	Loans	Shares and other equity	Insurance technical reserves	Other accounts receivable / payable	Financial assets
<b>Outstanding amount</b>							
2000	2321.2	1487.9	4027.9	849.4	1.1	305.7	8993.2
2001	2512.7	1739.4	4341.4	791.4	1.2	345.0	9731.2
2002	2541.3	1805.6	4604.9	734.1	1.3	322.8	10010.0
2003	2662.1	2005.7	4895.7	831.2	1.3	330.6	10726.5
2004	2910.0	2204.1	5343.7	1002.3	1.4	335.0	11796.7
2005	3356.8	2577.1	6139.2	1076.2	1.5	463.6	13614.4
2006	4196.7	3158.1	7168.6	1392.1	1.7	537.1	16454.3
2007	5055.0	3726.7	8060.2	1559.9	1.8	601.7	19005.2
2008	5240.9	4641.5	8545.4	1137.6	1.8	634.3	20201.5
2009	4953.7	4565.0	8490.6	1331.8	1.8	595.9	19938.7
2010	4921.9	4549.2	8917.9	1320.5	1.9	755.6	20467.1
2011	5030.2	4623.6	9049.4	1355.8	1.9	780.0	20841.1
<b>Transactions</b>							
2000	-28.1	437.1	376.4	98.8	~0	23.4	907.6
2001	189.0	607.1	319.3	56.7	0.1	18.9	1191.1
2002	128.8	671.9	304.6	73.0	0.1	-29.4	1149.0
2003	181.5	750.6	347.3	30.2	~0	16.6	1326.3
2004	300.5	804.4	517.2	99.9	0.3	9.3	1731.7
2005	286.5	679.3	747.3	49.0	0.1	125.7	1887.9
2006	490.3	794.2	892.4	97.3	0.1	47.8	2322.1
2007	934.8	1149.4	960.8	161.8	0.1	66.9	3273.7
2008	197.0	1384.1	523.9	13.8	~0	43.6	2162.5
2009	-303.6	1692.6	-48.4	38.4	~0	-38.0	1341.0
2010	-15.7	831.2	248.0	27.6	0.1	152.7	1243.9
2011	-22.3	855.0	256.9	30.6	0.1	161.1	1281.4
<b>Other changes in financial assets</b>							
2000	5.5	-385.8	45.4	7.9	~0	-4.2	-331.2
2001	2.5	-355.6	-5.8	-114.7	0.1	20.4	-453.1
2002	-100.2	-605.8	-41.1	-130.3	~0	7.2	-870.1
2003	-60.7	-550.6	-56.6	66.9	~0	-8.8	-609.7
2004	-52.5	-606.0	-69.1	71.1	-0.1	-4.9	-661.5
2005	160.2	-306.3	48.1	24.9	~0	2.8	-70.2
2006	349.7	-213.2	137.0	218.7	0.1	25.7	517.8
2007	-76.5	-580.8	-69.3	6.1	0.1	-2.3	-722.8
2008	-11.2	-469.2	-38.7	-436.1	~0	-11.0	-966.2
2009	16.4	-1769.2	-6.4	155.8	~0	-0.4	-1603.8

**Table 28: Assets held by other monetary financial institutions in the EU27 by type, 2000-2011, €bn**

2010	-16.0	-847.0	179.4	-38.9	~0	7.0	-715.5
2011	130.7	-780.6	-125.4	4.7	~0	-136.7	-907.4

Note: Intermediaries include 'insurance corporations and pension funds' as defined in Council Regulation (EC) No 2223/96.

Source: Eurostat – *financial balance sheet data (nasa\_f\_bs)*, *financial transactions data (nasa\_f\_tr)* and *other changes in financial assets data (nasa\_f\_of)*

## A3.2 Liabilities, other monetary financial institutions

**Table 29: Liabilities held by other monetary financial institutions in the EU27 by type, 2000-2011, €bn**

Year	Currency and deposits	Securities other than shares	Loans	Shares and other equity	Insurance technical reserves	Other accounts receivable / payable	Financial liabilities
<b>Outstanding amount</b>							
2000	5843.3	1505.4	172.3	1040.1	7.1	324.2	8892.4
2001	6384.9	1647.1	181.2	1065.7	7.4	376.0	9662.2
2002	6660.0	1689.9	196.6	1048.3	6.9	374.1	9975.8
2003	7003.4	1898.7	228.3	1199.8	7.6	400.9	10738.8
2004	7623.8	2197.8	233.5	1392.1	8.7	435.6	11891.4
2005	8747.9	2590.1	253.4	1586.8	8.4	554.0	13740.7
2006	10397.5	3100.2	277.4	2039.9	9.9	671.4	16496.3
2007	11967.1	3675.3	376.2	2097.9	9.0	757.4	18883.0
2008	12779.3	4336.3	442.5	1704.0	9.5	765.8	20037.5
2009	12403.9	4204.3	463.9	1956.2	8.3	763.4	19800.0
2010	12620.9	4498.2	440.6	1763.1	9.1	902.0	20233.9
2011	12769.8	4647.6	449.2	1802.0	9.3	933.7	20611.5
<b>Transactions</b>							
2000	258.2	490.4	14.6	56.1	~0	55.0	874.3
2001	507.4	569.5	10.3	50.0	0.2	23.6	1161.1
2002	366.3	659.9	19.5	66.1	-0.5	-6.4	1105.0
2003	456.0	728.6	31.9	58.4	0.7	26.9	1302.6
2004	729.6	895.2	13.4	55.3	3.6	35.0	1732.1
2005	925.8	761.6	24.7	40.5	-0.3	117.3	1869.6
2006	1106.7	996.5	15.7	90.0	1.1	98.9	2308.8
2007	1764.2	1174.3	101.5	145.1	-0.9	95.9	3280.0
2008	838.3	1050.5	68.9	180.0	0.5	10.8	2148.9
2009	-369.4	1551.2	25.4	62.1	-1.2	-12.1	1256.0
2010	87.9	1060.7	-19.6	-113.7	0.8	136.1	1152.2
2011	85.3	1096.3	-19.3	-118.2	0.8	141.4	1186.4
<b>Other changes in financial assets</b>							
2000	29.5	-413.9	11.9	6.4	2.8	-13.8	-377.2
2001	34.2	-427.8	-1.4	-24.4	~0	28.2	-391.2
2002	-91.2	-617.2	-4.0	-83.5	~0	4.5	-791.4
2003	-112.7	-519.8	-0.2	93.1	~0	-0.1	-539.6
2004	-109.2	-596.1	-8.2	136.9	-2.5	-0.3	-579.4
2005	198.2	-369.2	-4.8	154.2	~0	1.2	-20.4
2006	543.0	-486.4	8.3	363.0	0.4	18.5	446.8
2007	-194.6	-599.2	-2.7	-87.1	~0	-9.8	-893.4
2008	-26.1	-389.4	-2.5	-573.9	~0	-2.4	-994.4
2009	-6.0	-1683.2	-3.9	190.1	~0	9.6	-1493.4
2010	129.2	-766.8	-3.7	-79.4	~0	2.5	-718.3
2011	63.5	-947.0	27.9	157.2	-0.6	-109.8	-808.7

Note: Intermediaries include 'insurance corporations and pension funds' as defined in Council Regulation (EC) No 2223/96.

Source: Eurostat – financial balance sheet data (*nasa\_f\_bs*), financial transactions data (*nasa\_f\_tr*) and other changes in financial assets data (*nasa\_f\_of*)

## Annex 4 Disaggregated balance sheets of euro area OFIs, by type of intermediary

### A4.1 Pension funds

**Table 30: Assets of euro area pension funds by type, Q32008-Q22011, €bn**

Year	Quarter	Total	Currency and deposit	Loans	Securities other than shares	Shares and other equity	Investment fund shares	Money market fund shares	Prepayments of insurance premiums and reserves for outstanding claims	Other accounts receivable/payable and financial derivatives	Non-financial assets
2008	Q3	1278.3	183.7	72.4	357.9	248.1	571.3	6.9	28.8	31.5	43.1
	Q4	1237.0	198.3	83.4	344.2	182.8	598.8	4.6	28.0	65.4	43.2
2009	Q1	1213.0	189.5	76.1	362.6	172.3	303.1	11.8	28.2	51.9	43.4
	Q2	1227.2	186.3	69.2	297.3	194.3	365.4	6.5	28.7	36.8	42.7
	Q3	1291.5	185.9	66.9	286.9	136.9	563.2	8.8	29.0	43.0	42.0
	Q4	1326.2	186.8	65.7	285.3	135.7	605.0	5.9	29.0	41.3	41.6
2010	Q1	1370.7	185.3	65.6	286.1	138.6	300.5	12.1	30.3	49.2	37.4
	Q2	1385.3	187.4	68.7	294.4	136.2	494.3	6.6	30.7	58.4	37.5
	Q3	1445.8	192.1	75.0	303.4	140.9	576.0	10.4	30.8	79.4	37.8
	Q4	1404.5	193.4	72.8	287.0	151.6	282.1	9.7	31.3	41.1	37.7
2011	Q1	1411.8	193.2	67.4	295.6	144.8	533.2	7.5	31.3	37.6	38.5
	Q2	1420.8	195.9	67.6	295.1	147.4	583.6	5.9	31.1	34.1	38.7

Note: Outstanding amounts at end of period

Source: ECB Monthly Bulletin November 2011



Table 31: Liabilities and net worth of euro area pension funds by type, Q32008-Q22011, €bn

Year	Quarter	Liabilities									Net worth
		Total	Loans received	Securities other than shares	Shares and other equity	Insurance technical reserves				Other accounts receivable / payable and financial derivatives	
						Total	Net equity of households in life insurance services	Net equity of households in pension fund reserves	Prepayments of insurance premiums and reserves for outstanding claims		
2008	Q3	1236.0	80.3	0.0	6.7	1115.6	1114.6	0.0	1114.6	1.0	33.3
	Q4	1276.3	101.1	0.0	5.6	1146.0	1145.3	0.0	1145.3	0.7	23.5
2009	Q1	1278.6	91.2	0.0	4.6	1161.1	1160.0	0.0	1160.0	1.1	21.7
	Q2	1260.3	64.6	0.0	4.6	1172.9	1172.0	0.0	1172.0	0.9	18.2
	Q3	1267.4	54.0	0.0	5.7	1186.1	1185.3	0.0	1185.3	0.8	21.6
	Q4	1280.5	46.8	0.0	5.7	1201.6	1200.4	0.0	1200.4	1.2	26.4
2010	Q1	1316.2	41.0	0.0	6.3	1238.3	1237.0	0.0	1237.0	1.3	30.6
	Q2	1350.5	44.3	0.0	5.7	1265.9	1264.6	0.0	1264.6	1.3	34.6
	Q3	1381.0	49.7	0.0	5.7	1296.9	1295.6	0.0	1295.6	1.3	28.8
	Q4	1372.7	24.4	0.0	5.9	1316.3	1314.5	0.0	1314.5	1.8	26.1
2011	Q1	1377.7	24.3	0.0	6.2	1326.0	1324.1	0.0	1324.1	1.9	21.3
	Q2	1384.2	22.0	0.0	6.1	1331.3	1329.4	0.0	1329.4	1.9	24.9

Note: Outstanding amounts at end of period

Source: ECB Monthly Bulletin November 2011

## A4.2 Insurance corporations

**Table 32: Assets of euro area insurance corporations by type, Q32008-Q22011, €bn**

Year	Quarter	Total	Currency and deposit	Loans	Securities other than shares	Shares and other equity	Investment fund shares	Money market fund shares	Prepayments of insurance premiums and reserves for outstanding claims	Other accounts receivable/payable and financial derivatives	Non-financial assets
2008	Q3	4988.4	579.2	386.4	1923.7	684.7	887.2	75.4	222.3	117.8	111.6
	Q4	4921.6	602.3	395.2	1948.7	636.4	806.1	84.3	217.7	119.5	111.3
2009	Q1	4975.2	607.8	417.6	1998.4	613.4	792.5	92.0	215.8	124.3	113.3
	Q2	5102.9	596.5	418.5	2087.1	624.6	835.0	83.2	220.0	125.3	112.6
	Q3	5226.1	598.3	416.5	2138.0	655.7	883.2	79.5	223.0	120.2	111.8
	Q4	5316.3	600.1	412.2	2177.5	668.7	923.6	79.0	227.2	116.8	111.3
2010	Q1	5493.8	599.2	420.7	2289.7	676.8	962.9	76.6	236.6	120.1	111.1
	Q2	5505.7	598.1	420.2	2319.1	656.6	955.3	71.0	240.9	131.7	112.7
	Q3	5614.2	591.1	423.0	2395.4	666.6	983.8	64.9	241.4	135.6	112.2
	Q4	5573.0	580.7	428.1	2355.2	671.5	995.7	59.5	237.7	130.7	113.9
2011	Q1	5636.6	582.0	432.3	2380.8	682.0	1003.2	58.9	246.5	135.2	115.8
	Q2	5664.7	582.2	437.4	2393.2	686.7	1002.6	60.8	244.3	141.7	115.6

Note: Outstanding amounts at end of period

Source: ECB Monthly Bulletin November 2011

**Table 33: Liabilities and net worth of euro area insurance corporations by type, Q32008-Q22011, €bn**

Year	Quarter	Liabilities									Net worth
		Total	Loans received	Securities other than shares	Shares and other equity	Insurance technical reserves				Other accounts receivable / payable and financial derivatives	
						Total	Net equity of households in life insurance services	Net equity of households in pension fund reserves	Prepayments of insurance premiums and reserves for outstanding claims		
2008	Q3	5011.3	252.4	27.5	532.6	4079.7	3226.8	2923.6	303.2	852.9	119.1
	Q4	4986.4	254.7	28.9	498.6	4085.2	3237.9	2936.1	301.8	847.3	119.1
2009	Q1	4941.3	251.1	29.7	468.3	4074.7	3234.0	2938.1	295.9	840.6	117.6
	Q2	4847.4	247.6	31.7	416.5	4032.6	3209.8	2909.2	300.5	822.8	119.1
	Q3	4851.2	256.6	31.8	374.1	4067.5	3227.6	2927.5	300.2	839.9	121.2
	Q4	4955.6	257.1	33.1	390.4	4152.6	3310.9	3005.5	305.3	841.7	122.4
2010	Q1	5096.3	249.8	36.1	434.3	4252.5	3411.2	3094.8	316.4	841.4	123.5
	Q2	5160.8	237.8	39.5	430.4	4326.2	3488.1	3168.6	319.5	838.1	126.9
	Q3	5303.9	252.6	39.5	447.8	4437.2	3578.7	3255.5	323.2	858.5	126.8
	Q4	5305.1	254.6	40.9	419.4	4464.8	3605.2	3280.6	324.5	859.6	125.3
2011	Q1	5384.3	265.4	39.8	425.9	4526.9	3671.6	3337.6	334.0	855.3	126.3
	Q2	5430.2	259.6	42.3	433.1	4571.3	3717.1	3380.3	336.8	854.2	124.0

