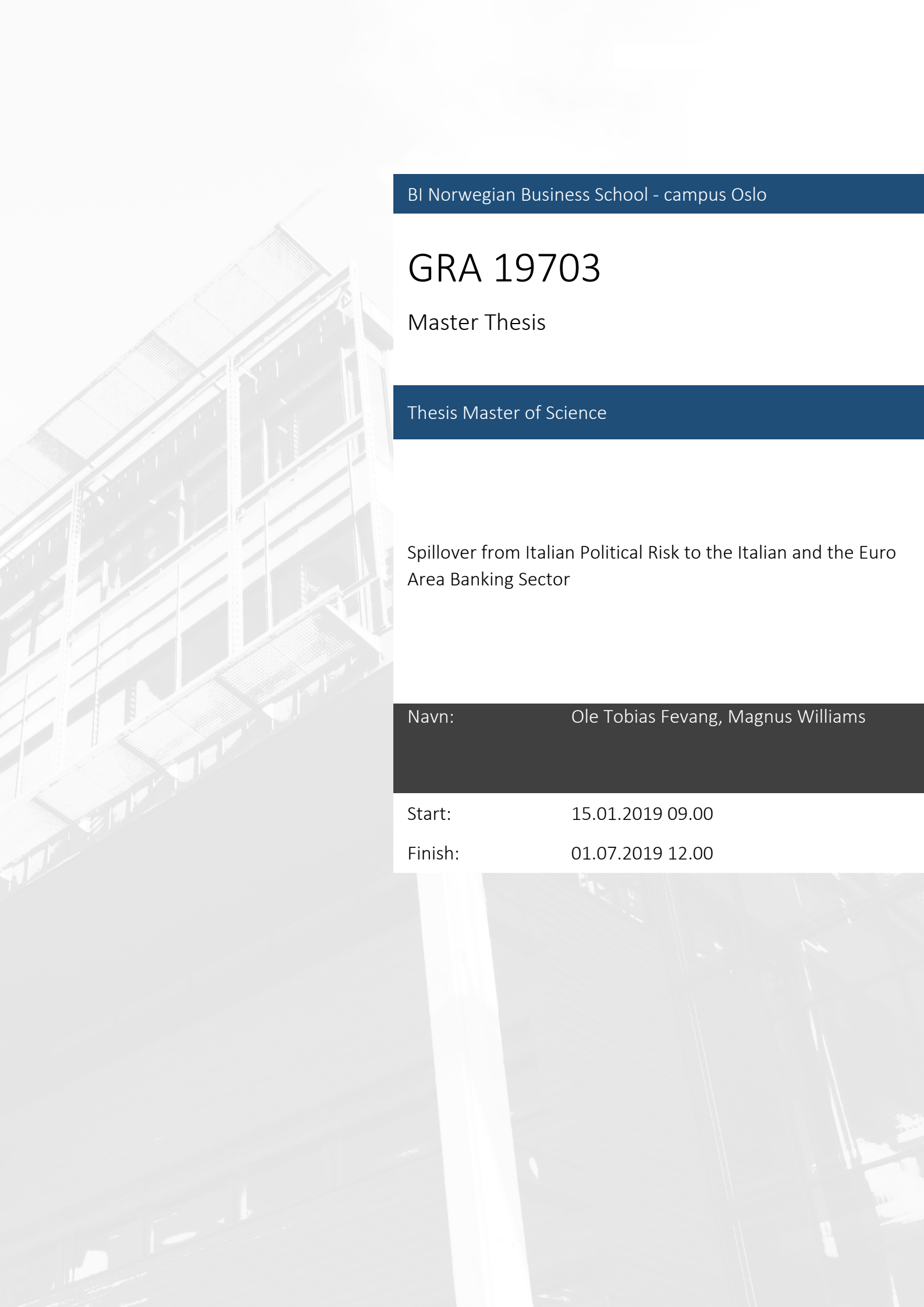

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Master Thesis

Thesis Master of Science

Spillover from Italian Political Risk to the Italian and the Euro Area Banking Sector

Navn:	Ole Tobias Fevang, Magnus Williams

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Spillover from Italian Political Risk to the Italian and the Euro Area Banking Sector

Master Thesis

by

Magnus Williams and Ole Tobias Fevang

MSc in Finance

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ABSTRACT

We examine if the political risk from the 2018 Italian election has caused a spillover effect from Italian sovereign risk to the banking sector within Italy and the Euro Area. We apply a panel regression to find evidence of correlation between CDS spread of Italian sovereign CDS and Euro Area banks CDS spreads. We find that there is a strong spillover from the Italian sovereign CDS to both the Italian and the Euro Area banks CDS spread. We conclude that the spillover has financially and statistically affected the banking sector in Italy and in the Euro Area negatively.

This Thesis is part of the MSc program at BI Norwegian Business School. The School takes no responsibility for the methods used, results found, or conclusions drawn.

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Acknowledgement

We thank our devoted supervisor Charlotte Østergaard for good feedback and support, while working on this thesis.

Glossary

BPS - Basis Points where 100 basis points = 1 %.

Credit Default Swap (CDS) - An insurance contract of an underlying asset between two voluntary parties. The protection buyer, who pays a regular fee (CDS spread) to the protection seller, in order to receive protection in the event of the underlying asset defaulting.

Euro - Official currency adopted by 19 Euro Area member states -- but not the 9 other European Union members-only. They retain their own currency.

Euro Area - The official name of the monetary union which have adopted a common currency, the Euro.

European Central Bank (ECB) - The official central bank of all the Euro Area member states who subsequently have adopted the Euro as their currency. Euro Area members do not have the autonomy to set their own central bank rates.

European Union - The political and economic union consisting of 28 member states - 27 if and when the United Kingdom leaves.

1. Introduction and motivation

In this master thesis, we study whether the political instability from the 2018 Italian general election has had a spillover effect from the Italian sovereign government to both the Italian and Euro Area banking sector. Moreover, we explore if it has led to a contagion of increased credit risk to the Italian and the Euro Area banking sector.

Due to different links between the Italian sovereign debt and the banking sector in the Euro Area, we believe that the increased political risk in Italy has spread. This link could be directly through the banks' balance sheets, or an indirect macro economical explanation.

Alter and Beyer (2014) have looked at the dynamics of spillover effects during the 2010 European sovereign debt crisis. In their paper, they examine the spillover effects of credit risk within the Euro Area across sovereign states and banks. The empirical data shows that the Italian sovereign has the largest gross impulse impact. While also having the third largest net spillover contagion of all sovereign states and banks. Because Italian sovereign also has a large response impact. This means that the sovereign Italian government is not only one of the most exposed countries to shocks received, but also in terms of affecting other Euro Area banks and sovereigns negatively. Italy is a significant source of risk to the Euro Area banking sector.

Because the stability of the Euro Area is dependent on the financial well-being of the countries within it, and how they affect each other, it is important for us to examine. The Euro Area is both large socially and economically since it incorporates 341 million people and because the Euro Area is the second largest economy in the world by GDP (Eurostat, 2018).

