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# Banking Distress in Europe in the Context of the Global Financial Crisis – the Role of Capital Flows

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Mislav Brkić

Zagreb, June 2019





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## Abstract

This paper describes three different channels through which the global financial crisis affected European banks. The first channel was related to the direct losses that they took as a result of their exposure to mortgage-backed securities in the US. The second channel was related to the deterioration of global liquidity conditions after the failure of Lehman Brothers in September 2008. Finally, the third channel appeared in countries with severe macroeconomic imbalances, whose sharp correction during the financial crisis caused a deep recession, resulting in significant credit losses in their banks. A better understanding of these issues is required in order to define appropriate policies to enhance the resilience of European banks.

**Keywords:**

banking crisis, capital flows, financial integration

**JEL:**

E52, E58, F36, G01, G21

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## 1 Introduction

The global financial crisis negatively affected many European banks. This paper identifies and describes three main channels through which these effects materialized. The first channel stems from the direct losses that European banks suffered due to their exposure to the credit derivatives market in the United States. Because of a sudden decline in house prices in the US, the market value of mortgage-backed securities fell sharply, which caused substantial losses to investors who held such instruments, including a few large European banks. The second channel is related to the sudden deterioration in liquidity conditions following the collapse of Lehman Brothers in September 2008. That event led to a sudden increase in global risk aversion, as many investors believed that further bank failures would follow. In such an environment, it became increasingly difficult for banks to obtain funding in the market, especially for those that were believed to have poor asset quality. Finally, the third channel emerged in countries that in the pre-crisis years had registered a widening of macroeconomic imbalances, in terms of large current account deficits and domestic demand overheating. Following the outbreak of the global crisis, these imbalances quickly narrowed, contributing to the economic decline. In the context of the deep recession, banks reported substantial losses due to significant deteriorations in their loan portfolios.

Of the three channels mentioned, the second and the third also affected banks that had not previously been involved in the derivatives market in the US. This paper investigates what stood behind their high vulnerability to external shocks. In some European countries, the main source of banks' vulnerability was their high exposure to real estate markets. As housing markets began to cool down in 2007, the quality of loans to construction and real estate companies started to deteriorate. In some other countries, the main problems were the fiscal and external imbalances – such as sizeable budget and current account deficits and external debt – that had built up during the earlier period. After the outbreak of the global crisis, those countries were no longer able to cover macroeconomic imbalances by borrowing from abroad, so they had to correct their imbalances in the midst of the recession. The rapid correction of imbalances imposed a heavy toll on the real economy and the financial system.

This paper shows that banks' foreign borrowing played an important role in fuelling the rapid credit growth that was the main factor behind the widening of imbalances. With the benefit of hindsight, it is now clear that, by borrowing abroad, banks had become more exposed to credit and refinancing risk. Exposure to credit risk increased as a result of unsustainable expansion of domestic demand, which was driven partly by aggressive bank lending. On the other hand, refinancing

risk increased due to banks' greater reliance on external funding sources, access to which could deteriorate in the event of a major global shock. In that context, it is argued that cross-border banking flows increased the vulnerability of European banks to global financial shocks. However, after the crisis, a series of regulatory reforms have been implemented both globally and in the EU, with banks becoming better capitalized and much less dependent on external funding.

In Croatia, banks were primarily influenced by the third channel of the crisis. Specifically, as the economy dipped into a recession after several years of unsustainable expansion, banks faced a significant deterioration in asset quality. Despite this, all major Croatian banks remained sound and well capitalized with a strong deposit base, so there was no need for expensive government intervention in the banking system as in some other European countries.

Many papers have dealt with the causes of the global financial crisis and its spillovers on the financial system and the wider economy.<sup>1</sup> However, none of them provided a detailed overview of the various channels through which the global crisis affected European banks. This paper aims to fill this gap by identifying the transmission channels and by linking these channels with the main sources of bank vulnerability at the onset of the crisis. A deeper understanding of these issues is required in order to define an appropriate policy mix that will enhance the resilience of European banks to global shocks. Having in mind the serious difficulties experienced by those banks that relied on external funding to sustain rapid credit growth in the pre-crisis period, it is clear that macro-prudential policies will have an important role. However, the crisis has shown that sound bank balance sheets are not always a sufficient guarantee of financial stability, particularly if large fiscal or other macroeconomic imbalances undermine investor confidence. This raises the importance of the EU's economic governance mechanisms to promote responsible policymaking and timely correction of macroeconomic imbalances.

The paper is structured as follows. The second chapter discusses the turmoil in the US credit derivatives market and its impact on European investment banks, and explains how this turmoil was transformed into a global crisis, which affected a wider range of European banks. The third chapter analyzes the main factors behind the high vulnerability of European banks, special attention being devoted to the link between the developments in the housing market and bank balance sheets. The fourth chapter examines the volume and sectoral composition of capital flows in order to establish whether banks relied on external borrowing to sustain strong credit growth in the pre-crisis period. The fifth chapter provides a short conclusion.

1 E.g. Bertaut et al. (2011), Borio and Disyatat (2011), Brunnermeier (2009), Obstfeld and Rogoff (2009), Noeth and Sengupta (2012).

## 2 The impact of the global financial crisis on European banks

### 2.1 Roots of the global financial crisis

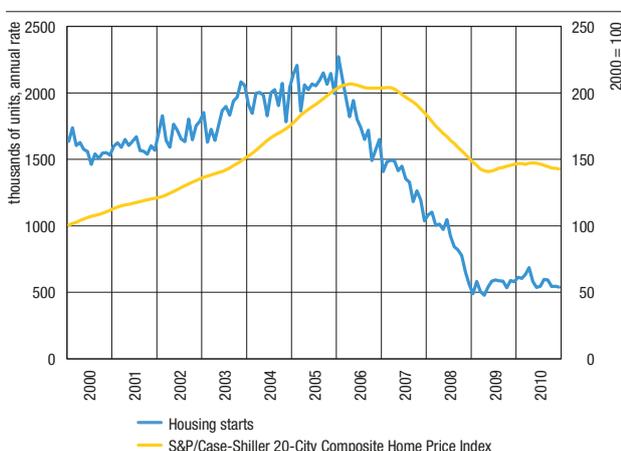
#### 2.1.1 Boom-bust cycle in the housing market in the US

The collapse of the large investment bank Lehman Brothers in September 2008 marked the beginning of the global financial crisis. However, the failure of Lehman was only a culmination of tensions in the financial markets that had been evident since the summer of 2007. These tensions arose from the negative feedback loop between housing market developments in the US and the balance sheets of financial institutions that were directly or indirectly exposed to that market. The high exposure of banks to the housing market was a reflection of the rapid credit expansion during the first half of the 2000s. The literature suggests that important factors behind the credit expansion were the abundant capital inflows to the US and the expansionary monetary policy of the Federal Reserve System (Fed) (Brunnermeier, 2009; Obstfeld and Rogoff, 2009).

The sizeable inflows of foreign capital to the US were partly a reflection of Asian countries' large current account surpluses. These inflows certainly contributed to the general decline in global interest rates seen in the first half of the 2000s. However, capital inflows stemming from European banks' investment activities had a larger influence on the pre-crisis credit dynamics in the US. In particular, while Asian countries invested their reserve assets mainly in US government debt securities, large European banks were rapidly increasing their exposure to the subprime mortgage market. Some authors argue that European banks' involvement in the credit derivatives market had a major role in fuelling credit expansion and housing market overheating in the US (Obstfeld and Rogoff, 2009; Bertaut et al., 2011; Borio and Disyatat, 2011).

Figure 1 shows that after several years of continuous upswing, in 2006 house prices in the US started to fall, while roughly at the same time housing construction began to slow down. While a vast literature has emerged after the crisis

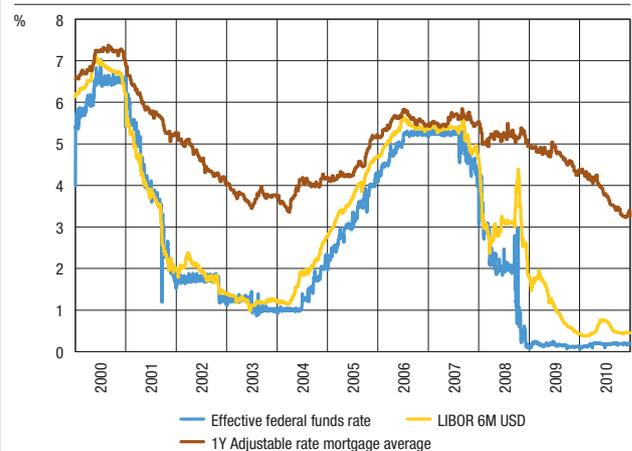
Figure 1 Housing construction and house prices in the US, 2000-2010



Source: Federal Reserve Bank of St. Louis.

explaining the connection between the housing market correction in the US and the global financial crisis, just a few authors have tried to identify the proximate triggers of the decline in house prices. Taylor (2007) argued that the adjustment in house prices was ignited by the sudden tightening of the Fed's monetary policy after several years of loose monetary conditions. The data presented in Figure 2 support such claim. Between June 2004 and June 2006, the Fed increased its key policy rate by more than 4 percentage points. The tighter monetary policy was quickly transmitted to reference rates, such as LIBOR, and this in turn resulted in a substantial increase in mortgage interest rates. The International Monetary Fund (IMF) also noticed the relation between the Fed's rate hikes and the adjustment of house prices. The IMF (2006) claimed that higher interest rates led to a weakening in the demand for housing, which, in the context of still rising supply, triggered a turnaround in house prices. The deteriorating outlook for the housing market in turn caused a sharp slowdown in housing construction.<sup>2</sup>

Figure 2 Reference rates and mortgage interest rates



Source: Federal Reserve Bank of St. Louis.

Many countries in the past experienced boom-bust cycles in the housing market, which usually generated large costs for the financial system. The housing market correction in the US differs from similar events because it even affected foreign financial institutions that seemingly had not directly contributed to the formation of the house price bubble. The widespread securitization of mortgage loans in the US is the main factor explaining why an adjustment of the housing market in one country led to global financial turmoil. As explained by Brunnermeier (2009), at the beginning of the 2000s there was a structural change in bank business models in the US, with banks moving away from the so-called originate-to-hold model – in which loans were kept on balance sheets until maturity

<sup>2</sup> IMF (2007b) noted that in the second half of 2006 housing investment in the US shrank by 19 percent year on year.

– and towards the originate-to-distribute model. This model assumes that most of housing loans are pooled and sold as mortgage-backed securities soon after the origination.

The idea behind the securitization of loans is not wrong as such, as there are certain benefits that may arise from transparent and simple securitization (Duffie, 2008; Segoviano, 2013). However, the way securitization was performed in the US was imprudent and risky. First, loan originators were not required to keep a proportion of loans on their balance sheets. Aware that loans would be sold immediately after their origination, mortgage lenders did not have appropriate incentives to carry out detailed screening of borrowers. This led to a notable deterioration in credit standards, with a rapid increase in the share of risky, subprime loans (Allen and Carletti, 2010; Keys et al., 2010). Second, by engaging in multiple securitizations, financial institutions transformed risky subprime loans into seemingly safe instruments, which were acceptable even to conservative institutional investors. Rating agencies played a key role in promoting such risky investments, as they often assigned the highest credit rating to the senior tranches of these derivatives (White, 2010). All the risks stemming from imprudent securitization materialized after the housing market entered a downward spiral in the second half of 2006.

### 2.1.2 Turmoil in the credit derivatives market in the US and the initial response of the Fed

The decline in the prices of mortgage-backed securities began in February 2007 as it had become evident that a significant part of subprime loans was non-performing. It accelerated further in the middle of the year when a major rating agency announced that it was considering downgrading a large number of highly rated credit derivatives (Brunnermeier, 2009). The turmoil escalated in August 2007 when BNP Paribas announced it was going to temporarily suspend redemptions from its US based investment funds due to inability to value mortgage-backed derivatives. Following that announcement, interest rates in US money markets rose, while the volume of interbank lending shrank considerably. The result was a worldwide shortage of US dollar liquidity.

The Fed undertook several measures to supply financial markets with additional dollar liquidity. In mid-August 2007, the Fed made certain adjustments with regard to its standing facilities (Armantier et al., 2008). In particular, banks' borrowing from the discount window was made more affordable and the maturity of these operations was extended. Furthermore, in September the Fed began the cycle of policy rate reductions, even though the US economy was then still growing. Nevertheless, these measures were not sufficient to alleviate the mounting liquidity pressures. Most banks did not want to borrow from the Fed's discount window because they were worried that other creditors would see it as a sign of weakness. This encouraged the Fed to introduce in December 2007 an alternative type of liquidity auctions – the Term Auction Facility (TAF). The TAF was more appealing to banks because it was organized according to a pre-defined time schedule rather than by individual banks' requests, while the interest rate was determined in a market-based manner. The large amount of funding provided through these auctions suggests that the Fed, by introducing the TAF, managed to avoid the problem of stigma, which is associated with discount window borrowing.

