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PART 5/5

COMMISSION STAFF WORKING DOCUMENT

European Financial Stability and Integration Review, April 2015
3. THE DEBT OVERHANG OF HOUSEHOLDS AND NFCs

The current level of private debt points towards continued vulnerability from a financial stability perspective in the EU. However, the levels and growth rates of households and NFCs debt varied considerably from country to country both before and after the crisis (Chart 2). Indeed, many of the countries that experienced the highest rate of growth of private debt in the pre-crisis years, i.e. Denmark, Greece, Ireland, Portugal, Spain, Sweden, were experiencing a credit boom.

Since 2008, private indebtedness peaked in many countries. Pressures to deleverage were significant, but only a fraction of countries managed to reduce their private sector indebtedness. However, often the extent of the adjustment was a fraction of the pre-crisis increase.\(^1\) In particular the countries that were more successful to deleverage were Spain, the UK and the Baltic countries. Germany is in a unique position having experienced a continued deleveraging that started in the early 2000s. On the contrary, some countries (e.g. Ireland, Greece, and Cyprus) experienced a sustained increase in the indebtedness of their private sector.

![Chart 2: Country breakdown of private sector debt (debt-to-GDP ratio, percentage points, 2013 data)](image)

Note: debt for NFCs and HHs has been calculated in agreement with the definition reported in Box A.
Source: Eurostat and authors' calculations

In some countries, deleveraging pressures took the mild form of passive deleveraging, where credit flows to the private sector remained positive, but growing more slowly than the GDP (e.g. Germany, Austria, and Sweden). Sharper pressures (active deleveraging) were sensibly more common across EU countries. The private sector actually refrained from taking on more debt, leading to negative credit flows and to a nominal contraction of balance sheet in Spain, Ireland, Portugal, the Baltic countries. Despite negative credit flows, the deleveraging has been so far unsuccessful in Greece, because of a GDP contraction exceeding that of credit flows.

3.1. Credit expansion and crunch: impact on households and NFCs

Although the households and NFCs sectors were subject to different trends, the increased indebtedness in both sectors developed in an exceptionally accommodative credit environment. In the run-up to the crisis, a wider access to credit was granted to households and NFCs previously barred from it. The sub-groups that benefited most were low-income households and SMEs. These are also the sub-groups that were hardest hit by the crisis and which are suffering more from the high debt. Households and NFCs were both heavily affected by the widespread credit crunch that started in 2007. Banks were forced to deleverage from the unsustainable pre-crisis levels and started to apply more restrictive credit standards to their customers. Moreover, the freeze of the interbank market caused a rapid transmission of higher interest rates to existing floating-rate loans and to new loans.

\(^1\) EC (2014a).
The credit crunch was long-lasting. Chart 3 (lhs) shows the net tightening of credit supply standards by banks in the euro area. From mid-2007 there was a sharp net tightening of credit conditions for both sectors. The net tightening decelerated only temporarily from 2009 to 2011. However, with credit supply standards already very tight, a new tightening followed when the sovereign debt crisis hit the euro area. The private sector experienced the first net easing of supply conditions only in the first quarter of 2014. Moreover, the banking sector started a general effort to deleverage. The annual growth rate of loans to the private sector was severely affected (Chart 3, rhs). The pace of growth decelerated starting from mid-2006 for loans to households, bottoming out at zero nominal growth in 2009. Loans to NFCs sharply dropped from a peak of 14 % year-on-year growth into negative territory as of Q3 2008. The subdued recovery that followed was well below its pre-crisis level and soon reversed with the sovereign debt crisis. The growth rate of loans has remained negative since mid-2012 for NFCs, while it turned negative for households in late 2013.

These negative developments in euro area lending dynamics – albeit in presence of a net easing of supply credit standards – are clearly related to the weakness of the private sector, which is not willing or not able to take on more debt. This conclusion is strengthened when analysing the cost conditions on existing loans throughout the crisis (Chart 4). Interest rates declined for both household and NFC loans since the end of 2008, thanks to the massive central bank interventions on official rates. After the peak of the sovereign debt crisis, interest rates continued to decrease, reaching the lowest level at the end of the time-sample. The private sector is in fact refraining from taking on more debt, despite easing supply standards by credit institutions and record-low interest rates, as the deleveraging pressures are still high in many countries.

The next two sub-sections analyse in more depth the financial conditions of households and companies. The aim is to better understand how the debt overhang is unfolding and which are the main obstacles and market failures that make it so enduring.
3.2. The non-financial corporation sector

The increase in the average debt-to-GDP ratio for EU NFCs reflects a build-up of debt that occurred through different phases. After the boom and bust of the 'new economy', a period of balance sheet consolidation followed until 2004, when the ratio started to grow sharply until peaking between 2009 and 2010 in many countries. During the crisis, NFCs made a consistent effort to deleverage, although debt levels did not always decrease. Increases in the debt-to-GDP ratio are mainly explained by weak GDP growth.²

By contrast, the NFC sector in the US was much more successful in its deleveraging process. One of the main reasons behind this difference between the EU and the US is that insolvency frameworks make company restructuring more difficult in the EU.³ This results in economic resources being locked in for longer periods, not allowing for a swift reallocation once the economic context changes and thereby acting as a general break on economic growth.

Heterogeneity in cross-country developments

The level of corporate indebtedness increased in almost all the EU member states. The accumulation of debt varied sharply across countries and was driven by several factors, including overly optimistic expectations about the long-term growth potential, and favourable lending and financial market conditions.⁴ In some countries the build-up of corporate sector leverage was excessive.⁵

The country-breakdown (shown in Chart 5 for a subset of EU countries) highlights part of this great variability. The only countries, where the corporate sector decreased its level of indebtedness in the 2000-13 period (as measured by the debt-to-GDP ratio) are Germany, the Netherlands, Austria and Slovakia. A subgroup of countries shows a more moderate level of indebtedness – as measured by the debt-to-GDP ratio – throughout the sample period (e.g. Germany, Italy, France, Austria and several CEE countries). On the other hand, the UK, the Netherlands, Sweden, Denmark and Luxembourg show higher level of corporate indebtedness. Eventually, the corporate sector in a third subset of countries (e.g. Spain, Portugal, Greece, and Finland) featured the sharpest increase in its indebtedness before the crisis erupted.

The debt accumulation peaked between 2008 and 2010 for the majority of member states. However, the speed of adjustment from the pre-crisis peak differed markedly across countries. The fastest corporate deleveraging to date was experienced in Spain, Sweden, the Baltic countries and Luxembourg. However, only a portion of the

² See, for instance, ECB (2012). Other measures of corporate indebtedness fail to capture these simple dynamics. For instance, corporate leverage ratios are generally more volatile than debt-to-income ratios, as they are influenced strongly by valuation effects. From 2009, euro area corporate leverage actually decreased. Its decline mainly captures increases in equity prices. Similarly, the debt to corporate income ratio is hardly significant, since it turned negative for several countries when the crisis hit.

³ CEPR (2014). The difference between insolvency frameworks makes also difficult to compare data on non-performing loans on banks' balance sheets. Indeed, banks' non-performing loans and provisions for loan losses, together with corporate and household defaults surged from the onset of the crisis in the US, but soon declined. Banks were quicker to clean their balance sheets. In the EU, on the contrary, the number of defaults was lower and banks relied more on forbearance and extend-and-pretend behaviour.


⁵ ECB (2014b).
pre-crisis increase has been reduced and the level of indebtedness of some countries (e.g. Ireland) increased markedly since 2008. At the end of 2013 the indebtedness of five countries was still increasing (Czech Republic, Denmark, Cyprus, Greece and Portugal). In the latter three cases, this increase can be mainly explained as unsuccessful deleveraging: the GDP contraction had more than offset the negative credit flows.

**Importance of financial development**

It is not very easy to compare the different debt levels observed in the different EU economies. Debt capacity and sustainability ultimately depend on the (perceived) ability to generate high enough future streams of income to repay the existing debt. Moreover, financial systems vary widely between EU economies in their development and way of allocating resources. This issue might deserve discussion in its own right, as differences in financial structures could account for a significant part of this variety, granting a higher debt capacity to companies in more developed financial systems. For instance, Ireland, Belgium and Luxembourg are the main hubs for the European headquarters of many non-EU multinationals. Therefore, their high corporate debt levels, given the high number of foreign subsidiaries operating on their soil, might not be a signal of a fragile corporate sector. However, the increases in corporate indebtedness observed in recent years in some of these countries require attention, because just like in the pre-crisis years they can be the signal of growing imbalances.

**Sustainability assessments**

The sustainability of corporate debt levels can be assessed in several ways. For instance, the widespread decrease in forecasted growth rates of potential GDP for most of the EU countries after the crisis is a signal of reduced long-term sustainability. A way to assess the short-term sustainability is through the analysis of the interest coverage ratio (ICR), which is defined as the ratio between a company's earnings before interest and taxes and its interest payments. According to the IMF (2013a), an ICR below 1 can be defined as a condition of debt overhang. In 2013, many NFCs still had a debt overhang problem, even if the debt service burden generally decreased: the proportion of NFCs in this situation ranged from 45 % to 55 % in the EU's most financially-stressed economies. Moreover, corporate debt overhang in some countries has resulted in a growing stock of non-performing loans, which limit banks' profitability and willingness to provide new credit. However, debt overhang is a broader concept that goes beyond short-term sustainability and includes solvent firms, which have to forego viable investment projects due to high debt levels. According to European Commission's studies, corporate deleveraging needs could still be significant in several member states (being above 10 % in at least six of them), implying a prolonged period of stress and negative credit flows for their corporate sectors.

**Post-crisis developments**

The different post-crisis dynamics of the debt-to-GDP ratio for EU countries have more than one explanation and can help to understand better the debt overhang problem. Indeed, many countries that experienced an increase in the ratio were actually hit by a negative trend in their GDP. This is particularly true for Greece, Cyprus, and Portugal. In absolute levels, the aggregate corporate debt for these countries actually stalled or grew very moderately in nominal terms, compared to the pre-crisis years. These countries, despite their efforts to deleverage, were actually caught in a debt spiral, which may generate even more fragilities in the corporate and financial sectors. In other countries less affected by such a negative trend in their GDP, the NFC sectors were more successful at deleveraging. However, deleveraging has been increasingly active (implying negative credit

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7 Indeed, looking at other metrics (like the debt-to-asset ratio), this picture appear more blurred. The corporate sector in Luxembourg, Sweden, Belgium, Denmark, the UK and France does not look extremely exposed to high indebtedness. On the contrary, the ratio is quite higher for several CEE and southern European member states. However, this metrics may be less reliable than the debt-to-GDP ratio and should be interpreted with some care.
8 See ECB (2012) and Lo and Rogoff (2015).
9 See EC (2014a). Further details on the methodology used to estimate deleveraging needs can be found in Cuerpo et al. (2014).
flows) and efforts to deleverage have increased in 2013. The contribution of negative credit flows became more relevant in that year.

The strength of the deleveraging pressures also depends on diverging developments in interest rates in the different countries. The debt service burden of euro area non-financial corporations has been on a declining trend since its peak in 2009 (ECB, 2012). However, the subsequent turmoil on sovereign bond markets sharply increased the level of fragmentation of financial market conditions. As shown in Chart 6 lhs, the dispersion of interest rates on existing loans to NFCs increased sharply and was still well above its pre-crisis level at the end of 2014. NFCs in the countries hardest hit by the sovereign debt crisis experienced worse funding conditions (Chart 6 rhs) and tighter credit standards. This certainly had a negative impact on debt sustainability and made the debt overhang a more pressing concern for NFCs in these countries. Even if interest rates and market fragmentation have decreased, the level of interest rates for many NFCs may not be low enough to make new investment attractive, as any profit generated will be absorbed by servicing existing debt. Indeed, the investment rate of NFCs in the EU decreased from 22.6% in 2007 to 19.3% in 2013. Therefore, market fragmentation is certainly still an issue, since NFCs that pay higher interest rates find deleveraging harder and reduce investment further. Although higher interest rates increased the deleveraging pressures, they also contributed to pushing some of the countries worst hit by the crisis into a debt trap.

Macroeconomic aggregates for the total non-financial corporate sector mask the reallocation of funds across productive sectors. In some countries and sectors, the accumulation of debt before the crisis was stronger. This was particularly the case for sectors that experienced a credit boom before the crisis, like the construction and real estate sectors. Over-indebted sectors have deleveraged more strongly than less indebted sectors. However, the systemic nature of the debt overhang in some countries (e.g. Spain, Ireland) is underscored by the fact that the deleveraging pressures on the corporate sector are not limited to the sectors that experienced credit booms before the crisis, like the construction and real estate sectors.

Over-indebtedness by company size

Aggregate data may not capture differences between SMEs and large companies. Large companies can more easily tap the corporate bond market and attenuate the impact of the credit crunch. The tightening of credit standards during the financial crisis affected mainly SMEs, which have traditionally been more dependent on bank credit. All of a sudden, SMEs found credit scarcer and more expensive. Moreover, being more dependent on relationship banking (mainly with local domestic banks), SMEs in crisis-hit countries also suffered the most from the fragmentation of the credit market. This led to debt becoming a constraining variable for SMEs in

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10 EC (2014a).
11 Part of the NFCs deleveraging might originated in the lowered economic growth perspectives, with NFCs reducing their external financing, as they need lower investment in new capital formation.
12 Coeuré (2014).
13 See ECB (2014b) and IMF (2013b).
14 Multinationals are able to go even further, issuing debt abroad through their subsidiaries. This also allowed many of these firms based in the countries hardest hit by the market fragmentation to enjoy lower cost conditions.
greater proportion than for large companies. Indeed, data from the ECB SAFE survey shows that the most pressing problem for SMEs in Greece, Cyprus, Italy and Spain is actually access to finance, while this concern affects a relatively lower share of SMEs at the EU28 level.

Moreover, a higher percentage of large companies than SMEs in the euro area indicated a decline in their debt-to-asset ratios from 2009 to 2011. SMEs also experienced a considerably higher interest payment burden. It is also important to note that on average SMEs tend to have higher leverage than larger companies and that their leverage was increasing during the crisis. At the same time, the average value added of SMEs compared with that of large decreased between 2007 and 2013. Consequently, the debt sustainability of SMEs across the EU has further fallen compared with to large companies.

These adverse developments for SMEs in many EU countries should be considered carefully, since SMEs constitute 99.8% of the number of companies and 66.9% of employment in the EU. The adverse impact of the debt overhang on SMEs can be felt in both employment and economic growth terms. Moreover the fact that the problem is so dispersed over a huge number of companies makes it harder to achieve a solution. The number of EU SMEs changed only marginally between 2008 and 2013. Many of them remained in business despite it not being economically profitable anymore, accounting for a significant share of the increase in corporate indebtedness in the EU. The share of companies with negative value added increased sharply in those years. Moreover growth potential had been substantially lowered by the crisis, reducing the prospective profitability of many companies. The rigidity of insolvency laws in many EU countries could be one of the reasons behind this development, because they reduce the incentives for loss-making companies to be liquidated.

3.3. The household sector

Household debt consists of two components: mortgage debt and non-mortgage debt, which mainly includes non-mortgage loans, credit lines and credit card debt. The bulk of household indebtedness is related to housing finance, while consumer credit, while growing, has still a limited importance in Europe. However, consumer credit, as more volatile and charged with higher interest rates, may substantially impact household consumption at a given moment. Household debt soared in the years leading up to the Great Recession of the previous decade. The indebtedness of the household sector rose more sharply compared with that of the NFC sector, and increased more sharply in the run-up to the crisis.

![Chart 7 – Debt-to-income ratios (EU average, base year 2000: 100) with data source: OECD, Eurostat Financial accounts data and authors’ calculations](chart7.png)

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15 The higher interest payment burden may reflect a number of causes (e.g. higher riskiness, as reflected by lower rating grades or higher leverage; higher dependence on bank credit, more costly during the credit crunch; lower liquidity).

16 For this and the following paragraphs, see ECB (2012), IMF (2013b), EC(2013) and EC (2014). A firm’s value added is measured as the difference between revenues and costs.

17 It is worth noting that a significant share of micro-firms are single-person firms and can be assimilated to households (except for the limited-liability feature), therefore for this type of firms the border between corporate and personal insolvency becomes blurred.

18 According to ECB data (ECB, 2013), over 43% of euro area households hold debt. The share of households with a mortgage debt is lower than that of households with non-mortgage debt (23.1% compared with 29.3%). However, the average amount of mortgage debt is considerably higher (EUR 68,400 per household compared with EUR 5,000) and therefore more significant.
Risky pre-crisis developments

In the years that led up to the crisis, many households took advantage of historically low interest rates on mortgage loans (as shown in Chart 4 above), and of more relaxed credit standards. Given the lack of comprehensive historical data, it is difficult to perform a thorough analysis of developments in credit standards on mortgage loans. However, the available empirical evidence allows us to conclude that loan-to-value (LTV) and loan-to-income (LTI) ratios increased steadily in many countries. This allowed many households to take out larger mortgages. Moreover, like in the US, many customers with limited credit guarantees obtained wider access to mortgage loans. The macro effect of this environment was a sustained and continued rise in property prices and in household indebtedness across most of the EU countries, until the crisis broke out. The simultaneous boom in house prices and the stock market meant that the net debt of the average household remained broadly stable, masking households’ growing exposure to a sharp fall in asset prices.

As shown in Chart 7, the average EU debt-to-GDP ratio increased until 2009, before starting a mild decrease. However, once this figure is compared with the debt-to-disposable income ratio, which is a much more precise figure of the debt sustainability of the sector (based on OECD data), the increase in indebtedness appears sharper. The ratio, based at 100 in 2000, almost doubled, and passed 180 in 2009. The aggregate level of household indebtedness had reached excessive levels. As the crisis unfolded, house prices started a prolonged and sustained decline. Many households saw their wealth shrink relative to their debt and, with less income and more unemployment, found it harder to meet mortgage payments. In response, the household sector as a whole began its deleveraging from the credit binge in 2009.

Heterogeneity in cross-country developments

Data from different countries (Chart 8) show much variability. The Nordic and Anglo-Saxon countries have the more indebted households’ sector. Among the Nordic countries, Denmark has the highest household debt-to-disposable income ratio (310 %) among the world’s developed countries (Norway has 200 % and Sweden 170 %). The Netherlands also has a ratio above 300 %. Such levels are well above the EU average and highlight a significant financial fragility of the sector to reversals in financial markets. In Chart 8 rhs, countries with lower levels of debt-to-disposable income are shown. Some of them, like Spain and Hungary experienced a sharp rise in indebtedness. Germany is an outlier since it experienced a continued deleveraging from 2000 onwards.

Chart 8 – Household debt in selected EU countries (percentage of disposable income)

Source: Eurostat Financial accounts data and authors’ calculations

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19 Building a proper series of these variables is extremely challenging at the moment because they became policy variables only after the crisis as a result of the re-discovery of macro-prudential measures in the policy debate. However a sense of the changes in these variables can be obtained from many sources (see, for instance, Jordá et al., 2014).

20 IMF (2012)

21 An alternative and more granular measurement of consumer over-indebtedness could be performed through the assessment of the difficulty of a household to meet commitments, be it due to credit or to the payment of bills (i.e. comparing credit repayments with income). For further reference, see The Over-indebtedness of European Households, European Commission 2014, p.21.
Post-crisis developments

Once the financial crisis made debt a constraining factor for many households around the EU as of 2009, tentative deleveraging was undertaken by the household sector. However, while some countries (e.g. Spain, Hungary) succeeded in reducing their average debt-to-GDP ratio, others (e.g. Greece) did not manage to do so, with many households caught up in a debt spiral. The extent of deleveraging pressures still runs high in several countries, exceeding 10% of GDP in at least seven countries (including the Netherlands, Greece, Spain and Ireland).23

Deleveraging pressures were made worse by the decline in the housing market. The prospect of a prolonged decrease in property prices that affected many countries (e.g. Spain, Ireland, Portugal, and Italy) has been a significant disincentive for households to take on new mortgage loans, leading, on aggregate, to negative credit flows in the housing sector. In this light, aggregate deleveraging resulting from maturing mortgage loans not being substituted by new ones, might not accurately reflect the actual debt sustainability of individual households. In addition, the credit institutions started to restrain their LTV and LTI ratios, contributing to the reduction of mortgage amounts and to aggregate deleveraging.

Box B: Foreign-currency mortgage loans

In the run-up to the financial crisis in 2008, some households in central and eastern Europe (CEE) financed their mortgages in Swiss francs, euros and Japanese yen, mainly convinced by the lower interest rates of some foreign-currency mortgage loans compared with the interest rates available in their home currencies. Typically, households do not hold a natural currency hedge and their resources to purchase derivatives for managing exchange risk are reduced (Economic Credit Research Institute, 2011). Therefore, this type of mortgages is highly sensitive to exchange rate fluctuations.

While before the financial crisis this was considered a popular financing method and did not seem to be problematic, many households are faced today with substantial losses due to appreciations in the foreign currency in question. For example, the recent decision by the Swiss National Bank (SNB) to abandon its policy of an exchange rate cap on the Swiss franc is expected to impact significantly on the mortgage loans of households in CEE countries that are indexed in a foreign currency. The Swiss franc jumped as much as 30% against the euro just after the SNB announcement. Similar spikes were registered against the Polish zloty (40%), the Croatian kuna (28%), the Romanian leu (26%) and the Hungarian forint (20%).24

Impact of interest rates and evolving macroeconomic conditions

A trickier element to analyse is the impact of the variations in interest rates on debt levels (Chart 9 for euro area countries). The pre-crisis increase in interest rates for house purchases was common to every country, as shown by the absence of much difference from country to country. However, the sharp decrease in interest rates, which began in Q4-2008, was not evenly passed on to final borrowers. The spike in the level of volatility from country to country shows that the decrease was immediately enjoyed only in certain euro area countries. Interest rates for mortgages remained considerably higher for many southern European countries. The cross-country heterogeneity decreased only slowly. Therefore, the passing on of lower financing costs to households took considerably more time in southern European countries. This had a twofold effect. First, the incentive to take on new mortgages,

23 For further reference, see EC (2014a).
24 Bloomberg and own calculations.
especially at variable rates, was lower in the countries with higher interest rates. This may have accelerated the deleveraging process and the downward trend in house prices. Moreover, higher interest rates made the servicing of existing variable rate mortgages more costly, heightening the debt overhang problem. Households in several CEE non-euro area countries also suffered as a result of the popularity of foreign-currency mortgage loans (see Box B). While this type of mortgage loans allowed many households to enjoy lower interest rate payments, it also exposed them to currency risk. In particular, this risk materialised for mortgage loans indexed in Swiss francs, when that currency sharply appreciated.

Household mortgages in Poland, Croatia and Hungary\(^\text{25}\) have been particularly affected by the appreciation of the Swiss franc. It is estimated that 46 % of the total home loans in Poland\(^\text{26}\) (approx. EUR 30 billion\(^\text{27}\)) are indexed in Swiss francs, while in Croatia the value of such household loans (primarily residential) is around EUR 21.8 billion\(^\text{28}\). Other EU countries (e.g. Romania, the Czech Republic and Austria) were also affected,\(^\text{29}\) but the volume of household mortgages indexed in Swiss francs in those countries is much lower.

A final factor is the overall macroeconomic context, which is characterised by falling or negative GDP growth across the EU, higher unemployment and stagnating wages. As a consequence of the adverse developments in the European economy, the disposable income in 2013 was lower than in 2007 for many European countries. This shows that the deleveraging in aggregate household debt has been even more pronounced. Together with higher unemployment, the aggregate household debt capacity was sharply reduced. Some households found it impossible to take out a new loan, while many others found themselves in dire straits over trying to pay back their existing debt. Unemployment rate increases had a particularly strong impact on mortgage debt service ratios in Greece, Spain, Portugal and Cyprus.\(^\text{30}\)

### Table 1 – Distributional results of the ECB Household Finance and Consumption Survey (HFCS)

#### Median debt to assets ratio – breakdowns

<table>
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<tr>
<th>Net wealth</th>
<th>Bottom 20% - 90%</th>
<th>90% - 100%</th>
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<tbody>
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<td><strong>All</strong></td>
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<tr>
<td><strong>BE</strong></td>
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<tr>
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<td>N</td>
</tr>
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</tr>
<tr>
<td><strong>FI</strong></td>
<td>N</td>
<td>M</td>
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#### Median debt service to income ratio, households with debt payments – breakdowns

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<th>90% - 100%</th>
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<tr>
<td><strong>FI</strong></td>
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</table>

#### Has negative net wealth - breakdowns (% of households)

<table>
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<th>Income</th>
<th>Bottom 20% - 90%</th>
<th>90% - 100%</th>
</tr>
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25 Hungary used to be one of the countries most exposed to Swiss franc loans. However, in 2014 it fixed the exchange rate for the conversion of household mortgages in euros and Swiss francs at well below current market levels. Thus, the impact on Hungarian households was reduced.


28 Bartłomiej Sawicki, "Poland and Croatia most affected by franc spike", published 4 February 2015.


ECB data on the percentage of indebted households in distress highlights not only that the situation varied from country to country, but also that the highest proportion of households in distress is mostly found in those countries hardest hit by the crisis (e.g. Greece, Spain, Italy, Cyprus, Portugal), which experienced a combination of higher interest rates with falling wages and employment (ECB, 2014a).

The same might be true for those EU countries that are apparently deleveraging more smoothly but which have higher debt levels (e.g. the Netherlands, Denmark, Sweden, and the UK). Their households could be extremely vulnerable to adverse shocks, such as an increase in interest rates, even if the aggregate impact of a shock would inevitably depend on the relative proportions of households with existing variable rate mortgages in each country. Although euro area households entered the crisis in a more solid balance sheet position, their net worth deteriorated as a consequence of the protracted weakness of the economy (the euro area entered a second recession in Q3-2011) and conservative fiscal policy. Households from these countries are in a much more vulnerable situation than in 2008.

**Distributional dimension of the problem**

Specific groups of indebted households are more exposed to debt pressure. The analysis of debt levels across the whole distribution of wealth or income of the household population could add further insight about the spread and intensity of the phenomenon. However, what aggregate data do not capture about deleveraging is that there is a long tail of over-indebted households that find deleveraging particularly hard. To this end, relying on the ECB Household Financing and Consumption Survey (HFCS) is particularly useful. This instrument provides 2010 data related to euro area economies. A summary of the results is presented in Table 1.31

Assets, debt and net wealth grow with income as does home ownership: the share of households owning their main residence grows from 47% for the bottom 20% of the euro area income distribution to 79.5% for the highest 10%. Higher income households have a higher debt capacity in absolute terms, since they can provide higher collateral.

Since higher income is generally associated with higher asset holdings, these households also have an additional cushion against adverse economic shocks. Wealth can come in two forms: non-financial or financial wealth. Both types of wealth are concentrated towards the top fifth of the income distribution. In particular, this subset of households has a disproportionately higher share of financial wealth: the bottom 40% of euro area households (according to the income distribution) hold only 3.4% of the total financial assets, compared to 47.6% held by the highest 10%. This is interesting, since higher-income households experienced the largest decline in wealth during the 2007-09 financial market downturn. However, this decline affected their debt capacity and funding choices in a limited way, since they could rely on a higher stock of per capita wealth. Moreover, prices of financial assets have at least partially recovered since then in many countries. The same is not true for housing prices. As a result, this diverging development hit lower-income households more heavily.

Lower-income households suffered more during the crisis for several additional reasons. When debt is considered as a share of personal wealth or income, lower income households appear to be much more indebted. The median debt-to-asset ratio decreases steadily for higher levels of income and net wealth. If we look at the figures according to the income distribution, the debt-to-asset ratio is 36.2% for the bottom 20% and only 15.6% for the top 10%. When the net wealth distribution is considered, the debt-to-asset ratio is 108.2% for the bottom 20% and 6.0% for the top 10%. Moreover, these ratios appear to be highest for the bottom 20% (both with respect to income and net wealth distributions) in the following countries: Austria, Finland, Germany, and the Netherlands. From aggregate data, these countries did not appear to be particularly affected by the household debt overhang problem. However, distributional data show very clearly that households at the bottom of the income and net wealth distribution in these countries are severely affected by the debt overhang. Households in the bottom 20% have also much higher debt service to income ratio and are therefore much more exposed to

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31 The process of imputing, validating and analysing the data for the HFCS is highly complex and time-consuming, and the data lack homogeneity. Moreover, the data draw a picture of household indebtedness before the sovereign debt crisis hit. The survey will be conducted every three years in most participating countries. Data for the second wave of the survey was collected in the second half of 2013 and in 2014. The report for the second wave is expected to be released in 2016.
over-indebtedness. This result may be a consequence of a wider access to credit obtained by lower income households. Another possible explanation is that the lower-middle income households got asymmetrically more hit by the crisis, and joined the low income household with their legacy debt.

The impact of the crisis on lower-income households has also been magnified by the very low amount of assets they hold. Therefore, it should come as no surprise that households with negative net wealth are concentrated on the lower-income parts of the income distribution. Again, distributional data show that the share of households with negative equity is particularly high in Austria, Finland, Germany, and the Netherlands. Therefore, these four countries are experiencing a significant problem of debt overhang at the tail of their income distributions together with the rest of the sample. This conclusion may be based on very different situations from country to country: for instance, a very high level of household debt in the Netherlands as opposed to lower assets holding by lower-income households in Germany.32

Although in peripheral euro area countries the debt overhang problem appears to be more widespread across the income distribution, lower-income households were generally more severely hit. Even if the debt overhang has a different intensity and spread in each country (as can be seen by the proportion of debtors in distress), generally speaking lower-income households tend to show a higher marginal propensity to consume. Therefore, when lower-income households get caught in a debt overhang problem as is the case in many countries, the negative impact on consumption expenditure is actually magnified by their stronger response to wealth shocks.33 Eurostat data show that final per capita consumption expenditure had decreased between 2008 and 2013 in several countries (e.g. Italy, Spain, Greece, Portugal, Romania, Hungary, etc.).34 These aggregate data may mask even sharper declines in consumption expenditure for lower-income households.

In contrast with the US households who were able to deleverage more quickly and smoothly, EU households appear to be struggling in many countries. At the macroeconomic level, this is probably a consequence of the double-dip recession experienced following the sovereign debt crisis. At the microeconomic level, this could also be due to the rigidity of insolvency procedures associated with mortgages in many countries. Despite the fact that securitisation made debt restructuring/renegotiation more difficult, the proportion of mortgage delinquencies and restructuring in the US was considerably higher than in the EU. US households caught in a situation of falling house prices, negative equity and high debt to service ratio could benefit from an insolvency framework that allows them to write down their debt more easily.

**Inter-generational dimension of the problem**

A final issue that needs to be addressed is the inter-generational distribution of the debt overhang effects on the household sector. The ageing and expected shrinkage of the EU’s population will have a long-term detrimental impact on household wealth. An ageing society implies weaker demand for assets, in particular housing. Research on the relationship between house prices and demographic variables suggests that demographic factors could dampen house price dynamics by reducing property price growth considerably over the coming decades.35 Moreover, since younger households are characterised by higher indebtedness and lower asset holdings (that is, lower net wealth), they find themselves more frequently in a debt overhang situation and are expected to stay in this situation for a longer period. Indeed, the proportion of households with negative wealth in the 16-34 subgroup tops 11.5 %, while for the other age subgroups the figure does not exceed 6.2 %.36 Taking a longer-term perspective, younger households are also more likely to suffer from the macroeconomic impact of an ageing society. This is even truer, once the fact that housing investment is the most significant complement of a pension scheme is taken into consideration. A deeper analysis on the potential impact of longevity risk and of ageing societies on households can be found in Chapter 4 of this Review.

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32 Another relevant issue in Germany is the very low proportion of households owning their own home in the lowest 20 % of the income distribution (16.3 %, compared with a euro area average of 47 %). For further evidence see the ECB HFCS (2013).

33 See Ampudia et al. (2014) and Mian et al. (2013). In addition, the consumption loss in 2010 relative to the pre-crisis trend was greater for economies that had a larger rise in the gross household debt-to-income ratio during 2002-06 (IMF, 2012). For additional euro area references see ECB (2014a), for the US, see FCIC (2011).

34 The Eurostat series considered here is: nama_fs_c, calculated as euros per inhabitant.

35 BIS (2014).

36 For additional data, see ECB (2013).
4. Consequences

The macroeconomic environment

So far the deleveraging process has proven to be slow and painful in Europe and deleveraging efforts have been successful only in a subset of countries. This is mainly a consequence of the current macroeconomic environment, which is itself partially a consequence of the debt overhang problem. Indeed, when the debt overhang unfolds at the macroeconomic level, its consequences are felt by the whole economy and not only by the indebted individuals or companies.

Currently, the EU economy has on average below-potential aggregate demand, almost no inflation and official interest rates at the zero lower bound in many countries. In addition, the euro area has only recently exited from a double-dip recession. The weakness of the economic recovery can be explained by the difficulty in dealing with some structural factors, like flagging productivity growth in many EU countries, structural external imbalances, and a high level of private debt in many countries.\(^{37}\)

Low inflation and growth

The severe demand contraction and consequent overcapacity has led to a situation of very low inflation. The result is a substantial slowdown of nominal growth, which interacts perversely with the deleveraging process.\(^{38}\) Indeed, a positive inflation rate slowly decreases the real value of existing debt, which is generally fixed in nominal terms. Therefore, the low inflation experienced in the euro area and other EU countries (e.g. the UK, Sweden) threatens to aggravate the burden of the debt overhang still besetting government and private economic agents.\(^{39}\) Low inflation exacerbates the demand compression driven by the debt overhang, as it makes deleveraging more difficult. This could lead to an even higher savings rate, as private and public entities try to reach their desired leverage ratio. The resulting reduction in consumption and investment could weigh on prices, raising the risk of a vicious disinflationary cycle. On the other side of the coin, the higher inflation rate experienced in the UK over the years of the crisis might have contributed to faster deleveraging, with domestic demand starting to react more positively.

This low-growth environment is also accompanied by stagnating nominal and real incomes, which contribute to making deleveraging harder.\(^{40}\) This 'nominal stagnation' forces households to compress their consumption and NFCs to decrease their investment rate in order to increase the required saving rate to deleverage, as debt cannot be paid back through growing incomes. This behaviour, although completely rational at the individual level, has a negative feedback loop in aggregate terms, forcing demand down further.

Impact of interest rates

The impact of a decrease in interest rates on the debt overhang is generally positive. Lower interest rates can reduce debt service burdens on variable-rate mortgages and on new debt. Lower rates may also provide support to asset prices. In fact, monetary authorities have typically cut interest rates in the wake of the financial crisis, thus reducing the debt service burden on households and companies, although with highly uneven effects across and within countries. However, despite interest rates hitting the zero lower bound and many further unconventional measures that have been taken by central banks, these have proved to be of limited relief for over-indebted households and companies.\(^{41}\)

At the same time, considering the incentives to private agents, low interest rates may slow the deleveraging process of the private sector. Lower interest rates can have the perverse effect of incentivising borrowers to take

\(^{37}\) Cross-country studies by IMF (2012) and Jordá, Schularick and Taylor (2014) show that the presence of a high level of household debt leads to deeper recessions.