The Euro Area has gone through a period with stable and low interest rates for fixed rate tenders at 0 % from 2016. ECB has the difficult task of setting the interest rate for the Euro Area jointly; whose 19 individual countries have vastly

different economic and demographic characteristics. Keeping the interest rate low keeps the supply of credit virtually limitless, which helps growth and avoids deflation. It also helps countries who have low growth and very high debt -- Italy is indeed the epitome of this situation. If the ECB were to raise interest rates it could potentially make it more difficult for Italy to manage their debt, which could increase the spillover effect.

The possible implications of this paper could be important for the markets and the banking sector. Our research will examine how strong the link is between increased risk for the Italian sovereign state and the Euro Area banking sectors largest banks. If there is a strong correlation between Italian sovereign risk and the Euro Area banks risk, the banking sector could be exposed to greater risk than they have accounted for, considering our new data that incorporates the 2018 Italian election. Decision makers within these institutions may learn new important financial implications of how much risk there is from Italy sovereign state to the Euro Area banking sector.

Limitations of our study are primarily four things: limits on the number of banks, only examining Italian sovereign debt, only examining banks and using market capitalization as a proxy for size. The limits of the data are discussed in further detail in section four of the data and preliminary analysis.

2.Literature review and theory

To investigate the increase in riskiness within the banks, we want to look at the Credit Default Swap (CDS) spread of the Italian sovereign bonds and how it affects the CDS spread of the Euro Area banks. A credit default swap is the most common type of derivative contract. Typically, the underlying is the debt of a company or a government, such as a corporate bond or sovereign debt CDS contracts trade on the notional principal face value. To name but a few, there are single-name CDS, index CDS and tranche CDS. The protection seller receives

cash flows from the protection buyer periodically known as the CDS spread.

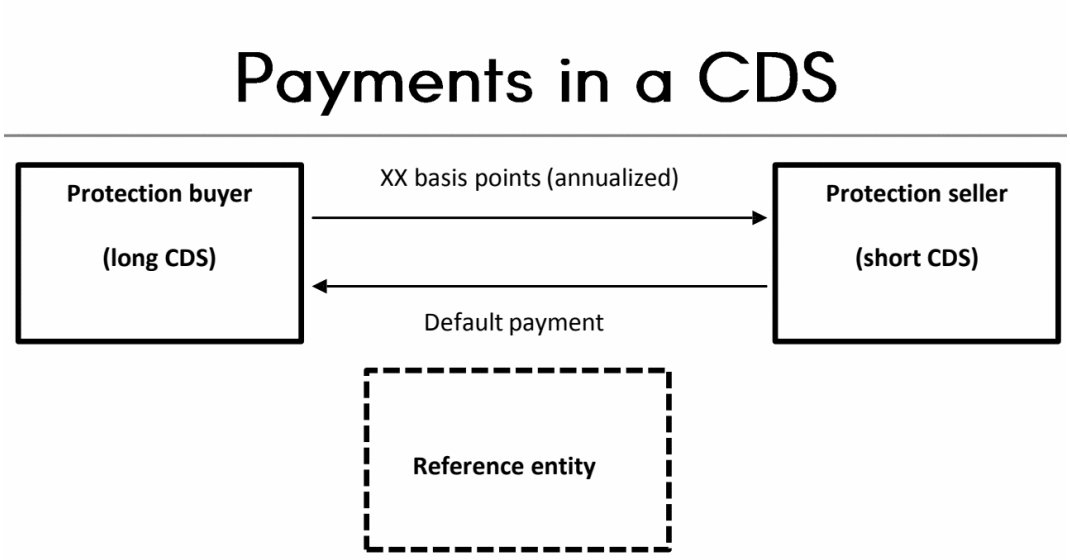

Figure 1: The payment structure in a CDS. The fee is annualized but normally paid. Known as the CDS spread in basis points.

Very large protection sellers' issue CDS contracts to protection buyers. Ordinary investors do not have access to trade this security. Because the CDS spread reflects the inherent likelihood of the bond issuer going bankrupt, it will correlate very strongly with the underlying asset. By construct, the CDS premium is a proxy for default risk of the underlying asset. A CDS does not remove the credit risk associated with the underlying asset; it merely transfers and reduces it from the protection buyer to the seller. Implicitly, the CDS seller has a better creditworthiness than the Italian sovereign government and can guarantee it. Within the market five-year CDS senior debt contracts is the industry de facto standard.

One important thing to note is the connection between CDS spreads and implied probability of default. The key assumption is that there is a certain recovery rate that the investor can recover in the case of a default of the underlying asset. A recovery rate can theoretically be anything from 0 % to 100 % dependent on many factors. Because the market assumes there is a recovery rate that is non-zero, investors will regain some of their money if Italy sovereign defaults. Then, by construction, a positive and non-zero recovery rate will make the CDS contract

have a lower premium payment than if there were no recovery rate (Koerner, 2014). For an example on CDS recovery rates, see Appendix A.

A high debt level for a sovereign state is bad news. If the level of debt for a sovereign state increase, creditors will doubt if they will get their money back. At the same time, the country will have a national budget to maintain. With precision, it will need to balance the budget such that it covers the expenses as social security benefits, military, infrastructure etc. At the same time, the nation's debt needs to be handled with care. Otherwise, the credit risk of the debt defaulting will increase.

An increase in the default rate of the government bonds could lead rating agencies to downgrade the bonds. Eventually it could place the bonds outside the investment grade tier, making it harder to attract large institutional investors when issuing new bonds. Especially without avoiding to pay higher rates.

Italy`s economy has been virtually stagnant for many years. It`s debt as of the end of the 3rd quarter 2018 is € 2.33 trillion Euro (Eurostat 2018). Moreover, Italy has fallen behind by the other Euro Area member states in terms of growth and prosperity. On the contrary, Italy's economy has not collapsed nor is it on the brink of it. For the last five years the Italian debt to GDP has been stable at 131 % all of the years. Suggesting that the Italian debt is manageable.

Up and to the new government taking office in May 2018, things have changed for Italy. An Italian five-year CDS spread on government bonds, which reflects the default risk of the bond, has increased from a level of approximately 100 bps in January 2018 to 223 bps a year later, see figure 2. The Italian general election was held 04.03.2018. It was a lag on a couple of month before the CDS spread really spiked. This because it took some time before it was clear who was going to form the new government. Arguably, part of the reason why the CDS spread has gone up is due to the new populist government's stance publicly towards not balancing the budget, as demanded from the European Union. The new government composition was expected to not only lower tax profits, but also increase government spending through their social reforms. Both factors

intertwine the direction of an increased budget deficit that drives the CDS spread up. Attinasi et al. (2009) makes support to our conclusion that the increased CDS spread is due to expectations of higher government spending (and deficit) and some uncertainty about a lack of will to follow EU mandated rules.

