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Effect of European Sovereign Debt Crisis on Banks' Performance and Consequences to General Economy

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Abstract

This paper studies the impact of the European sovereign debt crisis on Portuguese banks' share prices. I employ a powerful tool of empirical finance – the event study – to assess the behavior of banks' share prices before, and after a credit rating related announcement of both the sovereign and the banks individually. I find that the sovereign ratings are truly important for banks' performances while the individual ratings seem to have little importance. This is probably due to the fact that banks' credit ratings have been reflecting changes in sovereign ratings rather than any idiosyncratic factors of banks' solvency. Among the rating agencies studied the most predominant is Standard & Poor's. Furthermore, I come across evidence of market inefficient and anticipation, especially to announcements made by Moody's.

Key words: European sovereign debt crisis, banks' share return, event study, market efficiency.

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1. Introduction

Financial stability risks have increased substantially over the past two years due to the burst of the so-called European sovereign-debt crisis in 2010. In such a manner that for the first time since October 2008, the risks to global financial stability have increased[1]. So much so that some economists do not believe the eurozone will be able to survive as pressures seem to increase and spread every other day. For instance, early in 2012 the famous economist Nouriel Roubini warned that the eurozone will collapse within the year.

It all began when doubts about the Greek government ability to honor their debts maturing in 2010 made government bond yields to increase drastically. Ever since some European countries with special focus on those known as peripheral countries – Ireland, Portugal, Spain, and Italy – were thrown to the spotlight of the protracted crisis, which began with the late 2000s financial crisis.

This "second Great Contraction" – a second-hand[2] term coined by the famous economist Kenneth Rogoff - unfolded when the bursting of the US housing bubble caused the values of securities tied to US real estate pricing to plummet, damaging financial institutions at a global scale. As a result stock markets around the globe suffered great losses, especially between the collapse of Lehman Brothers in September 2008 and early 2009.

In the aftermath of the first stage of the crisis – predominantly financial - and with the economies slowing as a result of tightened credit and decreasing international trade, governments all over the world were forced to take on unprecedented fiscal

[1] Source: IMF, September 2011 issue of the Global Financial Stability Report.

[2] "The Great Contraction" is Milton Friedman's term for the recession which led to the Great Depression.

stimulus, expansionary monetary policy and tremendous institutional bailouts for those considered “too big to fail”. Among the main recipients of those spectacular rescue packages were banks, which were re-capitalized at a global scale so as to stave off the banking crisis instigated by the international financial crisis started in 2007.

The spectacular fiscal efforts, bailouts and the subsequent recession have caused a sharp deterioration of the public finances across advanced economies, raising in its turn concerns regarding the sovereign risk for those who already had weak fiscal positions.

As a consequence of the concerns, the financing costs for countries with poor fiscal balances rose immensely leaving Greece (May 2010), Ireland (November 2010), and Portugal (May 2011) no choice but default or ask for external help in order to meet their financing needs at a reasonable and viable cost. Nevertheless the apprehension regarding sovereign risk has affected hugely only the three countries mentioned above some others have seen their credit ratings downgraded increasing considerably their financing costs with special attention to Spain and Italy.

Furthermore and due to reassessment of global sovereign risk by market participants less vulnerable countries such as France, Belgium, or the United Kingdom were abruptly impacted with unprecedented widening spreads. Ironically, the deterioration of the public finances instigated with the attempt of saving the banking and financial systems and therefore ensuring economic prosperity going forward has now turned into this European sovereign-debt crisis, which is already having important adverse effects on banks and financial markets. So much so that in the euro area pressures on sovereigns threatens to reignite the adverse feedback loop between the banking system and the real economy.

For instance it is estimated the euro area sovereign credit strain from high-spread countries to have had a direct impact of about €200 billion on banks in the European Union since the outbreak of the sovereign credit crisis in 2010. In a nutshell, there is little difference between the position of American Banks in 2008 and the current position of European banks. Mortgage-backed securities or government bonds what matter is that they are not worth what people thought. In sum, today (as in 2008) people worry about the viability of major European (American) banks clogged with government bonds (mortgage-backed securities) whose value is difficult to assess.

Under such delicate circumstances it is interesting to study how the crisis has affected banks across Europe. Firstly because indeed, knowing how this sort of crisis affect institutions so exposed to government debt is important for investment decisions. Secondly, and in my opinion most importantly, due to the fact that banks are an important piece for the functioning of the real economy, and with banks facing difficulties it is likely that the real economy will be stuck without proper financing, as noted in several studies. Bernanke (1983) in one of his famous studies about the Great Depression argues that the credit squeeze on aggregate demand helped transforming the severe but not unprecedented downturn of 1929-30 into the most severe recession of the 20th century. As noted by the famous monetarists such as Milton Friedman and Anna Schwartz, Federal Reserve's failure to provide liquidity to banks suffering runs was crucial to the harsh development of the (first) Great Contraction of 1929-30.

However, the role of monetary policy in times of crisis is not clear and it is currently in active debate as the European Central Bank refuses to devaluate the euro over its main objective of maintaining price stability.

Given that government debt crisis are not common in developed countries, the literature studying the importance of credit rating agencies announcements is limited. The existent literature studies mostly its impact on developing economies, particularly its effect on government bond yields and credit default swaps spreads. Recently, due to the underlying situation, some authors have studied this relationship in a European standpoint.

This paper tries to provide a better understanding on how have the sovereign-debt crisis affected banks, in particular Portuguese banks listed on the main Portuguese stock index – PSI20. I first carry out a descriptive analysis on the performance of the Portuguese economy in general, and in particular of the banking industry. Then I compare banks' performances against others parts of the economy. In order to do so, I recur to two financial series; one corresponds to the banking industry price index whereas the other corresponds to the rest of the economy price index, from a stock-market viewpoint. Secondly, I conduct a "traditional" event study analysis to examine the significance of the impact of credit rating announcements on the return of Portuguese banks' shares. Thirdly, I use a regression based event study methodology as to complement the abovementioned analysis, and first and foremost to test for market efficiency and signs of anticipation conditionally on those events taking place.

The remainder of this paper is organized as follows: section two provides a brief explanation for the over-exposure banks have in relation to government debt. Section three explain the methodology used in this paper, and mentions the data used in order to conduct this study as well as it sources. In section four, five, and six present the empirical study and discuss the results. Finally, section seven encloses the main conclusions.

2. Why are banks so exposed to the Sovereign-Debt Crisis?

From past lessons to present mistakes

When attending introductory economics courses, students are taught that government debt, above all, that of advanced economies, is risk free. Recent events render the assumption not quite truth. In fact, not only recent events, as one can find various histories of government defaults and debt restructurings since the early nineteenth century[3]. Whilst in some cases those were resultant from riotous political periods: wars, civil conflicts or revolutions that made debtor governments unwilling or unable to meet their obligations. Examples of that are Turkey, Bulgaria and Austria-Hungary and Italy, Turkey, and Japan who suspended debt payments to enemy countries at the beginning of World War I and World War II respectively. Countries like Russia (1917), China (1949) and Cuba (1969) repudiated their debts at the time of their communist takeovers.

The list of default that resulted from such circumstances is long. But while the previous resulted from extraordinary out-of-the business-cycle events some others, the majority of defaults and debt restructurings don't belong to that category, but reflect instead fine interactions between domestic economic policies and shocks to the economy, counting with alterations in the external conditions and sometimes on political shocks. In fact we have several examples of that in the last few decades, with emphasis to the cascade default of Latin America in the 1980s or the Asian Financial crisis of 1997.

[3] Carmen Reinhart and Kenneth Rogoff count 250 defaults on government debt from 1800 to the early 2000s.

Now, if during the so-called "pretodollar recycling" as it was often called to the loans granted to the Latin America countries Walter Wriston's famous statement: "Countries don't go bust", was, as it turned out, a foolish thing to say, a thought following the same line of reasoning of 1929 when it was predicted permanently high stock prices or the more recent idea that house prices would never fall. The blind believe on the existence of such thing such as risk-free government debt in full 21st century with so much evidence behind us is equally naïve. Nevertheless it was based on those beliefs that banks are in the position they are today.

In the aftermath of the financial crisis, governments re-capitalized banks around the world in order to stave off the banking crisis. It worked but only to postpone it as most of the money banks receive from governments was without delay to the safest place banks could find in the chaos of the financial crisis – the so-thought haven of government bonds.

Furthermore there is the fact that, at least until recently, investors have paid little attention to the diversification of their government debt portfolio in general but particularly when it comes to advanced economies as those of the European Union. On top of that, the fact Basel II stipulates a zero capital requirement for such assets, encouraged even further the investment in the referred securities.

3. Impact of the sovereign-debt crisis on the general economy

The impact of the sovereign-debt crisis is already affecting the economy in an important manner. A good indicator of that is the fact that, for the first time since October 2008, risks to global financial stability[4] have increased, signaling a partial reversal in the progress made over the past three years, which reflects to great extend the significant rise in sovereign vulnerabilities. Particularly for Portugal, the most recent assessment[5] carried out by the Bank of Portugal estimates the GDP to back away 3,4%, representing the worst recession since the 1970s while the estimates point out to an economic stagnation for next year.

There are several factors resulting from the sovereign-debt crisis that contribute for the current state of the Portuguese economy.

On one hand, we have the current fiscal consolidation carried out by the government and under the supervision of troika[6], which surely has its share of blame for such deep recession. Without the possibility of using monetary policy as a tool to consolidate public accounts the only possibility left for the government to employ is fiscal policy and so it has been done. As a result of the contractionary fiscal policy implemented by the government – decrease of public consumption and increase of taxes - the aggregate demand reduced contributing for the recession. Together with the reduction of the public consumption comes the reduction of private consumption which for this year of 2012 is estimated to decrease by 7,3% driven by the income effect

[4] Source: IMF staff estimates

[5] Boletim Economico, Primavera 2012 of March,29

[6] Word of Russian origin, that in the context of the sovereign-debt crisis refers to the team responsible for monitoring the so-called "programa de ajustamento". It is composed by the European Commission, International Monetary Fund and European Central Bank.

coming essentially from the austerity measures - the increasing burden of taxes, salary cuts, or the unemployment – and to a less extend to negative impacts coming from the performance of financial markets.

Moreover, bad perspectives in terms of future income are tilting households to save rather than to consume.

On other hand, as a result of the undergoing depreciation of the euro, the exporting industry has been growing but those benefits not even begin to counter balance the negative impacts of the austerity measures.

Additionally to the income effect there are other factors that may impact negatively the aggregate demand namely the access to financing, which is where the importance of a healthy baking system comes into place. Data from a recent survey on lending conditions conducted by the Export and Credit Bank up to early January found that respondents indicating a tightening in lending conditions for the corporate sector have more than doubled – to 35% - since October 2011.

So far a scenario of a credit crunch is off the table but the importance of proper financing conditions for dynamic, and productive companies, especially small, medium, and exporters was highlighted by the European Commission and IFM in the third evaluation of the so-called "programa de ajustamento".

Adding up to the already fragile state of affairs inside the EMU, adds the imminent possibility that if mounting pressure over the bond issuance of bigger peripheral countries such as Spain and particularly Italy carries with it the need of those countries to be bailed out. If that is to happen the future of the EMU itself would be at stake as impacts will be huge with the most likely scenario to being the break-up of the

monetary. Under this tremendous pressure it is paramount that governments and ECB coordinate efforts and decide upon some measure to stave off the sovereign debt crisis.

4. Methodology

4.1 Introduction

With this paper I aim at providing evidence on how banks' performances are affected by credit rating announcements both at a country and bank level. This is an issue that has been affecting the life of all European citizens, especially those of the most affected countries such as Portugal and thus I believe it's important to study its effects to the banking industry. Moreover, while there are several publications studying the impacts of credit rating announcement on government bond spreads the literature regarding its impact on banks is limited, which makes it an important topic to analyze, especially in the days we are living in.

Beginning with what I call preliminary analysis, I compare the performance of banks with the performance of the other industries on the whole. This approach allows for a better understanding on how banks have performed in the past few years in comparison with the non-financial part of the economy. In addition I study the correlations of sovereign and banks' credit default swaps. Secondly, and in a more technical note I make use of a powerful tool of finance – the event study – in order to assess and quantify those impacts. Also, by employing this workhorse of empirical finance I pretend to assess the existence of market efficiency regarding credit rating types of announcements. However, the use of such statistical tool may carry with it a few shortcomings, namely due to the fact that apart from the period leading to the first

downgrade studied, it's difficult to find a clean estimation window. Nonetheless I try to make the necessary adjustments to mitigate problems that may arise from that. The exact detail on how I employed the event study tool is described in their respective sections.

4.2 Data & Sources

The data used so as to perform this study was collected on Datastream, Bloomberg, and Bankscope. From the first I obtained all the price series of banks, and other indexes used, as well as time-series of credit default swaps both for banks and for the Portuguese Republic. Then I ought to calculate the return of banks in order to carry out the analysis. From Bloomberg I obtained all the information regarding rating news over the period under analysis – from Jan '09 to Jan '12.

In total, considering all rating agencies there were 79 announcements. The detail of such announcements can be found in Table in Appendix 1. Finally, from Bankscope I obtained the data on banks' balance sheets. Additional details on the data used will be provided alongside with the extensive explanation of the methodology.

4.3 Ratings

4.3.1 Definition

The definition of ratings does not vary much from agency to agency and in a nutshell they provide an opinion on the ability of an entity or of a security issue to meet financial commitments, such as interest or repayment of principal, on a timely basis[7]. In the scope of this paper I use data from the Big Three[8] as well as from Dominion Bond Rating Service (DBRS), which is assessing since 2010 the creditworthiness for Banco Espírito Santo and Portugal. The ratings systems of all rating agencies are presented on Appendix 1.

Moreover, I focus on the ratings of long-term foreign currency-denominated debt because these debt issues have extensive rating information and tend to be more liquid... In total, there were 79 announcements. The most active rating agency was Moody's with 32 announcements followed closely by Standard & Poor's with 28. Fitch was the less active of the so-called big three with 15 while DBRS was obviously the less active overall with only 4 announcements. As expected, the results of the European sovereign debt crisis has tilted hugely the nature of such announcements – they are all negative announcements (downgrades or negative outlook revisions) with exception of two positive outlook revisions.

[7] Source: Fitch Ratings – Definitions of Ratings and Other Forms of Opinion – Apr 2012

[8] Name widely used when refering to the three main credit rating agencies (Standard & Poor's, Moody's, and Fitch)

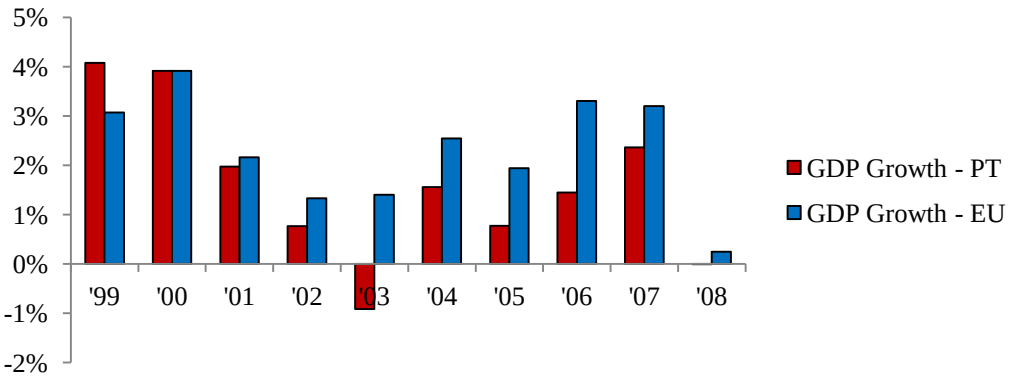
5. Preliminary Analysis

5.1.1 Portugal - the last decade

In this preliminary analysis I begin by providing a brief overview of major macroeconomic statistics - GDP Growth, Deficit, Debt, current account, and unit labor costs - that help understanding how the Portuguese economy has performed since the introduction of the euro until the beginning of the late 2000s financial crisis. Moreover I compare these statistics with those of the European Union on the whole so as to better grasp the relative performance of Portugal in comparison with the average of its European peers (henceforth refereed as European Union).

