**The impact of the 2007-2008 financial crisis on the banking systems in advanced European countries**

**Abstract**

The aim of this article is to explore the impact of the financial crisis in 2007-2008 on the banking sector in advanced economies of the European Union. The 2007-2008 financial crisis severely affected economies of the European Union, where the recession, the aftermath of the crisis, was more severe than in the US. Advanced economies were not often examined due to rare occurrences of financial crises in those countries, thus this research will contribute to the literature by providing detailed analysis of the crisis consequences on the economy and banking sector in advanced economies. Additionally, this research will provide an overview of the impact of the financial crisis on the banking sectors using the capital asset pricing model (CAPM) beta of the banking sector.

The collapse of Lehman Brothers worsened the situation in the EU financial markets, where high volatility and a huge drop in the equity prices were observed. Furthermore, a high value of beta of banking sectors in 2007 and in 2008 indicated the stress in the selected European banking sectors. The banking sector problems were due to the uncertainty about the EU financial institutions’ exposure to ‘toxic’ assets from the US. To restore confidence in the interbank market, the most troubled European financial institutions were bailed out. Despite governments’ interventions there was a decline in business investments and consumption, a decrease in exports and an increase in unemployment in the EU countries.

**1. Introduction**

The crisis of 2007-2008 that originated in the United States of America’s (US) financial market is considered as one of the most profound and financially severe in history. The causes of the financial crisis in the US were the development of the subprime mortgage market and its securitisation. At the beginning of 2007, mortgage-backed securities (MBS) issued by investment banks and based on a subprime crisis were proved to be worthless and were called ‘toxic assets’. The crisis increased uncertainty in the market because the level of the leverage ratio of households and firms was significantly higher than savings, especially in the US, so when the crisis began, investors were uncertain about the real value of their assets. Consequently, in 2008 and 2009, a great volatility in the exchange rate and prices of commodity was observed. Furthermore, stock prices also changed often abruptly. This created uncertainty of commodity prices, asset prices and exchange rate that aggravated economic decisions in the short and long run (Allen and Carletti 2010).

The bankruptcy of Lehman Brothers triggered direct and indirect contagion. The direct contagion affected Reserve Capital, the oldest money market mutual fund, with huge holdings of Lehman Brothers' debts. The price of a Reserve Capital share dropped below 1 US$, which resulted in withdrawal of funds from other money market funds and led the US government to give guarantees to all money market mutual funds. The indirect contagion occurred because investors made an assumption that Lehman Brothers was not the only financial institution in trouble and there was a high probability that other institutions may fall down. Consequently, the trade volume in the financial market decreased significantly which also negatively affected the GDP of many countries (Allen and Carletti 2010).

At the beginning of the global transmission of the financial crisis it was believed that the crisis in Europe would be much less severe than in the US, mainly due to the fact that causes of the financial crisis in the US such as loose monetary policy and financial market liberalisation were in contrast to the conditions in the European countries. But with time, the crisis in Europe was at least as serious and severe as in the US.

This paper contributes to the literature in two ways. First, it investigates the consequences and impact of the financial crisis on the advanced EU countries, especially on their banking sector. In the selected countries, the 2007-2008 financial crisis had a severe impact on the economy and the chosen sample gives an opportunity to study the financial crisis in advanced economies.

Second, it presents the CAPM beta calculations of the banking sector for the selected EU countries and with a discussion of other financial ratios, provides an assessment of the effects of the 2007-2008 financial crisis.

CAPM is a method to estimate the cost of capital and is also a model of risk and return. Beta in this model is a measure of market risk used by measuring the volatility of security due to the market risk relative to the market as a whole. According to CAPM, the efficient portfolio is the market portfolio and in this model, the market portfolio is used as a benchmark. Although CAPM assumptions are not completely accurate especially in terms of investors’ behaviour, CAPM generates robust results with relatively small errors.

The main aim of this article is to investigate the consequences and impact of the 2007-2008 financial crisis on the advanced EU countries especially on their banking sector, and thus the analysis will focus on 10 developed EU countries: Belgium, Denmark, France, Germany, Italy, the Netherlands, Portugal, Spain, Sweden, and the UK.