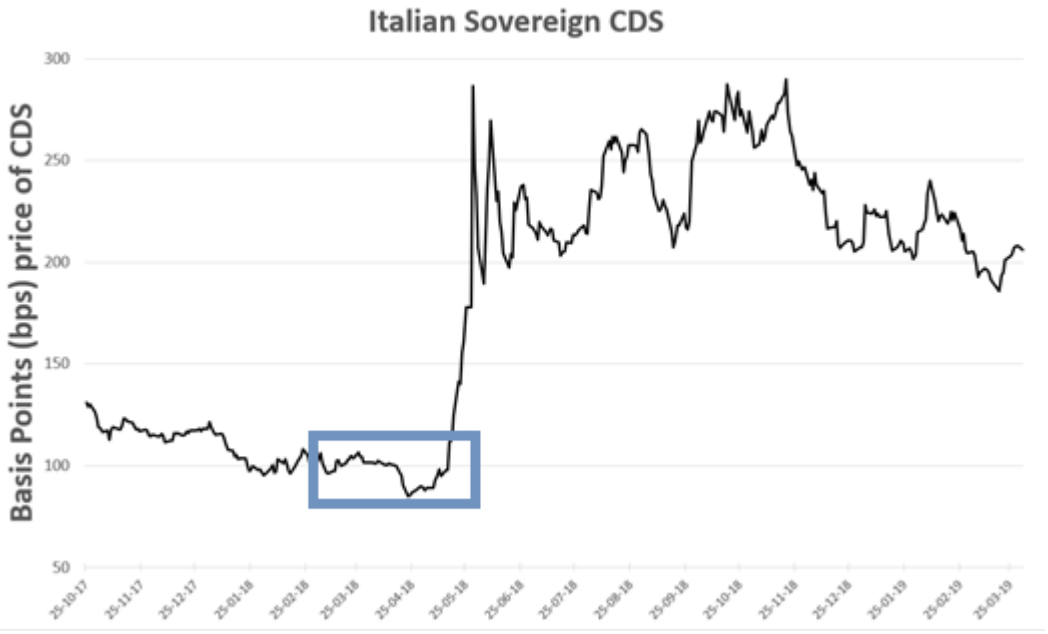

Figure 2: Italian five-year CDS contract. Note that it spiked quickly in May and June 2018 following the outcome of the 2018 Italian general election. Then the CDS price stabilized above 200 bps. Source: Bloomberg Terminal.

Italy is particularly vulnerable to CDS spread changes because they are heavily indebted with a lack of political will to ensure that they will manage that debt in a healthy manner. Consequently, we can see that the CDS spread spike quickly in a very short time horizon up to a peak of 273 bps.

Throughout time, many researchers have looked at how the credit risk of a sovereign country can affect other non-financial firms, both domestic and abroad. Breckenfelder (2018) looks at sovereign risk, CDS spread of different European countries, and how it affects the corporate credit risk in that specific country. They find that there is a clear correlation between the sovereign risk in a country and the corporate credit risk. If the sovereign risk increases by 10 percent, the corporate credit risk increases on average with 1.1 percent.

In their attempt to describe how the sovereign risk transfers to the non-financial companies, they find no support for the idea that the sovereign risk transfers indirectly through a bad macroeconomic environment. However, they claim to find support for two different channels where the sovereign risk transfers to the non-financial companies. The first is through a fiscal channel, where governments with increased sovereign risk need to take fiscal actions by increasing taxation, reducing subsidies etc. In this research, they found that companies with strong connection to the government is most affected.

The second channel is the financial channel. An increase of the sovereign risk in a country leaves the financial sector in a worse condition. This again makes bank lending more expensive and non-financial companies in countries where the banking sector hold a large fraction of the government debt affected by the spillover. Non-financial companies that are more reliant on bank financing face higher spillover of sovereign risk.

This article and the underlying studies are important for our research. It states that during the European debt crisis, when the Greek sovereign CDS spread increased, it had an effect on other European Union member countries sovereign CDS spread. On our side, we want to look at the relationship between the sovereign credit risk and the banks credit risk, and further how the banks in different countries affect each other. Breckenfelder helps us be certain that we will find some connection between the sovereign credit risk and the corporate banks credit risk. If there is a connection between the sovereign risk and the non-financial corporate credit risk, there is most likely a connection between the sovereign risk and the corporate banks credit risk.

Grande (2005) shows that news of a sovereign credit rating change for one country have effect on the sovereign credit spread for other countries. The findings from this study is a symmetric relationship. Negative ratings abroad, result in an increase in the domestic sovereign credit risk. However, positive ratings abroad do not give a discernible decrease in domestic sovereign credit risk. In other words, negative news has a greater impact than positive news.

This tells us that there is a positive correlation between the sovereign credit risk of different countries, but maybe not as strong as implied by Breckenfelder. Furthermore, it tells us that it is possible that the credit risk of banks in one country will have a connection to the credit risk of banks abroad. It is possible to make an argument that the use of credit ratings in the search of connections between countries credit risk would not be perfect. This is because the credit ratings could be biased and lack the power to reflect the underlying credit risk, as we saw during the financial crisis. If so, this study will not be worth much.

A balance sheet spillover effect to the Italian bank sector could cause a sovereign bank loop to begin (Brunnermeier et al. 2016). This is a negative spiral (Figure 3) where the increased CDS spread of sovereign debt also decreases the market value of the debt. The banks, who holds the sovereign debt in their balance, will have a reduced market value of their assets, which will lead to a fall in equity value for the banks. To keep up with capital requirements, they will have to reduce their loan portfolio, and the bank can potentially face a solvency issue. The government on their hand will have reduced tax revenues and lower economic growth. They may also have to bail out troubled banks. These three factors will put the government in an even worse position, which can lead the sovereign debt to become even more risky.

The price of the CDS contracts are determined by the market. The market is forward looking, and tries to incorporate various scenarios in to the CDS price. If the market is efficient, it will have incorporated the probability of a sovereign bank loop. This will increase the CDS prices.