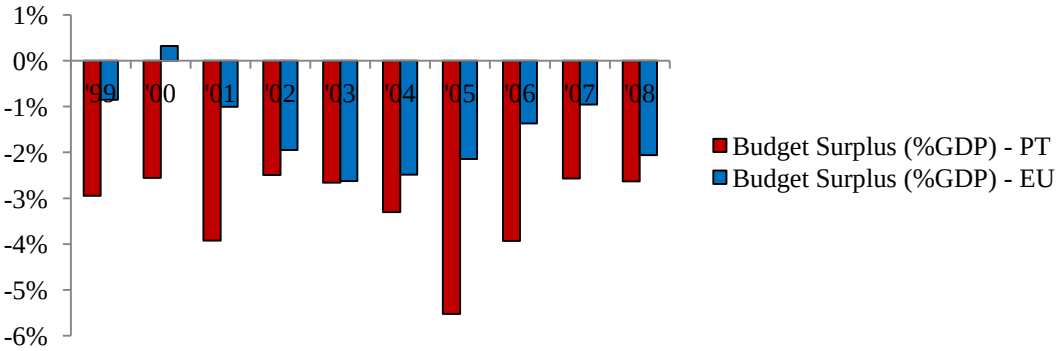
Beginning with the GDP growth (Graph 1) it is observable that in the very early years of the eurozone Portugal was very much in line with the average of the European GDP growth rate even outperforming it in 1999. However, and especially since 2002, the relative performance of Portugal dropped to below average and so it remained. All in all, during this last decade Portugal's GDP growth rate averaged 1,6% which compares poorly to that obtained by the European Union – 2,3%.

Graph 1 - Last Decade's GDP growth for Portugal and European Union. Source: OCDE Statistics



In relation to the budget surplus presented below in Graph 2, it is verifiable that in the first decade of the euro zone Portugal did not produce a single positive budget surplus. On the other hand, the European Union budget surplus albeit being positive only once (2000), in general, outperformed that verified in Portugal. The average budget deficit for Portugal during the analyzed period was of 3,25% per year, which means an on-average breach of the growth and stability pact. The average budget deficit for the entire European Union was less than half – 1,51%.

Graph 2 - – Budget Surplus as percentage of GDP for Portugal (PT) and European Union (EU) from '99 to '08; Source: OCDE Statistics

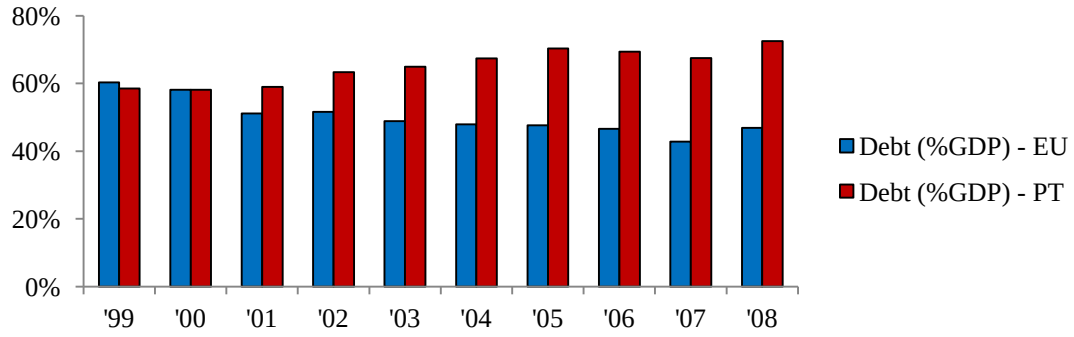


Regarding the evolution of government debt, by looking to Graph 3, it is detectable that the pattern of Portugal's debt has been an upwardly one whereas the

European Union reduced its stock of government debt over the same period. In fact, by 1999 Portugal was below the European Union average. However, due to the divergence verified on this specific indicator, as of the end of 2008, Portuguese government debt accounted for 72,5% of GDP, again above the stipulated in the growth and stability pact, while the average stock of government debt of the remaining European Union constituents was of 50%.

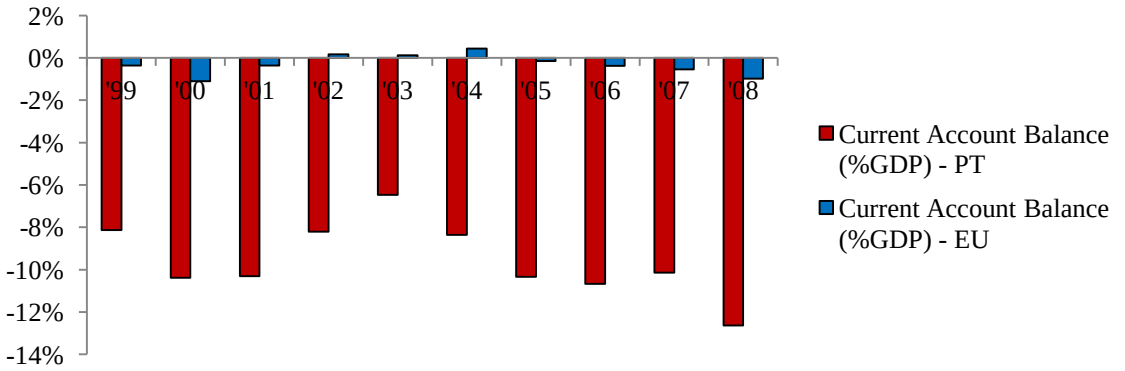
Graph 3 - Debt as a percentage of GDP for Portugal and European Union.

Source: OCDE Statistics



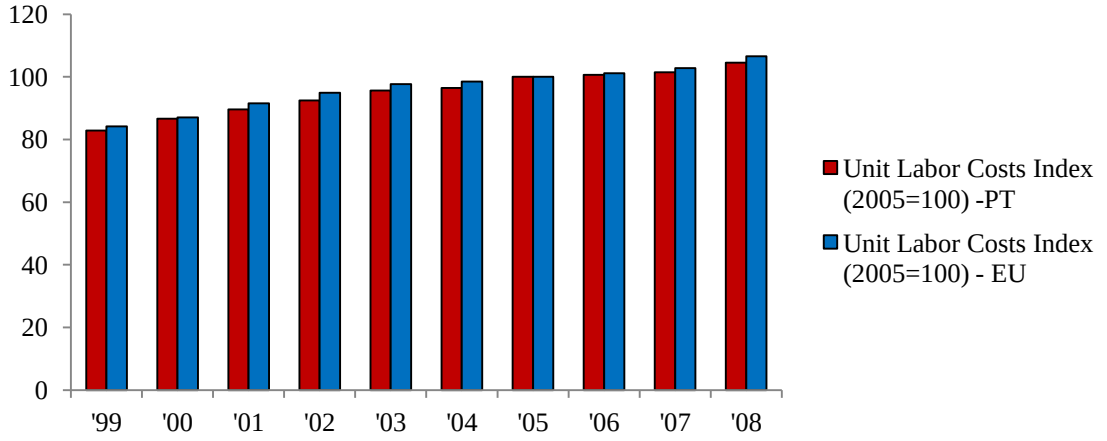
Moreover, I analyze the evolution of the Current Account Balance, which can be seen below in Graph 4. By means of investigating the evolution of this variable one can get insightful conclusions about the consumption behavior. As it is easily seen in the graph the current account balance is clearly and hugely negative for Portugal, being not uncommon current account deficits of 10%. On the other hand the current account of the European Union is roughly balanced. This imbalance suggests that the Portuguese economy was lending from other economies. During the scrutinized period the Portugal's current account averaged -9,73% while the average for the rest of the European Union amounted to -0,32%.

Graph 4 - Current Account for Portugal (PT) and European Union (EU) as percentage of GDP; Source: OECD Statistics



Finally I study the evolution of the Unit Labor Costs. This figure is calculated as the quotient of total labor costs and real output. Graph 5 below shows that Portuguese Unit Labor Costs are consistently below the European Union average. However, it is important to notice that nevertheless its lower unit labor cost, Portugal struggles to be competitive internationally.

Graph 5 - Unit Labor Costs for Portugal (PT) and European Union (EU) Source: OECD Statistics



In light of the abovementioned and briefly analyzed macroeconomic indicators, Portugal's current situation can be more easily understood. Especially the recurring

deficits that increased government debt to the unsustainable levels verified today. This figures were dramatically affect in the years following the "second Great Contraction" ('09 and '10), which led to intervention of the IMF in May, 2011.

5.1.2 Portuguese banks - the last decade

In addition to the evolution of main macroeconomic indicators I also present the progress of main figures for banks since the creation of the euro in 1999. This is important in order to assess and be aware of the main differences between banks, which consequently may affect the reaction of each bank to the European sovereign debt crisis. For instance, a bank with a greater exposure to sovereign debt is more likely to be significantly affected than a bank with lower exposure.

Firstly, I present a brief summary of each bank: history; influence in the national market; international presence; and strategy. Secondly, the performances of banks' shares are analyzed. In order to carry out this analysis I use the correspondent prices series from Datastream.

Finally, I study main figures of both sides of the balance sheet, which I believe might have explanatory power to the possible distinct reactions experienced by each bank. For this, I use data available on Bankscope. The use of balance sheet data can be very useful; however, it is important to be aware of possible shortcomings from using balance sheet data. Examples of possible drawbacks from using this type of data are value discrepancies (book to market value), and transparency. Those problems can render ratio analysis unreliable.

The analysis is done bank by bank. A summary with the main characteristics differences encountered encloses this section

5.1.2.1 Banco Espírito Santo, S.A.

Banco Espírito Santo, S.A. (commonly known as BES), is a universal financial services group headquartered in Portugal, its privileged market. Its origins remount to the ninetieth century. By that time José Maria do Espírito Santo e Silva did businesses such as currency and securities exchanges in his "Caza de Cambio". In 1915 after the death of the patriarch his heirs founded Casa Bancária Espírito Santo Silva & Cª which was transformed into a public limited-liability company in 1920 under the name Banco Espírito Santo. Following a Decree Law of 1975 (after the revolution who ceased the dominance of the fascist regime) the bank was nationalized and the Espírito Santo family was prevented from doing business in Portugal. Eventually, with the lifting of the very same laws, in 1986 the bank was privatized.

As of December 2011 the Group's activity in Portugal represented 74% of its total assets. With a presence in four continents, activity in 25 countries and employing more than 9,800 people, BES Group is currently the largest Portuguese listed bank by market capitalization and the second largest private-sector bank in Portugal by total assets (EUR 2.0 billion and EUR 80.2 billion, respectively, on December 31st, 2011).

Since its privatization, BES has followed a clear and consistent strategy of organic growth in the domestic market (where its share increased from 8.5% in 1992 to 19.3% in 2011), which has benefited from the development of a market approach based on a multi-specialist model. A growth strategy based on solid brand recognition and strong commercial dynamics have made BES a reference in the domestic market and in particular in the corporate segment.

Complementing its domestic operations, BES Group develops international activities focused on countries with cultural and economic affinities with Portugal, such

as Spain, Brazil and Angola. In December 2011 the international activity represented 26% of BES Group's consolidated net assets.

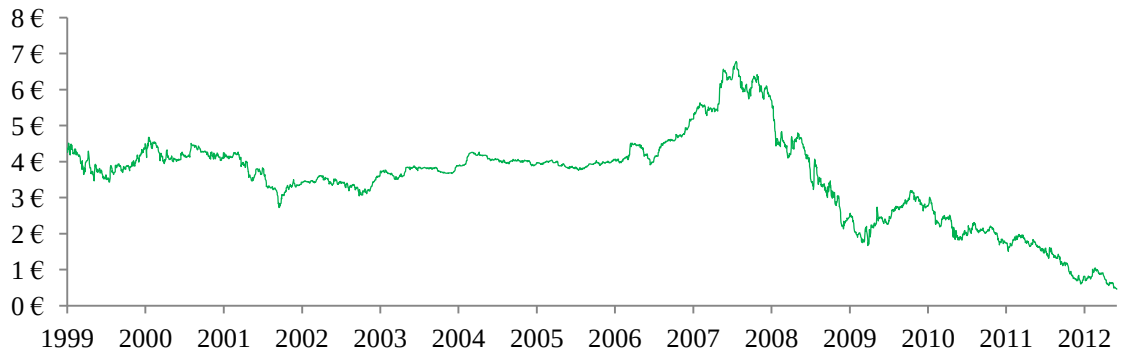
Stock Market Performance

Graph 6 below shows the evolution of BES stock price during the analyzed period.

From a quick glimpse it is observable that after a somehow stagnated period (from '99 to '05) the stock price rose considerably until late 2007. In 2008, as a result of the turmoil engendered by the financial crisis, the stock price of BES decreased significantly from around 5,7€ to 2.55€. The downgrade trend continued in 2009, roughly for the first three months. For the remaining of 2009 the share price rebounded, probably to due positive expectations regarding the real economy.

However, in the end of 2009, with the increase of concerns regarding the weak fiscal positions of some peripheral countries (Portugal included), the stock price suffered another negative deflection. Ever since, the trend has been negative.

Graph 6 - Evolution of BES's Stock price between '99 until May 31, 2012



In Table 1 below I present some descriptive statistics to help understand how BES has performed during the scrutinized period. Namely, the annualized return and volatility, maximum, and minimum value of the shares are showed. Moreover, I divide

the sample in periods I believe to be of interest. The descriptive statistics are exhibited for all sub-samples.

Table 1 - Desciptive Statistics - BES

	All	Until '07	04 to '07	08 to '09	10 to '12	From May '11
Average Return*	-12,04%	4,34%	9,90%	-27,19%	-60,45%	-99,96%
Volatility	28,03%	15,57%	11,26%	39,06%	46,73%	57,51%
Maximum	6,78 EUR	6,78 EUR	6,78 EUR	5,71 EUR	3,01 EUR	1,84 EUR
Minimum	0,45 EUR	2,73 EUR	3,76 EUR	1,67 EUR	0,45 EUR	0,45 EUR

Note: * Average Return is obtained by applying a simple arithmetic average of the daily returns and then multiplying it by the 251 trading days in a year.

Source: Author calculations based on Datastream

As one can observe, by considering the entire sample, the results are quite disappointing – an average annualized return of -12,04%.

However, this result is obviously tilted; firstly by the financial crisis, and secondly by the European sovereign debt crisis. In fact, from ’99 until ’07 the annualized average return amounted to 4,34%, which though not being great is certainly a solid performance.

Furthermore, if one wants to analyze the returns of BES shares without the effect of any crisis one ought to do it between ’04 and ’07. By doing so, the effects from the dotcom crisis and the ’03 recession are eradicated.

During the period leading up to the financial crisis the bank exhibits a good performance – showing an average annualized return of around 10%. Also, during this period the volatility of returns was the lowest, probably due to the inexistence of significant turbulent periods.

Moreover, I compute the same statistics corresponding to the periods of crisis. For this purpose I consider the financial crisis to correspond to the years of ’08 and ’09 and the European sovereign debt crisis to be from ’10 until the present. As it is observable

from table 1, BES's performance resented considerably with the crisis, showing an average annualized returns of -27,19% and -60,45% respectively. Naturally, the volatility also increased to levels between 40% and 47%.

Finally, I also consider solely the period after the external intervention, which took place in May 2011. In fact, this is the period with the worst performance, presenting an overwhelming average annualized return of around -100%.

From these results I conclude that notwithstanding the great impact proportioned by the financial crisis started in 2007, the European sovereign debt crisis is having an even more severe impact to BES. In particular after the external intervention.

Balance Sheet Analysis

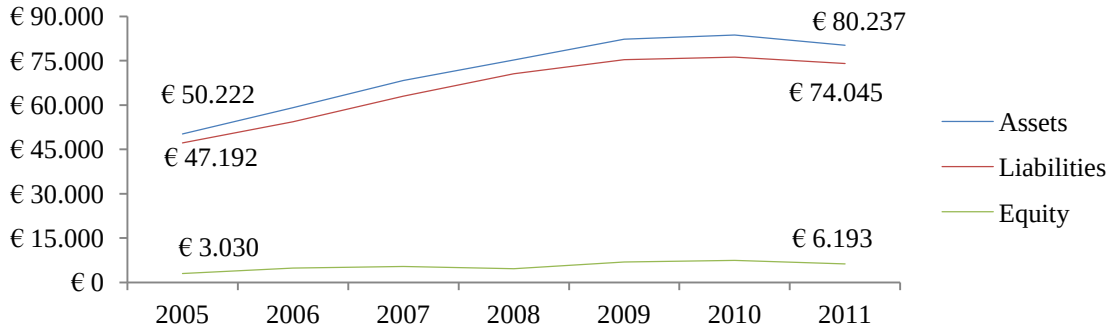
The study of the balance sheet starts with a simple analysis of its three major components – assets, liabilities, and equity. For BES, the data available on Bankscope ranges from the end of 2005 until December 31, 2011.

Graph 7 below shows the evolution of those three main figures. It is observable that assets and liabilities have been moving upwards fairly together - as of December 31, 2011 they had grown 60% and 57% respectively, in relation to their value on the end of 2005. On the other hand, equity shows a steeper increase – around 100% between 2005 and 2011.

Nonetheless, it is important to be aware of a particular caveat of the analysis of equity that is the fact that an increase in equity does not necessarily imply an increase in the share price of the bank. In fact, from the analysis of BES's share price of graph 6 it clear that it has been decreasing from mid/end 2007. The increase in equity showed in

graph 7 is due to increase in capital, mainly to comply with capital requirements imposed by Basel II, and not due to increase in the value of individual shares.

