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Bail-in and Bank Resolution in Europe

Aftermath of the first SRM Bail-in: Banco Popular

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Abstract

This study seeks to analyse the investors´ confidence in the Single Resolution Mechanism after the first application since its implementation in 2014: the acquisition of Banco Popular Español for €1 by Banco Santander S.A. An event study methodology on Stock Prices and CDS Spreads will be employed to run such analysis and two different events of bail-out will be contrasted to the original bail-in of Banco Popular. The event study methodology will allow us to verify that investors had already adapted their bail-in risk perception long before the Popular´s resolution and this symbolic event does not trigger any statistically significant impact on European banks. On the contrary, subsequent Italian bail-out events squandered what had been achieved by reducing the credibility of the Single Regulatory Board and its resolution mechanism.

Content

1. Introduction

As citizens, we want our taxes, meaning, part of the money we earn from our day-to-day efforts, to be used diligently and appropriately, and that is why in the current political framework we exercise our right to vote by entrusting ourselves to politicians who, in better or worse, represent our interests.

It is true that banks are an important, if not vital, part of our economy and that they play an extraordinary economic role. Even so, and taking into account a purely financial perspective, as a state shareholder, investing our taxes in saving financial institutions that have and will always have an economic purpose does not seem the best solution.

Numerous studies and own experience have shown that the existence of conglomerates investing in companies without apparent synergies results in a loss of value for shareholders. In such cases, the company´s board of directors, amid an economic incentive, is responsible for diversifying the risk on investor´s behalf, who could do it on its own for free. We could compare it with the scope of study that concerns us, since each one of us could invest, with our own risk profile, in bank shares without politicians doing it for us.

It is in a financial crisis situation where the scarcity of resources is combined with the likelihood of financial institutions in distress requiring them. It is precisely the case of Spain, where the crisis triggered the fall of Bankia, one of the most important banks in the country, which meant the rescue of the whole Spanish financial sector by European authorities.

The fact of observing a significant reaction from investors to the new requirements established by the SRM and the resolutions events that have been triggered so far, would allow us to conclude that the private sector has perceived changes in the authorities´ willingness to use public capital for good, what eventually can be translated in a reduction of future bail-out scenarios.

Nevertheless, there are many reasons in favour of bail-out, such as avoiding contagion of other financial institutions, avoid having to sell assets to unwanted third parties or avoid endless liquidation processes with the consequent legal disputes.

To this end, the European authorities approved the Bank Recovery and Resolution Directive (BRRD) in 2014, from which the Single Resolution Mechanism (SRM) is created providing the banking authorities with the necessary tools to manage any fall of a European bank under its supervision. Mechanism that was employed to liquidate Banco Popular on 7th June 2017, event that will be the trigger event in our case study.

In this paper we try to analyse in detail which perception have investors regarding SRM bail-in measures. We will try to clarify whether the first bail-in imposed by the newly born European mechanism has moved investors towards a perception of greater risk in their

investments and if consequently, institutions offering insurance to these investments demand a higher price to protect their losses.

We must bear in mind that Banco Popular news was not an isolated event and that this triggered a certain number of bank resolutions – mostly in Italy – with the aim of stabilizing the much-desired Banking Union. Nevertheless, Italy opted for a €20bn bail-out – mostly in guarantees – for its three poorly capitalized banks. This could mean that the market may have reacted defensively because of the Popular but that events such as the later Italian bail-out have shifted again the market perception with regards the likelihood of a bail-in. So, not only the reactions to the mediatic decision of the SRB will be studied in detail, but also whether there was a sustainable change in bail-in risk perception or not.

Finally, we will try, always from a very general point of view, to clarify if the ECB has in its hands the power that is so much presupposed and if it has the necessary capabilities to carry it out with the highest probability of success. We refer to the recent case in Latvia, where its entire financial system was accused of money laundering and corruption by the United States and other international agencies.

The paper is structured as follows: Section 2 presents the context of the events, providing background for the new Banking Union regulation and the resolution of Banco Popular. Section 3 exhibits the hypothesis to be tested, the scope of study and the data and methodology that will be used. Empirical results and its discussion are presented in Section 4, while Section 5 concludes the study.

2. Context

2.1. Bail-in and new regulation

During the global financial crisis, governments approved aid packages to financial institutions in form of capital injections to ensure the continuation of the banking sector. These injections, commonly called bail-out, accounted for almost €1.6 trillion between October 2008 and December 2012, money that came from taxpayers' pockets and was given to credit holders and shareholders of banks, exhibiting the lack of authorities' mechanisms to liquidate banks in an orderly manner.

In response to the financial crisis and in order to avoid further situations in which taxpayers' money had to be spent to save financial institutions, the European Commission has sought to create a safer Banking Union by implementing stronger prudential requirements for banks, improved protection for depositors and rules for managing failing banks.

Within the Banking Union there has been a commitment to shift supervision from the state level to the European level, harmonising the procedures for all banks, establishing a single framework for bank crisis and a common system for deposit insurances. As a consequence, the Single Supervisory Mechanism (SSM) and the Single Resolution Mechanism (SRM) have appeared (the two key pillars of the Banking Union) and the Single Resolution Fund (SRF) is in process of being created.

As of November 2014, the SSM is the new supervisory body in the Banking Union comprising the ECB and the national supervisory authorities of the participating member states.

The SRM holds the centralised power of decision regarding resolution of banks in the participating member states of the Banking Union. It derives its powers from the Bank Recovery and Resolution Directive (BRRD), adopted in 2014 to provide authorities with resolution tools to deal with failing banks, and the Single Resolution Mechanism Regulation (SRMR), which creates an integrated decision-making framework for resolution in the Banking Union.

The SRMR specifies that the Single Resolution Board (SRB) is responsible for the effective and consistent functioning of the SRM – fully operational since 1 January 2016. The SRB is the central resolution authority within the banking union, charged to prepare and monitor resolution plans for the banks under the SSM. The SRB is accountable to the European Parliament and the European Council. The decision to initiate a liquidation or resolution of a financial institution is taken either by the ECB or the SRB. The purpose of a resolution plan is to determine the bank's critical functions, to identify and address any impediments to its resolvability and to prepare for its possible resolution following the preferred strategy for that bank. The SRB is also in charge of the SRF, financed by the banking sector to ensure financial

support as a last resort after owners and creditors have borne losses, as well as responsible for setting the level of minimum requirements for own funds and eligible liabilities (MREL).

This whole framework permits a strong, centralised, coordinated, quick and independent decision-making process for bank resolution across the Banking Union. The aforementioned framework and its tools, notably bail-ins, intend to benefit public interest by easing either the orderly liquidation of failing financial institutions or their continuation, avoiding a significant negative impact on financial stability. Additionally, after the shift from bail-out to bail-ins fostered by policymakers, the cost for taxpayers should be minimized.

A bail-in process intends to make creditors participate in a bank's losses at time of distress. The idea is that shareholders and junior bondholders are wiped out to match the write down in non-performing assets while keeping bank's depositors and senior bondholders safe. Nevertheless, depending on the quality of the bank's assets and its amounts of capital they might be also hit. Thereafter, bail-in processes are politically tricky, as regulators must make tough choices about which creditors are wiped out and which are saved.

Since January 1st, 2016, it has been mandatory to bail-in shareholders and creditors for a minimum of 8% of total liabilities before public funds are granted to a financial institution under resolution. Notwithstanding, as matter of fact, events in Italy have shown that there are many ways to bypass the rules and governments might end up using public funds again. Some argue that the sole way to prevent bail-out is to require banks to hold larger capital.

The problem is that the loss-absorbing capacity requirements in the Banking Union will be implemented in 2019 but until then there will be a gap between the liabilities required to perform a bail-in and the real ones. In order to raise loss-absorbing debt, the main instrument used has been debt that in the event of failure – if its common equity tier one ratio falls below a set trigger level – is swapped to equity, known as contingent convertible bonds (CoCos). They became very popular in 2014 to help banks meet Basel III capital requirements, perfect for undercapitalized banks, and so far, large amounts have been sold.

Fundamental issues of new regulation are, first, the transition from one regime to another, as for several years the new tools will have to be applied to banks that might not be ready for it, creating legal and political fights. And, second, the credibility and predictability as investors have to believe and understand the new system. It is essential that creditors expect to bear the loss of a failing bank so that they don't take excessive risk. So there is a danger that too much discretion can affect the credibility of the SRM and people keep viewing bail-out as the more viable option due to the avoidance of contagion, the insurance of liquidity after the restructuring and the avoidance of creditor fight.

2.2. Banco Popular

This paper will make special focus on the Banco Popular resolution taken place on June 7th, 2017, as it is of paramount importance to observe the market reactions after the first bail-in on a financial institution taken place under the new SRM framework.

2.2.1. Background

Banco Popular Español, S.A. was founded in 1926 and became the leader of the small and medium sized business in the Spanish market. The Spanish bank grew through several mergers, consolidation of Spanish cajas such as: Banco Pastor, Banco de Castilla, Banco de Crédito Balear, Banco de Galicia and Banco de Vasconia, and international expansions, notably in US, Portugal and France, becoming the 6th largest bank institution in assets in Spain in 2017.

During the European financial crisis, Popular, performed a capital increase of €500 million and issued €700 million of convertible bonds in the third and fourth quarter of 2009. At that moment, it was the third-largest listed lender in market capitalisation in Spain. Despite being affected by the crisis, with notable rise of their non-performing loans, Popular managed, thanks to its focus on SME, to increase lending while others reduced credit in an attempt to clean up their balance sheets and improve capital ratios.

Again, in November 2010, in an attempt to strengthen its capital due to Basel III pressures, Banco Popular announced plans to raise up to €679 million mainly through compulsory convertible bonds. Provisions against non-performing loans and asset impairment significantly hit Popular's 2011 profits. That same year, Banco Popular acquired Banco Pastor, one of the Spanish cajas that failed the European stress tests in July 2011, in a near €6 billion merger. During the financial crisis, the Bank of Spain failed to address the crumble of Spanish financial sector, and stronger banks were absorbing weak institutions. During the crisis, Spain suffered a huge consolidation process within its financial sector, moving from 45 cajas in 2008 to 15 in 2012. Spanish banks were under high pressure due to inflated funding costs, rise of bad loans, low margins, weak credit demand and the fall in the value of real estate. In May 2012, the Spanish government rescued Bankia through a €4.5 billion capital injection, the country's largest nationalisation since the beginning of the crisis.