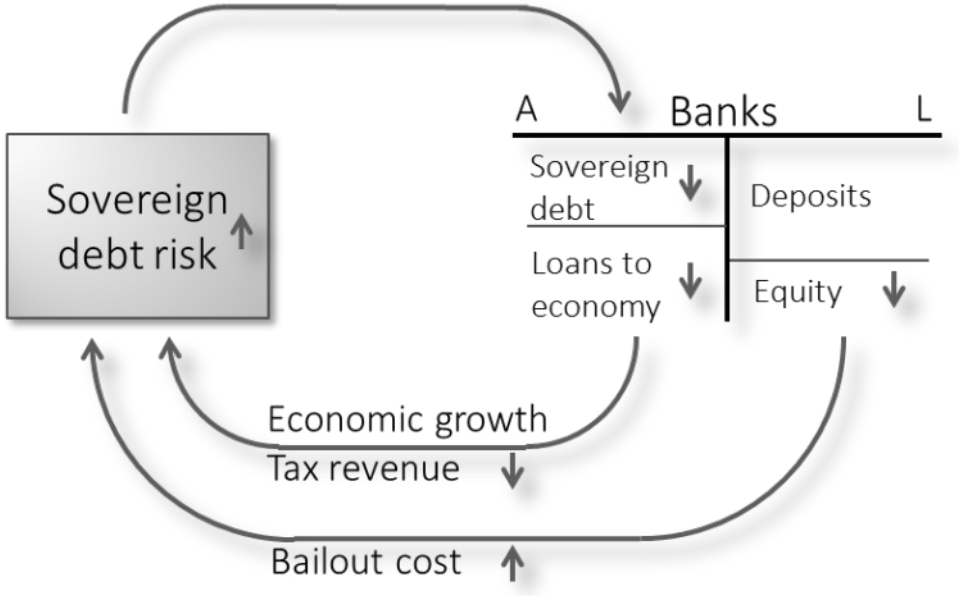

Figure 3: Sovereign bank loop. It starts with a lower creditworthiness from the sovereign that reduces the market values of banks' risk weighted assets who holds them as well as equity. Then, domestic banks become less creditworthy themselves who now loan less to the economy. Meanwhile, economic growth and tax revenue falls. Now, riskier sovereign governments have a greater chance of having to bail out its domestic banks holding its very own bonds. This is what creates the sovereign bank loop. Source: Brunnermeier et al. (2016)

All Euro Area banks need to be in line with the capital requirements stated in Basel III Capital Accord or face disciplinary consequences (Greenbaum et al., 2015). Banks need to be in line with two types of capital requirements. They measure against a risk weighting of the bank's assets that divide into tier one and two. See Appendix B for further details about each tier.

Euro Area banks are exposed to the recent increase in credit risk from Italian sovereign bonds. As such, their risk-weighted assets will be higher, thus lowering the banks' capital ratio. This has the potential to be a negative feedback loop. Because if this takes the bank under the required capital ratio, it will have to either raise more equity or sell assets to remain within the required capital ratio.

Both solutions are impractical and imperfect. Selling assets decreases the profitability of the bank in the end, but helps make the bank more liquid today and

stay in line with the required capital requirements. Banks are pro-cyclical, and they may need liquidity the most when the markets are down. They will have to sell assets or raise new equity at a risk-neutral discount. Only during neutral and good markets can a bank receive par or above par value for either issuing equity or selling assets. Selling assets is problematic as it removes current and future cash flows, and that is the core business of banks. Increasing equity in times when capital flees to safe havens is difficult without seeing a loss in the stock price.

Systemic risk increases within the financial sector if the assets held by Italian banks get riskier. Typically, banks hold assets consisting of loans, securities and cash. Of these assets' loans are typically the most important as they are the largest. While securities are the second largest. Together they are what banks profit from by claiming interest. Whereas cash is an asset banks almost hold nothing at all. In fact, holding more cash and reserves will lower a banks profit. The spillover effect is indeed the overall riskiness increasing of the Italian sovereign bonds affecting Italian financial institutions holding them. Which in turn increases the overall riskiness of the entire financial sector.

Risk shifting is more likely to occur for banks pressured to meet capital requirements. Which then may have another spillover effect to the entire Euro Area banking sector. Because if the banks are affected by the spillover from the Italian government, then those banks are now inherently riskier. That is because of the same three factors of balance sheet, economic state and risk shifting. Euro Area banks may have borrowed money to each other. If the economic state is bad, then these banks might be troubled.

Further, by looking at how the sovereign risk transfers, we can get a clue on how the risk transfers from the government to the banks. The fiscal channel is probably working through the banks as well. Increased taxation will affect the banks, and make it harder to deliver a profit from their business. The financial channel as described above, gives support to our paper, and the transfer of sovereign risk to the banking sector. If countries with a banking sector that holds a large fraction of their government debt affects the non-financial firms more, it would mean that the banking sector in such a country are getting risk transferred from the government.

The dynamic relationship of the spillover effects of the European sovereign countries and European banks are of importance to us. Alter and Bayer (2014) have studied and quantified the relationship of spillover between sovereign credit markets and banks in the euro area. Shocks from spillovers include four components, among sovereigns, among banks, from sovereigns to banks and from banks to sovereigns.

The sovereign to banks will be of interest for our thesis question. Because of their study, we conclude that there is a spillover effect from the Italian sovereign state to Italian and Euro Area banks under the debt crisis. Moreover, it is financially as well as statistically strong. This allows us to assume that the Italian sovereign is still a contagion factor.

De Bruyckere et al. (2013) investigates the excess correlation between banks and government default risk in Europe from 2007 to 2012. Where excess correlation is more correlation than what determined by standard common factors. Their article uses CDS spread at the bank and government level as we propose to do. Their findings include the impact of government contagion of debt levels having a spillover effect towards banks in that country. Especially banks with weaker capital ratios.

We expect to find similar results within our study by comparing Italian government CDS spreads to have an effect on banks riskiness. Considering the correlation between government and bank's riskiness level shown in this study, if we get other results it would certainly be unexpected. Additionally, this article explores the interdependence between banks and countries of finance.

Altavilla et al. (2017) discovered that there is a home bias in exposure. That is, Italian banks are more likely to be exposed to their own government. Which is not particularly surprising, given banks are subject to national conditions. Additionally, they know the local market better than across borders.

3. Methodology

Looking at the CDS spread for Italian sovereign bonds (see figure 2). It is reasonable to assume that the election in March and the accession of the new government in May has had a negative impact on the CDS spread. That is because the new government will most likely increase the expenditure for Italy, putting them in a situation where it will be more uncertain whether they are able to pay back their debt. After drawing the conclusion that the election has had an impact on the Italian government bonds CDS spread, we have found a factor or shock indicator to further look at how this has had an impact on the Italian banks, and the relationship between Italian five year government bond CDS spread and Italian banks five year CDS spread.

3.1 Regression Italy Sovereign to Italian Banks

To investigate the relationship between the Italian government bond CDS spread and the CDS spread for the Italian banks, we will perform a panel analysis. After collecting the data, we will make a panel data set containing the daily variables of Italian banks five-year CDS spread, Italian government bond five-year CDS spread and Market Capitalization of the Italian banks. Applying the panel regression, we will find the effect of the Italian Sovereign CDS spread on the average Italian Bank five-year CDS spread. We expect to find that there is positive relationship between the sovereign CDS spread and the Italian banks CDS spread.

$$y_{i,t} = a + B_1 * x_{i,t} + B_2 * s_{i,t} + u_{i,t}$$

$y_{i,t}$ = Italian banks five-year CDS spread
a = Constant term
$x_{i,t}$ = Italian five-year government bond CDS spread
B_1 = Effect of Italian five-year government bond CDS spread on the average Italian bank five-year CDS spread

B_2 = Size effect on the average Italian bank five-year CDS spread

$s_{i,t}$ = Size of the Italian banks measured in Market Capitalization

$u_{i,t}$ = Error term

3.2 Regression Italy Sovereign to Euro Area Banks

Further, when we want to investigate whether or not there is a clear relationship between Italian sovereign CDS spreads the Euro Area banks. We want to narrow our investigation to the Euro Area. By construct, Italian banks are part of both sections for Italy and Euro Area banks. See Appendix C for a full list of all Euro Area banks we included.