\(^{38}\) CEPR (2014).

\(^{39}\) Constancio (2014).

\(^{40}\) Also the fact that financial institutions in many EU countries are still grappling with cleaning their balance sheets does not make the situation easier.

\(^{41}\) See Cecioni et al. (2011) and Gambacorta et al. (2014).
on more debt and increasing the phenomenon of ‘zombie’ lending (the rollover of otherwise non-viable loans).\textsuperscript{42} From this perspective, the US non-financial corporate sector is already providing signals of re-leveraging, as some companies have taken advantage of the long period of low interest rates to issue bonds and take on new, or refinance existing obligations. Companies have built up cash buffers, increased dividends, and bought back stock. Many companies in Europe have followed the same path, although to a lesser extent, but the spending on fixed investment has remained quite subdued. Very low interest rates could keep poor-quality borrowers afloat, reducing the pressure for radical restructuring and reform and the incentives to reallocate resources efficiently.\textsuperscript{43}

Although low interest rates may have the immediate effect of reducing the debt service burden, both households and NFCs remain exposed to a normalisation in the level of global interest rates, whilst the high levels of accumulated debt stock makes them vulnerable in the event of a future disruption in international financial markets.\textsuperscript{44} Risk perceptions related to this issue are partially at the root of the fact that the financial integration of EU financial and capital markets has come to a halt. Together with the persisting market fragmentation, the vulnerabilities related to the debt overhang increase risks to financial stability.

\textit{Impact on consumption and capital formation}

Finding a solution to support a smoother and faster deleveraging from excessive indebtedness is therefore of paramount importance, particularly as the debt overhang is making itself felt in subdued levels of consumption and investment. Since debtors tend to be less wealthy than average (with a higher marginal propensity to consume) and since debt concentrates losses on the balance sheet of debtors, the consumption decline is larger for a given decline in aggregate wealth when there is more debt in the economy.\textsuperscript{45} The 2012 IMF World Economic Outlook (WEO) shows a larger decline in consumption for countries where the household debt had increased more in the run-up to the crisis. Moreover, considering the distribution of debt and wealth across society, the social costs of the debt overhang for lower-income households may be disproportionately higher than aggregate data would suggest. Moreover, the corporate debt overhang is negatively affecting aggregate capital formation. The proportion of the investment component decreased from 22.6 % of EU GDP in 2007 to 19.3 % in 2013, the decrease being larger in countries most severely affected by the crisis. The ECB (2014b) performed an analysis of the situation for individual companies, which showed that companies with higher levels of debt and higher interest payment ratios reduced their investment more than others during the crisis. The prolonged slump in the gross capital formation may in the end harm the growth potential of the EU economy.

5. THE WAY FORWARD: HOW TO PROCEED?

\textit{Among other sources, this section has drawn on work by Y. Liu and C. B. Rosenberg, published in 2013.\textsuperscript{46}}

5.1. Macroeconomic level

The contraction in economic activity associated with the debt overhang described in Section 4 above can be mitigated by an offsetting macroeconomic policy stimulus. Monetary policy can be used to counter deflationary pressures, which tend to transfer wealth from debtors to creditors. Because the face value of debt is fixed in nominal terms, deflation implies that the borrower has to dedicate more income in real terms to debt servicing. By the same token, inflation would imply a wealth transfer from creditors to debtors. Consequently, monetary policy can lessen the negative effects of a debt-driven recession by preventing deflation. However, monetary policy tends to be much less potent when there is debt overhang in the economy, for reasons explained in Section

\textsuperscript{42} See Wolf (2014). Low interest rates could induce “evergreening policies” and postpone necessary adjustments in banks’ balance sheets. Given the low cost of delaying foreclosure, very low interest rates may disguise underlying credit weakness, which would encourage banks to “extend and pretend” that loans of low-quality borrowers will become good (Gambacorta, 2011). This process took place in Japan in the 1990s: banks allowed debtors to roll over loans on which they could afford the near zero interest payments, but not repayments of principal (Caballero, Hoshi and Kashyap, 2008).

\textsuperscript{43} BIS (2014).

\textsuperscript{44} BIS (2014).

\textsuperscript{45} Mian et al. (2013).

4 and below. Moreover, there is the additional challenge of interest rates having reached the zero lower bound, which constrains the use of the conventional interest rate tool and calls for unconventional policy measures.

The quantitative easing (QE) programme started by the ECB in March 2015 is designed to push down the market interest rates further by lifting asset prices. If this leads to mortgage borrowers being able to refinance at a lower cost, it could prove helpful in reducing their debt service burden. However, the most vulnerable households — i.e. those with negative equity mortgages where the value of debt exceeds that of the property securing it — are not able to refinance without bringing in additional cash, which they usually do not have. On the corporate side, the expected further compression in bond yields is likely to favour mainly large companies, which rely more widely on bond markets for their external financing. The effect on SMEs suffering from debt overhang may be limited due to reasons similar to those in the case of over-indebted households: i.e. the inability to refinance. Nevertheless, the announced QE has already depressed the euro exchange rate, which should support euro area exports.

Given the limited ability of monetary policy measures to solve the debt overhang problem, a temporary fiscal stimulus could prove helpful. As explained by Koo in 2011, when the private sector is exclusively focused on reducing its debt level in a balance sheet recession, governments can substitute for private consumption and investment, provided that their balances are more robust than those of the private sector. However, this is not always the case in the EU, as public debt rose sharply during the crisis, often as a consequence of massive injections of public resources into the financial sector. Therefore, many governments have had to reduce other types of expenditure to try to compensate for this increase, not to speak of them having little chance to perform a fiscal expansion.

In this context, an alternative fiscal policy avenue worth exploring is what is called ‘fiscal devaluation’ to shift the tax burden from labour and other productive inputs to consumption. If done properly, this could promote competitiveness and, thus, exports and investment, through a positive impact on output and employment, while having a neutral fiscal impact. Moreover, it could potentially capture some of the tax hitherto lost due to unreported wages. However, the potential to capture lost tax would depend on the ability of economic agents to avoid paying the increased tax. In 2011, the National Bureau of Economic Research (NBER) suggested that fiscal devaluations allow for essentially the same outcomes as active monetary policy at a fixed exchange rate and with free capital flows. In 2012, the IMF estimated that a fiscal devaluation equivalent to 1% of GDP in a euro area country would generate an immediate increase in net exports of between 0.9% and 4% of GDP, losing significance only after 10 years.

At the same time, and as in classical devaluation, any positive stimulus from fiscal devaluation would be diminished if other trading partners engage in similar practices. As a matter of fact, Germany already approved such measures in 2007 and France did the same in 2012. There is also the issue of social security financing, because the budget would have to be somehow compensated for any decrease in social security contributions. Although it should theoretically be possible to use any tax revenue to finance the social security system, this could prove more challenging in practice, since social security contributions have traditionally been earmarked for the specific purpose of financing social security systems. However, a solution could be found, as evidenced by the Danish model where the social security system is mainly financed through income tax revenues.

More broadly, the longer the current debt overhang episode lasts, the more difficult it becomes for the economy to grow out of debt due to the damage done to its long-term growth potential. This is, of course, in addition to well-known medium- to long-term macroeconomic headwinds such as population ageing, the lack of further increases in the number of years in education, growing inequality in the distribution of income and wealth and technological advances. The expected impact of technological advances on the economy is ambiguous, but if it is

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47 See Reinhart and Rogoff (2011).
true that the latest technological advances exert deflationary pressures on the overall economy, then this would make the debt burden even more acute.

Prospects for further macroeconomic stimulus that could sustainably increase debt servicing capacity of households and companies appear slim, because monetary policy has in most countries already eased considerably, while fiscal space to boost government spending or provide tax relief is limited and the potential for further export growth is constrained by weak global outlook.

5.2. Microeconomic level

When macroeconomic policy channels are not sufficiently effective for reducing the debt overhang, potential solutions could be explored at the microeconomic level. BIS (2014) notes that exiting the debt trap requires policies that encourage an orderly reduction of debt through balance sheet repair. Given that the overall economic context makes it very difficult to move forward by growing out of debt, the problem of over-indebted households and companies will not go away unless it is tackled head on. Such a move would help bringing back into the EU economy important productive capacity that is represented by the economic activity of over-indebted households and companies, and allowing for a rebalancing of resources by speeding up the exit of unproductive companies. Thus, effective private debt resolution mechanisms are required to achieve the full productive capacity of the economy.

The avenues for action to achieve efficient debt resolution outcomes are (in the order of severity): payment enforcement; seizing of assets (e.g. foreclosure in the case of mortgage debt); and insolvency. Payment enforcement is usually problematic in the debt overhang case, as the latter term is used precisely to imply that the borrower is no longer capable of servicing the loan. Although foreclosure can be applied, it can only offer a partial solution in cases where the value of debt considerably exceeds the value of the property pledged. In situations that involve highly distressed households or companies with no other alternative ways of becoming economically productive, as in the case of debt overhang, the only way out may be through insolvency proceedings. Whereas foreclosure may or may not imply some debt relief, depending on the value of the seized asset and the legal framework, insolvency usually does. When it comes to the debt overhang situations, there is evidence that debt relief is associated with an increase in both the income and employment probability of households. Moreover, debt relief holds the potential to stimulate consumption, since debtors generally have a higher marginal propensity to consume than creditors. Recent research also finds that households with less income and higher leverage tend to have higher marginal propensity to consume. To avoid moral hazard, debt resolution mechanisms should be designed in such a way, so as to ensure that insolvency is declared only as a last resort measure.

Reforms to facilitate private sector debt restructuring are not without cost: they require time, effort and budgetary resources. There is also a political cost, as the reforms may be resisted by vested interests of individual creditors and debtors. Following financial crises, countries tend to become more politically polarised and this may result in legislative stalemate. Nevertheless, once indebtedness has reached levels that impede overall macroeconomic performance, there is an economic case to renegotiate debt contracts.

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51 The US system involves non-recourse mortgages in many States, whereby the debtor is not liable for repayment of the residual liability after foreclosure. In the EU, full-recourse financing has traditionally applied, whereby the debtor remains liable for any residual liability after foreclosure.
52 In 2010, 1.5 million Americans filed for over $450 billion in debt relief through the bankruptcy system. American households now receive more resources through bankruptcy than from temporary assistance for needy families and state unemployment insurance programmes combined. See L. Lefgren, F. McIntyre and M. Miller, “Chapter 7 or 13: Are Client or Lawyer Interests Paramount?”, the B.E. Journal of Economic Policy and Analysis (Advances), 2010, 10(1): Article 82.
54 Prominent economists (e.g. I. Fisher, M. King, J. Tobin) have argued that a higher marginal propensity to consume for debtors versus creditors explains why elevated private debt burdens are associated with economic downturns.
55 For example, see A. Mian, A. Sufi and F. Trebbi, “Resolving debt overhang: political constraints in the aftermath of financial crises”, NBER Working Paper 17831, February 2012.
private debt levels and economic performance depends on country-specific circumstances, such as the elasticity between net private liabilities and consumption or investment. In the current situation, the IMF has argued for taking action sooner rather than later based on two considerations. First, the initial crisis containment phase is arguably over. In the immediate post-crisis situation of an uncertain macroeconomic path, falling asset prices and frozen credit markets, it is difficult to judge individual debtors’ viability. As the environment starts to become relatively more stable, debtors’ viability is easier to assess and the potential benefits of restructuring their debt become more tangible. Secondly, alternative policy options appear largely exhausted, as explained above.

**Objectives of debt restructuring**

The counterpart to the debt overhang situation of households and non-financial corporations usually takes the form of non-performing loans (NPLs) on EU banks’ balance sheets. NPLs have risen sharply in many countries since the crisis. Historically, high NPL levels have declined after a crisis, following a pick-up in the economy and inflation. As explained in Sections 3 and 4 though, these macroeconomic conditions are not present this time round. The surge in NPL ratios has required banks to increase provisions and build capital, potentially constraining new lending.

Private debt restructuring usually involves some burden sharing between debtors (households and corporates) and creditors (usually banks). As a consequence, the size of any potential for private debt relief cannot be seen in isolation from the health of the banking sector, which is still in the midst of a post-crisis deleveraging phase. This implies the need to take into account banks’ loss-absorption capacity and to complement it by measures to safeguard financial stability. The private sector debt restructuring process should aim to maximise recovery rates and minimise the time and cost involved in debt restructuring. There are major differences across the EU with respect to the time and cost of corporate insolvency proceedings. As can be seen in Fig. 5.1 below, the longer the insolvency procedure, the lower usually is the recovery rate.

![Chart 10 - Time and cost of corporate insolvency proceedings in EU Member States](source: World Bank Doing Business 2014)

In select systemic cases, the public sector may also share some of the cost and impose across-the-board solutions. The bar for across-the-board government action (as opposed to a case-by-case approach) is typically set high, as any interference in the market mechanism necessarily causes distortions and is often associated with additional budgetary outlays. Therefore, government intervention is only justified if the debt problem is systemic in the sense that speedy resolution using the usual legal tools is no longer possible. Except for such systemic cases, however, the role of the public sector has been confined to implementing legal and institutional reforms that encourage timely market-based restructuring (including the removal of tax and regulatory obstacles).

**Public policy in support of debt restructuring**

Many EU countries have been undertaking reforms to speed up debt restructurings, relying primarily on a market-based approach. These reforms generally include the following elements:


59 idem
• improving the legal framework to support effective and efficient enforcement of creditor claims;
• facilitating out-of-court debt restructuring by issuing guidelines or establishing a legally binding framework; and
• implementing an information strategy to raise public awareness of the restructuring tools.

In a few cases, the authorities have resorted to temporary direct government intervention to deal with household over-indebtedness. The reforms have also been complemented by measures to strengthen banks’ capacity to manage distressed loans. Banks have incentives to keep financing insolvent companies simply to avoid the need to recognise losses. As a result, as explained in Section 4, banks deciding not to foreclose on debtors can negatively affect the wider economy, even though this may seem perfectly rational from their individual point of view.

At the EU level, issues related to the private debt overhang are also analysed as part of the European Semester process. Among other things, the most recent euro area report recognises that the remaining deleveraging needs by companies and households are in excess of 30% of GDP in several economies. The social situation in the euro area has not significantly improved and banks' balance sheets remain under pressure from high levels of NPLs. As part of the European Semester 2015 process, the Commission has proposed country-specific recommendations relating to the debt overhang problem and NPLs for a dozen of EU Member States.

5.3. The non-financial corporation sector

Corporate insolvency reforms

Corporate insolvency reforms undertaken in the wake of the recent financial crisis have focused on supporting the early rescue of viable companies. Recognising the importance of insolvency law in tackling the economic consequences of over-indebtedness, several European countries have introduced fast track court approval procedures (e.g. Latvia and Portugal) and pre-negotiated restructuring plans that bind minority creditors (e.g. Italy). Facilitating rehabilitation has been at the centre of the reform efforts in several countries. For example, the Baltic states and Romania have encouraged debtors to file for insolvency in the early stage of their financial difficulties. Estonia, Germany and Latvia have allowed flexibility in the use of restructuring tools, such as debt to equity swaps. Estonia, Germany, Italy, Latvia, Portugal, Romania and Spain have simplified procedures to facilitate creditor action on restructuring plans, and Latvia has accorded priority repayment status to creditors that provide new financing. Insolvency reforms also aim at streamlining liquidation procedures to speed up the exit of non-viable companies and thus help to maximise value for all interested parties.

At the same time, the effectiveness of these reforms depends on an adequate institutional framework that implements the law in a transparent, predictable and consistent manner. While petitions to participate in the improved rehabilitation proceedings may have increased, the judiciary process and institutions may not be able to handle the increasing insolvency cases resulting from the crisis due to an overloaded court system, lengthy and costly judicial process and a lack of well-trained and competent judges and insolvency administrators.

Out-of-court and hybrid restructuring procedures

Out-of-court restructuring may provide a speedy and cost-effective alternative to formal insolvency procedures. It involves restructuring of the business and finances of debtors in financial difficulty without resorting to a full intervention by the courts. A few countries (e.g. Latvia, Romania and Portugal) have recently issued non-binding guidelines on out-of-court corporate debt restructuring, seeking to avoid the costs and delays that are typically associated with the formal insolvency process. However, achieving effective out-of-court restructuring requires adequate incentives for creditors and debtors to participate in the restructuring. In this respect, it is critical to have in place an effective insolvency law that provides clear benchmarks to incentivise debtors and creditors to

60 This has been the case in the UK, Latvia, Hungary, and Croatia.
reach a restructuring agreement. Hybrid procedures, which combine elements of out-of-court and court procedures, present the advantage of reducing costs and length of the restructuring process, while at the same time ensuring stay of enforcement actions and cram down of dissenting creditors.

In addition, some countries have put in place a regulatory framework requiring financial institutions to write down the value of distressed debt. For example, Latvia and Romania have removed tax disincentives for debt write-downs or transfers of a distressed loan to a third party, Portugal has encouraged its tax and social security administrations to participate in debt restructurings in accordance with clearly defined rules and Latvia has streamlined and expedited foreclosure procedures to induce debtors to participate in negotiations. The IMF evidence to date suggests that these initiatives to facilitate out-of-court restructuring have generally been successful. However, the full benefits of these initiatives will only be evident once market participants and other stakeholders become familiar with the new framework and more experience is gained with its application.

5.4. The household sector

Personal insolvency regimes

A number of EU countries (e.g. Ireland, Estonia, Italy, Latvia, Lithuania and Poland) have introduced or refined personal insolvency regimes to achieve orderly resolution of the debt overhang, e.g. by shortening the discharge period. However, these countries have faced a number of challenges due to the following reasons. First, the design of personal insolvency legislation is inevitably driven by social policy considerations, including the goal to reinvigorate individual productive potential in the mainstream economy and to reduce the social costs of leaving debtors in a state of perpetual debt distress. Second, the legislation needs to avoid moral hazard by keeping an appropriate balance between maintaining credit discipline and giving financially-responsible debtors a fresh start. Third, the design of the legislation needs to take into account institutional infrastructure that is critical to its predictable and transparent implementation, including the availability and quality of judges and trustees, administrative capacity, accounting, and valuation systems.

Faced with wide-scale household mortgage distress in the aftermath of the recent crisis and the bursting of the real estate bubble, some EU countries (e.g. Greece, Spain and Portugal) have introduced special legislation to address unsustainable residential mortgage debt burdens on households, while limiting adverse effects on banks’ balance sheets and minimising moral hazard. All of these regimes provide for strict eligibility criteria, but they differ in several respects. First, some regimes allow financing institutions to opt in, while in others it is mandatory. Second, subject to certain conditions and as a last resort, mortgage debtors under some regimes are allowed to transfer the mortgaged property deed to the bank (or a government agency) and obtain (at least partial) cancellation of the mortgage debt.

Out-of-court settlement for private insolvency

A number of countries have also adopted measures to facilitate out-of-court settlement for distressed mortgages, e.g. in the form of voluntary guidelines or codes of conduct that provide guidance on mortgage restructurings for borrowers in financial distress (e.g. Ireland, Latvia, Estonia and Portugal). To reduce the burden on the court system, the personal insolvency law recently adopted by the Irish Parliament introduces three non-judicial debt settlement procedures for household debt, including a personal insolvency arrangement for settlement of secured debt up to EUR 3 million and unsecured debt (no limit) over six to seven years. The effectiveness of these approaches in tackling mortgage distress remains to be seen.

A few countries have looked beyond improvement of the legal framework and resorted to direct government intervention. Measures have included the imposition of a temporary moratorium on foreclosure (e.g. Greece and Hungary), and conversion of foreign currency-denominated debt into local currency (e.g. Hungary, see Box B in

62 For example, a 2010 survey by the Latvian Ministry of Justice noted that the nonbinding guidelines on out-of-court corporate debt restructuring were used in 90% of all out-of-court cases. For more details, see the “Report of the working group on NPLs in Central, Eastern and Southeastern Europe” by the European Bank Coordination Initiative, March 2012.
this chapter). Some countries have adopted a government support scheme (e.g. Latvia and Hungary) and/or set up an asset management company (e.g. Hungary and Spain).

6. FUTURE: AVOIDING NEW DEBT BUILD-UP

Among other sources, this section has drawn on work by R. Dobbs, S. Lund, J. Woetzel and M. Mutafchieva, published in 2015.63

Putting any potential solutions to the current debt overhang aside, one should seek to reduce the probability of a debt overhang reoccurring after the current episode is resolved. To start with, better data collection and monitoring is required to bring systemic risk measurement as close to real time as possible. This would enable the supervisory authorities to steer the credit cycle more effectively. Borrowers frequently underestimate the downside risks of debt and overestimate both the potential increase in value in their assets and their ability to repay, especially at the peak of the business cycle. The challenge is to protect the economy from the inevitable bad judgments of some borrowers (and lenders) without unduly limiting the flow of debt to sustain healthy economic growth.

Macroprudential policies

Macroprudential policies can help achieve this goal. For example, loan-to-value (LTV) ratios in mortgage lending are a direct measure of leverage: a high ratio at the outset increases the probability that a household will end up with negative equity. Stricter lending standards in some cases may also be warranted. Countercyclical macroprudential measures have the potential to tame the credit cycle, contributing to financial stability. Overall, assessment based on a broad range of indicators is warranted.

In 2014, many EU Member States actively pursued macroprudential policy, some using the trough of the financial cycle to introduce measures that may have a greater impact once the cycle turns. The primary objective of a large majority of measures was to prevent and mitigate excessive credit growth and leverage, especially in mortgage lending. The most frequently used instruments were higher risk weights and LTV caps, often in combination with affordability requirements.64

Improved product design and processes for private debt restructuring

EU countries mainly use full recourse mortgages, where lenders can seize assets other than the property securing the mortgage, including the future income of the borrower. This may act as a disincentive for out-of-work households to re-enter the labour market, given that a large proportion of their new income would have to be dedicated to servicing their existing mortgage debt. Eliminating the debt hanging over an individual’s income prospects gives that person strong incentives to find a job. In this way, non-recourse loans can lessen the severity of a recession and support recovery by enabling households to re-establish themselves in less expensive housing and to resume normal consumption. There is evidence that household deleveraging occurs fastest in countries with non-recourse mortgages, such as the US.

In theory, non-recourse mortgages may encourage borrowers to take on more debt, given that they can walk away from it, if need be. Moreover, borrowers can choose to default once the value of their property falls below the amount of the mortgage even if they can still afford to repay loans. However, there is little evidence that this is the case in practice: for instance, only 13.9% of US mortgage defaults in the recent recession were ‘strategic’. Moreover, to counter the incentive to borrow too much, non-recourse mortgages can be combined with conservative limits on LTV ratios and countercyclical macroprudential rules to dampen new lending during credit booms.

At the same time, treatment of mortgage defaults often seems to depend more on what happens in practice rather than on contractual requirements. For example, Ireland achieved an even larger reduction in household debt relative to income than the US by pursuing a broad programme of loan restructurings, despite having recourse

mortgages.65 These restructurings have helped Irish households deleverage to more sustainable levels of debt. However, such large-scale mortgage restructurings are difficult to execute efficiently, since they require both the agreement of lenders and a significant investment to review requests. This becomes even less feasible once the mortgages have been securitised. In Ireland, securing lender cooperation was less of a challenge only because the government had become a major shareholder in all three of the country’s largest banks.

Beside these tested contract forms, there have recently been many other innovative ideas on specific contract forms in mortgage lending. They all have one thing in common: introducing more risk-sharing. Better risk-sharing features of household debt can make repayment more flexible when borrower circumstances or economic conditions change, thus avoiding the costly option of default altogether.

Debt servicing insurance

One approach is to incentivise borrowers or lenders to take out debt servicing insurance, which exists in the case of consumer loans in some countries. In mortgage lending, insurance for repayment of the outstanding amount in the eventuality of the borrower’s death is also well established. This could be the most straightforward solution. Eventually, additional macroprudential policy measures could be applied in those cases where loan agreements do not benefit from such insurance.

More flexibility in debt contracts

Another possibility that is discussed would be to introduce some flexibility into the debt contracts themselves, making automatic reversible adjustments in repayment schedules contingent upon specific events, such as a job loss or indicators of economic recession and rising unemployment, as proposed by R. J. Shiller.66 His ‘continuous workout mortgages,’ are structured to adapt to changing conditions over the course of a loan to keep payments at a level that the borrower can afford. There are precedents for this kind of flexibility in other types of debt contracts, such as student loans, where payments are capped at a certain percentage of the borrower’s income, so that payments rise and fall along with incomes. Such flexibility would have implications in those cases where mortgages are securitised, but the overall effect of such a mechanism could still be less disruptive than a total cessation of payments and default.

Risk-sharing as part of debt contracts

The third, and most radical, approach proposed so far is to introduce an ‘equity-like’ element of risk-sharing into debt contracts. A. Mian and A. Sufi have proposed ‘shared responsibility’ mortgages, in which both lenders and borrowers face the upside and downside of fluctuating real estate prices.67 The underlying logic makes sense from the macroeconomic point of view, since a more equal sharing of losses between debtors and creditors could be more easily absorbed at the aggregate level than when losses are exclusively put on debtors’ shoulders. Even so, there would be formidable challenges to implementing such risk-sharing features in mortgage contracts. Interest rates on such loans would need to be higher than on conventional mortgages to compensate for the additional risk borne by the lender. In addition, the risk would probably also be reflected in higher regulatory risk weights for such type of loans. If borrowers were offered a choice, they would probably choose the less

65 As of June 2014, 102,000 mortgages (13% of the total) had been restructured through a variety of mechanisms, including temporary suspension of repayments, interest-only loans, maturity extensions, and principal reduction.
66 In such mortgages, changes in the monthly payment (and in the mortgage balance) could be triggered by events such as significant changes in home prices, job loss or recession. Payments would revert to the original level when conditions improve. The continuous workout mortgage would reduce the need for borrowers to exercise the costly option of default to alleviate debt and would guarantee lenders a stream of continuous payments, while sharing the underlying risk with the borrower. The automatic adjustment mechanisms of the mortgage would also avoid costly negotiations between borrowers and lenders. See R J. Shiller et al., ‘Continuous workout mortgages’, NBER working paper number 17007, May 2011.
67 If home prices in the surrounding community decline below the purchase price of the home, the borrower’s payment is reduced by a similar percentage. When prices recover, the payments revert to the original rate and the lender is entitled to 5% of the capital gain when the borrower sells. By automatically adjusting loan payments during tough economic conditions, foreclosure can be avoided. See A. Mian and A. Sufi, ‘House of Debt: How they (and you) caused the Great Recession, and how we can prevent it from happening again’, University of Chicago Press, 2014.
costly standard mortgage, preferring to take on the risk of falling prices themselves. As for the banks, it stays an open question whether they would be interested in providing such financial products. Each investor has a different risk profile and there must be a reason why banks predominantly grant loans instead of investing in equity. At the same time, products with such risk-sharing features could perhaps be supplied by other financial market participants. In any case, such contracts would be more difficult to securitise, given the potentially higher frequency of losses.

**Expeditious corporate bankruptcy system**

As mentioned in Section 5, a clear, consistent, and expeditious bankruptcy system for corporate debt is essential to enable businesses to restructure and move ahead. Efficient business bankruptcy processes are important not only in helping reduce leverage in the private sector, but also because they can increase market efficiency by removing inefficient competitors. In addition, they can promote innovation by giving entrepreneurs an opportunity to recover quickly from failure. However, the deleveraging of companies is not only about reducing debt, but also about raising equity. Up to the crisis, financial integration was mainly based on cross-border debt flows. Now, a more balanced financial integration approach is required, including measures to make it easier for SMEs to access equity markets and to improve the risk-sharing mechanisms in infrastructure investment projects.

**Removal of public subsidies to debt instruments**

Finally, the bias of public tax subsidies towards debt is also a problem. Not only do they skew the incentives in favour of debt instruments in general terms, but they also motivate companies to engage in elaborate cross-border schemes to minimise their tax bill. The tax incentives for real estate investment generally include tax deductibility of mortgage interest and preferential treatment of capital gains on residential properties. However, the major role of real estate bubbles in financial crises highlights the negative externalities associated with mortgage borrowing. The mix of incentives provided for residential housing should be reconsidered and balanced against other needs, such as investments in infrastructure, education, research and development, which would enhance the long-term productive capacity of the economy.

The corporate tax incentives in favour of debt should also be reconsidered to create a level playing field between debt and equity financing. For instance, the corporate tax rules often make interest payments deductible, while the cost of equity is not. Removing this debt bias could possibly shift the capital structure of firms more towards equity instruments. This can be achieved either by removing the tax deductibility of interest payments or by introducing the deductibility of the cost of equity. The latter may encourage companies to pay dividends rather than pursue share buybacks (often financed with new debt) to boost their stock prices. When implementing such a reform, however, one may need to ensure that the overall fiscal package is revenue-neutral.

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Mian, Atif, and Amir Sufi, 2014, ‘House of Debt: how they (and you) caused the Great Recession, and how we can prevent it from happening again’, University of Chicago Press.
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Chapter 4. Special focus on longevity risk

1. INTRODUCTION

Concerns over fiscal sustainability and a shift from defined benefits to defined contribution schemes in pension provision have contributed to transfer risk, including longevity risk, to households. While this shift began before the recent financial crisis, it has gained further momentum as a result of it. Households faced with increased longevity risk have to increase their supplementary pension provisioning. Consequently, individually saved personal pension products (excluding statutory or occupational pensions) are becoming more important. However, private households cannot always successfully assume or mitigate such risks. Therefore, these risks could once again find themselves, in one way or another, on the government’s balance sheet as an implicit liability on the government.

Significant under-hedged or under-insured individual risk represents both a short-term and long-term risk for society as a whole. That large individual risks can have macroeconomic implications became very clear during the crisis. Risks to housing equity were clearly evident in the US and a number of Member States, which in turn triggered severe balance sheet recessions, partly resulting in significant over-indebtedness. This observation provides the starting point for a discussion on how financial integration relates to risk-sharing technologies for private households and markets to lay off such risks — including for insurers, reinsurers and institutional investors such as pension funds.

Global and regional risk-sharing opportunities rise and fall with the degree of global and regional financial integration. Neither intermediated risk sharing, by means of the balance sheets of banks, insurers, reinsurers or institutional investors, nor the more direct risk-sharing technologies can be implemented effectively without free movement of capital. This is acknowledged in the note of President Juncker, which also highlights a possible increased role for new private risk-sharing technologies to promote overall financial stability, in addition to existing intermediated and mainly debt-financed forms of financial integration, which had contributed infamously to a propagation of risk during the sovereign debt crisis.

In spite of the many innovations of transforming and transferring risk within the financial sector, many large individual risks remain under-insured. The available level of insurance is inadequate (or sometimes non-existent), or the coverage is too expensive. This description of the situation before the crisis is still valid today.

Financial integration and innovation can be positive for financial stability to the extent that they reduce society’s collective exposure to these large individual risks. This special focus discusses some of these risks from the perspective of the balance sheet of both the household and the government, which has to manage at least part of the residual, unhedged risk. In short, providing households with better access to global and regional risk-sharing technologies can reduce the implicit liabilities of governments acting as insurer of last resort.

This special focus numerates four large risks facing individuals:

i. macro risks to the value (equity) stored in people’s homes;

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1 Authors: Harald Stieber and Saskia van Ewijk. This chapter has benefited from discussions at a technical workshop on longevity risk and disruptive life-income cycles, held in DG FISMA on 11 December 2014.
2 In their analytical note to the informal European Council of 12 February 2015, President Juncker, in close cooperation with the three presidents Tusk, Dijselbloem and Draghi, asked the question: ‘How could private risk-sharing through financial markets in the euro area be enhanced to ensure a better absorption of asymmetric shocks?’.
3 See Chapter 3.
4 Stiglitz (2010) provides a more critical assessment, but does not look at individual household balance sheets.
5 On page 7, it states (bold in the original): ‘(…) we need to address remaining barriers to investment and the free movement of capital and make capital market integration a political priority, including by considering issues like taxation, insolvency and company law. A well-integrated financial system in the EU, as a result of a Capital Markets Union, can make a monetary union more resilient against shocks by providing an element of private risk-sharing, and more efficient when it comes to generating jobs, growth and investment.’
7 More than 20 years ago, Robert Shiller observed in his book ‘Macro Markets’ that many large individual risks should be insurable at very little cost if only risk-sharing opportunities were fully exploited, be it at the level of a local housing community, or at the national, regional, or global level. He called it ‘democratising finance’.
ii. macro risks to educational status;

iii. risks to health status; and

iv. longevity risk, i.e. the risk of living much longer than expected without having the necessary financial means to maintain one’s quality of life.

The most difficult of the four appears to be longevity risk. Its liability for a household is partly offset by items on the asset side in the form of pensions, health and long-term care entitlements, and explicit and implicit government guarantees. In the end, longevity risk cannot be fully addressed by either financial retail products or financial markets, and the government will always have to assume a certain amount of extreme longevity (tail) risk.

All types of large household risks could benefit from increased divisibility of the household’s asset side. If assets and liabilities can be matched better, the overall balance sheet becomes more flexible, including during insolvency proceedings. Ideally, the latter should help to contain tail risks that cannot be shared among individuals or hedged in financial markets; this feature of bankruptcy -effectively becoming part of society’s risk management toolkit- is not ensured in all cases, even in those Member States where private insolvency regimes exist.

1.1. The single market dimension of international risk sharing

A stronger single market in retail finance products would help strengthen risk-sharing opportunities. Greater availability of financial products and services, not only in domestic markets but also cross-border, can be expected to have a positive impact on risk-sharing opportunities with respect to shocks, whether they are specific to a household as the final consumer of such products and services, to a local area, or to a Member State. In last year’s review, in a review of broad indicators for financial integration, the Commission presented estimated degrees of consumption risk sharing across Member States. These estimates pointed towards a decrease in international risk sharing in the EU since 2007. The present special focus extends this discussion.

A situation where individuals have access to risk-sharing technologies at the regional and global level is one aspect of having a high degree of financial integration. The EU’s free movement of capital is an integral part of this picture. Capital account restrictions could limit existing and possible future risk-sharing opportunities at the regional or global level. Ideally, macro-prudential policies and personal insolvency schemes can be designed in a way that complements risk-sharing opportunities, e.g. by capping housing market volatility and levels of household indebtedness.

The analysis is presented as follows. In section two, a model of the private household’s risk management problem is proposed with a focus on large risks facing the individual. Section three then discusses two of these risks, starting with a general assessment of their importance, followed by a discussion of existing risk-sharing mechanisms, and finally an overview of proposals made in the literature for complementing existing mechanisms. Section four concludes.