**2. Literature review**

At the heart of the financial crisis of 2007-2008 were problems in the banking sector in the US linked to mortgage-backed securities but the crisis also affected the European financial market where financial turmoil was experienced by many European financial institutions. Financial crises can be categorised into different types depending on their characteristics or sector of the economy that is affected the most. Among all the crises types, a banking crisis is the most relevant in explaining the dynamics and consequences of the 2007-2008 financial crisis. A banking crisis is defined as ‘occurrence of severely impaired ability of banks to perform their intermediary role’ (Davis and Karim, 2008). A banking crisis may cause a huge disruption in the economy, because of the banks’ role as an intermediary in allocation of resources in the economy (Lindgreen *et al*., 1996; Pericoli and Sbracia 2003). A banking crisis is also characterised by a decline in the ratio of non-performing assets to total assets (Pericoli and Sbracia, 2003) or when there is a significant decrease in banking capital (Caprio and Klingebiel, 1996).

It is widely agreed that the financial crisis of 2007-2008 was a banking crisis, and there are number of papers analyzing the consequences of the crisis. Research of Llaudes *et al.* (2010) studying consequences of the subprime financial crisis on emerging markets revealed that during the first stage of the crisis, countries with sound economic fundamentals experienced a smaller drop in GDP. Furthermore, countries with strong linkage to advanced economies or larger exposure to foreign bank claims suffered from a decline in GDP during the crisis.

Additionally, the severity of the crisis could be linked to pre-crisis credit growth to their GDP and current account deficit. There is some evidence that trade openness and manufacturing share could also be connected to the occurrence of the crisis (Lane and Milesi-Ferretti, 2010).

Claessens *et al.* (2010)tested the performance of the financial sector during the crisis in emerging and advanced economies using financial stress index (FSI) which was comprised of seven financial market development indicators including: Ted spread, banking sector beta, the inverted term spread, the stock market return, the stock market return volatility, sovereign debt spread, and exchange market volatility. The authors concluded that the financial crisis was more severe in countries with appreciating house prices, high mortgage debt and greater financial deepening, and where the industry relied on bank credit. Additionally, the share of foreign bank claims was positively related to the duration of the crisis.

There have been an increasing number of studies that have examined the financial crisis in the EU countries. According to Constâncio (2014), there were two major sources of crisis contagion in the EU banking sector, firstly, banks’ exposure to the US housing market and secondly, general change of risk perception due to the sub- prime crisis in the US. The crisis also had an adverse effect on a financial stability in the EU countries and led to rebalancing of their portfolios to include less risky government bonds.

According to Degl'Innocenti *et al.* (2017), one of the consequences of the financial crisis was an increase in the bank productivity growth in the EU banking sector in 2007 and 2008 because of changes in efficiency. However, the drop of productivity growth was observed between 2008 and 2010.

Popov and Udell (2012) studied the banking sector in emerging European countries before and during the financial crisis and found evidence of constraints in credit availability for companies.

Festic *et al.* (2011) invesigated the influence of growth of credit on non-performing loans ratio and confirmed that in Central and Eastern Europe, the growth of credit and lax banks’ credit policy could harm banking performance.

In turn, the study of Choudhry and Jayasekera (2014) used banking stock indices to assess the effect of the financial crisis on the EU countries with the focus on spillover effects between Germany, the UK and the US and smaller countries of the EU. Similarly, Shehzada and De Haan (2013) used the stock prices of banks to examine the impact of the financial crisis on the banking sector. This methodological aproach is supported by Efficient Market Hypothesis, which states that stock prices are an indicator for perceived bank riskiness. Their findings indicate that the financial crisis had greater impact on industrial countries and large banks, where bank stock prices remained lower than before 2007.