Many large European banks also had a great need for US

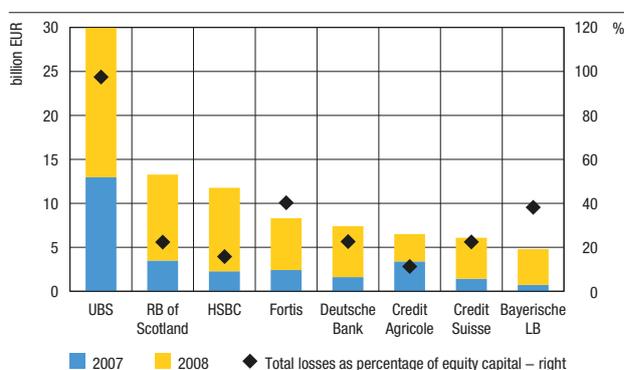
dollar funding. Until the start of the turmoil, these banks relied on a business model in which they would borrow dollars in US money markets to finance their international activities, including trading in credit derivatives. As money market conditions began to deteriorate, many of these banks were no longer able to refinance large stocks of short-term dollar liabilities (Fleming and Klagge, 2010). In order to alleviate the problem of US dollar shortage in Europe, in December 2007 the Fed arranged foreign exchange swaps with the European Central Bank (ECB) and the Swiss National Bank (SNB). In this way, the Fed significantly increased the capacity of the ECB and the SNB to provide much-needed US dollar funding to banks in their jurisdictions.

## 2.2 European banks' losses related to the US credit derivatives market

The British bank Northern Rock was the only large bank whose failure was directly associated with the turmoil in the summer of 2007. This bank was mainly focused on mortgage lending, while the main sources of funding were loan securitizations and short-term borrowing in money markets. After the turmoil in the derivatives market escalated and money market conditions worsened, Northern Rock was no longer able to meet its large short-term liabilities (Shin, 2009).

As regards other large European banks, the impact of the turmoil was felt mainly through losses on mortgage-backed securities. Figure 3 presents the estimated losses of eight large European banks stemming from their exposure to the US credit derivatives market. Most of these losses were recognized by mid-year 2008. Each of these banks suffered losses of at least 5 billion euro. While these losses were not exceptionally high relative to total assets (less than 2% of total assets), they were substantial in relation to their capital. The large ratio of losses to capital was a reflection of the high leverage that these banks maintained in the pre-crisis period. The median leverage ratio for the banks under review stood at 32, while two of them had a leverage ratio higher than 50. In such conditions, losses equal to 1% of total assets could deplete a third or even a half

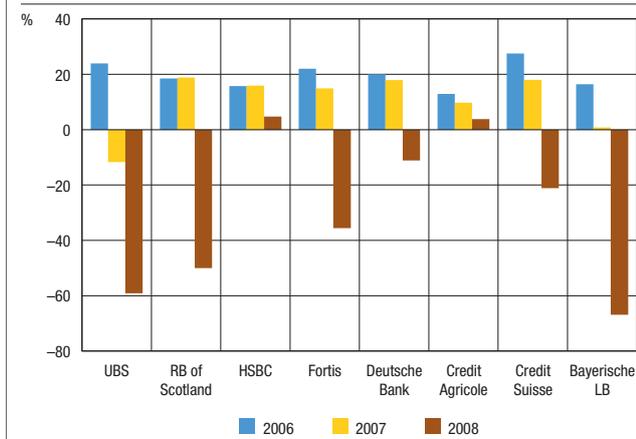
Figure 3 Estimated losses<sup>a</sup> of European banks caused by the turmoil in the derivatives market



<sup>a</sup> Estimated losses include value adjustment of housing loans and positions in credit derivatives backed by subprime and Alt-A housing loans (including CDOs), value adjustment of instruments for credit risk protection issued by specialized institutions (monoline insurance providers) and value adjustment of derivatives based on commercial real estate loans.

Sources: Banks' financial statements for 2007 and 2008, and author's calculations.

Figure 4 Return on equity (ROE), 2006-2008



Sources: Banks' financial statements for 2006, 2007 and 2008.

of the total capital stock of a bank.

The losses resulting from the crisis in the derivatives market were recognized as costs in the banks' profit and loss statements. As a result, large European banks reported a sharp decline in profitability since the second half of 2007 (Figure 4). Against the background of higher global risk aversion, market funding became less available and more expensive, which put additional pressure on earnings. Despite experiencing large losses on credit derivatives and having to refinance debts at higher interest rates, most of the observed European banks remained profitable until the second half of 2008, due to the still favourable conditions in their home markets (European Central Bank, 2008). However, following the intensification of the crisis in the fall of 2008, the European economy entered a deep recession and most of the banks under review ended the year with a significant loss (Figure 4).

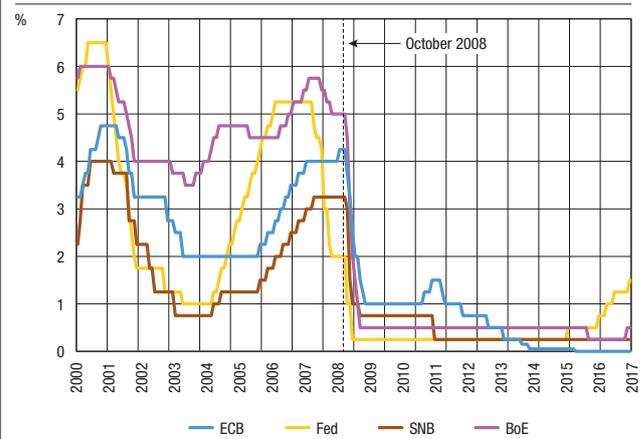
## 2.3 Deterioration of financial conditions following the failure of Lehman Brothers

### 2.3.1 Outbreak of the global financial crisis and the response of major central banks

While many large US banks experienced liquidity problems after the beginning of the turmoil in 2007, until September 2008 none of the large financial institutions failed. The investment bank Bear Stearns was on the brink of bankruptcy in March 2008, but the Fed arranged for this bank to be taken over by another institution. In early September 2008, the US government prevented the failure of the two state-sponsored agencies, Fannie Mae and Freddie Mac, affected by the housing market bust (IMF, 2008a).

However, only a week later, when it became clear that Lehman Brothers was not going to reach a deal with potential buyers, the US authorities decided not to intervene. There is a broad consensus that the main reasons behind the Lehman collapse were its heavy exposure to toxic derivatives, high leverage and excessive reliance on short-term market funding (Calomiris, 2008; Claessens et al., 2010). The bankruptcy was initiated in September 2008 when repo market lenders decided

Figure 5 Central banks' key policy rates



Sources: Fed, ECB, SNB and Bank of England.

not to roll over loans due to fears that Lehman would not be able to absorb further losses on toxic assets (Copeland et al., 2011).

The collapse of Lehman Brothers triggered a panic in the global financial markets, as many believed that further bank failures would follow. Given that it was highly uncertain how vulnerable the balance sheets of individual banks were, investors were extremely cautious with respect to lending to banks.<sup>3</sup> As a result, liquidity in the interbank money and bond markets dried up, causing tremendous liquidity problems to a number of large European banks. Liquidity problems were particularly acute in those banks that seemed vulnerable due to low asset quality, inadequate capital positions and excessive reliance on short-term market funding. Several large banks were virtually cut off from international financial markets.

Under such conditions, governments of the EU member states acted in a coordinated manner to prevent bank failures. In particular, vulnerable systemically important banks were recapitalized, government guarantees for bank liabilities were provided, deposit insurance coverage was increased, and in some countries 'bad banks' were established to remove non-performing assets from the banking system (Stolz and Wedow, 2010; European Commission, 2009). The ECB played an equally important role in restoring stability and confidence in the European financial system. In early October 2008, the ECB reduced the policy interest rates alongside other advanced economies' central banks (Figure 5). In addition to the reduction of interest rates, the ECB increased the volume of funding allocated through the main refinancing operations, while the list of eligible collateral was expanded. Finally, in order to provide a stable source of funding to sound banks, long-term refinancing operations (LTRO) were carried out (European Central Bank, 2010). Many banks participated in LTRO auctions,

<sup>3</sup> The reduction in money market activity was not only the result of higher risk aversion, but also a reflection of the banks' desire to enhance their liquidity buffers. Moreover, money market funds, which had previously been an important source of funding for European banks, reduced significantly the amount of lending to banks because they wanted to maintain sufficient liquidity to be able to meet shareholders' increased redemption requests (European Central Bank, 2008).

with most of them completely replacing weekly main refinancing operations by LTROs. Other key central banks took similar steps in response to the crisis (IMF, 2008a).

### 2.3.2 Liquidity problems of European banks at the height of the global crisis

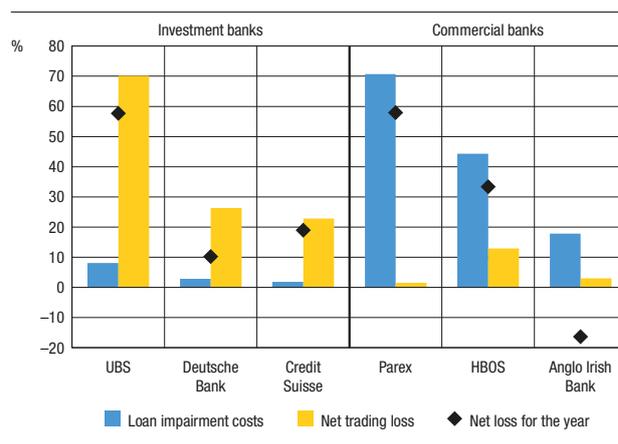
Among the banks that experienced liquidity problems following the collapse of Lehman Brothers were some of the large investment banks, which had reported sizeable losses on credit derivatives a year earlier. For example, the Swiss bank UBS, which among the European banks took the largest loss on derivatives, suffered a large outflow of funds in late-September 2008. The Swiss authorities decided to intervene to prevent the bank from going bankrupt (Swiss National Bank, 2009).<sup>4</sup> The British bank Royal Bank of Scotland (RBS), and Fortis and Dexia were also confronted with severe liquidity pressures following Lehman's demise.

The deepening of the financial crisis in September 2008 also affected banks that were not involved in the credit derivatives market in the US. These include the British bank HBOS, Anglo Irish Bank, Latvian Parex banka and the three largest banks in Iceland. These banks had in common their heavy reliance on the short-term money market as a source of funding.<sup>5</sup> Due to large refinancing needs and poor asset quality, these banks faced great market pressures following the outbreak of the global crisis. In early October 2008, HBOS requested liquidity support from the central bank because it was unable to refinance short-term liabilities (Bank of England, 2015). Unlike HSBC and the Royal Bank of Scotland, which suffered massive losses from trading in derivatives, HBOS was vulnerable predominantly due to excessive credit exposure to the commercial real estate sector. The failure of the Anglo Irish Bank was also caused by a combination of poor loan portfolio and excessive reliance on short-term funding sources. In January 2009, the Irish government nationalized the bank to avoid it going bankrupt (Kelly, 2009). The increase in investors' risk aversion had a dramatic impact on Parex banka as well. This bank, along with other large Latvian banks, relied largely on non-resident deposits to finance rapid credit growth (Purfield and Rosenberg, 2010). However, when the global crisis began, Parex banka faced much stronger pressures than other Latvian banks sharing the same business model. Parex banka was considered to be particularly vulnerable because it was the only large Latvian bank that did not have "deep pockets" – it was not owned by a foreign banking group that could provide liquidity in the event of a bank run.