Popular, following the European Union decision to demand 70 banks to raise €106 billion in new capital, still had to recapitalise itself to the tune of €2.36 billion by June 2012. Popular claimed that they would be able to achieve the new capital targets without recourse to state aid or rights issues, using only convertible bonds and retained profit. In September 2012, an independent report conducting stress tests on behalf of the ECB and IMF revealed that Popular had failed the test, and it would need to raise €3.2 billion in an adverse scenario, just below its market value at that moment. Again, Popular claimed that they would not take state aid and that they would try to raise new capital alone through an emergency €2.5 billion share

issue in November 2012. Shareholders, though, didn't take the news well as, on top of that, dividends were cut in October in an attempt to build up capital. Banco Popular reported a net loss of €2.46 billion for 2012, aggravated by the continued growth of non-performing loans, up to 8.98% in the last quarter of 2012 and then 14.5% in July 2013. This increase reflected the new policy of Bank of Spain arguing that domestic banks were being too optimistic in their treatment of their restructured debt, not taking the respective provisions against potential future losses and hadn't written down their bad loans to their true value.

Popular was deeply impacted after the December 2015 Spanish election, the instability and the low interest rates during the quantitative easing era where margins from lending were shrinking. At the beginning of 2016, Popular, which had very high amounts of non-performing assets (NPAs) and one of the largest non-performing loan (NPL) ratios within the Spanish market, started a process to sell a quarter of their NPAs in an attempt to collect €8 billion and clean its balance sheet. Later that year, in May 2016, due to increasing pressures to southern banks by the ECB to reduce their bad debts and increase provisions for NPLs and stabilise shares, Popular performed its third capital raise in 4 years, amounting to €2.5 billion, nearly half of its market value and half the amount of its bad debt at that moment.

In December 2016, after a year of bad results due to its bad loans and with bad news regarding the ECJ's resolution on the case of unfair floors on mortgage loans, entailing further compensations to borrowers, Popular announced that Emilio Saracho would replace Ángel Ron as its new chairman in February 2017. Market expected that Ron's departure might attract buyers as if not, Popular would need to go through another capital raise.

At the beginning of 2017, and after the publication of 2016 results (€3.5 billion losses), investors saw Popular's balance sheet as weak, and some claimed that if they weren't able to perform a capital increase they might need to perform a corporate transaction.

Ron's departure as chairman in February 2017 left a 95% of market value loss in 5 years for Popular. In April 2017 an auditing of Banco Popular revealed that the bank didn't have enough provisions for bad loans, triggering the departure of CEO Pedro Larena. That same month, Standard & Poor's and Moody's downgraded the rating of the institution and Popular announced that it would not pay dividends.

A situation of falling credit demand (fewer assets), with small lending rates (low margins), worsened by high amounts of non-performing assets of Popular, not matched with sufficient provisions triggered a continued deterioration of its quarterly results, Share Price and total capital ratio as well as core tier-one capital.

Despite the principal business of the bank, retail and corporate banking, were doing well, the real estate branch presented losses and customers deposits were starting to fall in the first quarter of 2017. In May 2017, while Popular's subordinated debt was trading to record lows

and EU officials warned that the bank could be liquidated if it didn't find an acquirer, BBVA and Santander were seen as potential buyers, as they were the ones able to absorb the €147 billion of total assets of which €37 billion were toxic.

While Banco Popular's AT1 bonds were plummeting in value, Caixabank and Bankia were able to issue large volumes of debt in 2017 trading close to par, highlighting the fact that apparently Banco Popular was being considered as an isolated event.

After Share Price reached record lows and Popular received a downgrade in the rating of its unsecured debt and deposit rating by Moody's, the 7th of June 2017 Banco Popular was acquired by Banco Santander at the symbolic price of €1.

2.2.2. _Resolution_

Since 15 July 2014 Banco Popular was subject to the consolidated supervision of the SSM and the resolution framework of the SRM.

Between the 5 and 6 June 2017, Popular requested €3.6 billion in emergency liquidity assistance (ELA) from the Spanish central bank to help stand the increase in deposits outflows, but they were rapidly distributed, it was suffering a bank run and it was clear to supervisors that Popular didn't have enough high-quality loans left to serve as a collateral for additional central bank aid.

On 6 June 2017, the ECB concluded that the institution was failing or likely to fail due to its rapidly liquidity deterioration, which wouldn't allow the institution to repay its obligations, and informed the SRB. According to the vice-president of the ECB at that moment, Vítor Constâncio, once the ECB transmits its concerns that a bank is failing or likely to fail to the SRB, they have no interference with the subsequent decisions; they have no legal competences on that subject afterwards.

Prior to the deciding on the resolution scheme to be applied, the SRB asked Deloitte to perform an independent valuation of the bank, which concluded that in a baseline scenario the value of the entity was negative €2 billion, casually being equal to the book value of Popular's subordinated debt.

On 7 June 2017, the SRB, in its first resolution action, decided to intervene to address Popular's liquidity and the shortfall in its value, as the prospect of finding an alternative solution within the private sector in reasonable time wasn't likely. It ordered the FROB, the Spanish Executive Resolution Authority, to transfer 100% of Banco Popular shares and debt to Banco Santander at the symbolic price of €1, exercising the power of write-down and conversion of capital instruments prior to the transfer.

According to the hierarchy of claims in the context of resolution, it was executed as follows: first the share capital was reduced to €0 from a market value of €2.01 billion, afterwards a

capital increase was performed by converting all the AT1 capital instruments into newly issued shares (€1.34 billion), and writing them down to €0, then another capital increase was done by transforming all the AT2 capital instruments into new share capital (€684 million) and finally all the shares issued as a result of the conversion of the AT2 capital instruments were transferred to Banco Santander.

2.2.3. *Aftermath*

Resolution allowed the continuation of the critical functions and services of the bank as well as the depositing and lending services, with no apparent contagion to the rest of the economy. Despite Popular's collapse, demand for AT1 and AT2 capital of Bankia and Caixabank increased while its yields decreased during the weeks following the resolution. Notwithstanding, it wasn't the case for subordinated debt of Cajamar, Liberbank and other middle and small peripheral banks; which was put under strong pressure. Highlighting the fact that, apparently, investors were able to discriminate among banks depending on the perceived level of risk.

Regulators claimed that, after its first test, new resolution tools to handle failing lenders had proven to be effective to protect taxpayers' money from bail-out as well as senior debt holders and depositors. Nevertheless, Popular's shareholders and junior bondholders were wiped out one day to another. For the first time, losses had been imposed to holders of alternative tier one securities (AT1), which saw the value of their investment (€1.34 billion) collapse while they were still trading at about half of its face value.

Popular resolution strengthened the credibility of EU authorities and established the precedent on how failing banks would be handled within the new SRM regime, despite some argue that it wasn't representative as the bank was sold before full resolution.

Days after the resolution, Danièle Nouy, Chair of the Supervisory Board at the ECB, seen as the president of the SSM, defended the handling of Banco Popular in front of the European Parliament, and even argued that EU authorities should be given additional powers to perform early intervention measures. In August 2017 Brussels signed off the purchase of Banco Popular by Banco Santander, giving a crucial endorsement to the SRM's resolution.

Although, the process raised several questions regarding its predictability across the market, triggering a crisis of confidence in the mechanism. Investors asked why the emergency liquidity fund of the ECB had not been used; how the valuation of the bank had been performed, as it appeared to be pretty pessimistic; why supervisors and regulators hadn't acted sooner; how could the bank had been declared fine for so long; who had withdrawn money the days before the resolution; how best public interest had been assessed.

On top of that, Deutsche Bank was contacted to organise a €4 billion raise of capital, after Morgan Stanley stepped down faced with the impossibility of carrying out the task. The capital

increase was scheduled for 12th June, 6 days after the intervention of the bank in which Deutsche Bank and Barclays guaranteed €2 billion each.

The aforementioned irregularities led wiped bondholders to start litigation processes against the decision-making entities to try to nullify their decision. Santander set a €1 billion compensation scheme in an attempt to make claimers waive the right to sue Banco Santander, but it wasn't enough to prevent legal actions against Popular's former management and the bank's auditors and supervisors. Bondholders claimed that on paper, Popular's solvency was above minimum requirements and that the SRB had relied on incomplete information and had failed to meet legal requirements to order the resolution.

The SRM framework, thus, appears to present some problems. Its agility creates new risks for middle and small publicly traded banks as activation of the SRM when a financial institution faces liquidity problems, even if it is solvent, can create speculative waves towards the entity. AT1 bonds, despite having been engineered to strengthen banks' balance sheets and reduce their leverage in difficult times, have proven to serve as a warning signal for depositors when they trigger, creating significant deposit outflows that can end with the liquidity of any lending bank.

Additionally, if a bank has limited amounts of TLAC, a full resolution, implying that 8% of bank's liabilities have to be wiped out before making use of taxpayer money, could hit senior bondholders and depositors, and the resolution decision would be highly political. This, for instance, was the case later in July 2017 with Popolare di Vicenza and Veneto Banca. Both banks had low levels of subordinated debt and most of its senior bondholders were retail investors. Thereafter, the SRB decided not to intervene as it was politically unpalatable, and the Italian government performed a state bail-out, not before wiping out their subordinated debt. A bail-in resolution could have caused a bank run, and the Italian government didn't want to take the risk. The test of the mechanism in this case wasn't successful and raised concerns regarding its credibility and viability. This exhibits that work still needs to be done to avoid the threat of bank runs and to make sure that banks have adequate amounts of loss absorbing capital, despite analysts worry that small risky banks would find expensive to issue this kind of debt.

3. Empirical analysis

3.1. Hypothesis

According to Schäfer, Schnabel and Weder di Mauro (2016) the strength of market reactions at other banks in response to a bail-in depends on two aspects: first, the bail-in basis and second, the strength of the political signal the event sends to other countries.

In the last years we have seen how banks react differently on crises, most southern European countries have had banking bail-out or liquidity crises, for example Spain, Italy, Portugal, Cyprus, Greece, etc.

Hypothesis 1: Does it mean that those countries have higher probability to fail or just that there is some kind of variable that make them be that likely. Do bail-in expectations depend on the sovereign's fiscal strength determined by its Debt to GDP ratio? Reactions should be weaker for banks in countries with high indebtedness, translated into lack of fiscal capacity, as they didn't expect to be bailed-out anyway since reactions would have occurred after SRM approval by the EU.

