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CATÓLICA LISBON SCHOOL OF BUSINESS AND ECONOMICS



# Credit Rating Changes and their impact on equity prices: how much should Banks care?

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## *Event study in stock markets*

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This dissertation investigates the existence of abnormal returns in a sample of 48 banks following credit rating changes done by S&P to those banks and to their sovereigns – a total of 10 countries – between 2008 and 2012. We analyse three types of effects: first, bank rating changes' impact on its own stock price; second, sovereign rating downgrades' impact on banks' stock prices (national and foreign); third, bank rating downgrades' impact on non-downgraded banks' equity prices. The impacts are seldom significant: a departure from existing literature that may result from the usage of a test statistic robust to cross-correlation and event-induced volatility effects, or from time series differences.

*Keywords: Event study, Equity price, Banks, Corporate Credit Ratings, Sovereign Credit Ratings, Credit Rating changes*

## **Resumé**

Cette étude concerne l'effet que les changements de notes donnés par S&P ont dans un échantillon de 48 banques et ses souverains (10 pays), entre 2008 et 2012. On explore trois effets: d'abord les changements de notes d'une banque ont dans le prix de son action; les abaissements de note souveraine ont dans les prix des actions des banques nationales et étrangères; troisièmement les abaissements de note d'une banque ont dans des autres banques qui n'ont pas eu abaissés. Les résultats sont rarement significatifs: une différence comparativement à d'autres études qui peut découler de l'utilisation d'une statistique de test robuste en corrélation entre les actions et la variance résultants de l'évènement, ou de différences entre les périodes en analyse.

*Mots-clés : Étude d'évènement, prix des actions, banques, notes de souverains, notes d'entreprises, changements de notes,*

## **Resumo**

A presente dissertação investiga a existência de retornos anormais numa amostra de 48 bancos como resposta a mudanças de notação (rating) feitas pela S&P aos bancos em causa ou às respectivas dívidas nacionais – num total de 10 países – entre 2008 e 2012. Exploramos três tipos de efeitos: reacção no preço da acção de um banco cuja dívida tenha sofrido um corte de notação; reacção no preço de acção de bancos no próprio país e no estrangeiro em resposta a uma descida na notação de dívida soberana; reacção no preço de acção de bancos cujo rating não tenha sido alterado, em resposta a alterações de notação noutros bancos. Na maioria dos casos, estes efeitos não são significativos: uma diferença comparativamente a estudos nesta área que pode ser explicada pela utilização de uma metodologia e estatística de teste robustas a correlação entre acções e a aumentos de volatilidade causados pelo próprio evento, ou pela utilização de um período de análise diferente.

*Palavras-chave: Estudo de evento, preço de acção, bancos, notação soberana, notação de empresa, mudança de notação*

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Finally, I must thank my friends (especially the fellow Double Mates) and my family, who are a living prove - to a Finance student - that “not everything that can be counted counts, and not everything that counts can be counted”<sup>1</sup>.

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<sup>1</sup> Albert Einstein

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## I. Introduction

The “Word of the Year” choices for the past few years illustrate ironically and almost perfectly the status quo of the Advanced World and how its Economy has been evolving, demonstrating as well the part it has come to play in common citizens’ everyday life. In the United States, the subprime mortgage crisis, arguably one of the roots of today’s malaises, became notorious for the general public at the onset of crisis – with “Subprime” being voted Word of the Year in 2007. The following winner was “Bailout”, a reflection of how the situation unravelled in the country: Bear Stearns had to be bailed out by the Federal Reserve Bank of New York in March 2008; Lehman Brothers had the opposite fate and filed for bankruptcy in September, out of Federal Reserve’s moral hazard fears following another bailout. Meanwhile in Europe, “Financial Crisis” (2008), “Stress test” (2011) and “Rescuing Routine” (2012) won the German Wort des Jahres; “Debt” was chosen in France (2010), “Austerity” (2011) in Portugal, “Crisis” (2012) in Italy, to give examples. In the United Kingdom, the most voted word in 2012 was “Omnishambles (noun, informal): a situation that has been comprehensively mismanaged, characterized by a string of blunders and miscalculations” – a quite accurate definition of the times we are living now.

Appendix 1 on page 44 shows some of the consequences: in the case of two major economic blocs – the United States and the European Union – the crisis has affected investors (with a decline in stock markets from 2007 to 2010 and values in 2012 still below pre-crisis level), households (the Gross National Income in nominal prices declined in the United States in 2009; countries such as Greece and Ireland registered sharp declines since 2007) and States (increasing financing costs data). While these figures are illustrative, they do not exhaust the consequences of this episode.

The crisis is far from over and it may entail future regulatory, systemic and governmental changes; because the Economy seems to be recovering slowly (and in many countries continues to decline), it continues to be a widely debated topic. The implications for some sectors are critical, and Banking is definitely one of them: banks are at the core of

every advanced economy through their many roles in the Economy, namely in creating money and facilitating monetary exchanges.

Another widely debated topic in recent years is that of credit ratings and the role of credit rating agencies in the Economy, but especially their action in this crisis. They have been accused of inflating ratings in securities in the subprime bubble, but also of rushing credit downgrades for corporates and, most importantly, sovereigns, in more recent years – sometimes creating domino effects and possibly self-fulfilling prophecies, as we will discuss.

One question that arises, then, is how market participants interpret the information conveyed by credit ratings and what impacts they cause. It is of utmost importance to understand what happened in the past to prevent (or exploit) future downfalls in the future; *Praemonitus praemunitus*.

Combining these two ramifications of banking and credit ratings, in this dissertation we will try to quantify the effects of credit rating changes in a sample of American and European banks with systemic importance. With an event-study methodology, we will look at credit rating changes from Standard and Poor's Rating Services (henceforth S&P) to the banks included in the sample as well as their sovereigns, to establish whether or not there is a market impact<sup>2</sup>. In the case of firms' rating changes, we will analyse the impact on the bank being downgraded and on other banks; with sovereign rating changes, we will observe reactions in banks' equity prices. We hope that a comparison between these effects sheds some academic light on the contagion effect anecdotally present in the press.

We follow (Hartmann, Straetmans, & De Vries, 2005) and focus on equity prices assuming that they reflect information about asset and liability risk as well as interbank risk (which can be manifested through investment correlation, interbank lending or other means). As these authors argue, working with equity prices allows us to avoid one of the complications in banking system studies, which is the fact that connections between banks

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<sup>2</sup> (Reisen & von Maltzan, 1999), (Brooks, Faff, Hillier, & Hillier, 2004) show that these are the least anticipated and have the greatest impact on market returns.

may act as a source of contagion; moreover, the parameters of these links are not easily determinable. As Jorion & Zhang (2007) also point out, equity markets are more liquid – a helpful property in this type of studies. Our rationale is to validate anecdotal evidence of contagion effects in the financial crisis and quantify them.

To the best of our knowledge, few studies focus on intra-industry effects relying on equity price changes when it comes to credit rating changes. There are studies on some of the issues we will be addressing, but not always up to date – and when discussing rating changes, the conclusions may change quickly depending on the time period considered. By combining elements of different studies and using recent data, we hope to provide a fresh, enlightened insight on the Banking sector – from the point of view of investors, with implications to managers.

This discussion will now continue with an overview of existing literature on this topic as well as a highlight of relevant results to contrast with ours later on the study. Subsequently, we will present our methodology, including a description of the sample and the rationale for its choice. Then, we will present and discuss our results, validating or rejecting our initial hypotheses. We will then conclude with some comments on the limitations of our study and possibilities for further research.

## **II. Literature review**

We will start the literature review with a discussion of the financial system and its impact on the real economy side, to establish the importance of studying banking impacts. We then look at the subject of contagion, which would be an interest of our study if rating changes prove to cause widespread impacts on banks. We then turn to the main focus of this dissertation – credit ratings.



## The interaction between finance and the real economy

One important element of literature to review and understand is that of the financial system's implications in the real economy – from the moment this relation exists, understanding the Banking sector becomes of foremost value. Because this is an area which has been comprehensively studied by many authors and not the main subject of this dissertation, I will rely on two influential authors to recapitulate existing literature.

An early revision can be found in Gertler (1988), who discusses the several emphases given to the topic over history. At the time of the Great Depression in 1929, analysing the role of the financial system in economic activity came to the forefront of academic work; money and credit supply were the main focus when discussing finance then. Another strand of research came with the discussion of firms' financial structure and its unimportance in financing decisions (Modigliani & Miller, 1958). In the 1970s, money supply – particularly unexpected changes – was again discussed; financial markets were under study, more than the financial system itself. A discussion on the relation between consumers' spending and their financial situation ensued, as well as the role of monetary forces in driving economic growth.

A change came with the new topic of information asymmetry, which quickly came to dominate financial system studies: both equity and debt markets can be affected by its opacity and there are difficulties investors and lenders face in evaluating counterparty risk. The general implication of these studies is that financing (and, consequently, the financial system) does matter to explain investment and other real economic variables: financial intermediaries may help solving information distortion issues. Subsequently, Fama (1980) and (1985) – both devoted to studying financial institutions as intermediaries – conclude that banks may be particularly efficient in reducing asymmetry. A prominent model, Diamond (1984) shows how an intermediary can save on monitoring efforts connecting savers to borrowers and facilitating investment; it was the acceptance of the role of banks as monitors.

A consequence of these studies is, then, the role of regulation towards financial institutions. Authors such as Diamond & Dybvig (1983) and Friedman & Schwartz (1986) proposed scenarios where governmental intervention was still needed; Diamond and Dybvig are particularly incisive in explaining bank runs and spawned much work in avoiding liquidity crunches; Bhattacharya & Gale (1987) advocate the role of the government as a provider of subsidized liquidity protection when financial institutions fail to secure it. Related to this issue, Bernanke and Gertler propose a model that underlines the importance of bank capital, which delineates the level of bank credit granted - consequently impacting investment and real growth.

Before concluding, Gertler dealt with the subject of financial structure; borrowing constraints, as evidenced by Scheinkman and Weiss (1986) or interest rates, explored by Farmer (1985) can contribute to economic cycles' determination, as can companies' ability to issue equity, presented by Greenwald and Stiglitz (1986).

Levine (1997) offers another comprehensive review of literature on this topic, at times with a different point of view than Gertler. Levine focusses his review on five purposes of financial systems, namely: risk management; resource allocation; reducing agency costs; pooling savings; arranging a payments system. Levine also focusses on two channels to affect output - "capital accumulation and technological innovation" (p. 691). The general conclusion is that financial systems and intermediaries can lead to economic growth. In a more recent study, Levine (2005) revisits his earlier work and provides additional insights on how Finance impacts the real economy – not only on aggregate terms, but also when it comes to income distribution.

To conclude this section, as we have seen there is an extensive literature on the interaction between financial intermediaries and economic growth to show how strongly they are connected. Thus, understanding how banks can be affected is an issue of interest.

## Financial contagion

The topic of financial contagion has spurred more interest recently than that of banking and growth; according to Claessens and Forbes (2004), “contagion” only started to be associated with Finance, as opposed to Medicine, after the Mexican peso crisis of 1994 and especially the 1997 currency crisis in Thailand (p.1). However, the literature is just as extensive – because defining contagion is a troublesome task and it can be the very first challenge in this research area: its study and interpretation depends largely on the methodology used.

On its website, the World Bank defines three vague types of contagion: “broad”, “restrictive” and “very restrictive”. The first and broader definition encompasses cross-border diffusion of shocks, whether they are positive or negative, although the latter tends to be privileged; the second emphasizes the abnormal (that is, beyond explanation) effect of these shocks; other names include “excess co-movement”; the third and narrower definition refers to the phenomenon of correlation jumps during crises when compared to normal times. While these distinctions are illustrative and somehow used, as pointed out in Dungey & Tambakis (2005), they are still fairly general; thus, many authors have tried to review what has been investigated on the subject of contagion and the definitions set forth, providing more precise differentiations.

We will now continue with further discussion of alternative definitions for contagion, of possible reasons for contagion to occur and also why contagion is more likely to succeed in banks than in other firms, in an attempt to establish the relevance of our study.

### Alternative definitions

In *A Primer on Financial Contagion*, (Pericoli & Sbracia, 2003) identify five recurrently used definitions of contagion. Starting by the first definition, Pericoli and Sbracia propose “Contagion is a significant increase in the probability of a crisis in one country, conditional on a crisis occurring in another country” (p. 9). The second is presented as “Contagion occurs

when volatility spills over from the crisis country to the financial markets of other countries” (p. 580); since, as the authors point out, volatility is usually associated with market uncertainty, this definition can be interpreted as a “spread of uncertainty”. The third definition states that “Contagion is a significant increase in co-movements of prices and quantities across markets, conditional on a crisis occurring in one market or group of markets” (p. 581). The fourth characterization is proposed as “(Shift)-contagion occurs when the transmission channel is different after a shock in one market” (p. 581). The fifth and final definition is “Contagion occurs when co-movements cannot be explained by fundamentals” (p. 581). This is also the definition proposed on Forbes and Rigobon (2002).

Since there are arguments for and against each usage, in practice authors start by stating in their studies what their approach to contagion will be, avoiding confusions but also giving rise to more studies on this subject (with different points of view). Depending on the definition, the explanations for contagion to occur and the propagation channels can be slightly different, as we will now discuss.

### **Explanations for contagion**

Claessens and Forbes discuss some explanations in *International Financial Contagion: The Theory, Evidence and Policy Implications* (2004), focussing on a broad definition which assumes that cross-country spillovers are contagion even if these countries are in the same geographic area and have meaningful links in stable periods. They then list three fundamental causes and five theories that rely instead on investors’ behaviour.

Among the fundamentals, the first group of causes would be a “common or global shock” (p.5), such as price changes of commodities, interest or currency rates adjustments – shocks that “can lead to increased co-movements in asset prices and capital flows” (p.5). A second group would be “trade linkages” (p.5), whether through direct trade or competitive devaluation actions, which can affect several countries at once and result in an overall effect which is larger than what the fundamentals would cause. The third group of fundamental

causes is “financial linkages” (p.6), which results from integrated financial markets and can happen through credit supply or capital flow changes – more severe for countries dependant on external funds.

In the field of investors’ behaviour explanations, Claessens and Forbes identify five main theories, all showing how individually rational actions can add up to aggregate shifts that go beyond the fundamentals. The first concerns the “role of liquidity problems” (p.6), which Valdés (1997) and Kaminsky, Lyons and Schmukler (2001) have studied: after losing in one market and to be able to fulfil their financial obligations, investors may be forced to sell assets in other markets; after losing in one country, banks may be forced to sell assets in other countries to reduce their overall risk exposure. The more exposed these parties are, especially due to leverage, the more they will try to compensate their losses and potentially spill the losses across markets. A second, related group explains how “incentive structures and changes in risk aversion” (p.7) – studied by Schinasi and Smith (2001) and Broner, Gelos and Reinhart (2004) – can lead investors to sell an asset class which is overweight (when compared to their benchmark) as a result of losses in another asset class; if many investors share a similar benchmark, there can be a substantial downward pressure on prices or currency depreciation. A third set of theories is based on asymmetry of information and how problems in one country may indicate that another country will suffer as well, leading investors to sell, sometimes to mimic what others who apparently have more information and have done so, as Calvo and Mendoza (1998) and Agénor and Aizenman (1998) illustrate. A fourth set, analogous to a bank run, reflects how investors may rush to sell an asset out of fear to have their foreign positions claimless – Jeanne (1997), Masson (1998) and Chang and Majnoni (2001) have developed such theories; this explanation of contagion can be difficult to distinguish from fundamentals theories, since fundamentals may be at the heart of investors’ behaviour. Finally, investors may act out of a “reassessment of the rules under which international financing takes place” (p.9), believing that a particular country will/will not be assisted in case of trouble and trying to limit their losses.

## **Banks and contagion**

In the widely cited and referred work of Kaufman (1994), the author discusses intra-industry spillovers – impacts of firms in their peers – and how this phenomenon is more prone to be witnessed in Banking than other sectors.

More recently, in Allen and Carletti (2012), the literature on contagion is explained and reviewed, to emphasize how banks are especially vulnerable to shocks. According to the authors, two main theoretical strands of research exist: one main approach focusses on direct linkages in banks, while the other focusses on indirect balance-sheet connections. Additionally, there are empirical studies on contagion when financial institutions fail.

In general, and as we have seen, banks – as financial system intermediaries – play several roles in the Economy; their preponderance, their many links, is what makes them so predisposed to contagion.

## **Credit Ratings**

Standard & Poor's, on its website, proposes the following definition of credit ratings:

*“Credit ratings are forward-looking opinions about credit risk. Standard & Poor's credit ratings express the agency's opinion about the ability and willingness of an issuer, such as a corporation or state or city government, to meet its financial obligations in full and on time.”*

(Standard and Poor's, 2013)

For the value of the information they convey, they have been the source of many studies – especially when it comes to rating changes and the added information they bring to the market.

## **The importance of ratings**

Ratings represent a substantial saving of time and effort looking for information in a particular security: they summarize quantitative and qualitative information about the debt issuer and convey a risk profile. Whether they provide new insights or only on publicly available information is a topic of debate and fundamental to understand the impact it may

have on stock prices. In any case, they help marketing a security and have played an increasingly important role in the financial innovation of recent years and the financial system itself. Some authors showed that firms (though not necessarily banks) may even take capital structure decisions to keep a certain rating (Kisgen, 2006).

### ***Corporate ratings studies***

In an early study, with U.S. corporate observations from 1977 to 1983, Hand, Holthausen and Leftwich (1992) examine daily data and find significant average excess stock returns following straight debt rating changes, but asymmetric: stronger and more significant for downgrades than for upgrades – but they exclude expected rating changes, that is additions to the S&P's Credit Watch list and actual rating changes by S&P and Moody's. The subject had been studied before, but mostly with monthly data.

Some studies point to the contrary, though: Goh and Ederington (1993) suggest that for downgrades, shareholders' response depends on the type of announcement made by the rating agency: if the downgrade follows a decline on the firm's financing capacity, stock prices tend to fall; if the downgrade is motivated by an increase in leverage, there is no significant decline on equity prices.

More recently and for European banks, Gropp and Richards (2001) have found, with observations from 1989 to 2000, that for equity prices there are significant responses for rating changes (even though the results may be contaminated by other events). They also suggest, following Goh and Ederington (1993), that the reason for the rating change is important and that a downgrade due to increased capacity may even be faced as good news and motivate positive abnormal returns.

Boot, Milbourn and Schmeits (2006) develop a model to explain the role of credit ratings, which they propose as "coordination mechanisms", and defend their importance; however, they do acknowledge that other points of view exist – such as Brealey and Myers (2003).

### ***Sovereign ratings studies***

Sovereign ratings indicate the soundness of state debt and the general conditions of the economy, therefore sending strong signals to investors. Borensztein, Cowan and Valenzuela, (2007) and Gande and Parsley (2005) discuss how sovereign debt can be a benchmark for interest rates in the country, thus impacting firms' financing conditions; banks are therefore particularly concerned by this information.

While the interest in analysing credit ratings has increased significantly in more recent years – especially changes made to sovereign credit –, studies on the topic precede the current crisis and the criticism towards the role that rating agencies played. Cantor and Packer (1996) were the predecessors of credit rating analysis, focussing on their determinants but most innovatively, in their impact. Since then, the studies multiplied and lately have been particularly investigated. Some studies focus on concrete issues: Lee, Sapriza, Wu (2010) conclude that sovereign rating changes affect significantly stock liquidity, especially downgrades; with a European Union countries sample, Afonso, Gomes, Taamouti (2002) show that downgrades have significant impacts on volatility and they cause contagion among countries. Others focus on debt or equity markets in general: (Larraín, Reisen, & von Maltzan, 1997), (Reisen & von Maltzan, 1999), (Steiner & Heinke, 2001) for bond markets; (Kaminsky & Schmukler, 2001), (Brooks, Faff, Hillier, & Hillier, 2004), (Ferreira & Gama, 2007), (Michaelides, Milidonis, Nishiotis, & Papakyriacou, 2012) for equity markets. All offer support for significant reactions to sovereign downgrades, and the latter highlight accentuating factors such as financial development, law systems, institutional quality and corruption to justify part of the reactions.

Brooks, Faff, Treepongkaruna and Wu (2012) offer a particularly relevant study focussing on financial crises, to check if sovereign rating changes destabilize the markets. While they conclude that these events have an impact on stock markets, they do not heighten financial market instability.



Correa, Lee, Sapriza, & Suarez (2012), who focus on the impact on banks, find significant results especially for downgrades. For 37 countries, between 1995 and 2011 and focussing on the same rating agency (S&P), the authors find that the effect of downgrades is stronger for banks more dependent on government support and with higher perceived probability to be bailed out. In Europe, where the data is available, the authors additionally found that this likelihood of government rescue effect is stronger than the response of banks with holdings of domestic government debt. They also find stronger results with larger downgrades (at least two notches).

Additionally, a report by the International Monetary Fund (2010), reviews the performance of credit rating agencies, including S&P, and concludes that they do impact stock market prices: by conveying new information but, importantly, because of their “certification role” (p.85).

The general conclusion of the literature is that sovereign credit rating changes, particularly downgrades, impact the financial markets.

### ***Rating quality***

One of the strands in ratings literature is that of ratings quality, which Hau, Langfield and Marqués-Ibáñez (2012) discuss and we summarize; this discussion is useful to understand how credit ratings are given and may point at interesting subjects to analyse.

A large part of studies in rating quality deals with the problems posed by agency and incentive problems. There are three main parties involved in a credit rating evaluation: the “consumer”, which is ultimately the investor interested in knowing the worthiness of the product they are investing in; the issuer, who wants their debt rated so as to market it according to its risk profile; the credit rating agency, who carries out the evaluation. One major concern, then, comes from the incentive that issuers have in inducing higher ratings – a higher rated product will sell at a higher price; the question was aggravated after 1975, when ratings started to be paid by the issuers. There is an upward bias not only when

issuers try to engage in “ratings shopping” – approaching several agencies trying to receive a better rating –, but also when the prospect of future rating solicitations of a particular issuer (and consequently, fees for the agency) is higher, which is the case of larger companies; Efing and Marqués-Ibáñez (2012), Griffin and Tang (2011) and He et al (2011) find empirical evidence of this latter theory. Additionally, rating agencies have a disproportionate power towards their consumers: if issuers do not ask for their ratings, they can assign unsolicited ratings, free of charge, but penalizing them with downwards bias (Partnoy, 2002; Fulghieri et al, 2010). Another incentive distortion happens with rating-contingent regulation of banks and investors (e.g. only investing in investment grade products), who then expect inflated ratings on products that, having in fact higher leverage (and risk), allow them to reap short-term profits; Calomiris (2009) and Opp et al. (2012) have discussed this question of rating-contingent regulation and so has Efing (2012), who concludes that even when full credit information is available, rating agencies have an incentive to inflate their evaluations to share with the clients the prospect of higher revenue.

Reputational capital, or the long-term interest that agencies have in producing reliable and trustworthy assessments, might be a solution for these issues (Cantor and Packer, 1995; Covitz and Harrison, 2003). However, its importance varies with business cycles and whereas in times of crisis it is more relevant, it loses power in boom periods (Bar-Isaac and Shapiro, 2012); other aspects such as uninformed investors (Bolton, Freixas and Shapiro, 2012) and periods of generalised credit downgrade events (Benmelech and Dlugosz, 2009) exacerbate this cyclicity.

Moreover, the quality of ratings can be affected by factors other than incentives, namely the difficulty in assessing rating quality when businesses are complex – the particular case of banking; in this sector, disagreements between agencies are greater than in any other (Morgan, 2002). Credit rating agencies have thus a general benefit in issuing lower-quality ratings than investing resources in scrutinizing complicated businesses (Mathis et al, 2009; Skreta and Veldkamp, 2009; Opp et al, 2010).

## Our study

The research questions of our study will then be:

*Q1: Are banks' equity prices affected by their credit rating changes? Could factors such as the country of origin (and its economy) influence the reaction?*

Given the literature discussed above, we expect banks to respond positively for upgrades and negatively to downgrades, with greater soundness for the latter – on which we intend to focus. As for the country of origin, the literature focusses more on the division between emerging and advanced economies or on other control variables; therefore, we can only try to guess that distressed countries should react more to downgrades than others.

*Q2: Are banks' equity prices affected by sovereign credit rating changes? Which factors could influence this effect?*

In light of the literature reviewed, we expect sovereign credit rating changes to cause significant abnormal returns to the banks on the sample, which are of systemic importance.

Additionally, in an attempt to grasp some bank contagion effect, we will look at the effect that bank rating changes have on other banks; however, the literature on this topic is scarce (particularly using the equity prices event study methodology). In case there are significant effects with downgrades, it would also be interesting to compare the three main type (own bank, other bank or sovereign) and see if there are major differences between them.

It is worthwhile mentioning the implications that the results have on the Efficient Market Hypothesis, as proposed by Fama: if the information conveyed by rating changes is new, we should expect a significant change in the price as soon as it is known – meaning that the

market incorporates almost immediately the new information. In this degree of efficiency, if there are no significant abnormal returns, that must mean that the information was not new.

### III. Sample and Methodology

#### Sample

We started by selecting the countries with the objective of gathering a wide yet manageable sample that included only advanced countries. The GIIPS countries (Greece, Ireland, Italy, Portugal and Spain) were of particular interest given the number of credit events they have witnessed recently, and were therefore included; to compare them with more affluent countries in the Eurozone, we included France and Germany. The United States were also a natural choice given our interest in comparing it with Europe. Furthermore, to have European countries without the Euro and seemingly less exposed markets we included also the United Kingdom and Switzerland, thus putting the total number of countries in 10.

To select the banks, and given that one of our (indirect) goals was to assess the financial system's stability, we looked at stress test reports done in the United States, in the European Union and in Switzerland by the competent regulator. Looking at the countries and bounded by information availability, we were left with 48 banks to include in the study (a full list can be found on Appendix 2, in page 47).

We retrieved from Bloomberg daily stock prices from 2008 to 2012, in local currency as to avoid exchange rate blur, for banks in the United States, the United Kingdom, Switzerland, France and Germany and Portugal, Ireland, Italy, Greece and Spain. The returns were calculated as log first differences and the 3-month Libor was used to compute excess returns.