Thematically, this discussion is linked to ongoing work in other international organisations. The IMF Data Gaps Initiative has recognised that better policies (e.g. in a financial stability context) are often limited by measurement issues and the availability and quality of data necessary to design and evaluate such policies. The OECD’s Inclusive Growth project is investigating how existing forms of financial intermediation interact with the income distribution of households, finding that lower-income households have a less than proportionate access to financial risk-sharing technologies. As a result, the latter can amplify other inequalities, such as access to housing, or to starting a business. Finally, the European Insurance and Occupational Pensions Authority is currently analysing why pan-

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8 See the discussion of debt overhang in the same volume.
9 See Kilborn et al (2013) for an international overview of personal insolvency schemes, and London Economics (2012) for a more EU-focused discussion.
12 This view is close to Robert Shiller’s call for a democratisation of finance as expressed in Kroszner et al. (2011), and Shiller (2012).
European personal pension products are not taking off; it will deliver an advice to the Commission in June 2015 on the possible introduction of a pan-European pension product or ‘29th’ regime.  

2. DEMOCRATISING FINANCE

There is an extensive literature on international risk sharing. However, throughout this literature, the actors or institutional units that engage in risk-sharing activities are typically national economies or large (multinational) corporations, including financial institutions. One reason for this restricted view is data availability: national economies are comprehensively modelled within the national accounting framework using an international standard that ensures a high degree of cross-country comparability. Individual financial institutions — at least the ones listed on a stock exchange — publish regular and detailed accounts about their investment decisions from which degrees of risk sharing can be derived. Another reason is that countries (national jurisdictions) and corporations represent legally enforceable pools of risks and profits.

Until recently, we knew little about the underlying evolution of risk as reflected in the balance sheets and income and expenditure flows of individual households in the EU. A systematic analysis and comparison of private households’ balance sheet data has begun only recently with the launch of the Eurosystem’s Household Finance and Consumption Survey. Also, financial transaction statistics are now being compiled more systematically (on a securities-by-securities basis) and in a more comprehensive manner as regards reporting units. As a result, the EU will over the coming years gradually close an important data gap compared with the US, and it will be possible to monitor financial stocks and financial transactions. In the end, additional statistics will enable a better, more detailed understanding of the financial system.

2.1. The risk-managing problem of the individual

Even before the recent crisis, a growing need for a broader set of risk management tools was widely acknowledged in the literature and in international policy fora. In light of demographic developments, there have been increasing calls for a more proactive risk management approach by governments towards risks on households’ balance sheets, and on the government guarantees, implicit or explicit, attached to those risks.

<table>
<thead>
<tr>
<th>Table 1: A not-so-simple balance sheet of the private household</th>
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<tr>
<td><strong>Assets</strong></td>
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<td>Educational status</td>
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<tr>
<td>Health status</td>
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<tr>
<td>Real estate assets</td>
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<tr>
<td>Other non-financial assets</td>
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<tr>
<td>Financial assets</td>
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<tr>
<td>Financial and non-financial guarantees and entitlements (pension, healthcare and long-term care)</td>
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<tr>
<td><strong>Household net worth</strong></td>
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Explanations of values in parenthesis: the indicated range for educational status is a ballpark figure for per capita expenditure for tertiary education; health status: ballpark figure for median real capital stock per worker; real estate assets: EUR 200 000 is the conditional median value of real estate assets where 64.4% of all households have real estate assets; other non-financial assets includes, for example, motor vehicles; financial assets: EUR 11 400 is the conditional median of financial assets in the form of any of the following: deposits (sight and saving accounts), mutual funds, bonds, shares, money owed to the household, value of voluntary pension plans and whole life insurance policies of household members and other financial assets items, including private non-self-employment businesses, assets in managed accounts and other types of financial assets; mortgages: EUR 68 400 is the conditional median value of outstanding mortgage debt, where 23.1% of households have mortgage debt, financial liabilities other than mortgages: 29.3% of all households have non-mortgage debt with a conditional median value of EUR 5 000 (student loans shown as a separate category here are included in this figure); Source: First wave of the Eurosystem’s Household Finance and Consumption Survey, authors’ calculations.

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14 In a similar vein, the European Commission’s CMU Green Paper states: ‘On personal pensions, providers are subject to a number of different pieces of EU legislation. This raises the question of whether the introduction of a standardised product, for example through a pan-European or ‘29th’ regime, removing obstacles to cross-border access could potentially strengthen the single market in personal pension provision. Any changes would need to ensure an effective degree of consumer protection, whilst at the same time improving coverage and take up and appropriate security of savings.’  
15 See Schoenmaker (2013).  
16 Draghi et al. (2004) and literature cited there, including Tirole (2002). Gray et al (2010) model the household balance-sheet risk as contingent claims on other sectors and stress the non-linearity feature of such cross-sectoral linkages. See also Merton et al. (2013).  
18 Groome et al. (2006).
Households’ balance sheets are a major source of risk. Table 1 highlights a few important concepts. In this balance sheet view, households can only consume as long as they have positive net worth. Indeed, consumption can be understood as a dividend stream out of household net worth. On the household’s asset side, we have replaced the net present value of net household income (typically used in the literature) with the intangible assets that determine the household’s capacity to generate any income in the first place: educational status and health status. We can therefore re-write the asset side of the household as containing the following elements: educational status, health status, real estate assets, other non-financial assets, financial assets, and financial and non-financial guarantees and entitlements, such as pensions, healthcare and long-term care entitlements. Where possible, we mention some orders of magnitude in brackets. In the case of health status, we derive a ballpark figure based on per capita spending on tertiary education in Member States. The ballpark figure for health capital is even rougher given the wide disparities in capital stocks throughout the EU. The range indicates the human capital stock implicit in regional capital intensities in the EU. In contrast, the figure for real estate wealth is a statistic from the Household Finance and Consumption Survey.

The household balance sheet shows the importance of large individual risks. From a macro-financial stability point of view, these are more important than risks attached to individual financial assets. The latter receive high and growing attention from the banking industry under the heading of ‘private banking’ and from asset managers in the investment and pension fund industry. It is certainly worthwhile to explore — but beyond the scope of this chapter — how these industries could help, in a more holistic approach, to better manage non-financial assets in a way that goes beyond the current consumer protection and financial product transparency and safety regulations.

The liability side only partly matches the asset side, giving rise to various forms of mismatch, including maturity mismatch, and asymmetric valuation risk. Maturity mismatch and asymmetric valuation risks on the asset and liability side both contribute to an increased risk of experiencing negative net worth at some point during the household’s life cycle. On the household’s liability side, we find more or less matching entries:

- Student loans are either an explicit loan to pay for tuition, or consumer loans to pay for living expenses during higher education: so far, this category does not, in general, have a macroeconomic dimension in the great majority of Member States.

- Net present value of private health spending is a highly income-elastic category, which can be expected to capture a very large part of materialising longevity risk; we are not aware of even a ballpark figure for this risk.

- Mortgages are so far the household liability that most closely matches an asset and therefore provides a starting point for a more granular analysis of household financial risk; we report the median value for households having such mortgages, which is the case for 23.1% of those covered in the Household Finance and Consumption Survey.

- Financial liabilities other than mortgages represent a rather modest value for the median household, but concern a large group of households (29.3%); also, the distribution of these liabilities matters. This category will also contribute to financing educational and health status and could become much more important over the coming years.

- Finally, tax and social security liabilities and any residual longevity risk provide direct links to the government’s balance sheet and risk management problem.

Protecting the asset side of this balance sheet serves to protect household net worth, i.e. household consumption, and demand for products and services in the economy as a whole. As a consequence, better managing the largest household risk directly affects future growth and employment.

20 This representation is also in line with a production function approach with labour enhancing technological process.
21 One could easily complicate this discussion further by including household liabilities in foreign currencies; see the provisions of the Mortgage Credit Directive in this context.
22 See Michaelson, A., J. Mulholland (2014) for ballpark figures of longevity risk in current market-based funding schemes, e.g. private pensions; they can be thought of as very conservative lower bands compared with unexpected additional future private spending on health.
However, using its balance sheet more extensively, the household will also incur additional risk. Additional risk can arise from valuation effects (housing equity), or the broader macro-environment (low-yield environment affecting the rate of return of longer-term savings and insurance products). Hence, the success of a household’s use of its balance sheet for risk management will not only depend on its capacity to expand its size, but also on a number of other factors that are linked to financial product design, and the actual structure of risk-sharing arrangements. This includes how they allocate risk under different scenarios, and the interplay of risk-sharing arrangements with bankruptcy rules. In some cases, directly pricing these risks in financial markets could be an important complement to the existing savings and insurance products that today dominate many households’ portfolios.

The size of household balance sheets increases with financial development. Recent empirical work, including a large international panel covering 38 European economies, provides evidence along these lines:

- mortgage markets are deeper in countries with low inflation (levels and volatility);
- the depth of mortgage markets is positively correlated with creditor rights and ease of contract enforcement (both features of the judicial system directly affecting the expected liquidation value of housing collateral); and
- mortgage finance grows with income per capita (i.e. economic development) across countries, but even more strongly within countries.

Mortgages have features of a luxury good, similar to private health insurance. In terms of capital market characteristics, the countries with developed mortgage-bond markets also have the highest depth of mortgages. However, this may also reflect fiscal and regulatory features specific to these countries, in particular fiscal incentives built into private pension savings schemes.

<table>
<thead>
<tr>
<th>Chart 1: General government debt projections including projected increases in age related spending, percentage of GDP</th>
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<tr>
<td><strong>Note:</strong> Projections for the United States (left), Japan (middle) and the United Kingdom (right) are based on different scenarios with respect to the future increase in effective interest rates (increases by 0, 1, or 2 percentage points); Source: Cecchetti (2013)</td>
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2.2. The risk-managing problem of the government

The balance sheet of the household already hints at the problem for the government as a global risk manager. On the one hand, the government wants to limit its exposure to household risk (in particular, longevity risk) by putting caps (eligibility criteria, outright numerical caps, etc.) on the numerous financial and non-financial guarantees it provides to citizens. On the other hand, it must keep track of the evolution of households’ net worth so as to not allow private consumption possibilities to fall to a level that is self-defeating.

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24 A case study of the Danish households’ balance sheets is a valuable illustration: see Møller Christensen et al (2012).

25 See the description in Lindert (2004) as to how, even during its most liberal phases, the British government has regular introduced minimum income floors (in Britain known as ‘Poor Laws’) to avoid the self-defeating situation where a substantial part of the population can no longer take part in regular economic life. We cannot judge if the motivation was a proper macroeconomic one, or if well-off classes present in the legislature were more afraid of social unrest. In the late 1960s, the US took this debate a step further: a project for a work-free basic income was clearly based at least partly on macroeconomic considerations where it was deemed useful to protect consumer spending in an increasingly specialised monetary economy. While its pure version failed to get a majority in both houses of Congress, a scaled-down version was enacted in the form of a family-earned income tax credit in the early 1970s. Somewhat curiously, European governments, instead of making the income tax schedule more progressive on the lower end, often preferred outright monetary and non-monetary (in-kind) transfers based on detailed and costly to administer eligibility criteria.
The risk management problem of a government is considerably simpler in its structure. It is sometimes described as a debt management problem (this may have contributed to a degree of neglect in managing public assets where such assets exist). This is not a bad description as long as the definition of debt is sufficiently comprehensive. Chart 1 shows how strongly debt dynamics change once age-related spending is taken into account: debt trajectories become unsustainable in three major economies with highly developed financial systems. The following stylized fact illustrates the ageing dynamics driving this: by 2050, the group aged 60-79 years is projected to double in size to 1.6 billion. A substantial part of the increase in old households concerns economies with highly developed financial systems.

As in the case of the household, a balance sheet representation is helpful (Table 2). The government’s simplified balance sheet can be represented as follows: on the asset side, it contains the net fiscal asset (present value of the sum of future primary balances, i.e. revenues minus expenditures), and other public assets (including foreign currency reserves, other financial assets, and physical assets). On its liability side, the government has financial and non-financial guarantees, foreign currency debt, local currency debt, and base money.26

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
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<tbody>
<tr>
<td>Net fiscal asset</td>
<td>Spending obligations</td>
</tr>
<tr>
<td>Other public assets</td>
<td>Foreign currency debt</td>
</tr>
<tr>
<td></td>
<td>Local currency debt</td>
</tr>
<tr>
<td></td>
<td>Base money</td>
</tr>
<tr>
<td></td>
<td>Financial and non-financial guarantees</td>
</tr>
</tbody>
</table>

Note: Government here includes the central bank; Source: authors’ elaboration

This chapter notes different approaches among Member States, also reflecting different levels of development of local financial markets. As also discussed in Chapter 2, the Nordic countries and the UK exhibit a larger household balance sheet reflecting a more active use of the financial system to manage longer-term risks (e.g. pensions). As stressed by recent empirical work, better access to mortgage finance and longer-term risk insurance tools allows households to more actively manage income risk, mainly between periods of high current income and periods of either lower income or higher than expected expenditure, for example, because of materialising health risks or long-term care needs. As recently stressed by the OECD, fiscal policies obviously have a role to play here. As long as the link with household income and risks to educational and health status, and housing equity, is strong and direct, a progressive taxation schedule can be a great cushion.27 But this link is not equally strong over the life cycle of the household and, during old age, it may simply break down altogether.28

As a result of the crisis, risk sharing in international consumption in the EU has fallen.29 But the risk management capacity of national economies has fallen more generally as a consequence of the exhaustion or discontinuation of several buffers that previously existed:

- a favourable demographic development limited long-term risks (spending obligations);
- inflation can no longer adjust government liabilities in local currency; and
- debt, both in foreign and local currency, can no longer be used to shift spending pressures from the present into the future.

There is a diminishing capacity to take long-term (ageing-related) risks onto the balance sheet of the government.30 This has become an almost automatic reaction. As in the case of the three buffers mentioned- and which are no longer available- any further risk materialising on the government’s balance sheet almost immediately appears on the household’s balance sheet, either as higher taxes or a haircut on household assets.

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26 Obviously, in this view, it can be seen immediately that a government that cannot manage its base money or its local currency debt loses two immediate risk management channels.
27 See Holter et al. (2014).
28 The discussion of fiscal policies is beyond the scope of this special focus.
29 As has been documented in European Commission (2014), European Financial Stability and Integration, SWD(2014) 170, 28.4.2014; this section borrows from Chapter 7 and the material referenced there.
30 As observed already by Visco (2005) and Draghi et al (2004).
The government can no longer provide any inter-temporal smoothing of the consumption of households, which automatically increases the pressure to use distributional policies (with immediate effect) more actively.

2.3. Risk sharing on the balance sheet of intermediaries

Risk sharing in the single market can be undertaken by households holding an optimally diversified portfolio of equity and debt securities. Households may choose to diversify through financial retail products (banking and insurance products) where the actual investment decision is left to the financial institution. Even if the portfolio bought by the household this way was identical, the household will regularly task a financial operator to manage such a portfolio. The finance literature shows, at best, mixed results for the efficiency of such management by a third party. Typically, active (wealth) management cannot outperform the market, and the lack of achieving at least the market return has to be added to any direct costs (e.g. management fees) borne by the household.31

The recent crisis has highlighted that intermediation creates its own categories of risk, e.g. through pro-cyclical investment behaviour by intermediaries. Depending on the level at which risk sharing takes place, there can be implications for the possible and achievable degree of risk sharing (from a social welfare perspective). However, there can also be ramifications for financial stability. If, for example, risk-sharing mechanisms — at the national level on the one hand, and at the level of financial intermediaries on the other — exhibit different patterns of pro-cyclicality, the location of risk sharing could either amplify cycles or help dampen such cycles. A working group at the Bank of England32 found anecdotal evidence for pro-cyclical investment behaviour33 by insurers,34 and more mixed results for pension funds. However, a strong structural shift away from equity towards fixed income investment is observed over a 15-year period, partly in response to increasing longevity risks. On this structural shift, the working group notes that ‘Because equity does a better job than debt of sharing risk between borrowers and lenders, (…) (this) may leave the system as a whole with poorer risk sharing (…)’.

Households faced with increased longevity risk will have to increase their supplementary pension provision. As a result, personal pension products (individually saved, distinct from statutory or occupational pensions) are becoming more important. A recent discussion paper from the Bank of England has highlighted links between accounting rules (marked to market) and the investment behaviour of pension funds and insurers, and possible limits on the risk-sharing capacity of intermediaries as an unintended consequence of regulations and standards that aim at market transparency and market integrity.35 The European Insurance and Occupational Pensions Authority is now analysing why pan-European personal pension products are not taking off and will deliver an advice to the Commission in June 2015 on the possible introduction of a pan-European pension product or ‘29th’ regime.

3. TWO MAJOR AND INTERCONNECTED RISKS FACING PRIVATE HOUSEHOLDS

This section highlights two major types of financial risk that private households face throughout their lives, and that are interconnected: risks attached to housing equity and longevity risk. They are interconnected on the balance sheet of the household as owner-occupied housing remains a major vehicle to protect the balance sheet in old age. However, in both cases private households could benefit from gaining access to better risk-sharing technologies. Each risk is first discussed in more detail. Secondly, existing risk management and risk-sharing

31 A recent study commissioned by the Financial Service User Group has confirmed this stylised fact which is well documented in the finance literature on fund management.


33 The working group has used two concepts of pro-cyclicality. First, in the short term, as the tendency to invest in a way that exacerbates market movements and contributes to asset price volatility, which can in turn contribute to asset price feedback loops. Asset price volatility has the potential to affect participants across financial markets, and to have longer-term macroeconomic effects. Second, in the medium term, as a tendency to invest in line with asset price and economic cycles, so that willingness to bear risk diminishes in periods of stress and increases in upturns. A tendency by insurance companies and pension funds to invest pro-cyclically in the medium term might deepen the troughs and exaggerate the peaks of asset prices during economic cycles in a way that is potentially detrimental to financial stability and long-term economic growth.

34 On the other hand, Schoenmaker (2013) finds that geographical diversification of risks has held up well during the crisis on the balance sheet of the insurance sector.

technologies are listed. Finally, possible additional risk management and risk-sharing opportunities, as discussed in the finance literature, are highlighted.

3.1. Housing equity

‘Although we certainly cannot rule out home price declines, especially in some local markets, these declines, were they to occur, likely would not have substantial macroeconomic implications.’
Alan Greenspan, 2005 testimony to the US Senate

The crisis has highlighted the central role of housing finance in a financially developed market society. Housing finance increased in importance with rising income per capita. Buying a home represents the biggest single financial undertaking for most private households in their lifetime (see Table 1). Public pensions are in an almost continuous state of restructuring. If pension entitlements, which we regularly refer to as contingent liabilities, were debt contracts (IOUs) traded on a market exchange, most pension reforms would constitute a credit event (default), or debt restructuring. Consequently, the need to protect standards of living at later stages of life becomes ever more prominent.

Housing equity continues to be a long-term savings vehicle that is acceptable to many private households. With national pension systems under pressure, there is growing interest in financial retail products for equity release and decumulation\textsuperscript{36} of pension savings to provide additional income for old-age households.

However, from a financial stability point of view, a more active use of equity release would require a much better hedging of macro-risks, such as large changes in the market value of homes, to begin with.

Macro-prudential policies can play an important role. The absence of market-based insurance against risk contained in house price developments points to incomplete or missing markets for such risks, partly owing to measurement issues, inadequate legal and regulatory frameworks, screening and monitoring issues, and moral hazard problems. After the recent crisis, we care much more about the financial stability implications of any particular solution to these issues. The very fact that housing equity is regularly leveraged, relatively illiquid and exposed to local price fluctuations exposes owner-occupiers to important wealth and savings volatility.\textsuperscript{37}

Better financial retail products as well as more complete financial markets to address shocks to housing equity

Given the significance of mortgage finance in our societies, and given the fact that, based on our best estimates, this part of finance will become even more important with ageing societies, the question as to how best to organise the entire system of mortgage finance is a pressing one. Certainly, in an ideal situation, one would like to ensure (an optimal combination of) sufficient choice between different forms of housing finance (also through effective competition between providers) to cater for different individual needs on the one hand, and a high level of consumer protection through safe and transparent financial products, on the other.

The link to financial stability is clearly identified in the EU’s Mortgage Credit Directive, which states that a deeper EU market for mortgage debt contracts requires ‘flexible and reliable markets’.\textsuperscript{38} This includes legal certainty about all phases of mortgage credit arrangements, and close monitoring of the residential property market itself to avoid the situation where housing finance leads to a debt-driven amplification of cycles in the property market with the potential of propagation of risk across the financial sector as a whole.

Given the prominence of housing finance for the development of deep capital markets, we have also become increasingly aware of insolvency regimes as a possible market barrier. Concretely, debt instruments, and any derived financial products including mortgage-backed securities, do not achieve the same market valuation under different insolvency regimes because of differences in default probabilities and recovery values. It is an important question to be answered in the context of a Capital Markets Union if there is a need to harmonise

\textsuperscript{36} Decumulation is mentioned for the sake of completeness but is not further discussed.

\textsuperscript{37} See Groome et al (2006).

\textsuperscript{38} Article 26 of the EU Mortgage Credit Directive.
insolvency regimes, e.g. to allow an EU-wide, deep market in residential mortgage-backed securities. Incentivising the transfer of retirement savings through capital markets could benefit the producing economy by means of a virtuous cycle of higher savings, higher investments, higher output capacity, and creation of additional wealth.

Retail finance

With mortgages, cross-border mobility is hindered by differing fiscal treatments, but also by a change in recovery values depending on the personal insolvency regime. An avenue to address this could lie in taking a proposal put forward by Posner and Zingales \(^{39}\) for the case of the US and adapting it to the situation of intra-EU mobility. The insolvency regime is attached to the mortgage contract and can therefore ‘travel’ with the mortgage holder without creating legal uncertainty for the lender. Obviously, the problem of extra-territoriality would have to be addressed in an appropriate manner in this case.

Markets

New risk transfer markets for risks attached to housing equity were proposed more than two decades ago. \(^{40}\) These proposals have been refined over the years. As discussed in this section, government action is required to address measurement and standardisation issues that arise in this context. But it may even be necessary to require households to hedge at least part of their risk in such markets because there is clear evidence that households — otherwise left exposed to such risks — would not reach the optimal amount of risk sharing/transfer. \(^{41}\)

Insolvency schemes

Until now, the active use of their balance sheet for financial risk management purposes has remained, to a large extent, a privilege of high-income households. As shown in international empirical studies and in the analysis of data coming out of the first wave of the new Household Finance and Consumption Survey, \(^{42}\) financial flexibility strongly correlates with household income. The latter in turn correlates with employment status, which we have argued reflects differences in educational and health status. Will any possible improvements on the side of products and markets only accrue to the well-off in this case?

If insolvency schemes remain as they are, this outcome is indeed very likely to persist. The problem is that households face insolvency proceedings with an asset side that cannot be divided. Unlike firms, they cannot structure assets and match particular assets with particular liabilities. This does not provide a lot of flexibility when one of the assets suffers a (negative) shock. On the other side, outstanding liabilities will regularly be nominally fixed (full lack of downward flexibility — widely known from labour market economics where wage claims are liabilities of the firm — is not sufficiently critiqued when it comes to a household’s liability side where these liabilities are the assets of (financial) firms). After a shock to its asset side that is often multi-dimensional, e.g. a severe illness followed by a change in employment and the ensuing shock to educational status, the household becomes a bad risk and may lose its financial flexibility exactly when it is most needed (unless all these risks were successfully hedged). On its liability side, secured debt will be collected, including enforcement of the collateral. In addressing any unsecured debt, the household may become subject to insolvency proceedings. However, in insolvency, all remaining assets can be liquidated before any remaining debt is cancelled. At the end of the procedure, the household is still facing the full consequences of the (unhedged) shock to its asset side, but has lost all financial flexibility on its liability side.

There are a few exceptions to this rule. Under Chapter 13 of the US Federal Bankruptcy code, the household’s home equity benefits from at least partial protection as long as certain conditions are met. However, there are remaining weaknesses to which we can add specific concerns in the single market. As pointed out by Posner and

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41 The discussion of the exact mix of behavioural constraints is beyond the scope of this chapter; it is sufficient to note here that sub-optimality here applies in this case both at the level of the individual (homeowner) and the level of society as a whole.
Zingales (2009), Chapter 13 (and similar proceedings in EU Member States) make the degree of protection of home equity contingent on the structure of the household’s liability side.

It is not easy to devise a scheme for partial debt relief that can avoid moral hazard in the presence of valuation shocks (as after the burst of a housing bubble). In the example used by Posner and Zingales, a less leveraged family experiencing negative equity after the burst of a (local) housing bubble is worse off compared with a maximum leveraged family that had financed the house at the maximum possible loan-to-income or loan-to-value ratios.

From a macro-prudential point of view, one would not want to create such an incentive structure. In addition, this moral hazard could be exploited disproportionately by high-income households and such schemes would add to the already empirically observed bias of the financial system to favour high-income households at the expense of society as a whole.

Insolvency schemes could be designed more rigorously as a stop-loss option for each type of liability individually. A possible solution strategy would require going one step further than US Chapter 13. While unsecured debt could be written off relatively easily with positive impacts, for its correct pricing by financial intermediaries, any form of debt contract matching a tangible or intangible household asset should include sufficient information on loss and recovery value to enable the screening and pricing of its risk, its monitoring and the establishment of its recovery value. In the case of intangible assets such as educational status and health status, there are two possibilities. Either it is possible to create a financial market asset that at least partly represents the intangible asset and which can be liquidated, or there is an insurance policy providing at least partial insurance based on an index value of the intangible asset. However, the two options do not provide the same risk transfer possibilities in liquidation: the financial market instrument can be transferred and liquidated under various circumstances, whereas the insurance contract is written on the name of the person and only pays out if the insured risk materialises.

3.2. Longevity risk

How to increase the financial resilience of households confronted with longevity risk is a question with important macro-financial implications. Any unhedged, uninsured residual longevity risk will eventually materialise on the balance sheet of the government, the insurer of last resort. Longevity risk raises important challenges for the design of financial products, for the correct measurement of risk and the sharing of such information, and for the design of markets where such risk can be hedged.

Product design

There is a common understanding that there is no simple solution. Annuity products have become unattractive because of falling returns in the low-yield environment. Also, retail products have been criticised for being opaque, not consumer-friendly. It has also been observed that there is a communication gap with consumers who should be helped to better understand the difference between insurance and investment products.

An early wave of retail products using financial derivatives to hedge long-term financial risk at the level of the private household exposed major weaknesses where products did not sufficiently focus on consumer protection. Regaining the trust in financial risk management instruments will be delicate. It will require a carefully chosen mix of financial education on the side of consumers and advisers (e.g. along the lines of the Mortgage Credit Directive), and the highest standards in the area of financial benchmarks and official statistics,

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43 International Monetary Fund (2012).
44 Examples, including from UK (retail products using interest rate swaps, etc.), have been highlighted in the work of the Financial Services User Group.
45 Under the slogan ‘humanising finance’, Robert Shiller urged to fully embrace the findings of behavioural finance especially when designing financial retail products. The presence of ‘framing effects’ means that individuals cannot correctly appreciate the risk-payoff structure of a retail product. Unfortunately, some financial retailers have exploited these effects to rip off consumers. Today, regulatory authorities such as the Financial Conduct Authority in the UK build their consumer protection policy around concepts established and tested in behavioural finance. In addition to Shiller, researchers Reinhard Selten and Daniel Kahneman have delivered important insights based on laboratory experiments.
integrity of market infrastructure, and as much certainty as possible about financial accounting standards. Certainly, one should hope that politicians understand that changing tax rules every four or five years in an area where the planning horizon is 40, 50 or 60 years (OECD) will make it very difficult to arrive at viable market-based solutions.

**Measurement and sharing of data**

Measurement gaps play an important role when explaining the lack of risk-sharing technologies. If risk sharing is also to take place at a supranational or even global level, measurement gaps will have to be closed. Furthermore, the sharing of data needs to be ensured as a necessary condition for the existence of adequate financial instruments and markets where such instruments can be traded.

Measurement can require, at least in some instances, a role for the government where common standards cannot be established or enforced on a voluntary basis by market participants. Standards required for measurement often have a public good character, or they create a positive externality where costs accrue to some while benefits accrue to many. A failure to capture the benefits by those who bear the costs will then result in no standards emerging and a lack of markets.

**Market design**

Markets have remained highly incomplete. In addition to the uncertainties surrounding future mortality and life expectancy, markets are still not adequately equipped to handle inflation risk, macroeconomic risk (as reflected in national and regional GDP), or risk specific to local housing markets, the materialisation of which continues to produce large shifts in the value of local housing equity. Such incompleteness of markets has important financial stability implications. Until these are addressed and markets are made more complete, the markets will retain their dangerous potential to amplify and propagate rather than diversify and contain risks, especially those attached to housing finance.

Housing finance needs democratisation while avoiding new sub-prime crises. Given the particular role for housing equity to protect against poverty in later stages of life, there is an important policy challenge as to how the potential of housing finance can be democratised while avoiding the errors of the past, where housing finance was the main source of risk both for individuals and for society as a whole. Macro-prudential policies can, in the best case, limit the amplitude of swings in local housing markets. However, they are second-best policies. They are difficult to implement owing to the need to correctly identify the relevant market, both geographically and in terms of market segments. A first-best policy would consist in hedging risks continuously. Furthermore, some markets will not be liquid in all states of the world when left to private (market-making) initiative alone. The question arises if in some cases there is a need for a ‘market-maker of last resort’ to complement the lender of last resort and financier of last resort functions already carried out by monetary and fiscal authorities, respectively.

A decade ago, the Visco group contemplated new markets and instruments for longevity risk, including so-called longevity bonds. It is useful to recall the policy conclusions reached back then. The group found that:

i. given the increasing influence of capital flows related to retirement savings, governments could facilitate the development and expansion of capital markets for undersupplied financial instruments for retirement savings and the provision of pension benefits, including through non-discriminatory tax rules;

ii. regulatory and supervisory developments should aim to influence and support the trend towards more rigorous risk management, greater transparency, and better governance of private pension funds, including by ensuring consistency between funding and prudential requirements and accounting standards; and

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46 As stressed in the Visco group’s report, and as reiterated by Shiller in every book since Macro Markets, current financial markets for hedging longevity risk remain incomplete.

iii. as long-term risks were increasingly shifted to individual households, protection of pension beneficiaries, financial education and financial advice would all need to be strengthened.

Behind this proposal stood the observation that existing markets had time horizons that were too short, and that very long-term instruments for hedging longevity risk were lacking. Pension funds, asset managers and (re)insurers would be the natural users of such financial instruments.

Recent reports by the OECD and the Joint Forum provide insight into the management of longevity risk by financial institutions and discuss the role of markets in hedging this risk. In December 2014, the OECD completed a study on mortality assumptions and longevity risk and the implications for pension funds and annuity providers. The results show that a failure to account for future improvements in mortality can expose pension funds and annuity providers to an expected shortfall in provisions of well over 10% of their liabilities.

Based on its findings, the OECD report recommends that the regulatory framework must ensure that pension funds and annuity providers have the right information and incentives to manage longevity risk. Thus, regulation should require that the mortality tables they use are up-to-date, include the expected future improvements in mortality, and are based on the mortality experience of the relevant population. Currently, the requirements regarding mortality tables vary in different countries. Some countries impose minimum requirements on the assumptions and data used in measuring mortality through regulation. In other countries, industry bodies play a role in setting standards, to which institutions adhere in practice. The OECD recommends that clear guidelines be put in place everywhere. It also sees a role for governments in improving the public availability of mortality data through its statistical institutes. Finally, accounting standards should ensure appropriate valuation of longevity instruments.

In addition, in order to ensure that pension funds and annuity providers can continue to provide longevity protection to individuals, there could be a case for active government intervention to help the development of the market for longevity risk transfers. A well-functioning longevity risk transfer market would allow the transfer of risk from those who hold it to those that are better able to handle its financial consequences. This could be (re)insurers, capital market participants and even private companies that might benefit from unexpected increases in longevity (such as providers of long-term care and health care). As such, a well-developed market could promote financial stability.

To kick-start the market, governments could develop reliable longevity indices to provide a price reference, bring over-the-counter standardised transactions to exchanges or electronic trading platforms where they are cleared centrally, and issue longevity-indexed bonds. Additional standardisation and transparency in the market can help capital market investors in supplying longevity protection, but the measurement of residual risk when using index-based longevity hedges will remain a problem for pension funds and annuity providers. This is where better data availability comes in. Previous attempts at issuing such longevity bonds by the European Investment Bank and the World Bank have been unsuccessful. Unless tied to rising retirement ages, the issuance of longevity bonds would expose governments to additional longevity risk. There are reasons why the growth and deepening of the longevity risk transfer market may be desirable, such as unburdening the balance sheets of pension funds and increasing the industry’s ability to take on longevity risk from individuals. Nevertheless, a shift from the corporate sector to a limited number of (re)insurers, with global interconnections, may also increase systemic risk, as the Joint Forum report rightly points out. Considering the pros and cons of jump-starting the market through government-issued longevity bonds, the Joint Forum and the IMF conclude that it is not clear that the advantages outweigh the costs, noting that estimates of net gains are difficult to provide. Longevity risk is a residual risk that can be mitigated by better protecting the asset side of individuals. It helps to distinguish how the household’s risk management relates to longevity risk:

48 See Swiss Re Europe (2012) for a recent overview.
49 International Monetary Fund (2012).
50 OECD (2014).
(i) The government will prefer households to hedge the educational risk. This should improve the household’s likelihood to remain productive, perhaps beyond statutory retirement age, and — if there is a link with life satisfaction — the household could also make lesser use of health care entitlements.

(ii) The government will prefer households to hedge home equity risk. This will reduce the need for income support in whatever form, including at old age.

Hence, on the management of both educational risk and housing equity risk, incentives appear well aligned. The difficult part is health risk: the government will prefer, under present circumstances, that households hedge their health risk, but only up to a point.

Governments therefore have an interest to lay off this risk to a third party, say an insurance company, which in turn transfers some of the risk to a reinsurance company. The reinsurance company in turn would be interested in a market where such risks can be hedged. There seems to be an understanding among experts that, beyond a certain point of life expectancy, no financial intermediary and no market can manage the longevity tail-risk at reasonable costs. Currently, this cut-off point seems to lie around the 90-year mark. Beyond this point, the government has to assume its function as insurer of last resort.

However, this may not be the end of risk-sharing opportunities. In the US — where at least high-income households use their balance sheet more actively, but a similar case can also be made for some Member States, such as Denmark, the Netherlands and the UK — better insurance of housing equity could help to address longevity risk as well, since households seem to be quite aware of the longevity problem. In one scenario, the housing equity is liquidated and transformed into lifelong membership in a managed long-term care community. How this will work out in the longer term remains to be seen. However, it is obvious that there must be important returns to scale to be realised in a large long-term care community where infrastructure can be optimised around the needs of (very old) seniors. Intermediate solution strategies that emphasise short distances and use of information technologies will allow some economies as well.

4. CONCLUSIONS

In this special focus chapter, we have screened large individual risks, analysing two of them in more detail from a financial services and markets perspective:

(i) the risk of not being able to realise the (expected) internal rate of return of higher education, or any specialised form of education more generally;

(ii) the risk of suffering important shocks to one’s health status;

(iii) the risk to lose equity in one’s home; and finally

(iv) longevity risk, i.e. the risk of living much longer than initially expected without having the necessary financial means to organise the longer lifetime successfully.