The global financial crisis triggered a financial crisis in Iceland. In October 2008, the three largest banks, whose total assets were several times higher than Iceland's gross domestic product, failed within just one week (IMF, 2008b). The resulting capital outflows were so severe that a currency crisis

followed, forcing national authorities to deploy capital controls to mitigate depreciation pressures. Claessens (2010) argues that the collapse of Icelandic banks was a consequence of their excessively rapid expansion in the earlier period, which was largely based on volatile external funding sources. The availability of external sources of financing started to worsen in early 2008, when foreign investors, in the context of increased global risk aversion, began to assess more cautiously the imprudent funding profiles of Icelandic banks. Market pressures on Icelandic banks intensified considerably in September 2008 after the failure of Lehman Brothers. In order to prevent its bankruptcy, the Icelandic government decided to take over the third largest bank in the system. This move prompted investors to cut credit lines to the other two large banks, while there was also a significant outflow of deposits from the foreign branches of these banks (Claessens, 2010). Such response of lenders and deponents was a reflection of their fears that if these banks were nationalized, the government would not be able to bail them all out. This was a reasonable assumption given the large

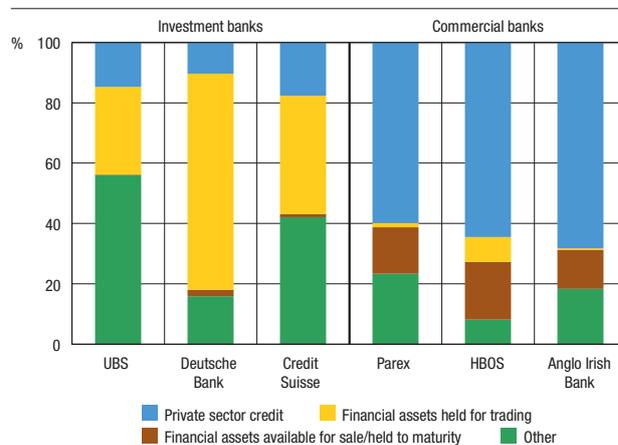
Figure 6 Selected items of banks' profit and loss accounts for 2008, in percent of equity<sup>a</sup>



<sup>a</sup> Values are expressed as percentage of the value of shareholders' equity at the end of 2007.

Sources: Banks' annual reports for 2008.

Figure 7 Banks' asset structure, 2007



Sources: Banks' annual reports for 2007.

4 The Swiss National Bank set up a stabilization fund which took over illiquid assets from UBS worth approximately USD 40 billion, while the government recapitalized the bank by purchasing convertible bonds in the amount of CHF 6 billion.

5 The problem is that short-term market sources can be considerably less stable than retail deposits because they need to be rolled over frequently, which implies higher refinancing risk in the event of market disturbances. Moreover, lenders in the money market are normally other financial institutions, which are very sensitive to changes in the borrower's risk profile. In contrast, retail depositors usually do not respond sharply to bad news since they are completely or partially protected by the deposit guarantee scheme.

difference between the total value of the banks' balance sheets and the size of Iceland's economy.<sup>6</sup>

Figures 6 and 7 confirm that the aforementioned commercial banks differed greatly from large investment banks with respect to the main sources of vulnerability on the eve of the global financial crisis. Figure 6 presents some items of the profit and loss account for the year 2008 for three large investment banks (UBS, Deutsche Bank and Credit Suisse) and three commercial banks (Parex, HBOS and Anglo Irish Bank). The data reveal that, on the asset side, weak credit quality was

the main source of the vulnerability of commercial banks in 2008, as evidenced by high loan impairment costs. In contrast, investment banks were vulnerable due to poor trading results, which were driven by substantial losses on toxic derivatives in the US. This reflects large differences in the balance sheet structure of commercial and investment banks, where lending to the real economy represents the main part of commercial banks' assets, while most of investment banks' assets take the form of marketable securities for trading purposes (Figure 7).

### 3 Exposure of European banks to domestic risks on the eve of the global financial crisis

Based on the discussion in the previous chapter, it can be argued that the global financial crisis affected European banks through two main channels. The first channel stems from substantial losses on mortgage-backed securities, while the second channel was a result of higher risk aversion, which made banks' refinancing in the money market considerably more difficult. In some countries an additional, third channel emerged as well. Specifically, the global financial crisis marked the end of the period of abundant capital flows among EU member states, which strongly affected countries that had previously enjoyed rapid growth fuelled by sizeable capital inflows. This chapter will examine the accumulation of credit risk in the banking systems during the period of high capital inflows, with a particular emphasis on the feedback between bank lending and real estate market trends.

#### 3.1 High exposure to the real estate market

##### 3.1.1 Feedback between bank balance sheets and the real estate market – a literature review

The strong link between bank balance sheets and real estate market developments arises from the fact that bank loans are usually the main source of financing for construction, as well as for final purchase of residential and commercial real estate objects. Therefore, both supply and demand in the real estate market depend on the availability of bank loans. Consequently, a sudden slowdown in credit activity would likely have a stronger impact on construction and real estate development than on other sectors of the economy.

Having a large exposure to construction and real estate development firms can be risky for a bank, given the very cyclical nature of these activities. Their procyclicality reflects the fact that the demand for real estate is highly sensitive to sudden changes in the expectations of households and other investors

in the real estate market. The problem is that households usually shape their expectations by simply extrapolating existing trends (Case and Shiller, 1988). During economic expansions, households typically expect their incomes to continue growing and are therefore more willing to take on long-term housing loans. By contrast, when a recession begins, households' expectations about the economic outlook become more pessimistic and their propensity to borrow falls, causing a weakening in the demand for housing (ECB, 2009b).

The marked cyclicity of output of construction and real estate development activities also stems from some specific features of real estate supply, such as the lengthy development process and slow depreciation of the existing stock of real estate (Davis and Heathcote, 2005). Taking into account that it may take more than a year to construct a new residential or commercial building, there is a risk that the macroeconomic environment will worsen in the meantime, which will in turn make it more difficult for developers to find sufficient demand. Given the very slow depreciation of the real estate stock, construction activity will likely remain subdued for a while until the existing excess supply is absorbed.

The behaviour of banks over the economic cycle increases the output volatility in the real estate sector. Many authors have dealt with the procyclicality of bank lending (Asea and Blomberg, 1998; Jimenez et al., 2006; Dell'Ariceia et al., 2008). The literature suggests that the main factors behind the relaxation of credit standards during expansions are lower perception or risks in the environment of positive output growth and rising collateral values<sup>7</sup>, and harsh competition in the market for bank loans. In contrast, perceptions of credit risk typically increase during recessions and banks respond to this by

<sup>6</sup> Buiter and Sibert (2008) point out that small countries using their own currencies, such as Iceland, can not generally be credible home countries for large internationally active banks. The basic problem is that central banks in such countries are unable to issue convertible currencies, which are necessary for internationally active banks when facing liquidity problems. If due to market disturbances banks are not able to refinance foreign currency liabilities by borrowing in the market, and the central bank does not have the capacity to act as lender of last resort in convertible currencies, the banking system may collapse even if banks are fundamentally sound.

<sup>7</sup> In an influential paper, Bernanke and Gertler (1989) used the theory of financial accelerator to explain the link between the movement of collateral values and the credit activity of banks. Due to asymmetric information in the credit market, the cost of financing for economic agents will depend on the value of the assets they own. Given that the market value of assets is positively correlated with the volume of investment, strengthening of investment activity will be reflected positively in collateral values. The increase in the value of collateral will in turn stimulate further investment growth, as higher collateral values will enable debtors to borrow at more favorable terms. This positive spiral of investment and collateral values will last as long as macroeconomic conditions stay favorable. However, when a strong shock hits the economy, collateral values will start to shrink, undermining the ability of agents to borrow. At this point, the financial accelerator starts to operate in the opposite direction.

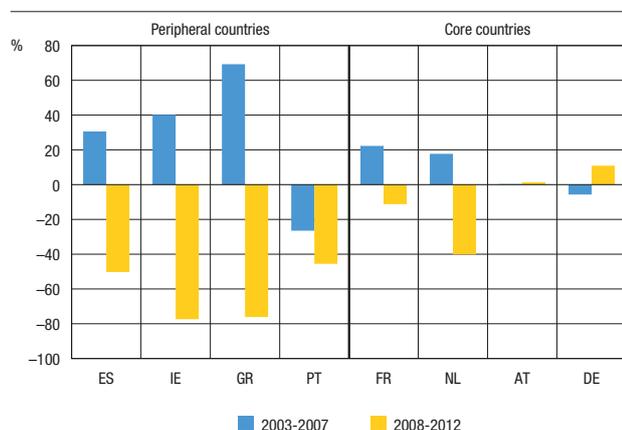
tightening credit standards and cutting their exposure to the real estate sector. The reason is that a recession coupled with house price adjustment will negatively affect the profitability of construction and real estate development companies and thus undermine their debt-servicing capacity. A number of housing loans to households will also likely become non-performing after the bursting of a real estate market bubble (ESRB, 2015a). This reflects the fact that real estate market trends are generally highly synchronized with the business cycle, so it is likely that a real estate market correction will coincide with a decline in disposable income and employment (Davis and Heathcote, 2005). Moreover, some borrowers may decide to engage in what is called strategic default – stop servicing their debts although their financial position has not worsened – if the values of their homes have fallen below the unpaid principal of their loans (Chatterjee, 2010).

### 3.1.2 Developments in EU real estate markets before and after the outbreak of the crisis

Several member states registered in the pre-crisis period a real estate market boom accompanied by a strong credit growth. Although buoyant construction activity had a positive impact on economic growth and employment in these countries, it was later revealed that such a growth model was harmful and unsustainable. Meanwhile, other member states enjoyed a balanced growth – with bank loans and housing construction growing more modestly – and this enabled them to avoid a deep decline after the outbreak of the global crisis in 2008.

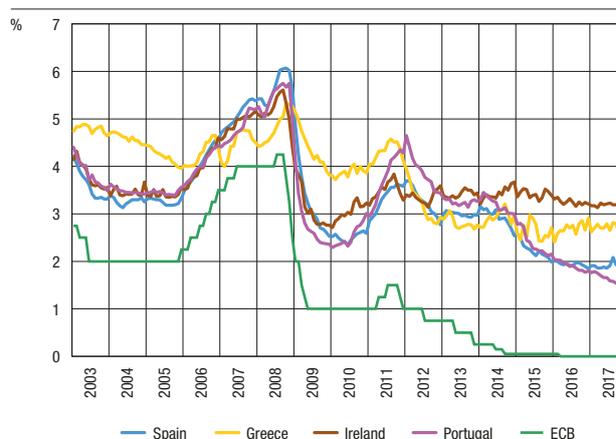
The housing boom was particularly pronounced in the peripheral countries of the euro area. In the years prior to the global crisis, peripheral countries such as Ireland, Greece and Spain enjoyed robust economic expansion. Nevertheless, they failed to achieve sustainable income convergence, given that their growth was mostly driven by excessive domestic demand, which led to a build-up of internal and external macroeconomic imbalances (Gros, 2012). Buoyant domestic demand facilitated the development of non-tradable sectors of the economy, such as construction, real estate development and retail trade. In that context, peripheral countries reported in the pre-crisis

Figure 8 Gross investment in dwellings, selected euro area countries, cumulative change



Source: Eurostat.

Figure 9 Policy rate of the ECB and interest rates on housing loans in the peripheral states



Source: ECB.

years a faster growth in housing investment compared to core countries of the euro area (Figure 8).<sup>8</sup> With hindsight, excessive accumulation of resources in the real estate sector was both a structural vulnerability for their economies and a systemic risk for their banking systems. Specifically, due to great dependence of these countries on housing construction as a driver of income and employment growth, there was a risk that disturbances in that sector could have a severe impact on aggregate economic conditions. Banks were also highly sensitive to real estate market developments, as their exposure to the real estate sector increased considerably during the expansion.

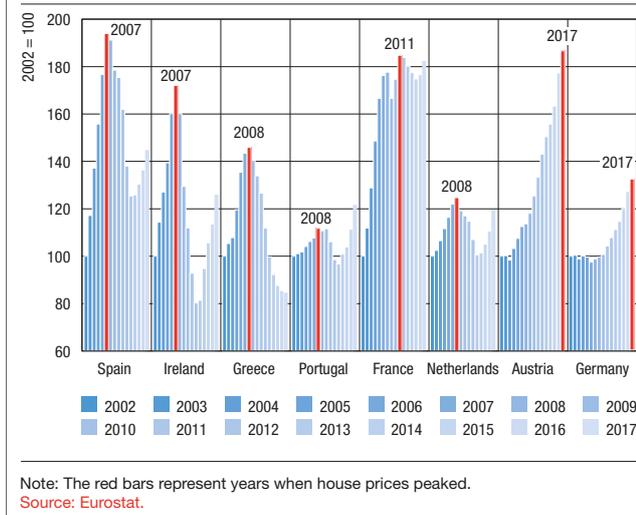
The gradual tightening of the ECB's monetary policy was one of the triggers of the housing market adjustment in peripheral euro area countries (Central Bank of Ireland, 2007; Banco de Espana, 2010). Between June 2003 and November 2005, the key policy rate remained unchanged at the level of 2%, which was consistent with the monetary policy stance of other major central banks. However, in December 2005, the ECB began a cycle of monetary policy tightening, with the key interest rate increasing by 200 basis points in just a year and a half.<sup>9</sup> Tighter monetary conditions were reflected in bank lending rates, including interest rates on housing loans (Figure 9). In the context of higher borrowing costs and overvalued house prices, the affordability of housing in peripheral countries declined, depressing the demand in the real estate market. Changes in expectations also played a role in this turnaround (Ortega and Peñalosa, 2012). In particular, as the likelihood for a house price correction increased due to excess supply, tighter financing conditions and the global turmoil, housing construction was no longer considered to be a profitable investment.