To select the list of events, we used Bloomberg's Event function after creating a portfolio with the list of banks identified, as well as the Sovereign Debt monitor to find

sovereign rating changes. We considered only the events whose estimation and event window fell within the period of returns (2008-2012). The list of events can be found in Appendix 3 – Bank rating changes description (page 49) and Appendix 4 – Sovereign rating changes description (page 53); the event clustering is described on Appendix 5 – List of event clusters (page 55).

## Methodology

In our research design we had to take into account some econometric problems stemming from the fact that the banks included in the sample are most likely correlated (especially those in the same country); moreover, events can induce volatility and increase correlation between stock prices – that is, as we discussed, is a major area of research. As (Kolari & Pynnönen, 2010) put it, even when cross-correlation is low, it increases significantly with event clustering (same event day for multiple firms) – a problem to which Gande and Parsley (2005) also draw attention, since there is event windows contamination.

While some authors such as Correa, Lee, Sapriza and Suarez (2012) opt for a regression approach, we looked at other means to overcome this problem. In particular, we look at the test statistics developed by Kolari and Pynnönen (2010), who propose a test statistic adjusted to cross-correlation, adapting the one proposed in Patell (1976), and another to deal with both autocorrelation and cross-correlation – an adaptation of the Boehmer, Musumeci and Poulsen (BMP) methodology. According to the authors, this latter adjusted statistic – abbreviated to ADJ-BMP – takes into account two major problems in event studies in single and multiple-day event windows. Nonparametric tests would also be an option, and Kolari and Pynnönen (2010) conclude that the Corrado and Zivney (1992) nonparametric rank test is comparable in robustness and power to the ADJ-BMP test for single-day abnormal returns and short Cumulative Abnormal Returns (CAR) windows. However, in longer CAR windows, the ADJ-BMP performs better; since we will CARs, the ADJ-BMP is a suitable choice.

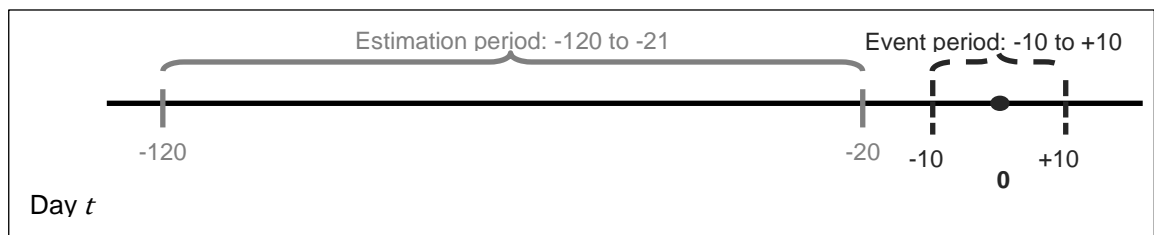
## Returns estimation

Several possibilities exist for the calculation of the estimated returns, and Kolari and Pynnönen propose five: a constant mean model; a market model; an OLS model; the Fama-French model; the Fama-French Industry Model. In our case, for simplification (since more complex models would require a substantial volume of information, time-dependant, for the 48 banks in the sample), the market model is used to calculate the abnormal returns (ARs) as:

$$AR_{it} = (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) - R_{it} \quad (1)$$

where  $R_{it}$  is the return of the MSCI World Bank Index (Bloomberg code MXWO0BK:IND) on day  $t$ ;  $\alpha_i$  and  $\beta_i$  are obtained for bank  $i$  from an estimation window regression. The estimation and event periods are defined as follows:

**Figure 1 - Estimation and event window**



Let  $n$  denote the total number of banks included in the sample (48). Kolari and Pynnönen assume, following (Campbell, Lo, and MacKinlay 1997), that the asset returns of the firms ( $r_{nt}$ ) in the sample are “serially independently multivariate normally distributed random variables with constant mean and constant covariance matrix for all  $t$ ” (p. 3999).

### Calculation of test statistics<sup>3</sup>

For the statistical tests, the authors – following Patell (1976) – use scaled abnormal returns (SARs), defined as “prediction errors divided by the estimated residual standard deviation of the factor model used to define returns” (p. 4000), in this case the market model.

<sup>3</sup> The equations here presented rigorously follow the ones presented in (Kolari & Pynnönen, 2010) but have a slightly different notation for an easier understanding, so that the reader is not forced to consult the original paper.

If returns are assumed to follow a normal distribution, the SARs follow a *t* – *student* distribution with  $m - p - 1$  degrees of freedom where  $m$  is the number of observations in the estimation window (in our case, 100) and  $p$  is the number of explanatory variables in the estimation model (in our case, 2) – thus, we are dealing with a  $t_{97}$ -distributed variable. The calculation also involves a correction term ( $d_t$ ) for the estimation of the regression parameters ( $\alpha$  and  $\beta$ ). We then have:

$$SAR_{it} \equiv A_{it} = \frac{AR_{it}}{s_i \sqrt{1 + d_t}} \quad (2)$$

with  $s_i$  being the standard deviation of the regression residuals and  $d_t$  calculated as described in the paper. The SARs, the authors argue, are burdensome to interpret and should be used only for detecting the signal of the event effect; the economic information should be interpreted from the ARs.

The test statistics can be done computed under two alternative assumptions. If we assume that the securities included in the sample are similarly correlated, the SARs are averaged to enter the numerator of the test statistics as:

$$\bar{A}_t = \frac{\sum_{i=1}^n A_{it}}{n} \quad (3)$$

The second element of the test statistics in this first assumption is the variance of the average (cross-sectional) SARs –  $\sigma_{\bar{A}_t}^2$  –, estimated as:

$$s_{\bar{A}_t}^2 = \frac{\sum_{i=1}^n (A_{it} - \bar{A}_t)^2}{n - 1} \times \frac{1}{1 - \bar{r}} \times \frac{1 + (n - 1)\bar{r}}{n} \quad (4)$$

where  $\bar{r}$  is an estimation (based on the estimation period) of the average cross-correlation between banks. This formula adds to the sample variance two terms that improve accuracy, removing a bias resulting from cross-correlation between stocks (which would understate the true cross-sectional variance, since the average cross-correlation is positive).

This is important because understating the true variance would lead to an easier rejection of the null hypothesis (of zero scaled abnormal returns) in  $t$ -statistics.

Alternatively, if we know stocks to be cross-correlated in  $q$  blocks with  $n_k$  observations each, such that within the block there is cross-correlation but between the blocks there is not, the SARs are averaged accordingly. For the SARs cross-sectional variance, we start by estimating the variance  $\sigma_{\bar{A}_{kt}}^2$  in each group  $k$  as:

$$s_{\bar{A}_{kt}}^2 = \frac{\sum_{i=1}^{n_k} (A_{it} - \bar{A}_{kt})^2}{n_k - 1} \times \frac{1}{1 - \bar{r}_k} \times \frac{1 + (n_k - 1)\bar{r}_k}{n_k} \quad (5)$$

where the terms are analogous to those of equation (4), but for block  $k$ . The variance  $\sigma_{\bar{A}_t}^2$  is then estimated as:

$$s_{\bar{A}_t}^2 = \frac{1}{n^2} \sum_{k=1}^q n_k^2 s_{\bar{A}_{kt}}^2 \quad (6)$$

In any case, the  $t$ -statistic is obtained with equations (3) and (4) or (6) as:

$$t_{ADJ-BMP}_t = \frac{\bar{A}_t}{\sqrt{s_{\bar{A}_t}^2}} \quad (7)$$

In some cases, we compute CARs to capture the effect in a larger period of time (a few days); it may be the case that more than one rating change happens in a short period of time or that another event occurs and the response, if it exists, is not immediately incorporated into the stock price. The test statistics are computed in the same way and since abnormal returns are additive, their calculation is straightforward (as pointed out by the authors in their paper).



## IV. Results

### Q1: Banks' own effect

To answer the first question of whether or not banks' stock prices are affected by a rating change to their debt, we started by using equations (3), (4) and (7) and compute the test-statistics for all the affected banks, regardless of their country or the event date. These results are presented in detail on Appendix 6 (page 58) – Panel 6.1; they do not show evidence of effects from downgrades. ARs for downgrades are only significant in days -9 and +4 (both positive), which does not seem to have a particular reason to occur. The CARs are also weak around the event day and no conclusion can be taken. As for upgrades, there is evidence of anticipation of the events, since on day -2 there is an abnormal return of 2.87% significant at the 5%-confidence level; there is also a positive abnormal return on day +6 significant at the 5% level. In this case, the CARs are positive and all significant at the 10% level in days -2 and -1.

Since downgrades constitute the bulk of our sample, we used several methodologies and subsamples to analyse their impact in more depth, to see if results changed. The previous calculations were done for the 200 downgrades identified, but not all of them represent an actual rating cut: some are just a negative outlook revision. Since it might be the case that outlook revisions do not impact the market, when rating cuts actually do, we performed the same calculations only for rating cuts and for cuts of more than one notch.

On Panel 6.2.A, we used two alternative methodologies in an attempt to improve our results: using equations (5) and (6) and aggregating observations in groups of countries when computing SARs. This is important because the calculation of the test statistic involves an average correlation term and if we take all securities as equally correlated when in fact there are blocks with greater cross-correlation than others, that noise is spread to all the observations. However, the panel shows that computing the statistics all together or grouping them by countries brings little change to the results.

Considering only rating cuts, there continue to be no significant ARs on the days close to the rating cut date, although the results on day zero do gain some significance. Using then only the first methodology (without blocks), we computed the response to rating cuts of at least two notches (38 observations), whose results are shown in Panel 6.2.B; no AR or CAR is significant.

These results, however, may hide some national effects; separating the events by country yields more interesting results. Panel 6.3 shows the results for the sub-sample of rating cuts, with events grouped between countries.

As we can see, the United Kingdom has significant abnormal returns at the 5% confidence level for days -10 (negative) and +10 (positive), and at 10% for day +8 (positive). Spain has significant abnormal returns at the in days -10 (negative) and -1 (negative), as well as +9 (negative). Ireland has significant abnormal returns on days +3 and +9 (both positive). Italy has positive abnormal returns in days -6, -2 and +4 and a negative abnormal return on day +1. Greece shows abnormal returns on day -6 and +6 (negative) and on day +4 (positive). Portugal shows significant but positive abnormal results on day -10 and +8. The United States have significant positive returns on day -9, and significant negative on day -8. Switzerland has a 1% significant positive return on day +3. France has positive abnormal returns on day -2 significant at 10%. Germany could not be analysed separately since it only had one observation; moreover, Ireland and Switzerland's conclusions, resulting from a lower number of observations, are not as strong as other countries'.

The CARs could offer a different view, in case the effect was not immediately incorporated in the stock price but instead in a short period of days. However, they are only significant for Portugal and France; on France, the returns are even positive, which does not have any economic rationale.

In general, we find some unusual results in days far from the rating change announcement, which is not explainable by fundamentals and uncommon in literature; we

suspect that this has to do with the fact that in many cases, the corporate announcements were preceded by sovereign rating announcements days before or other events; contamination is a serious problem in our sample, as Appendix 5 illustrates. Therefore, we tried to use a smaller event window of only -5 to +5 days, and CARs from -2 to +2 – presented on Panel 6.4. This should impact the results since scaled abnormal returns take into account the variance in the event window.

Using a new event window (again, only for rating cuts) eliminates significant returns “far” from the event itself, but downgrades still have no impact on stock prices in any of the days. This window seems to be more adequate – the problem of contamination was probably diminished. But the main conclusion remains: a rating downgrade does not seem to have an impact on the firm’s stock price; significance on ARs seems to increase when we consider only rating cuts (but not rating cuts of at least 2 notches), which Correa, Lee, Sapriza and Suarez (2012) found to be stronger.

## **Q2: Sovereign effect**

In this part, we discuss whether a credit event of a sovereign impacts stocks’ equity prices (the second question). Given the composition of our sample, with few upgrades, we will focus our analyses exclusively on sovereign downgrades. For each sovereign credit event, we observe the reaction it has on the country’s banks and also on other countries’ banks. The results using alternative methodologies are presented in detail in Appendix 7.

### **Own country effects**

We started our analysis by computing the statistics for each country and came to a general result that is composed of each country’s results weighted by the number of observations it has, following the two methodologies described earlier; the results are shown in Panel 7.1. Looking at downgrades, we can see that they do not have a significant impact on the days close to the event – the only significant (at 5%) ARs come in days -10 and +4, both positive. Again, there is almost no difference in the results between methodologies.

If we separate the results by country, we get to the results on Panel 7.2 – Germany had only one downgrade (in fact, a negative outlook) and the United Kingdom and Switzerland had none, thus they could not enter the country analysis; France, Italy and the United States, despite their inclusion, had only two.

Again, we find that there are no significant abnormal returns for banks, as a whole, near the event day. Most countries exhibit significant returns at the 5% level only “far” from the event day, namely: France, on days -4 (negative) and +4 (positive); Italy, on day -6 (negative); Portugal, on days -10 and -8 (both positive). The United States has, in addition to some strong abnormal returns on days -10 and -8 (positive) and -5 and +9 (negative), some abnormal returns closer to the event day: on days -3 and +1, it shows a negative abnormal return significant at the 1% level; but we should be careful interpreting these results since, as it was mentioned, only two downgrades occurred.

### **Cross effects**

We also looked at the effect that a country’s sovereign rating changes have on other country’s banks. In this case, we computed abnormal returns and test statistics for a country’s banks in the event periods of other countries: thus, the results are summarized in six tables (the countries that had more than one downgrade)<sup>4</sup>. We also repeated the calculations for a shorter event window, from -5 to +5, as shown in Panel 7.5.

### ***Spain***

As we can observe in Panel 7.4.A, a Spanish downgrade seemed to have no sizeable impact on Italy and Switzerland. On some countries, significant abnormal returns only showed in days far from the event: France (positive AR on day -7); Germany (negative AR on day -4 and positive AR on day +8); Ireland (positive ARs on days -9, -8 and -6); United Kingdom (positive AR on day +4); Greece (positive AR on day +8); United States (positive AR on day -10). Finally, on Portugal, a Spanish downgrade caused a positive AR on day -1.

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<sup>4</sup> We included own country results in these tables to allow for a quicker comparison, but the results are the same as in Panel 7.2.

Looking at the results from a shorter time window, presented in Panel 7.5.A, Italy continues to have no response, and now neither do France, Ireland, Greece and the United States. The results also uphold for Portugal and to the United Kingdom. Germany no longer responds after the event, but only before with negative results on days -4 and -3.

### ***Ireland***

Ireland does not seem to affect other countries much if we consider the larger event window (Panel 7.4.B): France, Italy, Germany, Spain, the United Kingdom, Greece and the United States do not have any significant AR. Portugal has a negative AR on day +7 and Switzerland has a positive AR on day +3 and a negative AR on day +5.

The shorter event window (Panel 7.5.B) maintains the results for Italy and Greece, but changes the results for France, where positive ARs are significant on days -4 and +3; Germany, where now there are positive ARs on days -5 and -1, as well as a negative AR on day +5; Spain, where a significant positive AR appears on days -4 and +3; the United Kingdom, with a positive response on day +4; the United States, with a positive response on day +4. For Portugal and Switzerland, where there were some response, the results also change now. Portugal now shows positive response after the event, with significant ARs on days -5, +3 and +4 (positive). For Switzerland, the results uphold: positive response on days +3 and +4, but negative on day +5; additionally, a negative response appears two days before.

### ***Italy***

With the larger time window – and the results shown on Panel 7.4.C – Spain shows no response to an Italian sovereign downgrade; France and the United Kingdom react positively 4 days after (5% significance). Some countries show a response only prior to the event: Portugal, with a 5% significant negative AR on day -7; Greece, with 5% significant results on days -8 (positive) and -7 (negative); the United States with 10% significant positive AR on days -8 and -3. Other countries react both before and after: Ireland, with a 1% significant

response on day -3 and a 5% significant on day +4, both positive; Germany, with 1% significant response on days -8 and +1 and a 10% significant AR on day -1, all positive; Switzerland, with positive ARs with 5% significance on day -8 and 1% significance on day +4.

Considering the shorter time window – and the results shown on Panel 7.5.C –, the conclusions uphold for France, for Ireland and for Switzerland (respond positively before and after the event) and for Greece and the United States (who respond positively before the event), but change for the rest. Portugal no longer has significant ARs; Germany now responds before and after, with particularly sound ARs on days +1 and +4, both positive; Spain now has a reaction before (10% significance on day -3) and after the event (1% significance on day +4), both positive.

### **Greece**

Looking at Panel 7.5.D, which uses the larger time window, we can see how some countries barely respond to Greek sovereign downgrades. France and Spain only react before 6 days the event, both positively; the United States only responds 9 days after, also positively. Italy also has a positive response on day -6, but a negative on the event day; Portugal and Ireland also react negatively on the event day. Germany seems to anticipate the announcement, with a 1% significant result on day -3 and no other significant AR later, although most are negative. Switzerland has a late response on day +3. Finally, the United Kingdom has significant returns on days -10 (positive) and -7 (negative) as well as +6 (negative).

Using a shorter time window, Italy and Portugal continue to react on the event day; Germany maintains its late response on day +4; Switzerland also continues to react negatively on days +2 and +3. France now reacts with a negative AR on the event day. The United Kingdom, Spain and the United States no longer have any significant ARs.

### **Portugal**

As illustrated by Panel 7.5.E, with the usage of the large time window we observe that Italy, Germany and the United States do not react to a Portuguese downgrade; France reacts negatively afterwards (on days +2 and +5). The other countries have some significant returns far from the event window and positive (Spain on days -8 and +9, Switzerland on day +4, Greece on days -10 and -8). Ireland, curiously, has some strong (5% or 1% significant) positive ARs on days -9, -8, -6 and -1. Finally, the United Kingdom has a negative response on day -4 and a positive on day +8.

With the usage of a shorter time window, illustrated on Panel 7.5.E, we see that Germany and the United States continue to show no reaction; Greece does not respond either. France shows negative response on days -4, +2 and +5; Italy on day +5; Spain on day +5. The United Kingdom continues to have a negative AR on day -4 and Ireland continues to show a positive AR before the event.

### **Q3: Other banks' reaction**

In this section we focus on bank downgrades to see if there are spillovers from one country to the other. In particular, we test for abnormal returns on banks based in the same country, but not downgraded, and then on banks based on other countries.

#### **National effects**

To capture this effect, we used the base methodology (larger event window and variances without day blocks) and considered all downgrade events. As shown in Panel 8.1, the ARs and CARs in non-event banks of the same country where a downgrade happens are hardly significant for the countries under analysis. The significant ARs are far from the event day, except in the case of Italy (day -2) and the United States (day +1). Looking at CARs, which may capture the event reaction better since they allow for a lagged response, Portugal, Spain and the United Kingdom continue without significant CARs; other countries have them, and results are in those cases positive: these countries' banks seem to benefit

from rivals' downgrades. We should note, however, that some countries (Portugal, Switzerland) were left with few observations and their results should not be too much upheld.

### **International effects**

We started by computing base-window abnormal returns and test statistics as well as cumulative abnormal returns. In many cases, abnormal returns were significant a few days before or after the actual event and we suspect that it has to do with clustering of events. Therefore, we computed CARs which can give us a better idea of the downgrade impact around the time of the event. In the cases when more than one bank of a particular country was downgraded in one day, we only consider the event once for other countries. The results are shown on Panels 8.2.A to 8.2.J

Two countries had non-significant impacts on the others: Spain and Portugal, with 15 and 10 event dates (respectively). When British banks were downgraded, only German and French banks responded with significant CARs; in the German case, they were particularly high (-7.18% with 5% significance). In Ireland, where there is only one bank, seven downgrades happened: a single country, France, showed some evidence of response with significant positive CARs; although not significant, it is interesting to note how all other European countries responded with positive ARs. Italian banks' downgrades were received with positive CARs for all countries, but only significant in Portugal and Germany. Downgrades from Greek banks caused significant CARs in Ireland, Portugal and France: in Ireland, they were initially negative but became positive on the event day; on other countries, they were negative. American banks' downgrades (23) only impacted two countries, Portugal and Switzerland, and the response was positive in every country. Swiss banks' downgrades were met with significant CARs positive in the United Kingdom, Italy and Germany; in Ireland, they caused negative CARs. Finally, in response to French bank downgrades, banks in all countries had on average positive CARs; the results are significant for Italian and Swiss banks, but even more to Portuguese and Irish banks.



In response to this question, we can therefore conclude that cross effects only happen between some countries; Ireland and Portugal seem to be more vulnerable to rating changes. Moreover, the impact is not linear: Portuguese banks react negatively to Greek downgrades, but positively to Swiss banks, for example.

## Discussion of results

A large part of the conclusions to which we arrived goes against our initial hypotheses and the literature in the topic; we must then question the motives why this may have happened, and what are the implications of our results.

Banks do not seem to be impacted by downgrades to their debt; Gropp and Richards (2001) had pointed at significant reactions to rating downgrades, which we do not encounter. However, an obvious difference between the two studies is the sample: Gropp and Richards's is prior to the current financial crisis, and with the amount of credit rating changes that has happened lately, results may well have changed. We would even suspect there can be differences between initial and later rounds of rating cuts: while initial downgrades may have been faced as unexpected and event negative outlooks caused the market to stumble, as happened in previous years, we hypothesize that as credit ratings continue to be cut they lose information effect. This may be exacerbated by decreases below-investment grade, where from that point on, equity prices cease to decline as much as they did in higher levels.

Gropp and Richards, following Goh and Ederington (1993), point at different stock price behaviour depending on the reason why the firm is downgraded. However, this does not seem to explain our loss of significance, as it is hardly the case that recent downgrades happened because of capital structure choices – they were motivated by deteriorating economic conditions.

Moreover, with the turmoil in the markets in more recent years, rating downgrades to corporate debt may no longer be discrete, isolated events, that necessarily impacts firms (the issue of event window contamination). The way ratings are given may have also changed:

ratings can be assigned to match the perceived conditions of the firm, instead of shaping the market's view; this, however, is a difficult hypothesis to explore or prove.

In another departure from the existing literature, we saw that sovereign credit rating cuts did not seem to cause strong negative impacts on stock prices. Correa, Lee, Saprizza and Suarez (2012) used a recent sample, missing only the downgrades from 2012 (in comparison with our sample), though including many years before; that is probably not the source for differences. In this case, we suspect that the division by countries, as used in our paper, does not fully capture the dynamics of contagion. We grouped our observations by countries because we wanted to address anecdotal evidence of international contagion; while an answer regarding whether or not countries are linearly connected to one another would be interesting, other factors are probably more preponderant. As we discussed before, the authors propose some – such as reliance on sovereign help in case of difficulties.

When it comes to cross effects, where the literature is scarcer, we find no clear impacts between countries. There are some significant responses, particularly in CARs and in many cases positive. One factor could explain why banks react positively to some banks' rating cuts and negatively to others: the perceived implications that will have on the macroeconomic level. If a bank with higher systemic importance is under fire (a "too big to fail" bank), the regulator is more likely to act than if a smaller bank sees its conditions worsen. While we have no proof to offer on this hypothesis, similar action happened with sovereign debt – as soon as Spain and especially Italy started to raise concerns about their credit quality, the regulator took big steps to halt climbing yield spreads.

At this point, we should also note that our methodology is different to the one used in most papers cited so far. Instead of a regression to explain returns, we used an innovative statistic that tries to account for event-induced volatility and cross correlation, diminishing type I error when computing t-statistics for the event days. While theoretically this approach is adequate to our study, it may be in fact damaging the results by failing to reject the null

hypothesis (that abnormal returns are zero) when it should; but for all we know, it may also be the case that previous studies did not model volatilities correctly and that our results actually represent an improvement over previous studies.

### **Further research**

Given the results discussed so far, we are left with many questions and possibilities for research in the future. One useful exercise might be, continuing with this methodology, make subsamples on time, extending our analysis to the years before the crisis and check for significant differences; even with our current sample, there are enough events to allow for subsample analysis. It may also be interesting to analyse the difference between investment grade and speculative grade ratings, given the role of contingency-regulations. We could also estimate returns using a different model (or a different benchmark) to see if these are altered.

The reason why we have not done this analysis yet is the fact that the contrast of our results to previous ones may reveal inadequacy in the methodology used; therefore, a preliminary exercise could be a replication of the most commonly used methodologies for our sample, most recent, and see if results uphold. If they do approach our results – with loss of significance in abnormal returns, particularly for downgrades –, that would be a signal that this methodology is adequate; if they do not, then we should explore the underlying assumptions in our methodology and see if it applies practically to these events (albeit their theoretical sense).

### **Managerial implications**

Whatever the reason why our exercise shows different results than other studies, one thing is clear: ratings and their impact should not be taken at face value. While their role is undoubtedly important, they have also been shown to cyclically lose quality, to be tangled in conflicts of interests and they may not show new information. Managing a firm's financial decisions only with ratings in mind does not seem to be a good policy; investors should also be warned about the real prospect of quick money following a credit rating event.

## V. Conclusion

This paper focusses on the impact that credit rating changes – in corporate and sovereign debt – have on equity prices of banks; we focus mainly on downgrades and in a varied sample of advanced economies (some in better financial shape than others). Bank upgrades seem to be anticipated by the market, with significant results before the announcement. Most importantly, we do not find significant abnormal returns at the time of downgrades neither for corporates nor for sovereigns, which somehow contradicts the existing literature. The paper therefore questions the much-vaunted implication of downgrades, which so far have been described as meaningful events but may see their importance change as the number increases and they cease to bring new information to the market. Additionally, we found only mild evidence of contagion between banks and between countries. Factors other than the country of origin determine the severity of the links between banks.