Graph 7 – Main Balance Sheet Components



Additionally to the simple study regarding the evolution of major components of the balance sheet I also carry out a ratios analysis. Namely, I assess the importance of government bonds on the securities portfolio of each bank and in its turn, the relative importance of the securities portfolio in relation to assets. Moreover, I compute the ratio between government bonds and equity. Finally, I assess the how the bank is meeting its financing needs by computing the ratio between long and short term debt.

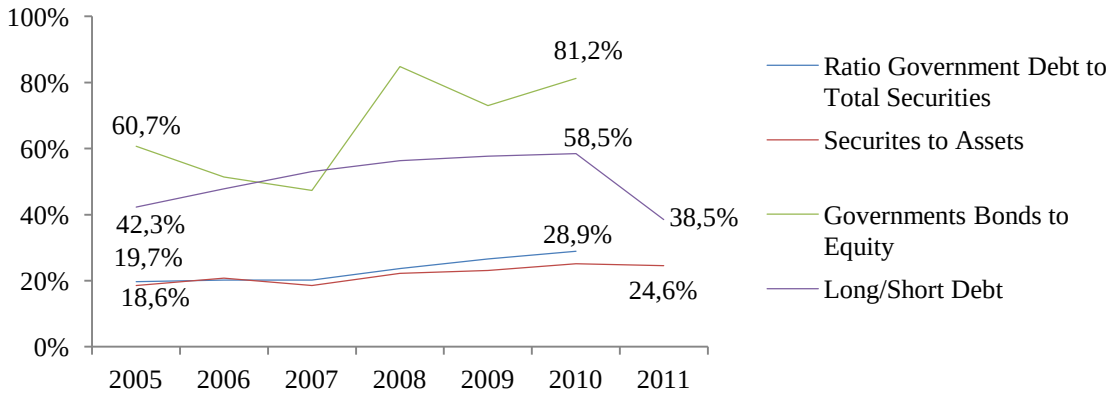
Graph 8 below shows the evolution of the ratios abovementioned.

From observing the evolution of the ratios studied it is noticeable the increasing importance of government debt to securities and of securities to assets, especially from 2008 onwards. This corresponds to the period in which governments around the world were implementing extraordinary fiscal efforts. It is therefore natural that with the increase of funds demanded by sovereigns, banks such as BES increased their exposure to such type of security.

Furthermore, and as a result of the increased exposure to government debt, the ratio between government bonds to equity increased from 60,7% in 2005 to 81,2% as of the end of 2010.

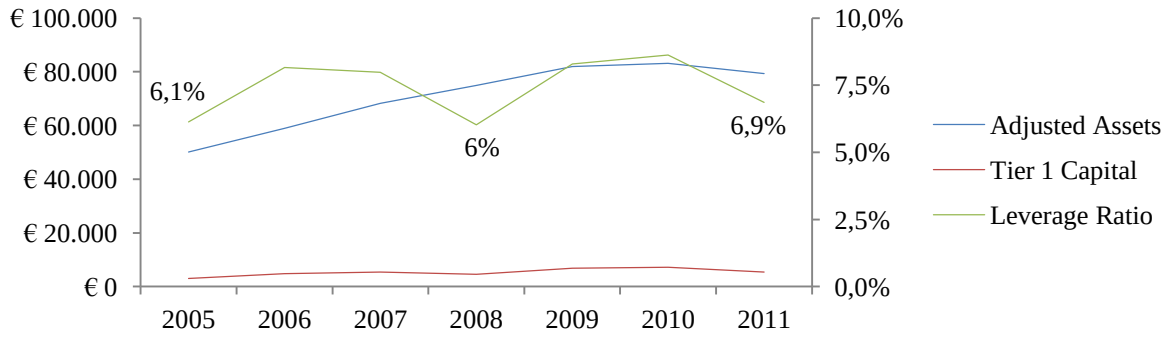
Finally the analysis of the ratio between long and short term liabilities reveals a consistent increase from 2005 until 2010. However, from 2010 to 2011 the ratio showed a drastic decrease of 20% from 58,5% to 38,5%, entailing that, with the sovereign facing such debt related problems, banks in general and BES in particular was prevented (through the high costs) of obtaining long term funds in the market.

Graph 8 – Ratio Analysis



Lastly, I compute the leverage ratio. The leverage ratio is generally expressed as Tier 1 capital as a proportion of total adjusted assets (total assets – intangible assets). Tier 1 capital is broadly defined as capital plus reserves minus intangible assets. The thresh-hold for a bank to be considered well capitalized is 5% (World Bank, 2005). The main advantages of the leverage ratio lie on the fact that it is simple and quick to calculate, cheap, and that it can be applied regardless of the capital adequacy regime in jurisdiction. One argument against the leverage ratio is that it only accounts for the balance sheet leverage. BES, as is observable in graph 9, never had leverage ratio below the "well capitalized" threshold. The minimum verified leverage ratio was in 2008 - 6% - still relatively far from the 5%.

Graph 9 – Leverage Ratio



5.1.2.2 Banco Comercial Português, S.A. – Millennium BCP

Banco Comercial Português, S.A. (commonly known as BCP or Millennium), is a universal financial services groups which has its decision centre in Oporto, Portugal. Founded in 1985 by Jardim Gonçalves and a group of investors from the Oporto region, BCP is the second largest Portuguese listed bank by market capitalization and the largest by total assets (EUR 987 million and EUR 102 billion, respectively, as of December 31, 2011).

Since its creation, BCP has followed a strategy based on acquisitions of other commercial banks. In 2004 it amalgamated all the brand names and restyled as Millennium BCP.

In Portugal the bank has over 2,5 millions of customers spread by the more than 900 branches granting it a market share of 25%.

Facing the maturity of the Portuguese national market, BCP initiated in 2003 an internationalization process, exporting the model of retail banking used in the homeland – this process is widely recognized as a successful case study of internationalization.

Currently, the bank is present in five continents either directly or by representation. The international presence is felt strongly in Poland, Greece, Angola, Mozambique and Romania. It has nearly 2 million customers throughout the world.

Stock Market Performance

Graph 7 below shows the evolution of BCP stock price during the analyzed period.

BCP's stock market performance differs from BES mainly during the first years of the monetary union. By means of observing Graph 7 one can see that indeed, from '99 to '03 the stock price decreased considerably. After this period, the behavior of BCP's share price is very much alike to that verified for BES. The period between '04 and '07 is characterized by a good performance while thereafter, as a result of first the financial crisis and second the European sovereign debt crisis, the shares have been experiencing a sustained decrease in value.

Graph 10 - Evolution of BCP's Stock price between '99 until May 31, 2012

Moreover, I carry out the same analysis of dividing the sample in sub-samples to assess the distinct performances originated by the different states of the economy.

Table 2 below show a brief summary of main indicators regarding the BCP's shares over the last thirteen years.

Table 2 - Desciptive Statistics - BCP

	All	Until '07	04 to '07	08 to '09	10 to '12	From May '11
Average Return	-20,45%	-1,54%	14,62%	-46,10%	-69,55%	-126,28%
Volatility	32,46%	24,47%	22,98%	40,21%	47,64%	58,64%
Max	4,26 EUR	4,26 EUR	3,52 EUR	2,44 EUR	0,86 EUR	0,55 EUR
Min	0,10 EUR	1,04 EUR	1,40 EUR	0,53 EUR	0,10 EUR	0,10 EUR

Note: * Average Return is obtained by applying a simple arithmetic average of the daily returns and then multiplying it by the 251 trading days in a year.

Source: Author calculations based on Datastream

In line with the performance of BES, also BCP performed quite badly during the whole sample, obtaining an average annualized returns of -20,4%.

From '99 until '07 the annualized average return accounted to -1,5%, which compares poorly to the one obtained by BES (4,34%). This shows evidence that the bank was more affected by the '03 recession and dotcom bubble. This may also be explained by the aggressive acquisition strategy carried out by the bank, which only later delivered the expected synergies.

During the period '04-'07 the bank went on to perform greatly, yielding an average annualized return of almost 15%. This was the period after the amalgamation of all the brand names and re-stylization as Millennium as well as a period in which the stock markets were in general in an upward trend. Despite that, BCP outperformed its main national competitor (BES) by roughly 5% per year, which indicates a successful spin-off of the brand.

In relation to periods of crisis, and considering the same periods as before – '08-'09 for the international financial crisis and '10-'12 to the European sovereign debt crisis – the results are once again overwhelming. As it is observable from table 2, the

performance of the bank suffered considerably with the crisis, showing an average annualized return of -46,1% and -69,5% respectively. Obviously, the annualized volatility also increased, to levels between 40% and 48%.

Finally, I consider solely the period after the external intervention, which took place in May 2011. In fact, this is the period with the worst performance, presenting a devastating average annualized return of around -126%.

Again, I find that the European sovereign debt crisis is having more importance than the financial crisis, especially after the bailout in May, 2011.

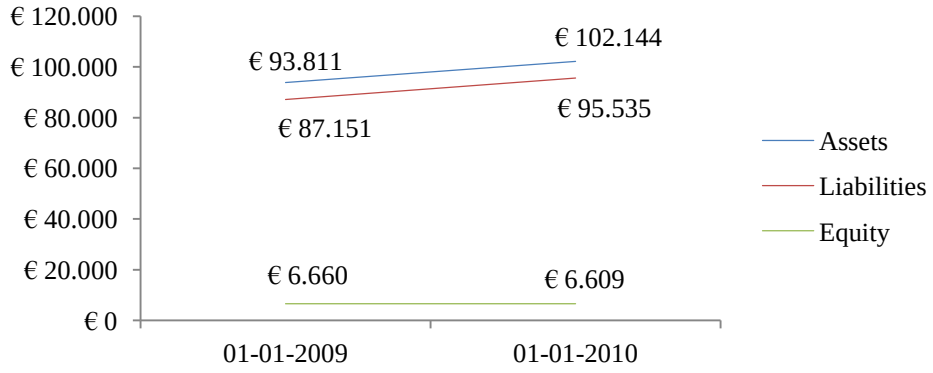
Balance Sheet Evolution

In order to study BCP's balance sheet evolution I follow the same steps as before. Unfortunately, the data available on Bankscope comprises solely the years of 2009 and 2010, which might render this analysis not so insightful.

Nonetheless, I point out the most notorious variations between the two years.

Starting in graph 10, which shows the evolution of the three major components of the balance sheet, there is not much to be said. Equity remained virtually unchanged, while necessarily both assets and liabilities roughly increased by the same amount.

Graph 61 - Main Balance Sheet Components

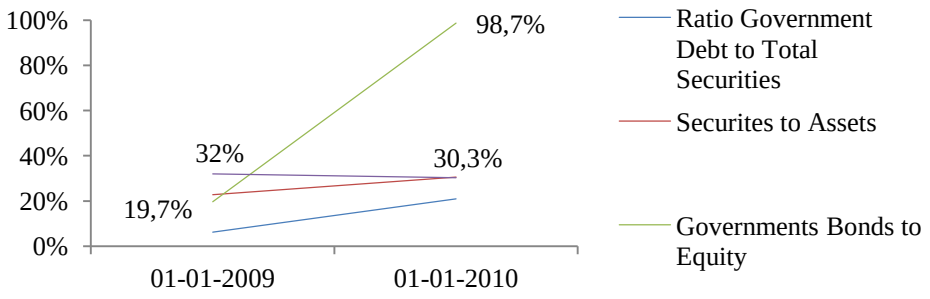


Regarding the ratio analysis I observe that all ratios move in the same direction as the ones of BES. (Graph 11)

Furthermore, I find through a simple extrapolation that between 2009 to 2010 the ratio securities-to-equity went from 3,2 to 4,72. For BES, this ratio is stable around 3 over the entire sample studied. This relative overexposure to securities may be on the root for the relatively poor performance of BCP's shares.

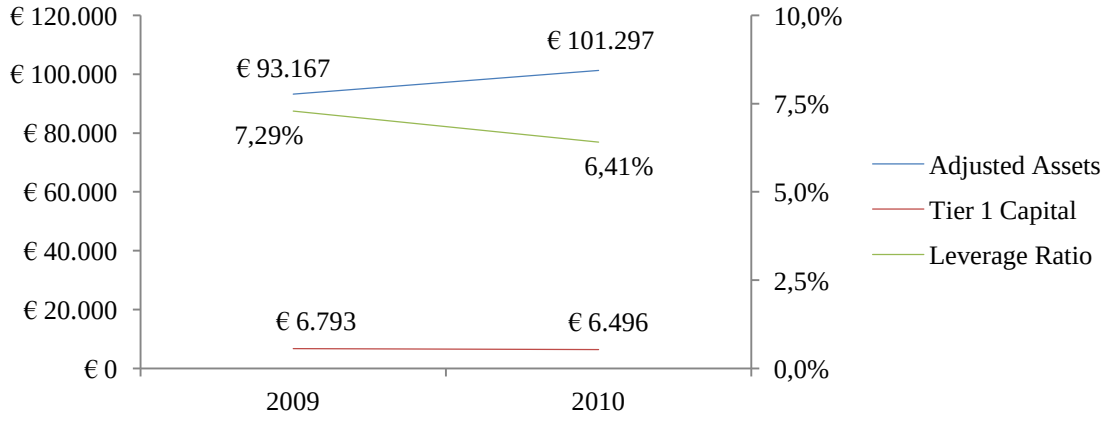
Remarkably, the ratio government bonds-to-equity increases from 19,7% to 98,7%. In relation to the ratio long-to-short term debt, and though it decreases, it is not comparable to the 20% decreases showed by BES.

Graph 72 - Ratio Analysis



Graph 12 shows that BCP's leverage ratio is within the levels required for a bank to be considered well-capitalized.

Graph 83 - Leverage Ratio



5.1.2.3 Banco Português de Investimento, S.A.

The origins of Banco Português de Investimento, S.A. (commonly known as BPI) can be traced back to 1981 when Artur Santos Silva conceived Sociedade Portuguesa de Investimentos. The main objectives of the early form of BPI were to help financing the private sector, to participate in the creation of a dynamic capital market, and to contribute to the country's industrial modernization.

In 1985 Sociedade Portuguesa de Investimento was transformed into an investment bank and incorporated, assuming the name Banco Português de Investimento. A year later the company listed its shares on the Lisbon and Oporto stock exchanges. This allowed the bank to attract sight and term deposits, grant short-term loans, participate in the interbank markets and engage in currency operations.

The nineties were characterized by a strong reinforcement of the banks' position in the national market through an aggressive acquisition strategy. By the end of the twentieth century the bank had confirmed its potential for growth and modernization.

Currently, BPI is the third largest Portuguese financial group both in term of market capitalization and assets (EUR 496 million and EUR 45,7 billion, respectively, on December 31st, 2011).

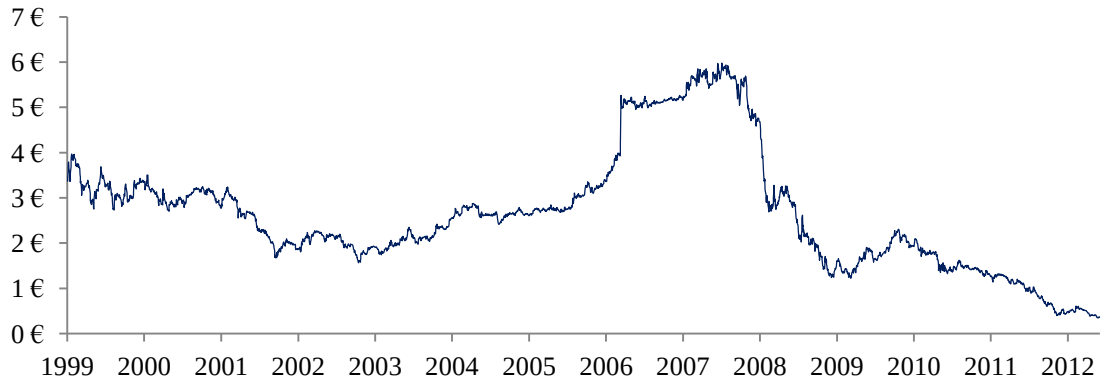
Additionally to its domestic operations, BPI carries out international activities in more than ten countries. However, its more significant international presence is in the former Portuguese colony Angola where it is the leader in commercial banking with a market share closing in 30%. The bank has 910 branches (695 in Portugal) and employs 10,000 people. In relation to clients, its domestic operations serve around 1,6 million customers whereas foreign operations are to serve around 1 million.

Stock Market Performance

Graph 13 below shows the evolution of BPI stock price during the analyzed period. It is observable that BPI's stock price pattern is close to that of BES.