Against such a background, after 2007 peripheral states recorded a sharp drop in housing construction, as well as a

<sup>8</sup> Portugal was an exception because it experienced a housing market boom earlier, between 1997 and 2000, after which housing investment contracted (Banco de Portugal, 2004).

<sup>9</sup> The ECB explained its decision to raise interest rates by the need to stabilize inflation expectations, as in the second half of 2005 the inflation rate exceeded the target level defined as an inflation rate below, but close to, 2% (Trichet and Papademos, 2005).

Figure 10 House price index, selected euro area countries, 2002-2017

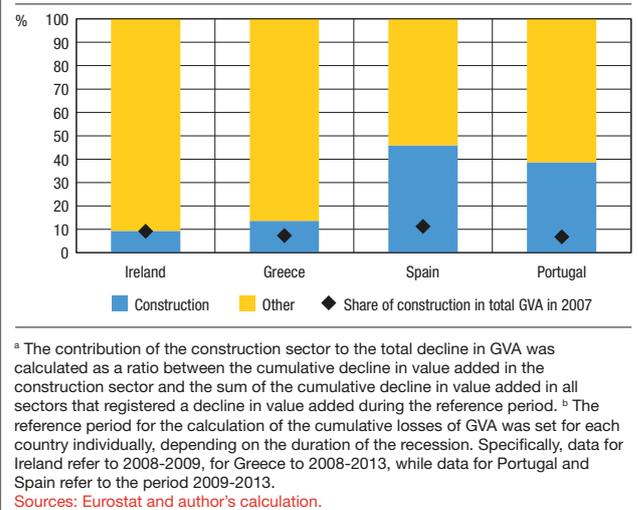


steady decline in house prices (Figures 8 and 10). Interestingly, in some countries housing supply kept increasing for some time despite the marked fall in new housing starts. This was in line with the findings in the literature that housing construction may respond to macroeconomic fluctuations with a lag.<sup>10</sup> For example, Banco de Espana (2010) noted that in Spain housing supply continued expanding in 2008 and 2009, as many construction projects initiated at the peak of the real estate boom were still being completed.

The outbreak of the global crisis in late 2008 and the associated deepening of the recession resulted in further worsening of real estate market conditions in the euro area's periphery. Figure 10 confirms that peripheral countries differed considerably from core countries with respect to housing market trends after 2008. While in most of the core countries house prices continued to grow even in the midst of the global crisis, Spain, Ireland and Greece registered a dramatic fall in house prices, which completely wiped out the value gains from the pre-crisis period. The severe drop in construction activity in peripheral countries had a major impact on the intensity and duration of the recession (Figure 11). Specifically, in most of the countries under review the contribution of the construction sector to the total loss of output was much larger than the share of this sector in gross value added (GVA). In Greece, for example, in 2007 the construction sector represented only 7.3% of gross value added, while its contribution to the total drop in GVA between 2008 and 2013 amounted to 14%. In Spain, the negative impact of the construction on aggregate variables was even stronger: the construction sector with a share of 11% was responsible for around half of the total loss of GVA during the recession. The sharp drop in construction output implied a substantial loss in employment, which added to labour market disturbances in peripheral countries. In Spain and Ireland, more than 40% of the total reduction in employment was the result of massive layoffs in the construction sector. Among the core countries, only the Netherlands experienced a moderate adjustment of the construction sector (De Nederlandsche Bank, 2011).<sup>11</sup>

<sup>10</sup> E.g., Davis and Heathcote (2005)

Figure 11 Contribution of the construction sector<sup>a</sup> to the cumulative decline in gross value added between 2008 and 2013<sup>b</sup>



In the period before the crisis, some new members of the EU had a similar pattern of economic growth to the one seen in Spain, Ireland and Greece. In particular, Baltic states, and, to a lesser extent, Croatia (a future member) and Slovenia based their economic expansions mainly on housing construction and retail trade (Figure 12a). Excessive growth of non-tradable sectors went hand in hand with a rapid growth in house prices. In Latvia and Lithuania, for instance, between 2003 and 2007 house prices increased by 140% and 230%, respectively. The unsustainable growth pattern in the Baltic countries was reflected in large current account deficits and the steady worsening of cost competitiveness indicators.<sup>12</sup> Following several years of overheating, these economies were extremely vulnerable at the onset of the global financial crisis. The severe economic depression in the Baltics that began in 2008 had a particularly strong negative impact on the construction and retail sectors, where value added fell considerably (Figure 12b).

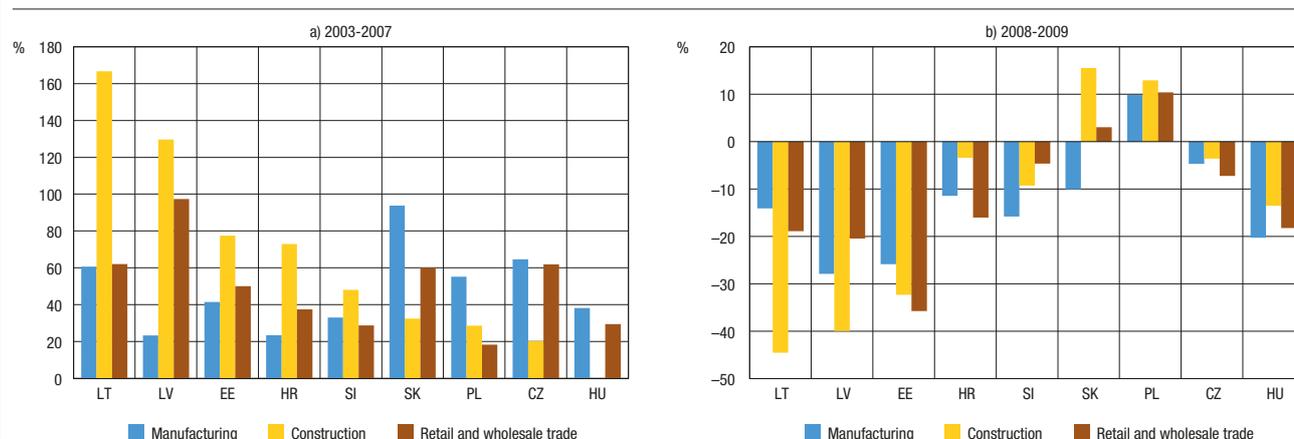
In Croatia and Slovenia there was also a quite strong housing market boom in the pre-crisis period, with house prices increasing by 68% and 81%, respectively, in 2003–2007. However, the real estate bubble was less pronounced than in the Baltics. Accordingly, the adjustment of the construction sector after 2008 was less harsh than in the Baltic states. However, in the environment of a prolonged recession, by 2013 both Croatia and Slovenia recorded a cumulative 50 percent drop in the construction output relative to the pre-crisis levels.

In Poland, Slovakia and the Czech Republic, the key impetus to economic growth in the years prior to the global crisis came from the export-oriented manufacturing sector (Figure 12a). Specifically, between 1999 and 2007 these countries

<sup>11</sup> The Dutch real estate market was in an expansionary phase from mid-1990, supported by favourable borrowing conditions and a tax regime that encouraged households to take on housing loans. Following the escalation of the crisis, households' expectations had become more pessimistic, which weighed on their demand for housing. However, the adjustment of the real estate market was much milder than in peripheral countries.

<sup>12</sup> In 2007, each of the three Baltic countries reported a current account deficit of at least 15% of GDP. Concerning cost competitiveness, in the period from 2004 to 2007, unit labour costs increased cumulatively by 30% in Lithuania, 39% Estonia and 80% in Latvia.

Figure 12 Cumulative change in gross value added by economic activity



Source: Eurostat.

doubled their manufacturing output, while the construction sector expanded only slightly, or even lost ground. Owing to the balanced and sustainable growth in the pre-crisis period, these countries did not suffer from harmful macroeconomic imbalances. This in turn enabled them to show greater resilience during the global crisis. For instance, the construction sector in these countries was generally unaffected by the negative effects of the recession (Figure 12b).

### 3.1.3 Impact of the housing market bust on European banking systems

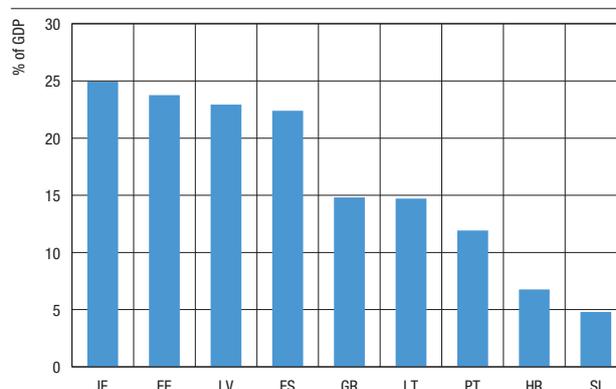
In some member states, the strong upswing in the real estate market before the crisis was accompanied by equally strong credit growth. Figure 13 shows cumulative increase in the stock of housing loans for the period 2004–2007. This figure reveals that housing loans grew rapidly in the pre-crisis period in peripheral euro area countries and the Baltic states. Apart from loans for house purchase, banks in the abovementioned countries granted significant amounts of loans to companies in the construction and real estate sectors. In Spain, Ireland and Estonia, bank lending to these sectors between 2004 and 2007 grew on an annual basis by 34, 45 and 54 percent, respectively.

Due to their heavy exposure to the real estate sector, banks began to face significant impairment losses once the real estate market experienced a downswing. Large losses arising from non-performing real estate loans were in some cases the main financial stability concern, which prompted governments to step in, including through large-scale recapitalizations and asset relief programs, to prevent systemic banks from collapsing. Specifically, in Ireland, Spain and Slovenia, governments committed substantial public resources to support banks burdened with problematic credit exposures to the real estate sector. This was in contrast to the situation in Germany, France and the Netherlands, where banking system support programs were set up primarily to amortize severe losses on toxic US mortgage-backed securities. Government intervention in the banking systems in Ireland and Spain was so large that it raised public debt sustainability concerns. Such a negative feedback loop between bank balance sheets and public finances was at the root

of the European sovereign debt crisis (Acharya, Drechsler and Schnabl, 2011; Mody and Sandri, 2011).

The negative link between the turmoil in the real estate market and bank balance sheets was particularly severe in Ireland. The peak of the real estate boom was reached in the third quarter of 2006, after which the market began to cool down. Already in 2007, Irish banks recognized substantial losses on their real estate portfolios (Kelly, 2009). Conditions in the Irish banking system deteriorated further with the onset of the global financial crisis. In the environment of elevated global risk aversion, vulnerable Irish banks were unable to refinance their market liabilities and thus began to rely on ECB liquidity support (Figure 14). The profitability of the entire banking system decreased considerably, mostly because of high provisions for non-performing loans to the real estate sector (Figure 15). The Irish government took several measures to prevent large banks from going bankrupt. The failing Anglo Irish Bank was taken over by the state, a few systemically important banks were recapitalized, while a specialized entity was established

Figure 13 Cumulative increase in the housing loans-to-GDP ratio, 2004-2007



Sources: National central banks and ECB.