Hypothesis 2: G-SIB designation creates positive wealth effects for concerned banks - TBTF issue, O'Hara and Shaw (1990). Should reactions be stronger for G-SIBs banks as they enjoyed a higher implicit guarantee ex-ante than non-G-SIBs? Ignatowski and Korte (2014) find that the OLA launch in the US led to decrease in the overall risk-taking of banks but not of the most systemically important banks. Is size of banks expressed as their total assets a good tool to understand banks' reactions in crises?

Hypothesis 3: Poorly capitalized banks (low Tier 1 ratios) should react stronger as they might be closer to needing the bail-out than banks with prudent capital ratios.

Hypothesis 4: Banks with large capital to bail-in, this is total liabilities and shareholder's equity minus deposits, should react strongly as investors and creditors have more money subject to be wiped out in a bail-in scenario.

Hypothesis 5: Does countries with historical bail-out scenarios imply a higher risk as perceived by investors? Is the impact of an event limited to the country institutions or there is a contagion with other countries?

3.2. Scope of study

3.2.1. *Banks*
The ECB oversees all significant and less significant banks in the participating countries. As of 1st January 2018, the SRB's supervises a total of 118 significant entities (Credit institutions, financial holding companies, mixed financial holding companies and branches of credit

institutions established in non-participating Member States). Within the pool of institutions, we can find all 8 Global Systematically Important Banks (G-SIBs): BNP Paribas, BPCE, Deutsche Bank, Crédit Agricole, ING Bank, Santander, Société Générale and Unicredit Group.

These 118 banks hold almost 82% of banking assets in the Euro area.

Significance is determined according to the SSM Regulation. To be considered as significant, a bank has to, at least, fulfil one of the following conditions:

- Size: Total value of assets exceeding €30 billion
- Economic importance: For the specific country or the EU economy as a whole
- Cross-border activities: Total value of assets exceeds €5 billion and the ratio of its cross-border asset/liabilities – in more than one other participating Member State – to its total assets/liabilities is above 20%
- Direct public financial assistance: It has requested or received funding from the European Stability Mechanism or the European Financial Stability Facility

Additionally, the ECB, to ensure higher supervision, can qualify a bank as significant. When a bank is classified as significant, the national supervisor (NRA) hands over the responsibility for direct supervision to the ECB. If a bank fails to meet the criteria for significance for three consecutive years, it can be reclassified as less significant. Additionally, if a resolution action requires the use of the SRF, the SRB is responsible for the adoption of the resolution scheme for that bank.

This event study will be focused on the analysis of the abnormal reactions of the 118 significant entities under the SSM umbrella, as those are the financial institutions that, when facing a failing or likely to fail trigger, would be applied the same SRM resolution procedure as Banco Popular.

3.2.2.   *Events and timeline*

Public metrics of listed companies – such as share or bond prices – are very sensitive to external macroeconomic variables, company press releases or even, as we are confronted in our study, changes in regulation in banks operating countries. The ultimate goal of an event study is to analyse the significance of a particular event, allowing investors to draw valid conclusions regarding future profitability of their investments.

Once occurred, news are instantly incorporated in market prices and consequently abnormal returns and event dates can be directly linked one to another, unless it contains other relevant news. We see how time is an important variable in such studies and we are forced to be as precise and accurate as possible when choosing the exact date.

News come from different information channels – corporate web site, conference calls or press conferences as examples – and have a different target base, consequently and with the

only purpose of harmonizing different sources of news we have used articles coming from the Financial Times – Europe Edition as it has a good coverage regarding regulatory topics, following O'Hara and Shaw (1990) methodology.

Since the purpose of the study is to understand and interpret the investor's credibility of the new bail-in scenario in Europe, the events that will be studied henceforth correspond exclusively to decisions made by national and supranational public institutions, both regulators and supervisors.

June 7th, 2017 – Banco Santander acquires Banco popular for €1: After a struggling period for Banco Popular stakeholders, the ECB declared the bank likely-to-fail on June 6th. One day later and following an independent third-party valuation of the bank at €2bn, the SRB bailed-in Banco Popular by winding down shares, AT1 and T2 capital posterior to its conversion into shares.

That is considered as the trigger event for the series of events that are to be studied in this report, since it was the first resolution following the Single Resolution Mechanism since its approval in 2016.

June 23rd, 2017 – ECB declares Veneto Banks likely-to-fail: After a long period of continued losses and repeated breaches of supervisory capital ratios, The ECB determined that Veneto Banca and Popolare di Vinceza were likely to fail.

The Italian State decided on June 25th to bail out both banks at a cost of €17bn of taxpayer´s money – €5.2bn of capital raise and €12bn of guarantees for future losses – leaving the good assets under management of Intesa Sanpaolo, the largest retail bank in Italy, for a €1 token.

July 4th, 2017 – Monte dei Paschi di Siena is bailed-out by Italian State: The world's oldest bank and fourth largest lender in Italy, failed to raise €5bn in new capital from investors to shore up its capital and decided to ask the Italian State for a bail-out.

Italy´s Finance minister decided to add €5.4bn to those already contributed for the Veneto banks.

3.3. Data

Most of a company´s metrics are driven by risk, the higher it is the larger the premium expected from investors. We are going to consider both Equity Share Price and CDS Spread to encompass all sources of financing, even though they do not reflect exactly the same risks.

Share Prices measure the value investors are willing to pay for a share of a company´s book value. This value may change as they are traded in free market conditions. These ups and downs represent a risk to investors that can be broken down into two. First, the risk that the market as a whole suffers losses due to macroeconomic environment, the so called systematic

risk. On the other hand, the risk associated with microeconomic company metrics - annual losses, change of directive, among others - known as idiosyncratic risk.

CDS Spread is a measure of the credit risk, which is understood as the risk of a company not being able to face interest payment on each of their corporate bonds. This credit risk is also present in the credit ratings issued by rating agencies. As opposed to Share Prices, CDS Spreads are not unique, there exists a number of quotes equal to the number of corporate bonds issued by the company.

Theoretically, we can see a negative correlation between the two priced securities, although empirically is not always the case. When Share Price increases, company future estimates improve what sometimes can be eventually translated in a decrease in its bonds CDS Spread.

The advantage of using Share Prices and CDS Spreads is that they are marketed instruments – with a permanently tracked price – and can be easily obtained. Share Price and CDS Spread will be obtained from the data provider and manipulated to infer relative abnormal returns.

When analysing impact on debt returns, CDS Spread of the Contingent Convertible bonds of the financial institutions data set will be used rather than bond prices. CDS contracts are an insurance against default on the firm's debt where CDS Spreads are expressed as a percentage of the amount insured paid on a regular basis.

Andres, Betzer and Doumet (2016) indicated that CDS Spreads are a much significant metric to be used in event studies since due to its risk-oriented nature:

- CDS are more liquid than corporate bonds
- They are easily comparable among companies
- CDS market is more reactive, meaning that news integration in price occurs earlier in CDS markets than in bond markets
- They provide a pure measure of credit risk, ignoring interest rate and illiquidity risk

All those reasons are in line with our intention to harmonize as much as possible our inputs – as seen before in our event decision process – to obtain confident conclusions.

From our base of 118 banks supervised by the ECB, we have obtained the Share Price and CDS Spread of those banks whose information was available (44 and 29 respectively). Both Share Price and CDS Spread are quoted and therefore their price is established by the market. This fact means that both instruments price reflects the risk perceived by their investors. All the required data is to be extracted from *Datastream*, the data provider of *Thomson Reuters*.

The fact that Credit Default Swaps are an insurance contract related to the different debt securities issued by each bank, implies that the number of CDS contract per bank is larger than one and correspond to different seniorities and different maturities. Due to the nature of this study only the CDS contracts issued against subordinated debt securities will be considered,

and more precisely the 3-years modified-modified[1] (or modified-modified 14[2]) the most common throughout banks.

3.4. Methodology

In order to assess our initial hypotheses, a series of methodologies have been carried out that complementarily allow to draw some final conclusions.

This methodology is based on three methods: The first two will try to find out if the events described above (Popular bail-in Resolution, Likely to fail of Veneto Banks and MPS's bail-out announcement) produced an abnormal reaction in the markets, represented in our paper by a series of 49 banks, all of them supervised by the ECB, of which 44 and 29 have their Share Price and CDS Spread available respectively.

The last method is based on the previous two and allows to observe which are the micro and macroeconomic variables that intervened in these events and that will allow creating a simple empirical model to be used for future events.

3.4.1. Aggregated Effect – Stock Prices

This first method is based on a two-tailed contrast of hypothesis in which we will try to see whether the market has significantly reacted to the events or not. For this matter, abnormal returns will be used, which are defined as the excess or defect of the daily return with respect to an expected value understood as a mean historical value. The average of those abnormal returns across banks should be null on the event date should no impact had occurred or differ from zero otherwise.

$$AR_{i,t} = R_{i,t} - E[R_{i,t}|L_1] \; ; (1)$$

Abnormal returns are computed as shown in (1), being $R_{i,t}$ the daily return of bank *i* on time t and $E[R_{i,t}|L_1]$ the expected daily return of a bank in a normal day, defined during an estimation window L_1, not being affected by any other important event.

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[1] From the CDS we will use the modified-modified restructuring (MM) introduced in 2003 as a smother change to previous severe modified restructuring clause (MR). Modified restructuring clause was introduced in 2001 in order to limit the scope of opportunistic behaviour by sellers of CDS in the event of restructuring agreements that did not cause a real loss. Restructuring agreements under modified-modified restructuring still count as credit events, but with a clause limiting the deliverable obligations with a maturity shorter than 60 months after the termination date of the CDS contract for restructured obligations and 30 months for all other obligations. Modified-modified restructuring (MM) contracts' spread is lower than the spread of full restructuring contracts (FR/CR) and larger than the no restructuring contracts (XR) due to its trigger likelihood.

[2] Modified-modified 14 CDS contracts are slightly riskier than the modified-modified (have a higher spread). These CDS appeared as a further modification to the modified-modified CDS during 2014.

We have decided to use the period L_1 defined from December 13th, 2016 to May 31st, 2017, a total of 120 unaltered trading days in which the normal expected value will be determined. The period from June 1st until June 6th, 2017 has not been considered as some leakage news may have occurred. For the other two Italian events, we have considered the same L_1 reference period. Taking 120 trading days plus 5 gap days would have meant including the Banco Popular event polluting the expected value and thereafter the number of gap days have been adjusted accordingly, being 17 for the second event and 24 for the third one.