Note: Outstanding amounts at end of period

Source: ECB Monthly Bulletin November 2011

### A4.3 Financial vehicle corporations

**Table 34: Assets of euro area financial vehicle institutions by type, Q12010-Q22011, €bn**

Year	Quarter	Total	Deposits and loan claims	Securitised loans							Securities other than shares	Other securitised assets	Shares and other equity	Other assets
				Total	Originated in the euro area					Originated outside euro area				
					MFIs	Remaining on the MFI balance sheet	Other financial intermediaries, insurance institutions and pension funds	Non-financial institutions	General government					
				Outstanding Amount										
2010	Q1	2290.8	358.3	1440.7	1135.4	559.3	137.6	25.0	7.3	135.4	280.4	99.3	43.5	68.6
	Q2	2285.6	363.1	1437.2	1131.6	570.6	140.5	24.7	6.4	133.8	278.7	101.3	41.1	64.2
	Q3	2284.8	350.1	1467.2	1173.9	582.4	133.8	24.6	6.4	128.6	260.2	100.3	41.4	65.7
	Q4	2350.0	373.4	1522.1	1238.2	606.4	125.0	22.7	6.0	130.2	251.6	92.5	41.9	68.6
2011	Q1	2254.7	352.8	1482.7	1194.3	595.3	131.8	23.0	5.9	127.6	240.3	89.0	36.8	53.1
	Q2	2206.0	337.4	1458.8	1173.5	585.3	136.0	21.9	5.2	122.1	232.0	89.3	36.4	52.1
				Transactions										
2010	Q2	-21.7	1.4	-13.0	-12.5	-	2.4	-0.9	-0.4	-1.6	-2.0	1.0	-3.2	-5.9
	Q3	-3.9	-12.2	24.2	33.0	-	-2.1	-0.6	-0.1	-6.1	-16.5	-0.5	0.4	0.7
	Q4	44.8	24.5	24.4	30.1	-	-4.7	-2.1	-0.4	1.4	-5.5	-0.9	-0.6	3.0
2011	Q1	-92.2	-23.2	-36.2	-44.2	-	9.1	0.6	0.0	-1.8	-10.1	-2.4	-4.9	-15.3
	Q2	-56.7	-12.3	-26.8	-23.1	-	2.5	-0.9	-0.3	-5.0	-9.4	0.0	0.0	-8.2

Note: Outstanding amounts at end of period

Transactions during period

Source: ECB Monthly Bulletin November 2011

Table 35: Liabilities of euro area financial vehicle institutions by type, Q12010-Q22011, €bn								
Year	Quarter	Total	Loans and deposits received	Debt securities issued			Capital and reserves	Other liabilities
				Total	Up to 2 years	Over 2 years		
	Outstanding amounts							
2010	Q1	2290.8	99.1	1982.6	96.0	1886.6	48.4	160.7
	Q2	2285.6	107.6	1960.8	91.1	1869.7	45.0	172.2
	Q3	2284.8	119.9	1946.7	86.5	1860.2	43.2	175.0
	Q4	2350.0	134.3	1969.9	93.5	1876.4	42.6	203.2
2011	Q1	2254.7	133.1	1886.5	83.9	1802.6	37.7	197.4
	Q2	2206.0	132.7	1845.0	83.2	1761.8	35.5	192.8
		Transactions						
2010	Q2	-21.7	6.0	-23.0	-5.1	-17.9	-2.8	-1.9
	Q3	-3.9	11.6	-10.3	-4.2	-6.1	-0.1	-5.1
	Q4	44.8	15.9	23.9	5.7	18.3	-2.1	7.1
2011	Q1	-92.2	-0.9	-79.0	-9.9	-69.1	-4.5	-7.8
	Q2	-56.7	-0.1	-48.6	-5.2	-43.4	-0.8	-7.2

Note: Outstanding amounts at end of period

Transactions during period

Source: ECB Monthly Bulletin November 2011

## A4.4 Investment funds

**Table 36: Assets of euro area investment funds by type, Feb-2010-Q22011, €bn**

Year	Quarter	Total	Deposits and loan claims	Securities other than shares	Shares and other equity (excl. Investment fund / money market fund shares)	Investment fund / money market fund shares	Non-financial assets	Other assets (incl. Financial derivatives)
<b>Outstanding amounts</b>								
2011	February	6382.2	390.4	2372.1	2012.7	878.4	223.5	505.3
	March	6338.4	387.3	2354.8	1973.7	882.7	221.4	518.5
	April	6382.9	391.1	2357.8	1991.8	891.7	221.7	528.9
	May	6432.5	391.9	2404.6	1992.2	898.9	222.3	522.6
	June	6353.2	390.4	2392.1	1958.5	887.6	222.3	502.3
	July	6402.3	389.4	2423.8	1940.0	890.5	222.9	535.7
	August	6144.0	405.4	2383.8	1734.1	837.8	223.6	559.3
<b>Transactions</b>								
2010	Q4	35.9	-11.0	48.2	49.9	16.6	-3.0	-64.8
2011	Q1	110.2	19.4	25.2	14.8	8.5	2.4	40.0
	Q2	70.4	5.6	43.4	25.8	13.5	3.2	-21.1

Note: Not including money market funds

Outstanding amounts at end of period

Transactions during period

Source: ECB Monthly Bulletin November 2011

Table 37: Liabilities of euro area investment funds by type, Feb-2010-Q22011, €bn								
Year	Month / Quarter	Total	Loans and deposits received	Investment fund shares issued			Held by non-euro area residents	Other liabilities (incl. financial derivatives)
				Total	Held by euro area residents	Investment funds		
		Outstanding amounts						
2011	February	6382.2	124.0	5823.8	4519.8	668.1	1304.0	434.4
	March	6338.4	127.1	5769.9	4475.9	668.1	1294.0	441.4
	April	6382.9	125.4	5813.5	4507.0	677.8	1306.5	444.1
	May	6432.5	125.2	5859.8	4530.5	684.0	1329.4	447.5
	June	6353.2	119.4	5787.6	4462.9	673.9	1324.7	446.3
	July	6402.3	119.0	5811.8	4456.4	673.9	1355.4	471.5
	August	6144.0	124.8	5532.9	4257.8	620.9	1275.1	486.3
		Transactions						
2010	Q4	35.9	-11.8	81.1	32.6	15.3	48.6	-33.4
2011	Q1	110.2	12.0	55.5	25.6	4.1	29.9	42.7
	Q2	70.4	-4.5	77.2	22.6	11.1	54.7	-2.3

Note: Not including money market funds

Outstanding amounts at end of period

Transactions during period

Source: ECB Monthly Bulletin November 2011

## A4.5 Money market funds

**Table 38: Assets of euro area money market funds by type, Feb-2010-Q22011, €bn**

Year	Quarter	Total	Loans to euro area		Holdings of securities other than shares issued by euro area residents				Money market fund shares / units	Holdings of shares / other equity issued by euro area residents	External assets			Remaining assets
			Total	o/w MFIs	Total	General government	Other euro area residents	MFIs			Total	o/w securities other than shares	o/w loans	
			Outstanding amounts											
2007		1154.8	96.3	94.0	509.2	75.3	120.1	313.8	69.9	1.6	460.4	381.6	77.8	17.4
2008		1274.3	155.6	152.1	542.8	101.1	106.6	335.1	80.1	4.5	478.8	375.5	102.9	12.5
2009		1232.9	117.9	113.5	589.2	126.4	72.7	390.1	68.5	5.8	426.6	381.7	44.6	24.9
2010	Q1	1208.0	111.9	107.9	581.6	106.1	74.1	401.4	61.9	4.2	425.1	377.9	46.5	23.4
	Q2	1197.5	105.3	103.5	557.2	91.9	75.4	389.9	55.6	4.2	452.7	392.9	59.4	22.5
	Q3	1173.9	110.5	108.9	549.4	86.4	81.2	381.7	52.0	4.5	432.1	371.3	60.2	25.4
	Q4	1132.8	95.1	93.9	520.9	81.9	72.2	366.8	50.0	4.6	438.9	368.7	69.7	23.3
2011	Q1	1105.5	88.0	87.3	512.4	79.4	75.2	357.7	50.3	3.6	429.2	365.8	62.8	22.0
	Q2	1071.5	103.6	102.9	457.2	78.1	67.9	311.2	47.1	3.8	438.5	326.6	111.8	21.2
	Q3	1100.7	112.2	111.3	438.4	80.6	67.5	290.2	44.6	3.1	478.7	340.3	138.3	23.8
			Transactions											
2007		146.9	38.1	37.3	51.2	5.1	-7.6	53.7	5.0	-1.3	51.2	6.0	45.0	2.7
2008		94.0	49.9	48.8	10.9	28.5	-18.2	0.6	9.2	0.9	26.8	1.1	26.4	-5.4
2009		-37.0	-35.4	-36.4	48.8	25.2	-32.5	56.1	-11.5	2.0	-53.4	6.9	-60.0	12.5
2010	Q1	-40.9	-6.0	-5.6	-10.5	-20.2	1.2	8.6	-6.6	-1.6	-14.7	-15.2	0.1	-1.5
	Q2	-50.2	-6.7	-4.5	-34.3	-17.2	0.5	-17.7	-6.3	0.0	-1.7	-10.2	8.8	-0.9
	Q3	11.1	5.0	5.2	-1.4	-5.5	6.8	-2.7	-3.5	0.2	8.7	2.8	5.7	2.9
	Q4	-45.8	-15.4	-14.9	-28.2	-4.0	-8.9	-15.3	-2.0	0.1	2.8	-5.8	8.5	-2.2
2011	Q1	-7.9	-7.0	-6.7	-5.0	-2.5	3.3	-5.7	0.3	-1.0	6.4	10.4	-4.0	-1.3
	Q2	-27.4	-2.0	-1.9	-36.5	-1.2	-7.1	-28.1	-3.2	0.2	15.1	0.0	15.7	-0.8
	Q3	7.0	5.4	5.2	-17.7	2.5	-0.9	-19.4	-2.4	-0.7	20.4	5.8	14.6	2.5

Note: Outstanding amounts at end of period; transactions during period

Source: ECB Monthly Bulletin November 2011



Table 39: Liabilities of euro area money market funds by type, Feb-2010-Q22011, €bn							
Year	Quarter	Total	Deposits of euro area residents	Money market fund shares / units issued, held by euro area residents	Capital and reserves	External liabilities	Remaining liabilities
Outstanding amounts							
2007		1154.8	8.9	754.1	0.2	375.3	16.2
2008		1274.3	5.2	825.0	0.1	427.2	16.9
2009		1232.9	1.7	732.6	0.0	469.5	29.1
2010	Q1	1208.0	3.9	706.1	0.0	469.3	28.7
	Q2	1197.5	4.4	673.0	0.0	494.1	26.0
	Q3	1173.9	6.7	652.1	0.0	485.8	29.3
	Q4	1132.8	2.3	612.3	0.0	494.3	23.8
2011	Q1	1105.5	1.8	632.8	0.0	444.7	26.3
	Q2	1071.5	2.5	607.5	0.0	440.1	21.4
	Q3	1100.7	3.0	607.5	0.0	459.9	30.4
Transactions							
2007		146.9	2.7	62.8	0.3	81.5	-0.5
2008		94.0	-3.7	33.8	0.1	61.7	2.1
2009		-37.0	-3.5	-25.9	-0.1	-20.1	12.5
2010	Q1	-40.9	2.2	-26.6	0.0	-16.3	-0.3
	Q2	-50.2	0.5	-37.1	0.0	-11.5	-2.0
	Q3	11.1	2.3	-20.9	0.0	26.5	3.2
	Q4	-45.8	-4.4	-39.8	0.0	3.0	-4.7
2011	Q1	-7.9	-0.5	-2.6	0.0	-7.2	2.4
	Q2	-27.4	0.7	-25.2	0.0	1.9	-4.9
	Q3	7.0	0.5	0.1	0.0	-3.0	9.4

Note: Outstanding amounts at end of period

Transactions during period

Source: ECB Monthly Bulletin November 2011

## Annex 5 Major financial institutions

### A5.1 Banks

Table 40: 100 largest banks in Europe, by total assets at the end of 2010	
	Total assets (€m)
BNP Paribas	3,026,659
Deutsche Bank AG	2,886,505
HSBC Holdings Plc	2,782,685
Barclays Plc	2,643,537
Royal Bank of Scotland	2,579,527
Crédit Agricole-Crédit Agricole Group	2,621,755
Banco Santander SA	1,844,179
Lloyds Banking Group Plc	1,759,656
Société Générale	1,714,778
BPCE Group	1,588,101
ING Bank	1,246,757
UniCredit SpA	1,407,918
Commerzbank AG	1,142,555
BPCE SA	1,123,043
Intesa Sanpaolo	997,836
Rabobank Nederland-Rabobank Group	988,412
Nordea Bank AB (publ)	879,811
Dexia	858,448
Banco Bilbao Vizcaya Argentaria SA	837,246
Danske Bank A/S	649,052
Standard Chartered Plc	585,562
DZ Bank AG-Deutsche Zentral-Genossenschaftsbank	580,842
KBC Groep NV/ KBC Groupe SA-KBC Group	485,959
Caja de Ahorros y Pensiones de Barcelona-LA CAIXA	432,794
Banca Monte dei Paschi di Siena SpA-Gruppo Monte dei Paschi di Siena	370,015
Skandinaviska Enskilda Banken AB	368,286
Svenska Handelsbanken	363,844
Nationwide Building Society	329,298
Erste Group Bank AG	311,939
Swedbank AB	289,868
Raiffeisen Landesbanken Holding GmbH	206,978
Banco Popolare	204,724
Unione di Banche Italiane Scpa-UBI Banca	197,760
Banco Popular Espanol SA	197,126
National Bank of Greece SA	182,895
European Financial Group EFG (Luxembourg) SA	157,359
Banco Comercial Português, SA-Millennium bcp	151,487

**Table 40: 100 largest banks in Europe, by total assets at the end of 2010**

	Total assets (€m)
Banco de Sabadell SA	147,079
EFG Eurobank Ergasias SA	132,066
Espirito Santo Financial Group S.A.	132,009
Banco Espirito Santo SA	126,715
Mediobanca SpA	106,418
Caixa d'Estalvis de Catalunya, Tarragona i Manresa-Catalunya Caixa	116,005
Caixa de Aforros de Galicia Vigo Ourense e Pontevedra-Novacaixa Galicia	111,322
Banca Cívica SA	108,112
Alpha Bank AE	101,181
Banca popolare dell'Emilia Romagna	88,609
Piraeus Bank SA	87,370
Bankinter SA	82,025
Banca Popolare di Milano SCaRL	81,875
Caisse d'épargne et de prévoyance Ile-de-France	81,662
Volksbanken Holding regGenmbH	70,564
Caja Espana de Inversiones Salamanca y Soria Caja de Ahorros y Monte de Piedad-Caja Duero y España	69,239
Banco BPI SA	69,162
Caja de Ahorros y Monte de Piedad de Zaragoza, Aragon y Rioja-Ibercaja	68,146
Powszechna Kasa Oszczednosci Bank Polski SA - PKO BP SA	64,887
Bank of Cyprus Public Company Limited-Bank of Cyprus Group	64,584
Marfin Popular Bank Public Co Ltd	64,498
Aareal Bank AG	62,432
HASPA Finanzholding	60,652
Banca Carige SpA	60,604
Banque et Caisse d'Epargne de l'Etat Luxembourg	57,462
Oesterreichische Kontrollbank AG	54,231
Banca Popolare di Vicenza Societa cooperativa per azioni	53,823
Yorkshire Building Society	53,391
OTP Bank Plc	53,141
BRED Banque Populaire	53,068
Raiffeisen-Holding Niederösterreich-Wien reg.Gen.mmbH	52,477
Sachsen-Finanzgruppe	51,603
Veneto Banca scpa	50,072
Crédit Mutuel Nord Europe	49,757
Jyske Bank A/S (Group)	49,299
Caisse régionale de crédit agricole mutuel de Paris et d'Ile-de-France-Crédit Agricole d'Ile-de-France	49,104
Banco Pastor SA	47,161
Sampo Plc	45,216
CAJAMAR Caja Rural, Sociedad Cooperativa de Crédito	45,153
Sparkasse KölnBonn	45,147