Providing households with better access to global risk-sharing technologies could substantially reduce the implicit liabilities of governments acting as a financier of last resort. In this sense, financial integration would have direct (beneficial) consequences for financial stability. Indeed, instead of assuming the risk of financial intermediaries in the form of both explicit government guarantees and implicit subsidies, much of the risk sharing of individuals could take place through the asset side of private balance sheets (similar to equity-based risk sharing, this would be largely anti-cyclical and beneficial for macro-financial stability).

The chapter notes different approaches among Member States, also reflecting different levels of development in local financial markets. However, all four large-risk categories would benefit from an increased divisibility of the household’s asset side, such that assets and liabilities can be better matched, and the overall size of the balance sheet becomes more flexible, including in bankruptcy. Ideally, the latter should help to contain tail-risks

53 This category includes single proprietor businesses, i.e. over 70% of EU SMEs.
that cannot be shared or hedged; this role of bankruptcy is not ensured in all Member States where private insolvency regimes exist.

Longevity risk was already very high on the policy agenda before the financial crisis. However, the increase in debt levels and the pressure on public finances has made it even more urgent to address the issues identified by the Visco group in 2005. Households faced with increased longevity risk will have to increase their supplementary pension provisioning. In such a scenario, personal pension products (individually saved, excluding statutory or occupational pensions) are becoming more important. The European Insurance and Occupational Pensions Authority is now analysing why pan-European personal pension products are not taking off and will deliver an advice to the Commission in June 2015 on the possible introduction of a pan-European pension product or ‘29th’ regime.

Overall, this special focus recalls that many of the largest individual risks remain uninsured, or the available level of insurance is inadequate, or available forms of insurance coverage are too costly. More than 20 years ago, Shiller made the observation in Macro Markets that many large individual risks should be insurable at very little cost if only risk-sharing opportunities (at the global level) were fully exploited. For this process, he coined the expression ‘democratising finance’. As of today, many risk-sharing and transferring technologies have not yet found their way from their uses within the financial sector to a more democratic use where they could help manage some of the largest individual risks. Nevertheless, in part in response to the crisis, regulators and legislators, and supervisors and consumer representatives now have a much better understanding of the potential and risks of financial technology compared with a decade ago.

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Chapter 5: Special focus on competition and regulation in the financial system

1. INTRODUCTION

Conventional wisdom sees both competition and regulation as having a beneficial effect on the overall functioning of the financial system and for the end-users of financial services and society at large. Effective competition should give rise to lower financial intermediation costs, the exit of inefficient players, optimal asset allocation, better and more varied financial services, and greater incentives for financial institutions and markets to innovate. Financial regulation should ensure a well-functioning, stable, safe and trustworthy Europe-wide financial system.

Seven or eight years since the onset of the financial crisis, the size, complexity, leverage, interconnectedness and concentration of the European banking sector is improving gradually, but the crisis has dampened competitive forces. Banks under stress have received unprecedented amounts of State aid preventing exit in several cases, entry of new banks and business models has been limited to date, and the largest banks have benefited from significant implicit and distortive ‘too-big-to-fail’ (TBTF) subsidies (IMF (2014)). In addition, EU banks have tended to retrench and focus their activities on national markets rather than offering services at pan-European level. Finally, according to some scholars, competition and regulation do not seem to have unlocked important efficiency gains in the finance industry.  

On the upside, the authorities’ extraordinary crisis management interventions have been successful in avoiding another Great Depression and restoring confidence in and stability of the financial system as a whole. Moreover, EU State-aid control has played an important role in ensuring that explicit bail-outs of financial institutions respect common rules across EU Member States (see also Box A). And an ambitious, comprehensive and internationally coordinated reform agenda for the banking sector has been pursued and largely completed in record time (European Commission (2014a)). Such major overhaul of financial regulation was needed to address the root problems underlying the crisis and deal with the unintended consequences of ad hoc crisis management.

At EU level alone, more than 40 acts, running to several hundreds of pages of primary (‘level 1’) legislation, have been introduced over the past five years in an effort to address shortcomings in the regulation of financial markets.  

Given its level and scope, however, the impact of this public intervention on the competitive landscape should not be underestimated. Moreover, a stream of post-crisis misconduct cases is revealing oligopolistic market structures in some of the most important financial markets. The banking sector has evolved, according to 2006-14 Edelman Trust Barometers, from being one of the most, to one of the least, trustworthy and respected sectors. The number of complaints filed against bank behaviour has risen sharply in the last couple of years. Scandals such as the manipulation of the London InterBank Offer Rate (Libor), foreign exchange (FX) markets, credit default swap (CDS) markets, (the aiding and abetting of) tax evasion and money laundering, front-running, the mis-selling of mortgages, etc., and the failure to dismiss or penalise the managers responsible, suggest that the culture, ethics and integrity of large financial institutions still needs to be improved, despite the

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1 Authors: Miguel de la Mano, Stan Maes and Dimitrios Magos. We are grateful to our DG Competition colleagues Guillaume Adamczyk and Bernhard Windisch and to our ECB colleague Hannah Hempell for providing Box contributions (Boxes A and B on EU State-aid control and recent Bank Lending Survey evidence, respectively).

2 Despite computerisation, specialisation, sophisticated risk management and mega banking mergers leading to claimed economies of scale, the finance industry is reported to be no more productive than it was in the early 20th century. Philippon (2014) reports that the unit cost of intermediation, i.e. the sum total of wages and profits taken by the US financial services industry, remains close to 2% over time. He claims that there have been no productivity gains in finance in the past 130 years and that this finding contrasts with the vast productivity gains in many retail consumer industries.

3 In the years ahead, hundreds of legislative acts (‘level 2’ legislation) will need to be adopted to operationalise and ensure the effectiveness of the ‘level 1’ legislation.

4 Similarly, Special Eurobarometer 398 reports that almost two thirds of EU citizens have lower confidence in the financial industry and in their own national authorities (including regulatory bodies) following the financial and economic crisis. Three quarters consider that banks should be restricted in terms of how they invest the deposits they receive and they would welcome tougher supervision and making the banks and their management directly responsible for all losses (including unlimited liability).
considerable public-sector intervention to stabilise the financial system. Competition and self-regulation do not seem to be delivering a radically different business model in which banks always serve their customers at minimum social cost.

This chapter discusses the interaction between competition and regulation in the financial system, with an emphasis on the banking sector. It argues that financial regulation and competition policy are certainly necessary if the financial system is to function properly, but that competitive pressure can deliver real benefits only in the context of well-established and appropriate regulation. Risks and dangers in banking arise primarily from a regulatory framework that is not adapted to the market structure. Prior to the crisis, large financial institutions became ‘TBTF’ because the authorities did not have suitable means to resolve them. Similarly, competition may result in herding and increased leverage and fragility in the absence of macro-prudential tools to counter asset price and credit booms. Experience from the crisis has led to reform attempts in the areas of resolution, especially of systemically important financial institutions, and macro-prudential regulation. This chapter argues that a regulatory framework that sets the wrong incentives, rather than market structure or competition, can actually drive systemic fragility. One lesson from the crisis is that competition enforcers and financial regulators may need to take concerted action to be jointly as effective as they could be.

Section 2 starts by describing the historical pendulum swings in financial sector competition policy and regulation and by recalling the basic justifications for government intervention in the financial system, through financial regulation, competition enforcement or in other forms. Special attention is devoted to the systemic importance of the banking sector and the perceived trade-off between competition and stability. Section 3 reviews the literature on gauging how well financial markets are functioning and how policy makers try to measure competition and systemic risk. Section 4 reviews several recent cases of TBTF misconduct behaviour and draws attention to the root causes of competition and regulatory concerns in the financial sector. Section 5 draws conclusions and recommends closer cooperation and concerted action between financial regulators and competition enforcers to make financial markets work better.

2. FINANCIAL MARKET REGULATION AND COMPETITION ENFORCEMENT

2.1. Historical pendulum swings

Over history, we can discern large pendulum swings in the official approach to regulation and competition in the financial system (particularly banking), rooted in perceived trade-offs between competition, stability and integrity.

In the decades following the Great Depression, i.e. between the 1930s and the 1970s, banking benefited from public safety-nets such as deposit insurance and ‘lender of last resort’ facilities. Efforts to curtail the resultant moral hazard and excessive risk-taking incentives made it one of the most regulated sectors in the economy. Competition was thought to be detrimental to stability, as it led banks to take more risks and could exacerbate the depositors’ coordination problem, making them more susceptible to bank runs. The watchwords were regulation, stability, intervention and weak enforcement of competition rules.

From the 1980s, there was a shift from tight regulation to liberalisation, based on the belief that competition enhances productive and allocative efficiency and introduces superior dynamic incentives. The buzzwords were deregulation, liberalisation, less intervention and less stability. A commonly held view of the second period is that banks have faced increased competition on both sides of their balance sheets, from financial markets and the...
development of disintermediation and financial innovation (e.g. shadow banking). However, returns on equity have been relatively high by historical standards and entry and exit have been at best modest, suggesting that competition may not be working as well as it could.

Reinhart and Rogoff (2008) illustrate that the first period was indeed characterised by relative financial stability and that there have been significantly more bank failures and crises in the second. In hindsight, a vicious circle, or ‘doom loop’, emerged in the decades before the financial crisis: TBTF gave rise to an unstable financial system, excessive risk-taking and distortions of competition. This period was characterised by aggressive balance-sheet expansion by TBTF banks – EU banks’ balance sheets in 2014 exceeded 300% of EU GDP (a sharp increase on the level in previous decades). Furthermore, the shift from relationship-oriented to more transaction-oriented banking nurtured a culture that exacerbated conflicts of interests and allowed large financial institutions to collude and manipulate oligopolistic financial markets, in turn giving rise to a sapping of confidence and financial stability (see section 4). In hindsight, there was no coherent approach to competition and regulation, nor a strategy to tackle problems or concerns.

Chart 1: Interplay between regulation and competition in the financial sector

A vicious circle emerged in the decades preceding the financial crisis, whereby financial stability, competition and market integrity came to have a mutually destructive effect on each other (see Chart 1). Competition among TBTF banks amplified a ‘doom loop’ whereby they expanded their balance sheets and took excessive risks, thus in turn attracting greater implicit subsidies that artificially promoted even more balance-sheet expansion and excessive risk-taking. In a way, the State unintentionally and implicitly subsidised TBTF banks. Competition is distorted not only across sectors, but also within the banking sector, between large and small banks and across banks of the same size across different Member States (see European Commission (2014b)).

2.2. Financial regulation should correct market and government failures

Market failures

If and when markets work properly, they are the best source of dynamism, prosperity and progress. Under certain circumstances, however, markets fail or become dysfunctional.

‘Market failure’ describes a situation where the market, based on private actors and left to its own devices, does not provide a good or service efficiently. It could, for example, provide too much or too little of a product or
service at a price that is too low or too high, from the point of view of society at large. This happens when the private benefits (or costs) of market transactions are not equal to the benefits (or costs) to the public or society, e.g. when private transactions produce pollution, systemic risk or innovation (known as ‘externalities’).

The financial system is particularly susceptible to market failures. They arise from (negative) externalities, informational asymmetries, coordination failures, the (partial) absence of market forces, or market power. Without government intervention to correct for market failures, the financial system would produce inefficient outcomes and become dysfunctional.6

Certain financial markets are prone to coordination failures and require regulatory intervention in the form of public benchmarks (as a coordination device) in order to function normally. If left to the market, benchmark setting may lead to suboptimal outcomes for society at large and may allow market participants to extract rents from consumers.

Liquidity or information about creditworthiness represent ‘public’ or ‘credence’ goods, whose production, when left to private players, may result in an underproduction of information or market abuses to the detriment of customers.

Market failures are particularly pervasive in the banking sector. Healthy banks can fail due to depositor runs, causing severe economic pain (hasty termination of productive investments and recall of loans at a loss). In addition, bank runs or confidence crises may give rise to negative externalities for the bank’s competitors and the overall economy. Importantly, while in non-financial markets the exit of a firm typically benefits its competitors (as surviving firms may increase their revenues and profits), negative externalities and contagion effects mean that the failure of a bank is likely to weaken its competitors. Contagion involves an initial shock becoming a systemic event and is therefore at the heart of a systemic crisis.7

In general, the root justifications for government intervention in the financial system are:

(i) to correct for market failures, thus keeping markets efficient and stable (e.g. by introducing deposit guarantee schemes to avoid coordination failures and confidence crises or guarding against abuse of market power through competition policy enforcement);

(ii) to create and enforce ‘rules of the game’, thus ensuring the integrity of the system (e.g. by introducing market abuse legislation);

(iii) to protect taxpayers’ interests when public money is spent or put at risk (e.g. by enforcing State-aid controls); and

(iv) to redistribute income and achieve other political objectives through taxes and subsidies (e.g. on the basis of industrial or social policy).

Government intervention can take different forms, therefore, including taxation, subsidies, regulation, competition enforcement or the setting-up of public institutions (e.g. central banks or deposit insurance).

**Government failures and their unintended side-effects**

Even if the underlying justification is sound, government intervention may give rise to unintended consequences. Regulatory failures may distort the competitive process and generate systemic risk, to give two important examples, and should be avoided or rectified. Deposit insurance and ‘lender of last resort’ facilities

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6 Improving risk-management systems internally is very important, but even with state-of-the-art systems some risks cannot be measured and internalised. Relying on banks’ own risk-management systems is not enough: they will never fully manage individual banks’ large but rare risks or ‘tail’ risks (because of TBTF and limited liability) nor incorporate the impact of banks’ actions on the stability of the system.

7 Contagion can be direct or indirect. Direct contagion arises because financial institutions are financially exposed to each other, through the payment system and/or other types of position, such as interbank loans, derivatives, repurchase agreements, etc. Indirect contagion can arise through two main channels. First, markets may assume that direct contagion effects exist, even when this is not the case (information channel). Second, if one institution is affected by financial problems, markets may expect other institutions in the same business to be hit by the same problems, which in turn can lead to them suffering shocks (common risk channel). Also, government support that prevents the costly exit of a failed bank may benefit the bank’s competitors. This is just one illustration of the special nature of competition in the banking sector, especially in times of crisis.
may help to avoid costly bank runs, but also incentivise excessive risk-taking or moral hazard and may even create systemic risk. Banks will be incentivised to artificially expand on the back of the public safety nets and thereby exploit the public safety nets so as to become too big to fail. The incentives from the public safety net coverage justify prudential financial regulation and supervision, and a need to curtail the banks’ incentives of becoming ever more systemically important. In sum, the unintended consequences of government intervention may require a new round of government intervention in the form of financial regulation and supervision (e.g. ‘taxing’ systemic risk through higher capital requirements).

Regulatory intervention may also be inadequate. For example, the (Pillar I) Basel II minimum capital requirements took no account of liquidity risk and systemic risk considerations. Arrangements that are initially targeted and effective may be circumvented and hence become ineffective over time or even unintentionally become a barrier to entry. Following the crisis, renewed attention has been paid to assessing this latter effect. The Dutch Authority for Consumers and Markets (2014) analyses barriers to entry to the Dutch retail banking sector and makes a number of recommendations relating to the financial regulation of banks, e.g. that laws and regulations be made simpler and more predictable, in particular for smaller banks. It argues that prudential laws and regulations should be geared more to the risk a bank poses for financial stability and the economy as a whole, and calls for an evaluation of the bank licensing system.

Avoiding the above government failures and unintended consequences is challenging for a number of reasons:

- key goals of regulation, such as financial stability, market integrity, effective competition and efficiency, are not directly observable, let alone quantifiable (see also section 3 below). They can often be assessed only indirectly and through relative and rough orders of magnitude as regards negative or positive effects;
- good regulation is not just about laying down the right rules, but also creating the right risk culture and incentives, appropriate governance and oversight, and understanding the limitations of analytical models and the (un)certainty of estimates; and
- financial markets are constantly innovating and institutions are constantly adapting to new rules. Much of the complexity of regulation stems from this ongoing adaptation once rules are implemented. Rules or procedures that look appealing on paper often turn out to be less effective once in place. As soon as a rule, be it simple or complex, becomes binding, it will cause changes in financial institutions’ risk management that will make it less binding and less effective in practice.

Any regulation will have repercussions for the allocation of market power in the financial sector, so can itself result in competition distortions that in turn threaten market stability and impact the economy. Regulatory intervention needs to be evaluated on an ongoing basis through ex post reviews and enforcement must be monitored closely. In the absence of a clear mandate to review and adapt legislation (such as that given to central banks), the regulatory framework may become increasingly complex, ineffective and in the worst instances interfere with the functioning of the market and act as an entry barrier.

2.3. The perceived trade-off between competition and stability

The literature on the impact of competition on financial stability is ambiguous. On the one hand, there are theories suggesting that greater competition can breed financial instability. This traditional view is referred to as the ‘charter’ or ‘franchise’ view. According to this school of thought, a more competitive banking sector results in a less stable financial system, because lower profits mean that banks have less of a buffer against unexpected

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8 Moral hazard refers to the problem of government guarantees and deposit insurance schemes inducing beneficiaries (bank shareholders, bank managers) to take excessive risks, because they reap the full benefits if the risks pay off, but the guarantor foots the bill if they do not.

9 The Dutch Authority for Consumers and Markets concludes that, due to its scope, complexity and frequent changes, the overall package of laws and regulations constitutes a barrier to entry into the banking sector. It also deems that prudential laws and regulations (including the supervision thereof) are disproportionately burdensome for smaller institutions, resulting in a cost disadvantage for entrants that are of no systemic importance.

10 This effect is sometimes referred to as Goodhart’s Law.
losses and hence greater incentives for excessive risk-taking (in a context of limited liability). Competition erodes bank franchise values and encourages banks to make big bets and search for profit by taking risks, as they have little to lose if their bets turn sour. Alternatively, a bank that enjoys significant market power has more to lose by engaging in more risky activities, as it has an incentive to safeguard the discounted value of its profits (Marcus (1984), Keeley (1990)).

More competition also reduces the informational rents that banks can extract from borrower relationships (as customers will switch more easily) and dampen banks’ incentives to screen borrowers properly, leading to riskier borrower portfolios and greater fragility (Allen and Gale (2000, 2004)).

In addition, competition results in smaller and less diversified banks, thus reducing economies of scope and scale, while large banks in concentrated banking systems can have more diversified portfolios (Diamond (1984), Allen (1990)).

Finally, the large number of banks to be supervised increases the supervisory burden, endangering their effectiveness.

An alternative, diametrically opposed view is that competition can be a source of greater market stability. Boyd and De Nicolo (2005) build on and refine the franchise view by contending that competition lowers interest rates, the borrower’s associated moral hazard and hence overall risk. Concentrated banking systems imply market power. Banks with greater market power are able to charge margins and therefore higher interest rates. The higher interest rates result in greater risk-taking by borrowers or attract riskier borrowers (adverse selection) and hence lead to greater fragility.

This school of thought would also argue that any negative effect of competition on stability can be counteracted. Even if competition leads to higher risk-taking, banks can and should increase their equity capital to compensate (Berger et al. (2009)).

Others argue that the moral hazard question is more pertinent in the context of low levels of competition and public safety-nets. Large banks in concentrated banking systems will tend to receive bigger subsidies through implicit TBTF policies that intensify risk-taking incentives and hence increase banking system fragility. The failure of a large bank could have a major impact on the continuity of the financial system and involve a high risk of contagion. Therefore concentrated banks are likely to be associated with greater implicit subsidies, which could in turn lead them to engage in ever-increasing levels of risk-taking. This mechanism results in a positive link between concentration and systemic fragility.

Also, large banks are more difficult to supervise and regulate, and subject to a greater risk of regulatory and supervisory ‘capture’. Size is positively correlated with complexity, interdependency and (possibly) supervisory capture. In addition, diversification can have negative implications for systemic stability if banks become too interconnected and start looking too much alike (Wagner (2008)).

In addition to any direct impact that it may have on risk-taking, competition can bring other key benefits in the form of gains in productive and dynamic efficiency, which can form the link between competition and bank stability. More efficient banks are more stable (Berger and DeYoung (1997)) and competition tends to trigger a reallocation of profits to more efficient firms (Olley and Pakes (1996)), ensuring ‘Darwinian selection’.

In sum, the theoretical literature produces ambiguous and inconclusive predictions. Some argue that intermediate levels of competition are optimal for financial stability. Introducing competition in monopolistic systems initially increases stability as borrowers become safer, but high competition becomes destabilising due to the charter value effect (Matutes and Vives (2000), Martinez-Mier and Repullo (2010) and Ratnovski (2013)).

The empirical literature is also rather ambiguous on the relationship between bank risk-taking, stability and competition. Inferences may vary depending on whether the financial crisis is part of the data sample. Jimenez et al. (2013) find that greater market power decreases bank risk-taking and Beck et al. (2007) find that concentrated banking systems are more stable. In contrast, De Nicolo et al. (2004) find that more concentrated banking

More generally, there is an inverse U relationship between competition and dynamic and productive efficiency, whereby extreme levels of competition or monopoly power are associated with low efficiency (see Motta (2004)).
systems are more likely to experience crises. Schaeck et al. (2009) find that competition, measured by Panzar and Rosse H-statistics (see section 3.1), reduces the likelihood of a crisis and Schaeck and Čihák (2013) show that limiting banking competition hampers banks’ financial stability. Zigraiova and Havranek (2015) survey 31 empirical studies published between 2003 and 2014 and find that the choice of data, regional coverage, estimation methodology, definition of variables, and control variables all influence reported coefficients and that overall there is no evidence of a robust relationship between competition and stability.

Despite the ambiguous relation between stability and competition, it seems there is overwhelming empirical evidence that competition enhances efficiency in banking.12 Stiroh and Strahan (2003) find that deregulation in the United States in the 1980s spurred a shift in market share from less efficient to more efficient banks. Carlson and Mitchener (2006) find that the expansion of bank branching in the USA increased competition in the 1920s by weeding out inefficient banks, which made the banking system more stable. Evanoff and Ors (2008) consider that the greatest benefit from increased competition following new entry relates to the cost efficiency of incumbent banks. Dell’Ariccia and Marquez (2004) and Degryse and Ongena (2007) suggest that banks’ response to more competition is to invest in activities that allow them to get to know their borrowers better, as this information makes them less prone to price competition (relationship-oriented as opposed to transaction-oriented banking). Competition is hence of crucial importance for greater allocative and productive efficiency and thus has clear benefits for the economy. Empirical evidence suggests that it can promote efficiency without necessarily undermining financial stability.

According to this literature, competition can bring important benefits to the financial sector and should not be sacrificed for fear of financial instability. What is needed is a regulatory framework that ensures that private incentives are aligned with the public interest and curtails the build-up of systemic risk. There is evidence suggesting that a poor institutional environment and inappropriate regulation in the liberalisation process exacerbate financial fragility (Demirgüç-Kunt and Detragiache (1998)). According to this view, the State should design policies that guarantee market contestability and create a market-friendly informational and institutional framework.

The German Monopolkommission (2014) advocates the primacy of competition, since it disperses market power and thus inherently tends to stabilise the system, ‘as long as deficient regulation does not channel competition in a way that leads to risk accumulations that put the financial system at risk’. It is concerned that there is too little (or, as it sees it, no) debate as to the suitable harmonisation of stability and competition aspects of financial market regulation, even though measures are adopted that will have a deep impact on the financial sector.

The interplay between financial stability and competition policy becomes even more important in times of crisis. In bad times, stability in banking is of paramount concern and government intervention becomes a necessity. If systemic risk materialises and markets are on the brink of collapse, the market power of individual market participants no longer plays a role – the clear short-term priority is to stabilise the system. The primary objective of policy makers in such times is arguably to ensure financial stability, which may mean that competition is considered to be of secondary importance. In crises, competition authorities may get surprisingly close to taking on the role of prudential authorities, because concerns about systemic stability may outweigh concerns about competition. In times of crisis, the task of the authorities is to devise intervention that minimises long-term distortions of competition. Bank supervisors’ and regulators’ superior knowledge of the state of the financial system calls for more cooperation between them and competition enforcement authorities. Governments have to strike a balance between appropriate regulatory oversight and continued reliance on competition principles. The OECD (2009) considers that ‘competition policy considerations should play an important role not only in financial sector bailouts but also in its subsequent recovery’.

In the recent crisis, governments ran to the banks’ rescue and were constrained only by EU State-aid rules. EU State-aid rules have been an important coordination and disciplinary device (see Box A). State intervention can have an impact on banking competition and potentially on future banking stability. Adequate crisis management

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12 Across industries, the major benefit of competition is greater efficiency. There is consensus that competition increases industry productivity through a process of entry and exit (Motta (2004)).
and resolution frameworks are critical to avoid distorting risk-taking incentives and jeopardising long-term financial stability and the competitive level playing-field.

This interplay is also important in the area of merger control. Indeed, in the course of the crisis, national merger control was temporarily set aside in certain instances by some Member States for financial stability reasons and mergers went ahead against the explicit advice of the relevant competition authorities (e.g. Lloyds and HBOS). In these cases, national authorities considered that these mergers would create more stability by enhancing bank profitability, although there is an on-going debate among policy makers. However, a number of objections can be raised to these mergers:

- banks’ and the banking sector’s concentration ratios and returns on equity were high and rising pre-crisis, so the problem does not seem to be that ‘excessive’ competition in the run-up to the crisis eroded bank franchise values and encouraged excessive risk-taking;
- the largest banking groups had already been growing fastest in the run-up to the crisis. It is true that medium-sized banks such as Northern Rock, the Spanish cajas and the Landesbanken had expanded aggressively and in unsustainable ways, but their spectacular failure conceals the fact that the biggest banks had expanded the most. Overall, the aggressive aggregate balance-sheet growth in the EU financial sector, from 175% of EU GDP to 350% in 2012, was entirely thanks to the 20 or so largest banks;
- in crisis time, State aid to TBTF banks may be less distortive than allowing mergers on financial stability grounds, as it is not easy to curtail the duration and extent of monopoly rents from such mergers; and
- Davies and Tracey (2014) find that economies of scale and scope are likely to be exhausted at levels below those of the merging banks, once TBTF-funding cost advantages are taken into account.

The genuine net benefits of mergers to the merged entities are unclear and in any case not immediate; what we can be sure of is that creating even bigger, interconnected and complex banks is tantamount to sowing the seeds of the next crisis. Market failures and excessive risk-taking are best addressed through regulation, rather than monopoly rents and anti-competitive mergers.

**Box A. EU State-aid control by the Commission: assessing viability and financial stability**

Around 30% of the entire European banking sector has been restructured under EU State aid rules. Between 2007 and 2014, the Commission took more than 450 State aid decisions, determining the restructuring or orderly resolution of 112 European banking institutions. The Commission reviewed State aid granted to some of Europe’s biggest financial institutions. Out of the top 20 European banks, the Commission approved aid to 12 banks, of which six were subsequently restructured, five received aid through approved aid schemes, and one was orderly liquidated.

**Table A1: State aid to the EU financial sector**

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>Total %EU28 2013 GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Recapitalisations</td>
<td>118 834</td>
<td>90 691</td>
<td>93 451</td>
<td>34 990</td>
<td>90 826</td>
<td>20 469</td>
<td>448 161</td>
</tr>
<tr>
<td>2. Asset relief interventions</td>
<td>9 800</td>
<td>79 516</td>
<td>53 967</td>
<td>-</td>
<td>35 425</td>
<td>9 530</td>
<td>188 238</td>
</tr>
<tr>
<td>sub-total (1 + 2)</td>
<td>128 634</td>
<td>170 208</td>
<td>147 418</td>
<td>-</td>
<td>126 251</td>
<td>29 999</td>
<td>636 399</td>
</tr>
<tr>
<td>3. Outstanding Guarantees</td>
<td>400 392</td>
<td>835 838</td>
<td>799 825</td>
<td>588 953</td>
<td>492 124</td>
<td>352 302</td>
<td>ns</td>
</tr>
<tr>
<td>3.a) Guarantees triggered</td>
<td>-</td>
<td>-</td>
<td>450</td>
<td>1 581</td>
<td>15</td>
<td>1 086</td>
<td>3 131</td>
</tr>
<tr>
<td>3.b) guarantees fees paid</td>
<td>714</td>
<td>6 710</td>
<td>9 240</td>
<td>9 088</td>
<td>7 192</td>
<td>5 218</td>
<td>38 163</td>
</tr>
<tr>
<td>4. Liquidity measures other than guarantees</td>
<td>22 193</td>
<td>70 146</td>
<td>62 628</td>
<td>60 581</td>
<td>44 283</td>
<td>34 551</td>
<td>ns</td>
</tr>
<tr>
<td>sub-total (3 + 4)</td>
<td>422 585</td>
<td>905 984</td>
<td>862 453</td>
<td>649 534</td>
<td>536 407</td>
<td>386 852</td>
<td>ns</td>
</tr>
</tbody>
</table>

Source: European Commission, Eurostat

13 Article 20.4 of the EU Merger regulation provides the possibility for Member States to invoke prudential rules to protect legitimate interests in merger controls of banks, whereby stability concerns would take primacy over competition concerns. Note that, recently, the Dutch central bank (DNB) recently stated by means of one of its directors that it will plead at the Single Resolution Board (SRB) for a “resolution test” for bank merger clearances, i.e. banks will need to prove that they can be resolved at least as swiftly after the merger than before the merger.

14 A simple counterfactual analysis reveals that the aggregate size of the EU banking sector would not have grown as a percentage of GDP if the top 20 banks’ balance sheets had grown in line with GDP growth in previous decades (ESRB (2014)).

15 Figures date from December 2014.
1. Big numbers at stake
Since the beginning of the European financial crisis, EU countries have provided EUR 671 billion in capital and repayable loans and EUR 1288 billion in guarantees\textsuperscript{16} to financial institutions in distress, subject to EU State aid rules.

2. Viability requirements under State aid rules
2.1. Three main pillars
The Commission’s assessment of bank restructuring plans under the State aid crisis rules is built on three pillars\textsuperscript{17}:

i - Restore long-term viability without further need for State support in the future, by restoring sustainable profitability and reducing risk; if this proves not possible, consider an orderly winding-down;

ii - Minimise the use of taxpayers’ money, through appropriate burden-sharing measures, including aid remuneration and contributions by the bank, shareholders and junior creditors;

iii - Limit distortions of competition through proportionate remedies. Giving State aid to a particular bank can distort competition, as it gives the bank an advantage over its competitors.

2.2. Restoring long-term viability is key
Throughout the crisis, the Commission has stressed the importance of financial stability when implementing State aid rules. Especially at the beginning of the crisis, exceptional market conditions made it necessary to ensure that conditions attached to State aid to systemic banks would not create disturbances in the financial markets. These conditions have been progressively adapted and tightened in order to reflect changing market conditions and the evolving nature of the crisis.

Restoring viability is a fundamental element of assessing banks in need of State support. Maintaining unviable banks on the market would further impair the financial system and monetary transmission mechanisms, and create a medium- to long-term risk to financial stability. It would also distort competition by crowding out viable banks capable of lending capital to the real economy. When a bank is assessed as unviable and unable to be turned around on the basis of a credible restructuring plan, it can receive liquidation aid in order wind down in an orderly fashion.

2.3. What does long-term viability mean?
According to the Restructuring Communication, ‘long-term viability is achieved when a bank is able to cover all its costs including depreciation and financial charges and provide an appropriate return on equity, taking into account the risk profile of the bank.’\textsuperscript{18} In order to minimise costs to the taxpayer, it is essential to ensure that State aid is appropriately remunerated and eventually recovered by the State. To achieve this, banks must have the ability to generate a sustainable income and an appropriate return on equity.

The Commission examines a large number of elements in order to assess whether the bank will be able to generate sustainable income and manage costs and risks. The Commission conducts a fundamental review of the bank’s business model and identifies the root causes of the bank’s problems, finds the best path to an improved or new business model, and produces a technical feasibility assessment and a stress scenario to ensure that the bank can withstand shocks. The Commission also examines the quality of the bank’s risk and credit management, and looks at the bank’s funding strategy and the development of its solvency position. Last but not least, the Commission reviews the overall governance structure as well as the appropriateness of remuneration and incentive structures.

The restructuring plan needs to demonstrate on the basis of all these elements that the bank can return to sustainable profitability within five years. The key elements of the new business model are laid down in legally binding commitments in a Commission decision approving State aid endorsing the restructuring plan. The proper implementation of the restructuring plan and commitments contained in it is subsequently monitored by trustees, acting as the Commission’s ‘eyes and ears’.

\textsuperscript{16} Total of peak amounts of outstanding guarantees issued by each Member State.
\textsuperscript{17} http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52009XC0819(03)&from=EN
\textsuperscript{18} Recital 13, http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013XC0730(01)&from=EN
3. Financial institutions under State aid control are progressively returning to viability

Empirical evidence (European Commission (2015)) suggests that financial institutions under restructuring plans are progressively returning to long term viability. Supported and restructured banks are showing significant improvement in operational and risk indicators, and in funding and solvency positions. However, the recovery is a time-consuming process. It is only towards the end of the restructuring period that the performance of restructured banks converges towards the values of banks that did not receive aid.

Results from the recent asset quality review and stress test conducted by the ECB on the main European banks confirm these findings. Most banks under State aid control successfully passed the test confirming their solvency. Ten banks under State aid restructuring that failed the exercise are only in the first couple of years of restructuring plan implementation. If the Single Supervisory Mechanism accepts all capital-generating actions implemented in 2014, only two of these banks will have a net capital shortfall, and one has announced recourse to private measures to fill the gap.
3. **How to assess if markets are functioning properly?**

To assess properly whether financial markets are working well, one needs to be able to measure the degree of competition and the degree of systemic risk created through the competitive process in a less-than-perfectly regulated environment.

### 3.1. Measuring static and dynamic competition in the financial system

How do financial institutions compete? What are their competitive strategies? How informative are market structure indicators? Are there trade-offs between competition and safety/stability? How should one assess and measure competition in modern financial markets?

Assessing competition in the financial system and banking sector is relatively complex, due to a number of unique characteristics (Claessens (2009)):

- the ‘production function’ for financial services is relatively opaque;
- the impact of regulation on competition may be significant without being easily observable (standardised versus internal-ratings-based approach to risk weights, implicit TBTF subsidies, quality of supervision, etc.);
- the impact on systemic stability of competition and business decisions (e.g. offering high deposit rates to attract customers, offering high loan-to-value (LTV) ratios to attract borrowers, etc.) is not obvious;
- the scalability of modern banking implies a greater challenge and greater data volatility; and
- it is relatively rare for comparable data to be retrieved in the area of banking, as compared with other sectors.

Moreover, the bail-out and subsequent reform agenda is likely to have a profound impact on the functioning of financial markets. The detailed aspects of several key reforms are being implemented and phased in only gradually and decisions are still outstanding on a number of important reforms (e.g. structural reform of major financial institutions). The effects of the reforms (e.g. as regards the reduced probability of a systemic crisis) are often difficult to quantify or even estimate with any reasonable precision. Some (e.g. preventing market abuses such as the manipulation of interest-rate benchmarks or the FX markets) will not be observable for many years, if ever. The benefits of reforms (e.g. a better banking culture) may be spread out (over time and across the taxpaying population) and medium-term, whilst the costs may be borne by specific, well organised stakeholders, typically in the short term. The impact on stability, efficiency, integrity and competition needs to be measured at the level of the system as a whole, i.e. from the viewpoint of the end-users, rather than at the level of the regulated entities or sector.