To investigate this relationship, we will also use panel regressions. By running the regressions for each individual bank's own CDS spread against the Italian sovereign CDS spread. Whilst also accounting for the size of the banks in terms of Market Capitalization. Then we can see if the increased riskiness of the Italian sovereign bonds has transferred abroad to EU partners. In the light of previous research, we expect to find that there is evidence of causation between the CDS spread of Italy sovereign and the other Euro Area banks. If we find this evidence, we can be able to say that the Italian election has had implications for the riskiness of the bank sector in the Euro Area.

$$y_{i,t} = a + B_1 * x_{i,t} + B_2 * s_{i,t} + u_{i,t}$$

$y_{i,t}$ = Euro Area banks five-year CDS spread

a = Constant term

$x_{i,t}$ = Italian five-year government bond CDS spread

B_1 = Effect of Italian five-year government bond CDS spread on the average Euro Area bank five-year CDS spread

B_2 = Size effect on the average Euro Area bank five-year CDS spread

$s_{i,t}$ = Size of the Euro Area banks measured in Market Capitalization

$u_{i,t}$ = Error term

To investigate the significance of our analysis, we will look at the t-test for each of the single coefficients, to see if they are significant. The f-test will also tell us if the whole regression has any explainable power.

In addition to just looking at the clear correlation and causation between the Italian sovereign CDS and the Euro Area Banks CDS, we will further our analysis by using some dummy variables to look at where the causation is greatest. High versus low market cap banks, high versus low holdings of Italian sovereign CDS. We will also perform an event study where we investigate if the causation has become greater after the election.

4. Data and preliminary analysis

We have downloaded the data separately for each bank and the Italian five-year sovereign CDS from The Bloomberg Terminal. The panel data is set in the long format. It sums up to 7106 data point observations with daily CDS spreads and market capitalization of the different Euro Area banks. The time horizon from 25.10.2017 to 01.04.2019 gives us both 374 observations of the Italian Sovereign CDS spread and each individual bank.

In an attempt to remove noise from our panel data with 7106 observations for each variable, we have calculated the average weekly data for all variables and done the same analysis over again. Which statistically gives us the same results. We will focus on the calculations with daily data throughout this paper.

Limitations to our study include four major key areas listed below.

Firstly, this master thesis narrows down to the largest Euro Area banks (EBA 2018) within the largest countries in the Euro Area. Broadening the scope to include more banks from more countries would expand upon this thesis such that it also incorporates mid and small cap. There are over 6000 credit institutions in the European Union (EBF 2018); almost none of these are part of our study. We did decide to keep the five largest Italian banks regardless of size because they are

more exposed and connected to their own sovereign government credit risk than non-Italian banks.

Secondly, we have decided to focus solely on Italy sovereign political events as an impulse sender into the Euro Area banking sector. This means we have restricted our debt measurements to the Italian sovereign debt. Some banks face exposure to retail and corporate debt in Italy, but not their sovereign debt. Our limited only includes Italian sovereign debt data.

Thirdly, this thesis only includes the banking sector, and not the finance industry at large. We only include commercial banks and not ones that are part of a conglomerate or insurance companies. In some countries such as France, banks are either part of a large conglomerate or community banks. Which means in practice they are not publicly traded companies nor do they have CDS contracts available for trade as per Bloomberg Terminal. However, the banking sector is only one of many sectors that in aggregate make up the financial sector. Another comprehensive study can add to this thesis by furthering the scope to all financial companies such as investment companies, insurance companies, shadow banking and real estate companies.

Fourthly, we have used market capitalization as a proxy to determine the largest banks we strongly believe have the largest impact on this study. Because banks are pro-cyclical, another study could use another proxy to look at bank size, such as their asset size. Moreover, another thesis could add a basket of all Euro Area countries largest banks to see the risk. Our thesis focuses purely on the largest banks in the Euro Area. A weakness of using market capitalization is the fact that it is highly volatile. Anecdotally; Deutsche Bank, which is still Germany's largest bank and part of our study, is trading at 6 euro per share in 2019 (22 billion € Market Cap) while it was 109 per share in 2007 (60 billion € Market Cap).

After rigorously examine the data under our possession, we have decided to first regress and look at the five Italian banks only against the Italian sovereign and market capitalization. Then we regress and look at all the 19 Euro Area banks -- of which Italian the same five banks are also included. The reason for this is that

we want to see if Italian banks differ in exposure to the Italian sovereign CDS than the overall Euro Area banking sector.

Firstly, we will examine Italian banks only. From the table 1 below, we can see that the mean is almost identical for Italian banks CDS and Italian sovereign CDS. Standard deviation for the Italian banks is very high; this is due to the difference in CDS spread between each of the banks in the sample. The variation can be huge, some banks have a CDS spread almost similar to the Italian sovereign CDS spread, and some are very much higher and lower. Because range is high for the Italian banks CDS spread compared with the Italian sovereign CDS spread, it is more expedient to look at the median of the samples. It will provide us a better idea of where the two samples centers, because it does not give too much weight to the outliers. Looking at the median it is clear that the Italian banks sample centers at a lower level with 50 bps less than the Italian sovereign sample.

CDS Table Italian Banks			
	Italian Banks CDS	**Italian Sovereign CDS**	**Market Cap Billions €**
Mean	186.097	180.619	16.997
Standard Error	2.458	1.481	0.403
Median	156.301	206.352	4.469
Mode	182.33	101.74	4.43
Standard Deviation	106.294	64.084	17.452
Sample Variance	11298.496	4106.883	304.599
Kurtosis	0.268	-1.547	-1.203
Skewness	0.989	-0.124	0.679
Range	448.451	204.865	52.630
Minimum	47.908	84.9	1.365
Maximum	496.36	289.765	53.996

Sum	348002.349	337757.575	31785.509
Count	1870	1870	1870

Table 1.

Unsurprisingly the correlation of 0.687 between Italian sovereign CDS and Italian banks CDS is quite high (table 2). Because of the negative feedback loop, banks who hold more Italian sovereign debt have higher exposure directly by holding it on their balance sheets. In addition, on average Italian banks hold more of their sovereign state's debt than non-Italian banks. On average Italian banks hold 69 % of all their sovereign exposures to their own nation - remarkably higher than anyone else. See Appendix D for a full list of sovereign exposure to Italy.

If these banks want to decrease their risk, they must decrease their exposure relative to their equity. Holding senior tranches of internationally diversified European Safe Bonds known as ESB can further help to mitigate risk (Brunnermeier et al. 2016).