**Table 40: 100 largest banks in Europe, by total assets at the end of 2010**

	Total assets (€m)
Bilbao Bizkaia Kutxa, BBK	44,096
Caixa D'Estalvis Unio De Caixes Manlleu Sabadell I Terrassa-UNNIM	42,947
Caixa D'Estalvis Union De Caixes Manlleu Sabadell I Terrassa-UNNIM	42,947
Investec Plc	37,584
Credito Vatelinese Soc Coop	40,535
Banca Popolare di Sondrio Societa Cooperativa per Azioni	39,810
Coventry Building Society	39,578
Caisse regionale de credit agricole mutuel Nord de France-Credit Agricole Nord de France	39,128
Banco de Valencia	35,897
Caisse d' epargne et de orevoyance Aquitaine Poitou-Charentes	35,523
Caisse régionale de credit agricole mutuel Centre-Est-Credit Agricole Centre-Est	33,590
Banca delle Marche SpA	32,546
Caja Laboral Popular Coop. de Crédito - Lan Kide Aurrezkia-Euskadiko Kutxa	32,539
RBC Dexia Investor Services Limited	31,691
Caja de Ahorros y Monte de Piedad de Gipuzkoa y San Sebastian-Kutxa	31,584
Banco Grupo Cajatres SA-Caja 3	31,450
Confederación Española de Cajas de Ahorros - CECA	30,974
Sydbank A/S	30,463
Länsförsäkringar AB	29,372
Caisse Régionale de Crédit Agricole Mutuel Brie Picardie-Crédit Agricole Brie Picardie	28,799
NLB dd-Nova Ljubljanska Banka d.d.	27,095
Caisse régionale de crédit agricole de Centre France-Crédit Agricole Centre France	26,588
Iccrea Holding SpA	25,448
BNP Paribas	3,026,659
Deutsche Bank AG	2,886,505
HSBC Holdings Plc	2,782,685
Barclays Plc	2,643,537
Royal Bank of Scotland	2,579,527
Crédit Agricole-Crédit Agricole Group	2,621,755
Banco Santander SA	1,844,179
Lloyds Banking Group Plc	1,759,656
Société Générale	1,714,778
BPCE Group	1,588,101
ING Bank	1,246,757
UniCredit SpA	1,407,918
Commerzbank AG	1,142,555
BPCE SA	1,123,043
Intesa Sanpaolo	997,836
Rabobank Nederland-Rabobank Group	988,412
Nordea Bank AB (publ)	879,811
Dexia	858,448

**Table 40: 100 largest banks in Europe, by total assets at the end of 2010**

	Total assets (€m)
Banco Bilbao Vizcaya Argentaria SA	837,246
Danske Bank A/S	649,052
Standard Chartered Plc	585,562
DZ Bank AG-Deutsche Zentral-Genossenschaftsbank	580,842
KBC Groep NV/ KBC Groupe SA-KBC Group	485,959
Caja de Ahorros y Pensiones de Barcelona-LA CAIXA	432,794
Banca Monte dei Paschi di Siena SpA-Gruppo Monte dei Paschi di Siena	370,015
Skandinaviska Enskilda Banken AB	368,286
Svenska Handelsbanken	363,844
Nationwide Building Society	329,298
Erste Group Bank AG	311,939
Swedbank AB	289,868
Raiffeisen Landesbanken Holding GmbH	206,978
Banco Popolare	204,724

**Source: BankScope**

Note: Banks for which total assets at end of 2010 available reported

BankScope search strategy involved: BvD Independence indicators A+, A, A-, U; UO and GUO only; Specialisations including and limited to commercial banks, savings banks, cooperative banks, real Estate & mortgage banks, investment banks, Islamic banks, bank holdings & holding companies and micro-financing institutions; consolidation codes C1 and C2; world regions/countries including and limited to Austria (AT), Belgium (BE), Cyprus (CY), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (GR), Ireland (IE), Italy (IT), Luxembourg (LU), Malta (MT), Netherlands (NL), Portugal (PT), Spain (ES), Sweden (SE), United Kingdom (GB), Bulgaria (BG), Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO), Slovakia (SK), Slovenia (SI)

Two nationally owned banks – Royal Bank of Scotland and ING Bank – added manually to list

## A5.2 Insurance undertakings

**Table 41: 100 largest insurance undertakings by total assets at the end of 2010**

	Total assets (€m)
AXA	720,898
Allianz SE	611,810
AVIVA Plc	425,320
Generali Assicurazioni SpA	416,674
Legal & General Group plc	376,714
Aegon NV	326,723
ING Verzekeringen NV	319,975
CNP Assurances	312,162
Prudential plc	303,987
Stichting Pensioenfonds ABP	274,435
Münchener Rückversicherungs-Gesellschaft Aktiengesellschaft	230,868
Predica	226,451
Old Mutual Plc	225,473
Standard Life plc	172,406
Resolution Limited	143,363
ERGO Versicherungsgruppe AG	134,397
BNP Paribas Cardif	128,513
SNS - Reaal NV	127,319
GAN (Group)	137,500
Talanx Aktiengesellschaft	105,845
AGEAS (Group)	98,807
Groupama (Combined)	98,799
Lloyd's Syndicate 0456	98,144
Poste Italiane SpA	95,717
Eureko B.V.	93,009
HDI Haftpflichtverband der Deutschen Industrie VaG	88,995
Ecureuil Vie	90,917
Sogecap	85,667
Pearl Group Holdings (No 2) Limited	80,015
Norwich Union plc	105,915
Scottish Widows Plc	78,921
Irish Life & Permanent Plc	75,699
Wüstenrot & Württembergische AG	74,238
SGAM Covéa (Combined)	72,659
Groupe des Assurances Crédit Mutuel SA	66,876
Aegon Nederland NV	65,948
Commercial Union plc	81,052
Lloyd's of London	70,733

**Table 41: 100 largest insurance undertakings by total assets at the end of 2010**

	<b>Total assets (€m)</b>
Delta Lloyd NV	78,487
Friends Provident Group Plc	66,475
RAS Holding SpA	63,776
Mutuelle Générale de Prévoyance	64,864
Scottish Equitable plc	66,394
Nationale-Nederlanden Levensverzekering Maatschappij NV	65,628
R+V Versicherung Aktiengesellschaft	64,332
SGAM AG2R La Mondiale	61,072
Achmea Holding NV	56,366
Friends Provident Limited	57,016
AG Insurance	57,747
Alecta Pensionsforsäkring Omsesidigt	56,508
La Mondiale, société d'assurance sur la vie et de capitalisation	55,867
Eurizon Vita SpA	50,440
Unipol Gruppo Finanziario SpA	51,294
Friends Aslh Limited	56,421
Zurich Assurance Ltd	46,055
Mapfre SA	45,580
Hannover Rückversicherungs-Aktiengesellschaft	45,268
Poste Vita SpA	45,073
Debeka Lebensversicherungsvereins auf Gegenseitigkeit Sitz Koblenz am Rhein	43,224
Premafin Finanziaria SpA	42,212
HGI Group Ltd	41,380
Fondiarria - SAI SpA	42,132
AXA Belgium SA	37,862
ASR Nederland NV	40,189
Versicherungskammer Bayern Versicherungsanstalt des öffentlichen Rechts	40,119
Natixis Assurances	36,623
AMF Pensionsförsäkring AB	39,395
Royal London Mutual Insurance Society Ltd	39,285
R+V Lebensversicherung AG	38,837
Vienna Insurance Group - Wiener Städtische Versicherung AG	38,355
Forsikringselskabet Danica, Skadeforsikringsaktieselskab af 1999	38,133
HBOS Financial Services Limited	57,613
General Accident plc	43,270
ABP Vie	34,987
Allied Dunbar Assurance Plc	36,708
Natio Vie	39,552
PFA Holding A/S	33,825
Livförsäkringsaktiebolaget Skandia (Publ)	36,453
PFA Pension	35,423

**Table 41: 100 largest insurance undertakings by total assets at the end of 2010**

	<b>Total assets (€m)</b>
Skandia Liv Sweden	34,869
Danica Pension Livsforsikringsaktieselskab	34,727
Mutuelle du Mans Assurances IARD (La) (Combined)	33,550
Wiener Stadtische Wechselseitige	32,109
Mediolanum SpA	32,549
Hermes Assured Limited	32,974
Ageas Insurance International N.V.	29,158
AachenMünchener Lebensversicherung AG	30,972
Union des Assurances Fédérales	32,383
XL Group Plc	30,496
Suravenir	29,980
Varma Mutual Pension Insurance undertaking	29,815
Royal & Sun Alliance Insurance Plc (Reclassified)	29,187
St. James's Place plc	29,699
Keva	29,605
IntesaVita SpA	29,551
DKV Deutsche Krankenversicherung AG	29,416
Sampo Plc	29,337
Delta Lloyd Levensverzekeringen NV	27,021
Ethias SA/NV	27,868
Württembergische Lebensversicherung AG	28,839
DBV Winterthur Holding AG	25,319
Groupama Vie	26,521
Scor SE	27,608
Uniqa Versicherungen AG	27,586

Source: ISIS



## A5.3 Pension funds

**Table 42: 100 largest pension institutions by assets at the end of 2010**

	Total assets (€m)
Norway Government Pension Fund Global	387,954,000
ABP	250,091,000
Pensioenfondszorg en Welzijn	90,500,000
Arbejdsmarkedets Tillaegspension (ATP)	77,887,300
Reserva de la Seguridad Social	60,375,000
BT group plc	39,245,752
Alecta	37,674,000
BVV	36,149,383
Sampensionen KP Life Insurance	35,466,616
PFA Holdings A/S	34,841,172
Pensioenfondszorg Metal en Techniek	34,048,000
Tredje AP-fond (AP3)	32,023,317
BVK= Bayerische Versorgungskammer	31,656,346
Danica Pension	31,465,100
Varma Mutual Pension Insurance	29,809,124
Kommunal Landspensjonskasse	29,057,417
AMF Pensions	28,484,700
Vital Forsikring ASA	28,293,285
BpfBOUW	26,455,573
Ilmarinen Pension Insurance	26,019,407
Universities Superannuation Scheme	24,832,434
Keva	24,676,627
Alcatel-Lucent	24,648,154
Air France-KLM	24,635,000
National Pensions Reserve Fund (Ireland)	24,400,000
Fonds de Reserve pour les Retraites	24,045,803
Royal Mail Group	23,474,502
Andra AP-fond (AP2)	22,779,067
Fjärde-AP-fonden (AP4)	22,135,262
Pensioenfondszorg van de Metalektro (PME)	21,993,000
PUBLICA Pensionskasse des Bundes	21,635,632
Första AP-fond (AP1)	19,436,605
Lloyds Banking Group	18,491,953
Barclays Bank	17,943,172
Deutsche Rentenversicherung Bunds	17,108,836
CEMEX UK	16,998,540
AHV/AVS	16,804,889
BVG-Sammelstiftung Swiss Life	16,517,358
Stichting Shell Pensioenfondszorg	16,087,000

**Table 42: 100 largest pension institutions by assets at the end of 2010**

	<b>Total assets (€m)</b>
Shell Pension Trust	16,087,000
BP	15,934,452
British Airways	15,448,325
BVK Personalversorge des Kantons Zurich	15,276,581
Government Pension Fund Norway	15,195,676
RBS	14,944,048
Stichting Philips Pensioenfond	13,680,400
BSAF SE	13,656,610
Statens Pensjonsfond (Valtion Eläkerahasto)	13,576,312
Ford Motors UK	13,523,000
UBS	13,447,737
Siemens AG	13,393,375
Nestle	13,027,483
VBL	13,021,118
KZVK Kirchliches Zusatzversorgungskasse	12,855,607
Electricite de France	12,601,440
SwissLife	12,596,262
National Grid UK Pension Services	12,329,564
Stichting Pensioenfond ING	12,292,864
Mineworkers Pension Scheme	12,236,843
Rabobank Pensioenfond	11,790,300
HSBC Pension Trust (UK)	11,656,373
ING Nationale Polska PTE	11,348,754
AVIVA BPH CU WBK	10,992,345
BAE Systems	10,992,000
Migros Pensionkasse (MPK)	10,845,105
Stichting Spoorwegpensioenfond	10,628,000
ENPAM	10,479,572
GlaxoSmithKline	10,424,800
Tata Steel UK	10,005,451
Banco Santander SA	9,912,000
BWVA	9,820,538
British Coal Staff Sup. Scheme Trustees Ltd	9,766,112
BBC	9,719,075
Grafische Bedrijfsfondesn (GBF)	9,564,431
Stichting van de ABN Amro Bank NV	9,376,044
Deutsche Bank	9,248,126
Daimler AG	9,094,848
BWVA	9,086,384
Aviva plc	9,084,339
Nordrheinische Aerzteversorgung	9,041,447

**Table 42: 100 largest pension institutions by assets at the end of 2010**

	<b>Total assets (€m)</b>
Fonds de Compensation Luxembourg	8,976,253
Allianz SE	8,814,002
Sparkassen-Versicherung AG V	8,792,084
Tapiola Pension Insurance	8,733,593
Pensionskasse der Novartis	8,625,000
Pensionkasse Post	8,562,094
Pensionkasse der Stadt Zurich	8,522,329
Railways Pension Trustee Company	8,450,530
Zurich Financial services AG	8,413,041
Credit Suisse Group	8,394,378
West Yorkshire Pension Fund (LGPS)	8,363,571
IGFCSS - Instituto de Gestao de Fundos IP	8,339,140
PK der Mitarbeiter des Hoechst Gruppe	8,806,897
Strathclyde Pension Fund (LGPS)	8,072,310
Co-operative Group Ltd	8,052,621
Pensionskasse SBB	8,022,022
Aerzteversorgung Westfalen Lippe	7,973,766
Rolls Royce Group plc	7,700,958
Pensioenfonds Vervoer	7,686,742
HBOS plc	7,679,792
ICI	7,646,596
Greater Manchester Pension Fund (LPGS)	7,374,720
PZU Zlota Jesion Pension Fund	7,288,813
Generali Versicherung	7,181,037
AXA	7,074,000
Pension Denmark	6,929,034
Sjunde AP-fonden (AP7)	6,266,453
West Midlands Pension Fund (LPGS)	5,522,760
RWE AG	4,512,298
Magistre & Psykologer Pensionkasse (MP)	3,120,629
Industriens Pension	2,430,322