As a result of these complexities, there is no general consensus on how to measure reliably whether competition works adequately in the financial system. Different metrics have been proposed and reported; these break down into three main approaches:

- The most popular set of competition metrics to date are **market structure measures**. These are relatively simple metrics, such as concentration ratios (CRs) or Herfindahl-Hirschman indices (HHIs). A CR(k) reflects the sum of the (number k) largest banks in the relevant market.\(^{19}\) HHIs reflect the sum of the market shares of all banks in a market, each weighted by market share. These metrics are based on the structure-conduct-performance (SCP) paradigm, which was dominant in industrial organisation between 1950 and 1970 and posited that market structure influences firms’ conduct and market performance. (i.e. greater concentration leads to firms behaving less competitively, as it facilitates collusive agreements in areas such as pricing, choice of technology, entry barriers, etc.; in turn, the firms’ behaviour influences market performance, as it gives rise to more market power and less social efficiency).

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\(^{19}\) These kinds of market share metrics presuppose the definition and identification of a ‘relevant market’.
The problems with market structure metrics are not only practical (having to delineate a relevant market), but also theoretical in nature:

- market structure may not always be exogenous or given, but may be influenced by firms’ conduct. The efficiency of a particular firm may give rise to a concentrated market, for example;
- high concentration and market power in innovation-rich industries may be necessary to compensate firms for their innovation and investment and do not necessarily imply reduced efficiency;
- the contestability theory suggests that market structure may be irrelevant when markets are fully contestable, in the sense that an oligopoly or even a monopolist may demonstrate highly competitive behaviour, as long as there are no entry and exit barriers and incumbents are subject to the threat of potential competition; and
- market structure measures do not take account of factual competition issues, such as switching costs, barriers to entry, proximity of banks, number of bank relationships, pass-through of cost decreases, etc., which may be useful signals as to the degree of competition in a given environment.

- A second set of competition metrics provides information about pass-through rates, or the extent to which output prices respond to changes in input prices. The underlying idea is that the extent of the response can be shown to depend on competition. Output prices respond one-to-one to changes in input prices in fully competitive markets, but only partially in an oligopolistic or monopolistic setting. Following this line of thinking, researchers have formulated and regressed a gross interest revenue function per bank as a function of input prices and control variables, yielding elasticity estimates. The sum of the estimated elasticities of bank interest revenues with respect to the set of input prices (Panzar-Rosse H-statistics (Panzar and Rosse (1987)) is deemed informative of the competitiveness of the market.

Alternatively, researchers have tried to estimate the ability of banks to price their services and products above marginal costs. The ratio of price to marginal cost should be equal to unity in perfect competition and increases with the degree of imperfection, which will depend on the substitutability of banks’ services and products, their share of the relevant market and the existence of entry or growth barriers. This is the idea underlying estimated Lerner indices.

An important problem with these metrics is that estimates do not seem to be very robust across studies and time.

- A third set of competition metrics provides information about factual competition issues, notably the contestability of the sector. This involves estimating the impact of switching behaviour and switching costs, the launch of new products or new entrants or barriers to entry, formal and informal barriers to entry for domestic and foreign banks, activity restrictions or other regulatory requirements, the proximity of banks and number of bank relationships, etc. Case studies, events and anecdotes may also help to illustrate the degree of effective competition and the (mal)functioning of the market. The OECD publishes overall indices that summarise regulatory barriers to competition across countries.

A review of the empirical literature produces surprisingly little robust and conclusive evidence as to whether current EU financial markets are competitive. It is difficult to find a report that assesses competition in the EU financial system, let alone a recent one. The most recent pan-European retail banking sector inquiry (European Commission (2007)) was limited in scope and is already dated. Despite the profound changes taking place in the financial system following the crisis and the authorities’ response, it is difficult to find even basic estimates of competition that go beyond 2010. Where such estimates exist, evidence is often quite rudimentary and limited to basic market structure metrics (e.g. CRs or HHIs for aggregates such as total assets) or metrics of profitability and margins.
Below, we provide high-level and basic data on the evolution of market structure measures and metrics reflecting pass-through rates. These data relate to the EU banking sector as a whole and therefore reflect only general trends in terms of consolidation and market power. They neither focus on specific markets nor capture the EU financial system as a whole.

Chart 2 focuses on market structure measures and shows how the CR5 concentration ratio (the combined market share of the five largest banks per Member State) and HHI evolved in the EU banking sector between 1997 and 2013. An almost uninterrupted rise can be observed in both cases. The aggregate weighted EU banking sector CR rose from approximately 35% at the end of the 1990s to 48% in 2013. Similarly, the HHI of the EU banking sector increased from around 500 to over 700.

In both cases, the trend is not reversed or even changed in the crisis period. Of course, significant differences exist across Member States. For example, CRs in Germany are relatively low (31% in 2013), although they increased significantly over the period (from 17% in 1997). At the other extreme, the 2013 (post-consolidation) CR in the Greek banking sector was 94%. Other countries (e.g. Finland and the Netherlands) also have CRs exceeding 80%.

Chart 3 presents metrics that reflect pass-through rates in the EU banking sector between 1999 and 2011. The Lerner index shows that bank profitability was relatively and consistently high in the run-up to the crisis. In 2011, the index drops significantly, reflecting reduced profitability, but remains close to the levels of the late 1990s and early 2000s. The evolution of the Boone indicator is harder to interpret, but points to a decrease in competitive pressures after 2007.

The Lerner index, a measure of market power in the banking market, is defined as the difference between output prices and marginal costs (relative to prices). Prices are calculated as total bank revenue over assets, while marginal costs are obtained from an estimated translog cost function with respect to output. Higher Lerner index values indicate less bank competition. Lerner index estimations follow the methodology described in Demirgüç-Kunt and Martínez Pería (2010).

The Boone indicator is a measure of degree of competition, calculated as the elasticity of profits to marginal costs. To obtain the elasticity, the log of profits (measured by return on assets) is regressed on the log of marginal costs. The estimated coefficient (computed from the first derivative of a translog cost function) is the elasticity. The rationale behind the indicator is that higher profits are achieved...
ECB Bank Lending Survey evidence sheds further light on how competition affects bank loan conditions in the euro area. Recent survey findings are discussed in Box B.

Box B. Evidence on gradually resurging competitive pressures in euro area bank lending

Assessing short-term changes in competitive pressures in the banking system is challenging given that comprehensive estimates on banks’ market power typically become available with a lag of at least two to three years. Nevertheless, survey evidence is available that can provide timely information on competitive pressures in bank lending. The Eurosystem’s bank lending survey (BLS) is a very valuable source in this respect. Recent information suggests that, despite the ongoing process of consolidation in the banking industry, there was a gradual pick-up in competitive pressures in the euro area bank lending market in 2014, facilitating a more efficient allocation of loans as well as a smoother transmission of monetary policy to the real economy.

A more general assessment of the development of competition in the euro area banking industry in 2014 is complicated by the fact that the respective indicators are typically only available with a significant time lag. This lag is due to the comprehensive econometric work that is required to construct such indicators and to the lagged availability of annual individual bank balance sheet data. That being said, survey evidence may offer a useful tool for obtaining early information on competitive pressures in the banking industry. More specifically, the Eurosystem’s bank lending survey (BLS) provides timely indications of changes in lending conditions directly or indirectly related to the development of competitive pressures. These indications should not be taken as an overall measure of the degree of competition in the banking sector, but may nevertheless provide useful information on changes in competitive pressures and how these changes may be influencing bank lending behaviour.

Based on the survey evidence, Chart B1 shows that, at least since the beginning of 2013, competitive pressures have been making an increasing contribution to an easing of credit standards for loans to enterprises by euro area banks.22 These results suggest that competitive pressures, along with a decline in banks’ risk perceptions and cost of funds and balance sheet constraints, were an important contributor to the latest easing in euro area banks’ credit standards.

Looking further back, as displayed in Chart B2, the period preceding the financial crisis was marked by an increase in competitive pressures among banks in terms of lending, starting in 2003 and becoming most pronounced in the period between 2005 and mid-2007. The financial crisis interrupted this trend and appears to have led to a substantial reduction in competitive pressures in lending. Following the peak of the financial crisis, some resurging competitive pressures were first

by more efficient banks. Hence, the more negative the Boone indicator, the higher the degree of competition, because the effect of reallocation is stronger. Estimations of the Boone indicator in this database follow the methodology used by Schaeck and Čihák (2010), modified so as to use marginal instead of average costs. Regional estimates of the Boone indicator pool the bank data by regions (for more information, see Hay and Liu (1997), Boone (2001) and Boone et al. (2005)).

22 For a copy of the Eurosystem’s bank lending survey questionnaire, see http://www.ecb.europa.eu/stats/money/surveys/lend/html/index.en.html

Notes: Negative values indicate an easing of credit standards. 'Cost of funds and balance sheet constraints' is calculated as the unweighted average of 'capital position', 'access to market financing' and 'liquidity position'; 'risk perception' as the unweighted average of 'expectations regarding economic activity', 'industry-specific risk' and 'risk on collateral demanded'; and 'competition' as the unweighted average of 'bank competition', 'non-bank competition' and 'competition by market financing'. Net percentages are defined as the difference between the share of banks reporting that credit standards have been tightened as a result of the factor in question and the share of banks reporting that they have been eased.

Notes: The chart shows changes in competitive pressures contributing to changes in credit standards (negative values indicating an easing and positive values a tightening of credit standards). 'Average competitive pressure' represents the unweighted average of the net percentages for the three sub-components of competition ('bank competition', 'non-bank competition' and 'competition by market financing'), with the respective contributions of the sub-components displayed in the stacked bars. For the definition of 'net percentages' see the notes to Chart B1.

Sources: Eurosystem bank lending survey (BLS), ECB.

Source: ECB.

![Chart B1: Factors contributing to a tightening of credit standards, loans to enterprises, Euro area, average net percentages per category](chart1.png)

![Chart B2: Evidence on competitive pressures, bank lending to enterprises, Euro area, average net percentages](chart2.png)
temporarily noticeable in 2010 and only started to develop again in the aftermath of the sovereign debt crisis – coinciding with the announcement of Outright Monetary Transactions (OMTs) by the ECB – and particularly in the course of 2014. This becomes visible when tracking the increasing contribution of competition to an easing (when values are in negative territory) of credit standards for loans to firms. The most recent survey evidence suggests that, despite the further increase in market concentration, competitive pressures in euro area bank lending markets have re-emerged, facilitating a more efficient allocation of loans as well as a smoother transmission of monetary policy to the real economy. This is likely to be linked to the restructuring and recapitalisation of banks, the ongoing, though slow, economic recovery and, in particular, the strong improvement in banks’ funding conditions seen since the 2012 OMT announcement and largely as a consequence of the range of monetary policy measures undertaken by the Eurosystem in 2013 and 2014.

The survey evidence further suggests that competitive pressures in lending relate mainly to the activity of other banks and less to competition from market sources of finance or from non-bank financial intermediaries. Nevertheless, the relative importance of market-based financing for the development of overall competitive pressures in bank lending to euro area enterprises has been increasing since the beginning of the financial crisis (see Chart B2). This is also in line with quantitative evidence on the increasing importance of market financing as an additional external source of euro area firms’ financing following the financial crisis.23

3.2. Measuring stability and systemic risk in the financial system

Markets do not function well and are unstable if they create systemic risk when left to their own devices, because such risk is by definition not internalised by the various private-sector participants in their interactions. It is hence important to be able to measure, assess, regulate and mitigate systemic risk, as a proxy for financial stability. This is arguably the key lesson to be learned from the build-up to the financial system crisis that materialised in September 2008. Do financial markets generate systemic risk? How can systemic risk be measured? Is there a link between competition and systemic risk in the banking sector?

‘Systemic risk’ is not to be confused with ‘systematic risk’ – the distinction is critical for both measurement and interpretation. Unlike the former, the latter is well studied and supported by extensive modelling and measurement.

‘Systematic risks’ are macroeconomic or aggregate risks that cannot be avoided through diversification. According to standard financial market models such as the capital asset pricing model (CAPM), investors exposed to systematic risks require compensation, because there is no simple insurance scheme whereby exposure to them can be averaged out. This compensation is typically expressed as an upward risk adjustment to expected returns.

‘Systemic risk’ is a different concept. It refers to risks of breakdown or major dysfunction in financial markets. The potential for such risks justifies financial market monitoring, intervention or regulation. Research on systemic risk aims to provide guidance on the consequences of alternative policies and help anticipate possible breakdowns in financial markets. However, the formal definition of systemic risk is much less clear than that of systematic risk. The literature suggests three possible notions of systemic risk:

i. systemic risk as a modern-day equivalent of a bank run triggered by liquidity (or solvency) concerns; measurement of the risk could be an essential input to the role of central banks as ‘lenders of last resort’ to prevent the failure of large, or groups of, financial institutions;

ii. systemic risk as the vulnerability of a financial network in which adverse consequences of internal shocks can spread and even grow; here the measurement challenge is to identify when a financial network is potentially vulnerable and the nature of the disruptions that can trigger a problem; and

iii. a third notion including the potential insolvency of a major player in or component of the financial system.

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23 For further details on the BLS and its results, see the comprehensive quarterly report: http://www.ecb.europa.eu/stats/pdf/blssurvey_201501.pdf?7a1bdddab03050b0b033cc26a03ce16c
Systemic risk is therefore basically a mixed bag of scenarios taken as justifying intervention in financial markets on the basis of macro-prudential policies. A key policy lesson from the 2008 financial crisis is to improve external monitoring, intervention and regulation to reduce systemic risk.

There is now a rich and comprehensive literature dealing with the measurement of systemic risk. Again, however, there is still no general consensus on how it should be measured and assessed. Measures can be divided broadly into two categories:

- macro-prudential measures that aim to measure the systemic risk of the entire system; and
- micro-prudential measures that aim to identify the contributions of individual financial institutions to overall systemic risk.

Well-known micro-prudential measures are CoVaR (Adrian and Brunnermeier (2011)), marginal expected shortfall (Acharya et al. (2010)), SRISK (Acharya et al. (2012)) and Granger-causality networks (Billio et al. (2012)). Some researchers argue that these lack transparency and may not be the best tool for identifying and regulating systemically important financial institutions (Haldane (2012), Drehmann and Tarashev (2011)).

Modelling systemic risk is particularly challenging, given that it is a tail-risk event triggering non-linearities and endogenous risk (because of financial institutions’ and markets’ responses) and because of the importance of government intervention to prevent, manage and resolve systemic crisis (role of macro-prudential policy, political economy considerations, etc.).

4. TBTF RELATED COMPETITION AND REGULATORY CONCERNS

'The scale of misconduct in some financial institutions has risen to a level that has the potential to create systemic risks. Fundamentally, it threatens to undermine trust in financial institutions and markets, thereby limiting some of the hard-won benefits of the initial reforms.... Enforcement must remain a credible deterrent to misconduct and the FSB will consider the extent to which enhanced co-operation between conduct supervisors and greater consistency in the application of conduct regulations across jurisdictions can improve its effectiveness.

In addition, the FSB will consider reforms to reduce the likelihood of misconduct, including by:

• assessing reforms to risk governance, compensation structures and benchmarks and, where appropriate, proposing additional measures in these areas;
• considering ways to improve market structure, standards of practice and incentives for good conduct in financial markets more broadly.

This full and challenging agenda is necessary to building a global financial system that is not just safe, simple and fair, but also diverse, trusted and open.’

(Mark Carney, Governor of the Bank of England and chair of the G20 Financial Stability Board — letter to G20 finance ministers and central bank governors, 4 February 2015)

4.1. Adverse effects on competition, efficiency, market integrity and systemic risk

TBTF is arguably the most significant challenge ever confronted by regulators and competition authorities.

In hindsight, the concept of TBTF gave rise to excessive risk-taking, competition distortions and unduly/artificially aggressive balance-sheet expansion, which in turn led to conflicts of interests, large financial institutions colluding in and manipulating oligopolistic financial markets, and ultimately a loss of confidence and stability in the financial system. Competition enforcers typically either assumed that regulators would take care of market failure problems and manipulation, or saw the circumvention of regulation as not warranting enforcement measures. Similarly, regulators assumed that enforcers would address problems of market
concentration and lack of entry and exit. The absence of an overall concerted competition and regulatory strategy to tackle the underlying TBTF problem simply allowed it to fester.

The TBTF problem basically stemmed from the fundamental shift, from the 1980s onwards, from the traditional relationship-oriented model of banking (ROM) towards the transaction-oriented model (TOM). This changed the rules of the game:

- transactions with customers were no longer largely win-win and long-term, but sometimes win-lose and short-term;
- banks no longer had an incentive to perform their monitoring and information-producing role properly (previously, they prospered when the customers prospered and \textit{vice versa}), but tended more and more to rely on hard information and trading based on private information (if need be against the interests of their clients) rather than collecting soft information; and
- the scalability of banking activities increased dramatically, with a corresponding increase in profitability, leverage and systemic risk.
- Bank corporate structure and hence also bank crisis management became relatively complex.

All in all, the shift from ROM to TOM brought the TBTF problem to a head.

Why did this shift from ROM to TOM take place? The answer is threefold:

- because it became technically possible to shift, thanks to breakthroughs in financial innovation and technology, such as securitisation and CDS;
- because banks had the incentive to switch and public safety-nets largely muffled market discipline; and
- because regulators and competition enforcers allowed it to happen. Underlying this benign stance was the belief that TOM was good for both economic growth and stability; it was seen as allowing:
  - the spreading of credit risk away from highly leveraged balance sheets towards individuals and institutions better able and willing to bear such risk;
  - better risk management;
  - more transparency on the fundamental value of loan portfolios;
  - greater liquidity; and
  - more flexibility in risk-return trade-offs.

The financial crisis has shattered this benign view. TOM has disappointed the authorities. The pre-crisis growth that it allowed proved unsustainable and fuelled asset bubbles, the bursting of which gave rise to hardship. TOM allowed risks to be concentrated on bank balance sheets rather than being dispersed to those better able to bear them. It also gave rise to greater interconnectedness. It led banks to neglect their primary role of producing information and monitoring borrowers. All in all, TOM gave rise to a deep distrust towards banks, whose interests were shown to be no longer aligned with their customers’.

The banks themselves had a number of incentives to switch to TOM:

- it allowed them significantly to increase their profitability;
- limited liability means that volatility is desirable for shareholders, bank managers and significant risk-takers. The asymmetric pay-off structure provides the incentive to take the excessive risks involved in TOM; and

TOM was actively promoted by regulatory risk weights that in hindsight proved to be too low and neglected the systemic risk that it created.
4.2. Case studies of TBTF misconduct behaviour

After banks received unprecedented aid from taxpayers in the months following the bankruptcy of Lehman Brothers, a number of scandals surfaced in which the largest banking groups were documented as having played an important role. These scandals illustrate that financial markets are still not working properly. Big financial players engaged, either alone or in a coordinated way, in a series of market manipulation activities. This behaviour was made possible by a combination of factors: poorly managed conflicts of interests, loopholes in the legislative framework, weak market design and oversight, and market concentration.

According to certain barometers (e.g. the Edelman Trust Barometer), the financial sector has evolved from being one of the most trustworthy and respected sectors before the crisis towards one of the least trustworthy and respected sectors today. The number of complaints filed against bank behaviour has increased sharply in the last couple of years, despite the considerable public-sector intervention that was necessary to stabilise the financial system. Scandals, such as the manipulation of Libor, FX, CDS, (the aiding and abetting of) tax evasion and money laundering, front-running, the mis-selling of mortgages, etc., and the failure to dismiss or penalise the managers responsible, suggest that the culture, ethics and integrity of large financial institutions still need to be improved and that reform efforts face a big challenge. The narrative according to which the current state of affairs is the result of the actions of isolated rogue traders or a few bad actors in certain firms does not square with the facts (number and scale of scandals).

In this section, we briefly explain three headline-making scandals, involving the manipulation by large banks of:

- Libor money market rates;
- foreign exchange (FX) markets; and
- commodity markets.

Such scandals have been blamed for eroding what little remained of public trust and confidence in banks. However, the complete list of scandals is much longer. For example, Conor (2014) has assembled information from around the world on antitrust investigations relating to price fixing by banking cartels or multilateral market manipulation cases. His work identifies more than 400 cases of large banks being involved in more than 60 separate illegal practices. Most of the 60 largest banks across the world have been involved in collusion investigations. Virtually all top banking groups in Australia, Japan, Switzerland, the UK and the United States have been involved in price-fixing cartels since 1990. Some scandals concern individual operators and are therefore not subject to antitrust scrutiny but rather market manipulation legislation.

What are the root causes of these scandals?

- Several financial markets are characterised by an oligopolistic market structure. For example, only seven to 18 banks were submitting, and hence determining, Libor rates and 70% of the global spot-market volume for foreign currency exchange (FX) was controlled by just seven banking groups. In addition, the combination of a TBTF environment and the small number of large banks in various markets is prone to conflicts of interests and collusion. Very often, the same TBTF banks seem to play an important role. TBTF has led to these banks being 'too big to fine’. Unprecedented fines have been imposed, but even prime ministers have raised concerns that excessive fines would jeopardise the viability of the banks and therefore the stability of the financial sector at large. In sum, the nexus of concentrated markets and the importance of TBTF banks fosters cartel-type activities. Connor (2014) argues that one of the reasons for the increase in the number of cartels detected in the past five to 10 years is the repeal of the Glass Steagall Act, following which large commercial banks have become complex conglomerates with insurmountable governance and management issues;

- Another root cause behind the behaviour of the large banking groups is likely to have been the switch from ROM to TOM (see above) and the mixing of traditional lending with trading activities. This shift increases the likelihood of conflict of interests, as it also means that bankers’ and customers’ interests are no longer aligned, but sometimes in conflict (positive-sum game of ROM versus zero-sum game of TOM). The shift to TOM also leads to a change in the culture of the banks. The focus on the short term
has invited institutional corruption (Salter (2013)). The President of the New York Federal Reserve Bank, William Dudley, has claimed that ‘[t]here is evidence of deep-seated cultural and ethical failures at many large financial institutions’.

The Kay Report (2012), which examines equity markets in the UK, notes that since the onset of the latest financial crises there has been a broad erosion of trust in financial intermediaries and in the financial system as a whole. This is seen as the long-term consequence of the systematic and deliberate replacement of a culture based on relationships by one based on trading, increasingly characterised by anonymity, and the behaviours that arise as a result.24

The President of the Federal Deposit Insurance Corporation (FDIC) Thomas Hoenig has stated in 2012 that ‘[g]iven this record, it is alarming that CEOs of some financial firms fail to grasp why they are trusted so little nor appreciate the reputational damage they caused their industry. They acknowledge very little offence in taking a public subsidy and squandering it in a series of actions that place billions of taxpayer dollars at risk. They fail to appreciate how in so many ways it seems that the game is fixed in favour of a privileged few. The public is aware that there seems to be no accounting for the enormous damage inflicted on our economy. In reaction to these events, new laws were passed and new regulations were written. The regulations are extensive, and the regulatory burden is significant. The result is thousands of pages of instructions meant to control nearly every aspect of a bank’s operations with the expectation that future crises will be far less disruptive or costly. I suggest that despite hundreds of added regulations, the incentives facilitating the excesses leading to the crisis remain largely unchanged. The reason is that the fundamental cause of the problem has not been fixed. The government safety-net has actually expanded to more firms. It protects firms engaged in the payments system, intermediation process, asset management, and broker-dealer activities. In addition and despite the Volcker rule, the safety-net will continue to cover most elements’.

**Libor case**

The London InterBank Offer Rate (Libor) is an important interest rate, representing the primary benchmark for short-term interest rates globally. Money market rates are used as a benchmark to set payments on as much as USD 800 trillion worth of financial instruments (i.e. approximately USD 120,000 worth of contracts per human being on the planet), ranging from complex interest-rate derivatives to simple mortgages. For example, the interest rate on a mortgage or a car loan may be set to Libor plus a few percentage points. Interest rate swaps may compare a fixed interest rate with Libor (in principle a variable interest rate). Libor therefore affects the global flow of money day-to-day.

Libor is set each day on the basis of what large global banks operating in London financial markets report or estimate to be their cost of borrowing in the money market. The banks report or quote to the British Bankers Association (BBA, a private trade association) the rate they expect to pay to get deposits in interbank markets.25

A high quote reflects a risk premium, so banks tend to underestimate their bids, especially in periods of financial distress. On 16 April 2008, the Wall Street Journal published a controversial article suggesting that some banks might have reported understated borrowing costs for Libor during the 2008 credit crunch and this may have misled others about their financial position.26 Libor remained unchanged for months, until the day before the

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24 The report examines the equity market, which is assumed to be relatively competitive and stable, and illustrates that even in these markets market/regulatory failures can be identified (notably the short-termist incentive structure for middlemen in equity markets). The report makes a number of recommendations, in particular concerning pay structure, to address the underlying conflict of interests, arguing that ‘executives’ bonuses should be locked until retirement to encourage them to focus more on long-term performance.

25 Libor is actually a set of money market indices. There are 150 Libor rates, as banks provide their own estimates for borrowing in 10 currencies for 15 different money market maturities (from overnight to a year). Individual rates are based on daily submissions from a panel of the largest, most active banks (between seven and 18 banks depending on the rate) and set by computing the interquartile mean of the quotes, i.e. the top and bottom 25 % are first eliminated and then the average of the rest is computed (e.g. if 16 banks submit quotes, the four highest and four lowest are discarded and the average of the remaining eight quotes is computed). Banking associations establish similar indices for other money markets located elsewhere, e.g. Euribor for continental Europe and Tibor for Tokyo.

26 Authorities initially contradicted the Wall Street Journal article, claiming there was no evidence of manipulation. In its March 2008 Quarterly Review, the Bank for International Settlements stated that ‘available data do not support the hypothesis that contributor banks manipulated their quotes to profit from positions based on fixings’. In October 2008, the International Monetary Fund published its regular Global Financial Stability Review, which also found that ‘[a]lthough the integrity of the US dollar Libor-fixing process has been
financial turmoil started in 2008. At the same time, other interest rates (e.g. the Eurodollar bid rate) and the CDS spreads increased.

Investigations revealed that senior management had sometimes directed the quote submitters ‘to keep their heads below the parapet’. The investigation also unearthed manipulation, notably in relation to trading, which seems not to have been directed by senior management. With trading, unlike with reputation, overstating is as likely as understating.

It has been claimed that manipulation was facilitated by market design. Submitted quotes are based on an estimate of banks’ borrowing costs and do not have to reflect the prices at which they have actually lent to or borrowed from each other (i.e. quotes are not based on actual transaction data). Libor is based on bank estimates and is therefore, by construction, open to manipulation, as banks are able collectively to manipulate the indices. A single bank may be able to affect the indices, but not as effectively, as the final rate depends on the submissions of all banks in the panel. As the underlying notional amounts of the derivatives are of significant value even a manipulation of the indices of minimal size can have significant effects.

As well as being able to manipulate the indices, banks may also be willing to do so, for at least two reasons:

- a high quote indicates that the bank is borrowing at a higher rate and thus reflects a higher risk premium. Particularly in times of crisis, banks prefer to understate their true borrowing costs and there is evidence of them doing so during the financial crisis (Murphy (2012));

- banks are subject to a direct conflict of interests arising from their trading activities with clients, e.g. when an agent is serving two or more interests and has the ability and incentive to favour one (possibly its own) at the expense of another. For example, banks have been sued by home-owners for having conspired against their borrowers. Some traders are alleged to have falsely and artificially increased Libor on the first day of the month, so as to increase borrowers’ mortgage rates (which are sometimes linked to Libor of the first day of the month) and their own net revenues and profits. A trader may engage in this behaviour unilaterally or seek to recruit traders in other banks to act in a concerted manner.

The Libor case underlines the importance of cooperation between supervisory, regulatory and competition authorities worldwide.

**FX case**

A second large-scale scandal has been the foreign exchange (FX) scandal, based on alleged market abuse. According to the UK’s Financial Conduct Authority (FCA), banks can be accused of manipulating FX benchmarks between 2008 and late 2013, i.e. after the Libor scandal had erupted and banks were under investigation.

With a daily turnover of EUR 3.5 trillion, the FX market is the largest in the financial system and affects the value of trillions of funds, derivatives and financial products. Nevertheless, FX markets have been among the least regulated and lack specific rules to combat insider trading. Business is not conducted in a regulated market, like an exchange, and there were no obligations to report to public authorities. Trading activity was difficult to monitor, as most of it took place in over-the-counter markets. Currencies trade around the globe and around the clock, without a ‘market close’ as for exchanges. Instead, data providers take periodic snapshots, e.g. in the one-minute window at 4 pm London time, when traders are observed for the widely followed WM/Reuters benchmarks and bid and offer rates from the order-matching systems, and actual trades executed and median bid

questioned by some market participants and the financial press, it appears that US dollar Libor remains an accurate measure of a typical creditworthy bank’s marginal cost of unsecured US dollar term funding’. The BBA claimed that Libor continued to be reliable even in times of financial crisis.

27 Whether unilateral conduct would have the effect of changing the effective Libor rate also depends on the other banks’ submissions. For example, if the bank’s quote is always in the top or bottom 25%, there would be no effect (see Murphy (2012) for a discussion on this).

28 In another example, a bank may either have an interest in a high Libor fixing, when as counterparty to the derivatives contract, it receives an amount calculated on the basis of the benchmark, or in a low fixing, when as counterparty to the derivatives contract, it needs to pay an amount calculated on the basis of the benchmark.
and offer rates from the benchmark rate are captured. For 21 major currencies, this is the most important fixing, as it covers roughly 1-2% of the day’s global currency trading. Some companies seek to time their transactions to coincide with this fix, e.g. index funds that track the market may use currency benchmark rates to keep their returns in line with the indices. Some companies and investors ask banks to process transactions at the fix price and use the fixes to measure their foreign currency assets and liabilities for accounting purposes.

The main difference between Libor rates and currency rates is that the latter are set on the basis of actual trades, unlike the estimated (borrowing) rates that banks submit to the Libor administrators. In principle, therefore, there should be less scope for manipulation. However, the predictability of the daily fix means that the system is open to abuse. The allegation is that traders game the one-minute fixing window to produce a daily benchmark rate that benefits their other positions – a practice known as ‘banging the close’. The 4 pm benchmark determines how much profit dealers make on the positions they have taken in the previous hour. It is possible that, because traders receive clients’ orders in advance of the close and some discuss orders with counterparts at other firms, banks have an insight into the future direction of rates and could trade ahead of their clients in order to profit from the fix. This would allow them to maximise profits on their clients’ orders and sometimes make their own additional bets.

The specificity of the alleged FX manipulation is that it concerns trading, i.e. bankers do not manipulate the benchmark using their own discretion, as in the Libor case, but by front-running client orders – hence the alleged conflict of interests. In addition, traders, who in theory should be competing with each other, appear instead to cooperate, as illustrated by text messages and chat rooms known as ‘the cartel’ and ‘the bandits club’. The concentrated market structure also facilitates coordination, given that the colluding partners would need to constitute a significant part of the market to be in a position to influence the fix. According to a Euromoney FX survey, in 2014 the top five banks still had a market share of over 60%. Traders from various banks make a rush of transactions for funds at the 4 pm close. This leads to a surge in trading volume at the fix, which (if coordinated) could influence the fix rate. Traders have had both an ability and incentive to manipulate the market.

The FX case has demonstrated that widespread scandals can arise in markets that appear simple, transparent and based on observable transactions. It has been possible ‘to manipulate markets under cover of daylight’ (Field (2014)).

**Commodities case**

Several cases involving large banks’ commodity (gold, silver and crude oil) activities have also come under the scrutiny of antitrust and regulatory authorities. The US Commodity Futures Trading Commission (CFTC) focuses on the unregulated London silver fix and gold fix markets. Twice a day, telephone conference calls are held to set the world cash (or spot) price of silver and gold. The high concentration in the market (three banks are involved in the former and five in the latter — a system in place since 1919) has put banks in a position to influence the benchmarks. The European Commission is investigating the Platt’s oil benchmark.

The commodity-related activities of large banks also serve to illustrate the problem of conflicts of interests. A lengthy US Senate report on banks’ involvement in commodity activities explains in great detail how three large Wall Street banks (Goldman Sachs, Morgan Stanley and JPMorgan Chase) created harm in the physical market for commodities. They used their commodity activities to gain access to commercially valuable non-public information that could be used to the benefit of their financial trading activities (insider trading). At times, physical commodity activities were used so as (potentially) to manipulate or influence commodity prices (through electricity bidding strategies or ‘merry-go-round’ trades). The three banks’ physical commodity

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29 Rates for less widely traded currencies are based on quotes during a two-minute window.
31 JPMorgan has settled charges with the Federal Energy Regulatory Commission in the United States for using manipulative bidding practices to obtain excessive electricity payments.
32 ‘Merry-go-round’ trades are deals that have little purpose other than moving a commodity between warehouses to influence how much customers paid for storage and associated financial products. For example, Goldman Sachs has been accused of paying cash incentives.
activities exposed them to multiple risks normally absent from banking, including operational, environmental and catastrophic event risks. None of them was adequately prepared for potential losses from a catastrophic event affecting its physical commodity activities, as they had failed to allocate sufficient capital and insurance (as compared with other institutions).

The report considers that these activities introduce new systemic risks into the US financial system, where taxpayers could be forced to step in with financial support to avoid the banks’ collapse. This exacerbates the TBTF problem and creates distortions in the market place, as banks’ access to the explicit and implicit safety-net also gives them an unfair competitive advantage over non-banks. The report recommends reaffirming the separation of banking from commerce and clearly limiting a financial holding company’s physical commodity activities to no more than 5% of its Tier 1 capital.

4.3. The response of public authorities to the scandals

The reaction of the authorities to these scandals has been twofold:

- fines have been imposed in cases of collusion or market abuse, as a deterrent; and
- regulation has been revised or updated to ensure that problems relating to conflicts of interests and insider trading are addressed sufficiently.

Fines and settlements

Following the above (and other) scandals, regulators and competition authorities imposed significant fines and settlements on banks. Often, in order to avoid lengthy procedures and ensure financial stability, given that the fines and private damages in the event of conviction would have been enormous, the banks and government bodies reached a settlement. From various sources that aggregate the settlements to be paid, it seems that, since 2009, banks have settled for more than USD 180 billion with US, EU and Swiss authorities. Credit Suisse (2014) considers that the 10 largest European banks will have total litigation losses of more than USD 100 billion (including estimated future losses). The FX scandal and claims relating to mis-selling and US mortgages constitute the largest categories.