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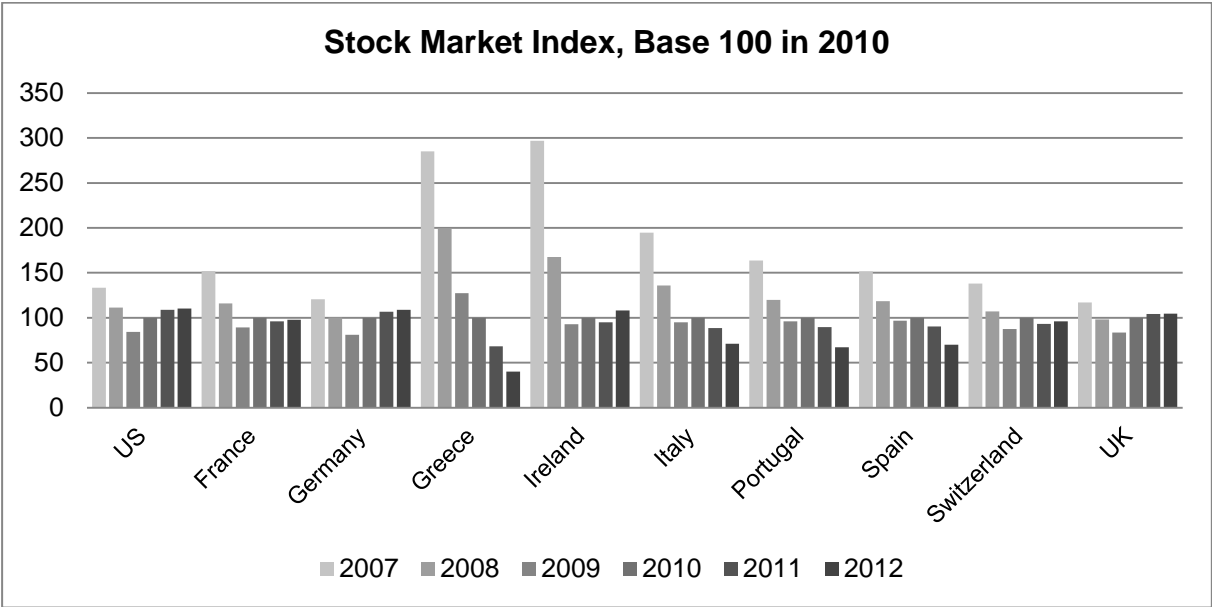
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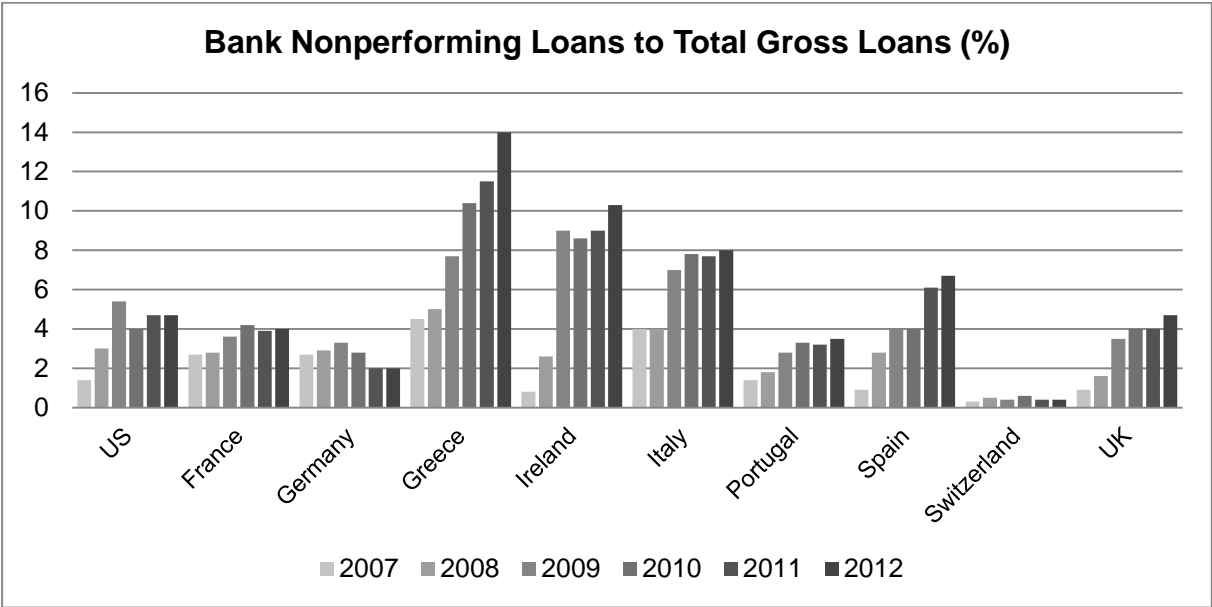
## VII. Appendices

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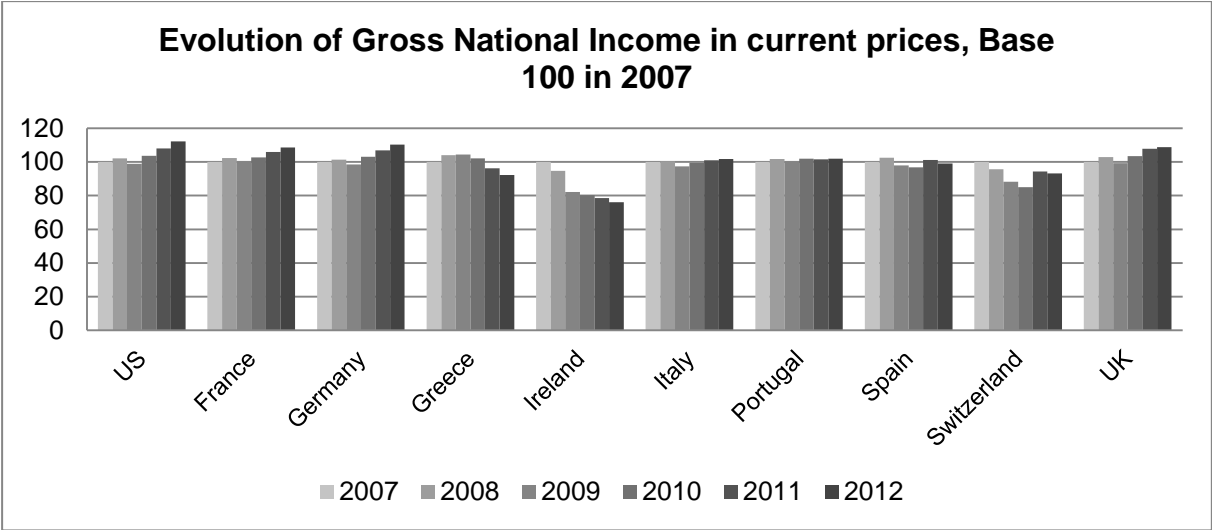
**Appendix 1 – Evolution of stock markets, bank nonperforming loans to total gross loans and gross national income for a selection of countries, 2007-2012 and of States’ financial costs in the European Union**



Data source: Euromonitor from trade sources/national statistics. Retrieved from Euromonitor on 27-03-2013.

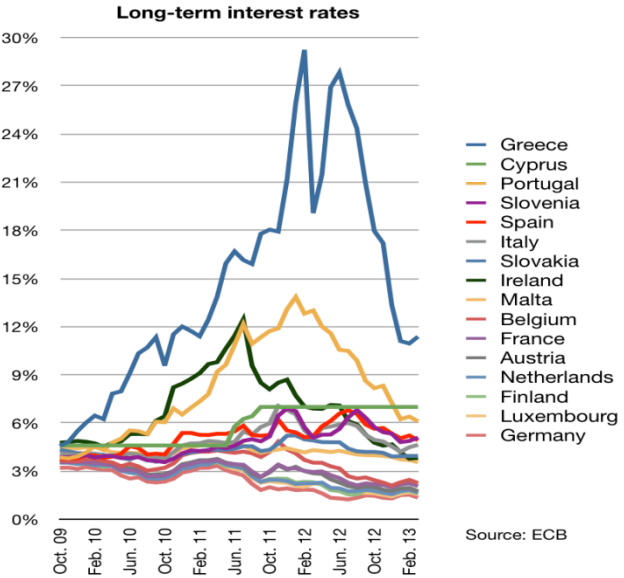


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Adaptation of the Euromonitor Gross National Income (GNI) series, original data in millions of local currency (USD for the United States, CHF for Switzerland, GBP for the United Kingdom, EUR for the rest). Data source: Euromonitor International from International Monetary Fund (IMF), International Financial Statistics. Retrieved from Euromonitor on 27-03-2013.

### Evolution of Long-term interest rates for European Union Member States, 2009-2013



Retrieved from Wikipedia on 16-04-2013. Data source: (European Central Bank, 2013)

Graph link: [http://en.wikipedia.org/wiki/File:Long-term\\_interest\\_rates\\_\(eurozone\).png](http://en.wikipedia.org/wiki/File:Long-term_interest_rates_(eurozone).png)

## Appendix 2 – Banks included in the study

Following regulators' reports on the financial system strength ("stress tests"), we identified a total of 83 banks; of these, 50 were listed and had available financial information, but 2 were left out since the time series started after 01.01.2008.

<b>Included</b>		
Country	Name	Bloomberg Code
<i>United States</i>		
	American Express Company	AXP US
	The Goldman Sachs Group, Inc.	GS US
	Bank of America Corporation	BAC US
	JPMorgan Chase & Co.	JPM US
	BB&T Corporation	BBT US
	The Bank of New York Mellon Corporation	BK US
	Capital One Financial Corporation	COF US
	Citigroup Inc.	C US
	Fifth Third Bancorp	FITB US
	KeyCorp	KEY US
	Morgan Stanley	MS US
	The PNC Financial Services Group, Inc.	PNC US
	Regions Financial Corporation	RF US
	State Street Corporation	STT US
	SunTrust Banks, Inc.	STI US
	U.S. Bancorp	USB US
	Wells Fargo & Co.	WFC US
<i>France</i>		
	BNP Paribas	BNP FP
	Credit Agricole	ACA FP
	Societe Generale	GLE FP
<i>Germany</i>		
	Deutsche Bank AG	DBK GY
	Commerzbank AG	CBK GY
<i>Greece</i>		
	EFG Eurobank Ergasias S.A.	EUROB GA
	National Bank Of Greece	ETE GA
	Alpha Bank	ALPHA GA
	Piraeus Bank Group	TPEIR GA
	Agricultural Bank Of Greece S.A. (ATEbank)	ATE GA
	TT Hellenic Postbank S.A.	TT GA
<i>Ireland</i>		
	Bank of Ireland	BKIR ID
<i>Italy</i>		
	Intesa Sanpaolo S.p.A	ISP IM
	Unicredit S.p.A	UCG IM
	Banca Monte Dei Paschi Di Siena S.p.A	BMPS IM
	Banco Popolare - S.C.	BP IM
	Unione Di Banche Italiane Scpa (UBI Banca)	UBI IM



<i>Portugal</i>		
	Banco Comercial Português, SA (BCP Or Millennium BCP)	BCP PL
	Espírito Santo Financial Group, SA (ESFG)	BES PL
	Banco BPI, SA	BPI PL
<i>Spain</i>		
	Banco Santander S.A.	SAN SM
	Banco Bilbao Vizcaya Argentaria S.A. (Bbva)	BBVA SM
	Banco Popular Español, S.A.	POP SM
	Banco de Sabadell, S.A.	SAB SM
	Bankinter, S.A.	BKT SM
<i>Switzerland</i>		
	UBS	UBSN VX
	Credit Suisse	CSGN VX
<i>United Kingdom</i>		
	ROYAL BANK OF SCOTLAND GROUP plc	RBS LN
	HSBC HOLDINGS plc	HSBA LN
	BARCLAYS plc	BARC LN
	LLOYDS BANKING GROUP plc	LLOY LN

<b>Excluded</b>		
<i>Time series started after 01.01.2008</i>		
Caja De Ahorros Del Mediterráneo (CAM SM), BFA-BANKIA (BKIA SM)		
<i>Not listed or with trading suspended</i>		
<p>Ally Financial Inc. (United States), BPCE (France), Landesbank Baden-Württemberg, DZ Bank AG Dt. Zentral-Genossenschaftsbank, Bayerische Landesbank, Norddeutsche Landesbank – GZ–, Hypo Real Estate Holding AG, München, WestLB AG - Düsseldorf, HSH Nordbank AG – Hamburg, Landesbank Berlin AG, Dekabank Deutsche Girozentrale – Frankfurt, WGZ Bank AG Westdt. Geno. Zentralbk, Ddf (Germany), Allied Irish Banks plc, Irish Life and Permanent (Ireland), Caixa Geral de Depósitos, SA (Portugal) and Caja España de Inversiones, Salamanca y Soria, Caja De Ahorros y Monte de Piedad, Grupo Banca Civica, Caja de Ahorros y M.P. De Zaragoza, Aragon y Rioja, Monte de Piedad y Caja de Ahorros de Ronda, Cadiz, Almeria, Malaga, Antequera y Jaen, Banco Pastor, S.A., Grupo BBK, Caixa D'estalvis Unio de Caixes de Manlleu, Sabadell I Terrassa, Caja de Ahorros y M.P. De Gipuzkoa Y San Sebastian, Grupo Caja3, Banca March, S.A., Caja de Ahorros de Vitoria y Alava, Caja de Ahorros Y M.P. de Ontinyent, Colonya - Caixa D'estalvis de Pollensa, Caixa D'estalvis De Catalunya, Tarragona I Manresa, Caixa de Aforros de Galicia, Vigo, Ourense e Pontevedra, Grupo BMN, Caja de Ahorros y Pensiones de Barcelona, Effibank (Spain)</p>		

(Board of Governors of the Federal Reserve System, 2013)

(European Banking Authority, 2011)

(The Swiss Financial Market Supervisory Authority FINMA, 2010)

### Appendix 3 – Bank rating changes description

List of the 222 rating changes made by S&P to the banks in the sample included in the event study. Upgrades are indicated in italics; \*+ denotes a positive watch, \*- denotes a negative watch.

Event	Bank	Date	Previous	New	Event	Bank	Date	Previous	New
BankRtg0	BMPS IM	05-12-12	BBB-	BB+ *-	BankRtg39	ACA FP	23-01-12	A+ *-	A
<i>BankRtg1</i>	<i>SAB SM</i>	<i>23-11-12</i>	<i>BB *-</i>	<i>BB</i>	BankRtg40	GLE FP	23-01-12	A+ *-	A
<i>BankRtg2</i>	<i>POP SM</i>	<i>23-11-12</i>	<i>BB *-</i>	<i>BB</i>	<i>BankRtg41</i>	<i>BKIR ID</i>	<i>20-01-12</i>	<i>BB+ *-</i>	<i>BB+</i>
BankRtg3	BKT SM	23-11-12	BB+ *-	BB	BankRtg42	BPI PL	16-12-11	BBB- *-	BB+ *-
BankRtg4	BNP FP	25-10-12	AA-	A+	BankRtg43	BCP PL	16-12-11	BBB- *-	BB *-
BankRtg5	BBVA SM	16-10-12	BBB+	BBB-	BankRtg44	BES PL	16-12-11	BBB- *-	BB
BankRtg6	SAB SM	16-10-12	BB+	BB *-	BankRtg45	SAB SM	15-12-11	A- *-	BBB *-
BankRtg7	POP SM	16-10-12	BB+ *-	BB *-	BankRtg46	POP SM	15-12-11	A- *-	BBB+ *-
BankRtg8	SAN SM	16-10-12	A-	BBB	BankRtg47	BKT SM	15-12-11	A- *-	BBB+ *-
BankRtg9	BKT SM	16-10-12	BB+	BB+ *-	BankRtg48	BBVA SM	08-12-11	A+	A+ *-
<i>BankRtg10</i>	<i>USB US</i>	<i>20-08-12</i>	<i>A</i>	<i>A+</i>	BankRtg49	SAB SM	08-12-11	A-	A- *-
BankRtg11	POP SM	08-08-12	BB+	BB+ *-	BankRtg50	SAN SM	08-12-11	AA-	AA- *-
BankRtg12	BMPS IM	03-08-12	BBB *-	BBB-	BankRtg51	BKIR ID	08-12-11	BB+	BB+ *-
BankRtg13	UBI IM	03-08-12	BBB+	BBB	BankRtg52	BKT SM	08-12-11	A-	A- *-
BankRtg14	BMPS IM	18-06-12	BBB	BBB *-	BankRtg53	BMPS IM	07-12-11	BBB+	BBB+ *-
<i>BankRtg15</i>	<i>SAB SM</i>	<i>25-05-12</i>	<i>BB+ *-</i>	<i>BB+</i>	BankRtg54	BPI PL	07-12-11	BBB-	BBB- *-
BankRtg16	POP SM	25-05-12	BBB- *-	BB+	BankRtg55	BCP PL	07-12-11	BBB-	BBB- *-
BankRtg17	BKT SM	25-05-12	BBB- *-	BB+	BankRtg56	BES PL	07-12-11	BBB-	BBB- *-
BankRtg18	BBVA SM	30-04-12	A	BBB+	BankRtg57	BP IM	07-12-11	BBB	BBB *-
BankRtg19	SAB SM	30-04-12	BBB- *-	BB+ *-	BankRtg58	BNP FP	07-12-11	AA-	AA- *-
BankRtg20	SAN SM	30-04-12	A+	A-	BankRtg59	CBK GR	07-12-11	A	A *-
BankRtg21	BKT SM	30-04-12	BBB	BBB- *-	BankRtg60	ACA FP	07-12-11	A+	A+ *-
<i>BankRtg22</i>	<i>RF US</i>	<i>15-03-12</i>	<i>BB+</i>	<i>BBB-</i>	BankRtg61	ISP IM	07-12-11	A	A *-
BankRtg23	BPI PL	14-02-12	BB+ *-	BB-	BankRtg62	GLE FP	07-12-11	A+	A+ *-
BankRtg24	BCP PL	14-02-12	BB *-	B+	BankRtg63	UCG IM	07-12-11	A	A *-
BankRtg25	BES PL	14-02-12	BB *-	BB-	BankRtg64	UBI IM	07-12-11	A-	A- *-
BankRtg26	BBVA SM	13-02-12	A+ *-	A	BankRtg65	BBT US	06-12-11	A	A-
BankRtg27	SAB SM	13-02-12	BBB *-	BBB- *-	BankRtg66	PNC US	06-12-11	A	A-
BankRtg28	POP SM	13-02-12	BBB+ *-	BBB- *-	BankRtg67	USB US	06-12-11	A+	A
BankRtg29	SAN SM	13-02-12	AA- *-	A+	BankRtg68	BBVA SM	29-11-11	AA-	A+
BankRtg30	BKT SM	13-02-12	BBB+ *-	BBB	BankRtg69	BAC US	29-11-11	A	A-
BankRtg31	BMPS IM	10-02-12	BBB+ *-	BBB	BankRtg70	BK US	29-11-11	AA-	A+
BankRtg32	BP IM	10-02-12	BBB *-	BBB-	BankRtg71	BARC LN	29-11-11	A+	A
BankRtg33	ISP IM	10-02-12	A *-	BBB+	BankRtg72	C US	29-11-11	A	A-
BankRtg34	UCG IM	10-02-12	A *-	BBB+	BankRtg73	GS US	29-11-11	A	A-
BankRtg35	UBI IM	10-02-12	A- *-	BBB+	BankRtg74	HSBA LN	29-11-11	AA-	A+
BankRtg36	BES PL	31-01-12	BB	BB *-	BankRtg75	JPM US	29-11-11	A+	A
<i>BankRtg37</i>	<i>CBK GR</i>	<i>25-01-12</i>	<i>A *-</i>	<i>A</i>	BankRtg76	LLOY LN	29-11-11	A	A-
<i>BankRtg38</i>	<i>BNP FP</i>	<i>23-01-12</i>	<i>AA- *-</i>	<i>AA-</i>	BankRtg77	MS US	29-11-11	A	A-

Event	Bank	Date	Previous	New	Event	Bank	Date	Previous	New
BnkRtg78	RBS LN	29-11-11	A	A-	BnkRtg122	RF US	23-11-10	BBB-	BB+
BnkRtg79	UBSN VX	29-11-11	A+ *-	A	<i>BnkRtg123</i>	<i>TPEIR GA</i>	<i>01-10-10</i>	<i>BB *-</i>	<i>BB</i>
BnkRtg80	WFC US	29-11-11	AA-	A+	<i>BnkRtg124</i>	<i>SAB SM</i>	<i>26-07-10</i>	<i>A *-</i>	<i>A</i>
BnkRtg81	BMPS IM	18-10-11	A-	BBB+	BnkRtg125	TPEIR GA	16-07-10	BB	BB *-
BnkRtg82	BP IM	18-10-11	A-	BBB	BnkRtg126	SAB SM	11-06-10	A	A *-
BnkRtg83	UBI IM	18-10-11	A	A-	BnkRtg127	ALPHA GA	27-04-10	BBB	BB
BnkRtg84	BNP FP	14-10-11	AA	AA-	BnkRtg128	BPI PL	27-04-10	A	A-
BnkRtg85	BBVA SM	11-10-11	AA	AA-	BnkRtg129	BCP PL	27-04-10	A-	BBB+
BnkRtg86	SAB SM	11-10-11	A	A-	BnkRtg130	BES PL	27-04-10	A	A-
BnkRtg87	POP SM	11-10-11	A-	A- *-	BnkRtg131	EUROB GA	27-04-10	BBB	BB
BnkRtg88	SAN SM	11-10-11	AA	AA-	BnkRtg132	ETE GA	27-04-10	BBB+	BB+
BnkRtg89	BKT SM	11-10-11	A	A-	BnkRtg133	TPEIR GA	27-04-10	BBB	BB
BnkRtg90	ISP IM	21-09-11	A+	A	BnkRtg134	ISP IM	23-04-10	AA-	A+
BnkRtg91	UBSN VX	16-09-11	A+	A+ *-	<i>BnkRtg135</i>	<i>ALPHA GA</i>	<i>16-03-10</i>	<i>BBB *-</i>	<i>BBB</i>
<i>BnkRtg92</i>	<i>BKIR ID</i>	<i>11-07-11</i>	<i>BB+ *-</i>	<i>BB+</i>	<i>BnkRtg136</i>	<i>EUROB GA</i>	<i>16-03-10</i>	<i>BBB *-</i>	<i>BBB</i>
BnkRtg93	ALPHA GA	15-06-11	B *-	CCC	<i>BnkRtg137</i>	<i>ETE GA</i>	<i>16-03-10</i>	<i>BBB+ *-</i>	<i>BBB+</i>
BnkRtg94	EUROB GA	15-06-11	B *-	CCC	<i>BnkRtg138</i>	<i>TPEIR GA</i>	<i>16-03-10</i>	<i>BBB *-</i>	<i>BBB</i>
BnkRtg95	ETE GA	15-06-11	B *-	CCC	BnkRtg139	RF US	11-03-10	BBB	BBB-
BnkRtg96	TPEIR GA	15-06-11	B *-	CCC	<i>BnkRtg140</i>	<i>BP IM</i>	<i>10-03-10</i>	<i>A- *-</i>	<i>A-</i>
<i>BnkRtg97</i>	<i>BCP PL</i>	<i>14-06-11</i>	<i>BBB- *-</i>	<i>BBB-</i>	BnkRtg141	STI US	01-02-10	BBB+	BBB
BnkRtg98	ACA FP	20-05-11	AA-	A+	BnkRtg142	BKIR ID	26-01-10	A *-	A-
BnkRtg99	ALPHA GA	11-05-11	B+ *-	B *-	BnkRtg143	ALPHA GA	17-12-09	BBB+	BBB *-
BnkRtg100	EUROB GA	11-05-11	B+ *-	B *-	BnkRtg144	BP IM	17-12-09	A-	A- *-
BnkRtg101	ETE GA	11-05-11	B+ *-	B *-	BnkRtg145	EUROB GA	17-12-09	BBB+	BBB *-
BnkRtg102	TPEIR GA	11-05-11	B+ *-	B *-	BnkRtg146	ETE GA	17-12-09	BBB+	BBB+ *-
BnkRtg103	ALPHA GA	31-03-11	BB *-	B+ *-	BnkRtg147	TPEIR GA	17-12-09	BBB	BBB *-
BnkRtg104	BPI PL	31-03-11	BBB *-	BBB-	BnkRtg148	RF US	04-11-09	BBB+	BBB
BnkRtg105	BES PL	31-03-11	BBB *-	BBB-	BnkRtg149	BMPS IM	01-10-09	A	A-
BnkRtg106	EUROB GA	31-03-11	BB *-	B+ *-	BnkRtg150	BCP PL	30-07-09	A	A-
BnkRtg107	ETE GA	31-03-11	BB+ *-	B+ *-	BnkRtg151	POP SM	10-07-09	A+	A
BnkRtg108	TPEIR GA	31-03-11	BB *-	B+ *-	BnkRtg152	BBT US	17-06-09	A+ *-	A
BnkRtg109	BPI PL	28-03-11	A- *-	BBB *-	BnkRtg153	COF US	17-06-09	BBB+ *-	BBB
BnkRtg110	BCP PL	28-03-11	BBB+ *-	BBB- *-	BnkRtg154	FITB US	17-06-09	A- *-	BBB
BnkRtg111	BES PL	28-03-11	A- *-	BBB *-	BnkRtg155	KEY US	17-06-09	A- *-	BBB+
BnkRtg112	POP SM	22-02-11	A	A-	<i>BnkRtg156</i>	<i>PNC US</i>	<i>17-06-09</i>	<i>A *-</i>	<i>A</i>
BnkRtg113	BKIR ID	02-02-11	BBB+ *-	BB+ *-	BnkRtg157	RF US	17-06-09	A *-	BBB+
BnkRtg114	ALPHA GA	03-12-10	BB	BB *-	BnkRtg158	USB US	17-06-09	AA *-	A+
BnkRtg115	BPI PL	03-12-10	A-	A- *-	BnkRtg159	WFC US	17-06-09	AA *-	AA-
BnkRtg116	BCP PL	03-12-10	BBB+	BBB+ *-	BnkRtg160	BAC US	08-05-09	A *-	A
BnkRtg117	BES PL	03-12-10	A-	A- *-	<i>BnkRtg161</i>	<i>C US</i>	<i>08-05-09</i>	<i>A *-</i>	<i>A</i>
BnkRtg118	EUROB GA	03-12-10	BB	BB *-	<i>BnkRtg162</i>	<i>GLE FP</i>	<i>07-05-09</i>	<i>AA-</i>	<i>A+</i>
BnkRtg119	ETE GA	03-12-10	BB+	BB+ *-	BnkRtg163	BAC US	04-05-09	A	A *-
BnkRtg120	TPEIR GA	03-12-10	BB	BB *-	BnkRtg164	BBT US	04-05-09	A+	A+ *-
BnkRtg121	BKIR ID	26-11-10	A-	BBB+ *-	BnkRtg165	COF US	04-05-09	BBB+	BBB+ *-