Source I&amp;PE

## A5.4 Other institutional investors

**Table 43: Other large institutional investors, by assets at the end of 2010**

	<b>Total assets (€m)</b>
Reserva de la Seguridad Social	60,375,000
Fonds de Reserve pour les retraites	24,405,803
BVV Versicherungsverein des Bankgewerbes	36,149,383
Fonds Stratégique d'Investissements (SFI)	21,000,000
Wellcome Trust	15,578,903
Zilverfonds-Fonds de vieillissement	16,310,010

Source: I&PE

## A5.5 Asset managers

**Table 44: 100 largest asset managers by assets at the end of 2010**

	Total assets (€m)
Allianz Global Investors	1,178,425
Amundi Group	669,874
BNP Paribas Investment Partners	530,281
Natixis Global Asset Management	505,167
AXA Investment Managers	499,000
Deutsche Asset Management	495,812
UBS Global Asset Management	393,300
Legal & General Investment Management	354,646
ING Investment Management	343,237
HSBC Global asset Management	296,542
Generali Investments	292,575
Aviva Investors	280,959
Credit Suisse	280,291
APG	239,000
M7G Investments	196,200
AEGON Asset Management	193,100
MEAG Munich Ergo Asset Management	192,687
Pioneer Global Asset Management	175,823
Eurizon Capital	167,934
Schroder Investment Management	167,006
Union Investment	165,665
Scottish Widows Investment Partnership	159,508
KBC Asset Management	158,137
Standard Life Investments	156,055
DekaBank	154,873
Aberdeen Asset Management	143,801
Robeco Group	134,723
Oppenheim Asset Management	132,000
BBVA Asset Management	129,793
Santander Asset Management	125,174
SEB Wealth Management	123,588
F&C Management	110,180
Swiss & Global Asset Management	102,300
Insight Investment	99,589
Groupama Asset Management	88,770
PGGM Investments	88,000
Nordea Investment Management	87,940
Lyxor Asset Management	86,309
Pictet Asset Management	85,446

**Table 44: 100 largest asset managers by assets at the end of 2010**

	<b>Total assets (€m)</b>
Swiss Life Asset Management	84,595
Dexia Asset Management	82,448
Ignis Asset Management	76,000
Danske Capital	70,921
Clariden Leu	68,800
Thredneedle Asset Management	68,076
Henderson Global Investors	65,401
Swedbank Robur Asset Management	65,224
ING Real Estate Investment Management	64,352
Bank Sarasin & Co.	63,173
DnB NOR asset Management	63,000
Baillie Gifford & Co.	62,927
Mn Services	62,100
Helaba Invest	58,141
Newton Investment Management	51,044
Union Bancaire Privée	50,413
Syntrus Achmea	45,600
Swisscanto Asset Management	40,660
Mediolanum	40,394
Erste-Sparinvest	40,000
Nykredit Asset Management	38,435
Delta Lloyd Asset Management	35,827
Metzler Asset Management	35,810
Carmignac Gestion	33,000
AMF Pension	32,472
Groupe UFG-LFP	31,930
PFA Pension	30,270
AEW Europe	29,800
Pohjola Asset Management	29,696
Irish Life Investment Managers	29,625
BayernInvest	29,354
SNS Asset Management	28,000
W&W Asset Management	27,000
Raiffeisen Capital Management	26,906
Vontobel Asset Management	25,507
WestLB Mellon asset Management	23,177
Bank Degroof	22,907
IVG Institutional Funds	22,700
KLP Asset Management	22,500
Joh. Berenberg, Gossler & Co.	21,900
Zürcher Kantonalbank Asset Management	21,221

**Table 44: 100 largest asset managers by assets at the end of 2010**

	<b>Total assets (€m)</b>
ARCA SGR	20,749
LBBW Asset Management	20,641
OFI Asset Management	20,268
ESAF - Espirito Santo Activos Financieros	19,693
PRIMA	19,648
BFT Gestion	18,664
Hauck & Aufhaeuser Asset Management	18,500
Wegelin Asset Management	17,500
Partners Group	17,275
Frankfurt-Trust	17,111
Mirabaud & Cie	16,500
Alfred Berg	16,000
Nordea Invest Fund Management	14,435
Petercam	14,170
Siemens Kapitalanlagegesellschaft	14,102
Bank Delen	13,200
SPF Beheer	13,200
Kempen Capital Management	12,904
AmpegaGerling Investment	12,700
LGT Capital Partners	12,600
Storebrand Asset Management	12,487
Oddo Asset Management	12,000
Edmond de Rothschild Asset Management	11,941
Quoniam Asset Management	11,700
Landesbank Berlin Investment	11,574
Skagen Funds	11,407
LGT Capital Mangement	10,881
TKP Investments	10,304
Comgest	10,029

Source: I&amp;PE

## A5.6 Hedge funds

**Table 45: 50 largest hedge funds by assets at the end of 2010**

	Total assets (US\$bn)
Brevan Howard	31.54
Man Investment	24.3
BlackRock	21.66
BlueCrest Capital Management	20.5
Lansdowne Partners	14.3
Winton Capital Management	13.65
GAM	13.18
GLG Partners	12.1
Brummer & Partners	8.64
Transtrend	7.6
Sloane Robinson	7.4
Gartmore Investment Management	6.87
Dexia Asset Management	6.68
The Children's Investment Fund Management	6
Spinnaker Capital	5.64
COMAC Capital	5.5
HSBC Global Asset Management	5.4
Polygon Investment Group	5.25
Jabre Capital Partners	5.2
Capula Global	5.19
Cheyne Capital	5
Marshall Wace	4.95
CQS Management	4.7
Aspect Capital	3.69
Cevian Capital	3.54
Arrowgrass	3.52
Prosperity Capital Management	3.48
Pharo Management	3.2
Capital Fund Management	3.14
Henderson Global Investors	3
Egerton Capital	2.84
SEB Asset Management	2.67
James Caird Asset Management	2.5
BlueBay Asset Management	2.5
Aquila Capital Concepts	2.4
Millenium Global Investments	2.3
Thames River Capital	2.22
M&G Investments	2.2



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TT International	2.1
IKOS	2
Odey Asset Management	1.83
Toscafund	1.8
Cazenove Capital	1.8
Ecofin	1.8
Armajaro	1.7
Tyrus Capital	1.64
GLC	1.59
Rubicon Fund Management	1.53
Boussard & Gavaudan	1.49
Altis Partners	1.4

Source: HedgeFund Journal

## Annex 6 Financial Stability Board global systemically important institutions list

**Table 46: List of G-SIFIs, November 2011**

Bank of America
Bank of China
Bank of New York Mellon
Banque Populaire CdE
Barclays
BNP Paribas
Citigroup
Commerzbank
Credit Suisse
Deutsche Bank
Dexia
Goldman Sachs
Group Crédit Agricole
HSBC
ING Bank
JP Morgan Chase
Lloyds Banking Group
Mitsubishi UFJ FG
Mizuho FG
Morgan Stanley
Nordea
Royal Bank of Scotland
Santander
Société Générale
State Street
Sumitomo Mitsui FG
UBS
Unicredit Group
Wells Fargo

Note: This initial list is based on the methodology set out in the Basel Committee on Banking Supervision (BCBS) document Global systemically important banks: Assessment methodology and the additional loss absorbency requirement, using data as of end-2009. The list of G-SIFIs will be updated annually and published in November every year. Therefore, the list will not be fixed – there can be new entries and exits every year and the number of G-SIFIs may change. The BCBS methodology will be reviewed every three years to capture changes in the banking system and progress in measuring systemic importance. The present list contains global systemically important banking groups; future lists may also contain G-SIFIs that are not banking groups. As from November 2012, the published list of global systemically important banking groups will show the allocations to buckets corresponding to the level of additional loss absorbency they would be required to meet had the requirements been in effect. The additional loss absorbency requirements will begin to apply from 2016, initially to those banks identified in November 2014 as globally systemically important using the allocation to buckets at that date.

## Annex 7 Literature on risk measures

### A7.1 Aggregate financial stability assessment frameworks of the IMF and the ECB

#### A7.1.1 IMF Financial Soundness Indicators

The objective of Financial Soundness Indicators (FSIs) is to provide an indication of financial stability on a comparable basis across countries. To this end, the International Monetary Fund (IMF) in co-operation with national authorities launched an initiative focused on formulating a definition and single methodology for the compilation of FSIs. The outcome of that initiative and its connection to assessing the impact of OFIs on financial stability are discussed below.

Financial Soundness Indicators (FSIs) focus primarily on financial stability through banks. With this in mind, the analytical framework for FSIs takes into account two ways in which shocks can affect the stability of the financial sector. Shocks can have direct impacts on bank balance sheets or indirect impacts through the non-financial sector. For example, exchange rate depreciation can impose losses directly on the banking sector but also have an indirect effect on asset quality by causing losses in the corporate sector.

Direct impacts to banks are monitored through FSIs of banks' credit risk (FSIs in the 'asset quality' category), market risk ('sensitivity to market risk' category) and liquidity risk ('liquidity risk' category); and through banks' capacity to absorb losses ('capital adequacy' and 'earnings and profitability' categories).<sup>11</sup>

The abovementioned categories form the core set of FSIs that the IMF board consider to be important for assessing risk to financial stability and focus on indicators based on balance sheet variables.

However, in addition, there is an encouraged set of FSIs consisting of indicators that may be relevant but where further analytic work is required to clarify their role; and, FSIs for non-bank financials, non-bank undertakings, households and real estate markets. The full list of FSIs is shown in Table 47 below.

Table 47: Financial Soundness Indicators: Core and Encouraged Sets	
	Indicator
<i>Deposit-takers: Core set</i>	
Capital adequacy	Regulatory capital to risk-weighted assets
	Regulatory Tier 1 capital to risk-weighted assets
Earnings and profitability	Return on assets

<sup>11</sup> The framework for analysis of FSIs is known as the CAMELS framework (or methodology), which is an acronym for 'Capital adequacy, Asset quality, Management soundness, Earnings, Liquidity, Sensitivity to market risk'. For a discussion of FSIs within the CAMELS methodology see, for example, Evans et al. (2000), Sundararajan et al. (2002) and IMF and World Bank (2005) in Gersl and Jaroslav (2007).

**Table 47: Financial Soundness Indicators: Core and Encouraged Sets**

	Indicator
	Return on equity
	Interest margin to gross income
	Noninterest expenses to gross income
Asset quality	Nonperforming loans net of provisions to capital
	Nonperforming loans to total gross loans
	Sectoral distribution of loans to total loans
Liquidity	Liquid assets to total assets (liquid asset ratio)
	Liquid assets to short-term liabilities
	Duration of assets
Sensitivity to market risk	Duration of liabilities
	Net open position in foreign exchange to capital
<i>Deposit-takers: Encouraged set</i>	
	Capital to assets
	Large exposures to capital
	Geographical distribution of loans to total loans
	Gross asset position in financial derivatives to capital
	Gross liability position in financial derivatives to capital
	Trading income to total income
	Personnel expenses to noninterest expenses
	Spread between reference lending and deposit rates
	Spread between highest and lowest interbank rate
	Customer deposits to total (non-interbank) loans
	Foreign-currency-denominated loans to total loans
	Foreign-currency-denominated liabilities to total liabilities
<i>Market liquidity</i>	
	Average bid-ask spread in the securities market /1
	Average daily turnover ratio in the securities market /1
<i>Non-bank financials</i>	
	Assets to total financial system assets
	Assets to GDP
<i>Non-financial undertakings</i>	
	Total debt to equity
	Return on equity
	Earnings to interest and principal expenses
	Net foreign exchange exposure to equity
	Number of bankruptcy proceedings initiated
<i>Households</i>	
	Household debt to GDP
	Household debt service and principal payments to income
<i>Real estate markets</i>	
	Residential real estate prices
	Commercial real estate prices
	Residential real estate loans to total loans
	Commercial real estate loans to total loans

Source: IMF

### A7.1.2 ECB macro-prudential indicators

In parallel to IMF FSIs, the European Central Bank (ECB) along with euro area central banks developed macro-prudential indicators (MPIs).

The objective of MPIs, as FSIs, is to monitor financial stability, especially through impacts on bank balance sheets. In this regard, MPIs consist of internal factors that largely relate to the balance sheet of banks.

However, MPIs consist of a far larger set of indicators. This is motivated by the objective of covering all major sources of risk, including structural changes in the economy, financial markets, and banks' business activities as these changes influence banks' risk profiles (see Mörttinen et al, 2005). In this regard, MPIs encompass balance sheet variables but also move beyond them.

Table 48 provides a summary of the ECB's macro-prudential indicators.

Table 48: Macro-prudential indicators	
	Indicator
<i>Internal factors</i>	
Profitability	38 indicators (income and cost developments and composition, efficiency, profitability, income and costs as percent of total assets)
Balance sheet quality	18 indicators (balance sheet - coverage as share per the banking sector, asset and liability composition; off-balance sheet items)
Capital adequacy	18 indicators (capital adequacy, asset quality, provisions)
Demand and supply conditions	7 indicators (interest receivable and interest payable, average margin and overall margin)
Risk concentrations	25 indicators (credit growth and sectoral concentration, aggregate lending, aggregate new lending, lending to non-MFI private sectors, industry exposures) 18 indicators (composition of other assets - aggregate fixed income securities holdings, aggregate equity holdings, aggregate balance sheet, currency and maturity structure of domestic lending, global credit exposures) 14 indicators (liquidity risk, exposures of EU-15 to new EU member countries, exposures towards emerging and developing countries, market risk exposures)
Market assessment of risks	8 indicators (all bank share price index, yield spread, bank rating, distance to default of major EU banks)
<i>External factors</i>	
Financial fragility	15 indicators (total debt corporate sector, household total debt, household saving ratio, median expected default frequencies for key industries)
Asset price developments	5 indicators (stock indices, real estate prices)
Cyclical and monetary conditions	10 indicators (rate of growth of GDP and its components, developments in unemployment, interest rates, exchange rates, consumer price index)
<i>Contagion factors</i>	
Interbank markets	3 indicators (interbank liabilities, share of assets of 3 and 5 banks with the largest interbank exposures)

Source: ECB

## A7.2 Risk measures proposed in the economic literature

### A7.2.1 CoVar

CoVaR is a measure of systemic risk. Systemic risk arises as a result of distress of individuals financial intermediaries affecting financial stability as a whole. Systemic risk arises through two main channels. Firstly, financial intermediaries may have direct contractual links (e.g., repos) that imply that financial distress in one influences another. Secondly, distress of an individual financial intermediary may influence others through price effects (e.g. in wholesale funding markets). CoVar captures this as the value at risk of the financial system given institutions being under distress.

Adrian and Brunnermeier (2011) calculate a "forward- $\Delta$  CoVaR" to monitor which financial intermediaries are expected to contribute most to systemic risk based on current financial intermediary characteristics.