The large unexpected fines, in combination with still-low leverage ratios of TBTF banks,\(^{33}\) raise the issue of financial stability. The fines may bring the banks down and give rise to further government support, which in turn exacerbates the TBTF problem. Some have argued that big financial institutions are ‘too big to prosecute’ and ‘too big to jail’. Eric Holder, the US Attorney General has admitted in 2013 ‘I am concerned that the size of some of these institutions becomes so large that it does become difficult for us to prosecute them when we are hit with indications that if you do prosecute, if you do bring a criminal charge, it will have a negative impact on the national economy, perhaps even the world economy’. This concern is not only raised in the United States. Andrew Bailey, chief executive of the UK’s Prudential Regulation Authority, has also admitted that the largest banks have become too big to prosecute because of the impact criminal charges would have on confidence in them.\(^{34}\)

The regulatory response in the EU

A further issue highlighted by these scandals is the role of regulatory and supervisory bodies. In the Libor case, for example, Barclays has argued that the UK regulator knew about the situation and was complacent. Financial supervisors may in some cases have a short-term incentive to maintain financial stability, even at the cost of

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33 ESRB (2014) illustrates that the leverage ratios of the largest EU banks do not exceed 4% in the second quarter of 2013.
34 In January 2014, the US Department of Justice (DOJ) imposed a criminal fine of USD 50 million on RBS Securities Japan. Several commentators note that, had the parent been subject to a criminal fine, it would have closed down in the US market, thereby increasing concentration (Connor (2014)). Even the former head of the DOJ Criminal Division said that ‘our goal here is not to destroy a major financial institution’. Criminal charges could have led to its exit from the market and caused collateral damage to employees and in terms of market concentration (Patterson (2013)).
markets not operating transparently. In the FX scandal, regulators have often been accused of turning a blind eye (Fields (2014)). Such incentives call for clear rules on market design to avoid market abuses and collusion.

Several regulatory initiatives have been launched to address the conflict of interests problem:

- The established legislative framework on market abuse, which addresses market manipulation and insider trading, has been amended and revamped.

  Amendments to the Market Abuse Regulation/Market Abuse Directive (MAR/MAD) criminal sanctions framework clarify that any manipulation of benchmarks, including Libor and FX, is clearly and unequivocally illegal and subject to administrative or criminal sanctions.\(^\text{35}\) Also, the new MAR recognises the interconnection of spot and commodity derivatives markets.

  Like competition policy, however, this framework deals with the conduct of market participants and hence remains an \textit{ex post} tool, albeit with a deterrent effect.

- Because several scandals arose due to poor market design and poorly regulated benchmarks, the European Commission has tabled a proposal on the design and use of benchmarks; this covers issues of governance of benchmarks, provision structure and methodology.

  The problem is that setting benchmarks often involves making an assessment on the basis of underlying data (i.e. there is a degree of discretion). The objective has been to design a regulatory framework that restores market confidence by establishing robust, reliable, representative and fit-for-purpose benchmarks that are immune to manipulation and would therefore prevent abuses \textit{ex ante} rather than providing a mechanism for sanctions \textit{ex post}.

- In January 2014, the Commission proposed \textit{structural reform} of the largest EU banks (\textit{inter alia}) to address conflicts of interests between trading and traditional core banking activities.\(^\text{36}\)

  The economic literature identifies conflicts of interests as one of the main diseconomies of scope (see Annex 9 to the Commission’s impact assessment on the proposal (2014)). A large literature has studied conflicts of interests arising in universal banking across different areas of activity such as proprietary and underwriting activities, for example. Fecht \textit{et al.} (2013) report empirical evidence from the German banking sector that proprietary trading can negatively affect retail customers, who are sold stocks that underperform as compared with other stocks in the bank’s proprietary portfolio and in the households’ portfolios. Customer portfolio performance is also significantly worse in banks that engage in proprietary trading.

- Another approach to realigning incentives and preventing excessive risk-taking is to provide the right incentives in bank executives’ \textit{pay structure}. The Capital Requirements Directive IV (CRD IV) introduced a number of changes to banks’ remuneration and governance structure, but one of the most controversial is a requirement that the variable component of material risk-takers’ total remuneration should not exceed 100\%, or under certain conditions 200\%, of the fixed component.

  Some claim that bonuses are good in that they realign managers’ incentives with shareholders’.

  However, others claim that such high pay incentives lead bank staff to engage in too much risk from the shareholders’ perspective. Also, it can be argued that shareholders (as they have only limited liability and in anticipation of TBTF) will be willing to take more risk than banks’ overall creditors (including bond holders) and the public at large, including taxpayers, would consider optimal.

- Other provisions of CRD IV concern enhanced risk management governance, more diversified board composition and enhanced transparency; and

- There have also been \textit{specific responses} to individual scandals.\(^\text{37}\)

\(^{35}\) This was not included in the European Commission’s original (October 2011) proposal for revised market abuse rules, but added on 25 July 2012. Criminal charges have been brought in the United States, with 13 traders charged in relation to the Libor case. Some are likely to receive severe sentences (up to 30 years’ imprisonment for each count).

\(^{36}\) European Commission (2014a) lists and discusses several other legislative measures that aim to increase transparency and integrity in the markets including the MiFID II package, EMIR, etc.
5. Conclusions

This chapter argues that regulation is needed, not only to correct for market and regulatory failures, but also to ensure that competition in the markets does not lead to a sharp build-up of systemic risk and the promotion of TBTF banks. Competition in banking is not dangerous per se. It is the regulatory framework in which banks operate and which sets their risk-taking incentives that drives the stability or fragility of banking. The regulatory framework should be evaluated on an ongoing basis, however, to ensure that it addresses market failures sufficiently and provides a stable system within which banks can compete on merit and without building up systemic risk.

The financial crisis has shown that imperfect and distorted competition, stemming, for example, from high concentration or implicit TBTF subsidies, severely impairs the functioning of financial markets, limits their efficiency and makes the financial system unstable and corrupt. Competition enforcement therefore goes hand in hand with sound regulation. Likewise, the intended impact of regulatory reforms may not materialise unless competition policy takes into account the new regulatory environment and complements regulatory measures with timely (including preventive) enforcement action.

The main challenge is to maintain competition in the market to the benefit of the economy, while at the same time creating a regulatory framework that minimises its possible negative impact on stability. Such a framework will include:

- additional capital charges for bank size, complexity and systemic importance;
- macro-prudential regulations that take into account the interaction between financial institutions; and
- (most critically) a resolution framework whereby even the largest financial institutions can be resolved, thus reducing the perverse incentives stemming from TBTF status.

Structural banking reform may complement the above reforms by ensuring the effectiveness of the overall reform agenda (European Commission (2013)).

The recent financial crisis and the authorities’ necessary but potentially distortive short-term and medium-term responses (bail-outs, extraordinary central bank support, regulatory overhaul, etc.) may illustrate the need for an in-depth and wide-ranging financial markets inquiry at EU level, in which competition enforcers, financial regulators and consumer protection agencies work closely together.

To assess whether markets are working adequately, financial regulation and competition enforcement within the financial system need to be more closely coordinated, because competition cannot be effective (i.e. fully achieve efficiency and innovation benefits) if the rules allow some market participants to exploit or circumvent them or if regulation itself becomes a barrier to entry. At the same time, financial regulation will fall short of achieving its objectives of stability and efficiency without competition enforcement that prevents (individual or collective) market abuse and mergers that could, in some specific circumstances, exacerbate the TBTF issue. Cooperation between financial regulators and competition policy enforcers needs to be strengthened at EU level. Systematic exchanges of information, expertise and staff are needed.

References


37 e.g. the Wheatley Review in the UK proposes finding a new Libor administrator, bringing Libor under UK regulatory oversight and creating a criminal offence of knowingly or deliberately making false statements relating to benchmark-setting.
38 The Commission's mandate and that of national competition authorities - under merger control - is defined as protecting consumers. Therefore, merger control cannot address financial stability concerns arising from TBTF.
39 Of course, confidential and competitively sensitive information must be protected.
Chapter 6. Special focus on cyber security risks in the financial sector

1. INTRODUCTION

This chapter discusses cyber security-associated risks and costs, and the challenges they pose to the financial sector, and gives an overview of existing regulatory requirements for financial services that are relevant to cyber security.

The financial services sector is one of the most targeted industries for malicious attacks. The modern financial system is digital and depends heavily on network infrastructure. Financial institutions carry out a number of critical functions such as managing payment and settlement systems. Moreover, they hold sensitive customer information and customer deposits. New sophisticated technologies for trading platforms, data warehouses and internet banking pose challenges for cyber security. The interconnectedness between market participants and financial institutions makes the financial sector vulnerable to disruptions from cyber-attacks. These may pose a serious threat to individual market participants, and can also affect the stability and integrity of the financial system as a whole. Therefore, cyber security risk has a systemic risk component.

It is well known that the revolution in digital technology has accelerated business possibilities and expansion due to the way information is collected, processed, stored and shared in globally interconnected digital platforms. According to a report by the University of Massachusetts 70% of households and 94% of firms that have more than nine employees are nowadays online and there has been immense growth in the use of social media and mobile devices (Nagurney 2014). In 2012, there were more than 2.25 billion internet users worldwide, a figure twice as high as in 2007 (Chart 1, Nagurney, 2014).

In 2015, the number of people with internet access is expected to exceed 3 billion, with an average 40% penetration rate among the world population (Chart 2, eMarketer, 2014). Looking forward, by 2018 almost 3.6 billion people, i.e. half of the world’s population, will be connected to the internet or the mobile internet (Mahajan, 2014).

In addition to business and personal services, electronic management is increasingly used for countries’ critical infrastructure and public services. However, these new opportunities come at a cost and with risks from...
malicious attacks. Whatever the motive behind them (whether crime, espionage or hacktivism), these attacks cause losses in financial assets, intellectual property, confidence and reputation, and can even harm the security of nations.

This chapter starts with a short description of the cyber environment (section 2), then presents some of the tools and techniques used in different cyber-attacks. Section 3 explains in more detail the cyber-risks for business in general, by giving some concrete examples of the most severe cyber-attacks in recent years, and shows the positive effects for the economy stemming from the new cyber-security industry. Section 4 focuses on financial services, by first giving some ‘facts’ on cyber-attacks and the associated damage to the financial industry, followed by some insights into the governance and management of cyber-risk in financial institutions, based on existing research and discussions with the industry (retail banks). Finally, section 5 describes important international initiatives, focusing on the existing regulatory requirements for financial services relevant to cyber security and EU attempts to set up a cyber security framework.

2. THE CYBER ENVIRONMENT

2.1. What is the cyber environment?

The cyber environment (alternatively called cyberspace) refers usually not only to everything related to information technology (IT), but especially to digitalisation and the virtual world. Clark et al (2014) characterise the cyber environment or cyberspace as ‘a virtual container of all data, signals and transactions that different actors — either individual, firms or public institutions — share and exchange in the local and wide area networks’

Cyberspace itself lacks governance and control. Cyberspace is ‘created, maintained, owned, and operated by public, private and government stakeholders that exist across the globe, and is subject to changes in technology, architectures, processes and expertise’ (NAPSNet, 2013). It exceeds geographical borders and can be accessed by other nations, public private firms and public institutional bodies, as well as opponents, in different ways and to different degrees. Due to these characteristics and the vulnerability of networks and computer systems, cyberspace faces a diversity of threats from different actors from inside the country or from abroad, and with different motives.

The Research Center of Cyber Intelligence and Information Security (CIS) at Sapienza University in Rome defines cyber threat or cyber-attack as an action by individuals, states or organisations aimed at ‘damaging or interfering with the proper functioning of the systems or networks’ that violates the integrity and confidentiality of data and the information contained (CIS Sapienza 2013, box V, p.9). Cybercrime is one type of cyber threat. It covers all activities with criminal purposes. This includes among other (but not only) fraud, identity theft and the stealing of information or intellectual property. However, what is considered as crime varies from one national jurisdiction to another. Cyber espionage is another type of cybercrime. This is the ‘wrongful acquisition of sensitive property or classified data or information’ (CIS Sapienza 2013, box V, p.9), while cyber

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terrorism is an ‘ideologically motivated action aimed at influencing a country or an international organisation’ (CIS Sapienza 2013, box V, p.9).

Cyber threats pose major challenges because they involve advanced digital technology, have a cross-border nature and are not easy to counter, as the actors, means, motivation, objectives and attack techniques are always changing (CIS Sapienza, 2013).

In order to respond to all of the different kinds of cyber threat mentioned above, the term cyber security is used to describe a ‘collection of tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, training, best practices, assurance and technologies that can be used to protect the cyber environment and organisation and user’s assets’ (United Nation (2008), p.2).

2.2. Developments in the cyber environment

This section looks at the history of cyber-attacks over the last 30 years. A good description of the development of cyber-attacks can be found in the ‘Cyber risk — a global systemic threat’ report issued by The Depository Trust & Clearing Corporation (DTCC) in October 2014. According to this report, cyber-attacks and defensive measures against them have evolved in four phases (Chart 3, DTCC, 2014), each representing major changes in the objectives of cyber-attackers.

Phase 1 (the so-called ‘fun’ phase) started with an attack on networked computers by a worm called ‘Morris’, which was released in November 1988. The worm featured self-replicating code that exploited vulnerabilities in the ‘Sendmail’ email server software. The attack was largely motivated by the intellectual curiosity of its author, who wanted to see whether such an attack was possible (DTCC, 2014). The worm caused delays and overcrowding across large portions of the network. At that time it was not a common practice for networks to be protected by firewalls. Nowadays using firewalls is seen as an industry standard among cyber defenders worldwide.

Phase 2 (the so-called ‘fame’ phase) of cyber threats was associated with the increased use of email in the late 1990s. With this came an escalation in widespread attacks using computer viruses and worms, culminating in a large-scale attack in 2001 by two self-propagating worms. The first, known as ‘Code Red’, appeared in July 2001. The second, known as ‘NIMDA,’ was released a week after the 11 September attacks (DTCC, 2014). Both spread rapidly by exploiting vulnerabilities in commonly used web server software and operating systems. Although the authors carried out the attacks to basically gain notoriety and fame, the damage due to disruptions in commercial networks was significant.

Phase 3 (the so-called ‘fortune’ phase) started around 2004, in a time when so-called ‘phishing’ began to appear in larger-scale campaigns. The idea behind this technique is to use tricks to find out passwords or credit card numbers that allow attackers to make money from them. Usually these activities fall under fraud. In response to ‘phishing’, defenders have increasingly used sophisticated IT tools for stronger authentication and risk-based...
decision systems for transactions, as well as sharing information about these threats with their peers. This collective effort has helped to establish cyber security as a key area within the financial services industry which continues to strengthen the industry’s resilience to cyber-attacks today.

Phase 4 (the so-called ‘force’ phase) began in 2007 and 2008 with the distributed denial of service (DDoS) attacks launched against Georgia and Estonia. This phase escalated in 2010 with ‘Stuxnet’, a destructive cyber-attack against uranium refining efforts in Iran. According to public sources, Stuxnet damaged almost one-fifth of Iran’s nuclear centrifuges. 3 Also during this phase, financial institutions started to become the target of cyber espionage actions, widely known as advanced persistent threats (APTs) (DTCC, 2014). In this case an unauthorised third party accesses the network and stays undetected within the network for a relatively long period of time. The focus is on stealing data. The APT attacks target not only critical sectors in the private sector, such as manufacturing and the financial industry, but also the public sector, e.g. national defence.

2.3. Actors in the cyber environment

It is often difficult to say with certainty what type of actor is behind a specific cyber-attack. A good description of the different types of actors in the cyber environment can be found in the ‘Cyber Security Assessment Netherlands’ report for 2012 to 2014. Larger and more complicated cyber-attacks involve numerous parties that use a wider set of tools. They target businesses and government organisations around the world and also consumers’ personal information, as shown in Chart 4.

[Chart 4: Threat groups and targets in the cyber environment]

The borders between the different categories are often fuzzy or overlapping (Chart 4). A state may be both a target and an attacker, motivated by geopolitics, its economic position or political reasons, such as intimidating dissident or opposition groups that oppose the government.

Professional criminals are mainly motivated by financial gain and the internet is an attractive environment for achieving this (e.g. through internet banking fraud). Citizens are vulnerable because of their dependence on computers and internet services, combined with their low security awareness and limited knowledge of security issues. Another significant threat for citizens comes from attacks that result in a breach of their privacy (Cyber Security Assessment Netherlands, 2012-2014).

Hacktivists are individuals or groups that are capable of conducting cyber breaches for ideological reasons. They primarily focus on the publication of data stolen through hacking and DDoS attacks. ‘Script kiddies’ are hackers who have reasonable, but not in-depth knowledge of information security and use techniques and tools developed by others. They are often motivated by desire for a challenge and have little awareness of the consequences of their actions (Cyber Security Assessment Netherlands, 2012-2014).

A private organisation may be an attacker, but it may also become the victim of other attackers and thus become a target in its own right. As targets, private organisations face various types of threats, from professional criminals or hacktivists, and espionage by states and other private organisations. As attackers, private organisations may use the internet to gain information about their competitors. In practice, the line between legitimate analysis (profiling) of competitors and corporate espionage is not always clear. The information may

vary from low-sensitive information, such as price lists for products, to highly sensitive information such as secret recipes (Cyber Security Assessment Netherland, 2012-2014).

**Internal actors** are members of the company (e.g. employees) who could pose significant threats and cause significant damage, if their intentions are malicious. A **cyber researcher** is a special actor focused on improving digital resilience. Cyber researchers are motivated by a desire to improve IT security in companies and government institutions, or even in society as a whole. However, sometimes the actions of cyber researchers have indirect consequences that make them part of a threat group. Cyber researchers’ test tools and research findings could be re-used by groups with less honourable intentions. Cyber researchers themselves may also become targets when attackers want to obtain research data and information about vulnerabilities from them (Cyber Security Assessment Netherland, 2012-2014).

Different actors may collaborate and learn from each other’s knowledge and methods. For example, many people learned from Stuxnet, a highly complex cyber-attack, by studying it in detail (Cyber Security Assessment Netherland, 2013). This is one way in which knowhow on cyber-attacks is propagated.

### 2.4. Techniques in the cyber environment

It is obvious that the rapid developments in IT and the digitalisation of services expand the possibilities of cyber criminals, as they have a wider range of tools at their disposal to execute cyber-attacks. To illustrate the diversity of the attacks and the challenges they pose, this section will describe very briefly some of the techniques used in cyber-attacks. These include DDoSs, Trojan malware, spambots, phishing and vishing (the telephone equivalent of phishing). We cannot provide an exhaustive description, as there may be other techniques for carrying out cyber-attacks that are not widely known to the public.

Distributed denial of service (DDoS) is a program that compromises several computers and uses them for targeted cyber-attacks. It uses what are called ‘**botnets**’ in order to overwhelm a targeted website or application with internet traffic, blocking access to it by other users. Botnets are basically a group of ‘compromised’ computers that are remotely controlled by the attacker. A compromised computer — an individual bot — is connected to the internet, usually with an ‘always-on’ broadband connection, running software clandestinely introduced by the attacker Clark et al., 2014, box 3.1). Other computers can be compromised automatically, rapidly expanding the size of the botnet. Cyber criminals can control networks of compromised computers through botnets, in this way protecting their anonymity. Access to sensitive information can be done through the use of botnets. They can also disrupt some critical national infrastructures.

On the other hand, in contrast to a botnet that stays undetected in a network and steals information, a **spambot** is another technique that uses automated computer programs to help send spam e-mails. It might for example create fake accounts and send spam using them in order to crack personal passwords or credentials. This threat is not be underestimated. Companies have observed that this kind of spam is getting increasingly difficult to detect as not only are the emails well-written but the sender address is often ‘spoofed’ to make it appear as though it has come from a familiar contact, thus making it appear even more legitimate (BBA, 2014).

**Trojan malware** is another serious threat. This is a technique where the credentials of individuals or firms are filtered from compromised IT systems and usually used for fraud. According to the British Bankers’ Association / BBA (2014), some of the biggest concerns in 2013/2014 were different variants of a Trojan called Zeus. The code source of Zeus, first detected in 2011, has been available in different variants for sale in criminal internet forums many times since then.

Malware can apparently be deployed more efficiently through the use of ‘exploit kits’. Exploit kits are tools to automate the process of identifying weaknesses in victims’ web browsers and plugins (particularly java and adobe plugins), so that malware can be installed (BBA, 2014). Less sophisticated channels (e.g. email, online advertising and social media) can be also used to deliver malware via compromised attachments or hyperlinks to compromised websites.
When introduced into a computer system or network, malware can work in a number of different ways. It can be programmed to activate itself either immediately or at a later stage when a specific condition is met. This means that most of the time the malware lies dormant in the system without doing any harm. However, as soon as a specific condition is met, the program activates itself and starts destroying or corrupting data and/or disabling system defences (Clark et al., 2014). The program may then also delete itself, leaving behind little or no trace at all. However, some malware remains even after a computer is scanned using cleaning software or reinstalled the operating system (Clark et al., 2014).

Other malware attacks like ‘vishing’ and ‘phishing’ are increasingly associated with social media. ‘Vishing’ or ‘voice phishing’ is the criminal practice of using the telephone to gain access to the public’s private personal and financial information for financial gain. ‘Phishing’ is where criminals attempt to acquire more sensitive information such as credit card numbers and passwords by posing as trustworthy entities in an electronic communication, including social media. When they have stolen data, fraudsters can produce better phishing emails that imitate communications from social media or public authorities.

3. CYBER RISK IN COMPANIES

Cyber-attacks can cause significant losses of business intelligence and intellectual property, drive up the cost of security, disrupt workflow and damage a company’s reputation. Information on data security breaches is not comprehensive because organisations have economic incentives not to reveal such information.

Research conducted by the World Economic Forum (2014) suggests that companies are struggling to carry out cyber risk management; highly visible breaches are occurring with growing regularity. We will discuss below the risks associated with cyber-attacks in companies and the problems companies face in trying to deal with such attacks. Short descriptions of three major cyber-attacks in the private (non-financial) sector and the damage they caused are provided in text boxes. The final part of this section will discuss the positive side effects for the economy and the new jobs being created thanks to the rapid growth of cyber security companies.

One of the problems faced by companies when dealing with cyber-attacks is that a company’s response may be fragmented. The authors of cyber-attacks have a global reach, and so threat mitigation strategies need to work from a global perspective. In reality, a company’s cyber responsibilities are often allocated to different departments and not centrally managed, making it hard for them not only to understand and prioritise threats, but also to respond to them (BBA, 2014).

The second problem stems from the interconnectedness of business channels and the supply chain (for example, a large company has several suppliers or has outsourced some of its operations to third parties). Successful attacks on smaller companies or third parties in the supply chain can significantly affect a larger market player and spread damage throughout the entire business sector (BBA, 2014). Vendors and suppliers are of course vital parts of any successful business, but making their IT systems secure brings its own costs and risks. In 2013, the US retailer Target was hit by one of the biggest data breaches in the industry’s history. The data breach cost the company an estimated $148 million (PGI, 2014). This example and two other cyber-attacks on non-financial companies are described in more detail in Box A.

<table>
<thead>
<tr>
<th>Nature:</th>
<th>Infiltration</th>
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<tbody>
<tr>
<td>Procedure:</td>
<td>In the days prior to Thanksgiving 2013, malware was installed in Target’s security and payments system. The hackers accessed Target’s payment network through its heating and ventilation systems vendor. The malware was designed to steal every credit card used at the company’s 1 797 US stores. At the critical moment, when Christmas gifts had been scanned and bagged and the cashier asked for a</td>
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swipe, the malware would step in, capture the shopper’s credit card number, and store it on a Target server commandeered by the hackers.\(^5\)

**Damage:** Target said that up to 40 million customers’ credit and debit card information had been stolen from people who shopped in stores between 27 November and 15 December. Subsequently, the company reported that a new group of 70 million customers — some of whom might also have had their card data stolen — had had their personal information compromised as well.\(^5\)

**Motive:** Building up dossiers on individuals, either to impersonate victims or lure them into giving up more sensitive information.\(^7\)

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**Nortel Networks Ltd**

**Nature:** Infiltration

**Procedure:** Using seven passwords stolen from top Nortel executives, the hackers infiltrated Nortel’s computers at least as far back as 2000 and downloaded technical papers, research and development reports, business plans, employee emails and other documents.\(^8\)

**Damage:** Given the enormous amount of information stolen using spyware and viruses for information gathering, the damage was incalculable.\(^9\)

**Motives:** Industrial espionage. This is a means of gaining access to the targeted company’s business plans. Unfair business practices such as this can subsequently bring the targeted company down.\(^10\)

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**February 2014 data breach**

**Nature:** Spamming and phishing

**Procedure:** Massive theft of credentials, including user names, email addresses and passwords. The email addresses were from major providers (i.e. AOL, Google, Microsoft and Yahoo) and almost all Fortune 500 companies and non-profit organisations.\(^11\)

**Damage:** It is estimated that around 360 million records were stolen in separate attacks, including one that yielded around 105 million records, making the ‘February 2014’ attack the biggest single credential attack known to date.\(^12\) In addition to the 360 million credentials, the criminals have been selling 1.25 billion\(^13\) email addresses.\(^14\)

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\(^13\) Taking into account an internet population of 2.89 billion users as of 2014 (see Chart 2), it follows that more than 43% of active email addresses have been sold on the black market.

The **reputation risk** related to a cyber-attack might be very significant and so many of the threats are not made public. The costs of public disclosure may have an impact on the financial markets (e.g. on a company’s stock prices and credit rating, including a possible rise in the cost of capital for companies who report being attacked). According to the Centre for Strategic and International Studies (CSIS) companies reporting major attacks suffer drops in stock value of between 1% and 5%. Some of these companies may even lose everything due to the attacks (CSIS, 2014). Even companies that are privately owned and not traded on public securities markets may be adversely affected by the consequences of a successful cyber-attack when banks and other lenders judge them to be more risky than previously estimated. Moreover, the negative publicity from a company’s security breaches may cause customers to lose confidence, in some instances giving a competitive advantage to its rivals. In addition, if an organisation reports a security breach, its investors, customers, or other stakeholders may take it to court to seek compensation. Last but not least, a public announcement of a cyber-attack may signal to hackers that an organisation’s cyber defences are weak and could encourage further attacks (Watkins, 2014).

**Damage** to businesses can even be a threat to the whole economy. This is particularly true when critical infrastructures and major market players suffer severe attacks, as was the case with the February 2014 attack against the leading email providers (see Box A).

One way to protect against damages from cyber-attacks and the associated regulatory fees is using cyber-insurance. Cyber-insurance gives first-party coverage of theft and fraud, business interruption and computer data loss and restoration, as well as third party coverage of litigation and regulatory issues. The demand for cyber-insurance is rapidly increasing, as the number of cyber-attacks and related damages mount. The US market grew fast, reaching $1 billion of gross written premium in 2013 and it was expected to double in 2014 (InfoSec, 2014). In Europe the cyber-insurance market is relatively small, with $150 million gross written premium in 2013, but was expected to grow by 50% to 100% in the following year (InfoSec, 2014). One positive effect of cyber insurance is that it imposes high requirements to the company’s security, (detailed vulnerability assessment and security plans, training of employees etc.) forcing the company to periodically review its practices and systems in detail.

Due to the increase in cyber-attacks and the security needs of companies, not only has the demand for cyber-insurers increased, but the business of cyber security firms is also flourishing. The **market capitalisation** of certain security firms hit new highs in the last two years. For example, the network security provider FireEye, after a $304 million initial public offering (IPO) in 2013, now has a market capitalisation of $6.36 billion in April 2015 (Bloomberg). Similarly, company firewall specialist Palo Alto Networks has increased its market capitalisation (mostly through new shares) 45 times compared to the IPO in 2012, when it raised $260 million (Bloomberg).

**Venture capital investment** in companies that provide cyber security software, solutions and services has strongly increased, especially in the US. In the first half year of 2014, venture capitalists invested $894 million in US cyber security start-ups, which is as much as the amount invested in the whole of 2013 in the US ($900 million). Venture capital investment in cyber security firms is also accelerating in Europe. For example, C5 Capital, based in London, launched in 2014 the first European cyber security-focused fund of $125 million and Index Ventures.

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16 Statistical data is collected by Marsh & McLennan Companies, see also [http://resources.infosecinstitute.com/cyber-insurance/](http://resources.infosecinstitute.com/cyber-insurance/).


20 Kuchler, H. ‘Europe’s first cyber security-focused fund to launch’. Financial Times: [http://www.ft.com/intl/cms/s/0/1abc22e0-63b-e11e-9a38-00144feabd0.html?%3fsitedition%3Dintl%23gxaazz3BEnSPxQ%3estsedition-intl](http://www.ft.com/intl/cms/s/0/1abc22e0-63b-e11e-9a38-00144feabd0.html#%3fsitedition%3Dintl%23gxaazz3BEnSPxQ%3estsedition-intl).
created a €400 million fund to invest in technology start-ups in Europe, Israel and the US.\textsuperscript{21} According to press, security start-ups hit $2.3 bn in funding in 2014, an increase of more than 30\% compared to the previous year. For comparison, in 2010 the total annual funding for start-ups in cyber security was less than $1 bn.\textsuperscript{22}

Chart 5: Connectivity and vulnerability (US entities)


Mergers and acquisitions have also increased quickly in the cyber security industry. 2014 was rich in mergers and acquisitions of cyber security firms. For example, FireEye purchased Mandiant for approximately $1.0 billion and Cisco Systems acquired Sourcefire for about $2.7 billion. 23

In recent years, cyber security has become a top priority in the financial industry and cyber risk is attracting more attention from the financial professionals. In the next section, cyber risk in financial services is discussed.

4. CYBER RISK IN FINANCIAL SERVICES

Financial institutions carry out critical functions, such as payment and settlement, manage deposits from their customers and hold sensitive customer information. This makes financial institutions, especially the large ones, an attractive target for cyber-attacks. In addition, financial services are entirely digital. Most transactions amount to nothing more than exchanging code and debiting and crediting accounts, with the only record of the transaction being an electronic record. If that record’s integrity is affected, so is the entire transaction.

Given the high degree of interconnectedness between actors and markets, cyber-attacks affect financial institutions and markets well beyond national borders. Chart 5 below shows how interconnectedness between financial institutions has drastically increased in the past decade, making them highly vulnerable to disruption and contagion.

When individual attacks spread throughout the system, they become a serious threat to financial market stability and to the economy as a whole.

Although financial companies (mostly banks) were among the first to be targeted by early cybercriminals, today cyber threats are by no means confined to the financial institutions, as they now also threaten critical market infrastructures, such as exchanges (see the examples in section 4.1 below). Cyber-attacks in financial market infrastructure could harm significantly the economy through the loss of credit and liquidity in the marketplace and the loss of confidence in the operational effectiveness of that marketplace. Given the high degree of interconnectedness in the financial system, cyber-attacks can rapidly spread and cause widespread disruption.

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interconnectedness between a number of systems and markets, the latter scenario would have a domino effect, damaging other critical infrastructure.

There is no doubt that technological progress in financial services has played a crucial role in making the system work efficiently, enabling greater automation of processes, higher processing power, improved risk management and a wider product range available on online platforms. This benefits business and retail customers.

The other side of the coin is that efficient systems are less stable, i.e. systems that have no redundant IT infrastructure in data and process would suffer higher losses and costs resulting from cyber-attacks than otherwise. This is especially a critical point for market infrastructure. That is why DTTC (2014) urge the development of highly redundant IT infrastructure with near real-time data replication. Financial institutions and infrastructures have to manage the trade-off between the efficiency of their systems, on the one hand, and stability, on the other. This depends on the management’s risk appetite and the risk strategy of the firm.

The rise in the frequency and scope of cyber-attacks can be attributed to several factors. For example, unfriendly nation states seek to gather intelligence or intellectual property data, and organised crime groups and cyber criminals breach systems motivated by monetary gains. As the cost of the technology used decreases, the barriers to entry to cybercrime are lowered. This makes it easier and cheaper for criminals to commit cyber fraud. In addition, a growing black market dealing in breached data is further encouraging wrongdoers (Cuomo and Lawsky, 2014).

4.1. Facts and figures in financial services

‘Every minute, of every hour, of every day, a major financial institution is under attack’ (Wilson H., 2013). However, many of the cyber-attacks are not made known to the public. If published, they might have detrimental effects, because the financial industry is founded on trust and confidence.

As there are no definitive statistics publicly available, this section provides figures gathered from different sources on cyber-attacks on the financial industry:

- In February 2015, the Carbanak hacker group (also known as Anunak) was discovered to have attacked about 100 banks, other financial institutions and online payment systems in around 30 countries, managing to steal up to $1 billion. The code was so sophisticated that it was able to increase the amount of money in a bank customer’s account and then steal the ‘made-up funds’. In this way, the victim would not detect the missing funds and report it to the bank (Fox-Brewster, 2015).

- Kaspersky Lab (2014) and B2B International reported from a worldwide survey that 93% of financial services companies experienced various cyber-attacks in one year, from April 2013 to May 2014.

• The International Organisation of Securities Commissions (IOSCO) and the World Federation of Exchanges Office (WFE) surveyed 46 global securities exchanges in 2013 and found that about 53% of the respondents had experienced a cyber-attack (Chart 6, IOSCO, 2013).

• The cyber-attack named ‘Operation High Roller’ 25 that was discovered in 2012, tapped around $2.5 billion from bank accounts in the US, Europe and Latin America (Kelley, 2012). According to the press, the malware was able to automatically find a customer’s highest value account and then transfer money to a prepaid debit card, from where it could be removed quickly and anonymously. The code could even change the bank statements of targeted customers in order to hide the theft.

• In April 2013, hackers managed to disrupt the Dow Jones Industrial Average index and force it to drop by more than 100 points within three minutes. This caused a temporarily loss of around $130 billion of market value in the US stock markets. The attackers did this by taking control over the Associated Press’s twitter account and issuing a false news alert that there had been an attack on the White House (DTCC, 2014).

Box B below gives an example of the infiltration of a major financial institution and provides details on the 2010 NASDAQ infiltration case.

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25 ‘Operation High Roller’ combines ‘an insider level of understanding of banking transaction systems with both commercial and custom malicious code’ without human participation, see: http://www.businessinsider.com/operation-high-roller-2012-6/#ixzz3XgKYj9oD.
address. A search in JP Morgan’s main servers found the address there as well, proving that the infiltration had also reached the bank’s main system.26

Origin: Uncertain. This assumption is based on analysis of the trove of stolen data in which JP Morgan customer info was stored.27

Motives: Uncertain. Personal data can be sold on the black market (financial gain).

Response: JP Morgan stated it would double its yearly cyber security spending by 2015 (from $250 million to $500 million).28 Some sources also report that JP Morgan was planning to hire 1000 specialised technicians and offer training.

Description

The hackers gained entrance to JP Morgan’s main system through an outside vendor, Corporate Challenge, which organised charitable events only accessible to the bank’s staff. The website appears to have been poorly secured, which allowed the hackers to steal its security certificate. This enabled the hackers to pose as the legitimate administrator of Corporate Challenge and monitor and retrieve customer credentials. The certificate was stolen in March 2014, which meant that the undetected infiltration period lasted up to four months.29

Equipped with such important data, the hackers were able to discreetly infiltrate JP Morgan’s main system and start transferring its customers’ data onto their own server. The hackers’ server contained stolen data from approximately 23,000 other breached websites.