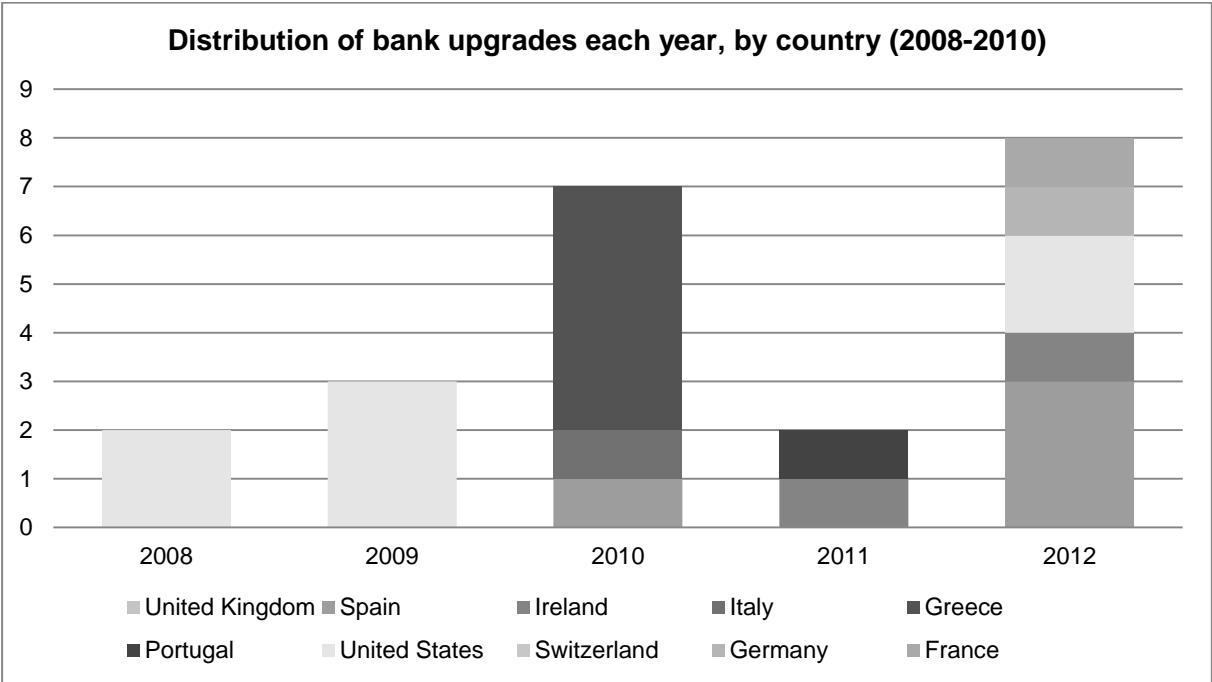
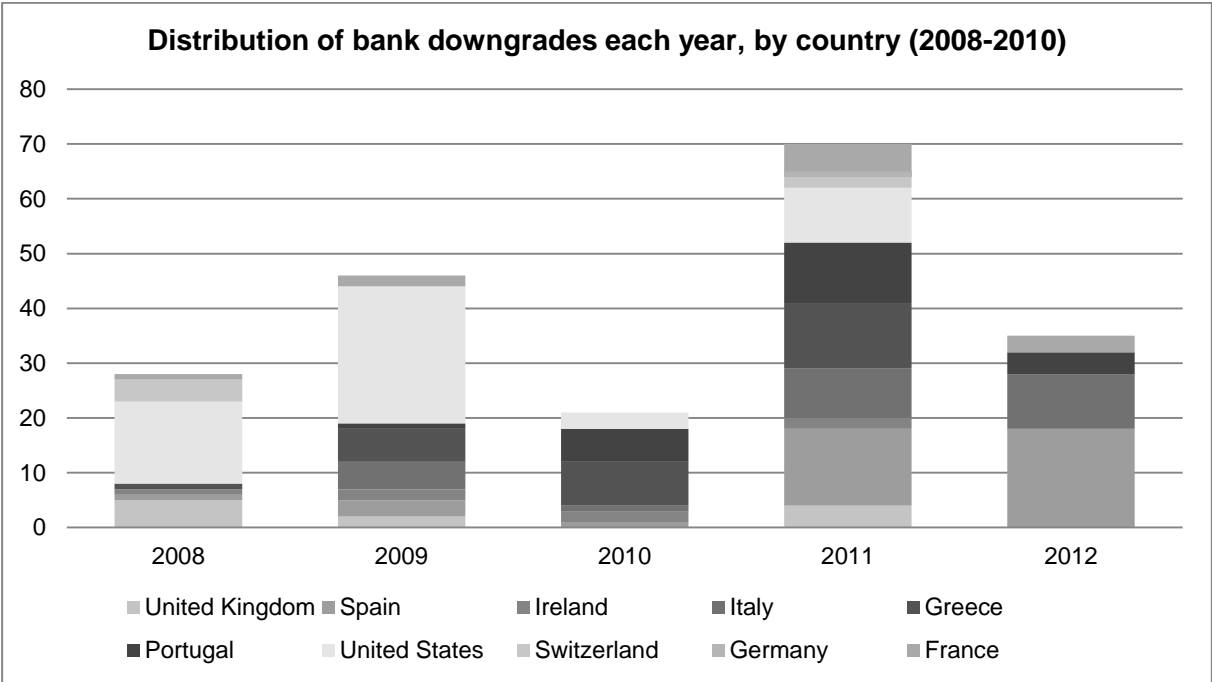
Event	Bank	Date	Previous	New
BnkRtg166	C US	04-05-09	A	A *-
BnkRtg167	EUROB GA	04-05-09	A-	BBB+
BnkRtg168	FITB US	04-05-09	A-	A- *-
BnkRtg169	KEY US	04-05-09	A-	A- *-
BnkRtg170	TPEIR GA	04-05-09	BBB+	BBB
BnkRtg171	PNC US	04-05-09	A	A *-
BnkRtg172	RF US	04-05-09	A	A *-
BnkRtg173	USB US	04-05-09	AA	AA *-
BnkRtg174	WFC US	04-05-09	AA	AA *-
BnkRtg175	BKIR ID	01-05-09	A	A *-
BnkRtg176	AXP US	30-04-09	A *-	BBB+
BnkRtg177	STI US	28-04-09	A	BBB+
BnkRtg178	BP IM	26-03-09	A *-	A-
BnkRtg179	AXP US	19-03-09	A	A *-
BnkRtg180	UCG IM	18-03-09	A+	A
BnkRtg181	LLOY LN	06-03-09	A+	A
BnkRtg182	SAB SM	04-03-09	A+	A
BnkRtg183	POP SM	04-03-09	AA-	A+
BnkRtg184	BAC US	03-03-09	A+	A
BnkRtg185	BP IM	20-02-09	A	A *-
BnkRtg186	BKIR ID	12-02-09	A+ *-	A
BnkRtg187	BNP FP	28-01-09	AA+ *-	AA
BnkRtg188	STI US	27-01-09	A+	A
BnkRtg189	STT US	20-01-09	AA-	A+
BnkRtg190	LLOY LN	14-01-09	AA- *-	A+
BnkRtg191	PNC US	07-01-09	A+ *-	A
BnkRtg192	ALPHA GA	19-12-08	A-	BBB+
BnkRtg193	AXP US	19-12-08	A+ *-	A
BnkRtg194	BAC US	19-12-08	AA- *-	A+
BnkRtg195	BARC LN	19-12-08	AA- *-	A+
BnkRtg196	C US	19-12-08	AA- *-	A
BnkRtg197	CSGN VX	19-12-08	A+ *-	A
BnkRtg198	FITB US	19-12-08	A+ *-	A-
BnkRtg199	GS US	19-12-08	AA-	A
BnkRtg200	JPM US	19-12-08	AA-	A+
BnkRtg201	MS US	19-12-08	A+	A
BnkRtg202	RBS LN	19-12-08	A+	A
BnkRtg203	UBSN VX	19-12-08	AA- *-	A+
BnkRtg204	WFC US	19-12-08	AA+ *-	AA
BnkRtg205	BNP FP	17-12-08	AA+	AA+ *-
BnkRtg206	CSGN VX	04-12-08	A+	A+ *-
BnkRtg207	BKIR ID	14-11-08	A+	A+ *-
BnkRtg208	PNC US	24-10-08	A+	A+ *-
BnkRtg209	AXP US	21-10-08	A+	A+ *-

Event	Bank	Date	Previous	New
BnkRtg210	UBSN VX	17-10-08	AA-	AA- *-
BnkRtg211	RBS LN	06-10-08	AA-	A+
BnkRtg212	WFC US	03-10-08	AA+	AA+ *-
BnkRtg213	POP SM	02-10-08	AA	AA-
BnkRtg214	C US	29-09-08	AA-	AA- *-
BnkRtg215	LLOY LN	18-09-08	AA-	AA- *-
BnkRtg216	BARC LN	17-09-08	AA-	AA- *-
BnkRtg217	BAC US	15-09-08	AA	AA- *-
BnkRtg218	FITB US	03-09-08	A+	A+ *-
<i>BnkRtg219</i>	<i>BK US</i>	<i>27-06-08</i>	A+	AA-
<i>BnkRtg220</i>	<i>C US</i>	<i>02-06-08</i>	AA- *-	AA-
BnkRtg221	MS US	02-06-08	AA-	A+

Source: Bloomberg; retrieved on April 7, 2013.

**Summary of Bank Rating changes**

	<b>Downgrades</b>	<b>Upgrades</b>	<b>Total</b>
2008	28	2	30
2009	46	3	49
2010	22	7	29
2011	70	2	72
2012	34	8	42



## Appendix 4 – Sovereign rating changes description

List of the 54 rating changes by S&P to the countries in the sample (Long term Foreign Currency Debt) included in the event study. Upgrades are indicated in italics, no changes underlined (rating reaffirmation); \*+ denotes a positive watch, \*- denotes a negative watch, u denotes an unsolicited rating.

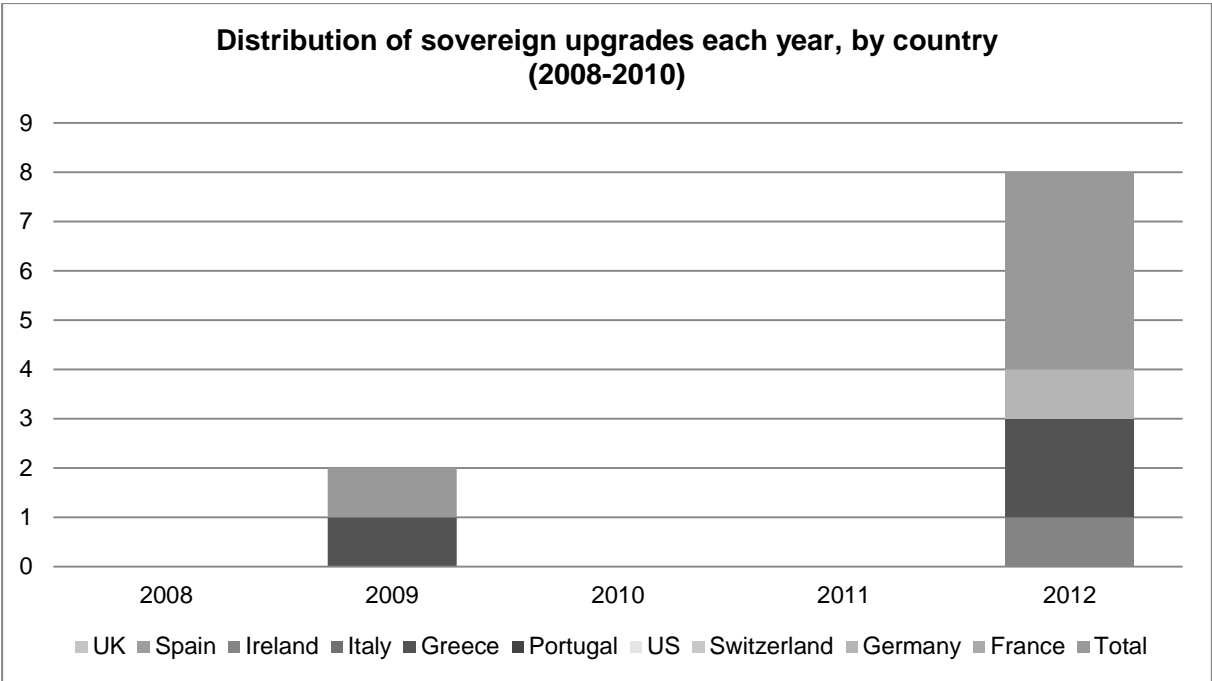
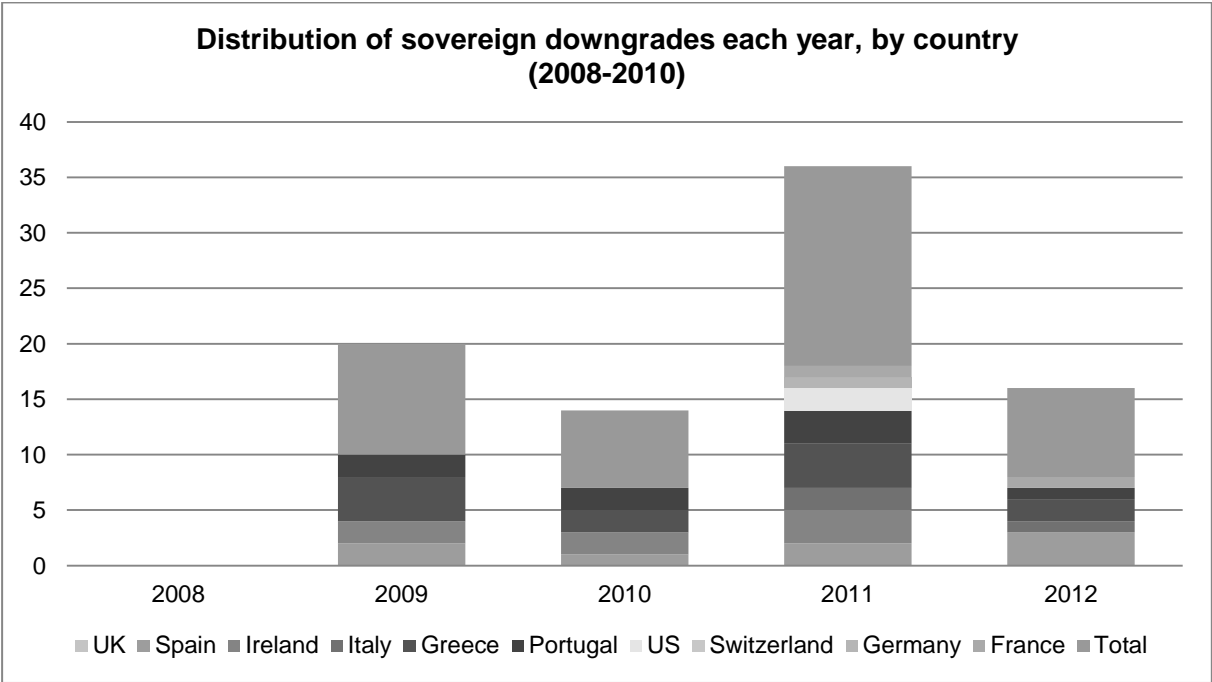
Event	Country	Date	Previous	New
<i>CtryRtg1</i>	<i>Greece</i>	<i>18-12-12</i>	<i>SD</i>	<i>B-</i>
CtryRtg2	Greece	05-12-12	CCC	SD
CtryRtg3	Spain	10-10-12	BBB+	BBB-
<i>CtryRtg4</i>	<i>Greece</i>	<i>02-05-12</i>	<i>SD</i>	<i>CCC</i>
CtryRtg5	Spain	26-04-12	A	BBB+
CtryRtg6	Greece	27-02-12	CC	SD
CtryRtg7	Spain	13-01-12	AA- *-	A
<i>CtryRtg8</i>	<i>Ireland</i>	<i>13-01-12</i>	<i>BBB+ *-</i>	<i>BBB+</i>
CtryRtg9	Italy	13-01-12	Au *-	BBB+u
CtryRtg10	Portugal	13-01-12	BBB- *-	BB
<i>CtryRtg11</i>	<i>Germany</i>	<i>13-01-12</i>	<i>AAAu *-</i>	<i>AAAu</i>
CtryRtg12	France	13-01-12	AAAu *-	AA+u
CtryRtg13	Spain	05-12-11	AA-	AA- *-
CtryRtg14	Ireland	05-12-11	BBB+	BBB+ *-
CtryRtg15	Italy	05-12-11	Au	Au *-
CtryRtg16	Portugal	05-12-11	BBB-	BBB- *-
CtryRtg17	Germany	05-12-11	AAAu	AAAu *-
CtryRtg18	France	05-12-11	AAAu	AAAu *-
CtryRtg19	Spain	13-10-11	AA	AA-
CtryRtg20	Italy	19-09-11	A+u	Au
CtryRtg21	US	05-08-11	AAAu *-	AA+u
CtryRtg22	Greece	27-07-11	CCC	CC
CtryRtg23	US	14-07-11	AAAu	AAAu *-
CtryRtg24	Greece	13-06-11	B *-	CCC
CtryRtg25	Greece	09-05-11	BB- *-	B *-
CtryRtg26	Ireland	01-04-11	A- *-	BBB+
CtryRtg27	Greece	29-03-11	BB+ *-	BB- *-
CtryRtg28	Portugal	29-03-11	BBB *-	BBB-
CtryRtg29	Portugal	24-03-11	A- *-	BBB *-
<u>CtryRtg30</u>	<u>US</u>	<u>24-02-11</u>	<u>AAA</u>	<u>AAAu</u>
<u>CtryRtg31</u>	<u>UK</u>	<u>17-02-11</u>	<u>AAA</u>	<u>AAAu</u>
<u>CtryRtg32</u>	<u>Italy</u>	<u>17-02-11</u>	<u>A+</u>	<u>A+u</u>
<u>CtryRtg33</u>	<u>Switzerland</u>	<u>17-02-11</u>	<u>AAA</u>	<u>AAAu</u>
<u>CtryRtg34</u>	<u>Germany</u>	<u>17-02-11</u>	<u>AAA</u>	<u>AAAu</u>
<u>CtryRtg35</u>	<u>France</u>	<u>17-02-11</u>	<u>AAA</u>	<u>AAAu</u>
CtryRtg36	Ireland	02-02-11	A *-	A- *-
CtryRtg37	Greece	02-12-10	BB+	BB+ *-
CtryRtg38	Ireland	23-11-10	AA-	A *-
CtryRtg39	Portugal	20-11-10	A-	A- *-
CtryRtg40	Ireland	24-08-10	AA	AA-
CtryRtg41	Spain	28-04-10	AA+	AA

Event	Country	Date	Previous	New
CtryRtg42	Greece	27-04-10	BBB+	BB+
CtryRtg43	Portugal	27-04-10	A+	A-
<i>CtryRtg44</i>	<i>Greece</i>	<i>16-03-10</i>	<i>BBB+ *-</i>	<i>BBB+</i>
CtryRtg45	Greece	16-12-09	A- *-	BBB+ *-
CtryRtg46	Greece	07-12-09	A-	A- *-
CtryRtg47	Ireland	08-06-09	AA+	AA
CtryRtg48	Ireland	30-03-09	AAA	AA+
CtryRtg49	Portugal	21-01-09	AA- *-	A+
CtryRtg50	Spain	19-01-09	AAA *-	AA+
CtryRtg51	Greece	14-01-09	A *-	A-
CtryRtg52	Portugal	13-01-09	AA-	AA- *-
CtryRtg53	Spain	12-01-09	AAA	AAA *-
CtryRtg54	Greece	09-01-09	A	A *-

Source: Bloomberg; retrieved on April 7, 2013.

**Summary of Sovereign Rating changes**

	Downgrades	Upgrades	Neutral	All
2008	0	0	0	0
2009	10	1	0	11
2010	7	0	0	7
2011	18	0	6	24
2012	8	4	0	12



## Appendix 5 – List of event clusters

Cluster	Situation
1	BnkRtg0 and CtryRtg2 happen on the same day, 05-12-2012.
2	On 23-11-2012, three Spanish banks have their rating changed: two are upgraded (BnkRtg1 and BnkRtg2), the other is downgraded (BnkRtg3).
3	Five Spanish banks are downgraded on the same day, 16-10-2012 (BnkRtg5 to BnkRtg9). They are preceded by a Spanish sovereign rating downgrade on 10-10-2012 (CtryRtg3)
4	Two Italian banks are downgraded on the same day, 03-08-2012 (BnkRtg12 and BnkRtg13). On 08-08-2012, a Spanish Bank is downgraded (BnkRtg11).
5	Two Spanish banks are downgraded (BnkRtg16 and BnkRtg17) and one is upgraded (BnkRtg15) on 25-05-2012.
6	A Spanish sovereign rating downgrade on 26-04-2012 (CtryRtg5) is followed by four Spanish bank downgrades on 30-04-2012 (BnkRtg18 to BnkRtg21). Greece is upgraded on 02-05-2012.
7	On 10-02-2012, all Italian banks are downgraded (BnkRtg31 to BnkRtg35). On 13-02-2012, all Spanish banks are downgraded (BnkRtg26 to BnkRtg30). On 14-02-2012, all Portuguese banks are downgraded (BnkRtg23 to BnkRtg25).
8	On 20-01-2012, the Irish Bank is upgraded (BnkRtg41). On 23-01-2012, two French banks are downgraded (BnkRtg39 and BnkRtg40), the other is upgraded (BnkRtg39). On 25-01-2012, a German Bank is upgraded (BnkRtg37). <i>Close to Cluster 9</i>
9	Six countries are downgraded on 13-01-2012: Spain, Ireland, Italy, Portugal, Germany and France (CtryRtg7 to CtryRtg12).
10	Three Spanish banks (BnkRtg45 to BnkRtg47) are downgraded on 15-12-2011. All Portuguese banks (BnkRtg42 to BnkRtg44) are downgraded on 16-12-2011. <i>Close to Cluster 11</i>
11	On 05-12-2011, six countries are downgraded: Spain, Ireland, Italy, Portugal, Germany and France (CtryRtg13 to CtryRtg18), similarly to cluster 9. On 06-12-2011, three American banks (BnkRtg65 to BnkRtg67) are downgraded. On 07-12-2011, there are 12 bank downgrades: all the Italian (BnkRtg53, BnkRtg57, BnkRtg61, BnkRtg63 and BnkRtg64); all the Portuguese (BnkRtg54 to BnkRtg56); all the French (BnkRtg58, BnkRtg60 and BnkRtg62); a German (BnkRtg59). On 08-12-2011, all Spanish banks are downgraded (BnkRtg48 to 52).
12	On 29-11-2011, 13 banks are downgraded: a Spanish (BnkRtg68); seven American (BnkRtg69, BnkRtg70, BnkRtg72, BnkRtg73, BnkRtg75, BnkRtg77 and BnkRtg80); all English (BnkRtg71, BnkRtg74, BnkRtg76 and BnkRtg78); a Swiss (BnkRtg79).
13	On 11-10-2011, all Spanish banks are downgraded (BnkRtg85 to BnkRtg89). On 13-10-2011, Spain is downgraded (CtryRtg19) – the exception where banks are downgraded immediately before the country and not the other way around. On 14-10-2011, a French bank is downgraded (BnkRtg84). On 18-10-2011, three Italian banks are downgraded (BnkRtg81 to BnkRtg83).
14	On 16-09-2011, a Swiss bank is downgraded (BnkRtg91). On 19-09-2011, Italy is downgraded (CtryRtg20).
15	On 11-07-2011, the Irish bank is upgraded (BnkRtg92). On 14-07-2011, the United States are downgraded (CtryRtg23).
16	On 13-06-2011, Greece is downgraded (CtryRtg24). On 14-06-2011, a Portuguese bank (BnkRtg97) and four Greek banks (BnkRtg93 to BnkRtg96) are downgraded, similarly to what happens in cluster 23.
17	On 09-05-2011, Greece is downgraded (CtryRtg25).