They find that intermediaries with higher leverage, more maturity mismatch and that are larger today are associated with larger systemic risk contributions one quarter, one year and two years later.

Moreover, they are able to provide quantitative estimates for how much stricter financial regulation should be for more systemically important institutions. For instance, a small intermediary may be subject to a tier one capital requirement of 8%, whereas a large intermediary should be subject to a requirement of 10% due to the influence of its size on systemic risk.

These findings motivate an attention in later chapters to larger, more systemically important institutions and an analysis of leverage and maturity mismatch.

### A7.2.2 Systemic expected shortfall

Acharya et al. (2012, 2010a, 2010b) state that systemic risk emerges when the financial sector falls short of capital and that the cost of this risk increases with the magnitude of the shortfall of capital. Systemic risk of a financial intermediary, therefore, is its contribution to the shortfall of capital.

Empirically, Acharya et al. (2011) describe how this measure is calculated. Firstly, the daily drop in equity value of a given firm that would be expected if the aggregate market falls more than 2% is calculated. This value is called marginal expected shortfall. The measure incorporates the volatility of the firm and its correlation with the market, as well as its performance in extremes and is estimated using a range of statistical methods (described in Brownlees and Engle, 2011).

Secondly, the marginal expected shortfall is extrapolated to a financial crisis which involves a much greater fall in market capitalisation (e.g., 40%) over a much greater time period (six months).

Thirdly, equity losses expected in a crisis are combined with a measure of the financial firm's leverage to determine how much capital would be needed in such a crisis.

Finally, the systemic risk contribution is the percentage of financial sector capital shortfall that would be experienced by this firm in the event of a crisis.

Acharya et al. (2010a, 2010b) demonstrate the ability of the systemic expected shortfall measure to predict emerging risks in the lead up to the financial crisis. This includes the outcome of stress tests performed by the regulator, the decline in equity valuations of large financial firms in the crisis and the widening of their credit default swap CDS spreads.

As in the case of CoVaR, this analysis suggests a focus on OFI size, leverage and some measure of OFIs' systemic importance (in this case, correlation with aggregate market equity).

### **A7.2.3 Distress insurance premium**

The distress insurance premium is measured by the price of insurance against systemic financial distress and an assessment of individual banks' marginal contribution to systemic risk.

The systemic risk indicator, a hypothetical insurance premium against catastrophic losses in a banking system, is constructed from real-time financial market data. The two key default risk factors, the probability of default (PD) of individual banks and the asset return correlations among banks, are estimated from CDS spreads and equity price co-movements, respectively.

To compute the indicator, a hypothetical debt portfolio that consists of total liabilities of all relevant financial intermediaries is constructed. The systemic risk indicator, effectively weighted by the liability size of each bank, is defined as the insurance premium that protects against distressed losses of this portfolio.

Marginal risk is calculated for each financial intermediary as the conditional expected loss from that sub-portfolio, conditional on a large loss for the full portfolio (see Huang, Zhou and Zhu (2009) for details).

### **A7.2.4 Systemic Risk Indicator**

Huang et al. (2011) propose use a systemic risk indicator reflecting the price of insurance against systemic financial distress. This indicator is equal to the hypothetical insurance premium against catastrophic losses in the banking system. Their complex approach involves computing risk-neutral probability of defaults and loss given default for individual banks, asset return correlations between individual banks and then the construction of a hypothetical debt portfolio that consists of the total liabilities (deposits, debts and others) of all banks.

### **A7.2.5 Shapley value approach**

Tarashev et al. (2010) propose to adopt the Shapley value approach developed in game theory for the attribution of systemic risk to individual institutions. In their analysis, they note that an institution's size, risk profile (probability of default and exposure to systematic risk) raise the institution's systemic importance. Importantly, they also find that, *ceteris paribus*, the institution's systemic importance increases non-linearly (more than proportionally) with size.

### **A7.2.6 Neural and network analysis**

In parallel to the attention given to the development of risk indicators, a different research strand focused on the interconnectiveness of financial institutions (banks) with a view to better understand propagation of shocks and contagion, and possibly derive risk indicators. So far, the

work is largely theoretical (see, for example, Amini et al. (2011), Faia (2011), Gai and Kapadia (2010) and Nier et al. (2008))

### A7.2.7 BCBS methodology for identification of systemically important institutions

In addition to the academic work outlined above, BIS (2011) outline an assessment methodology for assessing the systemic importance of globally systemically important financial institutions (G-SIFIs). This consultation document is a response by the Basel Committee to the Financial Stability Board's Recommendations described in BIS (2011).

The scope of the methodology is limited to banks and the approach seeks to identify indicators of different aspects of negative externalities that make banks critical to financial stability.

There are four categories of indicators: cross-jurisdictional activity, size, inter-connectedness, substitutability and complexity. Within each category there are multiple indicators (bar size). An indicator for a given bank is scored relative to the aggregate sum of the indicator across all banks. Each indicator is weighted equally in each category and each category is weighted equally in the overall assessment of the systemic importance of an institution. The indicators and weightings are summarised in Table 49.

Table 49: Indicator of BCBS indicator-based measurement approach		
Category (weighting)	Individual Indicator	Indicator weighting
Cross-jurisdictional activity (20%)	Cross-jurisdictional claims	10%
	Cross-jurisdictional liabilities	10%
Size (20%)	Total exposures as defined for use in the Basel III leverage ratio	20%
Inter-connectedness (20%)	Intra-financial system assets	6.67%
	Intra-financial system liabilities	6.67%
	Wholesale funding ratio	6.67%
Substitutability (20%)	Assets under custody	6.67%
	Payments cleared and settled through payment systems	6.67%
	Values of underwritten transactions in debt and equity markets	6.67%
Complexity (20%)	OTC derivatives notional value	6.67%
	Level 3 assets	6.67%
	Trading book value and available for sale value	6.67%

Source: BIS (2011)

Broadly speaking, the motivations for the categories of indicators are as follows. Cross-jurisdictional activity is intended to measure the importance of a bank outside of the jurisdiction in which it is headquartered. This captures an aspect of its international systemic importance.



Size captures another aspect of systemic importance. That is, all else equal, the larger the share of activity accounted for by a given bank, the more difficult it may be for other banks to take this bank's activity if it fails. The failure of larger banks may also have an impact on financial stability through their influence on confidence.

Similar to the rationale for cross-jurisdictional importance, the more inter-connected a given bank is to others, the more likely and costly it is for its failure to transmit through to the balance sheets of other banks. For instance, if a given bank lends more to other banks, holds securities of other banks, is engaged in repurchase agreements with other banks, etc.

Substitutability relates to the ability to replace the services a given bank provides in the event of failure and is captured through: assets under custody, payments cleared and settled through payment systems and values of underwritten transactions in debt and equity markets.

The complexity of an institution is expected to mean it is more systemically important, all else equal, due to the uncertainty resulting from the cost and time needed to uncover its impact on financial stability.

While this methodology is more basic than others covered in this section, its key merit is that it captures many different aspects of systemic importance. The list of G-SIFIs resulting from an application of this methodology is shown in Annex 6.

## Annex 8 Data search<sup>12</sup>

The following annex outlines data available on NBFIs from the perspective of analysing risks to financial stability, by source. Sources include a mix of industry associations, regulators and third-party data vendors, primarily at the EU wide level.

### A8.1 EFAMA

The European Fund and Asset Management Association (EFAMA) website includes an EFAMA Library toolbar on the left-hand side of the homepage, which aids the search for data. Data available through this source is described below.

#### Statistics

##### Latest trends

European Monthly Industry Fact Sheet (2009 - 2012)	This is a monthly published fact sheet which details the net fund product sales and asset data for UCITS and non-UCITS. The data which is provided by the national associations of its 23 members is aggregated. Data on Belgium, Cyprus, Estonia, Latvia, Lithuania, Malta and the Netherlands are not included in this aggregation, whilst information from Norway, Switzerland and Turkey is included.
European Quarterly Statistics (Most recent quarter)	<p>This provides information on the trends in UCITS market in the most recent quarter:</p> <ul style="list-style-type: none"><li>- Net sales by investments type</li><li>- Net sales by country of domiciliation</li><li>- Net assets by investments type</li><li>- Net assets by country of domiciliation</li></ul> <p>This provides information on the trends in non-UCITS market in the most recent quarter:</p> <ul style="list-style-type: none"><li>- Net sales and assets by investment type;</li><li>- Net assets by country of domiciliation;</li></ul>
International Statistical Release (Most recent quarter)	<p>This provides worldwide data for the most recent quarter on:</p> <ul style="list-style-type: none"><li>- Investment fund assets</li><li>- Geographical trends by fund type, equity, bond, money market, balanced/mixed, other</li><li>- Investment fund assets by fund type</li><li>- Net sales of investment funds</li></ul>

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<sup>12</sup> European Securities and Markets Authority (ESMA), Financial Services Authority (FSA) and Autorité des marchés financiers (AMF) not included due to a lack of available data.

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Statistics

- Number of funds, by fund type

More statistics

European Statistics (2003 - 2011) Contains historical versions of the European Quarterly Statistics release.

International Statistics (2003 - 2011) Contains historical versions of the quarterly International Statistics release.

Special Surveys

EFAMA Annual Asset Management Report Annual reports based primarily on responses to questionnaires by members with information on the asset management industry. Additional data sources are used to supplement responses when data is not provided.

Includes information on:

- AUM, Employment and Industrial Organisation
- AUM in investment funds and discretionary markets
- Clients of the European Asset Management Industry
- Asset allocation
- Financing of the Economy by European Asset Managers
- Total AUM at year end

Fact Book

Annually compiled book with information on the trends in the European investment fund industry as well as analysing potential future developments.

Includes:

- A description of the investment fund market in each of the 26 European EFAMA member countries

Historical data and the AUM of the largest European investment fund managers.

**A8.2 AFME**

The Association for Financial Markets in Europe's (AFME) website also has a drop-down toolbar which directs individuals to the relevant sections. A summary of the information that is provided under the heading of "Industry Facts and Figures" and was deemed potentially relevant for this report are set out below.

### Investing in Bonds Europe

Link to an educational, non-profit, non-commercial website which aims to teach individuals about bonds. This is a website that was developed by AFME in partnership with its members and other European market makers.

Provides in-depth market data, indices, economic indicators, market news, and commentary on different bond markets.

### Statistics and reports

<u>Leveraged finance</u>	High Yield & Leveraged Loan Report (2009 - 2011)	<p>This is a quarterly report that provides an overview of leveraged finance and contains information on:</p> <ul style="list-style-type: none"> <li>- Issuance of leveraged finance loans</li> <li>- Issuance of high yield bonds</li> <li>- Issuance of European developed market high yield bonds</li> <li>- Issuance of European emerging market high yield bonds</li> <li>- Credit quality</li> <li>- Relative value</li> <li>- Total return</li> </ul>
<u>Primary Dealers</u>	AFME/EPDA Price Discovery and Market Guide for the European Government Bonds Market	This provides information for investors and other interested parties on the providers of price and market data in European government bond markets.
<u>Securitisation</u>	Securitisation Monthly Data Supplement (2009 - 2012)	<p>This provides graphs which display:</p> <ul style="list-style-type: none"> <li>- CMBS spreads</li> <li>- RMBS spreads</li> <li>- ABS spreads</li> <li>- RMBS prices</li> <li>- CMBS and ABS prices</li> <li>- Indices data</li> <li>- iBoxx European ABS Total Return Data</li> </ul>
	Securitisation Data Report (2008 - 2011)	<p>This is a quarterly report which also allows individuals to download the underlying data used in the report.</p> <p>This report provides information on:</p> <ul style="list-style-type: none"> <li>- Issuance</li> </ul>

- Balances outstanding
- Credit quality – rating changes
- CMBS spreads
- RMBS spreads
- ABS spreads
- RMBS prices
- CMBS and ABS prices
- Indices data
- Total return benchmark data
- Asset-backed commercial paper
- Global comparative data

European  
Primary  
Dealers  
Handbook

This handbook provides a detailed description of the infrastructure of the primary and secondary markets of 15 European countries and the organisation of each of their Primary Dealer systems.

## A8.3 EVCA

On the homepage of the European Private Equity and Venture Capital Association (EVCA) website, there is a section headed “Knowledge Center”. Within this section, under the drop-down menu for “EVCA Research”, there are a number of potential data sources. The relevant information that is provided under EVCA research is described below.

### Latest data

EVCA  
Quarterly  
Activity  
Indicator  
(2006-2011)

Provides a slide show which describes trends across European over time.

These trends include:

- Private equity activity flows
- Private equity investment activity by amount
- Private equity investment activity by number of companies
- Private equity divestments, by exit route

### Statistics

<u>EVCA Yearbook 2011</u>	It is a comprehensive source European private equity and venture capital activity data, which is collected from more than 1,200 private equity firms.	The data includes annual figures on: <ul style="list-style-type: none"><li>- levels of private equity and venture capital investment into European companies</li><li>- equity divested at cost by private equity and venture capital firms</li><li>- funds raised by European private equity and venture capital managers</li></ul>
<u>Statistics: Performance</u>	Pan-European Private Equity Performance Benchmarks Study carried out by Thomson Reuters	The results of this study are available to EVCA members
<u>Statistics: Fundraising</u>	Annual Survey 2010	Provides figures displaying the annual funds raised by private equity and venture capital management companies located in Europe. (Presentations and data available for members)
<u>Statistics: Investments</u>	Annual Survey 2010	Provides figures displaying the annual investment activity undertaken by private equity and venture capital management companies located in Europe. (Presentations and data available for members)
<u>Statistics: Divestments</u>	Annual Survey 2010	Provides figures displaying the annual divestment activity undertaken by private equity and venture capital management companies located in Europe. (Presentations and data available for members)

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## **A8.4 ECMI**

Through the European Capital Markets Institute's (ECMI) website, it is possible to access the 2011 ECMI Statistical Package, via the heading of "Statistics" on the homepage. This statistical package can be purchased in pdf form and provides historical data relating to the following topics.