From '99 to '03 the BPI stock performed relatively poorly, between '04 and '07 followed the upward trend of its peers. Roughly from '08 until May '12 it has been affected severely by the protracted crisis, which began in 2007.

Graph 94 - Evolution of BPI's Stock price between '99 until May 31, 2012



Following the flow of analysis carried out in relation to BES and BCP I once again divide the period into the very same sample-periods in order to grasp disparity of performances under distinct conditions.

Table 3 below show a brief summary of main indicators regarding BCP's shares over the last thirteen years.

Table 3 - Desciptive Statistics - BPI

	All	Until '07	04 to '07	08 to '09	10 to '12	From May '11
Average Return	-10,86%	6,42%	16,65%	-33,43%	-56,49%	-83,45%
Volatility	31,51%	24,39%	21,01%	42,45%	42,34%	50,33%
Max	5,98 EUR	5,98 EUR	5,98 EUR	4,68 EUR	2,09 EUR	1,20 EUR
Min	0,35 EUR	1,56 EUR	2,41 EUR	1,23 EUR	0,35 EUR	0,35 EUR

Note: * Average Return is obtained by applying a simple arithmetic average of the daily returns and then multiplying it by the 251 trading days in a year.

Source: Author calculations based on Datastream

By observing table 3 one sees that BPI's performance on the whole (-10,9%), compares more with the one from BES.

With a solid performance between '99 and '07, yielding an average annualized return of 6,4%, the return on BPI's shares were highly affected by the financial and sovereign debt crisis.

After the "second great contraction" the shares' value started declining. In sum, from the start of the euro zone, BPI shares have had an average annualized return of -10,9%.

Again, I find that the European sovereign debt crisis is being more important than the financial crisis, especially after the bailout in May, 2011.

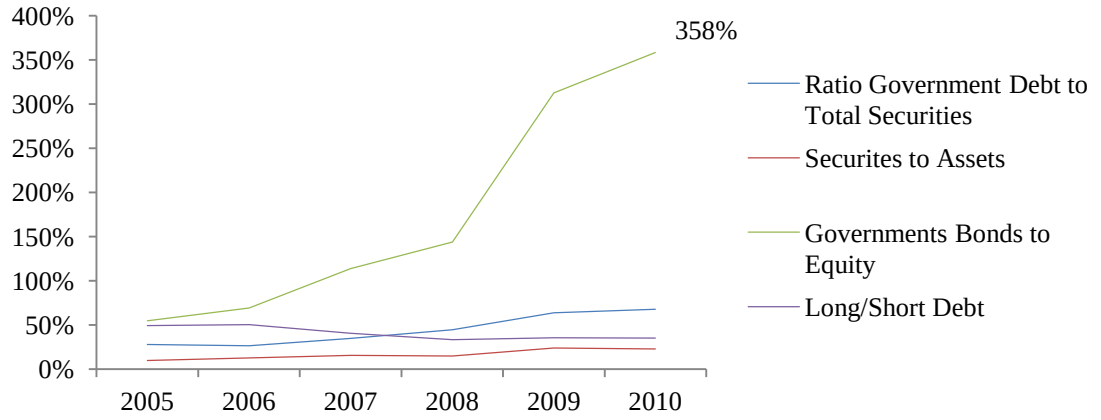
Balance Sheet Evolution

Always using the same approach I now study the abovementioned balance sheet related figures. Regarding the evolution of assets, liabilities, and equity they are in line with what happened with the previously analyzed banks. The evolution is presented in graph 14 and covers from 2005 until 2010.

Graph 105 - Main Balance Sheet Components

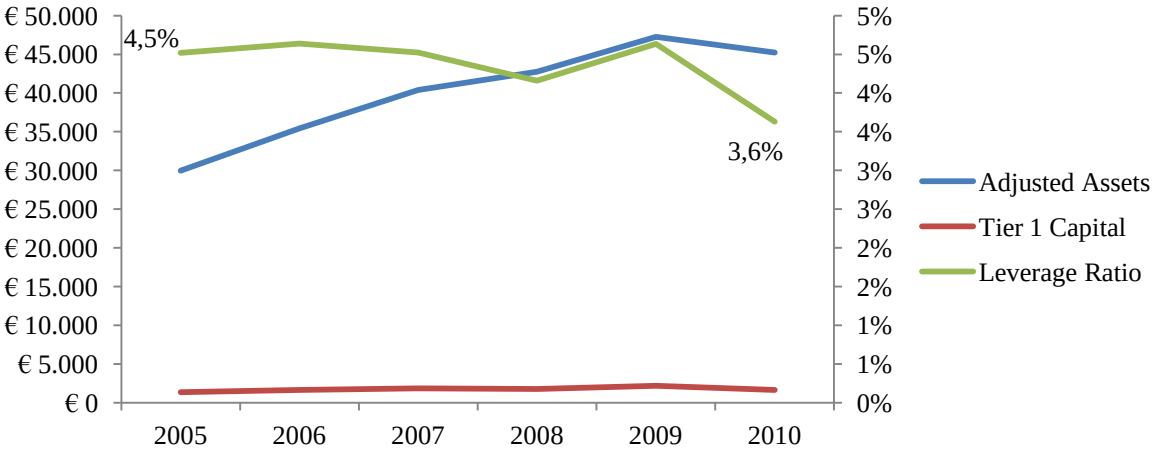
In graph 15 below are shown the ratios analyzed. In general, all ratios follow the same trends observed in the other banks. However, there is one particular ratio that stands out of the remaining – government debt-to-equity. The government debt held by BPI at the end of 2010 accounted for 3,58 times its book value of equity.

Graph 116 - Ratio Analysis



Finally, regarding the leverage ratio it is verifiable that BPI was not, at any time, complying with the 5% recommended by the World Bank. The evolution of the leverage ratio as well as of the adjusted assets and Tier 1 capital necessary to compute the first are presented in graph 16.

Graph 127 - Leverage Ratio



5.1.2.4 Banco Internacional do Funchal, S.A.

Banco Internacional do Funchal, S.A. (commonly known as Banif) is a Portuguese international financial services group headquartered in Funchal. The bank was founded and incorporated by Horácio Roque in the beginning of 1988 when it took over all of the assets and liabilities of the defunct Caixa Económica do Funchal.

Banif is the fourth largest Portuguese listed bank both by market capitalization and total assets (EUR 165 million and EUR 15,7 billion, respectively, as of December 31, 2011).

As for BPI the nineties were characterized by a strong reinforcement of the banks' position in the national market through an aggressive acquisition strategy.

Internationally, the bank is present in America (south and north), Africa and Asia.

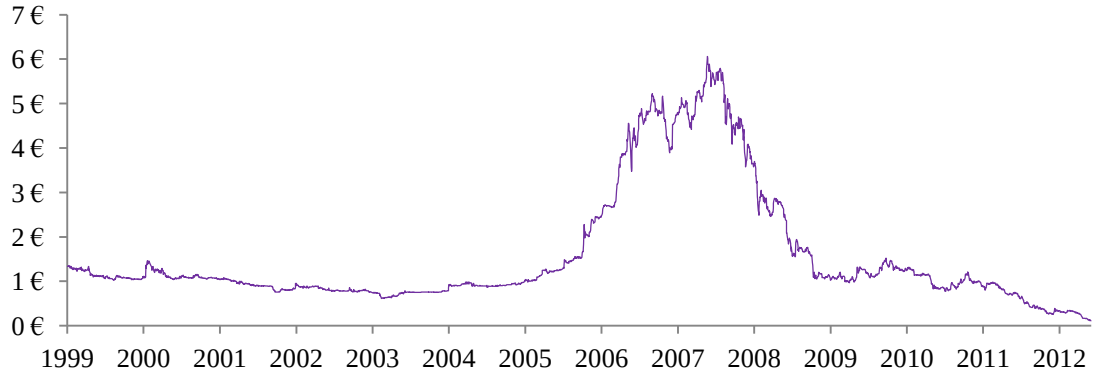
As of December 31, 2009 the bank had a total network of 352 branches, in mainland Portugal, Madeira and the Azores, and worldwide the Banif Financial Group had more than 680 points of sale.

Stock Market Performance

Graph 9 below shows the evolution of Banif stock price during the referred period under analysis. It is observable that Banif's stock price pattern is close to that of BES and BPI.

From '99 to '03 the Banif's stock performed relatively poorly, between '04 and '07 followed the upward trend of its peers. From '08 until May '12 it has been affected severely by the protracted crisis, which began in 2007.

Graph 138 – Evolution of Banif's Stock price between '99 until May 31, 2012



Following the flow of analyzing carried out in relation to the other three banks I once again divide the period into the very same sub-sample in order to assess the different performances under distinct conditions.

Table 4 below show a brief summary of main indicators regarding Banif's shares over the last thirteen years.

Table 4 - Desciptive Statistics - Banif

	All	Until '07	04 to '07	08 to '09	10 to '12	From May '11
Average Return	-12,39%	14,22%	37,01%	-43,21%	-85,85%	-146,40%
Volatility	33,03%	26,95%	29,61%	38,83%	45,53%	56,33%
Max	6,06 EUR	6,06 EUR	6,06 EUR	3,70 EUR	1,31 EUR	0,75 EUR
Min	0,11 EUR	0,61 EUR	0,87 EUR	0,97 EUR	0,11 EUR	0,11 EUR

Note: * Average Return is obtained by applying a simple arithmetic average of the daily returns and then multiplying it by the 251 trading days in a year.

Source: Author calculations based on Datastream

By observing table 4 one sees that Banif's performance on the whole, compares more with the one from BES – the average annualized return was also around -12%.

In relation to the subsamples, the calculations indicate that Banif has followed its peers' tendencies but in a rather magnified manner.

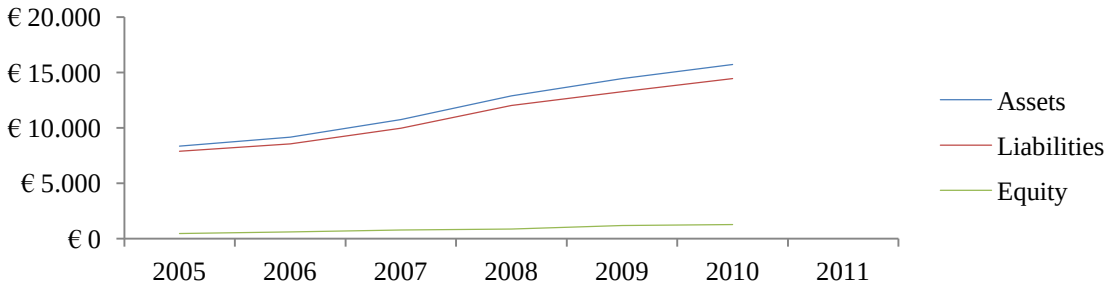
For instance, between ’99 and ’07, the bank had a good performance yielding an average annualized return of 14,2%. Notably, in the period of ’04-’07 the bank had an extraordinary performance – average annualized return of 37%.

After the “second great contraction” the shares’ value started declining. Remarkably, since the intervention of the troika in May 2011, Banif’s shares have experienced an average annualized return of -146%. Once again I find that among all the periods analyzed, the one that comprises the European sovereign debt crisis is engendering the worst effects.

Balance Sheet Evolution

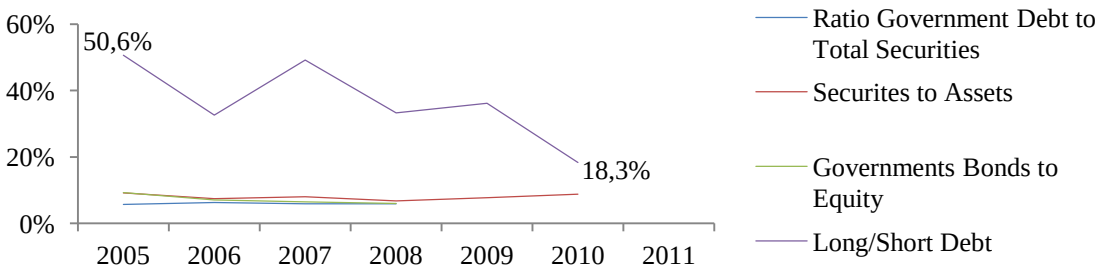
Finally, in relation to Banif, the analysis of the balance sheet items is present in graphs 18, 19, and 20. Once again the behavior is in general similar to the other banks.

Graph 149 - Main Balance Sheet Components



In relation to the ratio analysis, it is worth noticing that Banif’s long-to-short term debt ratio experienced a sharp decrease from the 50,6% verified in 2005 to the 18,3 verified in 2010. In relation to the other ratios there was no information beyond 2008 so it is difficult to draw conclusions.

Graph 20 - Ratio Analysis



Finally, in relation to the leverage ratio, I find it to fall within the limits required for Banif to be considered a well- capitalized bank.

Graph 21 - Leverage Ratio

Summary

Regarding the balance sheet figures analyzed above, there are several similarities between the various banks. Nonetheless, some indicators differ considerably among banks, which may explain the different performances.

Firstly, in relation to the evolution of the three main balance sheet components there is not much to be said as it is quite alike for all banks.

Secondly, through the ratio analysis, I find an incresing exposure to government debt, especially from 2008 onwards. Notably for BCP and BPI,which increase the government debt-to-equity ratio to 98,7% and 358% respectively. This might explain the underperformance of both banks in relation to BES. Moreover, it is worth of noticing the exposure of BCP not to government bonds but to securities in general – the securities-to-equity ratio is about 500%. This may also be on the root of such a bad performance for the Millennium bank.

Thirdly, in relation to the leverege ratio, all banks except BPI comply with the non-binding limit of 5%.

All in all, while many indicators have moved fairly together, the amplified exposure of BCP to government debt in particular and securities in general might explain its underperformance. Also BPI's relative overexposure to government debt might be on the origin of such underperformance in relation to BES. As for Banif, the analyzed figures do not point out any possible explanation for the poor stock market performance.

5.1.3 Real Economy vs. Banks

To begin the analysis on how sovereign ratings have affected banks I compare the performance of the banking industry with that of the non-banking industry from a few months before the beginning of the sovereign-debt crisis up until March 2012.

For this purpose I consider that the crisis started in January 2009 when the sovereign credit rating for Portugal was first downgraded. Not by chance, the period leading up to the first downgrade was one of tremendous turmoil. That fact might distort what I am trying to assess – that the sovereign debt crisis, notwithstanding affecting the economy on the whole affects banks more severely.

To do this comparison between banks' and the rest of the economy I used two series of daily data from Datastream – one that aggregates the entire Portuguese banking system (Portugal – DS Banks) and other, which encompasses all other industries except banks (Portugal – DS Non-Financial). Moreover, I compare individually the performance of the four publicly traded Portuguese banks against the same non-financial index (henceforth NFI).

In order to carry out this approach I compute the ratio[9] between each bank share value to the NFI value and set the value for September, 2008 equal to 100%. Despite the simplicity of this approach, it is useful to grasp the relative performance of banks relatively to other industries. More sophisticated approaches will be developed later on.

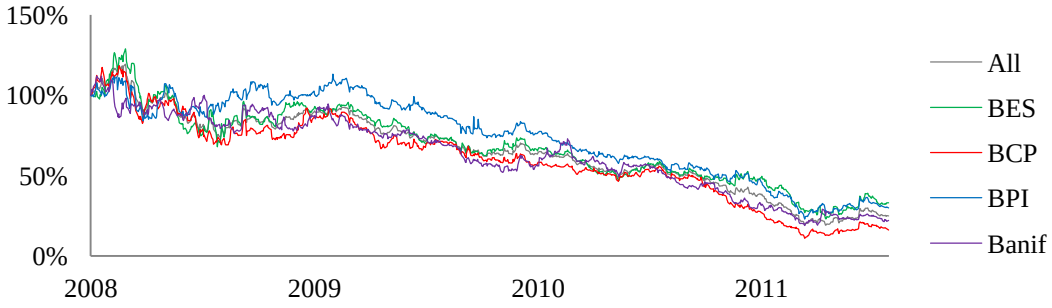
Results (Graph 1) demonstrate clearly that, Portuguese banks' share prices have underperformed greatly the NFI. For instance, the banking industry on the whole presents a ratio of 25% in March 2012. Individually the best performer during the scrutinized period was Banco Espírito Santo (BES) but its ratio against the NFI went

[9] $Ratio_{i,t}=Bank_{i,t}$ Share Value / NFI_t value. This approach is borrowed from Paneta et al. (2011)

from 100% in the beginning of September 2008 to 33% as of the beginning of March 2012. On the other hand, Banco Comercial Português (BCP) was the one having the worst performance – as of March 2012 the ratio was of 16,2%. These figures indeed suggest that the sovereign debt crisis has been having a tremendous impact on the banks' share prices in relation to the other industries. BPI and Banif exhibit a ratio of 30% and 22% respectively.