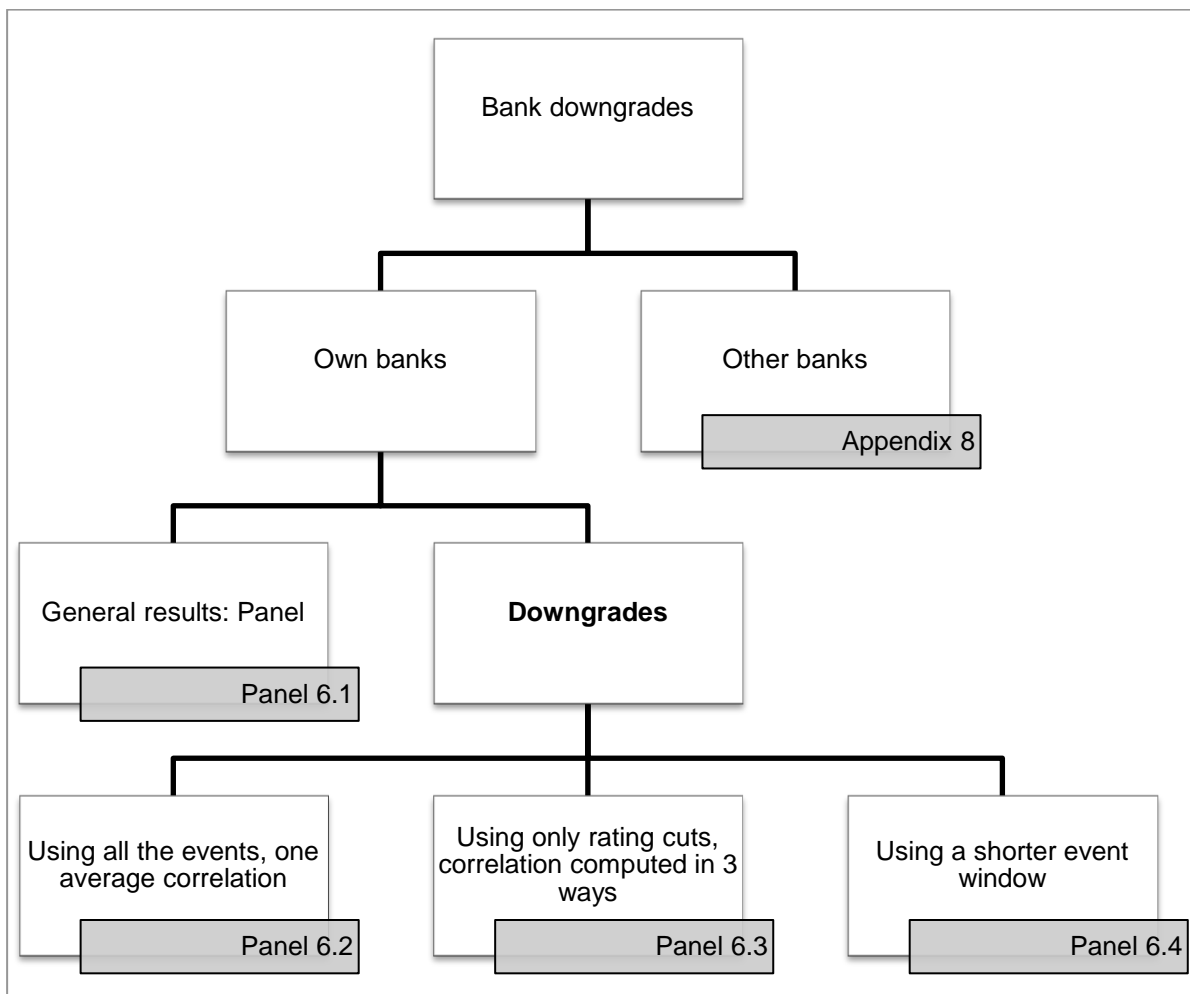


	On 11-05-2011, four Greek banks are downgraded (BnkRtg99 to BnkRtg102) - similarly to what happens in cluster 23.
18	On 24-03-2011, Portugal is downgraded (CtryRtg29). On 28-03-2011, all Portuguese banks are downgraded (BnkRtg109 to BnkRtg111). On 29-03-2011, Portugal and Greece are downgraded (CtryRtg27 and CtryRtg28). On 31-03-2011, four Greek banks (BnkRtg103, BnkRtg106 to BnkRtg108) and two Portuguese banks (BnkRtg104, BnkRtg106): similarly to what had happens in cluster 23.
19	On 17-02-2011, the ratings of France, Germany, Switzerland, Italy and the United Kingdom are reaffirmed (CtryRtg31 to CtryRtg35). On 22-02-2011, a Spanish bank is downgraded (BnkRtg112). On 24-02-2011, the American rating is reaffirmed (CtryRtg30).
20	On 02-02-2011, both Ireland and the Irish bank are downgraded (CtryRtg36 and BnkRtg113).
21	On 02-12-2010, Greece is downgraded (CtryRtg37). The next day, four Greek banks (BnkRtg114 and BnkRtg118 to BnkRtg120) and all Portuguese banks (BnkRtg115 to BnkRtg118) are downgraded, similarly to what happens in cluster 23.
22	On 20-11-2010, Portugal is downgraded (CtryRtg39). On 23-11-2010, Ireland (CtryRtg38) and an American bank (BnkRtg122) are downgraded. On 26-11-2010, the Irish bank is downgraded (BnkRtg121).
23	On 23-03-2010, an Italian bank is downgraded (BnkRtg134). On 27-04-2010, Greece and Portugal (CtryRtg42 and CtryRtg43), as well as four Greek banks (BnkRtg127 and BnkRtg131 to BnkRtg133) and all Portuguese banks (BnkRtg128 to BnkRtg130) are downgraded. On 28-04-2010, Spain is downgraded (28-04-2010).
24	On 10-03-2010, an Italian bank is upgraded (BnkRtg140). On 11-03-2010, an American bank is downgraded (BnkRtg139). On 16-03-2010, Greece (CtryRtg44) and four Greek banks (BnkRtg135 to BnkRtg138) are downgraded.
25	On 16-12-2009, Greece is downgraded. The next day, four Greek banks (BnkRtg143 and BnkRtg145 to BnkRtg147) as well as an Italian bank (BnkRtg144) are downgraded.
26	On 17-06-2009, eight American banks have their ratings changed: one receives an upgrade (BnkRtg156) and the other are downgraded (BnkRtg152 to BnkRtg155 and BnkRtg157 to BnkRtg159).
27	On 08-05-2009, two American banks are upgraded (BnkRtg160 and BnkRtg161).
28	On 04-05-2009, fifteen banks are downgraded: twelve American (BnkRtg163 to BnkRtg166, BnkRtg168 to BnkRtg169, BnkRtg171 to BnkRtg174 and BnkRtg176 to BnkRtg177); two Greek (BnkRtg167 and BnkRtg170); one French (BnkRtg 162); the Irish (BnkRtg175).
29	On 18-03-2009, an Italian bank is downgraded (BnkRtg180). The next day, an American bank is downgraded (BnkRtg179). On 26-03-2009, another Italian bank is downgraded (BnkRtg178). On 30-03-2009, Ireland is downgraded (CtryRtg48).
30	On 03-03-2009, an American bank is downgraded (BnkRtg184). The next day, two Spanish banks are downgraded (BnkRtg182 and BnkRtg183). On 06-03-2009, a British bank is downgraded (BnkRtg181).
31	On 07-01-2009, an American bank is downgraded (BnkRtg191). On 09-01-2009, Greece is downgraded (CtryRtg54). On 12-01-2009, Spain is downgraded (CtryRtg53). The next day, Portugal is downgraded (CtryRtg52). On 14-01-2009, Greece (CtryRtg51) and a British bank (BnkRtg190) are downgraded.

	<p>On 19-01-2009, Spain is downgraded.</p> <p>On 20-01-2009, another American bank is downgraded (BnkRtg189).</p> <p>On 21-01-2009, Portugal is downgraded (CtryRtg49).</p> <p>Six days later, yet another American bank is downgraded (BnkRtg188).</p> <p>Finally, on 28-01-2009, a French bank is downgraded (BnkRtg187).</p>
32	<p>On 18-12-2008, a French bank is downgraded (BnkRtg205).</p> <p>The next day, thirteen other banks are downgraded: eight American (BnkRtg193 to BnkRtg194, BnkRtg196, BnkRtg198 to BnkRtg201 and BnkRtg204); two British (BnkRtg195 and BnkRtg202); all the Swiss (BnkRtg197 and BnkRtg203); a Greek (BnkRtg192).</p>
33	<p>On 17-10-2008, a Swiss bank is downgraded (BnkRtg2010).</p> <p>On 21-10-2008, an American bank is downgraded (BnkRtg209).</p> <p>Three days later, another American bank is downgraded (BnkRtg208).</p> <p><i>Close to clusters 34 and 35.</i></p>
34	<p>On 29-09-2008, an American bank is downgraded (BnkRtg214).</p> <p>On 02-10-2008, a Spanish bank is downgraded (BnkRtg213).</p> <p>The next day, another American bank is downgraded (BnkRtg212).</p> <p>On 06-10-2008, a British bank is downgraded (BnkRtg211).</p> <p><i>Close to cluster 35.</i></p>
35	<p>On 15-09-2008, an American bank is downgraded (BnkRtg217).</p> <p>On 17-09-2008, a British bank is downgraded (BnkRtg216).</p> <p>The next day, another British bank is downgraded (BnkRtg215).</p>
36	<p>On 02-06-2008, two American banks have their ratings changed: one receives an upgrade (BnkRtg220), the other a downgrade (BnkRtg221).</p>

## Appendix 6 – Results for Q1 (Own banks' effect)

### Map of results



### Reference values

Confidence level	Test statistic	Value
1%	$t_{97}^{0.005}$	2.63
5%	$t_{97}^{0.025}$	1.98
10%	$t_{97}^{0.05}$	1.66

*Relevant for appendices 7 and 8 as well*

## Panel Appendix 6.1 – General results for banks' own effect

Methodology used: simple variance and test statistics, without grouping by days or countries. Number of observations: 200 downgrades (results on the left); 22 upgrades (results on the right).

### Downgrades

#### Abnormal Returns

Day	AR	t <sub>AB</sub>
-10	-0.94%	-1.11
-9	1.39%	**2.49
-8	-0.80%	-1.32
-7	0.72%	1.18
-6	0.19%	0.13
-5	-0.35%	-0.70
-4	0.02%	-0.05
-3	0.57%	0.58
-2	0.36%	0.99
-1	-0.06%	-0.19
0	-0.33%	-0.71
1	0.20%	0.19
2	1.61%	1.28
3	0.18%	0.14
4	1.42%	**2.15
5	0.02%	0.60
6	0.40%	0.55
7	-0.29%	-0.72
8	0.77%	1.43
9	1.23%	0.72
10	0.73%	0.68

### Upgrades

#### Abnormal Returns

Day	AR	t <sub>AB</sub>
-10	1.24%	0.91
-9	0.73%	0.35
-8	-0.95%	-0.83
-7	1.46%	1.20
-6	0.60%	1.37
-5	-0.05%	-0.24
-4	2.12%	1.64
-3	0.26%	0.06
-2	2.87%	**2.40
-1	1.39%	1.31
0	0.35%	0.91
1	-0.65%	-0.38
2	-1.07%	-1.06
3	0.90%	0.82
4	0.63%	0.95
5	-0.18%	-0.32
6	1.22%	**2.29
7	1.40%	1.04
8	1.03%	*1.74
9	0.21%	0.18
10	0.24%	-0.07

#### Cumulative Abnormal Returns

Day	CAR	t <sub>AB</sub>
-3	0.57%	0.75
-2	0.92%	1.11
-1	0.87%	1.02
0	0.53%	0.32
1	0.73%	0.41
2	2.34%	0.83
3	2.52%	1.11

#### Cumulative Abnormal Returns

Day	CAR	t <sub>AB</sub>
-3	0.26%	0.27
-2	3.13%	*1.87
-1	4.52%	*1.95
0	4.87%	1.66
1	4.23%	1.62
2	3.15%	0.79
3	4.05%	1.31

T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

## Panel 6.2.A – Effect of a rating cut in the bank’s equity price

Methodologies used: simple variance and test statistics, without grouping by blocks of days or countries. Number of observations: 141 (number of rating cuts).

### Abnormal Returns

Day	AR	t <sub>AB</sub> without blocks	t <sub>AB</sub> with country blocks
-10	-0.22%	-0.83	-0.81
-9	1.36%	***2.71	***2.67
-8	1.36%	-1.30	-1.40
-7	0.30%	0.84	0.85
-6	0.09%	0.22	0.14
-5	0.06%	-0.34	-0.33
-4	0.52%	0.76	0.71
-3	0.06%	0.00	0.08
-2	0.19%	0.10	0.23
-1	0.02%	0.14	0.13
0	-1.36%	-1.50	-1.46
1	0.40%	0.47	0.43
2	0.48%	0.18	0.23
3	0.37%	0.37	0.26
4	1.22%	**2.04	**2.37
5	0.31%	1.18	1.27
6	0.92%	0.83	0.91
7	-0.10%	-1.00	-1.05
8	0.61%	1.04	1.23
9	1.33%	0.58	0.53
10	0.39%	0.68	0.76

### Cumulative Abnormal Returns

Day	CAR	t <sub>AB</sub> without blocks	t <sub>AB</sub> with country blocks
-3	0.06%	0.16	0.25
-2	0.25%	0.10	0.12
-1	0.27%	0.17	0.30
0	-1.09%	-0.24	-0.42
1	-0.69%	-0.16	-0.34
2	-0.21%	-0.15	-0.22
3	0.16%	0.08	0.18

*T*-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

## Panel 6.2.B – Effect of a rating cut of at least 2 notches in the bank’s equity price

Methodology used: simple variance and test statistics, without grouping by blocks of days or countries.  
 Number of observations: 38 (number of rating cuts of at least 2 notches).

### Abnormal Returns

Day	AR	t <sub>AB</sub> without blocks
-10	1.46%	0.31
-9	1.35%	0.33
-8	-0.11%	-0.07
-7	1.51%	0.33
-6	-0.73%	-0.06
-5	1.00%	0.07
-4	0.53%	0.03
-3	0.29%	0.06
-2	-1.02%	-0.26
-1	-0.22%	-0.08
0	-1.59%	-0.25
1	0.41%	0.04
2	1.97%	0.18
3	-0.26%	-0.15
4	2.48%	0.43
5	-0.70%	0.03
6	0.45%	0.02
7	-0.19%	-0.04
8	1.09%	0.24
9	1.45%	0.12
10	-0.76%	-0.12

### Cumulative Abnormal Returns

Day	CAR	t <sub>AB</sub> without blocks
-3	0.29%	0.01
-2	-0.73%	-0.16
-1	-0.95%	-0.15
0	-2.55%	-0.27
1	-2.14%	-0.28
2	-0.17%	-0.11
3	-0.42%	-0.17

*T*-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

### Panel 6.3 – Effect of a downgrade on the bank's equity price, by country

#### Abnormal Returns

	Greece		Portugal		United States		Switzerland		France	
# events	28		22		53		6		11	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	-0.68%	-0.38	2.01%	**2.21	-3.62%	-1.07	-0.21%	-0.38	0.90%	1.26
-9	0.30%	0.51	0.15%	0.07	4.11%	**2.22	0.04%	0.42	1.28%	1.04
-8	0.52%	0.28	-0.23%	-0.63	-3.36%	**2.59	1.41%	0.48	0.69%	1.07
-7	-0.25%	-0.06	-0.50%	-0.74	1.29%	0.28	0.65%	0.71	1.19%	1.27
-6	-2.23%	-1.95	0.12%	-0.20	0.55%	0.37	0.93%	1.24	-1.35%	-0.86
-5	0.32%	-0.04	1.37%	0.91	-0.50%	-0.45	-1.40%	-1.09	-0.16%	-0.64
-4	-1.86%	-1.14	-0.47%	-1.16	0.58%	0.49	0.51%	0.71	0.22%	-0.19
-3	-0.58%	-0.46	-0.46%	-1.01	2.16%	0.83	0.51%	0.79	0.80%	0.97
-2	0.11%	0.12	-0.46%	0.08	-0.37%	-0.30	-0.16%	0.32	4.14%	1.66
-1	1.32%	0.62	-0.77%	-1.01	-0.15%	0.21	-3.02%	-0.80	1.85%	1.61
0	-1.58%	-0.94	-1.15%	-1.49	0.50%	0.10	1.31%	0.49	-0.66%	-0.64
1	0.22%	0.00	-0.29%	-0.91	2.22%	1.56	-1.29%	-1.27	-1.56%	-1.65
2	3.15%	1.26	0.96%	1.23	2.93%	0.78	2.22%	0.78	-0.39%	-0.11
3	0.46%	0.20	0.73%	0.57	-0.10%	0.09	2.41%	***4.61	-0.19%	0.19
4	3.72%	3.02	-0.04%	0.37	3.43%	1.18	-0.08%	-0.36	-0.92%	-1.08
5	-1.48%	-0.47	0.11%	0.52	-0.60%	-0.07	4.93%	***2.69	-1.02%	-0.81
6	-1.65%	*-1.83	1.19%	0.62	1.58%	1.47	-1.15%	-1.16	0.43%	-0.10
7	-0.62%	-0.49	-0.69%	-0.46	-0.88%	-0.42	-0.59%	-0.41	2.24%	1.09
8	-0.48%	-0.72	1.21%	**2.16	1.97%	*1.73	1.28%	1.17	1.65%	1.12
9	3.48%	**2.32	1.12%	0.49	1.13%	0.09	1.15%	1.24	2.77%	1.63
10	0.72%	0.39	0.30%	0.03	1.34%	0.71	-0.20%	-0.13	-0.76%	-0.22

#### Abnormal Returns

	Greece		Portugal		United States		Switzerland		France	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	-0.58%	0.04	-0.46%	-1.34	2.16%	0.72	0.51%	0.82	0.80%	1.05
-2	-0.46%	-0.27	-0.92%	-0.83	1.79%	0.64	0.35%	0.78	4.94%	*1.96
-1	0.86%	0.61	-1.70%	-1.19	1.64%	0.62	-2.67%	0.11	6.78%	*1.97
0	-0.72%	-0.11	-2.84%	*-1.93	2.14%	0.54	-1.36%	0.51	6.12%	1.06
1	-0.50%	-0.66	-3.14%	*-1.91	4.36%	1.46	-2.64%	0.22	4.56%	0.71
2	2.65%	0.37	-2.17%	-1.43	7.29%	1.39	-0.43%	0.51	4.17%	0.79
3	3.11%	0.41	-1.44%	-1.09	7.19%	1.52	1.98%	1.28	3.98%	0.88

T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

Panel continues on the next page

**Abnormal Returns**

	United Kingdom		Spain		Ireland		Italy	
# events	11		37		7		24	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	-1.29%	**2.00	-0.62%	**2.10	1.08%	-0.55	-0.32%	-0.57
-9	-0.23%	0.19	0.40%	0.85	0.49%	1.29	0.58%	1.02
-8	1.22%	0.07	-0.33%	-0.34	1.21%	1.29	-0.83%	-0.35
-7	1.55%	0.41	0.21%	1.20	1.30%	1.30	1.89%	1.93
-6	0.89%	-0.06	0.21%	0.48	1.13%	0.75	2.19%	**2.06
-5	-5.77%	**2.39	-0.03%	-0.16	-3.36%	*1.71	0.77%	1.06
-4	-0.92%	-1.35	0.28%	0.32	-0.21%	0.88	1.44%	1.36
-3	0.36%	0.94	0.08%	-0.49	-1.61%	-0.79	0.46%	0.57
-2	1.15%	1.11	-0.10%	0.39	-0.70%	-0.43	2.38%	**2.49
-1	-1.46%	-0.16	-0.47%	**2.03	0.81%	0.68	0.09%	0.32
0	-3.46%	-0.67	0.23%	0.28	0.23%	-0.32	0.15%	-0.60
1	-3.18%	-0.17	-0.41%	-0.16	3.81%	1.00	-0.96%	*1.93
2	2.72%	0.51	-0.07%	-0.36	2.03%	0.08	0.15%	-0.04
3	-3.89%	0.27	-0.50%	-1.54	5.01%	**2.45	1.27%	0.40
4	-3.64%	0.23	0.74%	0.95	-1.47%	**1.93	1.43%	**2.00
5	-0.62%	-0.49	0.62%	1.58	2.93%	0.51	0.48%	0.57
6	0.31%	-0.49	-0.01%	-0.42	-2.17%	-0.88	1.04%	1.61
7	-1.14%	-0.82	0.14%	-0.63	0.52%	-0.14	0.26%	0.00
8	3.44%	*1.77	-0.46%	-1.48	1.36%	0.57	-0.84%	-0.43
9	1.14%	-0.73	-0.68%	**2.36	4.09%	***6.17	0.46%	-0.10
10	7.05%	**2.37	-0.03%	-0.09	-1.03%	-0.28	-0.42%	-0.35

**Cumulative Abnormal Returns**

	United Kingdom		Spain		Ireland		Italy	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	0.36%	0.92	0.08%	-0.08	-1.61%	-1.08	0.46%	0.00
-2	1.51%	1.25	-0.02%	0.47	-2.31%	-0.84	2.85%	1.51
-1	0.05%	0.81	-0.48%	-0.45	-1.50%	-0.56	2.94%	0.78
0	-3.41%	0.23	-0.25%	-0.42	-1.26%	-1.22	3.09%	0.51
1	-6.59%	0.50	-0.66%	-0.52	2.55%	-0.38	2.13%	-0.32
2	-3.88%	0.83	-0.73%	-0.86	4.58%	-0.70	2.28%	-0.21
3	-7.76%	0.82	-1.23%	-1.03	9.59%	0.00	3.55%	0.06



**Panel 6.4 – Effect of a downgrade on the bank’s equity price (shorter event window)**

Methodologies used: country blocks to compute SAR variances and test statistics; sample variance and test statistics. Number of observations: 141 (number of rating cuts).

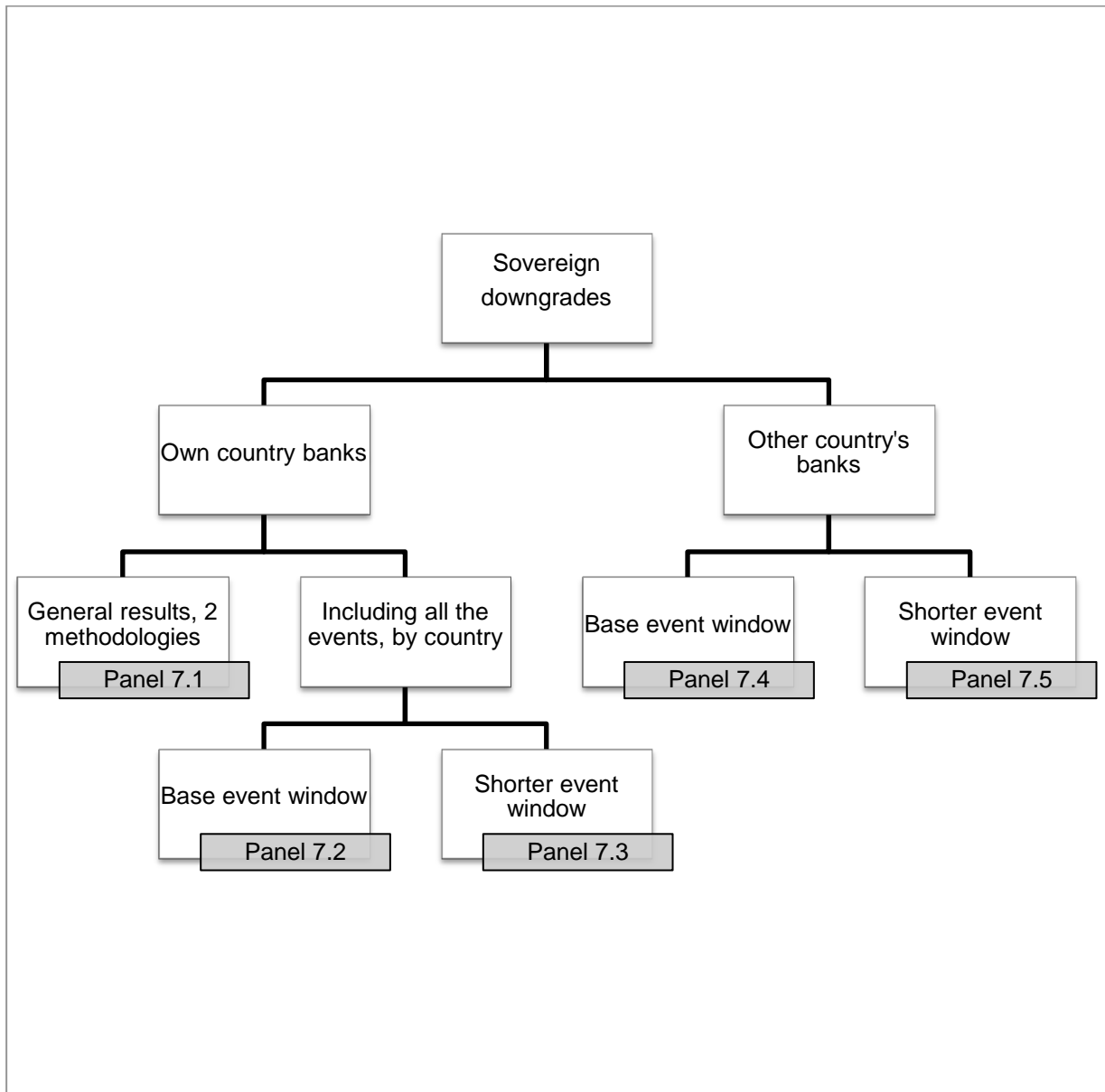
<b>Abnormal Returns</b>			
Day	AR	t <sub>AB</sub> without blocks	t <sub>AB</sub> with country blocks
-5	0.06%	-0.24	0.34
-4	0.52%	0.61	-0.05
-3	0.06%	0.06	-0.27
-2	0.19%	0.13	-0.66
-1	0.02%	0.01	0.54
0	-1.36%	-1.33	-0.72
1	0.40%	0.30	0.71
2	0.48%	0.03	0.04
3	0.37%	0.35	-0.16
4	1.22%	*1.88	1.17
5	0.31%	1.05	0.77

<b>Cumulative Abnormal Returns</b>			
Day	CAR	t <sub>AB</sub> without blocks	t <sub>AB</sub> with country blocks
-2	0.19%	0.24	-0.15
-1	0.21%	0.21	-0.15
0	-1.15%	-0.61	-0.22
1	-0.75%	-0.35	-0.20
2	-0.27%	-0.12	-0.16

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

## Appendix 7 – Results for Q2 (Sovereign rating changes effect)

### Map of results



### Panel 7.1 – Effect of a sovereign downgrade in the country’s banks

Methodologies used: day blocks to compute SAR variances and test statistics; no blocks to compute variance and statistics. Includes all downgrade events. Number of observations: 198 (43 events).

Day	AR	t <sub>AB</sub> without blocks	t <sub>AB</sub> with day blocks
-10	1.64%	**2.48	***2.69
-9	0.95%	0.92	0.99
-8	-1.27%	1.38	1.30
-7	0.15%	-0.15	-0.14
-6	0.40%	0.30	0.29
-5	-0.41%	0.39	0.35
-4	-1.00%	0.28	0.27
-3	-1.24%	-0.97	-0.80
-2	1.03%	0.83	0.73
-1	-1.00%	0.36	0.32
0	-0.62%	-0.88	-0.73
1	-0.23%	-0.64	-0.83
2	-0.05%	0.70	0.75
3	0.14%	-0.31	-0.34
4	0.75%	**2.59	**2.34
5	1.34%	0.63	0.77
6	0.04%	0.75	0.63
7	-0.51%	0.44	0.40
8	-0.79%	0.70	0.56
9	-0.52%	0.05	0.03
10	1.03%	1.12	1.02

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

## Panel 7.2 – Effect of a sovereign downgrade in the country’s banks, by country

Methodology used: country blocks to compute SAR variances and test statistics; all downgrades.