Market Capitalization is negatively correlated with a coefficient of -0.535 against the Italian banks CDS. Which means that an increase in market cap for an Italian bank predicts a lower CDS spread for the bank. Larger Italian banks have higher exposure compared to smaller ones. Which is due to concepts such as economies of scale. Larger banks are better suited to minimize their risk by diversifying asset classes.

The correlation between the banks market capitalization and the Italian sovereign CDS is not too important for our analysis. They are both independent variables but connect through the sovereign bank loop. If the Italian economy does better than expected, the Italian banks will have a larger balance sheet due to risk-weighted assets accounting system of the Basel accords. Including bank equities. Which means as the economy does better than expected, Italian bond yield decrease and so does its CDS. Finally, market cap increases as sovereign CDS decreases. That is the reason for the weak inverse relationship.

Correlation Table Italian Banks			
	Italian Banks CDS	**Italian Sovereign CDS**	**Market Cap Billions €**
Mean	1		
Standard Error	0.6870	1	
Median	-0.5354	-0.1479	1

Table 2.

The mean of 98 for Euro Area banks CDS is much lower than just for Italian banks (Table 3). Suggesting that Euro Area banks are have less risky bonds than Italian banks. Without Italian banks from this data, the average would be even lower. Standard deviation, median, mode and variance are also lower for Euro Area banks, suggesting they are more stable during our sample period.

Kurtosis and skewness are higher for the Euro Area banks CDS. Such a high level of kurtosis at 5.86 suggests the data has extremely small tail distribution. Hence, it represents very infrequent extreme variations, known as outliers, in the dataset. This results in the excess kurtosis being leptokurtic with fatter tails.

When it comes to market capitalization, the Euro Area banks are slightly larger at 27.68 billion than the Italian banks. This is partially due to the construct of the study to minimally five Italian banks. Only two of those five Italian banks (Sanpaolo and UniCredit) are in the top seven of Euro Area banks in terms of size. The three smallest banks in our study are in fact Italian (Unione, Banco BPM and BMPS).

Standard deviation for Euro Area banks at 21.2 is larger than just Italian ones. Suggesting that non-Italian banks in that time period actually has a higher fluctuation in terms of size. However, that can be due to factors outside of Italian political risk influencing their market cap, i.e. Deutsche Bank's continual decline in market cap for the past decade.

CDS Table Euro Area Banks			
	Euro Area Banks CDS	**Italian Sovereign CDS**	**Market Cap Billions €**
Mean	98.073	180.619	27.683
Standard Error	0.959	0.760	0.251
Median	72.721	206.35	23.713
Mode	182.33	101.74	29.840
Standard Deviation	80.900	64.072	21.204
Sample Variance	6544.819	4105.264	449.637
Kurtosis	5.864	-1.546	0.610
Skewness	2.289	-0.124	1.013
Range	480.77	204.865	96.677
Minimum	15.59	84.9	1.365
Maximum	496.36	289.765	98.043
Sum	696911.213	1283478.785	196720.036
Count	7106	7106	7106

Table 3.

Correlation between Italian sovereign CDS and Euro Area Banks CDS is 0.36, which is lower than just for Italian banks (table 4). Which means that the Italian sovereign has a lower relationship in co-movement. Although not particularly surprising, it is good to see the empirical data verify that there is a lesser yet positive correlation, which was expected.

When it comes to the correlation for the Market Cap against Euro Area Banks CDS, it is almost identical to just Italian banks CDS. Which means that across all of our data, 1 billion higher in market cap results in roughly -0.5 less CDS spread.

The Market Cap and Italian sovereign CDS is somewhat identical again. And for the same reason as stated above.

Correlation Table Euro Area Banks			
	Euro Area Banks CDS	**Italian Sovereign CDS**	**Market Cap Billions €**
Mean	1		
Standard Error	0.3606	1	
Median	-0.489	-0.1606	1

Table 4.

5. Results and main analysis

This section will present the empirical analysis of our research question. We are applying several different approaches to look at how the spillover effect may occur. Firstly, we are focusing on the main picture. Are there any important relations between the Italian Sovereign CDS spread and the Italian banks CDS spread? How does the bank size factor affect the CDS spread? We also look at the broader picture where we include the Euro Area banks we have selected for our analysis.

First, we have looked at how much impact the Italian Sovereign CDS spread has had on the Euro Area banking sector.

Second, we look directly at the date of the Italian government election in 2018, in order to determine whether there is any difference in how the Italian Sovereign CDS spread is affecting the banks before and after the election. Has the impact from Italian Sovereign CDS spread increased after the election, stayed the same or decreased?

Third, we find evidence for which type of banks who gets the largest spillover effect from the Italian Sovereign CDS spread.

Fourth, we are finally looking at the difference between the large and small market capitalization banks.

Fifth, we look at the difference between the banks who hold a large portion of the Italian sovereign debt and the banks who hold a small portion of the Italian sovereign debt.

5.1. Italian Banks

Applying the panel regression with Italian banks CDS spread as dependent variable and Italian Sovereign CDS spread and market capitalization as independent variables gives us the following regression results:

Regression Statistics	
Multiple R	0.8150
R Square	0.6642
Adjusted R Square	0.6639
Standard Error	61.6263
Observations	1870

ANOVA	**df**	**SS**	**MS**	**F**	**Significance F**
Regression	2	14026389.32	7013194.66	1846.6447	0.0000
Residual	1867	7090500.08	3797.80		
Total	1869	21116889.40			

	Coefficients	**Standard Error**	**t Stat**	**P-value**
Intercept	45.5754	4.7120	9.6721	0.0000
Italian sovereign CDS	1.0315	0.0225	45.8593	0.0000
Market Cap	-2.6941	0.0826	-32.6183	0.0000

Regression 1.

First, we want to comment on the significance of the coefficients and the model, before we move on to comment on the results. Italian Sovereign CDS spread has a t-statistic of 45.86, which tells us that we can reject the null hypothesis that the coefficient Italian Sovereign CDS spread is insignificant at a level of 0.1 %. We conclude that Italian Sovereign CDS is a significant coefficient to describe variations in the Italian Banks CDS spread.

For the Market Cap, we observe the t-statistics to be -32.62. That gives ground to state that the Market Cap is a significant coefficient for the Italian Banks CDS spread.

Moving on to the analysis of variance and the significance of the entire model, Significance F, our p-value of 0 suggests that on any significance level our model will provide more explanation to the variation in the Italian Banks CDS spread than a model without our coefficients.

Finally, the model has an R-squared of 0.6642, telling us that the model explains 66.42 % of the variation in Italian Banks CDS spread.

With a beta coefficient of 1.03 for the Italian Sovereign CDS spread, a 1 bps increase in Italian Sovereign CDS will increase the CDS of the Italian banks with 1.03 bps.