Moreover, one can observe from Graph 1 that following the natural distress caused by the failure of Lehman Brothers in the end of 2008 banks recover modestly until concerns about the creditworthiness of sovereigns started increasing (second half of '09). Lately, since late 2011/early 2012, banks started recovering relatively to the non-financial part of the market, which signals that investors are easing the pressure on Portuguese banks (government bonds' yields) as the so-called "programa de ajustamento" seems to be producing good enough results.

Graph 152 - ratio of the banks' shares prices to the NFI. Daily data; 1 September 2008 = 100. Sources: Datastream, author calculations



Secondly, I study the correlations between the sovereign and banks' credit default swaps (CDS) with the purpose of seeing if the perceived creditworthiness of banks moves together with that of the sovereign. The banks analyzed are BES, BCP,

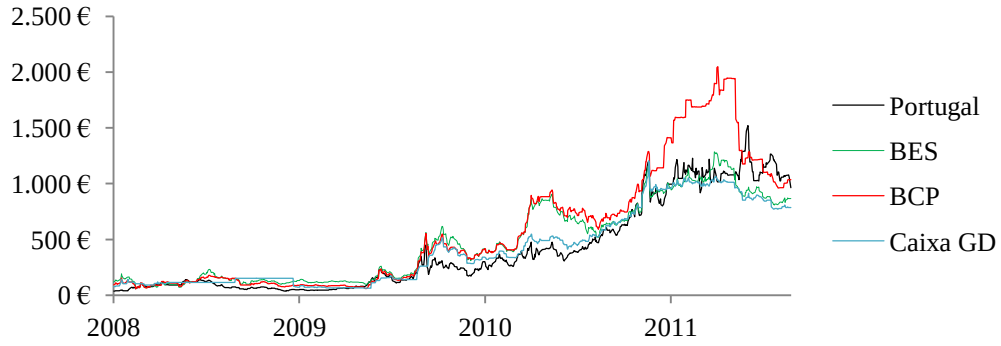
and Caixa Geral de Depósitos. Due to lack of information BPI and Banif are not examined.

In order to carry out this analysis I use the 5-year senior CDS as they are the most liquid instrument among all the maturities available and therefore represent more accurately the true relationship between sovereign and banks' CDSs.

Regarding the analyzed time-span it corresponds to the previous 5 years. The study was made by exploiting daily data collected from Datastream. So as to have a reliable continuous series I had to combine the CMA Datavision CDS series with Thomson Reuters CDS series as the first ends in 2010 and the latter begins in 2009.

As one can observe from the Graph 2, banks' and sovereign's credit default swaps have been moving quite closely, which indicates a strong relationship between the creditworthiness of the sovereign and that of banks. Moreover, it is observable that CDSs started increasing more dramatically on the end of 2009, when the sovereign debt crisis was first identified.

Graph 163 - 5 year credit default spreads from the Republic of Portugal and Portuguese banks. Source: Datastream



Calculations on the correlations between sovereign and banks' CDSs and among banks are presented below in Table 1. The computations show correlations really close

to 1. In relation to the sovereign, CDS correlations range from 0,94 of BES to 0,97 of CGD. Inter banks CDS correlations range from 0,95 (BPI with BES and CGD) to 0,98 between BES and CGD.

Again, correlation coefficients show evidence of a very strong relationship between the creditworthiness of the sovereign and that of banks.

Table 5 – Correlation between sovereign and banks' CDSs

	Portugal	BES	BCP	BPI	Caixa GD
Portugal	1				
BES	0,94	1			
BCP	0,95	0,97	1		
BPI	0,90	0,95	0,96	1	
Caixa GD	0,97	0,98	0,97	0,95	1

Sources: Author calculations based on Datastream.

6. Empirical Study

6.1.1 Introduction

In this section an event study on the effect of sovereign-debt crisis on banks' performances is carried out. In order to do so I study the impact of announcements by credit rating agencies on the return of banks' shares. This study considers all credit rating agencies that issue rating opinions on any of the considered institutions – Standard & Poor's, Moody's, Fitch and DBRS. Furthermore I analyze the impact of both outlook revisions and downgrades separately.

The implementation of the event study has the advantage of using available financial market data. Furthermore, its usefulness lies on the fact that, given rationality in the market place, the effect of an event will impact the securities' prices without delay, which makes the use of event studies an important tool in capital market research as a way of testing market efficiency.

The event study framework has several applications for various fields but especially in the world of finance. The most notable are related to announcements of: mergers and acquisitions, earnings, issues of new debt or equity or the release of macroeconomic related figures, accounting rule changes, or changes in the severity of regulation.

In this paper I conduct an event study in which the event studied is rather than a corporate level announcement, a supra company announcement where all companies are affected at the same type –announcements by credit rating agencies. Studying an event that impacts all companies simultaneously carries with it some statistical problems that will be addressed later on. Hereafter follows a brief literature review on event studies.

6.1.2 Literature Review

"There was little evidence on the central issues of corporate finance. Now we are overwhelmed with results, mostly from event studies" (Fama, 1991, p.1600)

The sentence above illustrates well the importance that event study has had in the understanding of the corporate world. Moreover, and even though, event studies have been introduced several decades ago Harrington and Shrider (2007) point out that "over 35 years following its introduction by Fama, Fisher, Jensen, and Roll (1969), the short-horizon event study remains a workhorse of empirical finance and corporate finance in particular." Although Fama et al. (1969) introduced the basic methodological approach for event studies its concept can be traced back to the early 1930s. James Dolley (1933) examines the price effects of stock splits, studying nominal price changes at the time of the announcement. Nevertheless the study lacked on sophistication as James Dolley solely observed either if the price increased or decreased it certainly served as the starting point of important research leading into what is widely accepted today. Meanwhile and not surprisingly between the early 1930s to the 1960s the sophistication of event study increased considerably. Examples of papers contributing to the event study methodology in that period are: John H. Myers and Archie Bakay (1948), C. Austin Barker (1956, 1957, 1958), and John Ashley (1962). Those papers had the merit of removing the general stock market price movements and separating out confounding events. But it was not until the late 1960s that the event study methodology would see its biggest breakthrough upon which researchers build and perfection to reach what is widely accepted today. Firstly, Ray Ball and Philip Brown (1968) considered the information content of earnings. Secondly, and most importantly Fama et al. (1969) (hereby FFJR) study the effect of stock splits after removing the effects of simultaneous

dividend increases. Now I succinctly present the event study methodology proposed by the latter authors. The literature review from 1969 onwards follows after the model as it relates very much with it because the subsequent research basically tries to overcome some shortcoming of this early study.

Fama, Fisher, Jensen and Roll (FFJR) (1969)

To capture the effect of an event on stock *i*, FFJR account for the relation between the return of stock *i* during month *t*, $r_{i,t}$, and the return on a broad stock market index, in their study the CRSP NYSE Market Portfolio, during month *t*, $r_{m,t}$. Using a sample of monthly returns from 1926 to 1960, they estimate the single index model suggested by Sharpe (1963) for each stock *i* in the sample:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \hat{\varepsilon}_{i,t}.. \quad (1)$$

After estimating the equation above FFJR use the residual term of the market model calculated on an out of sample bias, $\hat{\varepsilon}_{i,t}$, as an estimator of the abnormal return for stock *i* during event month *t*. This method removes the effect of wide economic factors leaving the portion of return that is due to firm specific information. The estimator of the average abnormal return for month *s*, is defined as follows:

$$AAR_s = \sum_{i=1}^{N_s} \frac{AR_{i,s}}{N_s},, \quad (2)$$

where $AR_{i,s}$ is the estimator of the abnormal return for stock *i* and N_s is the number of firms in the sample during month *s*. Then, and in the case of an event window greater than 1day, the estimates of average abnormal return are summed across months to

measure the cumulative effect on the sample securities of company specific information arriving at the market from month *s1* to month *s2*. The estimator of this goes as:

$$CAAR_{s1,s2} = \sum_{s=s1}^{s2} AAR_s. \quad (3)$$

In order to carry out the hypothesis testing on the significance of a certain event it is typically used a t-ratio. In the very starting point of this methodology it was assumed that individual,$AR_{i,s}$ were independent and identically distributed. However, several issues with heteroskedasticity and dependence needed to be addressed. The list of issues is large and comprises the following: often abnormal returns estimators 1) are cross-sectionally correlated, 2) have different variances across firms, 3) are not independent across time for a given firm or 4) have greater variance during the event period than in surrounding periods.

As a result of the issues referred above, in the years following the pioneering research, some modifications have been proposed aiming at providing solutions to the statistical inconsistencies of the models used in the early studies. The first two problems are noted and examined in several studies. In an attempt to correct those first two issues Jaffe (1974) and Mandelker (1974, Appendix) introduce the portfolio method. They construct a series of $\mathrm{SAAR_t}$ (ARR/stdevARR) estimates, which are independent if the $\mathrm{AAR_t}$ are independent across time, and identically distributed. By doing so they accommodate for the cross-sectional correlations and different variances and a standard *t* test can be used. Stephen Brown and Jerold Warner (1980) propose a test similar in spirit, except a time series of AAR is used to generate the standard deviation of AAR.

Moreover, there is the issue of using the residual variance estimate from the market model during the estimation period to estimate the variance of abnormal return estimator. Patell(1976) draw attention to the fact that prediction errors have greater variance than the regression disturbances. Addressing this issue is somehow easy. One can either use the correct equation, based on the residual variance and the matrix of independent variables, to calculate the precision of the prediction errors. Or, a sample of data before the event period can be used to generate a separate series of prediction errors used solely to calculate the variance of the event period prediction error.

The possible existence of event-induced heteroskedasticity is first addressed by Beaver (1968). For accommodating the likely existence of heteroskedasticity Collins and Dent (1984) propose a generalized least squares technique when the variance of each firm's abnormal return estimator increases proportionally during the event period. Froot (1987) suggests a method of moments estimator that allows for event-induced heteroskedasticity. Perhaps the simplest solution to the problem of event-induced heteroskedasticity is the one discussed by Boehmer, Musumeci and Poulsen (1991). Their method assumes that the event-induced increase in variance is proportional for each firm. Boehmer, Musumeci and Poulsen find in simulations that their test is unbiased and more powerful than other well specified alternatives.

In addition, there is a problem with time series dependence. If under the joint hypothesis that returns are given by the market model with stationary parameters and that the market is informationally efficient the disturbances in the market model, *uit*, are independent across time, neither the residuals nor the prediction errors from the market model are, however, independent across time as it is often assumed. Mikkleson and

Partch (1988) and Mais, Moore and Rogers (1989) discuss that, regression residuals and prediction errors are correlated since they are based on the same parameter estimates. Both studies propose a test statistic which incorporates this dependence. Cowan (1991), Karafiath and Spencer (1991), Sweeney (1991) and Salinger (1992) analyze the bias in hypothesis tests about cumulative average abnormal returns when average abnormal estimators are correlated. The degree of bias depends on the number of observations in both the estimation period *T* and the event period *S*[10]. When *S* is small relative to *T*, the uncorrected (biased) test statistic will be very close to the corrected (unbiased) one. But, when *S* is relatively large, the bias is substantial.

There is a considerably number of papers proposing solutions for the statistical problems encountered in the early specification of event studies. Stephen Brown and Jerold Warner (1980) focus on the implementation issues resulting from the use of data sampled at a monthly interval. The same authors discuss the best practices but for daily data in 1985. Fama (1991) gives great attention to the testing of market efficiency. Kothari and Warner (1997), and Fama (1998). Smith (1986) presents reviews of event studies of financing decisions. Jensen and Ruback (1983), Jensen and Warner (1988), and Jarrell, Brickley, and Netter (1988) survey corporate control events. Recently, Kothari (2001) reviews event studies in the accounting literature.

[10] Cowan (1991) show that when T=100 and S=5, the uncorrected test statistic is expected to exceed the correct by mere 1.6%. When T=100 and S=60 the uncorrected is expected to exceed the correct by significant 25.2%

6.2 "Traditional" Event Study

After having reviewed the academic developments of the last few decades and the several hypotheses one has when performing an event study I now present the methodology used in this study. While the approach made is closely related to what Fama et al. (1969) suggested it has some modifications as to correct statistically problems arising from the fact that the event is the same for all analyzed securities. I focus primarily in A. Craig MacKinley (1997) and Khotari and Warner (2006) to carry out the analysis.

6.2.1 General Steps

Even if there is no universally unique methodology to conduct an event study, there is a general setup of the analysis. After defining the events of interest, which on the realm of this paper are the announcements of credit rating agencies, one has to decide upon the period over which security prices of relevant firms will be examined – this period is known as the event window.

For the sake of this paper and as stated previously the relevant firms are the Portuguese banks, explicitly those listed on the PSI 20. Regarding the event window the analysis will focus on a 5-day event window. The event window is larger than the event of interest so as to permit for the examination of periods surrounding the event. For instance, by considering an event window greater than solely the day in which the announcement is made, it's possible to study for market efficiency or for anticipation, as it will be discussed below.

The appraisal of the event's impact entails a measure of the abnormal return, just like in Fama et al. (1969). The abnormal return is defined as the actual ex post difference between the realized return of the firm and the "normal return" during the

event window. The normal return is defined as the expected return without conditioning on the event taking place. The abnormal return for firm *i* and event date *t* is therefore as follows:

$$AR_{i,t} = r_{i,t} - E(r_{i,t}|X_t), \quad (4)$$

where $AR_{i,t}$, $r_{i,t}$, and $E(r_{i,t}|X_t)$ are the abnormal, realized, and normal returns respectively while X_t is the conditioning information for the normal return model.

A variety of models have been proposed to compute the normal returns to then generate abnormal returns estimates. The importance of the normal return model lies on the fact that with greater r-squared the greater is the variance reduction and therefore the prediction will have more power.

However, r-squared is not all, as with the increase of explanatory variables goes the increase in estimation error in a way that it's important to have a model offering a high r-squared while being at the same time parsimonious. Examples of models brought forward are: 1) mean-adjusted returns, (2) market model, (3) deviation from the Capital Asset Pricing Model (CAPM), or (4) deviations from the Arbitrage Pricing Theory (APT).

In this paper I use the so-called market model due to its simplicity, parsimoniously and the fact that gains arriving from employing multifactor models for event studies are limited. Studies on the effectiveness of each model have found that the market model explain the majority of returns while APT models add little explanatory power in comparison with the increasing estimating error rendering the latter as more sophisticated but equally efficient.

The implementation of statistical models such as the market model require the assumption that asset returns are independent and identically distributed through time, which while being a strong assumptions, its empirically reasonable and inference using normal return models tend to be robust to deviations from assumptions.

6.2.1 Market Model

The market model is a statistical model in which the return of any given security is linked to that of a broad market portfolio. As refereed above, the statistical specification of the model is build upon the assumption of joint normality of assets returns and is as follows:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \varepsilon_i\,, \tag{5}$$

$$E\left[\varepsilon_{i,t}\right] = 0 \text{ and } Var\left(\varepsilon_{i,t}\right) = \sigma_{\varepsilon_i}^2, \tag{6) \& (7}$$

where $r_{i,t}$ and $r_{m,t}$ represent the period-*t* return of bank i and of the market respectively, and $\varepsilon_{i,t}$ is the zero mean disturbance error term. $\alpha_i, \beta_i, and\ \sigma_{\varepsilon_i}^2$ are the parameters of the model.