	France		Italy		Spain	
# events	2 downgrades x 3 banks		3 downgrades x 5 banks		8 downgrades x 5 banks	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	1.58%	0.46	-1.59%	-0.93	0.15%	-0.08
-9	0.21%	-0.04	-1.06%	-0.78	0.23%	0.13
-8	1.90%	0.94	1.41%	0.62	0.02%	0.28
-7	0.09%	0.22	-1.17%	-0.14	0.44%	0.22
-6	-1.50%	-0.58	-5.85%	-2.43	-0.04%	-0.24
-5	0.13%	0.09	-2.88%	-0.69	-0.87%	-0.86
-4	-2.12%	**2.32	-0.83%	0.01	-0.18%	-0.31
-3	0.61%	0.04	2.06%	0.54	-0.52%	-0.25
-2	-0.79%	-0.54	2.88%	0.87	0.39%	0.11
-1	2.94%	0.82	2.98%	0.66	0.03%	0.15
0	1.38%	0.61	1.17%	0.43	-1.24%	-0.93
1	1.67%	0.40	1.17%	0.80	-0.15%	-0.09
2	-0.58%	-0.48	-1.28%	-0.44	-0.36%	-0.41
3	1.30%	0.20	-2.79%	-1.26	-0.48%	-0.36
4	5.76%	**2.14	5.20%	1.24	0.47%	1.18
5	1.15%	0.55	0.61%	0.14	0.11%	-0.29
6	2.70%	0.52	3.80%	1.07	-0.30%	-0.34
7	-3.37%	-1.84	0.60%	0.15	0.88%	0.45
8	-1.19%	-0.22	4.15%	1.27	1.52%	0.88
9	-0.16%	-0.12	1.25%	0.17	0.55%	0.46
10	0.94%	0.30	-0.02%	0.17	0.58%	0.39
	Portugal		Greece		United States	
# events	8 downgrades x 3 banks		12 downgrades x 6 banks		2 downgrades x 17 banks	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	2.53%	**2.24	2.83%	*1.77	1.08%	***2.63
-9	1.12%	1.50	2.37%	0.87	0.14%	0.29
-8	1.66%	**2.09	-5.05%	-0.01	1.00%	**2.30
-7	-1.43%	-0.53	1.36%	0.52	-1.54%	*-1.69
-6	-0.19%	0.27	2.37%	1.10	-0.12%	-0.19
-5	0.89%	0.58	-0.82%	0.41	0.75%	**2.53
-4	0.14%	0.68	-2.41%	0.76	-0.62%	-1.10
-3	0.06%	0.80	-2.27%	-0.27	-2.71%	***-3.48
-2	-0.77%	-1.38	2.16%	0.95	0.51%	0.35
-1	0.76%	0.18	-2.87%	0.24	-2.30%	-1.19
0	-0.42%	-0.45	-0.77%	-0.25	-1.12%	-0.74
1	-1.31%	-0.74	1.75%	0.39	-5.49%	***-3.30
2	1.01%	0.62	-1.45%	0.77	2.74%	0.94
3	1.38%	*1.75	2.08%	0.54	-3.63%	-0.79
4	0.45%	0.54	-2.13%	0.01	3.70%	**2.12
5	-1.42%	-1.54	3.90%	1.06	0.22%	1.09
6	-0.14%	0.34	-1.58%	0.03	1.72%	1.01
7	-0.05%	1.05	-0.89%	0.61	-1.07%	-0.63
8	0.10%	-0.26	-4.10%	0.00	0.38%	0.15
9	2.65%	1.60	-1.48%	0.41	-3.47%	***-4.01
10	0.54%	1.45	2.79%	0.99	-1.08%	-0.62

*T*-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

**Panel 7.3 – Effect of a sovereign downgrade in the country’s banks, by country – new event window**

Methodology used: country blocks to compute SAR variances and test statistics; all downgrades.

	France		Italy		Spain	
# events	2 downgrades x 3 banks		3 downgrades x 5 banks		8 downgrades x 5 banks	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	0.13%	0.18	-2.88%	-1.12	-0.87%	-1.42
-4	-2.12%	***-3.67	-0.83%	-0.01	-0.18%	-0.38
-3	0.61%	0.11	2.06%	0.82	-0.52%	-0.60
-2	-0.79%	-0.91	2.88%	1.41	0.39%	0.11
-1	2.94%	**1.84	2.98%	1.20	0.03%	-0.16
0	1.38%	1.08	1.17%	0.61	-1.24%	-1.20
1	1.67%	0.83	1.17%	1.08	-0.15%	-0.08
2	-0.58%	-0.84	-1.28%	-0.66	-0.36%	-0.70
3	1.30%	0.37	-2.79%	**1.89	-0.48%	-0.73
4	5.76%	***3.35	5.20%	**1.76	0.47%	1.15
5	1.15%	0.95	0.61%	0.29	0.11%	-0.83
	Portugal		Greece		United States	
# events	8 downgrades x 3 banks		12 downgrades x 6 banks		2 downgrades x 17 banks	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	0.89%	0.42	-0.82%	0.54	0.75%	0.61
-4	0.14%	0.61	-2.41%	0.71	-0.62%	-0.26
-3	0.06%	0.60	-2.27%	-0.46	-2.71%	-0.89
-2	-0.77%	**2.01	2.16%	1.36	0.51%	0.08
-1	0.76%	0.17	-2.87%	0.28	-2.30%	-0.27
0	-0.42%	-0.60	-0.77%	-0.35	-1.12%	-0.18
1	-1.31%	-0.93	1.75%	0.62	-5.49%	-0.90
2	1.01%	0.45	-1.45%	0.85	2.74%	0.30
3	1.38%	*1.70	2.08%	0.59	-3.63%	-0.21
4	0.45%	0.80	-2.13%	-0.03	3.70%	0.51
5	-1.42%	**2.13	3.90%	1.34	0.22%	0.27

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

## Panel 7.4.A – Cross effects originating from Spain’s sovereign downgrades

Methodology used: country blocks to compute SAR variances and test statistics.

Day	Spain		France		Italy		Germany		Portugal	
	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	<b>0.15%</b>	<b>-0.08</b>	1.17%	0.60	0.58%	0.14	0.26%	0.15	0.83%	0.52
-9	<b>0.23%</b>	<b>0.13</b>	0.65%	-0.02	0.25%	0.27	-0.67%	-0.78	0.90%	0.98
-8	<b>0.02%</b>	<b>0.28</b>	0.40%	0.20	-0.08%	-0.19	0.66%	0.36	0.91%	1.03
-7	<b>0.44%</b>	<b>0.22</b>	1.41%	*1.74	0.82%	1.11	-0.04%	0.53	-1.02%	-0.25
-6	<b>-0.04%</b>	<b>-0.24</b>	0.76%	0.13	-0.63%	-0.17	0.22%	0.29	0.36%	1.09
-5	<b>-0.87%</b>	<b>-0.86</b>	-0.57%	-0.30	-0.15%	0.26	-0.74%	-0.43	0.38%	0.60
-4	<b>-0.18%</b>	<b>-0.31</b>	-0.27%	-0.95	-0.76%	-0.38	-1.27%	-1.79	0.08%	0.42
-3	<b>-0.52%</b>	<b>-0.25</b>	-1.18%	-0.34	0.44%	0.43	-1.82%	***-2.67	0.61%	0.84
-2	<b>0.39%</b>	<b>0.11</b>	0.30%	0.14	1.02%	0.56	-1.55%	-0.52	-0.81%	-0.68
-1	<b>0.03%</b>	<b>0.15</b>	1.53%	1.01	1.67%	0.98	-0.26%	0.33	1.71%	*1.74
0	<b>-1.24%</b>	<b>-0.93</b>	-0.90%	-0.54	-1.40%	-0.98	-1.44%	-0.93	-0.38%	-0.42
1	<b>-0.15%</b>	<b>-0.09</b>	-0.64%	0.22	0.45%	0.72	-0.73%	-0.03	0.79%	0.35
2	<b>-0.36%</b>	<b>-0.41</b>	-0.30%	-0.21	-1.08%	-0.90	-0.98%	-0.50	0.55%	0.36
3	<b>-0.48%</b>	<b>-0.36</b>	0.07%	0.01	-1.52%	-1.51	-1.13%	-1.06	-0.01%	0.01
4	<b>0.47%</b>	<b>1.18</b>	0.77%	0.73	1.53%	1.23	1.08%	1.09	0.37%	0.64
5	<b>0.11%</b>	<b>-0.29</b>	0.59%	-0.14	-1.33%	-1.10	0.02%	-0.42	-0.82%	-0.83
6	<b>-0.30%</b>	<b>-0.34</b>	-0.39%	0.17	0.52%	0.18	0.93%	0.92	-0.17%	0.25
7	<b>0.88%</b>	<b>0.45</b>	0.88%	-0.32	0.63%	0.23	3.32%	0.63	-0.18%	0.20
8	<b>1.52%</b>	<b>0.88</b>	2.19%	0.40	2.38%	1.44	2.46%	*2.00	1.67%	1.14
9	<b>0.55%</b>	<b>0.46</b>	-0.20%	0.01	0.76%	0.14	0.12%	-0.12	0.00%	-0.03
10	<b>0.58%</b>	<b>0.39</b>	2.30%	1.19	0.74%	1.18	1.58%	1.67	0.86%	1.85
Day	Ireland		Switzerland		United Kingdom		Greece		United States	
	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	1.45%	-0.35	1.72%	0.79	0.49%	-0.06	3.01%	1.32	1.69%	**2.32
-9	1.22%	1.67	-0.57%	-0.68	0.42%	-0.21	1.16%	0.62	-0.69%	*-1.69
-8	1.68%	1.89	0.50%	0.46	0.64%	0.14	0.88%	1.27	-0.43%	-0.03
-7	1.62%	0.90	1.67%	0.83	1.87%	1.66	-0.36%	0.89	1.42%	0.80
-6	4.41%	***2.83	0.74%	0.19	1.37%	0.33	1.27%	1.24	0.92%	0.74
-5	1.37%	1.15	0.89%	0.52	1.69%	0.98	-0.83%	-0.04	0.01%	0.18
-4	2.01%	0.92	-1.30%	-0.95	-1.24%	-1.07	-0.97%	-0.31	0.49%	0.26
-3	-0.43%	-0.36	-0.96%	-0.45	-0.15%	0.63	-1.21%	0.17	0.44%	1.14
-2	1.99%	0.23	0.39%	-0.32	0.54%	0.37	-3.12%	-0.53	-0.56%	-0.16
-1	-1.54%	-0.43	0.93%	0.76	-0.31%	0.33	2.24%	1.23	-0.29%	0.11
0	-9.10%	-1.05	-1.61%	-1.17	-3.79%	-0.16	0.44%	-0.05	-3.50%	-0.60
1	4.37%	1.52	-0.82%	0.30	-1.23%	0.51	2.48%	1.31	2.71%	0.81
2	-1.42%	-0.40	-0.44%	-0.65	-1.13%	-0.66	-0.08%	0.51	-1.81%	-0.72
3	-1.42%	-0.64	1.63%	0.45	-0.67%	-0.18	0.68%	0.31	0.96%	0.59
4	3.97%	1.10	1.41%	1.61	0.22%	*1.68	1.72%	1.17	-0.95%	-0.41
5	-6.35%	-1.04	0.24%	-0.04	-2.62%	-1.09	1.58%	0.12	-2.18%	-0.41
6	4.30%	0.29	-0.43%	0.53	-1.20%	-0.10	2.19%	1.16	3.35%	0.06
7	3.71%	0.56	2.38%	0.39	4.54%	0.88	-3.96%	-0.24	-1.10%	-0.17
8	-4.33%	-0.44	1.16%	0.61	-0.73%	-0.31	5.75%	***2.71	0.12%	-0.27
9	5.19%	1.04	0.83%	0.19	0.92%	0.48	4.71%	1.24	-0.08%	-0.41
10	3.23%	-0.03	1.07%	0.56	3.48%	0.92	0.03%	0.21	0.61%	0.23

T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

## Panel 7.4.B – Cross effects originating from Ireland’s sovereign downgrades

Methodology used: country blocks to compute SAR variances and test statistics.

Day	Ireland		France		Italy		Germany		Spain	
	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	<b>4.63%</b>	<b>1.03</b>	1.79%	0.92	0.41%	0.95	0.82%	0.12	0.95%	0.77
-9	<b>-1.11%</b>	<b>0.12</b>	0.81%	0.72	0.33%	0.29	-0.37%	0.22	0.72%	0.39
-8	<b>0.64%</b>	<b>-0.09</b>	0.46%	0.02	1.38%	1.12	0.84%	0.28	1.24%	1.14
-7	<b>2.62%</b>	<b>0.29</b>	1.11%	1.50	0.83%	0.74	1.57%	1.32	0.80%	0.49
-6	<b>2.37%</b>	<b>0.23</b>	0.78%	0.34	-0.10%	-0.34	0.09%	-0.07	0.09%	0.08
-5	<b>1.41%</b>	<b>0.85</b>	1.17%	0.47	1.76%	1.08	1.97%	1.53	1.24%	0.79
-4	<b>3.64%</b>	<b>*1.81</b>	0.43%	1.01	0.82%	0.40	1.25%	0.73	1.14%	1.16
-3	<b>-0.68%</b>	<b>-0.22</b>	0.00%	0.27	-0.59%	-1.11	-0.03%	-0.64	-0.11%	-0.23
-2	<b>-0.63%</b>	<b>-0.87</b>	-0.42%	-0.50	0.98%	0.45	1.08%	0.80	0.40%	0.09
-1	<b>0.65%</b>	<b>0.84</b>	0.26%	-0.14	0.20%	-0.03	2.06%	1.31	-0.06%	-0.15
0	<b>0.65%</b>	<b>-0.02</b>	-0.77%	-0.29	-0.02%	0.40	-2.87%	-0.91	-0.30%	0.03
1	<b>3.65%</b>	<b>*1.74</b>	0.39%	-0.28	1.11%	0.47	1.06%	0.32	1.30%	0.99
2	<b>1.96%</b>	<b>1.28</b>	0.33%	0.01	0.93%	0.55	0.89%	0.44	0.10%	-0.31
3	<b>3.01%</b>	<b>0.70</b>	1.58%	0.74	1.75%	0.79	1.47%	0.45	1.82%	1.10
4	<b>4.94%</b>	<b>1.06</b>	0.44%	0.08	0.69%	-0.09	0.49%	-0.14	0.63%	0.74
5	<b>-1.20%</b>	<b>-0.58</b>	-0.54%	-0.65	-1.27%	-1.31	-1.26%	-1.54	-0.07%	-0.13
6	<b>0.60%</b>	<b>-0.26</b>	-0.42%	-0.33	-0.19%	-0.14	-0.75%	-0.83	0.24%	0.25
7	<b>-3.27%</b>	<b>-1.10</b>	-0.12%	-0.50	0.29%	0.09	-0.62%	-0.66	0.28%	0.06
8	<b>1.07%</b>	<b>0.70</b>	0.01%	-0.14	1.18%	0.39	1.88%	0.47	1.14%	0.68
9	<b>2.58%</b>	<b>0.45</b>	1.19%	0.34	1.06%	0.23	0.97%	-0.06	1.09%	0.44
10	<b>-0.35%</b>	<b>-0.62</b>	0.35%	0.40	0.63%	0.56	-1.25%	-0.87	0.51%	0.23
Day	Portugal		Switzerland		United Kingdom		Greece		United States	
	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	1.98%	1.57	0.10%	-0.40	0.63%	-0.05	1.00%	0.72	0.56%	-0.34
-9	0.06%	0.81	0.02%	-0.16	-0.86%	-0.57	-0.03%	-0.17	-0.98%	-1.30
-8	0.19%	-0.82	0.96%	0.80	0.06%	0.10	1.53%	1.05	1.06%	1.55
-7	-0.59%	-0.29	0.98%	1.21	1.14%	0.42	1.73%	1.52	-1.40%	-1.03
-6	-0.63%	-1.09	0.61%	0.46	0.94%	0.93	0.68%	0.23	-0.59%	-0.58
-5	0.90%	1.25	1.04%	1.00	1.17%	0.46	2.51%	1.96	0.89%	0.77
-4	-0.19%	-0.08	0.66%	0.98	-1.00%	-0.76	-0.27%	-0.34	-0.80%	-0.16
-3	-0.60%	-0.32	-0.53%	-0.67	-0.40%	-0.72	0.05%	0.05	0.07%	0.64
-2	-0.21%	0.26	-0.75%	-1.08	0.95%	-0.14	-0.60%	-0.27	-0.33%	-0.06
-1	1.07%	0.34	-0.41%	-0.11	2.19%	1.07	0.05%	-0.09	-3.80%	-1.09
0	0.07%	-0.20	-0.98%	-0.84	-0.46%	0.19	-0.02%	0.04	1.98%	0.31
1	0.39%	0.80	1.22%	0.61	0.66%	0.25	1.17%	0.92	-0.56%	-0.15
2	0.27%	0.12	1.39%	1.22	0.91%	1.08	-0.45%	-0.25	1.56%	0.52
3	1.77%	1.10	1.48%	<b>*1.93</b>	0.97%	0.96	2.10%	0.84	-0.84%	-0.64
4	0.89%	1.10	0.89%	1.33	1.15%	1.15	1.41%	0.82	1.70%	1.00
5	-0.23%	0.12	-1.29%	<b>*-1.75</b>	0.13%	-0.04	-2.04%	-0.75	1.69%	-0.45
6	-0.61%	-0.68	-0.43%	0.02	0.35%	0.84	-1.26%	-0.74	-0.59%	0.62
7	-1.30%	<b>*-1.71</b>	-0.14%	-0.84	0.15%	0.22	2.07%	0.74	-0.93%	-0.38
8	0.99%	0.23	1.81%	1.16	0.78%	0.43	2.32%	1.28	-0.67%	-0.85
9	0.59%	0.61	0.43%	-0.81	1.05%	0.22	-2.77%	-1.24	0.35%	0.80
10	0.10%	0.16	-0.70%	-0.54	-0.54%	-0.26	0.61%	0.41	-0.46%	-0.73

T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

## Panel 7.4.C – Cross effects originating from Italy’s sovereign downgrades

Methodology used: country blocks to compute SAR variances and test statistics.

	Italy		France		Ireland		Germany		Spain	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	<b>-1.59%</b>	<b>-0.93</b>	0.43%	0.25	-2.88%	-1.24	-0.96%	-0.39	-0.48%	-0.38
-9	<b>-1.06%</b>	<b>-0.78</b>	-0.80%	-0.43	1.44%	1.35	-1.74%	-0.44	-0.05%	-0.13
-8	<b>1.41%</b>	<b>0.62</b>	0.98%	0.49	1.17%	1.15	1.81%	***2.85	-0.32%	-0.34
-7	<b>-1.17%</b>	<b>-0.14</b>	0.69%	0.54	-1.78%	-1.19	-0.31%	-0.34	-0.37%	-0.13
-6	<b>-5.85%</b>	<b>** -2.43</b>	-1.99%	-1.00	0.06%	0.06	-1.45%	-0.56	-2.01%	-1.54
-5	<b>-2.88%</b>	<b>-0.69</b>	-2.33%	-0.54	2.77%	1.08	-2.18%	-0.70	-0.43%	-0.21
-4	<b>-0.83%</b>	<b>0.01</b>	0.76%	0.03	2.15%	1.81	0.36%	0.24	-0.06%	-0.03
-3	<b>2.06%</b>	<b>0.54</b>	-0.02%	-0.02	2.71%	***7.62	1.12%	1.17	2.17%	0.69
-2	<b>2.88%</b>	<b>0.87</b>	0.31%	-0.09	-6.02%	-1.45	1.30%	0.99	-0.23%	-0.23
-1	<b>2.98%</b>	<b>0.66</b>	0.05%	0.11	1.62%	0.69	2.82%	*1.75	0.43%	0.39
0	<b>1.17%</b>	<b>0.43</b>	0.89%	0.36	2.05%	1.08	-1.03%	-0.60	0.88%	0.54
1	<b>1.17%</b>	<b>0.80</b>	-0.43%	0.02	0.51%	0.39	0.66%	***3.26	0.52%	0.57
2	<b>-1.28%</b>	<b>-0.44</b>	-0.01%	-0.23	0.89%	1.48	0.15%	0.03	-0.32%	-0.26
3	<b>-2.79%</b>	<b>-1.26</b>	0.55%	0.13	0.47%	0.24	-1.44%	-0.23	0.34%	0.14
4	<b>5.20%</b>	<b>1.24</b>	5.58%	**2.18	7.00%	**2.33	5.20%	1.76	2.28%	1.25
5	<b>0.61%</b>	<b>0.14</b>	1.21%	0.78	-1.40%	-0.50	1.55%	0.48	-0.23%	-0.16
6	<b>3.80%</b>	<b>1.07</b>	4.16%	1.02	1.00%	0.57	4.23%	1.07	0.11%	0.00
7	<b>0.60%</b>	<b>0.15</b>	-2.06%	-1.43	-0.24%	-0.15	0.53%	0.02	0.20%	0.28
8	<b>4.15%</b>	<b>1.27</b>	0.15%	-0.06	-0.92%	-1.01	2.10%	1.46	0.33%	0.37
9	<b>1.25%</b>	<b>0.17</b>	-0.04%	-0.08	1.42%	0.63	-1.47%	-0.62	1.29%	0.66
10	<b>-0.02%</b>	<b>0.17</b>	0.90%	0.37	0.36%	0.11	0.31%	0.17	1.04%	0.71
	Portugal		Switzerland		United Kingdom		Greece		United States	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	3.23%	0.84	-1.12%	-0.17	-2.06%	-1.27	-2.99%	-0.92	-0.43%	0.44
-9	-0.53%	-0.55	1.03%	0.50	-0.41%	-0.08	1.56%	0.22	-1.83%	-1.16
-8	2.02%	0.59	2.27%	**2.36	2.95%	1.67	6.75%	**2.01	3.67%	*1.94
-7	-4.93%	** -2.15	1.17%	0.90	0.86%	0.62	-4.41%	** -2.32	-1.92%	-1.32
-6	-1.93%	-1.01	-1.72%	-1.19	-1.06%	-0.40	2.13%	0.80	-0.53%	0.11
-5	1.50%	0.35	-0.35%	-0.44	0.44%	0.28	-0.36%	-0.04	0.25%	0.05
-4	-0.37%	-0.30	0.00%	-0.24	-0.26%	-0.57	-1.79%	-0.65	0.60%	0.26
-3	-0.05%	0.25	1.03%	1.29	3.15%	1.36	1.19%	0.15	3.06%	*1.86
-2	-0.52%	-0.01	-2.42%	-0.27	1.24%	0.54	-0.38%	-0.25	1.38%	0.50
-1	3.33%	0.61	2.80%	1.99	2.53%	1.05	4.33%	1.74	0.64%	0.33
0	0.76%	0.17	-1.08%	-0.48	0.05%	0.08	1.38%	0.39	-0.88%	-0.17
1	-1.27%	-0.34	1.04%	1.03	0.79%	0.29	-1.15%	-0.27	-0.54%	-0.25
2	0.53%	0.17	1.01%	0.08	0.78%	0.24	0.48%	0.04	-1.07%	-0.09
3	0.82%	0.44	-0.31%	-0.01	-2.33%	-1.28	3.03%	0.27	-2.24%	-0.75
4	1.37%	0.47	3.62%	***4.23	5.15%	**2.56	0.25%	-0.06	1.45%	0.44
5	-1.30%	-1.09	1.42%	0.59	0.22%	-0.20	-3.46%	-0.85	1.38%	0.29
6	-0.63%	0.01	1.90%	0.84	2.26%	1.36	5.38%	1.32	0.29%	-0.06
7	-1.54%	-0.66	-0.26%	-0.11	-1.75%	-1.35	-1.15%	-0.37	-1.04%	-0.27
8	1.57%	1.14	0.86%	0.62	0.04%	-0.04	6.33%	1.59	0.67%	-0.09
9	1.80%	0.96	-1.35%	-1.79	0.32%	0.11	5.46%	0.44	-1.26%	-0.32
10	-0.47%	-0.35	-0.59%	-0.56	-1.04%	-0.98	-1.33%	-0.39	-3.31%	-1.60

T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.



## Panel 7.4.D – Cross effects originating from Greece’s sovereign downgrades

Methodology used: country blocks to compute SAR variances and test statistics.