Figure 14 Eurosystem's credit to monetary financial institutions, index (2003 = 100)

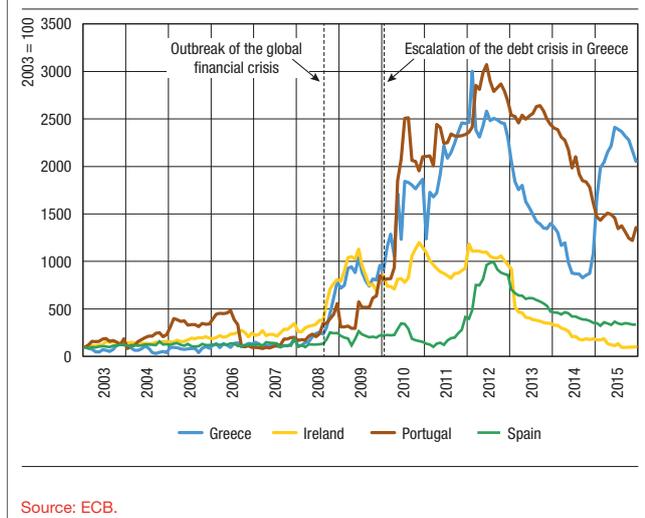
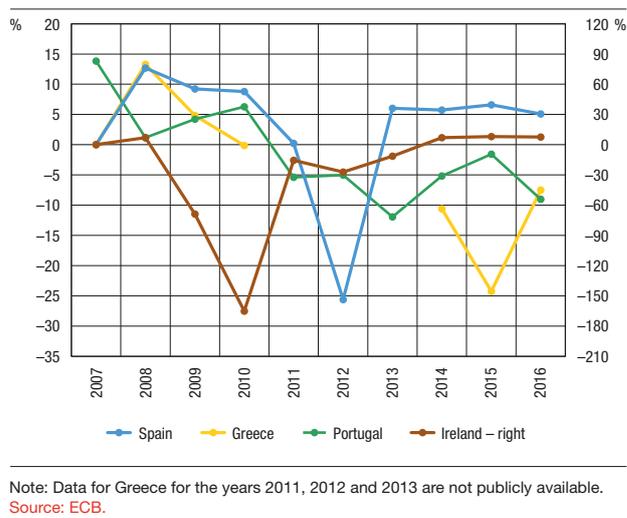


Figure 15 Return on equity in the banking systems



to remove non-performing loans from the banking system. In addition, the Irish government issued guarantees for major banks' liabilities to help them regain access to financial markets (IMF, 2010b). Comprehensive intervention by the Irish authorities had a major role in stabilizing the financial system, but it entailed great costs for public finance.<sup>13</sup>

Spain did not experience a systemic crisis like that of Ireland, but part of its banking system was severely affected by the global turmoil. In particular, following the outbreak of the global financial crisis in September 2008, borrowing conditions for Spanish savings banks (*cajas*) deteriorated considerably, as investors were concerned about their high exposure to the real estate sector (IMF, 2011). By the end of 2010, the share of bad loans in total loans to construction and real estate sectors reached 14 percent (Banco de Espana, 2011). Another source of weakness of the savings banks was their excessive reliance on short-term market funding. While the government took actions to consolidate the savings banks, whereby their number declined by two-thirds, these institutions remained highly vulnerable (European Commission, 2012). Therefore, many believed that the government would need to engage in further capital injections, which would have created additional pressures on public finances. Because of increased investor fears, the risk premium on Spanish government debt rose further, while banks' access to financial markets became significantly impaired, prompting them to borrow heavily from the ECB (Figure 14). The pressures in the sovereign debt market culminated in the first half of 2012, when it was discovered that one large bank (Bankia) needed more capital than previously thought. In order to secure financing for the recapitalization of Bankia and to mitigate market tensions, the Spanish government entered in July 2012 into a financial assistance program with the EU (European Commission, 2012).<sup>14</sup>

Greece and Portugal also experienced adjustment of the real estate market, but this did not generate large costs for the banking systems. In Greece, for instance, the decline in house

prices began later and was much less dramatic than in Ireland. House price growth had decelerated as early as 2006, but the decline in house prices started only after the escalation of the global financial crisis (Bank of Greece, 2009). Initially, the downswing in the real estate market had no strong negative impact on the banking system. Unlike in Ireland and Spain, where exposures to construction and real estate companies were the main source of credit losses, in Greece consumer loans accounted for the largest share of non-performing loans. However, with the further intensification of the recession in the context of a strong fiscal consolidation, the performance of all classes of loans, including loans to the construction and real estate sectors, deteriorated (Bank of Greece, 2014).<sup>15</sup> In Portugal, the real estate market adjustment was even more modest. As mentioned earlier, Portugal did not go through a real estate market boom during the mid-2000s, although it did record a significant deepening of other macroeconomic imbalances. Given that the real estate sector was not overstretched, there was no need for a sharp downsizing of the sector following the outbreak of the crisis. Although there was no housing market bust, Portugal nevertheless faced a prolonged economic slump, which also weighed on the performance of the banking system (Figure 15).

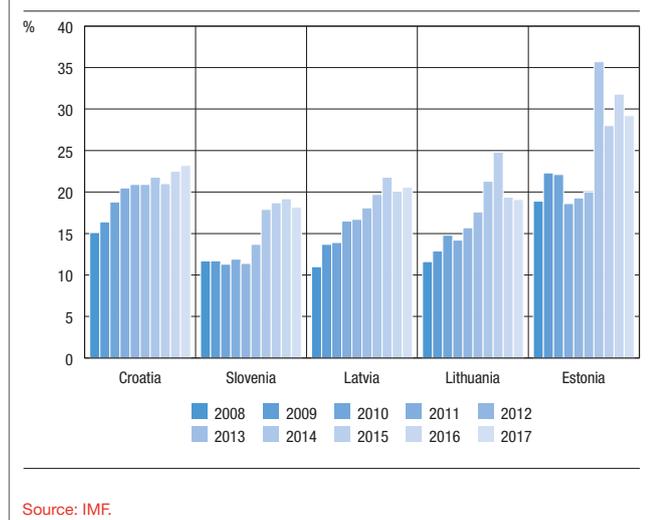
In Slovenia, the Baltic states and Croatia, banks' balance sheets were hit hard by the recession and the real estate market adjustment, but only in Slovenia did this lead to a full-fledged banking crisis. With the onset of the recession, Slovenian banks faced a dramatic deterioration in the asset quality, with loans to construction companies being the most problematic (IMF, 2012). Slovenia was specific among the new EU

<sup>13</sup> Due to the impact of the recession and bank recapitalization efforts, Ireland's government debt increased from 24% of GDP in 2007 to 86% of GDP in 2010.

<sup>14</sup> The key elements of the banking system restructuring program were the recapitalization of vulnerable banks at the individual level and the transfer of bad real estate loans from the banks' balance sheets to a specialized entity. The restructuring program was successfully completed in January 2014. During the implementation of the program Spain spent less than half of the total EUR 100 billion allocated through the financial assistance program (European Commission, 2014).

<sup>15</sup> By the end of 2013, the share of bad loans in total loans reached 46 percent for consumer loans, 31 percent for loans to non-financial corporations and 26 percent for housing loans.

Figure 16 Banking system's capital adequacy ratio, 2008-2017



Source: IMF.

member states because its banking system was dominated by state-owned banks, rather than by subsidiaries of large foreign banking groups. Therefore, when large credit losses began to threaten the solvency of some institutions, the government had to step in, which in turn produced significant pressures on the state budget.<sup>16</sup> By contrast, in the Baltic states the improvement in the banks' capital positions after 2008 was mainly the result of additional capital paid in by foreign parent institutions (Figure 16).

Croatia's banking system showed remarkable resilience during the recession, despite the unfavourable macroeconomic conditions and the associated sharp deterioration in the quality of banks' assets. In the context of a protracted recession and illiquid real estate market, the increase in default rates was the most common among construction and real estate development companies. The performance of housing loans worsened as well, but to a lesser extent.<sup>17</sup> The resilience of Croatian banks largely stemmed from their initial capital and liquidity buffers being very high, enabling banks to absorb credit losses and overcome transitory liquidity disturbances (Bokan et al., 2010; Vujčić and Dumičić, 2016). Since systemically important banks remained fundamentally sound, Croatia, unlike many other countries, did not have to commit large funds from the state budget to stabilize the banking system.

### 3.2 Exposure of European banks to other macroeconomic risks

In some EU member states, difficulties in the banking systems were not a consequence of large losses on toxic credit derivatives or of their excessive exposure to overheated real estate markets. In particular, banking system distress in Greece, Portugal and the Baltic states arose from large fiscal and external imbalances, which negatively affected the confidence of depositors and investors. In Greece and Portugal, the main cause of concern was the rapidly rising public debt, while the Baltic states were vulnerable due to large current account deficits.

Greece and Portugal saw a pronounced deterioration in their budget balances after the onset of the crisis, and a sharp increase in the public debt.<sup>18</sup> Elevated fiscal risks, along with other internal and external macroeconomic imbalances, led to a marked increase in government bond yields, with an unfavourable impact on the banks' cost of funding (Bank of Greece, 2010; Banco de Portugal, 2010). By the beginning of 2010, Greek and Portuguese banks had virtually lost access to financial markets and thus became entirely dependent on ECB liquidity support (Figure 14). Greek banks, in addition to losing access to the market, were further affected by massive deposit outflows and the need to post additional liquid assets as collateral for Eurosystem's refinancing operations.<sup>19</sup> However, the biggest shock for the Greek banking system was the restructuring of Greece's public debt in March 2012. Because of the partial debt write-off, Greek banks had to reduce the value of their sovereign debt holdings by roughly EUR 37 billion, which – together with high loan loss provisions – completely wiped out their capital (Bank of Greece, 2014). The partial Greek debt write-off had an equally dramatic impact on banks in Cyprus, which also held large portfolios of Greek government securities (European Commission, 2013b).

The temporary tensions in the Baltic states' banking systems at the end of 2008 were associated with, at that time, very large external imbalances. Although banks were heavily exposed to the real estate sector, this was not the main cause of concern for depositors and other investors.<sup>20</sup> Depositors and investors were worried that, given the excessive imbalances, the Baltic states could be forced to devalue their currencies against the euro to achieve the necessary macroeconomic adjustment (Ingves, 2010). Excessive imbalances were best seen in large current account deficits and rapidly growing consumer and house prices (Figure 17). Devaluation of national currencies could have been detrimental to the solvency of banks, given the high level of loan and deposit euroisation in the Baltic states. Pressures on banks were particularly severe

16 The Slovenian government contained the crisis by recapitalizing or liquidating a few vulnerable banks, while a large proportion of non-performing loans was removed from the system and placed on the balance sheet of a specialized asset management company (European Commission, 2013). The total costs of the restructuring of the banking system exceeded 10 percent of GDP.

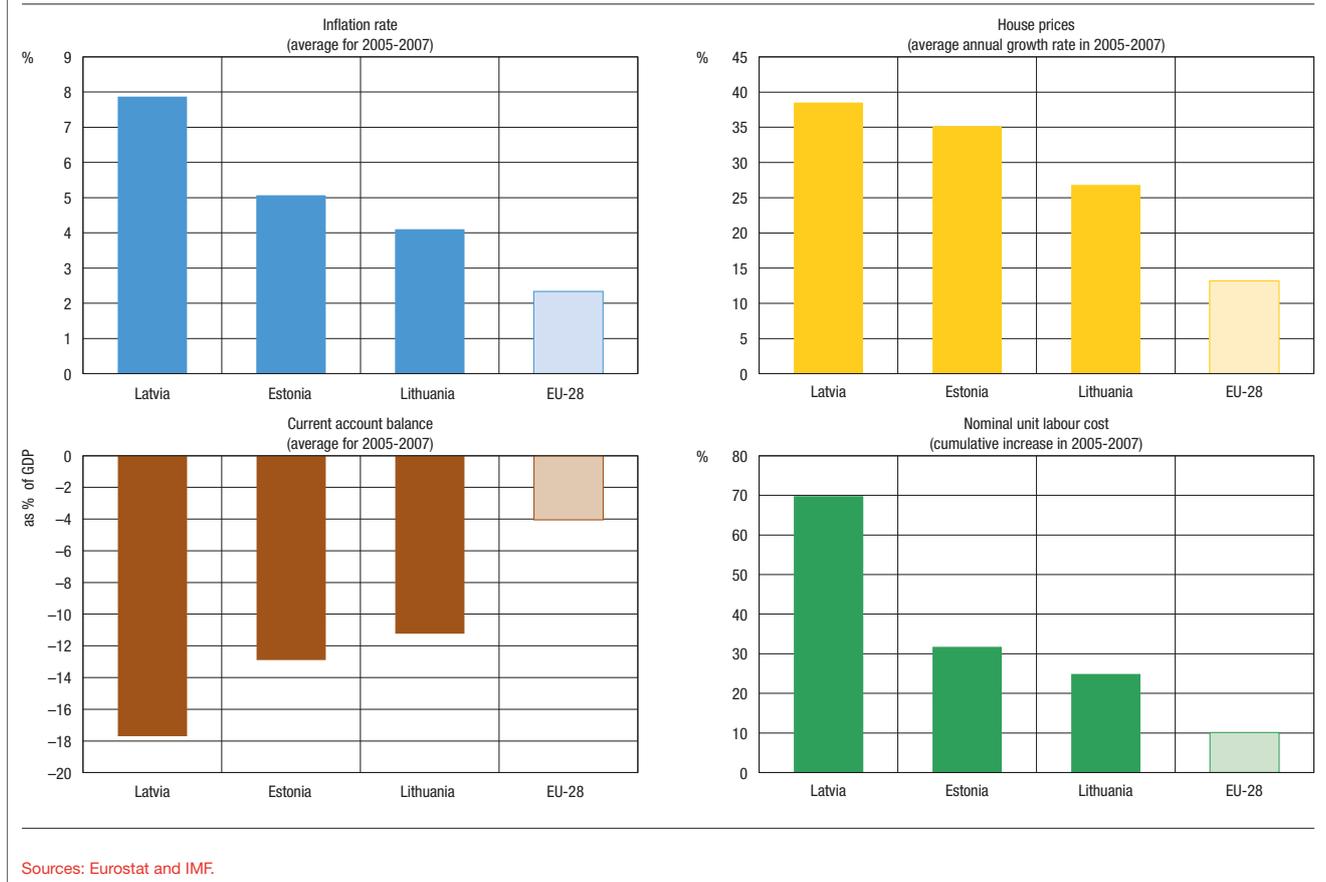
17 According to CNB data, by the end of 2015, as much as two-thirds of total loans to the construction sector were classified as non-performing. As for loans to real estate development companies, the share of bad loans reached the highest level in late 2014, when it stood at 40 percent. Meanwhile, in the category of loans for house purchase, the share of non-performing loans never exceeded 10 percent.