**3. Consequences of the financial crisis of 2007-2008 on the EU economies**

The economic situation in the European countries in 2007 was stable. On average the Euro area’s GDP increased by 2.6% in 2007. The first sign of slowdown could be seen in the fourth quarter of 2007 when economic growth dropped to 1.5% in the Euro area (IMF 2008 April), and the negative economic growth rate was marked in one quarter of 2007 in Denmark, Portugal and Italy. What can also be noticed is that the perception of the economic outlook by businesses and consumers deteriorated at the end of 2007. The growth rate in smaller European countries like Sweden, and the Netherlands was still high in the end of 2007 (Table 1). The confidence in the European markets was diminished by information that more banks from Germany and France were exposed to ‘toxic’ assets from the US. Moreover, the headline inflation rate increased to 3.5% (year to year) in 2008 in the Eurozone. Most of the countries reduced fiscal deficits and in general, the fiscal deficit in the Eurozone dropped from 1% to 0.6% of GDP. The large fiscal deficit was still persistent in France being 2.4% of GDP and in the UK, being 3.0% of GDP (IMF 2008 April).

**Table 1 Quarterly change in GDP quarter to quarter in 10 selected countries of the European Union**

|  |  |  |  |
| --- | --- | --- | --- |
| Country | Real GDP growth rates in 2007 change over previous quarter (in %) | Real GDP growth rates in 2008 change over previous quarter (in %) | Real GDP growth rates in 2009 change over previous quarter (in %) |
| **1Q** | **2Q** | **3Q** | **4Q** | **1Q** | **2Q** | **3Q** | **4Q** | **1Q** | **2Q** | **3Q** | **4Q** |
| **Belgium** | 0.9 | 0.3 | 0.7 | 0.5 | 0.7 | 0.3 | -0.5 | -2.1 | -1.8 | 0.0 | 1.1 | 0.7 |
| **Denmark** | 0.9 | -0.5 | 0.8 | 1.0 | -1.4 | 1.5 | -1.8 | -2.4 | -2.2 | -1.9 | -0.1 | 0.1 |
| **France** | 0.6 | 0.5 | 0.4 | 0.3 | 0.3 | -0.6 | -0.5 | -1.6 | -1.7 | 0.0 | 0.1 | 0.5 |
| **Germany**  | 0.6 | 0.5 | 0.9 | 0.4 | 1.0 | -0.4 | -0.4 | -2.0 | -4.1 | 0.2 | 0.8 | 0.9 |
| **Italy**  | 0.1 | 0.1 | 0.4 | -0.5 | 0.5 | -0.6 | -1.1 | -1.8 | -3.5 | -0.2 | 0.4 | -0.2 |
| **Netherlands** | 1.3 | 0.6 | 1.4 | 1.3 | 0.5 | -0.4 | 0.1 | -1.2 | -2.2 | -1.4 | 0.8 | 0.5 |
| **Portugal**  | 1.5 | 0.0 | -0.1 | 1.0 | 0.0 | -0.2 | -0.5 | -1.1 | -2.3 | 0.3 | 0.6 | -0.1 |
| **Spain** | 0.9 | 0.8 | 0.8 | 0.7 | 0.5 | 0.0 | -0.8 | -1.1 | -1.6 | -1.1 | -0.3 | -0.2 |
| **Sweden** | 1.0 | 0.5 | 0.7 | 1.5 | -1.2 | -0.1 | 0.0 | -3.8 | -2.6 | 0.2 | 0.0 | 1.1 |
| **United Kingdom**  | 1.1 | 1.2 | 1.2 | 0.2 | 0.1 | -0.9 | -1.8 | -2.1 | -1.5 | -0.2 | 0.4 | 0.4 |

Source: OECD

In 2008, GDP of the EU was growing but the growth was weaker than the year before. The slowdown in growth was accounted to the increase of oil prices and further deterioration of financial systems due to its exposure to the US mortgage-backed assets and worsening credit quality and confidence in the sector. To restore confidence, Belgium, France, Germany, the Netherlands and the UK bailed out the most troubled financial institutions like Fortis and Dexia. Furthermore, assurances to deposits in Germany and the UK were provided (IMF 2008 October).

The last months of 2008 were marked by high volatility and a huge drop in equity prices together with a decline in business investments and consumption. Unemployment rate also increased in 2009 in all EU countries except Luxembourg. The decline in the economic activity was reflected in a significant decline in GDP in most of the countries of the EU at the end of 2008.