Day	Greece		France		Italy		Germany		Portugal	
	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	<b>2.83%</b>	<b>*1.77</b>	-0.06%	-0.20	0.70%	0.61	0.43%	-0.90	0.53%	1.02
-9	<b>2.37%</b>	<b>0.87</b>	0.07%	-0.32	0.43%	0.58	0.68%	0.42	0.30%	0.57
-8	<b>-5.05%</b>	<b>-0.01</b>	0.89%	0.27	0.86%	1.22	0.79%	-0.11	0.27%	0.35
-7	<b>1.36%</b>	<b>0.52</b>	-0.21%	-0.45	-0.29%	-0.43	0.07%	-0.22	0.08%	0.29
-6	<b>2.37%</b>	<b>1.10</b>	1.57%	<b>**2.20</b>	1.34%	<b>**2.07</b>	1.13%	2.54	0.94%	1.27
-5	<b>-0.82%</b>	<b>0.41</b>	1.01%	0.31	0.76%	0.13	0.93%	0.65	0.15%	-1.09
-4	<b>-2.41%</b>	<b>0.76</b>	0.48%	0.91	1.53%	<b>*1.73</b>	-0.56%	-0.23	0.05%	0.25
-3	<b>-2.27%</b>	<b>-0.27</b>	-0.49%	-1.62	-0.54%	-1.04	-1.40%	<b>***-3.53</b>	-0.18%	0.04
-2	<b>2.16%</b>	<b>0.95</b>	-0.35%	-0.51	-0.37%	-0.31	-0.42%	-0.38	0.35%	1.28
-1	<b>-2.87%</b>	<b>0.24</b>	0.66%	0.88	0.95%	1.64	0.11%	1.01	0.08%	0.53
0	<b>-0.77%</b>	<b>-0.25</b>	-1.55%	-1.00	-1.76%	<b>**2.06</b>	-1.91%	-1.12	-1.36%	<b>**2.03</b>
1	<b>1.75%</b>	<b>0.39</b>	0.39%	0.65	0.18%	0.66	-0.15%	0.94	0.37%	0.40
2	<b>-1.45%</b>	<b>0.77</b>	-0.15%	-0.76	-0.45%	-0.94	-0.39%	-1.18	0.47%	0.00
3	<b>2.08%</b>	<b>0.54</b>	-1.23%	-0.27	-1.26%	-1.56	-1.56%	-1.08	-0.26%	-0.32
4	<b>-2.13%</b>	<b>0.01</b>	-1.05%	-0.42	-0.07%	0.61	-1.52%	-1.44	0.31%	0.75
5	<b>3.90%</b>	<b>1.06</b>	-0.22%	-0.52	-0.20%	-0.20	-0.42%	-0.25	-0.19%	0.25
6	<b>-1.58%</b>	<b>0.03</b>	-1.06%	-0.95	-0.62%	-0.10	-0.46%	-0.26	-0.20%	-0.13
7	<b>-0.89%</b>	<b>0.61</b>	-0.99%	0.22	-0.14%	0.05	-0.29%	0.05	0.07%	0.69
8	<b>-4.10%</b>	<b>0.00</b>	0.92%	0.03	0.67%	0.54	0.72%	-0.08	-0.08%	-0.20
9	<b>-1.48%</b>	<b>0.41</b>	1.37%	-0.58	0.69%	0.11	1.09%	0.32	1.17%	1.04
10	<b>2.79%</b>	<b>0.99</b>	-0.18%	-0.64	-0.13%	-0.29	0.85%	-0.63	-0.39%	-0.19

Day	Ireland		Switzerland		United Kingdom		Spain		United States	
	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	-0.57%	-1.38	0.67%	0.08	0.86%	<b>**2.06</b>	0.12%	0.49	0.50%	-0.27
-9	2.16%	1.20	0.42%	0.26	0.54%	0.06	0.28%	0.17	0.77%	0.37
-8	-3.33%	-1.24	0.39%	0.64	1.06%	0.43	0.52%	0.42	0.31%	0.28
-7	0.64%	1.07	0.56%	-0.79	-0.99%	<b>**2.17</b>	-0.24%	-0.25	-0.18%	-0.61
-6	3.09%	<b>**2.23</b>	0.77%	0.90	0.90%	1.24	1.12%	<b>*1.88</b>	0.51%	-0.53
-5	-0.76%	-0.23	0.47%	-0.16	0.82%	0.42	0.58%	0.01	0.65%	0.97
-4	-0.11%	-0.37	1.19%	0.31	1.02%	0.84	0.48%	0.74	0.27%	-0.04
-3	1.03%	-0.58	-0.28%	-1.49	-0.09%	-0.54	-0.20%	-0.32	0.00%	-0.53
-2	-0.24%	-0.46	-0.45%	-0.81	0.64%	-0.15	-0.52%	-0.77	-0.92%	-0.92
-1	1.64%	1.56	0.50%	1.23	0.83%	1.07	0.36%	1.24	0.23%	-0.31
0	-2.34%	<b>*1.89</b>	-0.76%	-0.47	-1.37%	-1.14	-0.88%	-0.95	-0.56%	0.32
1	2.03%	1.46	-0.07%	-0.19	0.04%	-0.19	0.07%	0.33	-0.56%	0.18
2	3.23%	1.16	-0.38%	-1.65	-1.60%	-1.64	-0.48%	-1.59	0.20%	0.07
3	-4.97%	-0.51	-1.77%	<b>**2.26</b>	-3.93%	0.00	-0.80%	-0.91	-2.32%	-0.58
4	2.92%	0.50	-0.30%	0.67	-2.21%	-1.46	0.02%	0.61	1.01%	0.59
5	-2.56%	<b>*1.76</b>	-0.16%	-0.37	-0.80%	-0.63	-0.28%	-0.28	-0.72%	-0.61
6	-10.47%	<b>**2.42</b>	-0.12%	-0.93	-4.12%	<b>*1.70</b>	-0.62%	-0.68	-1.96%	-0.88
7	4.98%	0.43	-0.83%	-1.39	-2.01%	-1.59	-0.44%	-0.26	0.58%	-0.38
8	2.40%	0.88	1.13%	0.07	3.08%	0.63	0.44%	0.15	-0.97%	-0.86
9	-1.65%	-1.39	1.42%	1.62	-0.21%	-0.85	1.66%	0.96	2.95%	<b>*1.95</b>
10	6.64%	1.48	2.36%	1.51	1.71%	0.54	0.38%	0.12	-1.50%	-1.48

T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

## Panel 7.4.E – Cross effects originating from Portugal’s sovereign downgrades

Methodology used: country blocks to compute SAR variances and test statistics.

Day	Portugal		France		Italy		Germany		Spain	
	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	2.53%	**2.24	1.68%	1.67	0.90%	0.75	-0.09%	-0.48	0.61%	0.99
-9	1.12%	1.50	1.04%	0.67	0.45%	0.19	-0.78%	-0.52	0.16%	-0.08
-8	1.66%	**2.09	1.06%	0.55	0.47%	0.33	0.47%	0.68	1.16%	*1.75
-7	-1.43%	-0.53	0.76%	0.07	-0.47%	-0.18	-0.27%	-1.13	0.23%	0.31
-6	-0.19%	0.27	0.02%	0.54	-1.15%	-0.30	-0.38%	0.11	-0.09%	0.05
-5	0.89%	0.58	-0.15%	-0.06	0.04%	0.24	-1.11%	-0.07	0.30%	0.44
-4	0.14%	0.68	-1.07%	-1.03	-0.88%	-0.23	-1.51%	-1.00	-0.26%	-0.31
-3	0.06%	0.80	0.79%	0.34	0.93%	0.67	-1.33%	-0.11	0.78%	0.73
-2	-0.77%	-1.38	-0.88%	-0.37	0.00%	-0.34	-1.33%	-0.66	-0.49%	-0.72
-1	0.76%	0.18	-0.17%	0.33	0.61%	0.20	0.51%	0.80	-0.42%	-0.13
0	-0.42%	-0.45	0.54%	0.35	-0.93%	-0.83	-0.63%	-0.92	-0.56%	-0.44
1	-1.31%	-0.74	-0.29%	-0.22	-0.56%	-0.48	-0.75%	-0.84	-0.57%	-0.31
2	1.01%	0.62	-1.15%	*-1.70	-0.61%	-0.50	-0.67%	-0.32	0.30%	-0.22
3	1.38%	1.75	3.07%	1.13	-0.60%	-0.82	0.05%	-0.32	1.20%	0.58
4	0.45%	0.54	1.17%	0.61	1.71%	1.33	1.41%	0.95	0.63%	1.05
5	-1.42%	-1.54	-0.40%	**2.00	-1.10%	-1.42	1.53%	-0.42	-0.94%	-1.39
6	-0.14%	0.34	1.21%	0.33	1.28%	0.83	0.99%	0.50	0.39%	0.61
7	-0.05%	1.05	-0.95%	-0.79	-0.76%	-0.42	0.46%	-0.07	0.47%	0.96
8	0.10%	-0.26	-2.45%	-0.94	0.71%	0.52	-0.30%	-0.03	-0.46%	-0.11
9	2.65%	1.60	4.59%	1.29	3.46%	1.39	3.27%	1.45	3.83%	**2.47
10	0.54%	1.45	1.30%	0.93	0.39%	0.39	0.21%	-0.53	0.85%	0.85
Day	Ireland		Switzerland		United Kingdom		Greece		United States	
	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	-0.52%	-0.86	-0.18%	0.26	0.92%	-0.19	2.08%	*1.81	-0.35%	-0.68
-9	2.06%	**2.18	0.90%	0.33	0.68%	-0.05	1.28%	0.79	0.60%	-0.75
-8	2.66%	***2.66	1.46%	*1.84	1.56%	0.64	3.52%	***2.70	1.06%	1.59
-7	0.36%	-0.54	-0.05%	-0.59	1.60%	0.39	-1.45%	-1.00	-0.88%	-0.86
-6	3.30%	***3.37	0.70%	0.86	0.13%	0.13	0.79%	1.06	0.44%	-0.26
-5	-0.91%	0.00	-0.93%	-0.71	-0.87%	0.28	0.95%	0.55	0.31%	0.55
-4	2.01%	1.10	-0.38%	-0.62	-1.19%	*-1.86	-0.85%	-0.25	-1.22%	-0.31
-3	-0.64%	0.60	0.74%	1.17	0.35%	1.24	-0.30%	0.01	0.72%	0.87
-2	-10.38%	-1.45	-0.42%	-1.02	-4.01%	-0.31	0.72%	0.27	-3.28%	-0.76
-1	6.29%	**2.57	-0.53%	0.28	0.06%	0.71	0.17%	-0.18	1.30%	0.07
0	-3.59%	-0.79	-0.10%	-0.64	0.31%	0.06	-0.07%	0.14	-0.26%	-0.18
1	-6.75%	-1.43	0.13%	0.13	-1.29%	-0.57	-0.61%	-0.61	0.10%	-0.01
2	8.98%	1.19	1.04%	0.02	-0.47%	0.14	1.15%	0.31	-0.11%	0.25
3	1.81%	-0.07	1.47%	0.81	2.04%	0.72	2.08%	0.69	-0.22%	-0.44
4	-8.27%	-0.16	1.11%	***3.30	-4.04%	-0.44	0.43%	-0.21	0.17%	0.70
5	11.62%	1.46	-0.09%	-1.13	0.92%	-0.51	-0.59%	-0.26	0.27%	-0.69
6	-2.07%	0.15	0.71%	1.00	0.65%	1.34	1.50%	0.44	-0.44%	0.58
7	-2.17%	-1.75	0.87%	0.96	0.23%	-0.24	0.83%	1.16	0.47%	0.03
8	4.42%	0.64	-0.09%	-0.33	1.01%	**2.52	2.58%	0.57	-1.32%	-1.05
9	1.45%	-0.19	2.48%	1.52	4.22%	1.35	4.36%	1.16	1.59%	1.23
10	6.13%	1.44	1.45%	0.82	0.93%	-0.17	0.48%	0.43	2.32%	0.11

T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

**Panel 7.5.A – Cross effects originating from Spain’s sovereign downgrades (shorter event window)**

Methodology used: country blocks to compute SAR variances and test statistics.

	Spain		France		Italy		Germany		Portugal	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	<b>-0.87%</b>	<b>-1.42</b>	-0.57%	-0.78	-0.15%	0.15	-0.74%	-0.73	0.38%	0.47
-4	<b>-0.18%</b>	<b>-0.38</b>	-0.27%	-1.27	-0.76%	-0.80	-1.27%	***-3.03	0.08%	0.38
-3	<b>-0.52%</b>	<b>-0.60</b>	-1.18%	-0.63	0.44%	0.37	-1.82%	** -2.11	0.61%	0.86
-2	<b>0.39%</b>	<b>0.11</b>	0.30%	0.34	1.02%	0.49	-1.55%	-0.54	-0.81%	-1.01
-1	<b>0.03%</b>	<b>-0.16</b>	1.53%	1.20	1.67%	0.65	-0.26%	0.11	1.71%	***2.67
0	<b>-1.24%</b>	<b>-1.20</b>	-0.90%	-0.53	-1.40%	-1.20	-1.44%	-1.00	-0.38%	-0.42
1	<b>-0.15%</b>	<b>-0.08</b>	-0.64%	0.34	0.45%	0.65	-0.73%	-0.07	0.79%	0.63
2	<b>-0.36%</b>	<b>-0.70</b>	-0.30%	-0.61	-1.08%	-1.01	-0.98%	-0.83	0.55%	0.28
3	<b>-0.48%</b>	<b>-0.73</b>	0.07%	-0.11	-1.52%	-1.57	-1.13%	-1.01	-0.01%	-0.28
4	<b>0.47%</b>	<b>1.15</b>	0.77%	0.91	1.53%	0.82	1.08%	1.29	0.37%	0.59
5	<b>0.11%</b>	<b>-0.83</b>	0.59%	-0.66	-1.33%	-0.89	0.02%	-0.52	-0.82%	-1.10

	Ireland		Switzerland		United Kingdom		Greece		United States	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	1.37%	1.03	0.89%	0.57	1.69%	1.14	-0.83%	-0.21	0.01%	0.11
-4	2.01%	0.63	-1.30%	-1.41	-1.24%	-1.29	-0.97%	-0.61	0.49%	0.38
-3	-0.43%	-0.57	-0.96%	-0.80	-0.15%	0.99	-1.21%	0.17	0.44%	1.54
-2	1.99%	0.57	0.39%	-0.31	0.54%	0.56	-3.12%	-0.57	-0.56%	-0.13
-1	-1.54%	-0.77	0.93%	0.71	-0.31%	0.27	2.24%	1.48	-0.29%	0.05
0	-9.10%	-1.31	-1.61%	-1.55	-3.79%	-0.15	0.44%	0.13	-3.50%	-0.75
1	4.37%	1.11	-0.82%	0.48	-1.23%	0.82	2.48%	1.45	2.71%	1.29
2	-1.42%	-0.25	-0.44%	-0.70	-1.13%	-0.94	-0.08%	0.99	-1.81%	-1.35
3	-1.42%	-0.75	1.63%	0.89	-0.67%	-0.39	0.68%	0.44	0.96%	0.89
4	3.97%	0.78	1.41%	*1.77	0.22%	*1.78	1.72%	1.43	-0.95%	-0.91
5	-6.35%	-1.26	0.24%	-0.13	-2.62%	*-1.73	1.58%	0.64	-2.18%	-0.79

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 7.5.B – Cross effects originating from Ireland’s sovereign downgrades (shorter event window)**

Methodology used: country blocks to compute SAR variances and test statistics.

	Ireland		France		Italy		Germany		Spain	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	<b>1.41%</b>	<b>0.93</b>	1.17%	0.86	1.76%	1.04	1.97%	*1.84	1.24%	1.27
-4	<b>3.64%</b>	<b>1.64</b>	0.43%	*1.83	0.82%	0.54	1.25%	0.65	1.14%	**2.03
-3	<b>-0.68%</b>	<b>-0.53</b>	0.00%	0.44	-0.59%	-1.14	-0.03%	-1.25	-0.11%	-0.75
-2	<b>-0.63%</b>	<b>-0.73</b>	-0.42%	-0.84	0.98%	0.44	1.08%	0.87	0.40%	0.31
-1	<b>0.65%</b>	<b>0.90</b>	0.26%	-0.05	0.20%	-0.04	2.06%	*1.70	-0.06%	-0.28
0	<b>0.65%</b>	<b>-0.12</b>	-0.77%	-0.71	-0.02%	0.44	-2.87%	-1.24	-0.30%	0.05
1	<b>3.65%</b>	<b>*1.87</b>	0.39%	-0.39	1.11%	0.37	1.06%	0.44	1.30%	1.46
2	<b>1.96%</b>	<b>1.39</b>	0.33%	0.03	0.93%	0.58	0.89%	0.65	0.10%	-0.70
3	<b>3.01%</b>	<b>0.70</b>	1.58%	*1.70	1.75%	0.83	1.47%	0.67	1.82%	*1.90
4	<b>4.94%</b>	<b>1.11</b>	0.44%	0.13	0.69%	-0.15	0.49%	-0.24	0.63%	0.98
5	<b>-1.20%</b>	<b>-0.28</b>	-0.54%	-1.20	-1.27%	-1.31	-1.26%	***-2.72	-0.07%	-0.15
	Portugal		Switzerland		United Kingdom		Greece		United States	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	0.90%	**2.13	1.04%	1.31	1.17%	0.55	2.51%	1.59	0.89%	1.01
-4	-0.19%	0.04	0.66%	1.23	-1.00%	-0.82	-0.27%	-0.46	-0.80%	-0.20
-3	-0.60%	-0.22	-0.53%	-0.89	-0.40%	-1.03	0.05%	0.25	0.07%	0.90
-2	-0.21%	0.47	-0.75%	*-1.71	0.95%	-0.30	-0.60%	-0.52	-0.33%	-0.03
-1	1.07%	1.10	-0.41%	0.02	2.19%	1.27	0.05%	0.09	-3.80%	-1.60
0	0.07%	-0.13	-0.98%	-1.03	-0.46%	0.31	-0.02%	0.18	1.98%	0.28
1	0.39%	1.51	1.22%	0.82	0.66%	0.36	1.17%	0.74	-0.56%	-0.08
2	0.27%	0.45	1.39%	1.48	0.91%	1.41	-0.45%	-0.38	1.56%	1.15
3	1.77%	*1.91	1.48%	***3.08	0.97%	1.20	2.10%	0.81	-0.84%	-1.17
4	0.89%	*1.80	0.89%	**2.13	1.15%	*1.75	1.41%	0.66	1.70%	**2.04
5	-0.23%	0.45	-1.29%	*-1.83	0.13%	-0.01	-2.04%	-0.93	1.69%	-1.08

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 7.5.C – Cross effects originating from Italy’s sovereign downgrades (shorter event window)**

Methodology used: country blocks to compute SAR variances and test statistics.

	Italy		France		Ireland		Germany		Spain	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	<b>-2.88%</b>	<b>-1.12</b>	-2.33%	-0.70	2.77%	1.04	-2.18%	-0.88	-0.43%	-0.69
-4	<b>-0.83%</b>	<b>-0.01</b>	0.76%	-0.19	2.15%	*1.93	0.36%	0.44	-0.06%	-0.03
-3	<b>2.06%</b>	<b>0.82</b>	-0.02%	-0.01	2.71%	***4.81	1.12%	1.32	2.17%	*1.84
-2	<b>2.88%</b>	<b>1.41</b>	0.31%	-0.33	-6.02%	-1.54	1.30%	0.99	-0.23%	-0.54
-1	<b>2.98%</b>	<b>1.20</b>	0.05%	0.45	1.62%	0.61	2.82%	*1.82	0.43%	0.87
0	<b>1.17%</b>	<b>0.61</b>	0.89%	0.84	2.05%	1.14	-1.03%	-1.09	0.88%	0.90
1	<b>1.17%</b>	<b>1.08</b>	-0.43%	0.17	0.51%	0.24	0.66%	***4.54	0.52%	1.20
2	<b>-1.28%</b>	<b>-0.66</b>	-0.01%	-0.51	0.89%	1.45	0.15%	0.03	-0.32%	-0.65
3	<b>-2.79%</b>	* <b>-1.89</b>	0.55%	0.26	0.47%	0.37	-1.44%	-0.41	0.34%	0.28
4	<b>5.20%</b>	* <b>1.76</b>	5.58%	***3.83	7.00%	**2.38	5.20%	***3.05	2.28%	***2.68
5	<b>0.61%</b>	<b>0.29</b>	1.21%	1.30	-1.40%	-0.49	1.55%	0.56	-0.23%	-0.43
	Portugal		Switzerland		United Kingdom		Greece		United States	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	1.50%	0.74	-0.35%	-0.44	0.44%	0.39	-0.36%	-0.05	0.25%	0.07
-4	-0.37%	-0.56	0.00%	-0.27	-0.26%	-0.41	-1.79%	-1.17	0.60%	0.52
-3	-0.05%	0.28	1.03%	1.81	3.15%	*1.88	1.19%	0.59	3.06%	***3.09
-2	-0.52%	-0.03	-2.42%	-0.96	1.24%	0.64	-0.38%	-0.13	1.38%	1.02
-1	3.33%	1.41	2.80%	**2.18	2.53%	1.05	4.33%	*1.83	0.64%	0.47
0	0.76%	0.45	-1.08%	-1.03	0.05%	0.06	1.38%	0.86	-0.88%	-0.42
1	-1.27%	-0.53	1.04%	1.06	0.79%	0.49	-1.15%	-0.23	-0.54%	-0.39
2	0.53%	0.20	1.01%	0.10	0.78%	0.23	0.48%	0.45	-1.07%	-0.39
3	0.82%	0.63	-0.31%	-0.07	-2.33%	*-1.97	3.03%	0.98	-2.24%	-1.78
4	1.37%	1.04	3.62%	***12.49	5.15%	***5.12	0.25%	0.24	1.45%	1.02
5	-1.30%	-1.56	1.42%	0.72	0.22%	-0.12	-3.46%	-1.65	1.38%	0.78

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 7.5.D – Cross effects originating from Greece’s sovereign downgrades (shorter event window)**

Methodology used: country blocks to compute SAR variances and test statistics.

	<b>Greece</b>		<b>France</b>		<b>Italy</b>		<b>Germany</b>		<b>Portugal</b>	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	<b>-0.82%</b>	<b>0.54</b>	1.01%	0.46	0.76%	0.22	0.93%	0.34	0.15%	-1.04
-4	<b>-2.41%</b>	<b>0.71</b>	0.48%	0.93	1.53%	1.49	-0.56%	-0.43	0.05%	-0.06
-3	<b>-2.27%</b>	<b>-0.46</b>	-0.49%	*-1.72	-0.54%	-1.10	-1.40%	***-3.56	-0.18%	0.05
-2	<b>2.16%</b>	<b>1.36</b>	-0.35%	-0.58	-0.37%	-0.32	-0.42%	-0.49	0.35%	1.28
-1	<b>-2.87%</b>	<b>0.28</b>	0.66%	1.46	0.95%	1.63	0.11%	1.31	0.08%	0.53
0	<b>-0.77%</b>	<b>-0.35</b>	-1.55%	*-1.81	-1.76%	***-2.78	-1.91%	-1.58	-1.36%	** -2.16
1	<b>1.75%</b>	<b>0.62</b>	0.39%	0.91	0.18%	0.61	-0.15%	0.89	0.37%	0.46
2	<b>-1.45%</b>	<b>0.85</b>	-0.15%	-0.94	-0.45%	-0.91	-0.39%	-1.52	0.47%	-0.03
3	<b>2.08%</b>	<b>0.59</b>	-1.23%	-0.38	-1.26%	-1.59	-1.56%	-1.29	-0.26%	-0.31
4	<b>-2.13%</b>	<b>-0.03</b>	-1.05%	-0.64	-0.07%	0.41	-1.52%	*-1.92	0.31%	0.72
5	<b>3.90%</b>	<b>1.34</b>	-0.22%	-0.59	-0.20%	-0.65	-0.42%	-0.21	-0.19%	0.10
	<b>Ireland</b>		<b>Switzerland</b>		<b>United Kingdom</b>		<b>Spain</b>		<b>United States</b>	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	-0.76%	-0.21	0.47%	-0.21	0.82%	0.53	0.58%	0.03	0.65%	1.15
-4	-0.11%	-0.34	1.19%	0.30	1.02%	0.99	0.48%	0.71	0.27%	0.18
-3	1.03%	-0.20	-0.28%	*-1.72	-0.09%	-0.78	-0.20%	-0.55	0.00%	-0.59
-2	-0.24%	-0.33	-0.45%	-0.58	0.64%	-0.19	-0.52%	-1.01	-0.92%	-1.06
-1	1.64%	1.45	0.50%	1.23	0.83%	1.48	0.36%	1.37	0.23%	-0.48
0	-2.34%	-1.57	-0.76%	-0.19	-1.37%	-1.42	-0.88%	-1.63	-0.56%	0.14
1	2.03%	*1.78	-0.07%	-0.08	0.04%	0.10	0.07%	0.29	-0.56%	0.31
2	3.23%	1.54	-0.38%	*-1.70	-1.60%	-1.50	-0.48%	-1.69	0.20%	0.08
3	-4.97%	-0.44	-1.77%	*-1.79	-3.93%	-0.38	-0.80%	-0.98	-2.32%	-0.53
4	2.92%	0.86	-0.30%	0.39	-2.21%	-1.84	0.02%	0.44	1.01%	0.22
5	-2.56%	*-1.97	-0.16%	-0.39	-0.80%	-0.78	-0.28%	-0.64	-0.72%	-0.62

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 7.5.E – Cross effects originating from Portugal’s sovereign downgrades (shorter event window)**

Methodology used: country blocks to compute SAR variances and test statistics.

	Portugal		France		Italy		Germany		Spain	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	<b>0.89%</b>	<b>0.42</b>	-0.15%	0.08	0.04%	0.51	-1.11%	0.15	0.30%	0.96
-4	<b>0.14%</b>	<b>0.61</b>	-1.07%	** <b>-2.51</b>	-0.88%	-0.45	-1.51%	-1.44	-0.26%	-0.52
-3	<b>0.06%</b>	<b>0.60</b>	0.79%	0.42	0.93%	0.66	-1.33%	-0.51	0.78%	1.42
-2	<b>-0.77%</b>	** <b>-2.01</b>	-0.88%	-0.70	0.00%	-0.39	-1.33%	-1.06	-0.49%	-0.72
-1	<b>0.76%</b>	<b>0.17</b>	-0.17%	0.87	0.61%	0.40	0.51%	1.30	-0.42%	-0.13
0	<b>-0.42%</b>	<b>-0.60</b>	0.54%	-0.22	-0.93%	-1.51	-0.63%	-1.56	-0.56%	-1.04
1	<b>-1.31%</b>	<b>-0.93</b>	-0.29%	-0.43	-0.56%	-0.67	-0.75%	-1.08	-0.57%	-0.73
2	<b>1.01%</b>	<b>0.45</b>	-1.15%	** <b>-2.15</b>	-0.61%	-0.74	-0.67%	-0.46	0.30%	-0.28
3	<b>1.38%</b>	* <b>1.70</b>	3.07%	1.37	-0.60%	-1.20	0.05%	-0.92	1.20%	0.80
4	<b>0.45%</b>	<b>0.80</b>	1.17%	1.23	1.71%	1.58	1.41%	1.35	0.63%	1.24
5	<b>-1.42%</b>	** <b>-2.13</b>	-0.40%	*** <b>-4.15</b>	-1.10%	** <b>-2.40</b>	1.53%	-1.33	-0.94%	*** <b>-2.99</b>
	Ireland		Switzerland		United Kingdom		Greece		United States	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-5	-0.91%	0.18	-0.93%	-0.52	-0.87%	0.50	0.95%	0.74	0.31%	0.78
-4	2.01%	0.78	-0.38%	-0.57	-1.19%	* <b>-1.71</b>	-0.85%	-0.61	-1.22%	-0.40
-3	-0.64%	0.52	0.74%	1.24	0.35%	1.85	-0.30%	-0.16	0.72%	1.18
-2	-10.38%	-1.15	-0.42%	-1.38	-4.01%	-0.06	0.72%	0.84	-3.28%	-0.81
-1	6.29%	** <b>2.08</b>	-0.53%	0.34	0.06%	0.83	0.17%	-0.20	1.30%	-0.25
0	-3.59%	-0.67	-0.10%	-0.95	0.31%	-0.15	-0.07%	0.24	-0.26%	-0.27
1	-6.75%	-1.18	0.13%	-0.35	-1.29%	-0.77	-0.61%	-0.67	0.10%	0.04
2	8.98%	0.98	1.04%	-0.08	-0.47%	0.32	1.15%	0.16	-0.11%	0.53
3	1.81%	-0.19	1.47%	1.15	2.04%	0.24	2.08%	0.98	-0.22%	-0.80
4	-8.27%	-0.19	1.11%	*** <b>2.78</b>	-4.04%	-1.12	0.43%	-0.18	0.17%	1.21
5	11.62%	1.13	-0.09%	-1.81	0.92%	-0.79	-0.59%	-0.30	0.27%	-1.10

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

## Appendix 8 – Results for Q3 (Other bank’s rating changes)

### Panel 8.1 - Reaction of other banks in the same country (average abnormal returns, cumulative abnormal return and respective t-statistics), by country, following a bank downgrade

Methodology: simple scaled abnormal returns and cross-sectional variance (without country or day blocks). In the cases where more than one bank was downgraded in the same country in the same day, all event banks were excluded, only non-event banks remained. Ireland could not be analysed since it has only one bank; Germany has only one bank rating downgrade and was excluded as well.