In order to compute the normal expected value of the stock returns we will use the market model, which relates linearly the stock return with the absolute value of the market return, again focusing only in return magnitude. To determine the market portfolio, we will consider a European banking index such as the STOXX Europe 600 banks index.

$$E[R_{i,t}|L_1] = \alpha_i + \beta_i \cdot R_{m,t} \; ; (2)$$

Figure 5 and *Figure 6* of the Appendix section exhibit respectively the normal probability plot of the Share Price and CDS Spread changes of the analysed banks. Stock Price Returns, due to its larger liquidity, fit better the normal distribution than de CDS Spread changes. In both cases, though, the initial assumption of this paper will be that they follow a normal distribution, despite we observe how, when it comes to extreme changes, they appear more frequently than they should under a normal distribution.

With the premise that the Share Price and the CDS Spread returns follow a normal distribution (3), the abnormal returns will follow a normal distribution with the same standard distribution centred in zero (4).

$$R_{i,t} \sim N(\mu_i, {\sigma_i}^2) \; ; (3)$$

$$AR_{i,t} \sim N(0, {\sigma_i}^2) \; ; (4)$$

Positive abnormal returns will imply that the change for the specific day and bank is above the reference mean determined during the period from $t = 1$ to $t = L_1$ ($E[R_{i,t}|L_1]$) and negative ones the other way around.

$$\begin{cases} H_0: \overline{AR}_{t=event} = 0 \\ H_1: \overline{AR}_{t=event} \neq 0 \end{cases} \; ; (5)$$

Equation (5) shows the contrast to be assessed, H_0 being that the event has no impact on the mean across banks of stock returns on the day of the event, which is the same as stating that, amongst banks during the event window, the average stock return and the expected return are close to each other or that the abnormal average stock return is equal to zero.

Campbell, Lo and MacKinlay (1997) in their event study dissertation expose that the variance of the average of the normally distributed abnormal returns $(AR_{i,t})$ can be performed as exhibited in equation (7), the standard deviation of the mean will be calculated as the average of each of the unbiased standard deviations of each of the N banks during the period L_1, and equation (8) shows the statistic for day t for this methodology.

$$\overline{AR}_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t} \; ; (6)$$

$$Var[\overline{AR}_t] = \frac{1}{N^2}\sum_{i=1}^{N}\boldsymbol{\sigma_i^2} \; \; where \; \; \boldsymbol{\sigma_i} \approx \sqrt{\frac{1}{L_1-2}\sum_{t=1}^{L_1}\left(R_{i,t} - E[R_{i,t}|L_1]\right)^2} \; ; (7)^3$$

$$\frac{\overline{AR}_t}{\sqrt{Var[\overline{AR}_t]}} \sim N(0,1) \; ; (8)$$

Nevertheless, we will directly estimate the standard deviation of the abnormal average returns through equation (9), which will deliver directly an unbiased estimator of the population. Equation (10) will be the used statistic for day t, distributed as a Student-t with $N-1$ degrees of freedom under the null hypothesis if the $\overline{AR}_t$ are identically distributed, independent and normal (Brown and Warner, 1985).

$$Var[\overline{AR}_t] \approx \hat{S} = \sqrt{\frac{1}{L_1-1}\sum_{t=1}^{L_1}(\overline{AR}_t - E[\overline{AR}_t|L_1])^2} = \sqrt{\frac{1}{L_1-1}\sum_{t=1}^{L_1}(\overline{AR}_t)^2} \; \; ; (9)$$

$$\frac{\overline{AR}_t}{\hat{S}} \sim t\,Student(N-1) \; ; (10)$$

3.4.2. *Aggregated Effect – CDS Spread*

The analysis described above for stock returns must be repeated for CDS Spreads, the only difference being the calculation of abnormal returns. For CDS Spreads, the average model is used instead of the market model shown in equation (2), where abnormal returns are computed as:

$$A\Delta SM_{i,t} = \Delta SM_{i,t} - E[\Delta SM_{i,t}|L_1] \; ; (11)$$

$$E[\Delta SM_{i,t}|L_1] = \frac{1}{L_1}\sum_{t=1}^{L_1}\Delta SM_{i,t} \; ; (12)$$

Where $\Delta SM_{i,t}$ is the daily CDS Spread change of bank i on time t and $E[\Delta SM_{i,t}|L_1]$ the expected daily CDS Spread change of a bank in a current day.

3.4.3. *Individual Effect*

The following method, together with the first, will allow us to establish the bases for the inception of the model described in the next chapter. In addition, it will complement the

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[3] Approximation when using the market model due to the sampling error, which becomes negligible as L_1 grows. When using the average model each bank's unbiased standard deviation will be computed as $\boldsymbol{\sigma_i} = \sqrt{\frac{1}{L_1-1}\sum_{t=1}^{L_1}\left(R_{i,t} - E[R_{i,t}|L_1]\right)^2}$ instead.

conclusions drawn, making it possible to discern which banks were significantly impacted, in an individual basis, by the analysed events.

This method uses most of the definitions from the first one. Nevertheless, this time the abnormal returns are used as independent variables in a linear regression in which the significance of one of the parameters (β_1) will be tested.

$$AR_{i,t} = \beta_0 + \beta_1 \cdot Event_i \; ; (13)$$

A one-day and a three-day window centred on the day of the event will be defined, called the "event *windows*", which will allow us to understand whether the bank was impacted only on the event day or, on the contrary, news leakage or delayed reactions took place in the market. The model assumes that the abnormal returns are to be constant at any day outside the event windows and different otherwise. The event variable is by definition a dummy variable, which is equal to one during the event windows and zero otherwise.

Considering the hypothesis of the model, we want to observe for what banks β_1 is statistically different from zero, meaning that the event significantly impacts the abnormal returns during the event windows.

$$\begin{cases} H_0: \beta_1 = 0 \\ H_1: \beta_1 \neq 0 \end{cases} \; ; (14)$$

It is worth noting that for CDS Spread changes the methodology employed will be the same besides the abnormal change calculation procedure explained in the previous chapter.

$$A\Delta SM_{i,t} = \beta_0 + \beta_1 \cdot Event_i \; ; (15)$$

3.4.4. *Macroeconomic Multivariate Model*

So far, with the first method, we have assessed whether the average abnormal returns of banks supervised by the SSM were significantly different from zero during the three analysed events. The individual effect model has helped us determine which of the aforementioned banks' financial instruments quotes were significantly impacted during the event periods and if a delayed or advanced effect took place.

This last method will consist in a multivariate model focused on the one-day event window to help us identify what are the bank characteristics that result in a significant abnormal reaction in the three studied events. This analysis will help us verify or reject the hypothesis regarding the impact of bail-in and bail-out events across European banks supervised by the SSM. To do so, we will perform the following regression using both the abnormal CDS Spread change and the abnormal stock price return in the event day as independent variables:

$$AR_{i,t}\big|_{t=event\ day} = \beta_0 + \beta_1 \cdot Country_i + \beta_2 \cdot GSIBs_i + \beta_3 \cdot Size_i + \beta_4 \cdot DebtGDP_i$$

$$+\beta_5 \cdot Tier1_i + \beta_6 \cdot Deposits_i \; ; (16)$$

$$A\Delta SM_{i,t}\big|_{t=event\ day} = \beta_0 + \beta_1 \cdot Country_i + \beta_2 \cdot GSIBs_i + \beta_3 \cdot Size_i + \beta_4 \cdot DebtGDP_i$$

$$+\beta_5 \cdot Tier1_i + \beta_6 \cdot Deposits_i \ ; (17)$$

Where:

- $Country_i$: refers to whether the i bank is incorporated in the same country as the bank that is triggering the event (1) or not (0) (Hypothesis 5)
- $GSIBs_i$: refers to whether the i bank has been designed as a G-SIBs (Global Systemically Important Banks) (1) or not (0) (Hypothesis 2)
- $Size_i$: refers to the size of the i bank in term of total assets in Euros (end 2016) (Hypothesis 2)
- $DebtGDP_i$: refers to the ratio of government gross debt to GDP of the origin country of the i bank (2017). In order to check the fiscal strength of the bank's country and its capacity to perform a bail-out (Hypothesis 1).
- $Tier1_i$: refers to the ratio of core equity capital (in which AT1, contingent convertible bonds, are included) to risk weighted assets of the i bank (end 2016). This will help us understand whether poorly capitalized banks had a stronger reaction or not. (Hypothesis 3)
- $Deposits_i$: refers to the ratio of customer deposits (demand deposits, saving deposits and time deposits) to total liabilities (end 2016). To check whether banks with abundant capital for bail-ins react stronger. (Hypothesis 4)

The aim of this regression is to, through a series of hypothesis tests on the nullity of the parameters ($\beta_0 \dots \beta_6$), identify which ones are significantly different from 0 in order to explain the abnormal reactions among banks.

$$\begin{cases} H_0: \beta_i = 0 \\ H_1: \beta_i \neq 0 \end{cases}, i = 0 \dots 6 \ ; (18)$$

This will allow us to establish which characteristics of a bank are important when assessing the potential contagion impact after a bail-in event and confirm or reject the presented hypothesis in section 3.1. Additionally, the sign of the parameters, once deemed significant, will allow us to understand in what direction does the variable push the abnormal returns.