Moreover, because of the contraction of export opportunities in Western Europe and investors’ avoidance of risk, the growth rate and export fell dramatically. One of the consequences of the financial crisis was a significant decrease in exports in 2009 (Figure 1). Exports of capital and intermediate goods were more affected than exports of consumer goods mostly because of a decline in manufacturing sector.

**Figure 1. Export of goods and services at current prices in million of euro**



Source: Eurostat

**4. The impact of the financial crisis of 2007- 2008 on the EU banking sector**

Although European banks were not involved in the distribution or issuance of subprime-backed mortgages, many banks bought ‘toxic’ assets between 2003 and 2007. Moreover, the crisis was triggered in the European banking system by excess risk taking, increase in leverage and dollar shortage (Chorafas 2009).

One of the first symptoms of the crisis was loss of liquidity and a significant increase in interbank rates (IMF 2008 April). After the bankruptcy of Lehman Brothers in September 2008, worries about further losses on the US mortgage-backed assets froze wholesale and funding markets. These problems spread the crisis to the real economy. The shock in Europe was more severe than was expected. European policy was criticised because of the reluctance of the European Central Bank (ECB) to change interest rates, which were at the level of 4% from June 2007 to July 2008. At the same time the Federal Reserve System (FED) in the US cut interest rates to ensure liquidity of financial system. Additionally, European policy provided only short-term refinancing operations that supported short-term liquidity that was in contrast to the FED open market operations that were conducted on a larger scale (Fitoussi and Saraceno 2010).

The financial crisis also had an impact on banking institutions in the EU especially on their profitability. Between 2007 and 2008, Return On Equity (ROE), which is a measurement of bank’s profitability, fell by 7.3% in the average EU bank. A decrease in profitability was due to an increase in liquidity, capital and interest rate risks. More than 10% of banks in those countries disappeared due to bankruptcy or merged with other financial institutions (Lindblom and Willesson 2012).

Additionally, a significant increase in non-performing loans as a percentage to the total gross loans was observed in 2008 and in the following years in the EU countries (Figure 2). The ratio of non-performing loans to total loans is usually a sign of a banking crisis and a significant increase in the amount of non-performing loans can seriously jeopardise banks' profitability and financial sector performance.

**Figure 2. European Union non-performing loans to total gross loans in percentage**

Source: Adapted from World Bank

An increase of the ratio of non-performing loans to total loans was a symptom of declining capital in banking systems, which was due to an increase in the number in loan defaults.

In many previous banking crises, the consequence of the crisis was the government intervention in banking sectors. The crisis of 2007-2008 brought write-down of assets due to lower credit ratings and losses on banks’ portfolios because of a slowing down economy and in some cases ‘toxic’ financial instruments held in portfolios. This negatively affected bank’s capital and led to liquidity and solvency problems of many banks. As this became a more systematic and serious problem of financial system in many countries, European governments decided to intervene. Government interventions included capital injections, relief on impaired assets, liquidity and bank funding support and guarantee on bank liabilities. The government support was a significant part of GDP especially in Belgium, the UK and the Netherlands (Figure 3).

**Figure 3. Public interventions in the banking sector (effective) during financial crisis until 2009 as % of GDP**



Source: Adapted from European Commission (2009)

Although no intervention was effective in Italy, approved capital injection into the Italian sector accounted for 1.3% of GDP in 2009 (European Commission 2009). In European countries, government policy aimed to increase liquidity and prevention of solvency problems in financial sectors by provision of capital injections and impaired asset relief and restore trust in financial institutions by providing guarantees on bank liabilities. Through bailouts, some financial institutions were nationalised like German bank Hypo Real Estate or partially nationalised like Royal Bank of Scotland (RBS) and many others received capital injections or government guarantees for their assets and debt. The number of important financial institutions that received financial support from the government was significant (Table 2).