6.2.2 Estimation

Regarding the length of the estimation window(L_1), it is usually set to encompass the 120 daily observations prior to the event window. The event window isn't included in the estimation window to avert the event from influencing the normal performance model parameter estimates. However, in this case, due to the high frequency of downgrades there are cases where the prior 120 daily observations partly cover other events. In order to estimate the parameters robust method are used, in order to accommodate for the possibility of heteroskedasticity and autocorrelation. Given the

model parameters one has then to measure and analyze the abnormal returns. The sample abnormal returns are as follows:

$$\widehat{AR}_{i,t} = r_{i,t} - \left[\hat{\alpha}_i + \widehat{\beta}_\iota r_{m,t}\right], \tag{8}$$

where $\widehat{AR}_{i,t}$ represent the abnormal returns estimated by using the market model. Under the null hypothesis, conditional on the event window market returns, the abnormal returns will be jointly normally distributed with a zero conditional mean and conditional variance $\sigma^2\left(\widehat{AR}_{i,t}\right)$ as presented below:

$$\sigma^2\left(\widehat{AR}_{i,t}\right) = \sigma^2_{\varepsilon_i} + \frac{1}{L_1}\left[1 + \frac{\left(r_{m,t} - \hat{\mu}_m\right)^2}{\hat{\sigma}^2_m}\right], \tag{9}$$

where $\hat{\mu}_m$ is the average return of the market during the estimation period, and $\hat{\sigma}^2_m$ the variance of the returns during the same period. The second component is due to sampling error and leads to serial correlation of abnormal returns. This problem is solved easily as in practice the length of the estimation window can be chosen to be large enough so that the second component of the right-hand side of (6) goes to zero. In fact, by using an estimation window as explained above its secure to ignore it case in which the variance of the abnormal returns will be solely $\sigma^2_{\varepsilon_i}$. After having estimated the abnormal returns and in order to assess the significance of the event it's paramount to make use the distribution of abnormal returns, which under the null hypothesis - that the event has no impact on the behavior of returns - is:

$$\widehat{AR}_{i,t} \sim N\left(0, \sigma^2\left(\widehat{AR}_{i,t}\right)\right). \tag{10}$$

6.2.3 Aggregation of Abnormal Returns

Furthermore and in order to accommodate for multiple period event window one has to aggregate the abnormal returns observations. The concept used for such aggregation is again the cumulative abnormal return (CAR), the same used by Fama et al. (1969). For an event window going from τ_1 to τ_2 the sample cumulative abnormal return is the sum of included abnormal returns:

$$\widehat{CAR}_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \widehat{AR}_{i,\tau}. \quad (11)$$

Moreover, and as in the variance of abnormal return in (6), asymptotically the variance of $\widehat{CAR}_i$ is defined as:

$$\sigma_i^2(\tau_1, \tau_2) = (\tau_2 - \tau_1 + 1)\sigma_{\varepsilon_{i,t}}^2. \quad (12)$$

The distribution of the cumulative abnormal return under the null hypothesis is then:

$$\widehat{CAR}_i(\tau_1, \tau_2) \sim N\left(0, \sigma_i^2(\tau_1, \tau_2)\right). \quad (13)$$

6.2.4 Estimation of the Variance

In practice, because $\sigma_{\varepsilon_{i,t}}^2$ is unknown, one must estimate the variance of the abnormal returns. The sample variance measure of $\sigma_{\varepsilon_{i,t}}^2$ from the estimation window is a suitable choice. Given the null distributions of the abnormal return and of the cumulative abnormal return, tests of the null hypothesis can be conducted using the following *t*-ratio:

$$t - test = \frac{\widehat{CAR}_i(\tau_1,\tau_2)}{Var[\widehat{CAR}_i(\tau_1,\tau_2)]^{1/2}} \sim N(0,1). \quad (14)$$

The test above allows for studying the effect of the event of interest at an individual basis. In order to study the impact at an aggregate level (i.e. banking industry on the whole) bank's abnormal returns should then be aggregated; however, this is not possible as the assumption that the abnormal returns are independent across securities does not hold.

6.2.5 Inferences with Clustering

There are two ways of handling the overlapping of the event window. One is to use a portfolio approach, case in which the security level analysis can be applied directly to the portfolio. The other is to analyze the impact at a security level. This second approach is most commonly used when there is total clustering and in spite of having little power and poor finite sample properties relatively to the first, has the advantage of accommodating for situations where some firms exhibit positive abnormal returns and some other negative abnormal returns. In the scope of this work I'll do both specifications.

6.2.6 Results

Applying the methodology explained above I study the significance of all announcements made by the pertinent rating agencies. Firstly, I estimate the 5-day CARs starting on the day of the announcement (11). Secondly, I ought to estimate the variance of the CARs, which is done using (12) after estimating the variance of the abnormal returns. Finally, with the 5-day CAR and respective standard deviation I apply the *t*-test (14). The appraisal of the *t*-test is standard.

Table 6 below presents a brief summary of the results obtained by employing this so-called "traditional" event study methodology. The events are treated individually, and divided into two groups - downgrades and outlook revisions – so as to grasp the impact of each set of events[11]. The upper part of the table sums up the impacts of sovereign related announcements whereas the inferior summarizes the effect of bank related announcements. I present the average CAR across all events as well as the percentage of significant events of each set of announcements (e.g. 1/5 means that 1 out of 5 was significant). For a more comprehensive understanding please refer to Appendix 3 where the results are presented in an extensive manner, event by event.

[11] For example, all the announcements of S&P regarding BES are considered a set of events.

Table 6 - Summary of Announcements' Effects

	Sovereign Downgrade							
Bank	S&P		Fitch		Moody's		DBRS	
Banking Industry	Downgrade	Out.Rev	Downgrade	Out.Rev	Downgrade	Out.Rev	Downgrade	Out.Rev
%Significant Events	1/5	2/4	2/5*		0/3	0/2	2/2	
Average CAR	-0,41%	-4,34%	-1%		-1%	1%	-7%	
Banif								
%Significant Events	1/5	1/4**	1/5		0/3	0/2	1/2	
Average CAR	-2,83%	-0,82%	-4%		-1%	1%	-6,04%	
BCP				Not applicable				Not applicable
%Significant Events	2/5	1/4	2/5		1/3	1/2**	1/2	
Average CAR	-0,46%	-3,94%	-3%		-2%	1%	-6,06%	
BES								
%Significant Events	3/5*	3/4	3/5*		0/3	0/2	1/2	
Average CAR	-0,68%	-6,84%	-1%		-3%	1%	-6,12%	
BPI								
%Significant Events	0/5	1/4	1/5**		0/3	0/2	1/2	
Average CAR	-2,59%	-1,85%	1%		-2%	2%	-7,80%	

	Bank Level Downgrade							
	S&P		Fitch		Moody's		DBRS	
	Downgrade	Out.Rev	Downgrade	Out.Rev	Downgrade	Out.Rev	Downgrade	Out.Rev
BCP								
%Significant Events	1/4	1/3***	1/4**	0/1	0/5	2/4**	NA	
Average CAR	2,19%	-5,02%	0,16%	1,19%	-0,86%	2,10%		
BES								
%Significant Events	2/4*	0/2	NA		1/5**	2/4**	1/2	NA
Average CAR	3,07%	-5,43%			-0,80%	5,06%	-6,12%	
BPI								
%Significant Events	1/4**	0/2	0/4	0/1	1/4**	0/5***	NA	
Average CAR	-0,19%	-4,53%	2,89%	0,15%	1,99%	1,89%		

The threshold for an event to be considered significant is a p-value<10%; *This percentage include cases where the CAR are significantly positive; **Significant events arising from this set of events are only positive;*** one of this outlook revision is a positive one

Source: Author Calculations

From the results presented in table 1 it is observable that sovereign related announcements engendered, in general, negative CARs. Particularly, announcements from S&P and DBRS caused negative average CARs across all the analyzed securities.

Also, Fitch's announcements produced negative average CARs to all securities with the exception of BPI. In relation to Moody's, the results point out a clear division between downgrades and outlook revisions with the first producing negative average CARs across the board whereas the latter generated positive average CARs, also across the board.

Breaking the analysis into downgrades and outlook revisions from S&P one observes that with exception of Banif and BPI, outlook revisions have had more impact than downgrades themselves. In fact, sovereign outlook revisions by S&P are the set of events producing the most significant average CARs.

For instance, the Portuguese banking industry on the whole underperformed the broad market, on average, by 4,34% in the 5-days following a sovereign outlook revision against the 0,41% correspondent to the parallel underperformance after a downgrade. Individually, the most affected banks by sovereign outlook revision are BES and BCP, which exhibit an average CAR of -6,84% and -3,94% respectively, which again implies a huge difference from the CARs produced by downgrades (-0,68% and -0,46%).

On the other hand, for Banif and BPI, downgrades caused more impact than outlook revisions; however, the difference between the verified average CARs is not as significant as for the cases of BES and BCP.

Nevertheless the diverse effects experienced by each bank, the above observations seem to entail that outlook revision by S&P are taken by the market as truly new information and that somehow, markets participants anticipate the downgrade with the outlook revision. In fact, by looking at Appendix 1

(chronology of downgrades/outlook revisions since January ’09) it is observable that S&P is sort of the leading rating agency in the sense it anticipates the other agencies (announcements by other rating agencies come consistently after the analogous one from S&P).

As a result of the previous and the fact that rating opinions are almost perfectly substitutes it is normal that announcements made by S&P create more significant CARs in relation to other rating agencies. This is also supported by the portion of significant events engendered by the various rating agencies - S&P has the biggest portion of significant events (excluding DBRS). Announcements coming from the newly appointed[12] DBRS are significant across the board and produced considerable negative average CAR, ranging from -6,04% for Banif to -7,80% to BPI. However, as the sample of DBRS announcement is really limited (four downgrades/two dates), it is difficult and imprudent to draw meaningful conclusions.

Furthermore, taking into consideration individual announcements it is again detected that outlook revisions from S&P caused considerable negative average CARs. However, and because usually rating agencies review their rating opinions for all the institutions around the same date (Portugal included) it is difficult if not impossible to assess the relative contribution of individual/sovereign outlook revision to the negative CARs observed. Regarding individual rating announcements from Fitch and Moody’s there is no evidence of them generating systematic negative CARs. In relation to the significance of individual announcements I find it to be very low and more surprisingly, to cause at times

[12] DBRS started issuing rating opinions on BES and Portugal in 2010

positive and significant CARs. This last observation may be due to the market having worst expectations regarding the awaited announcements in comparison to what actually happened. (e.g. agency issues an outlook revision when a downgrade was expected)

From these results there is evidence that markets value more sovereign than individual ratings, meaning that market participants seem to acknowledge, at the time of a sovereign related announcement, that sooner or later banks will receive the same treatment. This finding may be associated with the fact that banks' credit rating reviews have been reflecting changes in sovereign ratings rather than any idiosyncratic factors regarding banks' solvency.

Moreover, I find evidence that S&P is the predominant agency in the sense its announcements generate in general, more significant and negative CARs. Particularly, outlook revisions from S&P, probably as a result of being fresh information coming to the markets, generate the most remarkable negative average CARs.

Furthermore, it seems that, analogously to the relation between sovereign and individual ratings, market participants expect other rating agencies to announce something similar to that S&P has already announced. This seems to render announcements from rating agencies other than S&P rather "useless".

6.3 Regression Based Event Study

6.3.1 General Setup

Additionally to the traditional event study methodology I also use regression based event study methodology to evaluate the impact of credit rating agencies' announcements on the return of banks' shares. In order to do so, and as before I use the market model so as to eliminate the effects of wide economic factors leaving the portion of return that is due to firm specific information. Then, by recurring to a set of dummy variables that assume the value of 1 on the day of the downgrade it's possible to evaluate the impact of such an event in banks performance as measured by their stock market performance. To complete the analysis I also include four lags of the dummy variable. The use of the five dummy variables is in a sense, the equivalent to have a 5-day event window and permits to study for market efficiency. This approach considers the significance of abnormal returns day-by-day, conversely to the "traditional" event study that solely studies the significance of the cumulative returns over the length of the event window. The regression estimated by using this approach is as follows:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \sum_{\tau=\tau_1}^{\tau_2} \gamma_{i,t} D_{\tau,t} + \varepsilon_i, \quad (15)$$

where $D_{\tau,t}$ are dummy variables assuming value one on $t = \tau$ and zero otherwise (i.e., D_{τ,τ_1} assumes value on the day of the announcement, D_{τ,τ_2} on the day after the announcement etc.) and $\gamma_{i,t}$ are the correspondent coefficients. All the remaining variables and parameters remain unaltered from what was presented in (2). With this approach the coefficients on the dummy variable correspond precisely to the

abnormal returns verified in that day. The regression is estimated by using the entire sample, from February ‘07 to January ’12.

6.3.2 Testing for anticipation

The analysis carried out so far aims at analyzing the reaction of banks’ share prices after a credit rating announcement is made. Analogously, it might be interesting to assess if the information contained in the announcements are somehow observed by the market even before the announcements are made.

To test for this hypothesis I use the very same framework as above only with a simple adaptation - the inclusion of dummy variables that assume value one in the days preceding the announcement. For this purpose I use five new dummy variables, one for each of the five days preceding the event. These five days are a very small period of time to make such analysis as if the fundamentals of a country/bank were to induce a downgrade, they would most likely be noticeable more than five days before the actual announcement.

However, due to the high frequency of downgrades during the period analyzed, using a larger window so as to study for a possible anticipation phenomenon will most likely violate the independence required for conducting such a study.

6.3.3 Results

Due to the length of the outputs generated by this regression based event study it is impossible to present the results here. However, in Table 7 below I try to sum up the results obtained. For a more comprehensive understanding please refer to Appendix 3 where the regressions’ outputs are presented in an extensive manner.

The summary is made at three levels: significance (immediate impact), market inefficiency, and anticipation. The judgment of the three considered levels is made qualitatively through a very simplistic approach – either they are verified ("yes") or not ("no"). For instance, in relation to the Portuguese banking industry on the whole (All), country level outlook revisions from S&P caused significant impact ("yes"); the adjustment of stock prices after the announcement exhibited signs of market inefficiency ("yes"); and finally, there were no signs of anticipation to the announcement ("no"). Again, I divide the analysis of into two groups – outlook revisions and downgrades.

Table 7 (part1) - Regression Based Event Study - Outlook Revisions

	Country Level									
	S&P					Moody's				
	All	BES	BCP	BPI	Banif	All	BES	BCP	BPI	Banif
Significant	Yes	Yes	Yes	No	No	No	No	No	No	No
Market Inefficiency	Yes	Yes	Yes	No	Yes	No	No	No	No	No
Anticipation	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes
	Bank Level									
Significant		Yes	No	No			No	No	Yes	
Market Inefficiency	NA	No	No	No	NA	NA	No	No	No	NA
Anticipation		No	Yes	No			No	Yes	No	

Note: The classification of the event as significant is due based on the existence of significant negative abnormal returns (significant coefficient of the parameter associated with the dummy variable) on the day of the announcement and day after; the classification of market efficiency is due based on the existence of significant negative abnormal returns on the days after the announcement is made; the classification of anticipation is due based on the existence of significance negative abnormal returns on the days preceding the announcement .
Source: Author Calculations.

Commencing from the significance of outlook revision for the country made by Standard & Poor's, there is evidence that it indeed produce significant negative abnormal returns to the banking industry in general, and to BES and BCP in particular.

As for market inefficiency I found significant abnormal returns on the days after the announcement for all the securities studied except of BPI, which indicate that the market is not efficient as it does not adjust entirely on the day in which the

announcement is made. Regarding the anticipation, I found no significant negative coefficient in the days preceding the announcement apart from BES.

Concerning country outlook revision made by the rating agency Moody's I found that they are not significant as there is no evidence of abnormal returns on the days announcements were made. Also, in the days after the announcement no abnormal returns are significant. However, interestingly, there is evidence of anticipation in all securities. Such anticipation may therefore explain the inexistence of abnormal returns in the day the announcement is made as the stock prices were already adjusted downwards.

Moreover, taking into account the outlook revision at a bank level, I found that the effects are practically null with exception for BES and BPI, when the announcement comes from Standard & Poor's and Moody's respectively. There is no indication of market inefficiency and suggestions of anticipation are weak. Again I found evidence that the market values the most country related announcements. The summary of the results found concerning the reaction of stock prices to downgrades is very briefly presented below in Table X after its analysis.

Firstly, it is observable that downgrades by Standard & Poor's are not significant across the board, only with the exception of BES. Instead, they seem to be highly anticipated which might be on the root of no significance in the day of the announcement. Secondly, downgrades by Moody's and DBRS have affected banks' share prices extensively. For both rating agencies I found the degree of anticipation to be low.

In relation to market efficiency I found that the market adjusted slowly after announcements coming from Moody's whereas DBRS related announcements do not seem to cause a slow adjustment of stock prices being the only exception BPI. Finally, the rating agency Fitch has no impact whatsoever with except of Banif. Regarding bank level downgrade I found that the only significant for BES are the ones by DBRS, which means little as the newly appointed rating agency reviewed their credit rating for Portugal and BES simultaneously. Standard & Poor's affects both BCP and BPI and also for both, there is a certain degree of anticipation. Once again, Fitch has no significance for both banks.

Table 7 (part2) - Regression Based Event Study - Downgrade

	Country Level									
	S&P					Moody's				
	All	BES	BCP	BPI	Banif	All	BES	BCP	BPI	Banif
Significant	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes
Market Inefficiency	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Anticipation	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes
	Fitch					DBRS				
Significant	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Market Inefficiency	No	No	No	No	Yes	No	No	No	Yes	No
Anticipation	No	No	No	No	Yes	No	Yes	No	No	No
	Bank Level									
	BES			BCP			BPI			
	S&P	Moody's	DBRS	S&P	Moody's	Fitch	S&P	Moody's	Fitch	
Significant	No	No	Yes	Yes	No	No	Yes	No	No	
Market Inefficiency	No	Yes	No	No	No	No	No	No	No	
Anticipation	No	No	Yes	Yes	Yes	No	Yes	No	Yes	

Note: The classification of the event as significant is due based on the existence of significant negative abnormal returns (significant coefficient of the parameter associated with the dummy variable) on the day of the announcement and day after; the classification of market efficiency is due based on the existence of significant negative abnormal returns on the days after the announcement is made; the classification of anticipation is due based on the existence of significance negative abnormal returns on the days preceding the announcement .
Source: Author Calculations.