18 At the end of 2007, public debt-to-GDP ratio stood at 103% in Greece and 68% in Portugal. Due to large budget deficits and the drop in nominal GDP, by the end of 2009 public debt climbed to 127% of GDP in Greece and to 84% of GDP in Portugal.

19 Specifically, due to credit rating downgrades, some securities were no longer accepted as collateral in refinancing operations of the ECB. Moreover, the market value of many still eligible securities declined sharply, which also required banks to post additional liquid assets. From January 2010 to February 2011, Greek banks had to post additional collateral worth about EUR 26 billion (Bank of Greece, 2011).

20 In their regular publications, central banks of the Baltic states reported that during the recession default rates increased the most for loans to construction and real estate development companies (Latvijas Banka, 2010; Lietuvos Bankas, 2009; Eesti Pank, 2009).

Figure 17 Key macroeconomic vulnerabilities of the Baltic states



in Latvia, where the second largest bank, Parex Banka, faced considerable deposit outflows. As previously mentioned, this bank seemed particularly vulnerable, since it was domestically owned and thus could not count on liquidity support from a foreign owner.

Liquidity difficulties of banks in the Baltic states did not turn into systemic banking crises. Latvia managed to resolve refinancing issues of Parex Banka within the macroeconomic adjustment program supported by the IMF and the EU (IMF, 2009b). The rest of the banks resisted temporary pressures with the help of their foreign owners who provided the necessary liquidity and capital to dispel depositors' fears. Foreign exchange swaps arranged between the Baltic states' central banks and the Swedish Riksbank also played a role in mitigating the distress, as these transactions increased the capacities of Baltic central banks to act as lenders of last resort in foreign

currency (Purfield and Rosenberg, 2010).

Bearing in mind the unpleasant experience of Greece, Portugal, the Baltic states and other countries that experienced a severe economic slump because of excessive imbalances, European leaders reached a consensus on the importance of a comprehensive economic governance reform (Brkić and Šabić, 2014). The main objectives of the reform were to increase the resilience of member states, and indirectly of the whole of the EU, by introducing a mechanism for timely identification and correction of macroeconomic imbalances, ensuring better discipline in the field of public finance, increasing the effectiveness of the framework for banking supervision and resolution and setting up permanent stabilization funds. Ambitious reform efforts were also needed to calm the financial markets and alleviate concerns that the EMU could collapse under the weight of the sovereign debt crisis.

## 4 The role of capital flows in the accumulation of risks in the pre-crisis period

This chapter examines the role of cross-border capital flows in the emergence of macroeconomic imbalances. It investigates the extent to which banks relied on external sources of funding to sustain rapid credit growth, which contributed to overheating of these economies.

### 4.1 Financial integration and the savings-investment gaps in EU Member States

The launch of the single currency in 1999, the liberalization of financial markets in Central and Eastern Europe (CEE), and the generally low interest rates in the global markets provided a strong impetus to capital movements between EU member states. In such conditions, capital inflows became a key driver of economic growth in less developed member states. Figure 18 reveals that, between 2003 and 2007, foreign savings financed a large proportion of gross investment in peripheral euro area countries and the countries of Central and Eastern Europe. Capital inflows were particularly sizeable in the Baltic countries, Portugal and Greece, where foreign savings covered more than a third of total investment. Meanwhile, advanced euro area countries, such as Germany, Austria and the Netherlands, maintained large surpluses of savings over investment. These surpluses were largely channelled to the aforementioned less developed member states. Banks from the advanced countries had a key role in shaping such capital movements.

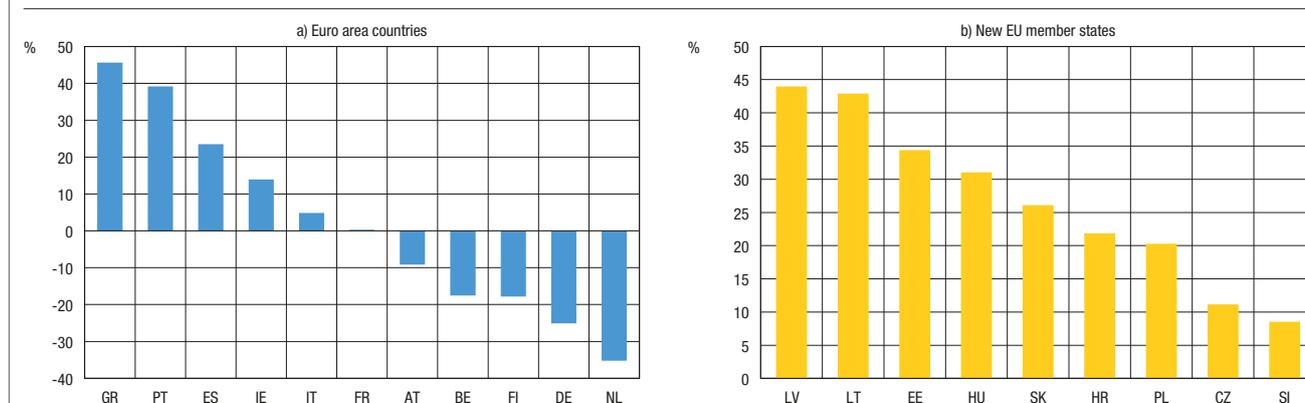
Large movements of capital from rich to relatively poor EU member states prior to the crisis were in contrast to the usual pattern of capital flows at the global level. As noted by Lucas (1990), in the global economy capital typically moves from poor to rich countries, although it would be economically reasonable for capital to flow in the opposite direction. The

literature provides some explanations for this rather surprising pattern of international capital flows. In particular, Reinhart and Rogoff (2004) argue that investors refrain from investing in poor countries because they are concerned about high macroeconomic risks, while other authors point to the problem of low quality of institutions, particularly in the area of the protection of investors' rights (Alfaro et al, 2007; Papaioannou, 2007). Taking into account the size of capital flows between the developed and relatively poor EU member states, it is clear that the so-called Lucas paradox is not relevant for the EU. In particular, the institutional convergence brought about by the adoption of common legislation – *acquis communautaire* – guarantees a relatively predictable investment climate in both developed and less developed members. This has made investors from advanced EU countries more inclined to invest in other countries where returns are higher.

The pronounced savings-investment gaps in euro area countries were not initially recognized as a major source of systemic risk. At that time, many authors considered that the excess of investment over savings in peripheral countries such as Greece and Portugal was a natural reflection of their real convergence, facilitated by the deepening of trade and financial integration.<sup>21</sup> Some of them claimed that, despite large current account deficits in the periphery, there was no reason for the ECB to intervene, given that the euro area as a whole maintained a balanced or slightly positive current account position. The IMF held a similar view of this issue (IMF, 2007a). However, after the outbreak of the global financial crisis and the emergence of debt sustainability concerns in Greece, the IMF began to take the sources and consequences of macroeconomic imbalances in the euro area more seriously (IMF, 2010a).

There is a broad consensus in the literature that the abundant capital flows from the euro area's core to the periphery

Figure 18 Share of gross investment covered by foreign savings, 2003-2007



Sources: Eurostat and author's calculations.

21 E.g. Blanchard and Giavazzi (2002), Campa and Gavilan (2006), Ahearne et al. (2007) and Ca'Zorzi and Rubaszek (2008).

contributed significantly to the widening of imbalances in peripheral countries.<sup>22</sup> Under the influence of capital inflows, peripheral countries experienced a rapid expansion of domestic demand, which led to an accumulation of harmful internal and external imbalances. Similar examples of economic expansions driven by strong capital inflows were also found among new EU member states (Mitra, 2011). However, as explained later in the paper, the impact on economic activity varied widely across countries, depending on the composition and sectoral allocation of capital inflows.

#### 4.2 Risks stemming from abundant capital inflows

The tensions that emerged in several member states after the outbreak of the global crisis did not differ significantly from the usual pattern of the financial crises commonly seen in emerging market countries. It has been empirically confirmed many times that there is a strong positive link between capital inflows and the probability of a financial crisis. For example, Reinhart and Reinhart (2008) found that the likelihood of a banking, debt and currency crisis is much larger in emerging market countries if they are exposed to sizeable capital inflows for a prolonged period. In contrast, in advanced countries, capital inflows generally do not cause financial crises but may result in higher macroeconomic volatility. Calvo (1998), in an analysis of the root causes of the financial crises in Mexico and South-East Asia, pointed out that the relation between capital inflows and financial crises stems from the fundamental balance of payments identity, according to which the current account deficit is equal to the capital and financial account surplus. If there is a sharp slowdown in capital inflows, an equally dramatic decline will be required in the current account deficit, which can only be achieved by a severe contraction of domestic demand. In other words, a large drop in capital inflows will almost certainly have a recessionary impact on the economy.

Excessive credit growth is one of the common side effects of capital inflows in emerging market countries. Mendoza and Terrones (2008), using data for 48 countries for the period from 1960 to 2006, found a significant statistical relationship between capital inflows and credit expansions for emerging market countries, while they found no such link for advanced countries. Although credit expansions did not lead to financial crises in all cases, most of the financial crises in the observed period were preceded by a period of rapid credit growth. The second common consequence of abundant capital inflows is fiscal expansion. Kaminsky et al. (2005) established a positive correlation between the size of net capital inflows and the rate of growth of public expenditures in emerging market economies. At the same time, these authors found that in OECD member countries fiscal policy is typically neutral over the financial cycle.

When assessing the effects of capital inflows on the economy, besides volume of inflows, one should also take into account their composition. The literature suggests that foreign direct investment (FDI) is a more favourable type of capital inflows than portfolio and other investment (Dell'Ariccia

et al., 2008; Aizenman et al, 2011; Levy Yeyati and Zúñiga, 2015). FDI is beneficial because they are usually very stable and allow for the transfer of technology and knowledge, which can positively affect economic growth, exports and employment. By contrast, portfolio and other investment tend to be more volatile and thus can represent a major challenge for policymakers. Moreover, such inflows can cause a deterioration in macroeconomic fundamentals, as they are often associated with excessive credit growth and real exchange rate appreciation.<sup>23</sup>

However, the classification of capital inflows according to which FDI is beneficial, while portfolio and other investment are harmful, is not always valid. The impact of direct investments on the economy may vary considerably depending on the sectoral allocation of these investments. For example, Alfaro (2005) found that FDI into manufacturing positively affect economic growth, while the impact on growth of FDI into primary and service sectors is negative or neutral. The impact of portfolio investment might also differ widely. On the one hand, in emerging market economies portfolio investment can indeed represent a major threat to financial stability. The reason is that international investors are aware of the shallowness of these financial markets, so they tend to respond quickly to changes in country risk perception in order to avoid potential losses (Jeanneau and Tovar, 2007). On the other hand, advanced economies enjoy much more predictable pattern of portfolio flows. Advanced countries usually have deep and liquid financial markets, which provide investors relative safety even during episodes of market tensions. Furthermore, advanced countries are less vulnerable to sudden changes in capital flows because they borrow almost exclusively in domestic currencies, and therefore a currency depreciation caused by capital outflows cannot jeopardize debt sustainability (Borensztein et al., 2004).

#### 4.3 Composition of capital inflows in EU member states

Capital inflows that peripheral euro area countries recorded in the years prior to the crisis did not have an optimal composition, as most of the total inflows were in the form of other investment and portfolio investment in debt securities (Figure 19). In Greece, a significant part of total inflows in the period from 2003 to 2007 related to government borrowing. Debt-creating inflows were the dominant type of capital inflows also in Spain, Portugal and Ireland. However, unlike Greece, where foreign capital was absorbed mainly in the sovereign debt market, in these countries capital inflows were associated with their banks borrowing intensively from abroad. At that time, banks from the periphery were able to access cheap funding in European financial markets due to favourable global liquidity conditions and the significant reduction in country risk premia following the creation of the EMU. Irish and Spanish banks were particularly aggressive in channelling foreign capital to domestic lending. The composition of capital inflows in the

22 Jaumotte and Sodsriwiboon (2010), Gaulier and Vicard (2012), Gros (2012), Wyplosz (2013).

23 Bukovšak, Lukinić Čardić and Ranilović (2017) analyze the impact of different types of capital inflows on the Croatian kuna exchange rate. They find that debt inflows typically exert appreciation pressures on the kuna exchange rate, while they find no such effect of equity inflows.