4. Results

In *Figure 1* and *Figure 2* we observe how the abnormal changes have evolved along our period of study. The vertical axis represents respectively, the daily average of abnormal Stock Returns and abnormal CDS Spread Mid Changes across banks. These metrics show by how many percentage points (p.p.) all banks were above or below, on average, with respect to the average historical mean over L_1. This historical average is very close to zero in both cases, thereafter dealing with an abnormal return will very similar to dealing with the regular returns. The horizontal axis represents the timeline used in our paper study, from 14th December 2016, until 4th July 2017, which includes our current state period L_1, our security gap five-day period and the events listed below:

- Event 1: Banco Santander acquires Banco Popular for €1 in June 7th, 2017 (day 125)
- Event 2: ECB declares Veneto Banks likely-to-fail in June 23rd, 2017 (day 137)
- Event 3: Monte dei Paschi di Siena is bailed out by Italian State in July 4th, 2017 (day 144)
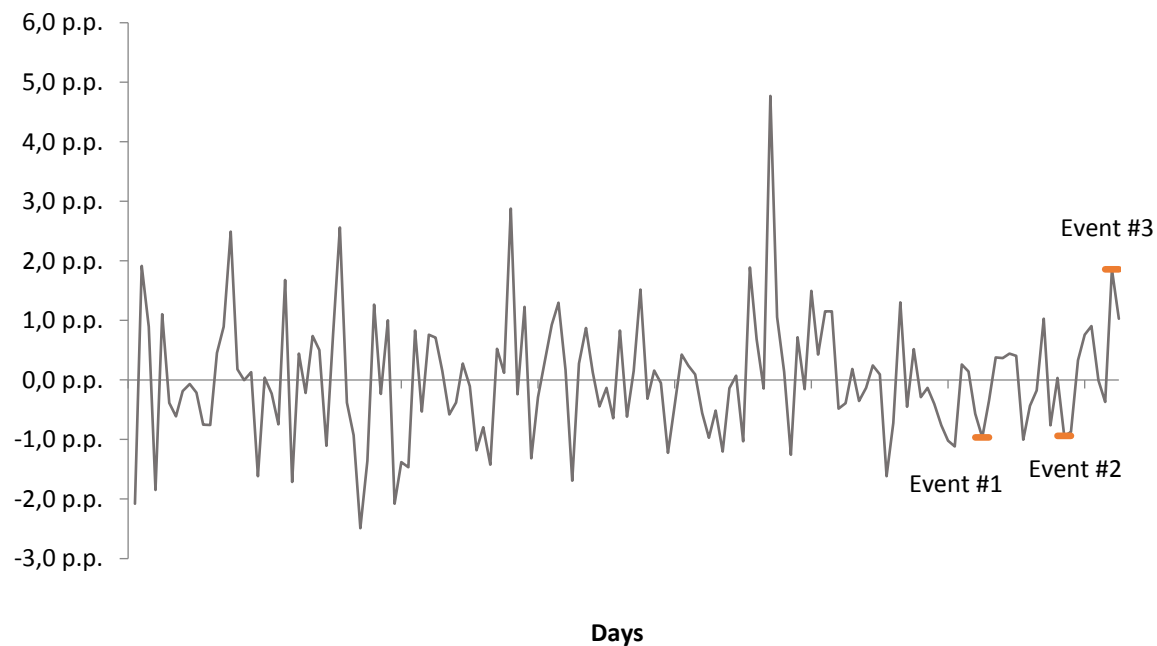
Figure 1: Average Abnormal Stock Price Return (p.p.)
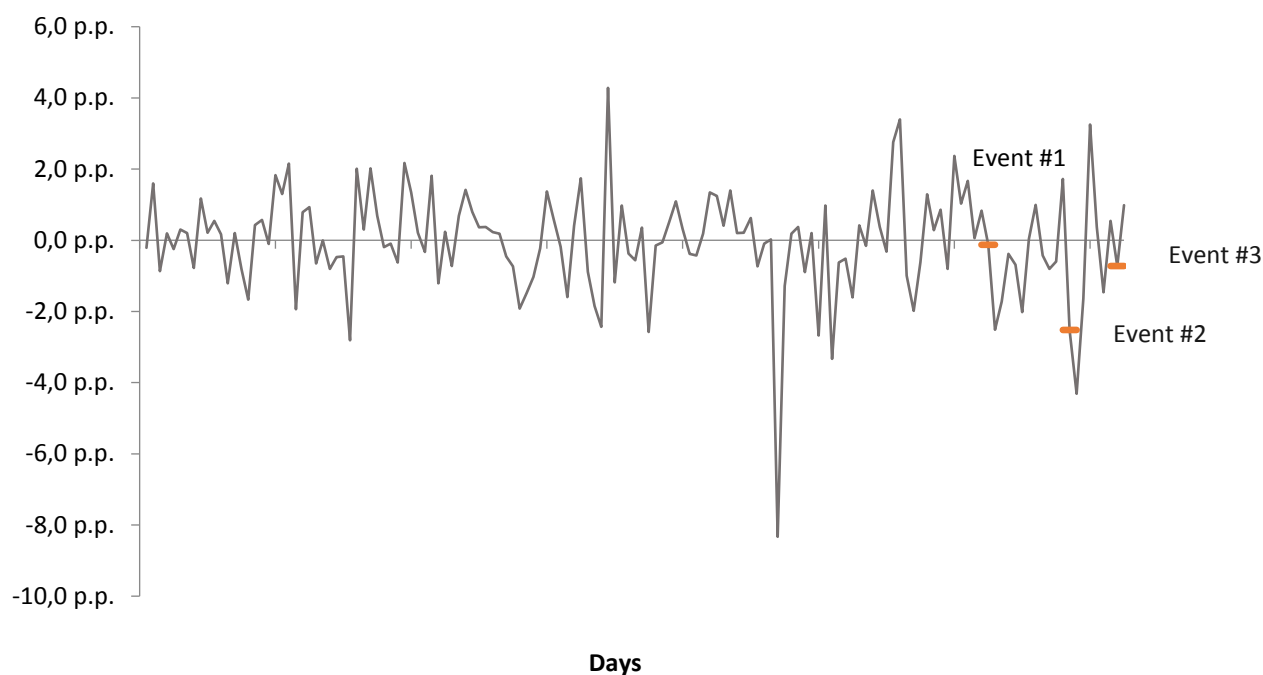
Figure 2: Average Abnormal CDS Spread Mid Change (p.p.)

		Event Day Average Abnormal Change	Standard Deviation Abnormal Change	T Ratio	P Value
$\overline{AR}$[4]	Event 1	(0,96)%	1,08%	(0,89)	0,19
	Event 2	(0,94)%	1,08%	(0,87)	0,19
	Event 3	1,86%	1,08%	1,72	0,05**
$\overline{A\Delta SM}$[5]	Event 1	(0,13)%	1,46%	(0,09)	0,47
	Event 2	(2,52)%	1,46%	(1,73)	0,05**
	Event 3	(0,72)%	1,46%	(0,50)	0,31

Table 1: Aggregated effect result summary (Method 1)

From an aggregated point of view as shown in *Table 1*, only events 2 and 3 have significantly impacted both financial markets, CDS Spread and Stock Price respectively, with Credit Default market having a notably higher volatility.

In order to better illustrate which banks were more impacted during the events, *Figure 3* and *Figure 4* represent the abnormal Stock Return and CDS Spread Mid Changes per bank for the three events.

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[4] Average Abnormal Stock Return.
[5] Average Abnormal CDS Spread Mid Change.
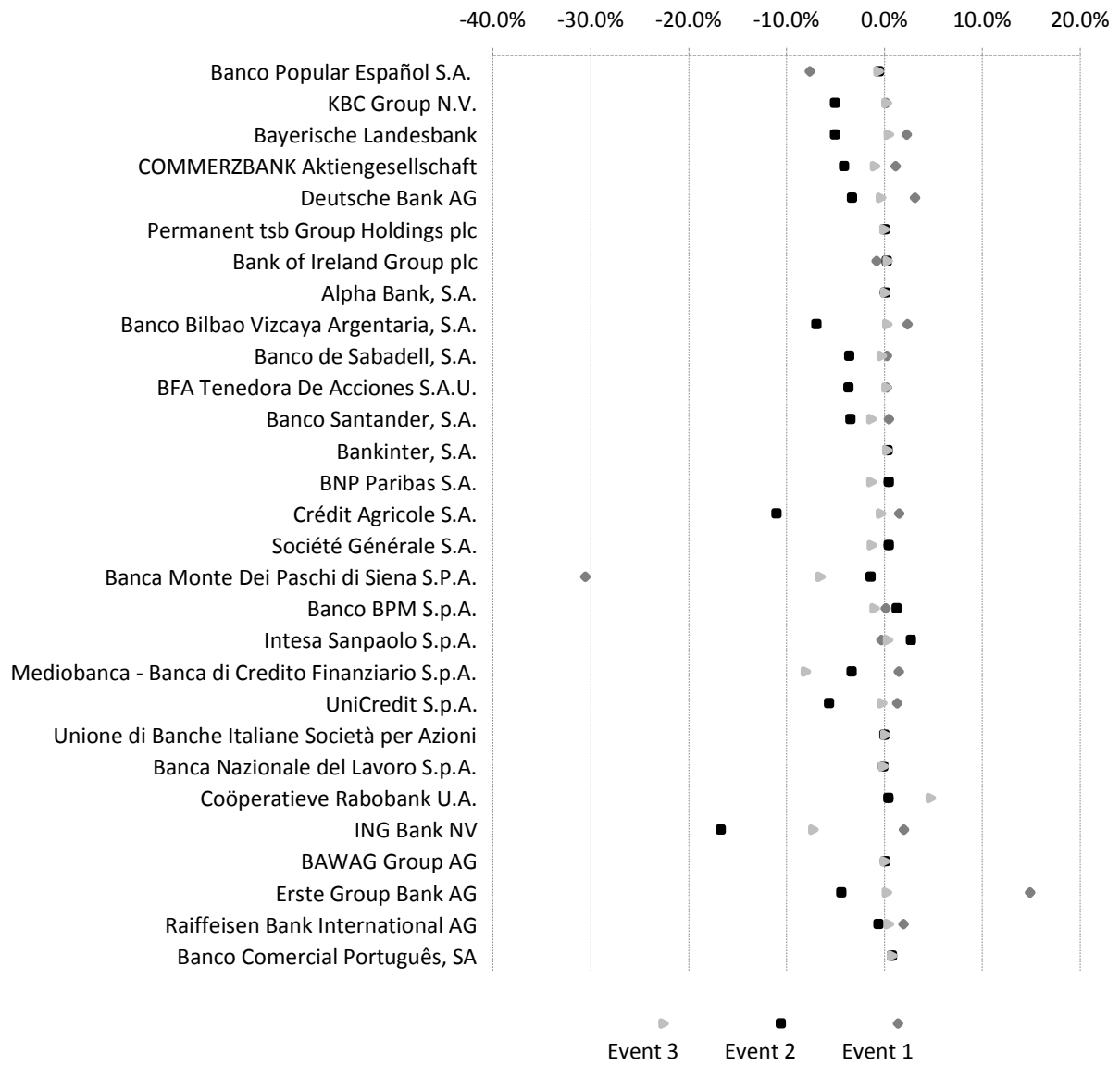
Figure 3: Abnormal CDS Spread Mid Change per bank and event (%)

Figure 4: Abnormal Stock Return per bank and event (%)

4.1.   Event 1: Banco Santander acquires Banco Popular for €1

As shown in *Table 2* and *Table 3* in the Appendix, one could conclude that Banco Popular resolution impacted banks mostly from Spain, Italy and other countries in Southern Europe. Of course, we are not facing a 100% contagion to other banks, but one could argue that the bail-out of Monte dei Paschi di Siena may have been triggered by, or at least been contributed in part by, the SSM resolution as well as Banca Carige's need for a capital injection later that month.