The link between Corporate Challenge and JP Morgan’s own network was confirmed when the IP addresses the hackers’ used on the Corporate Challenge website were also found in JP Morgan’s network logs.

Hackers are able to make money out of the stolen data by selling it on the black market. Such personal information is valuable for ‘phishing’ activities.

The following Box C gives an example of an infiltration of a securities exchange that may have been carried out for espionage purposes.

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### Box C. Example of a cyber-attack in a market infrastructure

**Case: 2010 NASDAQ INFILTRATION CASE**

**Quick facts**

- **Nature:** Highly sophisticated infiltration
- **Duration:** More than a year30
- **Procedure:** Custom-made malware (enabled hackers to steal data, spy on the system and disrupt it).31
- **Damage:** Monitoring of NASDAQ’s Directors Desk. Potential damage: strong disruptive power.
- **Detection:** NASDAQ detected suspicious files during a routine security scan. The company called in the FBI and forensic firms to confirm the breach.32

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**Origin:** Russian

**Motives:** Uncertain. Potentially geopolitical (e.g. cloning western networks).

**Response:** The US House Financial Services Committee launched a review of the safety of the country’s financial infrastructure in February 2011.

**Description**

The case is still under investigation (the NSA, FBI, and CIA have all been involved at different stages). The infiltration took place on NASDAQ’s Directors Desk, a special network where board members of over 230 companies exchange confidential information. Though there was no evidence of exfiltration of documents, hackers were able to monitor all activity in the system.

The malware was extremely sophisticated. In addition to invisible monitoring, it gave hackers the ability to extract documents and even ‘blow up’ the whole network using highly disruptive coding. Further proof of the malware’s sophistication came from the hackers’ use of two zero-day vulnerabilities. These are flaws unknown to developers and are exploited by hackers until the developer becomes aware of it. At that stage, developers rush to correct the gap, in principle having ‘zero days’ to fix them. The system remains exposed until there is a patch (Symantec33). This indicates that the hackers had extremely thorough knowledge of the system.34

Given the amount of confidential information they had access to, the hackers could have done some very profitable trading on the market. However, no trace of such trades was found, raising questions on the motives for such a complex infiltration. Some have argued that the hackers’ goal was to analyse and clone exchange practices in western countries in order to develop a Russian financial hub.35 This theory is supported by the fact that at the same time the Russian Government was attempting to build an efficient network to promote as an alternative to the European and American network.

### 4.2. Governance and management of cyber-risks in financial institutions

In many countries, risk appetite, strategy and ultimate limits are seen as the responsibility of the board for both financial and non-financial corporation. But in reality, board discussions in general do no deal sufficiently with technology risk. This was the finding of a survey of directors and senior executives from the world’s biggest firms across various sectors, conducted in 2012 by Carnegie Mellon.36 57% of respondents said that boards are not undertaking important steps to manage reputational and financial risks resulting from cyber-attacks. Although the risk management has a prominent focus, the linkages between the IT risks and the enterprise risks are in general not well understood. With respect to financial services companies, which accounted for 1/3 of the sample, the survey ‘confirmed the belief among security experts that, overall, the financial sector has better privacy and security practices than other industry sectors’ (CyLab, 2012, p. 6). The reason might be that the financial services sector depends highly on confidence and reputation, so that security has priority. Moreover, the financial services industry is more regulated and supervised than others, so that stricter internal controls and procedures make it possible to better detect and handle malicious attacks.

For financial services, cyber-crime is ranked second among the top 5 economic crime types experienced by the financial sector, after asset misappropriation (internal fraud due to misuse or theft of assets belonging to a company) (see also Global Economic Crime Survey, PWC 201437). One interesting aspect is that internal fraud in this sector is mainly caused by newcomers / junior staff. One reason for this might be that the complexity of

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35 Michael Riley, ‘How Russian hackers stole the Nasdaq’, op. cit.

36 CyLab surveyed 108 board members or senior executives from the list of Forbes Global 2000 companies (50% board members, 50% executives). 75% of the respondents were from critical infrastructure companies (13% in energy and utility, 33% in financial sector, 2% in healthcare, 15% were industrials and 12% IT and telecommunication companies). In terms of geographical distribution: 40% of the surveyed companies were from the US, 30% from Europe, 19% from Asia and the remaining companies from the rest of the world.

37 The 2014 Global Economic Crime Survey survey comprises 1330 responses from the financial services sector across 79 different countries worldwide.
(trading) products that require financial engineering makes them more difficult to control for both controllers and external auditors.

Financial service firms, especially banks, have multiple business lines spread among different territories, with a number of functions outsourced to some external suppliers, therefore management responsibility for IT risk is often fragmented. Moreover, many financial services firms do not have a dedicated Chief Information Officer. Responsibilities for cyber security usually involve the Chief Operating Officer and Chief Risk Officer, in some cases also the Chief Financial Officer. The fragmentation in responsibilities and handling of incidents within the firm causes gaps in IT security policies and procedures, so some financial institutions have hired cyber security ‘czars’ with specific responsibility for cyber security (see also Elliott and Saka, 2010).

One big challenge that many financial institutions face is that they operate through a collection of several operating systems in different areas (front-, middle- and back-office) that entails several reconciliation processes. Some of the programs are commercial — ready-to-use systems — while others are custom-made. Moreover, several old legacy systems from former mergers are still in use, and the internal systems require a lot of effort and investment to protect.

In terms of risk management, cyber security breaches are measured as part of operational risk. Data on internal and external losses go into risk models for operational risk to measure unexpected losses, either through the standardised method or advanced measurement approaches (AMA). Internal losses come from internal breaches / incidents (which are usually IT-related problems, as over 90% of the processes in banks are IT-related) that are systematically captured and processed.

External breaches (which also include cyber-attacks) in a traditional retail bank that has different distribution channels and online payments are predominantly ‘phishing’ (in some small cases also scamming). According to the banks, phishing usually presents as a set of many small incidents (known as ‘high frequency, low impact incidents’) that may add up to a larger amount of damage altogether. In the (Basel II) operational risk categories, these incidents are captured under ‘external fraud’. In terms of risk management processes, there is usually a weekly report on incidents and damage (including cyber-security damage) sent to the executive board for information, discussion and potential action.

Retail banks continually invest in their infrastructure to protect against new kinds of phishing and other kinds of cyber-attacks. This is a continuous process that is based on different factors, such as the number of attacks in the past, and the damage from them, but also to attacks and damage reported by their peers. Certain cyber-attacks, depending on their frequency and the related losses, are internally classified as business cases and special attention and a budget for the development of security measures is devoted to them. However, until now banks have not seen cyber-attacks as the biggest part of operational risk. Legal risk, which increased in significance especially during the crisis, makes up the bulk of operational risk in banks.

The budget allocated for handling cyber-attacks is not only related to the outputs of the operational risk models. This is only a fraction of it. The budget also takes into account other factors, including the outputs of the IT department and of the business side of the bank.

Banks expect malicious cyber-attacks to increase, because of rapid digitalisation (see also Chart 2). And, with digitalisation, the variety of upcoming services, such as payment by smartphone, expose banks much more to cyber-attacks than before. These days, smartphones have more the function of small computers than phones, which makes them vulnerable to attacks.

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39 The term ‘czar’ is a popular usage referring to high-level government officials who oversee a particular policy. It is commonly used in the United States and the United Kingdom, [http://en.wikipedia.org/wiki/Czar_%2528political_term%2529](http://en.wikipedia.org/wiki/Czar_%2528political_term%2529).

40 AMA refers to the internal model of a bank that is used to measure operational risk. [A source explaining AMA](http://en.wikipedia.org/wiki/Operational_risk#Basel_II_seven_event_type_categories).

41 Source: discussions with leading European retail banks.

Protecting against cyber-attacks requires not only sophisticated technology and specialised staff, but — most importantly — increased awareness among employees of potential cyber-risks, through training and communication programmes. This of course also demands commitment from the top-management of the financial institution.

5. WORK IN INTERNATIONAL ORGANISATIONS AND REGULATORY BODIES

5.1. Institutional set-up in the European Union

The institutional set-up in the European Union (EU) is a combination of responsibilities at both national and European level. National competent authorities are the first line of defence in maintaining a good level of security within their territory, but they cooperate cross-border on risks and security breaches that extend beyond their national boundaries. Chart 7 shows a number of organisations involved in cyber security issues at different levels.

The European Network and Information Security Agency (ENISA), established in 2004, assists the European Commission, the Member States and the business community to address, respond to and prevent network and information security (NIS) problems. The EU computer emergency response team (CERT-EU) is responsible for the security of the IT systems of EU agencies and institutions. In March 2009, the European Commission established the European public-private partnership for resilience (EP3R) to encourage sharing of NIS-related information between interested parties in the public and private sectors at European level. EP3R is now subsumed into the NIS Platform.

On law enforcement, the European Cyber Crime Centre (EC3) was established in 2013 as part of Europol to serve as the centre of operations for the fight against cybercrime in Europe. Europol/EC3 works closely with Eurojust to improve its capability in fighting cybercrime.

The main agency responsible for cyber defence at EU level is the European Defence Agency (EDA).

5.2. Policy work at EU level on a cyber security area

The European Commission has proposed a network and information security (‘NIS’) directive to ensure a ‘high common level of network and information security (NIS) across the EU’. The previous regulatory framework required only that telecommunication companies report serious NIS incidents and take risk management steps. But several specific infrastructure and service providers are particularly vulnerable, given that they are highly dependent on an accurately functioning network and information systems. These sectors include ‘banking, stock exchanges, energy generation, transmission and distribution, transport (air, rail, maritime), health, internet services and public administrations’ (EC, 2013a, p.4). The objectives of the proposed directive are as follows:

• All Member States would be required ‘to ensure that they have in place a minimum level of national capabilities by establishing competent authorities for NIS, setting up Computer Emergency Response Teams (CERTs), and adopting national NIS strategies and national NIS cooperation plans’ (EC, 2013a, p.4).

• The national competent authorities should ‘cooperate within a network enabling secure and effective coordination, including coordinated information exchange as well as detection and response at EU level’ (EC, 2013a, p.4).

• Taking the Framework Directive for electronic communications as a model, the proposal ‘aims to ensure that a culture of risk management develops and that information is shared between the private and public sectors. Companies in the specific critical sectors and public administrations should assess the risks they face and adopt appropriate and proportionate measures to ensure NIS’ (EC, 2013a, p.4).

The European Parliament adopted a report on the NIS directive in March 2014 and the final text is expected to be agreed in 2015. The implementation deadline is expected to be in early 2017.

5.3. Financial services regulatory requirements relevant to cyber security

Though not adopted with current cyber-security concerns in mind, EU financial regulation already has a considerable number of requirements that are relevant from a cyber-security perspective.

The Central Securities Depositories (CSD) Regulation (Article 45) states the need for CSDs to apply appropriate IT tools in order to identify, monitor and manage sources of operational risk, both internal and external (i.e. from other CSDs and other market infrastructures), and to minimise their impact through appropriate tools. In addition, CSDs must plan and carry out a programme of tests of the arrangements under Article 45 and inform the competent and relevant authorities without delay of any operational incidents stemming from such risks (EC, 2014c).

Both the European Markets Infrastructure Regulation (EMIR) and the Commission Delegated Regulation 153/2013 (Article 9) contain provisions on the need for central counterparties (CCPs) to maintain adequate IT systems for dealing with the complexity of services provided and to ensure high standards of security and confidentiality of the information they hold. EMIR also contains provisions on trade repositories; Article 79 requires trade repositories to ensure the continuity of their business by setting up backup facilities (EC, 2012).

Operational risk requirements for financial institutions in the Capital Requirements Regulation and the Capital Requirements Directive (CRR/CRD IV) are relevant to IT-related risks. Article 85 of the CRDIV (relevant to the basic indicators approach, mostly used by smaller banks) requires institutions to implement policies on, evaluate and manage operational risk exposure. Financial institutions also need to have contingency plans that ensure continuity of their business and limit losses in case of severe disruptions. Articles 4 and 321 to 325 of the CRR set out the measures that financial institutions have to take and also the capital they need to hold in order to cover operational risk, including risks related to cyber-attacks (EC, 2013c and 2013d).

Article 16 of the Markets in Financial Instruments Directive (MiFID) requires investment firms to ‘have sound administrative and accounting procedures, internal control mechanisms, effective procedures for risk assessment, effective control and safeguard arrangements for information processing systems’ (EC, 2014b). Under Article 47, Member States must require the regulated market to be adequately equipped to manage the risks to which it is exposed and to mitigate those risks, including systems disruptions (EC, 2014b).

The Solvency II Directive contains provisions on the specification of the operational risk module of the standard formula. Article 107 of Solvency II sets out capital requirements for operational risk for insurance and reinsurance undertakings, which also includes risks from IT incidents and cyber-attacks (EC, 2009a).

Operational risk means ‘the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events’, and includes legal risk. http://en.wikipedia.org/wiki/Operational_risk#Basel_II_seven_event_type_categories.
The proposal for a payment services directive II (PSD II) contains relevant provisions that address cyber security at two levels. The first addresses security management within the payment services provider (Article 5), while the second deals with incident reporting to competent authorities, in case of major operational or security incidents (Articles 85/86) (EC, 2013e).

The Credit Rating Agencies Regulation (CRA III) stipulates, in Article 6(4), that credit rating agencies must have sound procedures, internal control mechanisms and safeguard arrangements for information processing systems. It also contains provisions on infringements by the credit rating agency, including failure to effectively check or safeguard the above (EC, 2009b).

While not specific to the financial sector or IT-related risks, the Accounting Directive (Article 20) stipulates that the corporate governance statement that listed undertakings draft must contain a description of internal control and risk management systems for the financial reporting process (EC, 2013f).

5.4. Cyber security initiatives at international level

In 2001 the Council of Europe’s Cybercrime Convention (known as the ‘Budapest Convention’) represented the first attempt to harmonise the legal framework for fighting cybercrime. The convention defined crimes (e.g. illegal access, system and data interference) and set out rules on jurisdiction and criminal investigation measures. It was one of the few Council of Europe initiatives that was also signed and ratified by non-member states, including the USA, Japan and Canada (Graux, H., 2013).

The United Nations (UN) has passed two resolutions, one criminalising the misuse of information technology and another clearly stating that international law also applies to cyberspace. The North Atlantic Treaty Organisation (NATO) has also promoted cyber security harmonisation among its members. In 2011, NATO introduced a policy and action plan, which paves the way for the alliance to strengthen defence efforts (Watkins, 2014). Finally, in April 2015, the Interpol Global Complex for Innovation (IGCI) will be operational in Singapore, which will facilitate cooperation on cybercrime beyond national borders.

In February 2015 the US government announced the creation of a new federal agency, the Cyber Threat Intelligence Integration Centre (CTIIC), which will allow existing agencies and private sector to combine their efforts in a coordinated manner to address cyber-attacks. CTIIC will coordinate and centralise data collection related to cyber-attacks.

In 2012, the House of Representatives in the US passed the Cyber Intelligence Sharing and Protection Act (CISPA), which was then stopped in the US Senate. The bill’s initial objective was to ensure the security of networks and help the US government investigate cyber-attacks, through US government cooperation with technology and manufacturing companies. In January 2015 it was reintroduced and is pending.

Some important initiatives in other countries are the new Australian Cyber Security Centre (ACSC), which became operational in November 2014. The Association of Southeast Asian Nations (ASEAN) countries, following the initiative of Japan, committed in September 2013 to take concrete measures to promote cooperation, and to share data and information in the areas of cyber security strategies, including critical infrastructure. In May 2013, India released its National Cyber Security Policy, which seeks to protect both the private and public infrastructures from cyber-attacks.

6. Conclusions

Rapid digitalisation has accelerated the number of cyber-attacks and the related risks are not only of great concern to corporations and strategic sectors, but are also a threat to national security. Financial services are at the heart of these events, because financial institutions hold deposits for corporations and households and process transactions and payments worldwide in real time.

It is acknowledged amongst professionals in the financial industry that it has become impossible to prevent attacks. Cyber threats are continuously evolving and have become complex. It requires sophisticated advanced technology measures to counteract them. This in turn, costs money and time. But, this is only one side of the coin. As the weakest link in the security chain is human, it is paramount to increase awareness of employees and management on the importance of cyber security. Education on security is vital; development of a cyber security strategy and formal internal policies within the company remain key.

The risks arising from cyber-attacks are not limited to individual entities. The highly interconnected players and market infrastructures in the financial system enable cyber-attacks to swiftly spread to other markets and participants and cause contagion throughout the system, becoming a threat to financial stability.

Not only is it therefore a matter for individual nations to have the appropriate policies to strengthen cyber-security and protect their citizens, companies, economy and, more generally, society from cyber threats, but it is paramount to promote close cooperation and take harmonised action at EU and — if possible — at international level, in order to be successful in the long term.

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Chapter 7. Special focus on SME credit information in the EU

1. INTRODUCTION

The Commission’s communication on the long-term financing of the European economy\(^2\) included the announcement of a mapping exercise on the availability of credit information on small and medium-sized enterprises (SMEs) across Europe. Chapter 7 outlines the findings of this exercise and the rationale behind it, along with a number of policy initiatives that could benefit the capital markets union\(^3\) agenda.

SMEs face a structural hurdle when accessing finance - the lack of adequate, comparable, reliable, and readily available information. Information on SMEs is usually held by banks, and is difficult for non-bank finance providers to access. The lack of availability of credit information is a barrier to entry in the market for SME financing. The lack of information also makes it harder for finance providers other than banks to properly assess an SME.

To help SMEs access finance, it is important to increase SMEs’ visibility to potential finance providers and ensure that those have greater access to credit information on SMEs so they can better assess their creditworthiness. This would significantly improve the efficiency (and, if carried-out across borders, the integration) of SME funding markets. It would also increase competition and help diversify the funding options open to SMEs by helping alternative finance providers (e.g. supply chain finance, asset-based finance, peer-to-peer lending, private equity) make informed decisions.

Chapter 5 of the European Financial Stability Integration Report 2013 (on EU’s SME credit assessment industry) identified significant differences between Member States in terms of the degree of information available and the disclosure culture. The structure of national legislation was identified as a major barrier to cross-country credit flows, because foreign credit assessment firms must rely on the national firm’s assessment and cannot fully compare it with its own assessment. One consequence arising from the heterogeneous information is competitive disadvantages of SMEs on access to finance among MS.

To address this situation, a thorough analysis of the current situation of the credit information disclosure across MS in the EU is necessary, i.e. a mapping exercise on data availability.

This Chapter 7 explains the rationale behind the mapping exercise, presents its findings and concludes with some general principles upon which future policy on improving credit information data for SMEs could be based. The chapter is structured as follows:

- **Section 2** presents some facts on SME lending.
- **Section 3** shows how serious the information problems are, based on the findings of studies carried out recently by the Commission.
- **Section 4** explains the mapping exercise, the methodology used and the results obtained.
- **Section 5** describes the differences between the EU and the US, based on interviews with market participants.
- **Section 6** describes the experience of BI & Scoring firms in the EU single market.
- **Section 7** suggests possible follow-up policy initiatives.

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\(^1\) Authors: This chapter was written by Denada Prifti and Ana Maria Sanchez Infante (DG FISMA) and benefited from the respondents to the mapping survey listed in Annex 2.

\(^2\) SWD/2014/0105 final, 27 March 2014

2. FACTS

Banks are the biggest lenders to SMEs, as they hold the most detailed credit information on SMEs necessary to assess their creditworthiness. Bank loans and other advances accounted for 85% of total non-financial corporate debt outstanding in the euro area and in the UK in 2011, whereas non-financial corporate bonds accounted for only 15% (Llewellyn, 2012). This is not the case across all Organisation for Economic Cooperation and Development (OECD) economies: in the United States the proportion is 53% to 47%\(^4\). The European Central Bank (ECB) lending survey for July–November 2014 also reveals that bank-related products are the main sources of finance for SMEs in the euro area SMEs - 61% of SMEs surveyed considered bank loans to be an important source of funding, while 53% included bank overdrafts. Other commonly used forms of financing were leasing (45% of SMEs) and trade credit (31%). Market-based sources of finance and factoring, were reported less often as relevant instruments. 24% of SMEs said internal funds were an important alternative source of finance.

Interest rates for smaller loans (of less than €1m) are 2% to 3% higher than for larger loans (Chart 1). The higher interest rate spread is a result of SMEs’ lower creditworthiness - which is determined by the availability and quality of information about them.

The financial crisis has made it harder for SMEs to access funding, as different sources of short- and long-term financing have been affected by endogenous liquidity and solvency problems in the EU banking sector. Higher interest rate spreads reflect not only creditworthiness, but also perceived sovereign risk. While in July 2006 (prior to the financial crisis) the lending spread between the core EU countries (which include Germany, France, Belgium and the Netherlands) and the peripheral countries (which include Greece, Italy, Portugal and Spain) was only 50 basis points (bp), in July 2014 it was at 200bp. The spread was far higher for smaller companies than for larger ones (Chart 2). Better credit information affects not only the lending process and interest rates on loans, but it is also very important for capital markets. For instance, differences in the types of information available could hamper the securitisation of loans to SMEs, or the burden associated to providing investors with the necessary information could increase the costs of going public for SMEs.

SMEs need up-to-date information on the creditworthiness of their clients / debtors, not only to fund businesses, but also to ensure the working capital is available in the supply chain. Suppliers can offer longer payment periods or a loan to their business partners, depending on the debtor’s creditworthiness. Mainly owing to the crisis, SMEs have experienced a twofold squeeze - firstly, demand for their products has fallen due to economic downturn, and secondly, they are faced with longer collection periods, which have even doubled to up to six months or more (EFSIR 2012), in spite of the European late payment directive\(^5\). Longer collection periods increase SMEs’ needs for liquidity and working capital\(^6\), and this is aggravated by a possible downturn in

\(^4\) The US is also commonly cited as having a 70:30 split between corporate bonds and bank loans in total nonfinancial debt outstanding. This is due to the exclusion of the farm and small-unincorporated sectors of the economy. Using the broader definition gives the 47:53 split quoted in the text. (AFME, ‘Financing European growth: a new model’, 2012.)

\(^5\) European Late Payment Directive 2011/7/EU.

\(^6\) Working capital represents operating liquidity available to business.
turnover owing to the crisis. Last but not least, many SMEs face insolvency, owing in part, to their short-term liquidity needs to keep their business running. To finance working capital, most SMEs rely on internal financing, and/or short-term credit from suppliers, and/or some specialised financial products such as factoring. Some SMEs resort to a direct loan from banks or other financial institutions in order to finance their working capital needs.

The World Bank’s ‘Doing Business 2013’ report emphasises the crucial role that credit information plays in the exchange of goods and services. In particular, the World Bank’s enterprise survey shows that in most European countries about 55%-70% of working capital and new investments are financed through internal sources (retained earnings), 20-28% through bank loans and 12-25% through alternative sources of finance, especially trade credit and leasing (World Bank, 2013).

3. WHAT ARE THE PROBLEMS?

Information problems start with insufficient and inappropriate data, e.g. around 25% of all companies in a country (approx. 700,000 firms on average per Member State) and around 75% of self-employed companies (1.5m to 1.8m firms on average per Member State) are not assessed. Added to this are differences in the breadth and depth of credit information between MS and barriers to collecting data (see Chart 3). The structure of national legal frameworks not only influences the domestic market, but was also identified as a major obstacle to cross-country credit flow, because a foreign credit assessment firm has to rely on the national firm’s assessment and cannot fully compare it with its own assessment on a like for like basis (see the European Financial Stability Integration Report 2013, Chapter 5). In addition, there are differences in the interpretation and implementation of data protection regulations and different requirements for SMEs to file annual accounts as pointed out in a recent survey by the Association of Consumer Credit Information Suppliers (ACCIS) (2014).

Another information problem is the lack of transparency on banks’ feedback to SMEs on their creditworthiness, making it harder for them to access finance. The smaller the company, the more likely it is that its credit application could be declined by a financial institution\(^7\) (Centre for Strategy and Evaluation Services, 2014). In addition, the bank feedback varies in quality, depending on the bank and the country. Under Article 431(4) of Regulation (EU) No 575/2013 (the EU Capital Requirement Regulation), SMEs can ask for written feedback when they apply for a bank loan. But very little has been done in practice to actually implement it\(^8\).

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\(^7\) This was the evidence of a study that DG GROW (former DG ENTR) conducted together with the Centre for Strategy and Evaluation Services (CSES) on ‘Evaluation of Market Practices and Policies on SME Rating’ in 2013/2014.

Other studies have highlighted the **inadequate business information available for listed SMEs** (European Competitiveness and Sustainable Industrial Policy Consortium, 2013, study for DG GROW, formerly DG ENTR). It is hardly possible to cover the costs of good research because of the little trading on smaller companies. The number of listed SMEs has fallen in recent years. This development can be partly explained by the low number of entrants, but mainly a result of companies deciding to de-list and go private.

An additional problem is **enduring negative information** that leads to a bad score (default or near default) with a bankrupt entrepreneur after discharge. A recent study by Ecorys (2014) for DG GROW ‘Bankruptcy and second order chance for honest bankrupt entrepreneurs’ shows that individual entrepreneurs are burdened with negative information long after a bankruptcy or litigation procedure has ended. In some countries, such as Luxembourg, the information is never removed.

**Chart 3** visualises the flow of credit information between several stakeholders and the information barriers they encounter.

**Chart 4** illustrates data sharing between banks and BI & Scoring firms. It shows that data sharing by banks with other market participants is limited, and varies between Member States. Banks and central banks only share SME data in a ‘closed’ communication.

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**7. MAPPING EXERCISE**

This section presents the findings of the mapping exercise carried out by DG MARKT⁹ in September/October 2014. Mapping the current data landscape used to assess the creditworthiness of SMEs in each Member State helps to provide an overview of the current situation. For this purpose, a set of key variables, especially those that are necessary for credit reporting was identified, drawing on input from external stakeholders (in both the public and private sector) and different institutions, such as the World Bank (2014).

DG MARKT presented the key data elements necessary for assessing a company’s creditworthiness and for evaluating it at an informal EFC meeting in June 2014. All Member States supported the Commission’s initiative and considered it an important step towards understanding the problems linked to missing or inadequate information.

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⁹ Since 1 November 2014, DG MARKT changed into DG FISMA. It applies to all the note.
7.1. Methodology

The survey with the set of variables was sent to BI & Scoring firms in 28 Member States in September 2014. The aim was to find out whether credit information on SMEs is available to interested credit information firms outside banks. 26 Member States responded.

We talked to various national authorities (ministries of finance and economic affairs) about their current and planned national initiatives. We also consulted several departments within the European Commission. These included DG JUST (to clarify data protection issues); DG GROW and departments working on the business registers interconnection system (BRIS) and the mortgage directive.

<table>
<thead>
<tr>
<th>Box A. Information required for comprehensive credit reporting and assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Company basic data</strong></td>
</tr>
<tr>
<td>Identification data (e.g. tax registration number), date of establishment, company address, telephone number.</td>
</tr>
<tr>
<td><strong>Company activity</strong></td>
</tr>
<tr>
<td>Information on sectors in which the company is active, its structure in domestic and foreign markets (e.g. subsidiaries, branches), shareholders, and the company’s market (clients) and suppliers.</td>
</tr>
<tr>
<td><strong>Legal structure</strong></td>
</tr>
<tr>
<td>Legal structure of the firm, which is usually obtained from a public authority, such as Handelsregister in Germany or Companies House in the UK.</td>
</tr>
<tr>
<td><strong>Executives</strong></td>
</tr>
<tr>
<td>The chief executive officer, common directorship, antecedents (where relevant), other personnel or key managers, representation on other boards, personal and professional data, adverse (negative) information and credit information on directors.</td>
</tr>
<tr>
<td><strong>Credit reporting data</strong></td>
</tr>
<tr>
<td>Lending and credit behaviour information (loans and credit lines, monthly instalments and non-performing loans and related amounts).</td>
</tr>
<tr>
<td><strong>B2B</strong></td>
</tr>
<tr>
<td>Information on commercial credit and payment behaviour and outstanding payments.</td>
</tr>
<tr>
<td><strong>Public record filing</strong></td>
</tr>
<tr>
<td>Information recorded in lawsuits, court actions, collections, outstanding payments from government agencies, bankruptcies and payment behaviour of SMEs with government agencies (e.g. tax, fees).</td>
</tr>
<tr>
<td><strong>Annual accounts</strong></td>
</tr>
<tr>
<td>Balance sheet and profit and loss data; delays on publication, off-balance sheet items, consolidated disclosure, approved / audited annual accounts, and number of employees.</td>
</tr>
<tr>
<td><strong>Micro-firm information</strong></td>
</tr>
<tr>
<td>Turnover, financial burden, number of employees, immovable properties and properties valuation, mortgage on the property.</td>
</tr>
</tbody>
</table>

7.2. Set of variables

The raw data used to assess the creditworthiness of SMEs include basic company information, company activity and legal structure, information on credit history, annual accounts and other financial information which evaluates repayment capacity, and information (negative and positive) on a company’s willingness to repay its debt. Data on executives and public record filing are also fed into the credit assessment. For the assessment of micro-firms that are not limited liability and do not produce annual reports, (including also start-ups, innovative companies, etc.), some other key indicators (turnover, number of employees etc.) and personal credit information on the owners are used to assess the company.

Box A shows the key information used to assess the creditworthiness of the company. A detailed breakdown of the variables is provided in Table 1 (first column).
The table of variables was sent to BI & Scoring firms in 28 Member States, as well as the Banque de France, the National Bank of Belgium, the National Bank of Romania and the Central Bank of Slovenia. The companies/institutions were asked to reply whether the data were available to them (publicly or privately). In some countries there was more than one respondent. In BE, CZ, EL and FR there were two respondents, while for IT and the UK three BI & Scoring firms replied. The following section summarises the findings. Details on each Member State can be found in Annex 1. The names of respondents are listed in Annex 2.

7.3. Findings of the mapping exercise

The mapping results are graphically illustrated in Table 1 and can be summarised as the following:

- **Credit Registers** are available in most countries, except in Luxembourg where there is no credit register at all and 11 other countries (CY, DK, EE, EL, FI, HR, IE, NL, PL, SE and UK) in which there are no public credit registers.

- **Basic Company Data** are available in all Member States, with some limited access to data in ES and SE. However, data regarding the **Company Activity** are very different in the availability and disclosure. 11 Member States (AT, BE, BG, CZ, EL, FR, HU, IT, LT, LU and SI) have (almost) full disclosure and others (CY, DK, FI, HR, PT or SK) disclose very little data.

- There is full disclosure of **Company Legal Structure**, whether publically and/or privately.

- The results for information on company **Executives** are mixed. Personal data on executives, such as their credit behaviour or fiscal information, are generally not available, with a few exceptions (CZ, IT, LT, SE and UK). This could be because of data protection law. 13 Member States (BG, CY, DK, EE, ES, FI, HR, HU, LU, PL, PT, RO, SK or SI) have very little or no data available on executives available.

- **Credit Reporting** – there is little or no loan level data available in six countries (BG, DK, EE, FI, LU, NL and PT); negative data (non-performing loans) are available in most Member States except BG, DK, EE, LU, NL and PT.

- Data on **B2B relationships** are usually privately available, but not in some countries (BE, BG, CY, HR, HU, NL, PT and SK). 14 Member States do not provide information on the payment behaviour of SMEs with regard to telecommunications and utility providers (AT, BE, BG, CY, DK, EL, HR, HU, IT, PL, PT, RO, SK and SI).

- With regards to **Public Record Filing**: lawsuit and court actions are available, except in eight countries (AT, DE, EE, HR, LU, PL, RO and SI), and information on the business relationship with government agencies is not available in 14 Member States (AT, CY, DK, EL, ES, IE, HR, IT, LU, NL, PT, SI, UK).

- **Annual Accounts** are well covered across Member States. However, off-balance sheet liabilities and assets, and consolidated group accounts are not always available.

- For **Micro-firms**, turnover data are almost always available, sometimes with restricted access, and in some countries they are linked to personal data.

From the mapping table, the UK, Italy, but also Lithuania appear to have a very good data coverage. However, data availability, particularly with regard to loan history, is limited in Bulgaria, Estonia, Spain, Finland, Luxembourg, the Netherlands and Portugal.

**In conclusion, there is in general a good coverage in the basic company data and company activity. Also data on annual accounts are in almost all Member States available. However, the availability of loan level data and payments history that is necessary to assess credit repayment willingness and capability of an SME is quite different between Member States. In some countries, data are not available at all and in some others only negative data exist.**
Table 1: Survey results with set of variables

<table>
<thead>
<tr>
<th>Credit Register</th>
<th>Company name</th>
<th>Company type</th>
<th>Company size</th>
<th>Company sector</th>
<th>Company industry</th>
<th>Company address</th>
<th>Company phone</th>
<th>Note: red stands for not available, green for available and yellow for only partially available</th>
</tr>
</thead>
</table>

The ‘Credit Register’ column refers to the ownership of the Credit Register, whether it is a public institution or a private company.

The ‘Public’ column means that data are available and disclosed to everybody (independently if one has to pay or not), while the ‘Private’ column means that data are disclosed only to closed user groups.
7.4. Case study UK: Best practice in credit information data

The UK is one of the most competitive markets in terms of credit information. The private sector is well established and competitive. It shares and provides both personal and commercial credit information. There are six private credit bureaus, multiple resellers and other smaller market players. They collect credit information from a number of public and proprietary sources and use this information to provide analytical and data services to their customers. The three largest credit bureaus providing personal credit information are Experian, Equifax and Callcredit. Experian, Equifax and Creditsafe are also important providers of commercial credit data. Dun & Bradstreet (D&B), with headquarters in the US, is another major provider of commercial credit data. D&B also provides networked services with respect to credit scoring and credit information on cross-border clients (e.g. if a German company needs information of a Spanish firm). However, this is a closed network. The information is provided only to members that pay an annual fee.

Data are shared among the ‘closed user groups’ operating within the credit bureaus that govern, using the principles of reciprocity, access to data sourced from credit accounts. These groups prevent non-financial lenders, such as trade creditors, and indirect financial creditors, including investors in securitisations, from accessing data provided by direct financial lenders, such as banks. There are also closed user groups around specific financial products, such as business current accounts, which restrict the sharing of information on those products to just those lenders offering those products.

Data subjects, whether individuals or businesses, can access information held about them in credit bureau databases for verification purposes and information sourced publicly is generally available to all their customers. However, access to credit data obtained from proprietary sources is currently governed by the principles of reciprocity. These principles are determined by the Steering Committee on Reciprocity, made up of credit industry trade associations, credit industry bodies and credit bureaus. The principles ensure that companies seeking to access shared data from credit bureaus receive credit performance information of the same type that they contribute and that companies contribute all the data that they have available. So for example, if a lender only contributes negative credit information (i.e. that relating to defaults or other adverse credit events) they will only be able to access negative credit information from the credit bureaus.