Baltic states and Hungary was similar to that in peripheral euro area countries (Figure 19). In the Baltic states it was mainly the foreign borrowing of banks, while in Hungary the government sector was increasing its debt most rapidly.

Although it was not yet a member of the EU, Croatia experienced equally strong capital inflows. Croatia's attractiveness to foreign investors can partly be explained by the country's clear EU accession prospects, as in October 2005 it officially started negotiations for EU entry. However, it is worth noting that, in the environment of ample global liquidity and intensive cross-border flows within Europe, many other countries from Southeastern Europe reported similarly large capital inflows despite being far away from EU membership. In most of these countries, intra-group lending between euro area parent banks and their local subsidiaries was the dominant form of capital inflows in the pre-crisis period (Winkler, 2009).

In Croatia, foreign direct investment accounted for approximately half of the total inflows in the observed period (Figure 19). Nevertheless, given the unfavourable sectoral allocation of direct investment, these investments did not add to the productive capacities of the economy. Nearly 40 percent of total direct investment in the period from 2003 to 2007 was allocated to financial intermediation, 12 percent to construction and real estate development, while less than 20 percent of total investment went to the manufacturing industry (Figure 20). The large volume of direct investment in financial intermediation was partly a reflection of prudential measures introduced by the Croatian National Bank to contain banks' excessive external borrowing. Specifically, these measures made it increasingly costly for Croatian banks to borrow from their foreign parent institutions, so parent institutions decided to replace interbank lending (which is recorded under "other investment") with capital injections (which are treated as "foreign direct investment") in order to circumvent restrictions. Although in this way they managed partly to evade the restrictions, the indirect result was a notable increase in capital adequacy ratio at the system level, which was a major factor behind Croatian banks' impressive resilience during the prolonged recession.

On the other hand, Poland, Slovakia and the Czech Republic experienced mostly positive effects from capital inflows. In

Figure 19 Financial account surplus, average for the period 2003-2007

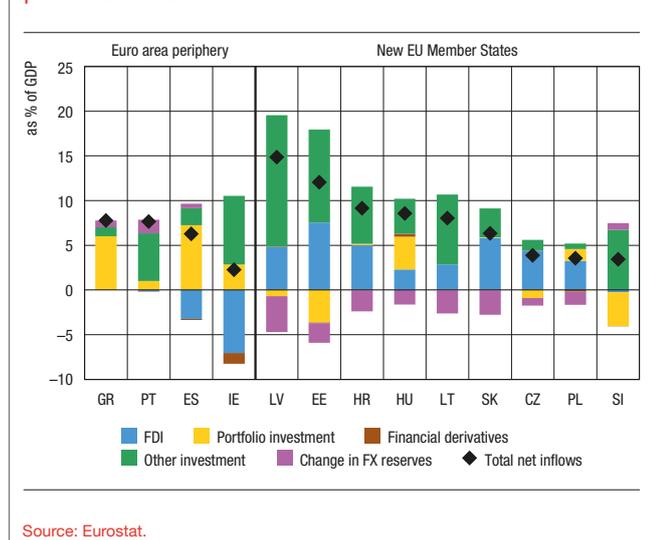
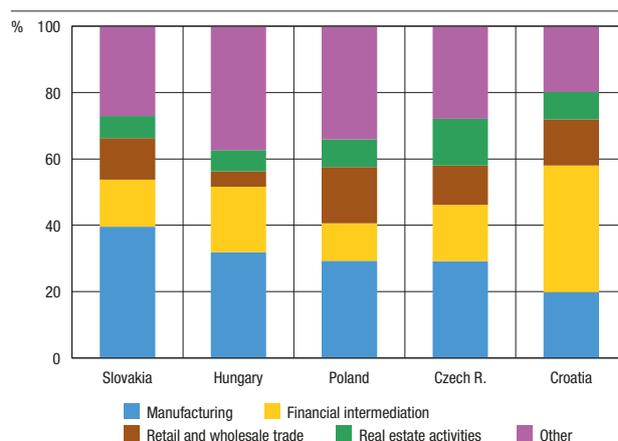


Figure 20 Sectoral composition of foreign direct investment, 2003-2007



Sources: OECD and HNB.

these countries, the volume of capital inflows was more moderate than in other new member states, while the composition of inflows was favourable, with the dominant role of direct investment in tradable sectors (Figures 19 and 20). The largest part of investment was absorbed in the automotive industry (Pavlinek, 2015). Specifically, in the 1990s and early 2000s a number of major car producers established assembly lines in Poland, Slovakia, the Czech Republic in order to take advantage of their cost competitiveness and favourable geographical position. Given that most capital inflows were allocated to the manufacturing industry, these countries did not face overheating like some other member states and hence were able to perform relatively better during the global crisis.

#### 4.4 Negative impact of capital inflows on bank balance sheets

In some member states, sizeable debt-creating capital inflows imposed large costs on the banking system. On the one hand, in the context of easy access to foreign financial markets, some European banks relied heavily on external sources of funding to maintain rapid credit growth, and this made them very sensitive to sudden changes in global risk aversion. On the other hand, abundant capital inflows – driven by heavy external borrowing by banks or the state – fuelled the unsustainable expansion of domestic demand and led to a widening in macroeconomic imbalances. Due to excessive imbalances, the recession that was ignited by the global crisis was extremely deep and long, which in turn caused large credit losses to banks.<sup>24</sup>

24 Excessive external borrowing can be detrimental to the real economy and the banking system regardless of which sector is borrowing the most. For example, as the Greek case has shown, if the government is increasing its debt rapidly, a sudden loss of access to international markets may trigger a debt crisis with a severe impact on economic activity. Under such conditions, financial stability may be jeopardized even though banks' balance sheets were healthy in the beginning.

#### 4.4.1 Increase in refinancing risk

Banks' exposure to refinancing risk can be monitored by looking at the loan to deposit ratio at the system level. An increase in the loan to deposit ratio would reveal that loans grew faster than deposits, which means that banks relied also on alternative funding sources, such as borrowing on international financial markets (ESRB, 2015b). Market funding sources are considered less reliable than retail deposits, as investors in the financial markets tend to react abruptly to changes in the risk profile of a particular bank or to a general adjustment in investors' risk appetite. Therefore, by increasing the share of market funding sources in the liability structure, a bank exposes itself to a greater refinancing risk. A decline in the loan to deposit ratio, conversely, would suggest that the increase in deposits exceeded the expansion of loans. Reduction in loan to deposit ratios is commonly observed in times of crisis, when banks try to reduce risk exposure in order to strengthen their capital ratios.

From 2001 to 2007, loan to deposit ratios increased notably in all peripheral euro area countries (Figure 21). By borrowing on European financial markets, peripheral countries' banks were able to maintain strong credit growth, which largely outpaced the expansion of the deposit base. Irish and Spanish banks were particularly active in this regard. In Spain, the aggregate loan to deposit ratio was relatively high already in the second half of 1990s. Following the creation of the EMU, Spanish banks' external borrowing accelerated further and the loan to deposit ratio reached around 200 percent on the eve of the global crisis. This means that the total amount of loans to the private sector was roughly twice as large as available domestic deposits. As reported by Banco de Espana (2007), in that period Spanish banks issued covered bonds and mortgage-backed securities in European markets to obtain funding for their credit activity.<sup>25</sup> Irish banks followed a similar business model (Connor et al., 2010).

The BIS data on cross-border bank exposures shown in Figure 22 reveals that banks played a key role in transferring

funds from core countries to the euro area's periphery. After the launch of the EMU, core country banks steadily increased their exposures to the periphery, with interbank lending accounting for the largest share of total exposure. This pattern of capital flows was severely disrupted by the outbreak of the global financial crisis in late 2008. The outbreak of the crisis triggered a sharp increase in risk aversion, which prompted core country banks to reduce their exposures to banks from vulnerable peripheral countries. As a result, at the height of the sovereign debt crisis, banks from Greece, Ireland, Spain and Portugal were effectively shut out of European financial markets. In such an environment, many of these banks were forced to turn to central bank refinancing operations (ECB, 2009a; Noeth and Sengupta, 2012). With the aim of reducing leverage and improving capital adequacy ratios, peripheral countries' banks made efforts to cut their risk exposure, which was done mainly by a slowdown in lending. This was mirrored in the gradual decline in loan to deposit ratios after 2008 (Figure 21). Greece was an exception, as the loan to deposit ratio began to rise sharply again in 2010 due to massive deposit outflows triggered by the sovereign debt crisis.

In addition to banks from peripheral euro area countries, banks in some of the new EU member states were also vulnerable because of excessive external borrowing. Subsidiaries of large foreign banking groups served as the main channel through which foreign capital was transformed into domestic lending. For example, banks in the Baltic states imported large amounts of capital from abroad, mainly by borrowing from their parent institutions, in order to maintain rapid credit growth at home (Purfield and Rosenberg, 2010). As a result, loan to deposit ratios deteriorated significantly over time, reaching levels of 200 percent or more (Figure 23). Interestingly, in Slovenia there was also excessive external borrowing of banks, although its banking system was mostly domestically owned (IMF, 2012). Following the outbreak of the global crisis in 2008, banks in the Baltic states and Slovenia engaged in sharp deleveraging, and their loan to deposit ratios soon returned to more sustainable levels.

In other new member states, the expansion of banks' balance sheets in the pre-crisis period was more moderate, with

Figure 21 Loan to deposit ratios, peripheral euro area countries, 2001-2015

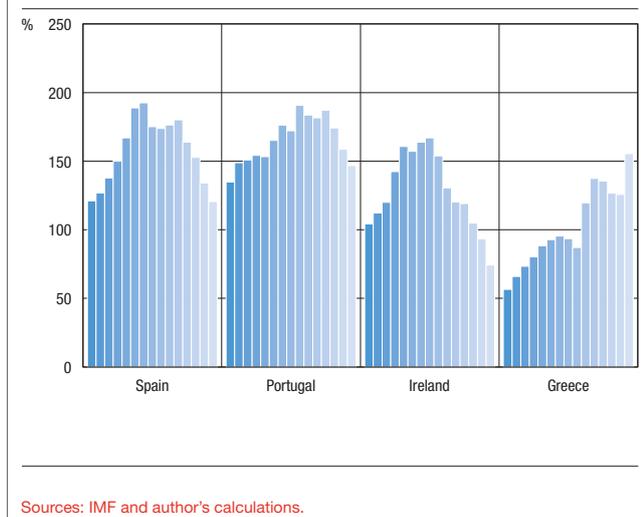
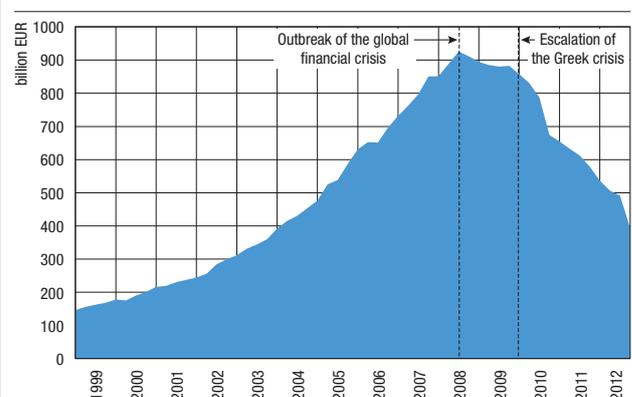


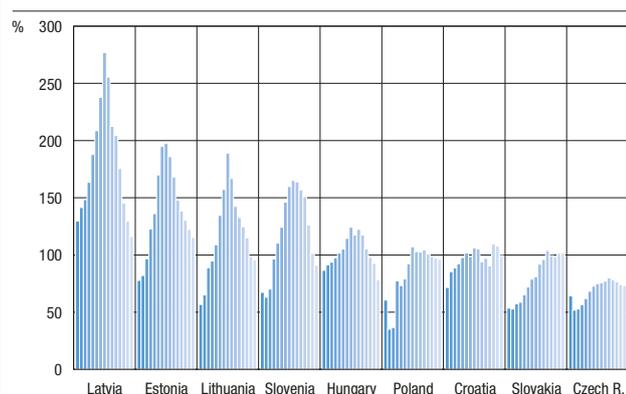
Figure 22 Core country banks' claims on peripheral countries



Note: Core countries are Germany, France, Belgium and the Netherlands, while peripheral countries are Greece, Spain, Ireland and Portugal.  
Source: BIS locational banking statistics.

<sup>25</sup> Spanish banks' liabilities resulting from securities issued rose from 6% of GDP in 2001 to 26% of GDP in 2007.