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Equity market

Market capitalisation	This includes information on: <ul style="list-style-type: none"> <li>- Domestic market capitalisation</li> <li>- Total number of listed companies</li> <li>- Total value of share trading</li> <li>- Share trading as a share of market capitalisation</li> <li>- Number of listed ETFs</li> <li>- Total value of ETF trading</li> </ul>
MiFID statistics	This includes information on: <ul style="list-style-type: none"> <li>- European equities turnover and volume</li> <li>- European Economic area (EEA) equities turnover and volume by national market</li> </ul>

Debt securities market

Amount outstanding	This includes information on: <ul style="list-style-type: none"> <li>- Aggregate size of debt securities market</li> <li>- Debt securities market by issuer</li> <li>- Debt securities market by segment</li> </ul>
Net issuance	This includes information on: <ul style="list-style-type: none"> <li>- Aggregate net issuance of debt securities</li> <li>- Debt securities by issuer</li> <li>- Debt securities by segment</li> </ul>
Bond market by exchange	This includes information on: <ul style="list-style-type: none"> <li>- Number of new bonds listed by stock exchange</li> <li>- Total value of bond trading by exchange</li> <li>- Number of bond trades on European exchanges</li> </ul>
Covered bond market	This includes information on: <ul style="list-style-type: none"> <li>- Outstanding amounts</li> </ul>
Securitisation	This includes information on: <ul style="list-style-type: none"> <li>- Issuance</li> </ul>

Exchange-traded derivative market

Turnover	This includes information on: <ul style="list-style-type: none"> <li>- Interest rate derivatives by maturity</li> <li>- Commodity derivatives by exchange</li> <li>- Stock options and futures</li> </ul>
Open interest	This includes information on: <ul style="list-style-type: none"> <li>- Open interest of exchange traded derivatives by risk category, instrument and location</li> </ul>

Over-the-counter derivative market

Notional amounts outstanding	This includes information on: <ul style="list-style-type: none"> <li>- OTC foreign exchange derivatives</li> <li>- OTC single-currency interest rates derivatives</li> <li>- OTC equity-linked derivatives</li> <li>- OTC commodity derivatives</li> <li>- Credit default swaps</li> </ul>
Gross market values	This includes information on: <ul style="list-style-type: none"> <li>- OTC foreign exchange derivatives</li> <li>- OTC single-currency interest rates derivatives</li> <li>- OTC equity-linked derivatives</li> <li>- OTC commodity derivatives</li> <li>- Credit default swaps</li> </ul>

Asset management

Mutual funds	This includes information on: <ul style="list-style-type: none"> <li>- Total number of Mutual funds</li> <li>- Total net assets of Mutual funds</li> </ul>
Mutual funds excluded funds of funds	This includes information on: <ul style="list-style-type: none"> <li>- Number of Mutual funds excluded funds of funds</li> <li>- Net assets of Mutual funds excluded funds of funds</li> </ul>
UCITS market	This includes information on: <ul style="list-style-type: none"> <li>- Number of UCITS market funds</li> <li>- Net assets of UCITS market funds</li> </ul>
Non-UCITS market	This includes information on: <ul style="list-style-type: none"> <li>- Number of non-UCITS market funds</li> <li>- Net assets of non-UCITS market funds</li> </ul>
Comparison of EU27 UCITS and non-UCITS markets	
Pension funds	This includes information on: <ul style="list-style-type: none"> <li>- Total assets of pension funds</li> </ul>
Insurance undertakings	This includes information on: <ul style="list-style-type: none"> <li>- Total assets of insurance undertakings</li> </ul>

Gross domestic product

GDP



Exchange rate

Exchange rate USD/EUR

Global comparative data

Debt securities overview

Outstandings/net issuance of government debt securities

EU and US credit to non-financial business, outstandings

EEA total credit to non-financial business, outstandings

Net issuance of debt securities

Structured products issuance and outstandings

**A8.5 HFI**

Hedge Fund Intelligence (HFI) has a global database, “The HFI Global Database” which it describes as the most comprehensive hedge funds, fund of funds and UCITS database available, as it tracks over \$1.1 trillion assets.

A large amount of analysis is also carried out by HFI, which is available in the form of articles, within which graphs are also included displaying various historical trends.

Additional publications are produced by HFI with EuroHedge, which focuses on EuropeAbsolute UCITS is the information service on the Absolute Return UCITS industry which HFI provide. This offers news and data on fund performance, new fund launches, industry trends and global regulatory changes.

UCITS Platform survey 2011

This is a compiled based on the responses of 100 fund managers. However these fund managers are based all over the world, not just in Europe.

This includes information on:

- Industry breakdown by investor type
- Top UCITS platforms by absolute return assets
- Top UCITS hedge funds on a platform
- Absolute return UCITS strategies

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### The Global Billion Dollar Club

This is a global list of the funds that have over \$1 billion of AUM

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## **A8.6 Lipper Hedge Fund Database**

This is privately-owned database and it requires a subscription to gain access to it. It provides more than 350 fields of data on 7,000 hedge funds, along with detailed fund profile reports.

The database provides monthly performance data, which is updated daily. The information provided by the database covers items such as fund strategy and inception date, along with price and performance data from the inception of the firm. It is possible to organise this data based on investment type, geography and industry sector.

Additional background information is included in this database, such as information on fund structure, fees and leverage levels.

## **A8.7 TowerGroup**

TowerGroup is a research and advisory services firm which focuses solely on the global financial services industry. They provide a large number of reports on subjects including banking; securities and investments; and insurance. However, TowerGroup does not hold any datasets for the analysis of NBFIs. Reports are available via subscription.

## **A8.8 IPE**

Investment and Pensions Europe (IPE) is a leading European publication aimed at institutional investors and those operating pension funds.

There were two different issues of the magazine which provided useful data on the largest European pension funds and the largest European asset managers in 2011. In both case, each type of institution was ranked based on the value of their AUM.

The June 2011 edition of the IPE magazine had a list of the top 400 global asset managers as well as a ranking of the top 120 European institutional managers. Whilst the October 2011 edition included a ranking of the top 1000 global institutional investors as well as the top 1000 European pension funds.

## **A8.9 ECB**

The European Central Bank website provides a large array of statistics in their Statistical Data Warehouse. The particular statistics provided on their website that proved to be useful for our purposes concerned “Monetary, banking and financial markets” as well as “Payments and

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securities trading, clearing, settlement". More details on the information provided by the ECB are below. The data is available on a monthly, quarterly or annual basis and aggregate measures for the EU and the euro area are also available.

Money, banking  
and financial  
markets

MFI balance sheets

Assets	This includes information on: <ul style="list-style-type: none"> <li>- Loans</li> <li>- Loans to NFCs by NACE (estimates)</li> <li>- Securities other than shares</li> <li>- Shares and other equity</li> <li>- Fixed assets</li> <li>- Remaining assets</li> <li>- Other assets and asset aggregation</li> </ul>
Liabilities	This includes information on: <ul style="list-style-type: none"> <li>- Currency in circulation</li> <li>- Deposits</li> <li>- Money Market Funds shares/units</li> <li>- Debt securities issued</li> <li>- Capital and reserves</li> <li>- Remaining liabilities</li> <li>- Other liabilities and aggregations of liabilities</li> </ul>

MFIs loans, deposits  
and security  
holdings by sector

Governments

Other financial intermediaries

Insurance corporations and pension funds

Non-financial corporations

Households

Credit Institutions  
balance sheet

Assets	This includes information on: <ul style="list-style-type: none"><li>- Cash</li><li>- Loans</li><li>- Securities other than shares</li><li>- Shares and other equity</li><li>- Fixed assets</li><li>- Remaining assets</li><li>- Other assets and asset aggregation</li></ul>
Liabilities	This includes information on: <ul style="list-style-type: none"><li>- Deposits</li><li>- Debt securities issued</li><li>- Capital and reserves</li><li>- Remaining liabilities</li><li>- Other liabilities and aggregations of liabilities</li></ul>

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Money Market Funds  
balance sheet

Assets	This includes information on: <ul style="list-style-type: none"><li>- Loans</li><li>- Securities other than shares</li><li>- Shares and other equity</li><li>- Holdings of MMF shares/units</li><li>- Remaining assets</li><li>- Other assets and asset aggregation</li></ul>
Liabilities	This includes information on: <ul style="list-style-type: none"><li>- Deposits</li><li>- MMF shares/units issued</li><li>- Remaining liabilities</li><li>- Other liabilities and aggregations of liabilities</li></ul>

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Investment  
funds

Total  
investment  
funds

Assets	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Deposits and loan claims</li> <li>- Non-financial assets</li> <li>- Remaining assets and financial derivatives</li> <li>- Securities other than shares</li> <li>- Securities other than shares o/w accrued interest</li> <li>- Shares and other equity</li> <li>- Shares and other equity excluding investment fund and money market fund shares/units</li> <li>- Shares and other equity o/w Investment fund and money market fund shares/units</li> <li>- Shares and other equity o/w Quoted shares excluding investment fund and money market fund shares/units</li> <li>- Total assets/liabilities</li> </ul>
Liabilities	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Investment fund shares/units</li> <li>- Loans and deposits received</li> <li>- Remaining liabilities and financial derivatives</li> <li>- Total assets/liabilities</li> </ul>

Equity funds

Assets	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Deposit and loan claims</li> <li>- Non-financial assets</li> <li>- Remaining assets and financial derivatives</li> <li>- Securities other than shares</li> <li>- Securities other than shares o/w accrued interest</li> <li>- Shares and other equity</li> <li>- Shares and other equity excluding investment fund and money market fund shares/units</li> <li>- Shares and other equity o/w Investment fund and money market fund shares/units</li> <li>- Shares and other equity o/w Quoted shares excluding investment fund and money market fund shares/units</li> <li>- Total assets/liabilities</li> </ul>
Liabilities	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Investment fund shares/units</li> <li>- Loans and deposits received</li> </ul>

- Remaining liabilities and financial derivatives
  - Total assets/liabilities
- 

### Hedge funds

Assets      This includes information on:

- Deposit and loan claims
- Non-financial assets
- Remaining assets and financial derivatives
- Securities other than shares
- Securities other than shares o/w accrued interest
- Shares and other equity
- Shares and other equity excluding investment fund and money market fund shares/units
- Shares and other equity o/w Investment fund and money market fund shares/units
- Shares and other equity o/w Quoted shares excluding investment fund and money market fund shares/units
- Total assets/liabilities

Liabilities      This includes information on:

- Investment fund shares/units
  - Loans and deposits received
  - Remaining liabilities and financial derivatives
  - Total assets/liabilities
-

Insurance  
corporations and  
pension funds

Total insurance  
corporations  
and pension  
funds

Assets	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Total assets</li> <li>- Total financial assets</li> <li>- Currency and Deposits</li> <li>- Loans</li> <li>- Securities other than shares</li> <li>- Shares and other equity</li> <li>- MMF and non-MMF Investment fund shares/units</li> <li>- Prepayment of insurance premiums and reserves for outstanding claims</li> <li>- Other accounts receivable/payable and financial derivatives</li> <li>- Non-financial assets</li> </ul>
Liabilities	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Total liabilities</li> <li>- Loans received</li> <li>- Securities other than shares</li> <li>- Shares and other equity</li> <li>- Insurance technical reserves</li> <li>- Other accounts receivable/payable and financial derivatives</li> <li>- Net worth</li> </ul>

### Insurance corporations

Assets	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Total assets</li> <li>- Total financial assets</li> <li>- Currency and Deposits</li> <li>- Loans</li> <li>- Securities other than shares</li> <li>- Shares and other equity</li> <li>- MMF and non-MMF Investment fund shares/units</li> <li>- Prepayment of insurance premiums and reserves for outstanding claims</li> <li>- Other accounts receivable/payable and financial derivatives</li> <li>- Non-financial assets</li> </ul>
Liabilities	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Total liabilities</li> <li>- Loans received</li> <li>- Securities other than shares</li> <li>- Shares and other equity</li> <li>- Insurance technical reserves</li> <li>- Other accounts receivable/payable and financial derivatives</li> <li>- Net worth</li> </ul>

### Pension funds

Assets	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Total assets</li> <li>- Total financial assets</li> <li>- Currency and Deposits</li> <li>- Loans</li> <li>- Securities other than shares</li> <li>- Shares and other equity</li> <li>- MMF and non-MMF Investment fund shares/units</li> <li>- Prepayment of insurance premiums and reserves for outstanding claims</li> <li>- Other accounts receivable/payable and financial derivatives</li> <li>- Non-financial assets</li> </ul>
Liabilities	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Total liabilities</li> <li>- Loans received</li> <li>- Securities other than shares</li> <li>- Shares and other equity</li> </ul>



- Insurance technical reserves
- Other accounts receivable/payable and financial derivatives
- Net worth

Financial Vehicle  
Corporations

Assets	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Total assets</li> <li>- Deposits and loan claims</li> <li>- Other (financial derivatives, fixed assets and remaining assets)</li> <li>- Other securitised assets</li> <li>- Securities other than shares</li> <li>- Securitised loans</li> <li>- Shares and other equity</li> <li>- Total assets/liabilities</li> </ul>
Liabilities	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Loans and deposits received</li> <li>- Debt securities</li> <li>- Capital and reserves</li> <li>- Other (financial derivatives and remaining liabilities)</li> <li>- Total assets/liabilities</li> </ul>

Payments and securities trading,  
clearing, settlement

Securities clearing

Clearing members	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Domestic participants</li> <li>- Non-domestic EU participants</li> <li>- Non-domestic non-EU participants</li> <li>- Total participants</li> </ul>
Non-OTC derivatives contracts	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Commodity derivatives, futures</li> <li>- Commodity derivatives, options</li> <li>- Derivatives</li> <li>- Financial derivatives, futures</li> <li>- Financial derivatives, options</li> <li>- Other commodity derivatives</li> <li>- Other financial derivatives</li> <li>- Other financial derivatives, of which credit default swaps</li> </ul>
OTC derivatives contracts	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Commodity derivatives, futures</li> <li>- Commodity derivatives, options</li> <li>- Derivatives</li> <li>- Financial derivatives, futures</li> <li>- Financial derivatives, options</li> <li>- Other commodity derivatives</li> <li>- Other financial derivatives</li> <li>- Other financial derivatives, of which credit default swaps</li> </ul>
Repo transactions	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Other repos</li> <li>- Repos</li> <li>- Repos, debt securities</li> <li>- Repos, equity</li> </ul>
Cash securities transactions	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Debt securities</li> <li>- Debt securities, equities and other securities</li> <li>- Equity</li> <li>- Equity, of which investment fund shares</li> <li>- Securities other than debt and equities</li> </ul>
Contracts / transactions cleared through a clearing link	<p>This includes information on:</p> <ul style="list-style-type: none"> <li>- Commodity derivatives</li> <li>- Financial derivatives</li> <li>- Repos</li> <li>- Securities (outright transactions)</li> </ul>

Securities transfers for settlement of cleared transactions	This includes information on: <ul style="list-style-type: none"><li>- Debt securities</li><li>- Debt securities, equities and other securities</li><li>- Equity</li><li>- Securities other than debt and equities</li><li>- Securities settlement instruments other than debt</li></ul>
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## A8.10 Eurostat

Eurostat is a leading provider of statistics on Europe. It provides statistics on a wide range of areas, including finance and banking.

All of the data that was relevant for this project could be found in the “Economy and finance” section. The information that was available is summarised below. It is generally available from 1980 onwards and the data can be separated at sector level. The sectors of interest for this project were S122 “Other monetary financial institutions”; S123 “Other financial intermediaries, except insurance corporations and pension funds”; and S125 “Insurance corporations and pension funds”.

All of the information provided by Eurostat that was relevant for our project could be found under “Financial flows and stocks (nasa\_f)”, which was within “Annual sector account (nasa)”, which was itself within the category “National accounts (including GDP) (na)”.