7 Conclusion

This paper assesses to what extend the European debt crisis have affected Portuguese banks. Firstly, I have made a comparative analysis between the performance of the banking industry and the performance of the broad index excluding the banking sector. Secondly, I have carried an event study analysis for the banks listed on the PSI20. The so-called events are supra company announcements issued by credit rating agencies, both of rating changes and outlook revisions from 2009 onwards. I analyzed the impact of announcements made by the relevant rating agencies – Standard & Poor's, Moody's, Fitch and DBRS.

From the first study I find that indeed, the banking industry has been severely impacted by this European sovereign debt crisis. The underperformance of the banking industry in relation to the remaining parts of the economy is overwhelming. Moreover, calculations on the correlations between sovereign and banks' CDSs reveal themselves to be really close to 1 indicating a strong relationship between the creditworthiness of the sovereign and that of banks.

Regarding the key results obtained with the event study they are essentially four-folded. Firstly, I find evidence that sovereign ratings are more important to banks' stock market performances than the actual bank level ratings. This finding may be associated with the fact that during this period, changes in banks' credit ratings have been reflecting changes in sovereign creditworthiness rather than any idiosyncratic factors of bank's solvency. Secondly, there is evidence that S&P is the predominant agency, seemingly because it generally anticipates its counter-parties in announcing analogous credit opinions. Thirdly, I find evidence that the market is not efficient in respect to this

type of announcements. Finally, there are indications of anticipation to several announcements.

This study studies solely the particular impact that the European sovereign debt crisis has had in Portuguese banks. However, further research on the impact of a sovereign debt crisis to advanced economies in general is worthy of being carried out. Namely its impacts to the real economy not only in the short run but also in the long run. Moreover, I believe it would be interesting to carry out future research on the dynamics of banks' stock market returns after the results of sovereign debt auctions are made public.

8 Appendices

Appendix 1 - Rating Agencies rating systems					
Characterization of debt and issuer (source: Moody's)		Ratings Scales			
		S&P	Moody's	Fitch	DBRS
Highest Quality	Investment Grade	AAA	Aaa	AAA	AAA
High Quality		AA+	Aa1	AA+	AAH
		AA	Aa2	AA	AA
		AA-	Aa3	AA-	AAL
Strong Payment Capacity		A+	A1	A+	AH
		A	A2	A	A
		A-	A3	A-	AL
Adequate Payment Capacity		BBB+	Baa1	BBB+	BBBH
		BBB	Baa2	BBB	BBB
		BBB-	Baa3	BBB-	BBBL
Likely to Fulfill Obligations, ongoing uncertainty	Speculative Grade	BB+	Ba1	BB+	BBH
		BB	Ba2	BB	BB
		BB-	Ba3	BB-	BBL
High Credit Risk		B+	B1	B+	BH
		B	B2	B	B
		B-	B3	B-	BL
Very High Credit Risk		CCC+	Caa1	CCC+	CCCH
		CCC	Caa2	CCC	CCC
		CCC-	Caa3	CCC-	CCCL
Near Default with Possibility of Recovery		CC	Ca	CC	CC
				C	C
Default		SD	C	DDD	D
		D		DD	
				D	

Source: S&P, Moody's, Fitch, DBRS, and Afonso et al. (2011)

Appendix 2 - Ratings Announcements

	Institution	Date	Announcement	Rating Agency
1	Portugal	13-01-2009	Outlook revision	Standard & Poor's
2	Portugal	21-01-2009	Downgrade to A+	Standard & Poor's
3	BES	06-04-2009	Outlook revision	Moody's
4	BCP	06-04-2009	Outlook revision	Moody's
5	BPI	06-04-2009	Outlook revision	Moody's
6	BCP	30-07-2009	Downgrade to A-	Standard & Poor's
7	BES	16-09-2009	Downgrade to A1	Moody's
8	BCP	16-09-2009	Downgrade to A1	Moody's
9	BPI	16-09-2009	Outlook revision*	Moody's
10	Portugal	07-12-2009	Outlook revision	Standard & Poor's
11	Portugal	24-03-2010	Downgrade to AA-	Fitch
12	BES	27-04-2010	Downgrade to A-	Standard & Poor's
13	BCP	27-04-2010	Downgrade to BBB+	Standard & Poor's
14	BPI	27-04-2010	Downgrade to A-	Standard & Poor's
15	Portugal	27-04-2010	Downgrade to A-	Standard & Poor's
16	BES	05-05-2010	Outlook revision	Moody's
17	BCP	05-05-2010	Outlook revision	Moody's
18	BPI	05-05-2010	Outlook revision	Moody's
19	Portugal	05-05-2010	Outlook revision	Moody's
20	BES	14-07-2010	Downgrade to A2	Moody's
21	BCP	14-07-2010	Downgrade to A3	Moody's
22	BPI	14-07-2010	Downgrade to A2	Moody's
23	Portugal	14-07-2010	Downgrade to A1	Moody's
24	BCP	21-07-2010	Downgrade to A	Fitch
25	BPI	21-07-2010	Downgrade to A	Fitch
26	BCP	08-11-2010	Downgrade to BBB+	Fitch
27	BPI	08-11-2010	Downgrade to A-	Fitch
28	Portugal	30-11-2010	Outlook revision	Standard & Poor's
29	BES	03-12-2010	Outlook revision	Standard & Poor's
30	BCP	03-12-2010	Outlook revision	Standard & Poor's
31	BPI	03-12-2010	Outlook revision	Standard & Poor's
32	BES	09-12-2010	Outlook revision	Moody's
33	BCP	09-12-2010	Outlook revision	Moody's
34	BPI	09-12-2010	Outlook revision	Moody's
35	Portugal	21-12-2010	Outlook revision	Moody's
36	Portugal	23-12-2010	Downgrade to A+	Fitch
37	BES	15-02-2011	Outlook revision	Moody's
38	BCP	15-02-2011	Outlook revision	Moody's
39	BPI	15-02-2011	Outlook revision	Moody's
40	Portugal	15-03-2011	Downgrade to Baa1 & Outlook revision	Moody's
41	Portugal	24-03-2011	Downgrade to BBB & Outlook revision	Standard & Poor's
42	Portugal	24-03-2011	Downgrade to A- & Outlook revision	Fitch
43	BES	28-03-2011	Downgrade to BBB & Outlook revision	Standard & Poor's
44	BCP	28-03-2011	Downgrade to BBB- & Outlook revision	Standard & Poor's
45	BPI	28-03-2011	Downgrade to BBB & Outlook revision	Standard & Poor's
46	Portugal	29-03-2011	Downgrade to BBB- & Outlook revision	Standard & Poor's
47	BCP	30-03-2011	Outlook revision	Fitch
48	BPI	30-03-2011	Outlook revision	Fitch
49	BES	31-03-2011	Downgrade to BBB-	Standard & Poor's

50	BPI	31-03-2011	Downgrade to BBB-	Standard & Poor's
51	Portugal	01-04-2011	Downgrade to BBB- & Outlook revision	Fitch
52	BCP	05-04-2011	Downgrade to BBB- & Outlook revision	Fitch
53	BPI	05-04-2011	Downgrade to BBB- & Outlook revision	Fitch
54	BES	06-04-2011	Downgrade to Baa2 & Outlook revision	Moody's
55	BCP	06-04-2011	Downgrade to Baa3 & Outlook revision	Moody's
56	BPI	06-04-2011	Downgrade to Baa2 & Outlook revision	Moody's
57	BES	25-05-2011	Downgrade to BBBH	DBRS
58	Portugal	25-05-2011	Downgrade to BBBH	DBRS
59	BCP	14-06-2011	Outlook revision*	Standard & Poor's
60	Portugal	05-07-2011	Downgrade to Ba2	Moody's
61	BES	15-07-2011	Downgrade to Ba1 & Outlook revision	Moody's
62	BCP	15-07-2011	Downgrade to Ba1 & Outlook revision	Moody's
63	BPI	15-07-2011	Downgrade to Baa3 & Outlook revision	Moody's
64	BES	07-10-2011	Downgrade to Ba2	Moody's
65	BCP	07-10-2011	Downgrade to Ba3	Moody's
66	BPI	07-10-2011	Downgrade to Ba2	Moody's
67	BES	20-10-2011	Downgrade to BBB	DBRS
68	Portugal	20-10-2011	Downgrade to BBB	DBRS
69	Portugal	24-11-2011	Downgrade to BB+	Fitch
70	BCP	25-11-2011	Downgrade to BB+	Fitch
71	BPI	25-11-2011	Downgrade to BB+	Fitch
72	Portugal	05-12-2011	Outlook revision	Standard & Poor's
73	BES	07-12-2011	Outlook revision	Standard & Poor's
74	BCP	07-12-2011	Outlook revision	Standard & Poor's
75	BPI	07-12-2011	Outlook revision	Standard & Poor's
76	BES	16-12-2011	Downgrade to BB	Standard & Poor's
77	BCP	16-12-2011	Downgrade to BB & Outlook revision	Standard & Poor's
78	BPI	16-12-2011	Downgrade to BB+ & Outlook revision	Standard & Poor's
79	Portugal	13-01-2012	Downgrade to BB	Standard & Poor's

Appendix 3 (part1) - Sovereign Downgrade

Agency: Standard & Poor's					
			Bank		
Event	Banking Industry	Banif	BCP	BES	BPI
13-01-2009		Outlook Revision			
t-test	-2,63***	-0,48	2,05***	2,05***	-0,89
CAR	-8,00%	-2,10%	-8,37%	-9,79%	5,26%
21-01-2009		Downgrade to A+			
t-test	-0,07	0,70	0,93	-1,01	-1,21
CAR	-0,23%	2,99%	3,89%	-4,82%	-7,17%
07-12-2009		Outlook Revision			
t-test	-0,32	0,53	-1,34	0,29	-1,04
CAR	-0,57%	2,21%	-4,38%	0,71%	2,85%
27-04-2010		Downgrade to A-			
t-test	0,37	4,10***	-0,62	2,53***	-1,60
CAR	0,50%	-11,40%	-1,47%	5,39%	3,58%
30-11-2010		Outlook Revision			
t-test	-2,48***	-0,47	-1,44	2,37***	-1,72*
CAR	-4,66%	-2,55%	-3,48%	-5,87%	3,61%
24-03-2011		Downgrade to BBB & Outlook Revision			
t-test	-2,52***	-0,80	2,43***	-1,74*	-1,36
CAR	-5,19%	-3,57%	-6,25%	-5,12%	3,16%
29-03-2011		Downgrade to BBB- & Outlook Revision			
t-test	-1,30	-0,39	-1,79*	-1,76*	-0,92
CAR	-2,75%	-1,67%	-4,66%	-5,22%	2,14%
05-12-2011		Outlook Revision			
t-test	-0,80	5,27***	0,07	2,04***	0,69
CAR	-4,14%	32,76%	0,48%	-12,39%	4,31%
13-01-2012		Downgrade to BB			
t-test	0,92	-0,07	0,77	0,86	0,47
CAR	5,64%	-0,49%	6,17%	6,38%	3,09%

*** p<0.01, ** p<0.05, * p<0.1
Source: Author Calculations

Appendix 3 (part2) - Sovereign Downgrade

Agency: DBRS					
Event	Banking Industry	Banif	BCP	BES	BPI
25-05-2011		Downgrade to BBBH			
t-test	-1,72*	0,45	3,92***	0,17	-0,48
CAR	-3,90%	1,64%	10,88%	0,52%	-1,40%
20-10-2011		Downgrade to BBB			
t-test	-2,59***	2,53***	-0,26	2,90***	3,16***
CAR	-9,38%	13,71%	-1,24%	12,77%	14,21%

*** p<0.01, ** p<0.05, * p<0.1
Source: Author Calculations

Appendix 3 (part3) - Sovereign Downgrade

Agency: Moody's					
			Bank		
Event	Banking Industry	Banif	BCP	BES	BPI
05-05-2010			Outlook Revision		
t-test	1,32	1,10	1,89*	-0,34	1,32
CAR	1,95%	3,27%	4,49%	-0,83%	3,40%
14-07-2010			Downgrade to A1		
t-test	-0,62	0,54	0,21	-1,09	-0,28
CAR	-1,27%	1,78%	0,56%	-3,02%	1,30%
21-12-2010			Outlook Revision		
t-test	0,51	-0,34	-1,10	1,18	0,17
CAR	1,01%	-1,78%	-2,51%	2,96%	0,39%
15-03-2011			Downgrade to Baa1 & Outlook Revision		
t-test	-0,82	-0,2905	-0,35	-0,6957	-1,12
CAR	-1,64%	-1,29%	-0,89%	-1,98%	2,56%
05-07-2011			Downgrade to Ba2		
t-test	-0,36	-0,90	-2,03***	-0,87	-0,70
CAR	-0,83%	-3,29%	-6,77%	-2,56%	2,12%

*** p<0.01, ** p<0.05, * p<0.1
Source: Author Calculations

Appendix 3 (part4) - Sovereign Downgrade

Agency: Fitch					
			Bank		
Event	Banking Industry	Banif	BCP	BES	BPI
24-04-2010			Downgrade to AA-		
t-test	2,36***	3,11***	0,52	3,63***	0,14
CAR	3,14%	-8,66%	1,24%	7,72%	0,31%
23-12-2010			Downgrade to A+		
t-test	0,23	-0,11	-0,19	0,88	-0,44
CAR	0,43%	-0,59%	-0,48%	2,16%	-1,02%
24-03-2011			Downgrade to A- & Outlook Revision		
t-test	-2,52***	-0,80	2,43***	-1,74*	-1,36
CAR	-5,19%	-3,57%	-6,25%	-5,12%	-3,16%
01-04-2011			Downgrade to BBB- & Outlook Revision		
t-test	1,22	-0,18	1,30	0,40	2,52***
CAR	2,59%	-0,79%	3,45%	1,21%	6,06%
24-11-2011			Downgrade to BB+		
t-test	-0,90	-1,33	-1,79*	2,05***	0,15
CAR	-4,29%	-8,13%	12,21%	10,42%	0,85%

*** p<0.01, ** p<0.05, * p<0.1
Source: Author Calculations

Appendix 4 (part1) - Sovereign Outlook Revisions

VARIABLES	S&P banks	Moody's banks	S&P BES	Moody's BES	S&P BCP	Moody's BCP	S&P BPI	Moody's BPI	S&P Banif	Moody's Banif
PSI20	1.208***	1.202***	1.119***	1.114***	1.266***	1.257***	1.090***	1.096***	0.898***	0.901***
	(0.0419)	(0.0426)	(0.0510)	(0.0522)	(0.0499)	(0.0499)	(0.0479)	(0.0487)	(0.0503)	(0.0522)
t-5	0.000372	0.00837*	-0.000586	0.0216*	-0.00249	0.00127	0.0136	0.0157***	-0.00318	-0.00951
	(0.00423)	(0.00441)	(0.00547)	(0.0113)	(0.00347)	(0.00237)	(0.0108)	(0.00235)	(0.00489)	(0.0142)
t-4	-0.0154	0.00551	-0.0221**	0.0146	-0.0126	0.00167	0.00579	0.00572	-0.00286	0.00976***
	(0.0130)	(0.00385)	(0.0101)	(0.0179)	(0.0147)	(0.00372)	(0.00809)	(0.0110)	(0.0104)	(0.00192)
t-3	-0.00348*	-0.0146***	0.00368	0.0283***	-0.00649	0.00882***	-0.00782	0.0160***	-0.00232	-0.00658
	(0.00189)	(0.00111)	(0.00361)	(0.000889)	(0.00442)	(0.00119)	(0.00559)	(0.00283)	(0.00822)	(0.00948)
t-2	0.0172	0.00490***	0.0393	0.00518**	0.00604**	0.00951***	0.0175	-0.00311	0.0287***	-0.0151***
	(0.0111)	(0.00131)	(0.0322)	(0.00252)	(0.00261)	(0.00164)	(0.0121)	(0.00396)	(0.00681)	(0.00113)
t-1	0.00397	-0.00204	0.00233	0.00111	0.00434	-0.00290	0.0122	-0.00401	0.0181	-0.0219***
	(0.00488)	(0.00172)	(0.00641)	(0.00978)	(0.00556)	(0.00235)	(0.0131)	(0.00449)	(0.0126)	(0.00204)
t0	-0.00396	0.000377	-0.0281	-0.0127	0.00934	0.00595	-9.35e-05	-0.00158	0.0192	-0.00933
	(0.00977)	(0.00520)	(0.0234)	(0.00774)	(0.00783)	(0.00563)	(0.00209)	(0.00153)	(0.0197)	(0.00605)
t+1	-0.0190***	0.0222	-0.0129**	0.0161***	0.0214***	0.0220	-0.00851	0.0326**	0.0145	0.0102
	(0.00391)	(0.0135)	(0.00513)	(0.00388)	(0.00495)	(0.0173)	(0.0102)	(0.0143)	(0.0143)	(0.0125)
t+2	0.00261	0.00920	0.0132	0.00788*	-0.00394	0.0154	0.00335	-0.0120*	0.0161	-0.00931
	(0.00338)	(0.00794)	(0.00863)	(0.00479)	(0.00317)	(0.0130)	(0.00551)	(0.00664)	(0.0212)	(0.0161)
t+3	-0.0131**	-0.00567	-0.0200*	-0.000625	-0.00722	-0.00902	-0.00498	-0.00107	0.0275	0.000137
	(0.00581)	(0.00359)	(0.0106)	(0.00827)	(0.00579)	(0.00830)	(0.0125)	(0.00285)	(0.0211)	(0.00834)
t+4	-0.00904*	-0.000472	-0.0145	-0.00669	-0.0100**	0.00193	-0.00328	0.000388	-0.0119**	-0.00505
	(0.00519)	(0.00200)	(0.0110)	(0.00732)	(0.00436)	(0.00172)	(0.00682)	(0.00626)	(0.00500)	(0.00600)
Constant	0.000999**	0.00115***	-0.000559	-0.000712	0.00108**	-0.00125**	0.00111**	-0.00104*	0.00174***	-0.00131**
	(0.000422)	(0.000424)	(0.000496)	(0.000515)	(0.000536)	(0.000532)	(0.000535)	(0.000534)	(0.000584)	(0.000594)
Observations	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304
R-squared	0.584	0.580	0.467	0.453	0.491	0.489	0.418	0.418	0.292	0.281