	France		Greece		Italy		Portugal	
# obs	13		25		42		5	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	0.11%	0.92	-0.89%	-0.68	1.96%	**2.26	0.73%	0.64
-9	1.00%	0.59	0.76%	0.75	1.16%	**2.26	1.35%	1.18
-8	2.32%	1.81	-0.41%	-0.11	-0.49%	-0.42	1.18%	**2.62
-7	0.42%	1.06	-1.89%	-0.84	-0.05%	-0.20	-0.45%	-0.77
-6	-1.75%	-0.81	0.67%	0.50	3.02%	***2.99	0.19%	0.40
-5	2.85%	1.61	0.51%	0.28	0.56%	0.22	0.22%	0.24
-4	1.05%	0.34	-0.68%	-0.48	1.72%	**2.46	-1.54%	-1.18
-3	-0.28%	-0.17	-0.73%	-0.63	0.84%	1.03	0.97%	0.61
-2	2.94%	1.27	0.97%	0.59	0.99%	**2.45	-0.14%	-1.51
-1	1.76%	1.18	3.96%	*1.79	0.00%	0.14	-2.15%	-0.30
0	0.30%	-0.90	0.87%	0.54	0.70%	0.98	0.32%	0.08
1	-0.21%	-0.59	3.06%	*1.82	0.69%	0.21	0.41%	-0.10
2	0.44%	0.25	2.29%	1.04	0.14%	-0.08	0.75%	0.75
3	-0.32%	0.50	-0.50%	-0.05	1.86%	1.01	0.54%	0.42
4	-1.88%	**2.20	2.65%	1.62	2.30%	***3.26	1.75%	1.27
5	1.51%	1.04	1.46%	1.10	0.65%	0.88	6.71%	***4.95
6	0.50%	0.98	0.42%	0.33	1.01%	1.48	3.56%	1.18
7	2.36%	1.38	1.09%	0.37	0.22%	0.02	0.22%	1.10
8	0.23%	0.03	0.40%	0.54	-0.12%	0.42	-1.40%	***-7.14
9	1.08%	0.77	4.31%	**2.83	1.01%	0.56	1.09%	1.01
10	1.29%	*1.82	-0.45%	-0.44	0.35%	0.47	-0.86%	-0.64
	France		Greece		Italy		Portugal	
# obs	13		25		42		5	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	-0.28%	-0.47	-0.73%	-0.71	0.84%	0.73	0.97%	1.06
-2	2.66%	1.03	0.24%	-0.34	1.83%	*1.79	0.83%	1.35
-1	4.42%	1.47	4.19%	0.85	1.84%	1.28	-1.33%	-0.31
0	4.71%	*1.68	5.06%	0.68	2.54%	1.56	-1.01%	-0.35
1	4.50%	0.78	8.12%	1.13	3.23%	*1.69	-0.60%	-0.72
2	4.94%	1.28	10.40%	*1.68	3.37%	1.60	0.16%	0.48
3	4.63%	0.88	9.90%	1.61	5.23%	2.05	0.70%	0.63

T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

Panel continues in the next page



	Spain		Switzerland		United Kingdom		United States	
# obs	60		4		17		338	
Day	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>	AR	t <sub>AB</sub>
-10	0.25%	0.39	0.58%	-0.34	-2.16%	-1.50	-2.34%	**2.01
-9	1.40%	*1.82	-2.22%	-0.70	0.35%	0.10	2.12%	**2.28
-8	-0.82%	-0.68	2.02%	1.13	2.93%	1.50	-1.89%	-1.41
-7	0.66%	**2.25	-4.38%	-1.21	4.23%	***3.45	1.72%	0.53
-6	-0.70%	**2.38	1.09%	1.48	0.79%	0.28	-0.25%	-0.22
-5	0.18%	-0.32	-4.00%	-1.23	-4.95%	**2.01	0.36%	0.02
-4	0.36%	0.66	4.13%	0.73	0.10%	-0.17	0.25%	0.61
-3	0.70%	1.34	2.30%	1.46	0.15%	-0.26	1.41%	0.68
-2	-0.25%	-0.29	-0.82%	0.40	-0.35%	-0.60	0.52%	0.84
-1	0.44%	0.79	1.22%	1.24	-2.66%	-0.91	0.42%	0.53
0	0.68%	0.97	3.56%	1.23	-4.94%	-1.63	-2.47%	-1.05
1	-0.52%	-0.45	-1.20%	-1.22	0.20%	-0.03	3.51%	**2.31
2	0.39%	0.54	-1.00%	-0.85	1.41%	0.53	0.16%	-0.05
3	1.05%	***2.68	3.23%	**2.29	-8.87%	-1.35	-0.20%	0.37
4	1.14%	**2.03	-2.10%	***2.88	-3.38%	-1.00	0.85%	0.25
5	0.86%	1.67	0.57%	1.58	2.35%	1.00	1.35%	0.53
6	0.28%	0.08	-2.43%	-0.89	1.56%	0.77	1.37%	1.11
7	0.76%	1.15	-1.37%	-0.14	-3.21%	-1.08	-0.77%	-0.82
8	-0.16%	-0.06	1.77%	1.21	2.02%	-0.03	-0.57%	0.02
9	0.16%	0.40	1.19%	0.49	2.69%	1.28	1.80%	0.88
10	0.25%	0.75	1.34%	0.93	4.51%	1.14	-1.01%	0.19

	Spain		Switzerland		United Kingdom		United States	
# obs	60		4		17		338	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	0.70%	0.10	2.30%	1.31	0.15%	-0.29	1.41%	0.81
-2	0.45%	0.12	1.48%	1.61	-0.20%	-0.24	1.93%	1.12
-1	0.89%	0.16	2.70%	**1.99	-2.86%	-0.69	2.34%	1.23
0	1.57%	0.24	6.26%	***2.64	-7.80%	-1.14	-0.13%	0.39
1	1.05%	0.12	5.07%	**2.21	-7.60%	-1.22	3.38%	*1.72
2	1.44%	0.25	4.07%	0.78	-6.19%	-0.49	3.54%	1.35
3	2.49%	0.94	7.30%	**2.08	-15.07%	-1.04	3.34%	1.54

*T*-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.

**Panel 8.2.A - Reaction of banks abroad (average cumulative abnormal return and t-statistic), by country, following a bank downgrade in the United Kingdom**

Number of bank downgrades in the United Kingdom: 11

Number of corresponding dates (and events): 7

	Spain		Ireland		Italy		Greece		Portugal	
# obs	35		7		35		42		21	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	0.14%	-0.51	-0.26%	-0.38	-0.17%	0.06	-0.97%	-0.29	-1.15%	-1.28
-2	1.33%	-0.04	1.13%	0.53	-0.82%	-0.35	-1.33%	-0.51	-0.15%	-0.17
-1	1.51%	0.10	-4.84%	-0.50	-2.06%	-0.54	-1.25%	-0.09	0.76%	0.64
0	1.39%	-0.12	-3.32%	-0.47	-4.52%	-1.45	-2.36%	-0.50	-0.09%	-0.09
1	2.32%	0.14	2.92%	0.09	-4.10%	-1.26	-0.45%	-0.12	-0.59%	-0.59
2	4.03%	0.41	-0.25%	-0.82	-1.47%	-0.19	2.69%	1.07	1.07%	0.43
3	4.00%	0.36	-13.10%	-1.30	-1.07%	-0.09	2.08%	0.66	2.44%	0.58

	United States		Switzerland		Germany		France	
# obs	119		14		14		21	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	-1.27%	0.42	-0.10%	0.62	-1.41%	-0.52	-0.43%	-1.08
-2	-2.20%	0.34	-1.60%	0.35	-1.07%	-0.31	-0.94%	-1.31
-1	-5.13%	0.11	-3.20%	0.15	-2.75%	-0.71	-1.12%	-1.14
0	-7.32%	0.10	-6.43%	-0.54	-4.37%	-1.27	-3.05%	*-1.69
1	-3.51%	0.45	-5.30%	-0.28	-7.18%	** -2.15	-3.12%	-1.53
2	2.61%	0.47	-2.04%	0.09	-4.99%	-1.32	-1.20%	-0.97
3	1.28%	0.09	-1.92%	0.50	-3.65%	-1.11	-0.42%	-0.80

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 8.2.B - Reaction of banks abroad (average cumulative abnormal return and t-statistic), by country, following a bank downgrade in Spain**

Number of bank downgrades in Spain: 37

Number of corresponding dates (and events): 15

	United Kingdom		Ireland		Italy		Greece		Portugal	
# obs	60		15		75		90		45	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	-0.57%	0.72	-2.97%	-1.22	1.56%	1.14	-0.39%	0.03	0.57%	0.79
-2	-0.87%	0.80	-0.05%	0.02	0.70%	0.21	0.97%	1.16	-0.10%	-0.01
-1	-0.65%	0.96	-1.10%	-0.29	1.03%	0.47	-1.28%	0.27	-0.32%	-0.12
0	-0.39%	1.08	-0.84%	-0.02	1.08%	0.56	-1.49%	0.50	0.07%	0.21
1	-0.28%	1.01	-1.73%	-0.01	1.59%	0.80	-0.62%	0.76	-0.11%	0.28
2	-1.78%	0.47	-0.61%	-0.73	0.80%	0.14	-2.94%	-0.32	-0.03%	0.28
3	-3.00%	0.43	1.41%	0.00	1.50%	0.24	-2.63%	-0.05	-0.06%	0.00

	United States		Switzerland		Germany		France	
# obs	255		30		30		45	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	0.73%	0.89	-0.02%	0.82	-0.06%	0.57	1.56%	2.09
-2	-0.07%	0.40	-0.71%	0.61	-1.01%	0.41	1.38%	1.60
-1	0.85%	1.04	-0.43%	0.51	-0.66%	0.28	0.80%	0.86
0	0.10%	0.50	0.30%	0.93	0.40%	0.62	1.01%	0.88
1	1.40%	0.97	0.71%	0.84	-0.43%	0.24	0.61%	0.70
2	0.41%	-0.03	-0.14%	0.48	-1.15%	0.14	0.44%	0.44
3	1.37%	0.52	-0.87%	0.26	-1.72%	0.04	0.98%	0.77

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 8.2.C - Reaction of banks abroad (average cumulative abnormal return and t-statistic), by country, following a bank downgrade in Ireland**

Number of bank downgrades in Ireland: 7

Number of corresponding dates (and events): 7

	United Kingdom		Spain		Italy		Greece		Portugal	
# obs	28		35		35		42		21	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	-0.17%	-0.13	-0.27%	-0.32	0.54%	0.21	-0.62%	-0.30	0.87%	0.64
-2	1.22%	0.14	1.08%	0.92	1.33%	0.30	0.54%	0.04	1.04%	0.64
-1	2.09%	0.31	1.74%	0.93	1.80%	0.52	2.35%	0.64	1.46%	0.80
0	2.44%	0.13	2.39%	0.96	2.73%	1.00	3.59%	1.05	2.34%	1.05
1	1.79%	0.21	2.07%	0.56	2.36%	0.37	4.07%	0.71	2.35%	0.67
2	0.27%	-0.47	1.61%	0.26	1.88%	0.18	2.69%	0.16	3.24%	0.99
3	0.30%	0.20	2.05%	0.56	1.96%	0.27	3.43%	0.65	4.07%	1.57

	United States		Switzerland		Germany		France	
# obs	119		14		14		21	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	-0.41%	-0.01	-0.70%	-1.17	-0.31%	-0.81	-0.15%	0.63
-2	-0.65%	-0.94	0.02%	-0.42	-0.45%	-1.08	-0.64%	-0.27
-1	1.14%	0.41	0.87%	-0.33	0.02%	-0.79	-0.43%	-0.79
0	-0.80%	-0.75	0.95%	-0.14	0.44%	-0.51	-0.04%	-0.52
1	0.39%	0.16	1.51%	1.14	1.02%	-0.26	-0.07%	-1.04
2	-0.76%	-0.36	1.63%	0.03	0.47%	-0.71	-0.33%	*-1.85
3	-0.15%	0.01	1.10%	-0.08	0.91%	-0.52	-1.57%	** -2.48

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 8.2.D - Reaction of banks abroad (average cumulative abnormal return and t-statistic), by country, following a bank downgrade in Italy**

Number of bank downgrades in Italy: 25

Number of corresponding dates (and events): 13

	United Kingdom		Spain		Ireland		Greece		Portugal	
# obs	52		65		13		78		39	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	0.91%	0.38	0.75%	0.58	1.56%	-0.01	2.40%	0.83	1.87%	1.09
-2	1.26%	0.11	1.50%	0.83	5.35%	0.88	5.19%	1.61	3.09%	*1.81
-1	2.58%	0.39	1.51%	0.88	2.88%	0.40	4.79%	1.21	2.76%	1.60
0	2.87%	0.19	1.51%	0.61	4.66%	0.75	5.05%	1.16	2.60%	1.54
1	4.65%	0.59	2.25%	0.76	5.82%	1.18	6.33%	1.14	2.84%	1.51
2	4.75%	0.55	1.98%	0.61	6.92%	0.88	4.38%	0.73	1.75%	1.36
3	6.07%	0.72	3.18%	1.08	8.24%	1.14	5.43%	1.16	1.88%	1.51

	United States		Switzerland		Germany		France	
# obs	221		26		26		39	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	0.83%	0.67	0.95%	0.87	1.42%	1.24	0.10%	0.17
-2	0.53%	0.24	0.78%	0.04	2.88%	1.01	1.17%	0.73
-1	0.62%	0.08	1.36%	0.61	4.17%	1.64	1.50%	0.90
0	1.70%	0.37	1.11%	0.28	4.18%	1.40	0.79%	0.26
1	0.43%	-0.15	0.71%	0.41	5.41%	1.55	1.50%	0.43
2	1.56%	0.31	0.69%	0.35	4.85%	1.37	1.80%	0.64
3	4.57%	0.84	2.54%	1.39	7.12%	**2.42	3.20%	1.05

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 8.2.E - Reaction of banks abroad (average cumulative abnormal return and t-statistic), by country, following a bank downgrade in Greece**

Number of bank downgrades in Greece: 33

Number of corresponding dates (and events): 9

	United Kingdom		Spain		Ireland		Italy		Portugal	
# obs	36		45		9		45		27	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	1.19%	0.81	-0.33%	-0.33	-1.56%	-1.05	-0.34%	-0.50	-1.02%	-1.01
-2	2.35%	1.09	0.27%	-0.13	-2.18%	***-2.99	-0.73%	-1.08	-0.80%	-1.23
-1	2.73%	1.33	1.30%	0.39	-2.50%	** -2.16	0.26%	-0.38	-0.66%	-1.45
0	2.48%	0.18	0.82%	0.19	1.11%	** -2.56	0.63%	-0.41	-1.77%	** -2.44
1	2.21%	0.38	0.84%	0.06	9.49%	-0.61	0.20%	-0.86	-1.69%	* -1.92
2	2.31%	0.47	1.92%	0.80	12.83%	0.59	0.94%	-0.47	0.50%	-0.89
3	2.57%	-0.01	2.23%	1.01	13.45%	0.88	1.41%	-0.16	1.36%	-1.01

	United States		Switzerland		Germany		France	
# obs	153		18		18		27	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	-0.01%	1.22	-0.38%	-0.19	-0.48%	-0.63	-0.59%	-1.05
-2	0.28%	0.94	0.14%	-0.07	-1.14%	-1.06	-1.55%	** -2.26
-1	0.99%	1.05	1.40%	0.43	0.18%	0.38	-0.74%	-0.74
0	-0.49%	0.29	0.45%	-0.36	0.54%	-0.19	-1.90%	* -1.86
1	-0.41%	0.58	0.31%	-0.41	0.44%	-0.30	-1.90%	* -1.82
2	-0.70%	0.85	0.69%	-0.40	1.16%	-0.23	-1.12%	-1.29
3	-0.91%	0.92	1.34%	-0.18	1.96%	-0.20	-1.37%	-1.03

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 8.2.F - Reaction of banks abroad (average cumulative abnormal return and t-statistic), by country, following a bank downgrade in Portugal**

Number of bank downgrades in Portugal: 23

Number of corresponding dates (and events): 10

	United Kingdom		Spain		Ireland		Italy		Greece	
# obs	36		45		9		45		33	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	0.82%	1.01	0.31%	0.80	1.46%	0.87	0.05%	-0.31	1.56%	0.25
-2	0.85%	0.78	0.65%	1.09	-0.37%	0.35	-0.55%	-0.57	0.47%	-0.37
-1	1.10%	0.85	0.82%	1.12	-2.15%	0.18	-0.22%	-0.20	3.68%	0.46
0	0.27%	0.15	0.07%	0.26	-0.13%	0.08	-0.57%	-0.52	2.93%	0.02
1	0.67%	0.41	0.46%	0.58	2.86%	0.20	-0.86%	-0.76	2.20%	-0.38
2	1.34%	0.56	0.50%	0.67	4.04%	0.46	0.51%	-0.16	4.28%	0.34
3	1.09%	0.23	0.22%	0.15	9.44%	0.89	0.03%	-0.26	3.48%	0.22

	United States		Switzerland		Germany		France	
# obs	153		18		18		27	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	-1.19%	-0.89	-0.24%	-0.17	0.66%	0.57	0.38%	0.46
-2	-1.48%	-0.30	-0.95%	-0.50	-0.39%	-0.11	-0.83%	-0.21
-1	-1.97%	-0.24	-0.79%	-0.20	0.07%	0.05	-1.71%	-0.33
0	-2.40%	-0.58	-1.51%	-1.04	-0.77%	-0.59	-3.20%	-1.18
1	-2.42%	-0.83	-0.77%	-0.66	-1.39%	-0.74	-2.05%	-0.67
2	-0.90%	0.30	-0.19%	-0.28	-0.61%	-0.34	-1.14%	-0.23
3	0.62%	0.46	-0.11%	-0.29	-1.21%	-0.59	-0.70%	-0.28

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 8.2.G - Reaction of banks abroad (average cumulative abnormal return and t-statistic), by country, following a bank downgrade in the United States**

Number of bank downgrades in the United States: 53

Number of corresponding dates (and events): 23

	United Kingdom		Spain		Ireland		Italy		Greece	
# obs	92		115		23		115		138	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	1.01%	0.76	0.49%	0.05	0.08%	-0.63	0.42%	-0.66	0.39%	-0.27
-2	0.76%	0.69	0.53%	0.24	-0.69%	-0.72	0.69%	-0.72	1.86%	0.25
-1	0.98%	0.94	1.56%	0.55	-1.74%	-0.47	2.35%	0.49	3.48%	0.57
0	1.07%	0.73	2.35%	0.52	1.30%	-0.20	3.10%	0.03	4.34%	0.30
1	2.83%	1.14	4.33%	1.38	8.34%	0.75	5.53%	0.43	7.29%	1.16
2	2.41%	1.05	4.83%	1.08	6.06%	0.17	6.01%	-0.29	9.35%	1.47
3	3.13%	1.49	5.02%	1.10	12.83%	0.67	7.01%	0.92	9.91%	1.53

	Portugal		Switzerland		Germany		France	
# obs	69		46		46		69	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	0.10%	0.56	1.81%	1.41	0.51%	-0.02	1.34%	0.90
-2	0.62%	0.73	3.13%	1.59	0.47%	-0.16	1.64%	0.78
-1	1.02%	0.90	3.59%	1.24	0.29%	-0.42	2.53%	1.43
0	1.39%	1.11	3.25%	1.44	0.30%	-0.29	3.49%	1.45
1	2.07%	2.15	4.48%	1.67	0.83%	-0.13	5.52%	1.55
2	2.19%	1.45	4.45%	1.69	-0.25%	-0.75	5.66%	1.27
3	3.05%	*1.86	5.10%	**2.50	0.93%	-0.13	5.69%	1.39

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*



**Panel 8.2.H - Reaction of banks abroad (average cumulative abnormal return and t-statistic), by country, following a bank downgrade in the Switzerland**

Number of bank downgrades in Switzerland: 6

Number of corresponding dates (and events): 5

	United Kingdom		Spain		Ireland		Italy		Greece	
# obs	20		25		5		25		30	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	1.50%	1.40	-0.02%	-0.23	1.07%	0.60	1.75%	1.46	0.56%	0.35
-2	2.66%	1.34	1.26%	0.50	-2.84%	0.07	1.27%	1.05	0.31%	0.55
-1	2.41%	1.41	1.56%	0.49	-9.17%	-1.28	1.52%	1.05	-1.26%	0.29
0	4.11%	1.30	1.80%	0.44	-10.73%	-1.03	2.37%	1.12	-2.51%	0.38
1	4.52%	1.14	1.59%	0.40	-5.50%	-0.44	1.58%	1.04	-2.99%	0.10
2	5.19%	1.43	1.67%	0.43	-7.55%	**2.05	2.44%	1.58	-2.67%	0.15
3	6.60%	**2.18	1.96%	0.69	-6.06%	-0.91	2.96%	**2.02	-2.21%	0.45

	Portugal		United States		Germany		France	
# obs	15		85		10		15	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	-1.42%	-0.86	1.75%	0.37	1.12%	0.68	0.97%	0.50
-2	-0.31%	-0.17	2.34%	0.37	0.27%	1.09	-1.71%	0.04
-1	0.81%	0.29	3.89%	0.81	0.16%	0.88	-1.45%	0.12
0	1.16%	0.12	3.91%	0.62	2.26%	1.33	-1.57%	0.12
1	0.11%	-0.73	4.33%	0.91	0.75%	0.94	-3.72%	-0.30
2	-0.26%	-1.46	3.84%	0.77	1.96%	0.99	-2.55%	-0.37
3	2.28%	0.03	3.04%	0.69	5.83%	**2.57	1.17%	0.50

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

**Panel 8.2.I - Reaction of banks abroad (average cumulative abnormal return and t-statistic), by country, following a bank downgrade in France**

Number of bank downgrades in France: 11

Number of corresponding dates (and events): 8

	United Kingdom		Spain		Ireland		Italy		Greece	
# obs	32		40		8		40		24	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	-0.43%	0.60	-0.22%	-0.59	6.92%	1.45	1.58%	1.30	0.68%	0.02
-2	5.20%	*1.74	1.78%	1.01	17.15%	***3.23	3.79%	**2.02	5.17%	0.78
-1	5.34%	1.42	2.82%	1.48	20.64%	**2.51	4.61%	***2.70	6.70%	0.66
0	7.35%	1.03	3.70%	0.79	25.49%	**2.38	6.11%	*1.78	8.58%	0.74
1	6.73%	0.61	4.11%	1.01	20.55%	*1.74	6.33%	1.43	6.55%	0.36
2	8.14%	0.87	4.52%	1.10	20.43%	*1.77	8.10%	*1.67	8.17%	0.51
3	7.66%	1.12	4.37%	0.94	24.53%	**1.99	8.15%	*1.85	10.53%	0.70

	United States		Switzerland		Germany		Portugal	
# obs	136		16		16		27	
Day	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>	CAR	t <sub>AB</sub>
-3	0.59%	1.16	0.47%	-0.22	0.70%	1.07	1.76%	**2.00
-2	0.71%	1.03	2.36%	0.32	2.90%	1.02	2.78%	**2.47
-1	0.89%	1.47	2.99%	0.56	3.93%	1.28	3.14%	**2.19
0	1.51%	1.68	4.89%	0.58	6.76%	0.71	4.26%	**2.20
1	0.54%	0.78	4.95%	0.83	5.98%	0.77	5.43%	***2.63
2	1.48%	1.28	5.55%	1.19	7.33%	1.31	4.87%	*1.76
3	0.95%	0.88	5.48%	**2.25	7.40%	1.44	5.58%	**2.51

*T-stats suggesting significant results are marked as \* if with 10% confidence level, \*\* if with 5% confidence level and \*\*\* if with 1% confidence level.*

## Affidavit

I the undersigned, Ana Alexandra Velez Mão de Ferro, certify on the honor that I have not plagiarized the paper enclosed, which means that I am the only author of all the sentences this text is composed of. Any sentence from a different author than me was written in quotation marks, with explicit indication of its source. I am aware that by contravening to the present rule, I break the recognised academic principles and I expose myself to the sanctions the disciplinary committee will decide on.

I also confirm this work has never been submitted during studies prior to ESCP Europe.

If this work has been written during studies conducted in parallel, I must precise it.

The remarks written in those pages only commit me.

Paris, 13.05.2013