Box B. Current initiatives in the UK to improve credit information

There are currently four initiatives underway in the UK in order to improve access to credit data on SMEs and micro-firms:

1. Legislation on SME data sharing

The UK Government has taken legislation (the small business, enterprise and employment bill 2014–15) through the House of Commons and House of Lords. It will require banks to share (with permission) data on their SME customers with designated private credit bureaus. The legislation will also require those bureaus to provide access to that data to any finance provider that has the SMEs permission. The data will be set out in legislation but they will mainly cover payment performance (positive and negative), default data on loans, business current accounts and credit cards. It will also cover business current account turnover data.

Currently a lack of SME credit information can act as a barrier to market entry. The policy intention is to improve the data available and open up access to the data that is shared, ensuring a level playing field for alternative finance providers and new entrants, increasing diversity of supply in the SME lending market.

Next steps: Following agreement by both Houses on the text of the Bill it received Royal Assent on 26 March 2015. The Bill is now an Act of Parliament (law) and implementation could be achieved in Q3/Q4 2015.

2. Bank of England consultation on a central credit register

The Bank of England (BoE) is also consulting on what benefits could be realised from a UK central credit register. They launched the discussion paper ‘Should the availability of UK credit data be improved?’ in May 2014, asking for comments and views by the 29 August 2014. This complements the above measure initiated by the UK Government and asks what would be the incremental benefits, over and above the Government’s proposals, of such a register in the UK. Three key incremental benefits are highlighted in the paper: securitisation, trade credit and access to public data. The paper also asks how, if a credit
register were seen as desirable, it could be best delivered through, for example, the existing infrastructure provided through private credit registers. On 28 November 2014, the BoE published a summary of feedback received from its discussion paper, concluding that the majority of respondents supported the improvement of the existing reporting infrastructure. The BoE is therefore currently working with market participants and other parts of the government on the following priorities:

**Improving access to credit data for trade credit providers**

BoE agrees with respondents that substantial benefits could be delivered for financing of SMEs through business-to-business lending or trade credit (delayed payment for goods and services provided), if providers of trade credit were able to benefit from the information credit bureaus receive from mainstream credit providers. Currently trade creditor’s access is prohibited by the principles of reciprocity which govern access to data shared by mainstream credit providers (banks), telecommunication and utility companies.

- BoE is exploring, together with the credit referencing industry, the costs and benefits of using these data to calculate the credit scores and credit limits offered to trade credit providers.

**Use credit data to support market-based financing for SMEs**

BoE agrees with respondents on that greater investor access to credit information (e.g. default data by loan type or sector) would support market-based financing, including via securitisation, for SMEs.

- BoE will work with the British business banks and industry to draft a list of information requirements that would help investors to improve their understanding of the SME asset class and consider investment opportunities. In a second step, BoE will work with the banks and the credit bureaus to explore whether this information can be made available through the existing credit reporting infrastructure.

**Improving access to information from publicly owned sources**

BoE supports the replies which recommended investigating further with HMRC the latter’s VAT register initiative (releasing basic information from the VAT register - see point 4 below); the government’s proposal to establish a public beneficial owners database for companies, containing information on the ultimate owners of companies, and sharing and publishing export data, relating to exporters and the goods they export. Other sources of information mentioned were: HMRC’s tax registers (business tax liability / payment performance) and business rates information.

The BoE clearly states that if cooperation with the industry does not succeed, it will work with the government to explore further legislation to realise the benefits of improved information sharing. And only then it could consider whether a central credit register would offer a better way to deliver the benefits.

3. HM Treasury, Autumn Statement (December) 2014:

The UK Treasury recently released its plan on sharing SME credit data for those banks that cover the majority of the credit business (Royal Bank of Scotland, Barclays, Lloyds Banking Group, HSBC, Santander, Clydesdale and Yorkshire Banks, Bank of Ireland, Allied Irish Bank, and Danske Bank) under proposals in the small business, enterprise and employment bill 2014-15. These banks will be required to share SME credit data with other lenders through credit bureaus and share information on SMEs which have been refused finance.

4. HMRC - use of non-financial VAT registration data in trade credit scoring

In July 2013, HMRC published the consultation document ‘Sharing and publishing data for public benefit’. This included proposals for possible controlled release of non-financial VAT registration data to qualified parties (including credit bureaus) for specific purposes, such as credit scoring.

VAT registration data are economically valuable because it offers the only comprehensive register of UK businesses over the GBP 81,000 per year turnover VAT registration threshold, as well as, those who register voluntarily. It is a unique source of data on unincorporated businesses, on which there are few public data sources. Matching VAT registration data with other information sources (e.g. Companies House, customer, court or bank data) would increase the amount and improve the accuracy of this data. This is likely to improve the quality of business-related services such as credit evaluation, for example. Potential users include credit bureaus, banks and other financial services providers.

**Next steps:** the measures are being taken forward in the small business, enterprise and employment bill.
5. Differences Between the EU and the US

Interviews with the biggest market players in the credit information business in the US, namely D&B and Equifax, were conducted, in order to understand the differences, if any, in their business models with regards to the EU; the importance of credit information for the credit supply of SMEs in the US and, finally, if there were any factors other than credit information which affect SMEs’ access to finance in the US. One of the interviewees praised the developments happening in Europe with regards to the setting up of networks and/or strategic arrangements and partnerships in order to overcome difficulties in cross-border credit information data gathering/sharing.

BI & Scoring firms in the US compared to Europe – differences, if any, between business models

In the US there is no central credit register. Each state has its own rules and laws about which information is held publicly. Basic data on companies are held in business registers at state level. There is no centralised business register. Therefore credit information companies need to collect data from 50 States, from the Secretary of State’s office which usually registers businesses and non-profit organizations. As each state can determine the type of data to file, the amount of data is significantly different between states. The data held are very basic, in most of the cases they contain only the company address and tax number. Annual accounts, for example that are available in public registers in Europe in every Member State, are not available in the US.

BI & Scoring firms in the US have a similar structure to those in the UK, as they are only private, and cover consumer and/or business information. It is also based on a reciprocity model and the acquisition of information.

In the US there is more data sharing happening, e.g. of private consumer information, than there is in the EU. Telecommunications bills are the only exception – these data are not shared by BI & Scoring firms in the US.

On the business information side of the business, D&B is the top specialist information provider. It has effectively established the industry standard, the ‘D-U-N-S Number’, which is very widely used. This is a unique nine-digit identification number for each physical location of a business. D-U-N-S number assignment is free of charge for all businesses required to register with the US Federal government for contracts or grants. Equifax and Experian are active on both, the business information and consumer side of the industry. TransUnion is only active on the consumer side.

The US market is consolidated among a few strong ‘national’ players: Equifax, Experian and TransUnion on the consumer side of the business. The business information side of the industry is highly concentrated, with D&B as the biggest player, followed by Experian and then Equifax which only entered that market five years ago. Creditsafe entered the market in 2012. But, the US market is also fragmented with local credit bureaus which are only present in certain states. Those smaller players provide data to the national players.

BI & Scoring firms collect credit obligation information from thousands of businesses nationwide. These businesses are typically the suppliers or lenders with which a company has existing financial relationships. They also collect legal filings from the various local, county and state courts across the US. Company background information is collected from a variety of independent and/or affiliated firms. For example, a local credit bureau in Georgia provides Equifax, its affiliate, with data.

But, BI & Scoring firms in the US also struggle to identify or obtaining information on micro-firms, start-ups, etc. Lending decisions in relation to these types of businesses should be supported on consumer data of the owner(s) of the business, not the business itself where either no information is available or not sufficient business history.

One of the two companies interviewed felt that the US needed to give small companies more help to access to finance. The only government supported initiative, the ‘US Small Business Administration’ (www.sba.gov), created in 1953 as an independent agency to ‘aid, counsel, assist and protect the interests of small business concerns’, was not felt to be sufficient as it tends to provide more information than assistance.
Do private solutions on credit information play an important role on credit supply of SMEs in the US?

According to the interviewees, the US has a ‘laisser-faire’ attitude towards BI & Scoring firms. It relies on the data they collect and the reports, scores, etc. they publish to support SMEs in accessing finance. The US government’s attitude is that the industry will develop solutions to overcome the data information gaps, i.e. a market-driven solution. By contrast, in Europe, the public sector is much more involved in helping SMEs access finance, both at national and at EU level.

Some initiatives by BI & Scoring firms in the US:

- Equifax offers business solutions for SMEs (see http://www.equifax.com/business/small-business), indirectly helping lenders provide funding to SMEs.
- Scoring (whether for businesses or sectors) is more developed in the US, than in Europe, but has also been around longer than it has in Europe (where historical developments differ widely according to the Member State concerned).

Are there other factors in the US that can overcome information problems?

BI & Scoring firms in the US are more oriented towards trade credit information. They use trade data rather than bank loan data to generate scores. On the contrary, Europe lacks detailed trade credit data. In the US more use is made of trade credit than bank loans because the asset finance market (e.g. invoice discounting, factoring, etc.) is more mature. Alternative financing of SMEs is stronger than in EU.

In conclusion, publicly available information in the US is relatively basic and more heterogeneous than in the EU. In terms of privately available data and credit information the US market seems very competitive. However, market participants confirmed that in terms of market depth, the UK is more developed than the US.

6. EXPERIENCE WITH THE EU SINGLE MARKET

In order to overcome the heterogeneity in data gathering in the EU market, BI & Scoring firms have adopted two main approaches: (i) network building, and (ii) establishing strategic partnerships:

- Networks: several BI & Scoring providers in Europe have formed networks in order to exchange information in an integrated way, using explicit identification data for each company. Scores – which usually differ between BI & Scoring providers in different countries – are mapped. This means network members receive information on a specific company from all member countries which they can then compare on a like-for-like basis. There are currently two large networks in Europe, BigNet (Business Information Group Network, which includes major commercial bureaus) and D&B (Dun and Bradstreet Worldwide Network).

- Strategic arrangements and partnerships: for respondents that have not joined a network, strategic partnerships with similar entities operating in foreign markets are essential and remain the way forward to expand their business in the future. However, in doing so, they still encounter numerous difficulties. An example would be the Federation of Business Information Services (FEBIS), a trade industry group comprised of 80 full members involved in providing both business & consumer credit reports, that works to further develop and enhance the industry in a collaboratively way. In particular, they aim to increase the flow of credit and finance to SMEs.

One of the interviewees praised these private-sector initiatives in the EU which have been established and working for some time. He also said that although they had been very successful, they were not well publicised.

Companies such as Equifax or D&B have been acquiring local players in order to establish an international network independently. There is also the franchise model used by D&B, for example, where a local private credit bureau can franchise the D&B business exchange model.
7. CONCLUSIONS

This current lack of standardised credit information on SMEs has been addressed in the Commission's Investment Plan\(^1\) and in the CMU Green Paper\(^2\) and has been identified as one of the five priorities for action in the short term.

The findings of the mapping exercise show that it is important to improve the availability and sharing of credit information which is necessary for assessing the creditworthiness of SMEs. A minimum set of common, comparable data that is equally accessible by all interested parties is important to widening the investor base for SMEs, increasing competition and fostering the efficiency and integration of SME funding markets.

This is relevant for a wide range of stakeholders including BI & Scoring firms, credit registries, banks, investors, SMEs, and public institutions.

The ‘Doing Business 2015’ report by the World Bank emphasises the importance of the existence of registration institutions (registries) for companies getting credit, particularly, effective systems for secured transactions and credit bureaus/registries can improve access to finance for SMEs. Collateral registries enable potential creditors or buyers to uncover any existing liens over property and allow them to register their own security interests, establishing priority over other creditors in case of the debtor’s default. In addition, credit bureaus/registries reduce information asymmetries making it easier to access finance. It also improves the borrower behaviour and reduces interest rates.

Any potential policy initiative would need to take into consideration the following principles:

- It should not place an additional administrative burden on SMEs.
- The minimum dataset should build on existing models and infrastructure, such as, among others, the work done by the ECB (AnaCredit project started in 2009) on loan level data on non-financial corporates across banks in the euro area, which is used for central bank purposes only. The ECB set of variables is not sufficient to create credit reports for SMEs, but contains useful standardised definitions of loan-level data which could provide a starting point.
- It should take into account the role an appropriate reciprocity model could play (where both parties benefit from data sharing) which is already standard practice in some countries.
- It should facilitate access to ‘positive information (i.e. on the regularity of payments) in addition to negative information (non-payments) on the creditworthiness of SMEs. This is not the case today in some Member States.
- For micro-firms, where there is a more significant gap in credit information, data on a company’s owner should be combined with company data. This considerably improves the credit assessment and related score, thus lowering the cost of credit. However, data protection concerns would have to be addressed.
- The design should facilitate cross-border lending, through sharing cross-border credit information via the existing networks/platforms of BI & Scoring companies.
- It should seek to facilitate market entry in business information.
- It should not counteract existing initiatives and legislation.
- The dataset should be designed with the needs of an identified user base in mind and clearly demonstrate how it meets their needs.
- The initiative should also balance the potentially conflicting interests and objectives of all market participants. It is therefore necessary to consider the extent to which public action should substitute or otherwise ‘nudge’ market-led solutions to the market failures in this area.

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\(^1\) COM(2014) 903 final
\(^2\) COM(2015) 63 final
ANNEX 1: SUMMARIES OF MAPPING RESULTS FOR EACH MEMBER STATE

AUSTRIA

Austria has two public credit registries, its central bank (Österreichische Nationalbank) and Kreditschutzverband von 1870, and various private credit bureaus. Clients of KSV, namely banks, insurance and leasing companies, exchange positive and negative information. It has also a fraud database.

Austria has a fairly broad availability and disclosure of the different sets of variables. Company basic data (publicly from Companies' House and the Chamber of Commerce), credit reporting information (privately, and only from the company itself, and from balance sheets, if available), B2B (privately, mostly from suppliers) – except payment behaviour with telecommunications providers & utilities, annual accounts (only limited and joint stock exchanges) – except off-BS assets, and data of micro-firms (turnover and number of employees are coming from the company itself) – except financial burden if the data are not coming from the cadastral register are available. Some data on executives are not available, such as, personal fiscal data and credit information (except for banks) and none of the public record filings are available, with the only exception of bankruptcies which are available from courts.

BELGIUM

Belgium has one public credit register which is Banque Nationale de Belgique (BNB), its central bank, which is only open to financial institutions and not to private business information companies.

Company basic data are available publicly (Crossroad Bank of Enterprises - Official journal - Central Bank). Data on company activity, company legal structure, and annual accounts are also available publicly with the exception of data on clients which are privately held (by VAT administration but not published publicly). On the contrary, data on suppliers, shareholders and branches abroad, are not available at all. Data on P&L for micro-firms are available publicly, with the exception of turnover and data on mortgage on the property. Credit reporting data are only privately available with the exception of data on monthly instalments. Data on B2B only include personal information regarding outstanding payments provided by business information companies and their private agreements with companies. Data regarding executives are however more heterogeneous in terms of disclosure with data lacking on personal data of executives and their credit information. The remaining data are publicly and/or privately available through the central bank, official journal, NSSO, Crossroad Bank of Enterprises, and Federal Public Service Finances.

BULGARIA

Bulgaria has only the central bank as public credit register and two private credit bureaus (Creditinfo and Experian).

All the data sets for company basic data, company activity (with some limitations in clients, suppliers and banks) and legal structure are mostly publicly available. Data about clients, suppliers and banks are privately available. With regards to executives the information about the CEO is publicly available, but the rest of variables are accessible with limited access or not at all, such as personal fiscal data, personal data of executives, adverse and credit information. Neither credit reporting information, nor B2B data are available at all. With regards to public record filing and specifically to the data sets suits, court actions and collections, a unified identification code of the company and/or the Personal ID number of the person is necessary in order to look for that type of

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4 KSV noted that they answered out of their best knowledge about Austria, without knowing what other companies practices were, above all regarding payment information from telecommunications providers & utilities.
information. Annual accounts data are publicly available, except of number of employees and off-BS liabilities. With regards to micro-firms, only data on mortgage on the property is publicly available.

**CROATIA**

In Croatia there is no public credit register. The private credit bureau HROK was founded by 20 Croatian banks under the auspices of the country’s banking association.

The total company basic data, legal structure and some of the company activity data are available in the public business register, except of the information regarding banks which is available at the central bank and private data base company providers. There are no data available on branches home, subsidiaries and branches abroad, clients and suppliers. Croatia has no official publication (gazette). Regarding executives the only information available through public business registers is common directorship(s) and the CEO. In relation to the credit reporting information data, they are all available through the credit bureau, HROK, but the written consent of the client (individuals and businesses) is required. Users of this credit register, i.e. banks, leasing and credit card companies and other financial institutions can only see the type of lender. The name of the lender is published only in the credit reports companies can buy for their own purpose. B2B, public record filing and information about micro-firms are not available at all. With regards to annual accounts, they are available through Croatia’s national annual accounts registry and private data base company providers, with the exception of data about delay in publication of annual accounts, off-BS assets and if the accounts are audited or not. The latter are not available at all.

**CYPRUS**

Cyprus has two private credit bureaus and one public credit register (central credit register) under the Central Bank of Cyprus.

Company basic data and company legal structure are publicly available (through the Companies Register), while credit reporting information is only privately available, namely through credit institutions. On the contrary, B2B data are lacking entirely. For company activity only data for company status, sector, shareholder, banks, and official publication are available. For executives all information is privately available with the exception of personal fiscal data, data of executives, and adverse information. With regards to public record filing, outstanding payments from governments and payment behaviour of SME with government are not at all available. In annual accounts, P&L and balance sheet are only available for public quoted companies. On the contrary, for all the companies is publicly available data on consolidated disclosure of group accounts and approved/audited annual accounts. The only obtainable information for micro-firms is turnover, and mortgage on the property.

**CZECH REPUBLIC**

The Czech Republic has two private credit bureaus together with their central bank. Their data are available to its users only via the reciprocity principle. The former ones, CRIF and Solus, hold negative and positive data.

All the data sets (company basic data, company activity, legal structure, executives, credit reporting information, B2B, public record filing, annual accounts and micro-firms), are either publicly or privately available, but with some limitations. For example, company activity data are found in commercial registers and in private databases. In the case of shareholder information, the latter might only disclose information for some types of companies, such as limited liability companies, or in special situations (public limited companies with only one shareholder). On the contrary, private databases might go into more details. With regards to branches (home or abroad), commercial registers have only officially registered branches and private databases might go into further detail. The same happens for information regarding executives (available through commercial register and private databases), public record filing (available through public bodies although cumbersome, or sometimes in private databases), annual accounts (available in an unstructured format through the commercial register and only if the company provides the information, or through private databases that sell them formatted) and micro-firms (most of the times only collected on demand and in the case of property, available in the real estate register).
With regards to credit reporting information it is privately available based on the reciprocity principle.

**DENMARK**

Denmark has no public credit register, but private credit bureaus. Credit bureaus only register negative information compiled from their clients and the Danish Official Gazette. The exchange of information is voluntary.

In Denmark there are no data on credit reporting information. Company basic data and their legal structure are entirely publicly available at the central business register. Annual accounts data are provided publicly through the central business register, with the exception of data on off-BS liabilities, off-BS assets, and consolidated disclosure of group accounts. Information on B2B and on micro-firms is available, privately and publicly, with the exception of payment behaviour of SME with telecommunications providers and utilities, and financial burden, respectively. In the case of information about property, access to the information is gained via an electronic citizen ID. There is almost no information available on company activity (only about company status, sector, banks and official publication), executives (only on personal data of executives and sometimes on credit information through commercial credit registers) and public record filing (only on bankruptcies).

**ESTONIA**

In Estonia there is no public credit register at the national bank. It has many companies in the private sector active in the collection of data. Estonian Credit Register was established by Estonian banks in 2001 and it is administered by private company Krediidiinfo; it contains delayed payments for companies and private persons. Krediidiinfo belongs to the Experian Group since 2006.

Company basic data, their legal structure, B2B and micro-firms information are entirely available (commercial register, private credit register or land register). Company activity information is missing data on clients, suppliers and banks. Executives are also missing information on fiscal data, personal data, adverse and credit information. Annual accounts, on the other hand, are lacking data on off-BS liabilities and off-BS assets. There are no credit reporting information data. They need to be filled out by banks.

**FINLAND**

Finland has two private credit bureaus.

They have the complete set of information on company basic data, company legal structure, B2B and public record filing. Annual accounts and micro-firms provide information with a few exceptions such as off-BS liabilities, off-BS assets, on the one hand, and immovable properties and mortgage on the property, on the other hand. With regards to company activity and executives almost half of the information is provided. Lastly, when looking at credit reporting information only data regarding identification of lender (available at the private credit bureaus) and non-performing situation (available at courts) are provided, leaving the other data unaccounted for.

**FRANCE**

Banque de France is public and the only credit register in France. But only credit institutions, credit insurers, ‘intermediaries’ in crowdfunding (and probably soon insurance companies, mutual insurance companies and provident institutions investing in loans under conditions provided for by their respective legislation) have access to it. Scoring entities (SMEs are usually not rated by rating agencies), active in the B2B credit and the supply chain industry, cannot access the information from the Banque de France.

Company basic and company activity data are available (privately and publicly) with some exceptions, being them, branches abroad, clients and suppliers. The data could only be obtained by contacting the company/SME directly. Regarding the executive data, no information is available on personal fiscal data (due to personal data protection law in France), adverse information and credit information if regarding the executive. Data on outstanding payments from government (in the public record filing section), and immovable properties/valuation and mortgage on property (in the micro-firms section) are also not obtainable through any source.

**GERMANY**
There is only one public credit register in Germany in the Bundesbank and a number of private credit bureaus (9).5

Germany has no data at all on credit reporting information. Within the other sections, the following data are not available: clients and suppliers (company activity section); adverse information and credit information (executives section); suits and court actions (public record filing section); off-BS liabilities and off-BS assets (annual accounts section) and finally the financial burden, immovable properties/valuation and mortgage on property (micro-firms sections). The available data are either public coming from the commercial office and register, for example, and/or privately available, through databases of the credit bureaus themselves or directly from the company.

GREECE

Greece has one private credit bureau, the company called Tiresias. The Central Bank of Greece does not assume any role as credit registry.

With limitations regarding the availability of data, Greece discloses the complete set of variables in the following sections: company basic data, company activity and company legal structure. Within company basic data only data for limited liability and public limited companies are publicly available (through official gazette, national registrar and ministry of finance). Other type of companies are available on the web of the Ministry of Finance but not to credit bureaus. With regards to company activity data, the privately available information (subsidiaries, branches, clients, suppliers and banks) is partially provided through inter-company networks or commercial associations (from a small number of companies and/or sole traders). The publicly available information such as company status and sector, for example, is provided on the web of the Ministry of Finance but, once again, not to credit bureaus. With regards to the shareholders, they are only available for limited liability and public limited companies in the official gazette.

Data regarding executives are not available on ultimate owner and personal fiscal data. Regarding personal data on executives they are only available when their companies are limited liability and public limited companies. Credit reporting information is only privately available and only to the financial sector, with the exception of information on identification of lender and lender type which are not available at all. B2B is lacking some data such as payment behaviour of SME with telecommunications providers and utilities, while other information is both publicly and privately available, through inter-company networks or commercial associations. Data on public record filing are publicly available from courts/registries for suits, court actions and bankruptcies. The private credit bureau Tiresias collects this type of information and provides the data centrally and electronically to its clients. Annual accounts are also lacking information, for example data on delay in publication of annual accounts, off-BS liabilities and off-BS assets. Data on balance sheet and P&L are only available for limited liability and public limited companies. Data on micro-firms is privately available (with some limitations) with the exception of immovable properties.

HUNGARY

There is only one public credit register (Central Credit Information System - CCIS) in Hungary. CCIS is developed and managed by BISZ Plc and maintained by GIRO Plc. BISZ Plc is owned by GIRO Plc and GIRO’s owner is the central bank.

Hungary discloses the following sections, whether publicly and/or privately: company basic data, company activity, company legal structure and credit reporting information. For the last one, financial institutions provide the information to the CCIS. With regards to the executives, Hungary does not make available the following information: personal fiscal data, personal data on executives, adverse and credit information. There is no data at all regarding B2B. And with regards to public record filing data on collections and outstanding payments to government are lacking availability. In annual accounts data on off-BS liabilities, off-BS assets and consolidated group accounts are also not available. On micro-firms, there is no disclosure on data regarding immovable properties and mortgage on the property.

IRELAND

The Irish Credit Bureau Ltd is owned by Irish banks and finance companies and maintains register of credit agreements, mainly from individuals but includes SMEs, as well. A public central credit register of credit to individuals and SMEs is currently at inception stage and is expected by 2016/17.

Ireland has disclosure, with some limitations, of the sections company basic data, legal structure, credit reporting information, B2B and annual accounts. B2B, for example, are provided through loading payment ledgers from suppliers. With regards to company activity data on branches abroad, clients and suppliers are not available. The other data, such as, subsidiaries abroad and banks, are available thanks to the investigation undertaken by the credit bureau. Personal fiscal data and credit information on executives are not available. Regarding the public record filing, Ireland does not make information available on outstanding payments from government and payment behaviour of SME with government. With regards to annual accounts, only companies in excess of €8.8 million are required to file P&L data in Ireland. This means that ca. 10-15% of companies are required to file in the public register, out of which ca. 5-10% are SMEs. On the contrary, more than 90% have to file balance sheet data. On the micro-firm section, Ireland only publishes data regarding mortgage on the property.

ITALY

Italy has four private credit bureaus, in addition to their central bank and its central credit register. The latter registers bank loans and inform participants about the aggregate indebtedness.

Company basic and company activity data are available (privately and publicly) with some exceptions, being them, clients, suppliers and banks. With regards to the executives there are no data at all regarding the personal data of the executives. There is another category within the public record filing where there are no data available, neither public, nor private, and which are outstanding payments to government and vice versa, payment behaviour of SME towards the government.

All variables of annual accounts are available through both sources, private and public. Regarding the credit reporting information, data on B2B (except payments behaviours with telecommunications providers & utilities for which no objectively representative data are available) and micro-firms only private sources are available. In the first two cases, there are the credit bureaus or B2B payment databases that have that information and in the last case, it is the Italian Chambers of Commerce and it is only mandatory for companies who have to provide their balance sheet.

LITHUANIA

Lithuania is together with the UK one of the most open countries in terms of information availability. There are up to five private credit bureaus in Lithuania, in addition to their central bank which manages the Loan Risk Database. Commercial banks are required to provide information to the central bank to be able to receive data in return and in general, there is a reporting requirement for supervision purposes. Banks share positive and negative information also through private credit bureaus.

Company basic, company activity and executives data are all available with the exception of information about clients. With regards to the shareholder information there are legal restrictions to access the information on the register for legal entities and shareholder register. Credit reporting information and B2B information is available only through private sources, i.e. credit bureaus. On the other hand, public record filing, annual accounts and information on micro-firms are available through public and private sources, being the exception, outstanding payments from government, for which no information is obtainable.

LUXEMBOURG

Luxembourg has neither a public credit register nor a private credit bureau.

Company basic, company activity data and legal structure are available either publicly through the trade register, or privately, through the company itself. Some data on the executives are not available at all: identification of the owner, personal fiscal data, adverse and credit information. The same applies for credit reporting information.
Only information on the identification of lender and type of credit lines are available. With regards to B2B disclosure, data on commercial credit repayment behaviour and outstanding payments are available gathered through suppliers/debt collection files (only privately available). Payment behaviour of SMEs with telecommunications providers and utilities are neither publicly, nor privately available. The same happens with public record filing, with the exception of bankruptcies. Annual accounts are available, except data on off-BS liabilities and assets. Finally, for micro-firms, no data at all are available on financial burden and mortgage on property.

THE NETHERLANDS

Netherlands has no public credit register, but accounts 13 private credit bureaus.6

Company basic data, (with limited data on clients and suppliers) information on micro-firms (with limited information on all the data) and company legal structure are available, both publicly and privately. Information regarding company activity and executives is also largely available, with the exception of data on banks, personal fiscal data, and adverse information which is missing. Data on public record filing and annual accounts is lacking half of the variables, specifically data on collections, outstanding payments from government, payment behaviour of SME with government, off-BS liabilities, off-BS assets, consolidated group accounts, and audited annual accounts unobtainable. There are furthermore no publicly nor privately information regarding credit reporting or B2B.

POLAND

Poland has no public credit register at the central bank. However, there is private sector activity in the country. For example, BIK (Biuro Informacji Kredytowej S.A.) owned by different banks collects positive and negative information. Banks are required, once they contribute data, to share that information.

Information with regards to company basic data, legal structure, credit reporting information (with the exception of loan details) and annual accounts (with the exception if they are audited or no) is available. Data on company activity in relation to their clients, suppliers and banks are not available. With regards to executives no information is available on personal fiscal data, nor adverse information or credit information. On B2B no data are available on payment behaviour of SME with telecommunications providers and utilities. In Poland, there are neither publicly, nor privately available data on public record filings (with the exception of bankruptcies) and micro-firms. On the latter some information is available in the Central Registration and Information on Economic Activity, mainly name, company’s seat, owners, and company activity. Entrepreneurs, on the contrary, are registered in the National Court Register. There is information on outstanding tax and tariff duties, arrears towards the social insurance contribution, creditors and value of outstanding debt are available. Additionally, Poland has a Register of Insolvent Debtors (RDN) constituting a supplemental repository of knowledge on natural persons being in debt.

PORTUGAL

Portugal’s central bank has registered credits. It is part of the supervisory functions of the bank and contains information on credit extended by participants to individuals and organisations. The data from the central bank is shared only with banks. The private sector is fairly competitive market with five private credit bureaus.7

Company basic data, company legal structure, and annual accounts data are all available. Information on micro-firms is not available at all. Half of the data on company activity are available, but data on subsidiaries and branches abroad, clients, suppliers, and banks are missing. There is furthermore no information provided at all for credit reporting information and B2B, while data are largely lacking for executives and public record filing with only information provided regarding CEOs, court actions and bankruptcies. For micro-companies the data are very spare.

ROMANIA

Romania has a central credit register which is held by the National Bank of Romania.

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Information on company basic data and its legal structure is available from the National Trade Register Office (NTRO) and the Ministry of Public Finance (MPF). Partial data on executives is available from NTRO, more specifically the names of authorised persons such as directors, administrators or board members, but also their date of birth. With regard to the other sections, data disclosure is quite heterogeneous. On the company activity category, data are available with some exceptions (clients, suppliers and banks), whereas on the credit reporting information side, there is no accessible information on types of credit lines and monthly instalments. Furthermore, in B2B there is no payment behaviour of SME with telecommunications providers and utilities available. With respect to public record filing, Ministry of Justice and/or NTRO provide information on suits, bankruptcies and court actions. Moreover, there is no data available about the delay in publication of the annual accounts, nor about the off-BS liabilities and off-Balance Sheet assets, or consolidated group accounts. With regards to micro-firms, the only information not available is on mortgage on the property.

SLOVAKIA

There is one public credit register, Register of Bank Loans and Guarantees (only information on legal persons and natural persons/entrepreneurs) which belongs to the National Bank of Slovakia. There are three private credit bureaus.

A complete data section is only available in company basic data and its legal structure. In all the other sections there are always some data missing. In company activity only data on company status, sector and shareholders are available; in executives, on common directorships; in credit reporting information, on types of credit lines, monthly instalment and non-performing situation; in public record filing, data on suits, court actions, bankruptcies and payment behaviour of SMES with government are disclosed; in annual accounts, on balance sheet, P&L and audited accounts are available and finally, on micro-firms, data on immovable properties. There are no data at all on B2B.

SLOVENIA

The public credit register has been set up in 1994 at the Slovenian central bank with an additional credit bureau called SISBON which only covers natural persons. There are some private credit bureaus in Slovenia, such as Bisnode, that collect and process the information of SMEs.

Company basic, company activity and legal structure data are available, with the exception of the information about clients and suppliers. Data on executives are only available about the ultimate owner and common directorships. With regards to credit reporting information data on the type of credit and monthly instalments are not disclosed. The rest of information is held by the central Bank (Bank of Slovenia), but only if the lender is a Slovenian bank. With regards to B2B and public record filing only information about outstanding payments and bankruptcies, respectively, is available. Information on annual accounts is all available with the exception if the accounts are consolidated or not. Regarding micro-firms only data on number of employees are available.

SPAIN

Spain has three private credit bureaus together with the credit register in the central bank. The data from the central bank is shared only with the banks.

For company basic, company activity, legal structure, B2B, and public record filing data are available, whether public and/or privately, although with some limitations. Company activity data such as company status, shareholders, subsidiaries (home, abroad) and branches (home, abroad), are not always available. Annual accounts information is partially available, excluding data on off-BS liabilities and off-BS assets. Information regarding executives and credit reporting information is not available at all, as this information is normally not used in credit reports, or in credit bureaus, with the exception of information about lender (type) which is sometimes available.

SWEDEN

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8 Natural persons which are not entrepreneurs are excluded from the register.
Sweden has 12 private credit bureaus approved by data protection, of which 5-6 are active. It has no public credit register.

*Company basic data, company legal structure, public record filing* are all available. *Annual accounts* information is furthermore all available with the exception of off–BS liabilities and consolidated group accounts. About half of the variables are available for *company activity* where information regarding sector / subsector of economic activity, shareholders, clients, suppliers and banks is not accounted for. Information regarding *executives* is largely available, lacking data on personal data. Data on ultimate owner and credit information is only available for sole traders. Data on *micro-firms* are equally available, although mainly privately, and with lack of information regarding number of employees, and immovable properties. All data for *credit reporting information* and *B2B* data are available with the exception of data on monthly instalments. But in the first case, the information is only provided for sole traders, and in the second case, it is provided by a limited number of companies.

**THE UK**

In the UK there are six private credit bureaus, multiple resellers and other smaller market players. There is no public credit register in the UK, but the private sector is quite competitive, with a developed infrastructure for data collecting and sharing in closed user group (e.g. bank/credit reference agencies) based on reciprocity principle.

*Company basic* data including the identification of common directorships is publicly available, filed with Companies House. But, on the contrary, what companies do not disclose is information regarding their clients and suppliers considered highly confidential. Basic information on executives is held by consumer credit bureaus (Experian, Equifax and Call Credit) and is disclosed to their members. In some cases companies may disclose information also with respect to subsidiaries abroad that is also publicly filed in Companies House.

Information on loans, types of credit, limits and overdraft are shared by banks in closed groups. This means that credit information firms are able to storage the data for own purposes and use it (e.g. Equifax ‘Insight’ and Experian ‘CAIS’), but they are not allowed to disclose or give the information further. Personal credit information on executives is not made available, neither outstanding payments from government and payment behaviour of the SME towards the government.

The *annual accounts* data and off-balance sheet items are publicly available for all limited companies through Companies House. However, micro-companies and sole traders have no obligation to register. As result, considerably less data are made available for micro-firms compared to the limited liabilities companies. Turnover for micro-companies is not available. It is approximately derived from the balance sheet data and other collected information.

**ANNEX 2: COMPANIES AND INSTITUTIONS CONTACTED FOR THE MAPPING SURVEY**

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<th>Country</th>
<th>Company/Institution</th>
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<td>Austria</td>
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<td>Cyprus</td>
<td>Artemis Bank Information Systems</td>
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<td>Solus</td>
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<td>Krediidiinfo (an Experian Company)</td>
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