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 4 (part2) - Bank Level Outlook Revisions

VARIABLES	BES		BCP		BPI	
	S&P	Moody's	S&P	Moody's	S&P	Moody's
PSI20	1.125***	1.102***	1.259***	1.262***	1.079***	1.094***
	(0.0511)	(0.0503)	(0.0499)	(0.0498)	(0.0478)	(0.0485)
t-5	-0.0280	-0.00245	-0.0234	-0.00774	0.0129	-0.0152
	(0.0188)	(0.00362)	(0.0161)	(0.00598)	(0.0150)	(0.0176)
t-4	0.00326	0.0159**	-0.0117*	-0.00619	-0.00680	-0.00127
	(0.00878)	(0.00766)	(0.00608)	(0.00476)	(0.0115)	(0.00475)
t-3	0.0676	0.0122	0.00172	-0.0110**	0.0324*	0.00288
	(0.0576)	(0.0150)	(0.00218)	(0.00470)	(0.0187)	(0.00718)
t-2	0.0106	0.0132	0.0140	0.0105***	0.0315*	-0.00386
	(0.00805)	(0.0256)	(0.00859)	(0.00362)	(0.0178)	(0.00520)
t-1	-0.0538	-0.00736	-0.00444	-0.000424	-0.0102**	0.00886
	(0.0390)	(0.00829)	(0.00908)	(0.0112)	(0.00466)	(0.00582)
t0	0.00732***	-0.00735	-0.00372	0.0113***	0.00826	0.00567
	(0.00184)	(0.0193)	(0.00432)	(0.00393)	(0.0129)	(0.00807)
t+1	0.0122	0.00669	-0.0126	-0.00684	0.00934***	-0.00470
	(0.0176)	(0.0127)	(0.00945)	(0.00554)	(0.00324)	(0.00679)
t+2	-0.0353***	0.0141**	-0.00212	0.0105	0.0233**	0.0148*
	(0.0133)	(0.00652)	(0.00951)	(0.0127)	(0.0100)	(0.00871)
t+3	-0.00106	0.0270	0.00800***	0.0113	-0.0103	0.00113
	(0.00612)	(0.0166)	(0.00222)	(0.00943)	(0.0106)	(0.00860)
t+4	-0.00326	0.000701	-0.0140	-0.00367	-0.00525	0.00587*
	(0.0241)	(0.00488)	(0.0149)	(0.00519)	(0.0321)	(0.00317)
Constant	-0.000624	0.000913*	-0.00107**	0.00118**	-0.00113**	0.00107**
	(0.000491)	(0.000504)	(0.000532)	(0.000536)	(0.000528)	(0.000539)
Observations	1,304	1,304	1,304	1,304	1,304	1,304
R-squared	0.473	0.456	0.491	0.490	0.422	0.418

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 4 (part3) - Sovereign Downgrades (Part1)

	Banks				BES				BCP			
VARIABLES	S&P	Moody's	DBRS	Fitch	S&P	Moody's	DBRS	Fitch	S&P	Moody's	DBRS	Fitch
PSI20	1.202***	1.203***	1.204***	1.206***	1.112***	1.114***	1.116***	1.115***	1.259***	1.260***	1.261***	1.265***
	(0.0425)	(0.0422)	(0.0422)	(0.0418)	(0.0515)	(0.0514)	(0.0512)	(0.0512)	(0.0506)	(0.0502)	(0.0502)	(0.0497)
t-5	-0.0104	0.000226	-0.00576	0.00672	-0.00880	0.00564	0.0121***	-0.00318	-0.00639	-0.00576	-0.00304	0.0123*
	(0.00809)	(0.00469)	(0.00599)	(0.00562)	(0.00895)	(0.0115)	(0.00341)	(0.00380)	(0.0135)	(0.00459)	(0.00678)	(0.00707)
t-4	-0.00153	-0.00374	-0.00365	0.00958	-0.00255	-0.00778	-0.0193**	-0.00205	-0.00391	-0.00270	0.00531	0.0162
	(0.00427)	(0.00609)	(0.00524)	(0.0111)	(0.00730)	(0.00498)	(0.00875)	(0.00833)	(0.00447)	(0.00977)	(0.0136)	(0.0171)
t-3	0.00905**	0.00205	-0.0153	0.00537	-0.00151	0.0121**	-0.0122	-0.00410	-0.0178**	-0.00243	-0.0168	0.00997
	(0.00392)	(0.00489)	(0.0106)	(0.0219)	(0.00592)	(0.00548)	(0.00978)	(0.0108)	(0.00774)	(0.00806)	(0.0111)	(0.0287)
t-2	0.00424	0.00854	0.00988*	0.000223	0.00672	0.00884*	0.0116***	-0.00892	-0.000679	0.00981	0.0234***	0.00377
	(0.0110)	(0.00667)	(0.00587)	(0.00319)	(0.0165)	(0.00458)	(0.000504)	(0.00664)	(0.00830)	(0.00948)	(0.00789)	(0.00483)
t-1	-0.00436	0.00508**	-0.00921	0.00173	-0.0120**	-0.00270	-0.0246	-0.00114	-0.00226	0.00735***	-0.00133	0.00429
	(0.00491)	(0.00238)	(0.0243)	(0.00443)	(0.00551)	(0.00365)	(0.0286)	(0.00379)	(0.00561)	(0.00233)	(0.0213)	(0.00582)
t0	-0.00566	0.0151***	-0.00881	-0.0128	0.00867**	0.0167***	0.0246***	-0.00503	0.000250	-0.0140*	-0.00148	-0.0171
	(0.00361)	(0.00521)	(0.00552)	(0.0117)	(0.00391)	(0.00249)	(0.00514)	(0.00572)	(0.00452)	(0.00730)	(0.0115)	(0.0147)
t+1	0.00334	-0.000871	0.0191***	-0.00356	0.00530	-0.00340	-0.0187**	-0.00518	0.00300	-0.000340	-0.0210**	-0.00410
	(0.00505)	(0.00919)	(0.00304)	(0.00447)	(0.0116)	(0.00366)	(0.00771)	(0.00332)	(0.00371)	(0.0121)	(0.00982)	(0.00663)
t+2	0.00359	-0.00169	-0.0179	0.00894***	0.0104	0.00759	-0.00462	-0.00118	0.000275	-0.00654	-0.0252	-0.00964
	(0.00792)	(0.00339)	(0.0125)	(0.00313)	(0.00990)	(0.00622)	(0.00283)	(0.00372)	(0.00799)	(0.00417)	(0.0203)	(0.00634)
t+3	0.00462	-0.0106**	0.00565	0.00199	0.00184	-0.0134**	0.00826	-0.000969	0.00207	-0.0102*	0.00612	0.00335
	(0.00689)	(0.00433)	(0.0154)	(0.00853)	(0.0101)	(0.00547)	(0.00940)	(0.00957)	(0.00643)	(0.00551)	(0.0195)	(0.0110)
t+4	-0.0101*	0.00911	0.00673	-0.00680	-0.0142**	0.00548	0.0286	0.00101	-0.00706	0.00939	-0.00493	-0.0119
	(0.00526)	(0.00965)	(0.0242)	(0.0138)	(0.00720)	(0.0137)	(0.0211)	(0.0154)	(0.00431)	(0.00729)	(0.0262)	(0.0135)
Constant	0.00103**	0.00108**	0.00104**	0.00110***	-0.000595	-0.000674	-0.000543	-0.000565	0.00109**	-0.00115**	0.00116**	0.00124**
	(0.000425)	(0.000426)	(0.000419)	(0.000415)	(0.000514)	(0.000518)	(0.000511)	(0.000519)	(0.000536)	(0.000535)	(0.000526)	(0.000519)
Observations	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304
R-squared	0.580	0.580	0.581	0.581	0.452	0.451	0.456	0.449	0.489	0.489	0.491	0.492

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 4 (part4) - Sovereign Downgrades

VARIABLES	BPI				Banif			
	S&P	Moody's	DBRS	Fitch	S&P	Moody's	DBRS	Fitch
PSI20	1.090***	1.086***	1.088***	1.085***	0.895***	0.891***	0.898***	0.898***
	(0.0486)	(0.0480)	(0.0479)	(0.0481)	(0.0509)	(0.0508)	(0.0505)	(0.0509)
t-5	-0.0114**	0.0150	-0.0111	0.00195	-0.00341	0.0106	0.0137***	0.00907
	(0.00532)	(0.0106)	(0.0106)	(0.00629)	(0.00447)	(0.0133)	(0.00378)	(0.00792)
t-4	0.00731	-0.00181	0.00957	0.00225	0.00358	-0.00396	0.00920	-0.00191
	(0.00759)	(0.00560)	(0.0111)	(0.00618)	(0.00589)	(0.00693)	(0.00715)	(0.00405)
t-3	-0.00184	0.00134	-0.0200	0.00134	-0.00705*	0.00502	0.0105	-0.00154
	(0.00698)	(0.00154)	(0.0144)	(0.0137)	(0.00382)	(0.00938)	(0.0247)	(0.00452)
t-2	0.00692	0.00251***	-0.00362	-0.00220	0.000357	0.0110	0.0278***	-0.00626
	(0.0100)	(0.000904)	(0.0152)	(0.00248)	(0.00703)	(0.0116)	(0.00178)	(0.00856)
t-1	-0.00280	-0.00133	-0.00487	-0.00427	2.43e-05	0.0213***	-0.00608	0.0112***
	(0.00658)	(0.00362)	(0.0203)	(0.00589)	(0.00776)	(0.00309)	(0.0102)	(0.00293)
t0	-0.0162	-0.0189***	0.0108***	-0.0113	-0.0110	-0.0161**	0.00409	-0.00811
	(0.0128)	(0.00302)	(0.00128)	(0.0134)	(0.00795)	(0.00626)	(0.00675)	(0.0110)
t+1	-0.0119	0.000475	-0.00776	0.00587	-0.00509	0.0117	0.0331***	-0.00736
	(0.00779)	(0.00755)	(0.00795)	(0.00564)	(0.00647)	(0.00925)	(0.00104)	(0.00896)
t+2	0.00476	-2.08e-05	0.0264***	-0.0142	0.00335	-0.00316	-0.00126	-0.00545
	(0.00883)	(0.00139)	(0.00845)	(0.0130)	(0.00821)	(0.00237)	(0.0233)	(0.00884)
t+3	0.00280	-0.00854*	-0.0193	0.00146	-0.00422	0.00437	-0.0155	-0.0125**
	(0.00861)	(0.00454)	(0.0211)	(0.00965)	(0.00559)	(0.00766)	(0.0297)	(0.00577)
t+4	-0.00358	0.0134	0.0164	0.0202**	-0.0109**	-0.0186*	0.0193	-0.00418
	(0.00336)	(0.0126)	(0.0197)	(0.00905)	(0.00452)	(0.0106)	(0.0323)	(0.00818)
Constant	0.000922*	-0.00103*	0.000903*	-0.00103*	0.00129**	0.00138**	0.00143**	0.00123**
	(0.000537)	(0.000538)	(0.000530)	(0.000534)	(0.000601)	(0.000596)	(0.000587)	(0.000600)
Observations	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304
R-squared	0.417	0.417	0.419	0.418	0.281	0.284	0.285	0.282

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 4 (part5) - Bank Level Downgrades

VARIABLES	BES			BCP			BPI		
	S&P	Moody's	DBRS	S&P	Moody's	Fitch	S&P	Moody's	Fitch
PSI20	1.120***	1.117***	1.116***	1.260***	1.262***	1.261***	1.080***	1.086***	1.086***
	(0.0514)	(0.0514)	(0.0512)	(0.0509)	(0.0500)	(0.0499)	(0.0482)	(0.0480)	(0.0479)
t-5	-0.0186	0.000791	0.0121***	0.00716**	0.00119	0.00841	0.0118	0.0152*	0.000348
	(0.0122)	(0.00683)	(0.00341)	(0.00363)	(0.00773)	(0.0196)	(0.0110)	(0.00879)	(0.00708)
t-4	0.00816***	-0.00632	-0.0193**	0.0141***	-0.00790*	0.0195	0.0136***	-0.00504	0.00997
	(0.00120)	(0.0109)	(0.00875)	(0.00533)	(0.00474)	(0.0266)	(0.00422)	(0.00690)	(0.0126)
t-3	-0.0124	0.00604	-0.0122	-0.0149	-0.00856	-0.000417	-0.0204**	0.00869	-0.00363
	(0.00922)	(0.00836)	(0.00978)	(0.0105)	(0.00893)	(0.00630)	(0.00993)	(0.00910)	(0.00523)
t-2	-0.0163	-0.00593	0.0116***	-0.00799	-0.00101	0.00389	-0.0206	-0.00125	-0.000510
	(0.0144)	(0.00452)	(0.000504)	(0.00784)	(0.00298)	(0.00542)	(0.0178)	(0.00166)	(0.00546)
t-1	0.00686***	-0.00292	-0.0246	-0.000428	-0.00593	-0.0186	0.0144***	-0.00678	-0.0256**
	(0.00258)	(0.00502)	(0.0286)	(0.00496)	(0.00715)	(0.0178)	(0.00425)	(0.00608)	(0.0113)
t0	0.0155	-0.00261	0.0246***	0.00876	-0.00249	0.000989	-0.00684	0.0114*	0.00941
	(0.0146)	(0.00312)	(0.00514)	(0.00937)	(0.0140)	(0.0102)	(0.00732)	(0.00630)	(0.00758)
t+1	-0.00673	-0.00355	-0.0187**	-0.0101*	-0.0111	0.00709	-0.0253*	0.0155	0.00804
	(0.00484)	(0.00755)	(0.00771)	(0.00535)	(0.00958)	(0.00972)	(0.0130)	(0.00951)	(0.00567)
t+2	-0.00363	0.00900**	-0.00462	0.00216	-0.000413	-0.00422	0.000239	0.000404	-0.000385
	(0.00508)	(0.00386)	(0.00283)	(0.00350)	(0.00421)	(0.00523)	(0.00810)	(0.00728)	(0.00758)
t+3	0.00226	0.00691	0.00826	0.0107	0.00115	0.00263	0.00637	0.00605	0.0164***
	(0.0103)	(0.00834)	(0.00940)	(0.00877)	(0.0101)	(0.0145)	(0.00997)	(0.00488)	(0.00634)
t+4	0.00610	0.00769	0.0286	-0.00401	0.00945*	0.00571	0.00833	0.00791	0.00291
	(0.00837)	(0.0127)	(0.0211)	(0.00627)	(0.00486)	(0.00811)	(0.0111)	(0.00899)	(0.00807)
Constant	-0.000531	-0.000648	-0.000543	0.00110**	0.00112**	0.00132**	0.000887*	0.00122**	0.00110**
	(0.000514)	(0.000521)	(0.000511)	(0.000537)	(0.000537)	(0.000517)	(0.000530)	(0.000540)	(0.000535)
Observations	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304
R-squared	0.455	0.450	0.456	0.491	0.489	0.491	0.424	0.419	0.421

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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