This backs up our earlier stated theory that the Italian Banks CDS spread has encountered a spillover effect from the Italian Sovereign CDS spread due to the election. Moreover, it is in line with Breckenfelder (2018), who finds support for the idea that sovereign risk transfers through a fiscal and financial channel.

However, if we look at the correlation of Italian sovereign CDS and Italian banks CDS, it does not imply a perfect correlation where they move in a one to one relationship. The correlation is 0.6870. Reasons for the mismatch could be many. Correlation between two variables does not necessarily imply causation. In

addition, it is possible that we are omitting some important variables to describe the variation in the CDS spread.

The sample suggest that the conditions for a sovereign bank loop is present. Since Italian sovereign debt risk has increased, Italian banks in particular face exposure to their country's sovereign risk. This could decrease the banks' risk weighted assets of sovereign debt. Which could lead to a decrease in loans to the economy. Banks' equity also falls. All of these factors lead to a transfer of decreased economic growth and tax revenue, plus an increased bailout cost, all of them transfers back to the Italian sovereign. Thus, the reinforcing sovereign bank diabolic loop continues.

5.2. Euro Area Banks

We have seen that the Italian sovereign CDS has had a spillover effect to the Italian banks. When we add the Euro Area banks to the panel set, we have the following results:

Regression Statistics	
Multiple R	0.5670
R Square	0.3215
Adjusted R Square	0.3213
Standard Error	66.6493
Observations	7106

ANOVA	**df**	**SS**	**MS**	**F**	**Significance F**
Regression	2	14948522.73	7474261.36	1682.5866	0.0000
Residual	7103	31552420.26	4442.1259		
Total	7105	46500942.99			

	Coefficients	Standard Error	t Stat	P-value
Intercept	78.8812	2.7528	28.6545	0.0000
Italian sovereign CDS	0.3655	0.0125	29.2284	0.0000
Market Cap	-1.6911	0.0378	-44.7608	0.0000

Regression 2.

Both the coefficients are highly significant, and have t-statistics on 29.23 (Italian sovereign CDS) and -44.76 (market cap). By just looking at the coefficients, we find two highly significant contributors both at 0.1 % significance level to describe the variation in the Euro Area's banks.

When we look at the analysis of variance, we have f-statistic of 1682.56 and a p-value of zero, which tells us that the model is better than a model with no independent variables, meaning our independent variables do add some explanation to the variation in the Euro Area banks CDS spread. The model is highly significant and the R-squared at 0.3215 tells us that the model is able to describe 32.15 % of the variation in the Euro Area's banks CDS spread. The coefficient Italian Sovereign CDS is 0.3655, which is much smaller than for the Italian banks only.

We have tested if the coefficient Italian Sovereign CDS is different in the regression for only Italian banks, and the regression for the Euro Area banks. We find that the coefficients are significantly different at a significant level of 0.1 %.

This is expected. Because the Italian banks do hold more Italian sovereign bonds. This is important to understand why the Italian banks alone are experiencing a greater spillover effect from the Italian sovereign CDS spread. See Appendix E for further details. The analysis is in line with Alter & Beyer (2014), which states that the Euro Area banks are subject to an exogenous spillover effect from sovereign states. The election in Italy has not only had a spillover effect to the Italian banks, but also to the Euro Area banks, even though the spillover is greater in the Italian banking sector. We believe the source of this spillover is due to a fiscal and financial channel.

There is an inverse relationship from market cap of Italian banks and their CDS spread. Smaller banks tend to be riskier. As for the CDS spread, the implications for the size factor is also smaller for the Euro Area banks. The difference between big and small banks CDS spread in the Euro Area is smaller than in Italy.

5.3. The Election

We have established that there is a spillover effect from the Italian sovereign CDS spread to the Euro Area's banks. Now we want to see if the election has changed the trend in any matter. Is the relationship stronger before or after the election? It is interesting to investigate if the spillover effect has increased due to the election. The exact date for our interrupted time series analysis is 05.03.2018, which is the day after the general election. We use two dummy variables that in the case of $Dummy_1$ gives one for all values before the election date and for $Dummy_2$ gives one for all values after the election date.

Regression Statistics	
Multiple R	0.3679
R Square	0.1354
Adjusted R Square	0.1351
Standard Error	75.2369
Observations	7106

ANOVA	**df**	**SS**	**MS**	**F**	**Significance F**
Regression	2	6293723.74	3146861.87	555.9240	0.0000
Residual	7103	40207219.25	5660.60		
Total	7105	46500942.99			

	Coefficients	Standard Error	t Stat	P-value
Intercept	32.9394	3.7274	8.8371	0.0000
Before	0.2303	0.0369	6.2335	0.0000
After	0.3842	0.0176	21.7823	0.0000

Regression 3.

The significance of the model is strong. Both t-statistics are high, and they are both significant on a 0.1 % level. The f-test also suggest that the model has a strong significance. The R-squared of 0.1354 suggest that the model can explain some variation in the CDS spread, but far from all. We have found that the beta coefficients Before and After is statistically significantly different, with a significance level of 0.1 %. See appendix F for t statistics.

The results from our regression gives us evidence that the spillover effect is larger after the election. Suggesting that the election of the new government in itself has made the banking sector to be more cautious in respect to what is happening in Italy. Before the election, our results are stating that an increase of 1 bps in the Italian sovereign CDS spread would make the Euro Area banking sector CDS spread increase with 0.2303 bps. After the election, the same situation will lead to a 0.3842 bps increase. As we have seen before, negative news has greater impact than positive news, Grande (2005). This may be one reason why the causation is greater after the election.

5.4. Big vs. Small

How do the big firms contribute to the variation versus the smaller firms in terms of market capitalization? Again, we are using dummy variables to investigate the relationship. $Dummy_1$ equals one if the banks average market cap throughout the sample is larger than the sample average of 23 billion euros. $Dummy_2$ equals one if the average market cap of the bank is less than 23 billion euros throughout the period.

Regression Statistics	
Multiple R	0.5108
R Square	0.2609
Adjusted R Square	0.2607
Standard Error	69.5583
Observations	7106

ANOVA	df	SS	MS	F	Significance F
Regression	2	12134121.98	6067060.99	1253.9517	0.0000
Residual	7103	34366821.01	4838.3530		
Total	7105	46500942.99			

	Coefficients	Standard Error	t Stat	P-value
Intercept	15.8231	2.4683	6.4106	0.0000
If Big	0.2944	0.0137	21.5604	0.0000
If Small	0.6003	0.0135	44.4243	0.0000

Regression 4.

Our analysis is consistent with previous research by Bijlsma et al. (2014) that smaller banks tend to be riskier due to a funding disadvantage versus the big banks. Big banks have the advantage of being too big to fail. Lenders are not equally cautious to lend money to big banks, because their government most likely bail out if they fail. Our study contains seven of the twenty-nine banks that the FSB considers big banks in 2018 (Financial Stability Board).