The 1-day and 3-day event window comparison exhibits that most of Popular's peers in Spain (Banco Santander, Bankinter, Banco de Sabadell, Liberbank, and Bankia) suffered a significant reaction in the prior and/or posterior days of the event, revealing the volatility that the resolution introduced in the Spanish market.

In spite of not being significantly enough, in the announcement day there was a negative impact of almost 1% on the banks' average abnormal stock returns. As shown in *Table 8*, the stock price reaction to the bail-in was significantly more severe (negative) for banks incorporated in countries with a high level of indebtedness, as well as for banks with high Tier 1 capital ratios. Those results are not aligned with our initial hypothesis. According to Hypothesis 1, reactions should be weaker for banks in countries with limited space for bail-out as they didn't expect to be bailed out in any case. Additionally, Hypothesis 3 states that banks with low capital ratios should react stronger than banks well capitalized.

Countries with high debt-to-GDP ratios are supposed to have low capacity to bail-out their financial institutions. Nevertheless, those countries are the ones that historically have had most of the European bail-out cases. In our study, banks from Spain, Italy, Greece, Ireland and Malta exhibited stronger reactions to the bail-in event, which could be explained by investors no longer relying on the bail-out culture previously established in such territories. One can consequently infer that the expectations for a potential bail-out are based on similar previous cases and on the predisposition of the competent institutions of the country.

Despite the fact that banks of *Table 2* and *Table 3* have some of the lowest Tier 1 ratios (Banca Monte Dei Paschi di Siena, Banco Popular, Banca Carige, Bankinter, and Banco Sabadell), according to results of *Table 8*, on average, a bail-in resolution should cause more extreme reactions to banks with high Tier 1 capital ratios, both in Stock Price Returns and CDS Spread Mid Changes. We should bear in mind that Banco Popular's bail-in was especially controversial due to the wipe out of €1.34 bn of AT1 capital (CoCo´s) that were still trading at 50% of its face value on June 6th. AT1 securities were designed as instruments to achieve higher Tier 1 capital ratios under the Basel III regulation. Investors, before the event day, had already learned that Banco Popular's shareholder's equity had severely deteriorated; the surprise came with the additional risk to the AT1 instruments under the bail-in resolution. Thereafter, institutions that

issued AT1 securities to fulfil Basel III requirements, increased its Tier 1 ratio with riskier capital leading to negative impact. Unfortunately, we have not been able to gather enough data regarding the ratio AT1 to total Tier 1 capital to prove this final implication. This could set the foundations for the continuation of this paper.

4.2.   Event 2: ECB declares Veneto Banks Likely-to-fail

When the Veneto banks were declared likely-to-fail by the ECB, CDS contracts were severely impacted: (2.52)% on average. We see how Spanish, Greek and, as expected, Italian banks were the most impacted. It is worth noting the negative sign of the result. We could deduct that the slump came after an upward trend caused by the instauration of the SRM, strengthened by Popular's resolution, which was reverted after the ECB announcement reducing AT1 bonds' risk.

Ever since Veneto Banca and Banca Popolare di Vicenza had repeatedly breached supervisory capital requirements, the perceived market risk of a potential bail-in increased, strengthening the power of the SRM. Nevertheless, in the likely-to-fail announcement the SRB specified that: "…the conditions for a bank resolution action in relation to the two banks had not been met. The banks will be wound up under Italian insolvency procedures." This made clear to investors that a bail-in wouldn't take place and National Resolution Authorities would apply the national proceedings instead – leading to a bail-out – which corrected market expectations by significantly lowering the CDS prices.

Regarding the multivariate analysis, we observe in *Table 8* how once market uncertainty was dissipated, and a bail-out was adopted, the impact in CDS spreads is significantly more negative for G-SIB banks, in line with Hypothesis 2. G-SIB banks should react stronger to a potential bail-in scenario due to the implicit guarantee ex-ante, once investors learn that a bail-out will take place instead, the correction should be also larger for G-SIB banks. Additionally, smaller banks in terms of assets, present a larger negative reaction in CDS Spreads, as stated in our hypothesis.

Negative Stock Prices Returns were more intense for banks incorporated in countries with high indebtedness. Italian banks were less affected, probably due to the worse implications that a bail-in scenario would have implied. This event highlights the differences between the reactions of Stock Prices Returns and CDS Spreads Mid Changes due to the nature of its investors.

4.3.   Event 3: Monte dei Paschi di Siena is bailed-out by Italian State

The culmination of the bail-out of Monte dei Paschi di Siena on July 2017, supposed a breath of fresh air for equity investors of the European banking system. Investors, who feared the permanent implementation of the bail-in as the unique mechanism after the Banco Popular resolution, saw the capital issues that the long-lived bank had been suffering since 2016 solved through a bail-out, leading to an abnormal 1.86% Stock Price growth on average.

The bail-out announcement had a significant positive impact on a high number of Spanish, French, and especially Italian banks – mostly the day of the event – exhibiting little news' leakage. The fact that equity suffers such a positive impact after the bail-out announcement, is due to shareholder's generally being wiped out in a bail-in mechanism and National Authorities injecting fresh capital otherwise.

Italian banks had a significant larger positive Stock Price reaction as shown by the Country variable. This result is aligned with Hypothesis 5, in which it is stated that banks within the same country of the affected entity should react strongly. The strong positive reactions are also true for larger banks in terms of assets, as well as for banks incorporated in countries with high debt-to-GDP ratio. The main reason is that Spanish and Italian banks saw how bail-out procedures were still applied for distressed entities.

Debt's riskiness is lowered for G-SIB banks but amplified for large banks in terms of assets, entailing a compensated neutral effect for large G-SIB entities. The average CDS Spread reaction was negative. *Table 8* shows that banks with high Tier 1 capital ratios and large Deposits had a positive beta and consequently saw little changes in their CDS Spreads. As according to Hypothesis 3 and 4, they should have been less impacted due to a change in bail-in expectations.

5. Conclusion

The fact that Banco Popular´s bail-in set a precedent in the European Union's banking system is indisputable because of the political consequences that can be inferred. It has been observed from SRB's resolution, that political authorities have a strong commitment to move from the historical bail-out comfort zone towards a new bail-in era in which tax-payers money is not at stake.

This paper study has tried to go a step further analysing investors´ credibility about the recently implemented tool, to see whether adopted measures in 2014 had been taken seriously and had been integrated in marketed financial securities as company Stock Prices and CDS Spreads.

In order to carry out the aforementioned, an event study has been deployed in which a semi-bail-out event and a traditional bail-out event were contrasted to the main event of the study itself. A whole spectrum of reactions has been obtained and analysed and allow us to conclude that investors had already integrated bail-in implications in securities prices.

Leaving aside Stock Prices and focusing our analysis on CDS Spreads, Banco Popular's resolution mainly impacted on direct competitors such as Banco Santander, other small Spanish banks, as well as MPS, severely damaged since 2016. Even so, we observe that on average the abnormal impact in CDS Spreads was (0.13)%, not being statistically significant. This leads to the conclusion that investors did not perceive this resolution as a risk increase of their financial products, since this perception had already been integrated with the approval of the Single Resolution Mechanism in 2014. Nevertheless, countries with high indebtedness reacted strongly to the aforementioned announcement which attacks directly Hypothesis 1.

Oppositely, we see how the final decision to bail-out Veneto banks dislodged investors´ mind, who saw how Europe turned its back on the measures adopted in 2014 to return to traditional bail-outs using public money as source of capital. This is the event that shows us the fact discussed above, that investors were already aware of the bail-in long before Banco Popular event happened and once an action was taken against the SRM guidelines, an abnormal (2.52)% drop in CDS prices occurred.

Finally, using the Stock Price Return analysis, we observe how the bail-out of MPS strengthens the results obtained in the second event. The final confirmation of a bail-out, that had been announced months before, ended with the uncertainty regarding the Italian entity and endorsed the fact that a bail-out could still be performed under the SRB supervision. These lead to a general rise of Stock Prices, especially in Italian banks that saw the eagerness of the Italian state to support its financial institutions.

All across the 3 events, we have observed how banks with high Tier 1 ratios, reversely to Hypothesis 3, reacted stronger. Notwithstanding, G-SIB banks showed stronger reactions to bail-in and bail-out announcements, in line with our Hypothesis 2 and banks incorporated in the same country as the concerned studied banks exhibited a more forceful reaction than the rest of them, endorsing Hypothesis 5. On the other hand, there have not been statistically significant enough results to prove or deny Hypothesis 4.

The study has opened the door to two new possible research channels, which have not been developed in detail due to lack of consistency with the paper itself and lack of available data respectively. In the first place, the observed correlation between Stock Price Return and CDS Spread Mid Change, which theoretically we understand, should be close to -1. This should be the case, since an increase in the share price can be translated into company management performance or positive estimates, which is usually accompanied by a reduction in operating risk, which, as we know, reduces the debt risk therefore decreasing CDS Spreads. We have observed empirically that sometimes both move in the same direction. One possible explanation would be that both securities have a very different investor core that does not react equally to the same events.

On the other hand, as mentioned in the results, we have seen that the Tier 1 Capital variable reacts negatively both for very small values and for values well above the average. As a hypothesis, we suggest that AT1 Contingent Convertible bonds have increased their risk after the occurred event of Banco Popular and maybe that´s what is impacting banks with a high Tier 1 Capital ratio, where AT1 securities represent a large amount of the total.