**Table 2. Financial institutions that received government support during the financial crisis**

|  |  |
| --- | --- |
| Country | Bank Name |
| United Kingdom | Loyds, RBS, Bradford & Bingley, Northern Rock |
| Germany | Commerzbank/ Dresdner, HSH Nordbank, Bayer LB, Hypo Real Estate, IKB |
| France | Banques Populairs, Caisse d’Epargne, BNP Paribas, Credit Agricole, Credit Mutuel, Societe General, Dexia |
| Netherlands | ING, Aegon, SNS Reaal, Fortis |
| Belgium | Ethias, KBC, Dexia, Fortis |

Adapted from Banco de Espania (2008 May)

Other forms of capital injections included purchase of preference shares, hybrid financial instruments and in some cases ordinary shares (ECB, 2009). The main objective of capital injection was to improve banks' capital position and maintain private ownership of the banks.

It is estimated that between 2008 and 2012, all EU governments spent nearly 4.5 trillion euro to help the financial sector, mainly to restore liquidity in financial markets and to support financial institutions in trouble through capital injection and guarantees on bank liabilities. Furthermore, the government became a major or sole shareholder in 19 out of 76 EU banking groups (IMF 2013). In a few countries, bank assets were swapped for government bonds and most countries guaranteed new bonds issues by banks. The EU increased deposit guarantees to 50,000 euro per deposit, and some countries established higher limits.

The ECB was also involved in bank rescue operations by providing refinancing facilities at low rates. Correspondingly, national central banks set up the Emergency Liquidity Assistance and Assets Purchase Facility in January 2009 by the Bank of England (IMF 2013) to buy high quality assets like UK government securities (gilts), commercial papers and corporate bonds to improve liquidity in credit markets (Stolz and Wedow 2010).

For further analysis of the banking sector, beta of banking sector was calculated for 10 European countries. Beta, according to CAPM, is a measurement of sensitivity of stock to market movements. Beta is also an indicator of market risk; if beta is greater than 1 then it means that the banking stock amplifies the overall movement of market, increasing the probability of a banking crisis.

 **Equation 1. Beta calculation**

$$β\_{i}=\frac{σ\_{bm}}{σ\_{m}^{2}}$$

$σ\_{bm}$ is the is the covariance between banking stock b’s return and the market return

$σ\_{m}^{2}$ the variance of the market return

As presented by beta in Figures 4-6 the banking sector risk increased in Portugal in 2007 and in the last quarter of 2007 in the Netherlands, France, Germany, the UK, Belgium and Italy. Moreover, in 2008 in all countries except Portugal, banking sector risks increased significantly in the third quarter of 2008, which is not surprising as Lehman Brothers announced bankruptcy in September 2008. In 2009, banking stress continued as beta increased in Italy, France and Sweden in the first quarter of 2009 and in the two first quarters of 2009 in the UK and Germany. The Belgian banking sector remained in stress for the duration of 2009.

**Figure 4. Beta of Swedish, Danish, Spanish and Portuguese banking sector**

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Source: author’s calculation, data from Datastream

**Figure 5. Beta of Italian, German and French banking sector**

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Source: author’s calculation, data from Datastream

**Figure 6. Beta of British, Nederland’s and Belgian banking sector**

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Source: author’s calculation, data from Datastream

The UK was one of the countries hit hardest by the crisis, mainly because 6.5% of its gross value added was generated by banking and insurance industries and 20% of UK GDP came from London’s economy which highly depends on its banking and insurance sector (Chorafas 2009). Moreover, the UK banking sector was exposed to other markets' movements as half of the assets owned by the UK banks were outside the country and UK banks were highly connected to other financial markets, so as financial turmoil affected the US markets, UK banks were hit too. Moreover, securitisation was widely used by the UK banks in 2007. Securitisation involved 25% of new mortgages with the majority funds coming from abroad (OECD 2009 June).

Belgian banks were also involved in investing in subprime financial instruments ABS and CDOs, which led to a decline in bank’s profitability between 2006 and 2007 (National Bank of Belgium 2008).

Another country affected by the US subprime crisis was the Netherlands where Dutch banks and its US subsidiaries were exposed to the US mortgage-backed securities and they suffered during the financial crisis because of limited interbank funding (IMF 2011 June). Another consequence of significant Dutch banks investments in structured credit products that originated in the US was 10 billion euro worth of write-downs that were made by four major Dutch banks in 2007 (De Nederlandsche Bank 2008).