Figure 23. Loan to deposit ratio, selected new EU member states, 2001-2015



Sources: IMF and author's calculations.

external sources of funding being used to a lesser extent. In such an environment, loan to deposit ratios in these countries remained close to or slightly above 100 percent during the observed period. In Croatia, the loan to deposit ratio did not deteriorate much despite the large presence of euro area-based banking groups. This can be explained by the appropriate use of monetary and macroprudential policies, which proved to be successful in slowing down banks' external borrowing and the associated credit expansion (Lim et al., 2011; Vujčić and Dumičić, 2016).

#### 4.4.2 Increase in credit risk

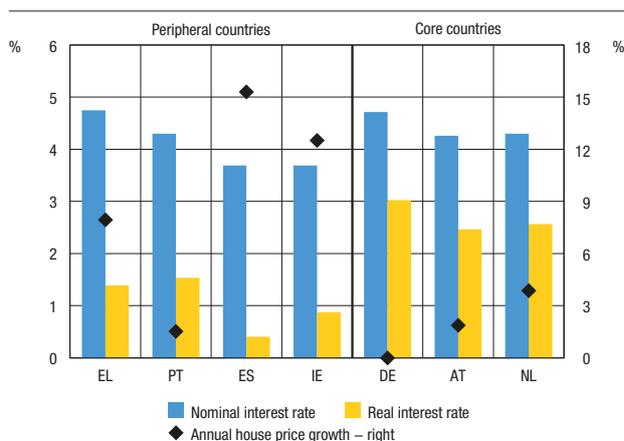
External borrowing was attractive because capital on European markets was easily accessible and cheap due to expansionary monetary policy and low risk premia (Micossi, 2015; Hale and Obstfeld, 2014). By obtaining funding from abroad at low cost, banks were able to maintain strong credit growth, with interest rates on loans much lower than would have been the case if banks had relied solely on domestic sources (Figure 24).<sup>26</sup> Under the conditions of low nominal interest rates and higher inflation rates relative to the euro area core, the real cost of credit in the periphery was very low. In Spain and Ireland, for example, between 2003 and 2006 real interest rates on housing loans were on average below 1%, compared to 2.5–3.0% in the core countries.<sup>27</sup> The real cost of credit was low also in some new member states, especially in the Baltic states, where real interest rates on housing loans were actually negative due to high inflation rates.<sup>28</sup>

Rapid credit growth supported by abundant capital inflows

26 Blanchard and Giavazzi (2002) document that in Portugal interest rates declined already in the late 1990s, as Portuguese banks' access to European financial markets improved in the context of the setting up of the EMU.

27 Gros (2012) noted that nominal interest rates in Ireland and Spain were lower than in the euro area's core because Irish and Spanish banks typically extended loans with interest rates linked to reference rates such as LIBOR, which fell sharply at the beginning of the century. In contrast, banks from the core countries provided loans at fixed interest rates, so the decline in reference rates did not have much impact on the average cost of loans. Moreover, the author argues that prudential standards in Ireland and Spain were relatively loose, with many loans having the loan to value ratio in excess of 100%.

Figure 24 Interest rates on housing loans and house price dynamics, average for 2003-2006



Sources: ECB SDW, Eurostat and author's calculations

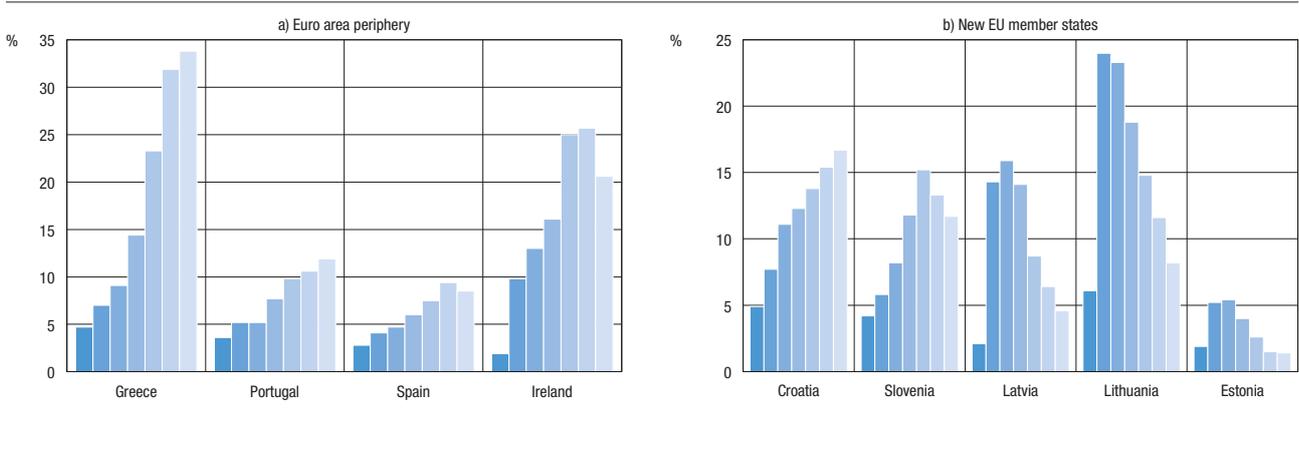
caused a number of adverse side effects, including unsustainable expansion of domestic demand, widening current account deficits, rapidly rising private sector indebtedness and the emergence of a housing market bubble. With the escalation of the global crisis, capital inflows fell sharply, and consumer and business confidence plummeted. As a result, domestic demand quickly contracted, causing a significant loss of output and employment (Gros, 2012; Tresselt et al., 2014). Against the background of a deep recession, banks faced substantial credit losses, as many loans – particularly those to the real estate sector – became nonperforming (Figure 25).

Bearing in mind that loose monetary conditions had contributed to excessive credit growth in the periphery of the euro area, the question arises why the ECB failed to adjust its policy early on to slow down the accumulation of harmful imbalances in these countries. The expansionary policy stance of the ECB was appropriate from the point of view of developed countries of the core, which were, at that time, experiencing subdued economic growth and low inflation rates. However, as Arghyrou (2006) and Micossi (2015) noted, the low interest rate policy was not suitable for peripheral countries, which were going through a robust, credit-driven expansion.

In Greece, banks' exposure to credit risk increased indirectly, as a result of the excessive foreign borrowing of the government. Following the outbreak of the global crisis, Greece's fiscal imbalances came to the fore, which in the context of higher investors' risk aversion led to a marked increase in yields on Greek government bonds (Figure 26). At the onset of the global financial crisis, Greek banks were well capitalized, liquid and profitable, while their funding structures were less risky than those of Irish and Spanish banks (IMF, 2009a). However, due to Greece's severe fiscal imbalances, Greek banks' access to European money markets deteriorated, while large amounts of retail deposits began to leave the system (Bank of Greece, 2011). Moreover, the sovereign debt

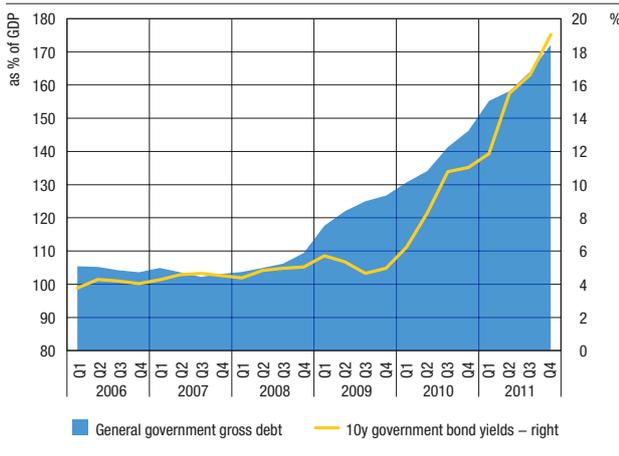
28 Foreign owners of banks in the Baltic states were not worried about negative real interest rates on loans because stable exchange rates of the Baltic states' national currencies against the euro enabled them to convert nominal earnings to the euro without taking a loss. In other words, stable exchange rate regimes protected their real income against high inflation.

Figure 25 Share of non-performing loans in total loans, 2008-2014



Source: IMF.

Figure 26 Greece – government debt-to-GDP ratio and yields on 10y government bonds



Source: Eurostat.

crisis had a detrimental impact on consumer and business confidence, which, along with harsh fiscal austerity measures, led to a deep and long-lasting economic downturn.<sup>29</sup> In such conditions, as much as a third of total loans became non-performing by 2013 (Figure 24).

Taking into account the unpleasant experience of Greece,

Ireland, Spain, and some of the new member states, it can be argued that intensive cross-border capital flows within the EU have made member states' economies more sensitive to global shocks. Namely, ample debt-creating flows from developed to less developed countries contributed to the unsustainable cyclical expansion in the latter, accompanied by a rapid build-up of macroeconomic and financial risks. The outbreak of the global crisis triggered the materialization of these risks and imposed a heavy toll on these countries, bringing the whole of the EU into a prolonged stagnation and undermining the stability of the single currency.

However, as noted above, ambitious reforms implemented after the financial crisis have reduced the likelihood that such a scenario will materialize again. In particular, the enhanced regulatory framework requires banks to maintain sound funding profiles, implicitly preventing them from borrowing excessively from abroad. In addition, the new framework enables regulators to impose additional prudential requirements, if they notice that credit activity has accelerated too much or that systemic risk has generally increased. At the same time, a set of new rules in the area of economic governance was introduced with the aim of promoting sound economic policies and ensuring timely recognition and correction of macroeconomic imbalances (Brkić and Šabić, 2014). Bearing in mind all these reforms, the risk of some member states experiencing an unsustainable economic boom driven by excessive debt-creating capital inflows is now much lower than before the crisis.

29 The IMF (2013) claimed that the negative impact on the real output of fiscal consolidation measures was much larger than what was expected in the macroeconomic adjustment program for Greece. The program assumed that the fiscal multiplier amounted to 0.5, while it turned out that the exact value of the multiplier was around 1. Because of the large negative impact of fiscal austerity measures, the recession was exceptionally deep and long, which is the main reason why Greece failed to meet the fiscal targets set out in the first adjustment program.

## 5 Conclusion

This paper highlights three channels through which the global financial crisis affected European banks. The first channel was the direct impact of the turmoil in the US credit derivatives market on large European investment banks that were exposed to this market. The second channel emerged after the collapse of Lehman Brothers in the fall of 2008, when global liquidity conditions deteriorated, causing liquidity strains on banks that were highly reliant on short-term financing. Finally, the third channel appeared in countries with severe macroeconomic imbalances, the sharp correction of which during the financial crisis caused a deep recession, resulting in significant credit losses in their banks.

The paper also investigates why banks in some member states were vulnerable at the onset of the crisis. The main source of banks' vulnerability was their exposure to their overheated real estate markets. Following the real estate market correction due to deteriorating financing conditions, a significant part of the loans granted to the real estate sector turned non-performing. The negative impact of the real estate market on bank balance sheets was particularly pronounced in Ireland and Spain.

In other countries, the main sources of banks' vulnerability were fiscal and external imbalances. Greece and Portugal were unable to refinance large government debts during the financial crisis. This weakened the confidence in Greek and Portuguese banks, constraining their access to financing. In Latvia, Lithuania and Estonia, the increased deposit outflows in late 2008 were associated with fears that the Baltic States would need to devalue their currencies to eliminate severe external imbalances.

This paper shows that foreign borrowing by local banks played an important role in fuelling the rapid credit growth

and macroeconomic imbalances. Following the creation of the EMU, the core countries' banks steadily increased their exposure to the periphery, primarily through interbank lending. This also affected the new EU member states and candidate countries where the subsidiaries of large foreign banks constituted the main channel through which capital inflows financed domestic lending. Such foreign borrowing exposed local banks to refinancing and credit risk. The refinancing risk stems from the increased reliance on external funding, which tends to be less stable than retail deposits. When the global crisis escalated, some banks were unable to refinance external liabilities and required liquidity support from central banks. The credit risk increased because of unsustainable expansion of domestic demand, partly driven by the aggressive bank lending prior to the crisis. After the outbreak of the global crisis, domestic demand collapsed, causing a deep recession, so the banks had to absorb substantial credit losses. In that context, the paper argues that strong cross-border capital flows within the EU increased the vulnerability of European banks to global financial shocks.

The experience of the financial crisis inspired the ambitious reforms in the EU that established the Banking Union with strong prudential mechanisms and the improved economic governance framework for the EU member states. European banks are now better capitalized and rely predominantly on stable local funding sources, rather than on external borrowing. The enhanced economic governance framework promotes sustainable and balanced economic growth across the EU with emphasis on prevention of the macroeconomic imbalances. This has increased resilience of the EU member states and their banks to the risks of possible excessive capital inflows in the future.

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