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7. Appendix

7.1.   Banco Santander acquires Banco Popular for 1€

	Bank Name	Bank Code	β_0	β_1	P Value β_1
CDS Spread	**Banca Monte Dei Paschi di Siena S.P.A.**	32	(0,06)%	(30,49)%	0,001***
	Banco Popular Español S.A.	0	0,32%	(7,96)%	0,007***
	Erste Group Bank AG	51	(0,09)%	14,98%	0,000***
	Permanent tsb Group Holdings plc	14	0,00%	0,01%	0,070*
Share Price	**Banca Carige S.p.A. - Cassa di Risparmio di Genova e Imperia**	31	(0,10)%	(4,59)%	0,047**
	Norddeutsche Landesbank - Girozentrale	12	(0,02)%	3,52%	0,001***
	Eurobank Ergasias, S.A.	17	(0,01)%	(4,81)%	0,091*
	HSBC Bank Malta p.l.c.	45	0,01%	1,99%	0,015**

Table 2: Banks reacting significantly to event 1 (1-day event window)

	Bank Name	Bank Code	β_0	β_1	P Value β_1
CDS Spread	**Banca Monte Dei Paschi di Siena S.P.A.**	32	0,05%	(14,70)%	0,004***
	Banco Santander, S.A.	23	0,03%	(2,86)%	0,065*
	Bankinter, S.A.	24	(0,07)%	(2,11)%	0,097*
Share Price	**Banco de Sabadell, S.A.**	21	0,00%	(1,24)%	0,088*
	BFA Tenedora De Acciones S.A.U.	22	(0,01)%	1,54%	0,057*
	Liberbank, S.A.	26	(0,03)%	(4,24)%	0,001***
	Banca Carige S.p.A. - Cassa di Risparmio di Genova e Imperia	31	(0,07)%	(2,69)%	0,045**
	Bank of Ireland Group plc	15	0,00%	(2,01)%	0,077*
	HSBC Bank Malta p.l.c.	45	0,00%	0,80%	0,068*

Table 3: Banks reacting significantly to event 1 (3-day event window)

7.2. Event 2: ECB declares Veneto Banks likely-to-fail

	Bank Name	Bank Code	β_0	β_1	P Value β_1
CDS Spread	Banco de Sabadell, S.A.	21	(0,06%)	(3,58%)	0,086*
	BFA Tenedora De Acciones S.A.U.	22	(0,12%)	(3,59%)	0,071*
	Bayerische Landesbank	4	0,01%	(5,09%)	0,050**
	Banco Bilbao Vizcaya Argentaria, S.A.	20	(0,06%)	(6,93%)	0,030**
	COMMERZBANK Aktiengesellschaft	5	0,02%	(4,15%)	0,054*
	Crédit Agricole S.A.	29	(0,09%)	(10,97%)	0,010**
	Erste Group Bank AG	51	(0,02%)	(4,41%)	0,072*
	ING Bank NV	48	(0,06%)	(16,68%)	0,000***
	KBC Group N.V.	2	0,02%	(5,08%)	0,010**
	UniCredit S.p.A.	39	(0,07%)	(5,60%)	0,028**
Share Price	Banca Carige S.p.A. - Cassa di Risparmio di Genova e Imperia	31	(0,13%)	(4,78%)	0,040**
	KBC Group N.V.	2	(0,03%)	(2,32%)	0,039**
	Alpha Bank, S.A.	16	0,04%	(4,29%)	0,079*
	Eurobank Ergasias, S.A.	17	0,05%	(5,22%)	0,070*
	Piraeus Bank, S.A.	19	0,12%	(5,74%)	0,063*

Table 4: Banks reacting significantly to event 2 (1-day event window)

	Bank Name	Bank Code	β_0	β_1	P Value β_1
CDS Spread	Banco de Sabadell, S.A.	21	(0,04%)	(2,22%)	0,072*
	BFA Tenedora De Acciones S.A.U.	22	(0,09%)	(2,71%)	0,028**
	Bayerische Landesbank	4	0,05%	(3,40%)	0,029**
	Deutsche Bank AG	7	0,02%	(2,25%)	0,090*
	Erste Group Bank AG	51	0,02%	(2,98%)	0,044**
	ING Bank NV	48	(0,05%)	(5,94%)	0,001***
	Mediobanca - Banca di Credito Finanziario S.p.A.	38	0,00%	(4,67%)	0,003***
	Raiffeisen Bank International AG	52	0,03%	(2,68%)	0,042**
	UniCredit S.p.A.	39	(0,03%)	(3,58%)	0,017**
	Unione di Banche Italiane Società per Azioni	40	(0,03%)	(1,82%)	0,034**
Share Price	Aareal Bank AG	3	(0,06%)	(1,11%)	0,073*
	Deutsche Pfandbriefbank AG	10	(0,13%)	(2,04%)	0,021**
	KBC Group N.V.	2	0,00%	(2,31%)	0,001***
	Eurobank Ergasias, S.A.	17	0,07%	(2,65%)	0,099*
	Erste Group Bank AG	51	(0,01%)	(1,37%)	0,040**

Table 5: Banks reacting significantly to event 2 (3-day event window)

7.3.   Event 3: Monte dei Paschi di Siena is bailed-out by Italian State

	Bank Name	Bank Code	β_0	β_1	P Value β_1
CDS Spread	Coöperatieve Rabobank U.A.	47	(0,22%)	4,97%	0,052*
	ING Bank NV	48	(0,14%)	(7,10%)	0,015**
	Mediobanca - Banca di Credito Finanziario S.p.A.	38	(0,16%)	(7,86%)	0,004***
Share Price	Banco Bilbao Vizcaya Argentaria, S.A.	20	(0,04%)	3,29%	0,012**
	Banco de Sabadell, S.A.	21	(0,06%)	3,16%	0,021**
	BFA Tenedora De Acciones S.A.U.	22	0,01%	4,90%	0,002***
	Banco Santander, S.A.	23	(0,03%)	3,52%	0,010***
	CaixaBank, S.A.	25	(0,03%)	3,93%	0,011**
	BPER Banca S.p.A.	34	0,02%	6,52%	0,005***
	Banca Popolare di Sondrio, Società Cooperativa per Azioni	35	(0,01%)	3,82%	0,015**
	Credito Emiliano Holding S.p.A.	36	0,04%	2,52%	0,060*
	Intesa Sanpaolo S.p.A.	37	0,05%	2,55%	0,059*
	UniCredit S.p.A.	39	0,01%	3,74%	0,079*
	Unione di Banche Italiane Società per Azioni	40	0,06%	3,67%	0,100*
	BNP Paribas S.A.	28	(0,02%)	2,95%	0,039**
	Crédit Agricole S.A.	29	(0,01%)	2,61%	0,062*
	Société Générale S.A.	30	(0,03%)	2,65%	0,074*
	Aareal Bank AG	3	(0,06%)	2,42%	0,033**
	COMMERZBANK Aktiengesellschaft	5	0,03%	3,89%	0,020**
	Norddeutsche Landesbank - Girozentrale	12	0,05%	(8,17%)	0,000***
	KBC Group N.V.	2	(0,02%)	2,34%	0,037**
	ABN AMRO Group N.V.	46	(0,01%)	2,55%	0,035**
	ING Bank NV	48	(0,01%)	2,40%	0,032**
	Všeobecná úverová banka, a.s.	57	0,02%	(2,13%)	0,085*

Table 6: Banks reacting significantly to event 3 (1-day event window)

	Bank Name	Bank Code	β_0	β_1	P Value β_1
CDS Spread	Banco de Sabadell, S.A.	21	(0,04%)	(2,22%)	0,072*
	BFA Tenedora De Acciones S.A.U.	22	(0,09%)	(2,71%)	0,028**
Share Price	BFA Tenedora De Acciones S.A.U.	22	0,02%	1,43%	0,077*
	Banca Carige S.p.A. - Cassa di Risparmio di Genova e Imperia	31	(0,17%)	8,89%	0,000***
	BPER Banca S.p.A.	34	0,00%	2,86%	0,026**
	Credito Emiliano Holding S.p.A.	36	0,02%	1,85%	0,024**
	Norddeutsche Landesbank - Girozentrale	12	0,05%	(2,67%)	0,000***
	Erste Group Bank AG	51	0,00%	1,36%	0,041**
	Sberbank Europe AG	53	(0,07%)	1,49%	0,050*

Table 7: Banks reacting significantly to event 3 (3-day event window)

7.4. Multivariate model results

			Constant	Country	G-SIB	Size	Gross Debt / GDP	Tier 1 Ratio	Deposits / Liabilities
Share Price	Event 1	**Beta**	6,3%	(0,3)%	(0,5)%	(0,0002)%	(0,021)%	(0,29)%	(0,015)%
		P Value	0,00***	0,30	0,34	0,42	0,00***	0,00***	0,19
	Event 2	**Beta**	4,4%	0,9%	(1,7)%	0,0012%	(0,034)%	(0,13)%	(0,006)%
		P Value	0,02**	0,07*	0,09*	0,12	0,00***	0,09*	0,35
	Event 3**	**Beta**	(4,8)%	2,0%	(1,1)%	0,0027%	0,017%	0,18%	0,024%
		P Value	0,08*	0,03**	0,30	0,05**	0,06*	0,13	0,19
CDS Spread Mid	Event 1	**Beta**	(17,5)%	0,5%	2,8%	0,0001%	(0,024)%	1,26%	0,041%
		P Value	0,14	0,44	0,33	0,49	0,32	0,03**	0,39
	Event 2**	**Beta**	(10,1)%	0,8%	(8,6)%	0,0049%	0,040%	0,05%	0,045%
		P Value	0,16	0,37	0,01**	0,06*	0,10	0,45	0,31
	Event 3	**Beta**	(12,4)%	(0,5)%	(4,9)%	0,0043%	0,011%	0,37%	0,091%
		P Value	0,02**	0,37	0,01**	0,01**	0,27	0,07*	0,04**

Table 8: Macroeconomic Multivariate Model results

7.5. Bank's data

Bank Code	Bank Name	Country	Share Price	Type CDS 3-Y Sub	G-SIB	Total Assets (€ billion)	Debt / GDP (%)	Total Capital Ratio (%)	Tier 1 Ratio (%)	Deposits / Total Liabilities (%)
0	Banco Popular Español S.A.	Spain	-	MM	-	148	98,7	13,2	12,1	56,0
2	KBC Group N.V.	Belgium	Yes	MM14	-	275	104,3	20,0	17,4	52,1
3	Aareal Bank AG	Germany	Yes		-	48	65,0	27,5	19,9	60,9
4	Bayerische Landesbank	Germany	-	MM14	-	212	65,0	17,0	14,7	40,9
5	COMMERZBANK Aktiengesellschaft	Germany	Yes	MM14	-	480	65,0	15,3	12,3	51,7
7	Deutsche Bank AG	Germany	Yes	MM	Yes	1591	65,0	16,6	13,1	34,6
10	Deutsche Pfandbriefbank AG	Germany	Yes	-	-	63	65,0	20,7	19,0	15,9
12	Norddeutsche Landesbank - Girozentrale	Germany	Yes	Removed	-	175	65,0	16,3	11,9	32,8
14	Permanent tsb Group Holdings plc	Ireland	Yes	MM	-	24	69,3	16,3	15,7	72,0
15	Bank of Ireland Group plc	Ireland	Yes	MM	-	123	69,3	17,9	14,9	61,9
16	Alpha Bank, S.A.	Greece	Yes	MM	-	65	180,2	17,1	17,1	50,6
17	Eurobank Ergasias, S.A.	Greece	Yes	Removed	-	66	180,2	17,9	17,6	51,1
18	National Bank of Greece, S.A.	Greece	Yes	Removed	-	79	180,2	16,3	16,3	51,5
19	Piraeus Bank, S.A.	Greece	Yes	-	-	82	180,2	16,9	16,9	52,0