Financial flows and  
stocks (nasa\_f)Financial  
balance  
sheets(nasa\_f\_bs)<sup>13</sup>

This includes information on:

- Net financial assets (BF90)
- Financial assets (F\_AS)
- Financial liabilities (F\_LI)
- Monetary gold and special drawing rights (SDRs) (F1)
- Currency and deposits (F2)
- Securities other than shares (F3)
- Loans (F4)
- Shares and other equity (F5)
- Insurance technical reserves (F6)
- Net equity of households in life insurance reserves and in pension
- Other accounts receivable/payable (F7)

Financial  
transactions  
(nasa\_f\_tr)<sup>14</sup>

This includes information on:

- Net lending /net borrowing (B9)
- Net financial transactions (B9\_F)
- Net acquisition of financial assets (F\_AS\_TR)
- Net acquisition of financial liabilities (F\_LI\_TR)
- Monetary gold and special drawing rights (SDRs) (F1)
- Currency and deposits (F2)
- Securities other than shares (F3)
- Loans (F4)
- Shares and other equity (F5)
- Insurance technical reserves (F6)
- Other accounts receivable/payable (F7)

Other changes  
in  
financial  
assets  
(nasa\_f\_of)

This includes information on:

- Net lending/net borrowing (B9)
- Financial assets (F\_AS)
- Financial liabilities (F\_LI)
- Monetary gold and special drawing rights (SDRs) (F1)
- Currency and deposits (F2)
- Securities other than shares (F3)
- Loans (F4)
- Shares and other equity (F5)
- Insurance technical reserves (F6)
- Other accounts receivable/payable (F7)

This includes information on:

- Net financial holdings gains and losses (B9\_GL)

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<sup>13</sup> Data also available at quarterly level (nasq\_f\_bs)

<sup>14</sup> Data also available at quarterly level (nasq\_f\_tr)

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### Financial flows and stocks (nasa\_f)

<u>Nominal</u>	- Net financial transactions (B9_F)
<u>holding</u>	- Financial assets (F_AS)
<u>gains/losses</u>	- Financial liabilities (F_LI)
<u>(nasa_f_gl)</u>	- Monetary gold and special drawing rights (SDRs) (F1)
	- Currency and deposits (F2)
	- Securities other than shares (F3)
	- Loans (F4)
	- Shares and other equity (F5)
	- Insurance technical reserves (F6)
	- Other accounts receivable/payable (F7)

This includes information on:

<u>Other changes</u>	- Net financial other changes in volume (B9_OV)
<u>in</u>	- Financial assets (F_AS)
<u>volume</u>	- Financial liabilities (F_LI)
<u>(nasa_f_oc)<sup>15</sup></u>	- Monetary gold and special drawing rights (SDRs) (F1)
	- Currency and deposits (F2)
	- Securities other than shares (F3)
	- Loans (F4)
	- Shares and other equity (F5)
	- Insurance technical reserves (F6)
	- Other accounts receivable/payable (F7)

## A8.11 iMoneyNet

iMoneyNet is a global provider of information relating to money market funds. They provide a large amount of information particularly relating to performance; portfolio composition; yield; growth rates; and monthly expenses. It is also possible to identify funds based on different characteristics such as Fund name; Domicile; credit ratings agency ratings; and fund class. In order to access this information a subscription is required.

iMoneyNet also produce the “IMMFA Money Fund Report” in conjunction with the IMMFA. This report provides information for both stable and accumulating NAV euro prime and euro government AAA-rated MMFs which could prove relevant for future analysis of MMFs. The report provides the following information:

- Total Portfolio Assets (€ millions);
- Assets (€ millions);

<sup>15</sup> Data also available at quarterly level (nasq\_f\_oc)

- Share Price
- 7-Day Simple Yield (%) net and gross
- 7-Day Comp Yield (%) net;
- 30-Day Simple Yield (%) net and gross;
- 30-Day Comp Yield (%) net);
- Weighted Average Maturity (WAM);
- Weighted Average Life (WAL); and
- Portfolio composition.

Portfolio composition separates assets into Treasury; Government other; Repos; Time Deposits (TDs); Certificates of Deposits (CDs); Commercial Paper (CP); Asset backed commercial paper (ABCP); Floating rate notes (FRNs); and other.

## **A8.12 Data Explorers**

Data Explorers collects data throughout the day from agent lenders, the sell side and the buy side, in an attempt to make a complete global data source of the industry. It is a leading provider of data on securities lending, tracking both short selling and institutional fund activity across all global market sectors.

It provides a unique data set of more than 3 million intraday transactions, which cover \$12 trillion of securities lending across 20,000 institutional funds.

They also produce a quarterly securities lending review which discusses the key current issues. Also provided within the review is a more in-depth analysis at an individual country-level.

## Annex 9 Stakeholder consultations

Consultation guides were provided for a number of institution types including insurance undertakings, pension funds, money market funds, asset managers (covering hedge funds) and private equity and venture capital funds. These are presented below.

CCPs were also consulted but in an unstructured format.

In addition, follow-up or separate meetings were held with stakeholders to speak on cross-cutting issues as covered in chapter 3.

## A9.1 Consultation guides

### A9.1.1 Insurance undertakings

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#### Background

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This rapid growth of non-bank financial intermediaries (i.e., so-called other financial intermediaries and the financial sector activities of insurance undertakings and pension funds) raises many policy questions, challenges and issues.

However, at the present time, there is a lack of comprehensive, evidence-based analysis and understanding of the role and impact of non-bank financial intermediaries on financial stability and the economy more generally.

The current study is intended to be an important building block for the Commission's further work within the context of the operation of the European Systemic Risk Board (ESRB). In this regard, it should provide a significant contribution to the Commission's knowledge building and information gathering capacity. The ESRB has been established with the purpose of identifying, monitoring and assessing potential risks to financial stability in the EU that arise from macroeconomic and financial developments. The ESRB conducts macro-prudential oversight of the EU financial system so as to contribute to the prevention or mitigation of systemic risks to financial stability. To achieve its mission, the ESRB collects and analyses information, monitors macro-financial developments and can issue recommendations to policy-makers and supervisors.

Taking into account the aforementioned background, the aims of the study are to:

- Undertake an analysis of the role of non-bank financial intermediaries (as a whole industry and per relevant segment) in the building up of imbalances and the asset bubble(s) during the period 2001-2007
- Undertake an assessment of the behaviour of non-bank financial intermediaries during the crisis (again as a whole industry and by relevant segment). In particular, the study seeks to examine whether non-bank financial intermediaries amplified the systemic risk and/or suffered asymmetrically from the financial crisis (i.e. over the period 2007-2009)
- Develop recommendations for a better supervision and regulation of risk among the relevant non-bank financial intermediary segments. This would be at the macro level to reveal economic imbalances rather than detailed micro-prudential rules – thus assisting the ESRB rather than the new ESAs



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**Section A. Nature of role in financial intermediation**

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- 1. How have developments in the financial sector and in financial intermediation from 2000 to 2010 impacted on the roles and activities of insurance undertakings?**

*OPEN RESPONSE*

- 2. What effects have the abovementioned changes had on the risks faced by insurance undertakings?**

*OPEN RESPONSE*

- 3. What new links have developed between insurance undertakings and the banking sector as a result of changes in the financial activities in the insurance sector?**

*OPEN RESPONSE*

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Section B. Experiences of the financial crisis

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In this section we would like you to consider sectoral balance sheet developments prior to and during the financial crisis for insurance undertakings. These developments are described in the table below. The data provided are official national accounts constructed by the European Commission and Member State statistical offices.

Size and annualised growth of balance sheets of insurance corporations and pension funds in the EU27			
	Size (€bn)	Growth	
	2009	Pre-crisis 2000-6	Crisis 2007-9
<i>Assets</i>			
Currency and deposits	980.7	6.8%	3.0%
Securities other than shares (incl., derivatives)	4024.8	9.7%	8.0%
Loans	577.0	5.1%	-1.0%
Shares and other equity	3866.9	4.1%	-12.0%
Insurance technical reserves	229.9	14.2%	5.0%
Other accounts receivable / payable	220.7	14.1%	-17.0%
<b>Financial assets</b>	<b>9899.9</b>	<b>6.7%</b>	<b>-2.0%</b>
<i>Liabilities</i>			
Currency and deposits	-17.3	-6.5%	0.0%
Securities other than shares (incl., derivatives)	58.0	30.8%	19.7%
Loans	-2.0	10.8%	3.5%
Shares and other equity	201.8	0.0%	-14.0%
Insurance technical reserves	12.6	6.5%	-1.4%
Other accounts receivable / payable	3.2	10.4%	-3.3%
<b>Financial assets</b>	<b>256.3</b>	<b>6.1%</b>	<b>-1.9%</b>

1. Which factors were behind the 9.7% p.a. growth of securities and other shares (which includes derivatives) prior to the crisis?

OPEN RESPONSE

2. In your view, what drove the contraction of shares and other equity by 12% p.a. in the crisis period on the asset side?

OPEN RESPONSE

3. Similarly, what drove the contraction of shares and other equity by 14% p.a. in the crisis period on the liabilities side?

OPEN RESPONSE

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- 4. Which other areas of the sectoral balance sheet do you see as reflecting important pre-crisis/crisis developments in the insurance sector?**

*OPEN RESPONSE*

- 5. In what ways do sectoral balance sheets today reflect connections between insurance undertakings and (i) banks; and (ii) other NBFIs that did not exist before?**

*OPEN RESPONSE*

- 6. Overall, what have been the top 5 impacts of the financial crisis on the insurance sector?**

*OPEN RESPONSE*

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### Section C. Data and measurement

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*This section focuses on the monitoring activities carried out by insurance undertakings of the build of risks in the sector, and the impact of these risks on overall financial stability.*

- 1. Are you aware of information sources insurance undertakings employ to establish a view of the build-up of risk in the insurance sector?**

*OPEN RESPONSE*

- 2. Do insurance undertakings monitor the activities and risk-taking behaviour of the major players in their sector, specifically? If so, what information sources are utilised for this purpose?**

*OPEN RESPONSE*

- 3. Which surveys do the major players in the insurance sector disclose information to (e.g. association surveys)?**

*OPEN RESPONSE*

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**Section D. Important institutions**

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- 1. Given changes in the structure of the financial sector over recent years and through the financial crisis, which individual institutions within the insurance sector do you feel play a critical role in terms of financial (in)stability, and may provide useful insights to this study?**

*OPEN RESPONSE*

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Section E. Additional comments

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1. If, in addition to the previously addressed points, there are any additional issues you feel should be considered during this study, please provide comment below.

*OPEN RESPONSE*

## A9.1.2 Pension funds

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### Background

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This rapid growth of non-bank financial intermediaries (i.e., so-called other financial intermediaries and the financial sector activities of insurance undertakings and pension funds) raises many policy questions, challenges and issues.

However, at the present time, there is a lack of comprehensive, evidence-based analysis and understanding of the role and impact of non-bank financial intermediaries on financial stability and the economy more generally.

The current study is intended to be an important building block for the Commission's further work within the context of the operation of the European Systemic Risk Board (ESRB). In this regard, it should provide a significant contribution to the Commission's knowledge building and information gathering capacity. The ESRB has been established with the purpose of identifying, monitoring and assessing potential risks to financial stability in the EU that arise from macroeconomic and financial developments. The ESRB conducts macro-prudential oversight of the EU financial system so as to contribute to the prevention or mitigation of systemic risks to financial stability. To achieve its mission, the ESRB collects and analyses information, monitors macro-financial developments and can issue recommendations to policy-makers and supervisors.

Taking into account the aforementioned background, the aims of the study are to:

- Undertake an analysis of the role of non-bank financial intermediaries (as a whole industry and per relevant segment) in the building up of imbalances and the asset bubble(s) during the period 2001-2007
- Undertake an assessment of the behaviour of non-bank financial intermediaries during the crisis (again as a whole industry and by relevant segment). In particular, the study seeks to examine whether non-bank financial intermediaries amplified the systemic risk and/or suffered asymmetrically from the financial crisis (i.e. over the period 2007-2009)
- Develop recommendations for a better supervision and regulation of risk among the relevant non-bank financial intermediary segments. This would be at the macro level to reveal economic imbalances rather than detailed micro-prudential rules – thus assisting the ESRB rather than the new ESAs

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**Section A. Nature of role in financial intermediation**

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- 4. How have developments in the financial sector and in financial intermediation from 2000 to 2010 impacted on the roles and activities of pension funds?**

*OPEN RESPONSE*

- 5. What effects have the abovementioned changes had on the risks faced by pension funds?**

*OPEN RESPONSE*

- 6. What new links have developed between pension funds and the banking sector as a result of changes in the financial activities in the pension funds sector?**

*OPEN RESPONSE*



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Section B. Experiences of the financial crisis

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In this section we would like you to consider sectoral balance sheet developments prior to and during the financial crisis for pension funds. These developments are described in the table below. The data provided are official national accounts constructed by the European Commission and Member State statistical offices.

Size and annualised growth of balance sheets of insurance corporations and pension funds in the EU27			
	Size (€bn)	Growth	
	2009	Pre-crisis 2000-6	Crisis 2007-9
<i>Assets</i>			
Currency and deposits	980.7	6.8%	3.0%
Securities other than shares (incl., derivatives)	4024.8	9.7%	8.0%
Loans	577.0	5.1%	-1.0%
Shares and other equity	3866.9	4.1%	-12.0%
Insurance technical reserves	229.9	14.2%	5.0%
Other accounts receivable / payable	220.7	14.1%	-17.0%
<b>Financial assets</b>	<b>9899.9</b>	<b>6.7%</b>	<b>-2.0%</b>
<i>Liabilities</i>			
Currency and deposits	-17.3	-6.5%	0.0%
Securities other than shares	58.0	30.8%	19.7%
Loans	-2.0	10.8%	3.5%
Shares and other equity	201.8	0.0%	-14.0%
Insurance technical reserves	12.6	6.5%	-1.4%
Other accounts receivable / payable	3.2	10.4%	-3.3%
<b>Financial assets</b>	<b>256.3</b>	<b>6.1%</b>	<b>-1.9%</b>

**7. Which factors were behind the 9.7% p.a. growth of securities and other shares prior to the crisis?**

OPEN RESPONSE

**8. In your view, what drove the contraction of shares and other equity by 12% p.a. in the crisis period on the asset side?**

OPEN RESPONSE

**9. Similarly, what drove the contraction of shares and other equity by 14% p.a. in the crisis period on the liabilities side?**

OPEN RESPONSE

**10. Which other areas of the sectoral balance sheet do you see as reflecting important pre-crisis/crisis developments in pensions?**

*OPEN RESPONSE*

**11. In what ways do sectoral balance sheets today reflect connections between pension funds and (i) banks; and (ii) other NBFIs that did not exist before?**

*OPEN RESPONSE*

**12. Overall, what have been the top 5 impacts of the financial crisis on pensions?**

*OPEN RESPONSE*

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### Section C. Data and measurement

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*This section focuses on the monitoring activities carried out by pension funds of the build of risks in the sector, and the impact of these risks on overall financial stability.*

- 1. Are you aware of information sources pension funds employ to establish a view of the build-up of risk in the sector?**

*OPEN RESPONSE*

- 2. Do pension funds monitor the activities and risk-taking behaviour of the major players in their sector, specifically? If so, what information sources are utilised for this purpose?**

*OPEN RESPONSE*

- 3. Which surveys do the major players disclose information to (e.g. association surveys)?**

*OPEN RESPONSE*

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Section D. Important institutions

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4. Given changes in the structure of the financial sector over recent years and through the financial crisis, which individual pensions funds do you feel play a critical role in terms of financial (in)stability, and may provide useful insights to this study?