Conversely, Italian, Portuguese, Danish and Spanish banks were not directly involved in originating and trade of credit-backed securities. However, an increase of uncertainty in the reaction to the financial crisis in the US and reduction in the interbank market had an effect on those banking systems. For example in Italy financial shares decreased from September 2007 to January 2009 by 64% (OECD 2009 June) and in 2008, Italian banks were first affected by the financial crisis by the limited availability of wholesale markets and thus banks’ profits declined by almost two thirds (Banca D'Italia, 2009). Also Spanish banks relied on external funding as their source of finance (IMF 2012 June) so a limited access to interbank and wholesale markets in the second half of 2007 negatively affected Spanish banks' operations (Banco de Espana 2007). The deteriorating situation in the financial market in Spain continued in 2008 resulting in a decrease of profits of Spanish credit institutions (Banco de Espana 2008). Portuguese and German banks’ profits were affected by an increase in cost of borrowing caused by the subprime crisis in the second half of 2007 (Banco de Portugal, 2008; IMF 2011 July).

In Sweden, the crisis resulted in currency depreciation, drops in output, banks’ liquidity problems and a drop in investment in the Baltics that resulted in a decrease in share prices (IMF 2011 July). Another consequence of the subprime crisis was an increase in the rate of interest of funds from abroad (Sveriges Riksbank 2007). In 2008 there was also a decrease in profitability of banks although not as dramatic and in line with the 10 years average (Sveriges Riksbank 2008).

In several countries the financial crisis led to financial problems of major financial institutions. One of the first was Northern Rock, which experienced problems with funding in 2007. Although the bank was not exposed to subprime mortgages, its growth strategy depended on securitisation and in 2007 when the crisis in the US reduced availability of long-term funds, Northern Rock experienced short-term liquidity problems and this led to deposit bank runs (Bank of England 2007). Another important European financial institution nationalised by the government was Fortis Nederland and ING, where the government purchased subordinates bonds worth 10 billion euro in October 2008, (further support for ING included 17 billion euro of bonds guaranteed by the government and 27 billion euro in assets guarantee on an Alt-A portfolio) (Stolz and Wedow 2010).

In the second half of 2008 the situation worsened especially for KBC, Dexia and large insurance group Ethias. Dexia were exposed to structured financial instruments from the US, Dexia via the US insurance subsidiary and German banks. Problems of Dexia also affected Ethias as Ethias held 5% of Dexia ownership (OECD, 2009). The concern over Dexia about the extent of exposure to subprime financial instruments led to difficulties in renewing short-term financing and a decrease in price of their shares. In September, Dexia received 6.4 billion euro in financial assistance from Belgian, French and Luxembourg governments (National Bank of Belgium 2008).

**5. Conclusions**

In the 10 selected European Union countries the first symptoms of the crisis were visible in 2007, when the economic growth decreased in the Euro area. Moreover, high value of beta of banking sectors indicated increase in risk in banking sectors in 2007 and 2008. The fall of Lehman Brothers undermined the trust in financial institutions in the EU and led to a decrease in bank’s profitability and also volatility and a decrease in equity prices, a decline in business investment and GDP and an increase in unemployment and finally a decrease in exports.

The crisis affected the European banking sector where financial turmoil was experienced by many European financial institutions. One of the first was Northern Rock, a UK bank; other difficulties of big financial institutions included the takeover of Dresdner Kleinwort investment bank by German Commerzbank AG, and HBOS-Britain's largest mortgage lender by Lloyds TSB. Other consequences of Lehman Brothers' fall included: bailout of Fortis by Netherlands, Belgium and Luxembourg, and a rescue package for commercial property lender Hypo Real Estate Holding AG from the German government.

There was growing uncertainty about EU financial institutions’ exposure to ‘toxic’ assets from the US, which contributed to the increase in stress in the European banking sector.

Although, majority of the EU banks were not directly involved in the trade of subprime backed securities, all countries in the sample experienced stress in banking sector and decrease in banks’ profitability. Further studies could include the reasons for severity of the crisis in the advanced economies with consideration of crisis transmission channels to the EU countries.

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