20	Banco Bilbao Vizcaya Argentaria, S.A.	Spain	Yes	MM14	-	732	98,7	14,7	12,5	53,0
21	Banco de Sabadell, S.A.	Spain	Yes	MM	-	213	98,7	13,8	12,0	62,3
22	BFA Tenedora De Acciones S.A.U.	Spain	Yes	MM14	-	194	98,7	15,6	14,7	45,7
23	Banco Santander, S.A.	Spain	Yes	MM14	Yes	1339	98,7	13,9	12,5	49,1
24	Bankinter, S.A.	Spain	Yes	MM14	-	67	98,7	12,6	11,9	62,9
25	CaixaBank, S.A.	Spain	Yes	-	-	348	98,7	15,4	12,4	50,7
26	Liberbank, S.A.	Spain	Yes	-	-	38	98,7	12,3	12,3	77,7
28	BNP Paribas S.A.	France	Yes	MM	Yes	2077	96,8	14,2	12,6	36,8
29	Crédit Agricole S.A.	France	Yes	MM	Yes	1524	96,8	18,6	13,9	33,9
30	Société Générale S.A.	France	Yes	MM	Yes	1354	96,8	17,9	14,5	29,3
31	Banca Carige S.p.A. - Cassa di Risparmio di Genova e Imperia	Italy	Yes	-	-	26	133,0	13,8	12,0	52,5
32	Banca Monte Dei Paschi di Siena S.P.A.	Italy	Yes	MM14	-	153	133,0	10,4	8,2	52,7
33	Banco BPM S.p.A.	Italy	Yes	MM14	-	169	133,0	14,8	12,5	53,0
34	BPER Banca S.p.A.	Italy	Yes	-	-	65	133,0	15,2	13,9	59,9
35	Banca Popolare di Sondrio, Società Cooperativa per Azioni	Italy	Yes	-	-	37	133,0	13,6	11,1	74,5
36	Credito Emiliano Holding S.p.A.	Italy	Yes	-	-	40	133,0	14,4	13,2	52,0
37	Intesa Sanpaolo S.p.A.	Italy	Yes	MM	-	725	133,0	17,0	13,9	40,3
38	Mediobanca - Banca di Credito Finanziario S.p.A.	Italy	Yes	MM14	-	70	133,0	15,3	12,1	26,0
39	UniCredit S.p.A.	Italy	Yes	MM14	Yes	860	133,0	11,7	9,0	52,6
40	Unione di Banche Italiane Società per Azioni	Italy	Yes	MM	-	112	133,0	14,1	11,5	50,0
41	Banca Nazionale del Lavoro S.p.A.	Italy	-	MM	-	79	133,0	13,2	12,2	55,6
42	Bank of Cyprus Holdings Public Limited Company	Cyprus	Yes	-	-	22	105,5	14,6	14,5	74,5
43	Hellenic Bank Public Company Limited	Cyprus	Yes	-	-	7	105,5	17,2	17,0	86,8
44	Bank of Valletta plc	Malta	Yes	-	-	11	55,9	16,8	12,8	85,6
45	HSBC Bank Malta p.l.c.	Malta	Yes	-	-	7	55,9	14,2	13,2	68,4
46	ABN AMRO Group N.V.	Netherlands	Yes	Removed	-	394	57,4	21,4	21,4	58,0
47	Coöperatieve Rabobank U.A.	Netherlands	-	MM14	-	663	57,4	25,0	17,6	52,4
48	ING Bank NV	Netherlands	Yes	MM14	Yes	844	57,4	17,8	14,7	62,9

| 50 | BAWAG Group AG | Austria | - | MM | - | 40 | 80,2 | 16,2 | 13,9 | 65,5 |
51	Erste Group Bank AG	Austria	Yes	MM	-	208	80,2	18,2	13,3	66,2
52	Raiffeisen Bank International AG	Austria	Yes	MM14	-	112	80,2	18,9	13,6	64,0
53	Sberbank Europe AG	Austria	Yes	Removed	-	13	80,2	19,0	15,4	61,2
54	Banco Comercial Português, SA	Portugal	Yes	MM	-	71	125,7	13,4	12,4	64,1
56	Tatra banka, a.s.	Slovakia	Yes	-	-	11	50,9	19,7	15,3	78,8
57	Všeobecná úverová banka, a.s.	Slovakia	Yes	-	-	14	50,9	17,2	14,7	68,1

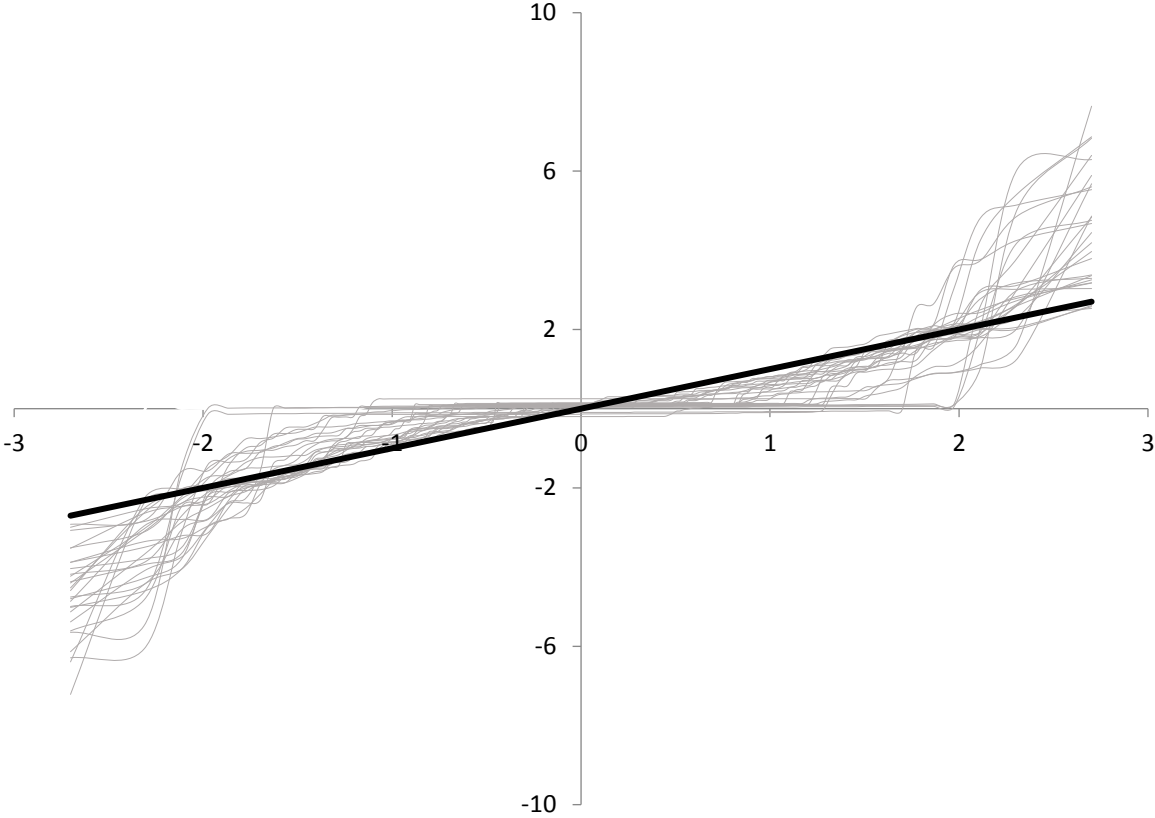*Table 9: Bank's raw data*
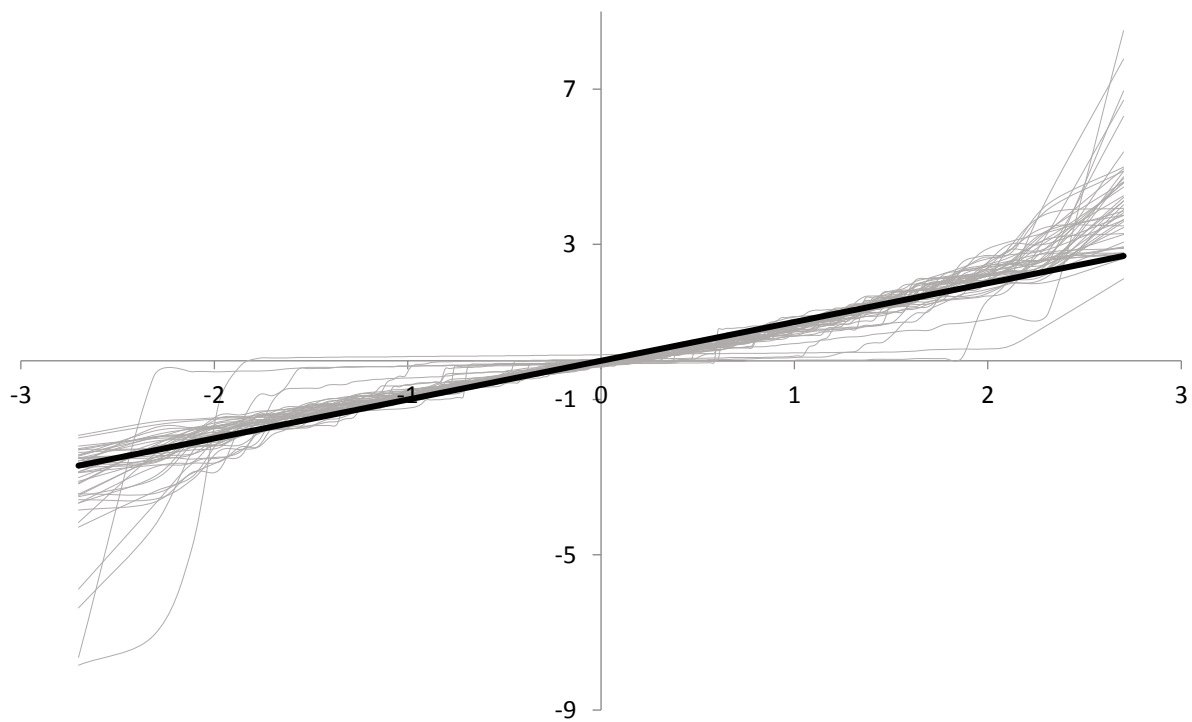
Figure 5: Normal probability plot of Stock Returns

Figure 6: Normal probability plot of CDS Spread returns