*OPEN RESPONSE*

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**Section E. Additional comments**

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- 2. If, in addition to the previously addressed points, there are any additional issues you feel should be considered during this study, please provide comment below.**

*OPEN RESPONSE*

### A9.1.3 Money market funds

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#### Background

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This rapid growth of non-bank financial intermediaries (i.e., so-called other financial intermediaries and the financial sector activities of insurance undertakings and pension funds) raises many policy questions, challenges and issues.

However, at the present time, there is a lack of comprehensive, evidence-based analysis and understanding of the role and impact of non-bank financial intermediaries on financial stability and the economy more generally.

The current study is intended to be an important building block for the Commission's further work within the context of the operation of the European Systemic Risk Board (ESRB). In this regard, it should provide a significant contribution to the Commission's knowledge building and information gathering capacity. The ESRB has been established with the purpose of identifying, monitoring and assessing potential risks to financial stability in the EU that arise from macroeconomic and financial developments. The ESRB conducts macro-prudential oversight of the EU financial system so as to contribute to the prevention or mitigation of systemic risks to financial stability. To achieve its mission, the ESRB collects and analyses information, monitors macro-financial developments and can issue recommendations to policy-makers and supervisors.

Taking into account the aforementioned background, the aims of the study are to:

- Undertake an analysis of the role of non-bank financial intermediaries (as a whole industry and per relevant segment) in the building up of imbalances and the asset bubble(s) during the period 2001-2007
- Undertake an assessment of the behaviour of non-bank financial intermediaries during the crisis (again as a whole industry and by relevant segment). In particular, the study seeks to examine whether non-bank financial intermediaries amplified the systemic risk and/or suffered asymmetrically from the financial crisis (i.e. over the period 2007-2009)
- Develop recommendations for a better supervision and regulation of risk among the relevant non-bank financial intermediary segments. This would be at the macro level to reveal economic imbalances rather than detailed micro-prudential rules – thus assisting the ESRB rather than the new ESAs

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**Section A. Nature of role in financial intermediation**

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- 7. How have developments in the financial sector and in financial intermediation from 2000 to 2010 impacted on the roles and activities of money market funds?**

*OPEN RESPONSE*

- 8. What effects have the abovementioned changes had on the risks faced by money market funds?**

*OPEN RESPONSE*

- 9. What new links have developed between money market funds and the banking sector as a result of changes in the financial activities among money market funds?**

*OPEN RESPONSE*

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**Section B. Experiences of the financial crisis**

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**In this section we would like you to consider sectoral balance sheet developments prior to and during the financial crisis within the money market funds space.**

**13. Which statistics do you see as reflecting important pre-crisis/crisis developments in the OFI sector?**

*OPEN RESPONSE*

**14. In what ways do the abovementioned statistics reflect connections between other financial intermediaries and (i) banks; and (ii) other NBFIs that did not exist before?**

*OPEN RESPONSE*

**15. Overall, what have been the top 5 impacts of the financial crisis on the OFI sector?**

*OPEN RESPONSE*



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### Section C. Data and measurement

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*This section focuses on the monitoring activities carried out by money market funds of the build of risks in the sector, and the impact of these risks on overall financial stability.*

- 5. Are you aware of information sources money market funds employ to establish a view of the build-up of risk in the sector?**

*OPEN RESPONSE*

- 6. Do money market funds monitor the activities and risk-taking behaviour of the major players in their sector, specifically? If so, what information sources are utilised for this purpose?**

*OPEN RESPONSE*

- 7. Which surveys do the major players disclose information to (e.g. association surveys)?**

*OPEN RESPONSE*

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Section D. Additional comments

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- 3. If, in addition to the previously addressed points, there are any additional issues you feel should be considered during this study, please provide comment below.**

*OPEN RESPONSE*

### A9.1.4 Asset managers

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#### Background

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This rapid growth of non-bank financial intermediaries (i.e., so-called other financial intermediaries and the financial sector activities of insurance undertakings and pension funds) raises many policy questions, challenges and issues.

However, at the present time, there is a lack of comprehensive, evidence-based analysis and understanding of the role and impact of non-bank financial intermediaries on financial stability and the economy more generally.

The current study is intended to be an important building block for the Commission's further work within the context of the operation of the European Systemic Risk Board (ESRB). In this regard, it should provide a significant contribution to the Commission's knowledge building and information gathering capacity. The ESRB has been established with the purpose of identifying, monitoring and assessing potential risks to financial stability in the EU that arise from macroeconomic and financial developments. The ESRB conducts macro-prudential oversight of the EU financial system so as to contribute to the prevention or mitigation of systemic risks to financial stability. To achieve its mission, the ESRB collects and analyses information, monitors macro-financial developments and can issue recommendations to policy-makers and supervisors.

Taking into account the aforementioned background, the aims of the study are to:

- Undertake an analysis of the role of non-bank financial intermediaries (as a whole industry and per relevant segment) in the building up of imbalances and the asset bubble(s) during the period 2001-2007
- Undertake an assessment of the behaviour of non-bank financial intermediaries during the crisis (again as a whole industry and by relevant segment). In particular, the study seeks to examine whether non-bank financial intermediaries amplified the systemic risk and/or suffered asymmetrically from the financial crisis (i.e. over the period 2007-2009)
- Develop recommendations for a better supervision and regulation of risk among the relevant non-bank financial intermediary segments. This would be at the macro level to reveal economic imbalances rather than detailed micro-prudential rules – thus assisting the ESRB rather than the new ESAs

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**Section A. Nature of role in financial intermediation**

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**10. How have developments in the financial sector and in financial intermediation from 2000 to 2010 impacted on the roles and activities of asset managers?**

*OPEN RESPONSE*

**11. What effects have the abovementioned changes had on the risks faced by asset managers?**

*OPEN RESPONSE*

**12. What new links have developed between asset managers and the banking sector as a result of changes in the financial activities of asset managers?**

*OPEN RESPONSE*

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Section B. Experiences of the financial crisis

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In this section we would like you to consider sectoral balance sheet developments prior to and during the financial crisis for 'other financial intermediaries' (which includes asset managers). These developments are described in the table below. The data provided are official national accounts constructed by the European Commission and Member State statistical offices.

Size and annualised growth of balance sheets of other financial intermediaries in the EU27			
	Size (€bn)	Growth	
	2009	Pre-crisis 2000-6	Crisis 2007-9
<i>Assets</i>			
Currency and deposits	2831.3	17.8%	-0.4%
Securities other than shares (incl., derivatives)	4747.5	15.2%	13.8%
Loans	3803.1	19.1%	5.8%
Shares and other equity	6349	14.8%	-4.8%
Insurance technical reserves	1.2	3.8%	-3.9%
Other accounts receivable / payable	249.3	11.1%	16.7%
<b>Financial assets</b>	<b>17981.4</b>	<b>16.1%</b>	<b>2.5%</b>
<i>Liabilities</i>			
Currency and deposits	47.8	9.3%	8.9%
Securities other than shares	5029.8	26.1%	15.7%
Loans	4205.6	14.0%	-5.2%
Shares and other equity	9185	12.3%	-1.4%
Insurance technical reserves	0.7	-	0.0%
Other accounts receivable / payable	213.2	14.9%	11.2%
<b>Financial assets</b>	<b>18682.2</b>	<b>14.5%</b>	<b>1.6%</b>

16. Which factors were behind the 19.1% p.a. growth of loan assets prior to the crisis?

OPEN RESPONSE

17. What was behind the slowdown in the growth of loans during the crisis?

OPEN RESPONSE

18. And similarly, what is your account of developments of loan liabilities over this period?

OPEN RESPONSE

19. In your view, what drove the contraction of shares and other equity assets by 4.8% p.a. in the crisis period?

*OPEN RESPONSE*

**20. Similarly, what drove the contraction of shares and other equity by 1.4% p.a. in the crisis period on the liabilities side?**

*OPEN RESPONSE*

**21. Which other areas of the sectoral balance sheet do you see as reflecting important pre-crisis/crisis developments in the OFI sector?**

*OPEN RESPONSE*

**22. In what ways do sectoral balance sheets today reflect connections between other financial intermediaries and (i) banks; and (ii) other NBFIs that did not exist before?**

*OPEN RESPONSE*

**23. Overall, what have been the top 5 impacts of the financial crisis on the OFI sector?**

*OPEN RESPONSE*

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### Section C. Data and measurement

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*This section focuses on the monitoring activities carried out by asset managers of the build of risks in the sector, and the impact of these risks on overall financial stability.*

- 8. Are you aware of information sources asset managers employ to establish a view of the build-up of risk in the sector?**

*OPEN RESPONSE*

- 9. Do asset managers monitor the activities and risk-taking behaviour of the major players in their sector, specifically? If so, what information sources are utilised for this purpose?**

*OPEN RESPONSE*

- 10. Which surveys do the major players disclose information to (e.g. association surveys)?**

*OPEN RESPONSE*

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Section D. Important institutions

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**11. Given changes in the structure of the financial sector over recent years and through the financial crisis, which individual member institutions do you feel play a critical role in terms of financial (in)stability, and may provide useful insights to this study?**

*OPEN RESPONSE*



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**Section E. Additional comments**

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- 4. If, in addition to the previously addressed points, there are any additional issues you feel should be considered during this study, please provide comment below.**

*OPEN RESPONSE*

### A9.1.5 Private equity and venture funds

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#### Background

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This rapid growth of non-bank financial intermediaries (i.e., so-called other financial intermediaries and the financial sector activities of insurance undertakings and pension funds) raises many policy questions, challenges and issues.

However, at the present time, there is a lack of comprehensive, evidence-based analysis and understanding of the role and impact of non-bank financial intermediaries on financial stability and the economy more generally.

The current study is intended to be an important building block for the Commission's further work within the context of the operation of the European Systemic Risk Board (ESRB). In this regard, it should provide a significant contribution to the Commission's knowledge building and information gathering capacity. The ESRB has been established with the purpose of identifying, monitoring and assessing potential risks to financial stability in the EU that arise from macroeconomic and financial developments. The ESRB conducts macro-prudential oversight of the EU financial system so as to contribute to the prevention or mitigation of systemic risks to financial stability. To achieve its mission, the ESRB collects and analyses information, monitors macro-financial developments and can issue recommendations to policy-makers and supervisors.

Taking into account the aforementioned background, the aims of the study are to:

- Undertake an analysis of the role of non-bank financial intermediaries (as a whole industry and per relevant segment) in the building up of imbalances and the asset bubble(s) during the period 2001-2007
- Undertake an assessment of the behaviour of non-bank financial intermediaries during the crisis (again as a whole industry and by relevant segment). In particular, the study seeks to examine whether non-bank financial intermediaries amplified the systemic risk and/or suffered asymmetrically from the financial crisis (i.e. over the period 2007-2009)
- Develop recommendations for a better supervision and regulation of risk among the relevant non-bank financial intermediary segments. This would be at the macro level to reveal economic imbalances rather than detailed micro-prudential rules – thus assisting the ESRB rather than the new ESAs

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**Section A. Nature of role in financial intermediation**

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**13. How have developments in the financial sector and in financial intermediation from 2000 to 2010 impacted on the roles and activities of private equity and venture funds?**

*OPEN RESPONSE*

**14. What effects have the abovementioned changes had on the risks faced by private equity and venture funds?**

*OPEN RESPONSE*

**15. What new links have developed between private equity and venture funds and the banking sector as a result of changes in the financial activities in the sector?**

*OPEN RESPONSE*

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Section B. Experiences of the financial crisis

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In this section we would like you to consider sectoral balance sheet developments prior to and during the financial crisis for other financial intermediaries (including, private equity and venture funds). These developments are described in the table below. The data provided are official national accounts constructed by the European Commission and Member State statistical offices.

Size and annualised growth of balance sheets of other financial intermediaries in the EU27			
	Size (€bn)	Growth	
	2009	Pre-crisis 2000-6	Crisis 2007-9
<i>Assets</i>			
Currency and deposits	2831.3	17.8%	-0.4%
Securities other than shares (incl., derivatives)	4747.5	15.2%	13.8%
Loans	3803.1	19.1%	5.8%
Shares and other equity	6349	14.8%	-4.8%
Insurance technical reserves	1.2	3.8%	-3.9%
Other accounts receivable / payable	249.3	11.1%	16.7%
<b>Financial assets</b>	<b>17981.4</b>	<b>16.1%</b>	<b>2.5%</b>
<i>Liabilities</i>			
Currency and deposits	47.8	9.3%	8.9%
Securities other than shares	5029.8	26.1%	15.7%
Loans	4205.6	14.0%	-5.2%
Shares and other equity	9185	12.3%	-1.4%
Insurance technical reserves	0.7	-	0.0%
Other accounts receivable / payable	213.2	14.9%	11.2%
<b>Financial assets</b>	<b>18682.2</b>	<b>14.5%</b>	<b>1.6%</b>

**24. Which factors were behind the 19.1% p.a. growth of loan assets prior to the crisis?**

OPEN RESPONSE

**25. What was behind the slowdown in the growth of loans during the crisis?**

OPEN RESPONSE

**26. And similarly, what is your account of developments of loan liabilities over this period?**

OPEN RESPONSE

**27. In your view, what drove the contraction of shares and other equity assets by 4.8% p.a. in the crisis period?**

*OPEN RESPONSE*

**28. Similarly, what drove the contraction of shares and other equity by 1.4% p.a. in the crisis period on the liabilities side?**

*OPEN RESPONSE*

**29. Which other areas of the sectoral balance sheet do you see as reflecting important pre-crisis/crisis developments in the OFI sector?**

*OPEN RESPONSE*

**30. In what ways do sectoral balance sheets today reflect connections between other financial intermediaries and (i) banks; and (ii) other NBFIs that did not exist before?**

*OPEN RESPONSE*

**31. Overall, what have been the top 5 impacts of the financial crisis on the OFI sector?**

*OPEN RESPONSE*

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### Section C. Data and measurement

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*This section focuses on the monitoring activities carried out by PE and VC funds of the build of risks in the sector, and the impact of these risks on overall financial stability.*

**12. Are you aware of information sources PE and VC funds employ to establish a view of the build-up of risk in the sector?**

*OPEN RESPONSE*

**13. Do PE and VC funds monitor the activities and risk-taking behaviour of the major players in their sector, specifically? If so, what information sources are utilised for this purpose?**

*OPEN RESPONSE*

**14. Which surveys do the major players disclose information to (e.g. association surveys)?**

*OPEN RESPONSE*

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**Section D. Important institutions**

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**15. Given changes in the structure of the financial sector over recent years and through the financial crisis, which individual institutions within the sector do you feel play a critical role in terms of financial (in)stability, and may provide useful insights to this study?**

*OPEN RESPONSE*

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Section E. Additional comments

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5. If, in addition to the previously addressed points, there are any additional issues you feel should be considered during this study, please provide comment below.

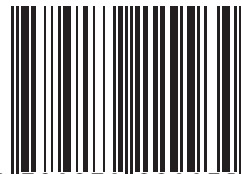
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