Another explanation could be economy of scale. It could be easier for the big banks to diversify risk. Moreover, it could be due to market access. Small banks could have less market access, which again gives less possibility to diversify.

The beta coefficient for small banks is 0.6003, while the beta coefficient for the large banks are 0.2944. The election has had a greater impact on the small market cap banks than the large. All coefficients are significant, and the R-squared is

0.2609. We find that the coefficients are significantly different at a significance level of 0.1 %. See appendix F.

5.5. Holders of Italian Sovereign Debt

A balance sheet effect can explain parts of the spillover from the Italian sovereign CDS. To find some evidence for this claim, we have divided the banks after who holds more Italian sovereign debt. The information about holdings of Italian sovereign bond is collected from the Bloomberg Terminal, and can be found in the excel attachment. $Dummy_1$ equals one if the bank holds a large portion of the Italian Sovereign debt, and $Dummy_2$ equals one if the bank holds a small portion of the debt.

Regression Statistics	
Multiple R	0.4439
R Square	0.1970
Adjusted R Square	0.1968
Standard Error	72.5040
Observations	7106

ANOVA	**df**	**SS**	**MS**	**F**	**Significance F**
Regression	2	9161683.14	4580841.57	871.4077	0.0000
Residual	7103	37339259.85	5256.83		
Total	7105	46500942.99			

	Coefficients	**Standard Error**	**t Stat**	**P-value**
Intercept	15.8231	2.5728	6.1501	0.0000
Large Holdings	0.5590	0.0141	39.6904	0.0000
Small Holdings	0.3403	0.0142	23.9046	0.0000

Regression 5.

The results are not surprising. Banks with large holdings of Italian sovereign debt face more impact by the spillover effect than banks with smaller holdings. Earlier in this thesis, we have called this the balance sheet effect by Breckenfelder. The entire model and the coefficients have a strong significance, and the coefficients are significantly different on a significance level of 0.1 %. See appendix F.

6. Conclusion

Spillover of risk from sovereign states into the banking sector is dangerous because of the sovereign bank loop, because it increases the risk for the sovereign, the banks and the economy. The negative consequence of the sovereign bank loop is that banks who hold sovereign debt that increases in risk will themselves be considered riskier, and this continues the spillover into the economy. The spread of political risk from the 2018 Italian general election has caused the Italian sovereign CDS to increase. It has increased because the election created expectations for the new government to increase the budget deficit. As we have proven, the Italian sovereign CDS has caused both the Italian and Euro Area banks CDS to increase along with itself. The fiscal and financial channels drive the negative self-reinforcing sovereign bank loop where potential losses are higher. To overcome the Italian sovereign bank loop, banks which are overexposed to Italian sovereign debt must decrease their holdings with regards to their equity. Italian banks are more exposed to their own government risk due to the home bias. We conclude that the spillover of risk is both statistically and financially strong from the Italian sovereign to the Euro Area banks. All our regressions provide evidence of that, including all our dummy variables. However, we did not research whether it is the fiscal or financial channel that is causing the most impact. Future research could try to explain where the spillover effect is greatest.

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Appendix

Appendix A

Listed below is the mid, high and low CDS Spread of the Italian sovereign from 25.10.2017 to 01.04.2019 which is the range of our data set. We have looked at the two extreme corners of the CDS spread observed during that time period. For each CDS spread 280 (high), 190 (mid) and 100 (low), there is a corresponding scenario for a chosen low (20 %), mid (40 %) and high (60 %) assumed recovery rate. That means in total there are nine scenarios.

The market sets their own recovery rate, typically industry practice is 40 %, but it depends on the asset class and there is no set rule to follow. Probability Default is calculated from the actual observed CDS Spread and an assumed recovery rate. Then, the expected payment for the protection buyer is shown.

Scenario	CDS Spread	Recovery Rate	Prob. Default	Exp. Payment	Value
Low	280	20%	3.50%	224	56
Mid	280	40%	4.67%	168	112
High	280	60%	7.00%	112	168
Low	190	20%	2.38%	152	38
Mid	190	40%	3.17%	114	76
High	190	60%	4.75%	76	114
Low	100	20%	1.25%	80	20
Mid	100	40%	1.67%	60	40
High	100	60%	2.50%	40	60
Type	**Past Data**	**Assumed by mkt**	**Implied**	**Ex-ante expectations**	**Value**

Appendix B

Capital Requirements	
Tier 1 (Core) Capital	• Common Stock • Retained Earnings • Capital Surplus • Disclosed Capital Reserves
Tier 2 (Supplementary) Capital	• Loan and Lease Loss Allowances • Preferred Stock with Maturity of at least 20 years • Subordinated Obligations • Undisclosed Capital Reserves • Hybrid Capital Instruments

Note: Tier 1 Capital is considered the highest quality bank capital that is able to absorb losses continuously under normal conditions. However, tier 2 capital is of less quality but should still absorb some of the losses in the case of insolvency. Tier 3 capital was previously existing under Basel II, but was abolished when Basel III came.

Appendix C

The banks we will examine in our population listed below by their rank in terms of average market cap.

Name	Country	Average Market Cap Billions €	Rank	Size
Santander	Spain	77.97	1	BIG
BNP Paribas	France	67.60	2	BIG
ING Group	Netherlands	49.44	3	BIG
Sanpaolo	Italy	42.92	4	BIG
BBVA	Spain	40.14	5	BIG
Credit Agricole	France	35.31	6	BIG
UniCredit	Italy	31.69	7	BIG
Société Générale	France	30.19	8	BIG
KBC Group	Belgian	27.81	9	BIG
Deutsche Bank	Germany	22.38	10	SMALL
Caixa Bank	Spain	22.30	11	SMALL
ABN Amro	Dutch	22.15	12	SMALL
Erste Group	Austria	15.44	13	SMALL
Commerzbank	Germany	11.88	14	SMALL
Bankia	Spain	10.15	15	SMALL
Banco de Sabadell	Spain	7.90	16	SMALL
Unione	Italy	3.81	17	SMALL
Banco BPM	Italy	3.65	18	SMALL
BMPS	Italy	2.85	19	SMALL

Appendix D

Country and Bank	Average Market Cap bn €	Sum Exposure to Italy Sov bn €	Average Expsore to Market Cap	Average own Sov exposure to Italy
Austria	**15.441**	**0.342**	**0.34 %**	**0.00 %**
Erste Group	15.441	0.342	0.34 %	0.00 %
Belgium	**27.818**	**2.911**	**2.91 %**	**4.10 %**
KBC Group	27.818	2.911	2.91 %	4.10 %
France	**44.374**	**9.951**	**3.32 %**	**0.00 %**
BNP Paribas	67.604	3.230	3.23 %	0.00 %
Credit Agricole	35.317	6.601	6.60 %	0.00 %
Societe Generale	30.200	0.119	0.12 %	0.00 %
Germany	**17.131**	**15.679**	**7.84 %**	**37.95 %**
Commerzbank	11.882	8.795	8.79 %	41.20 %
Deutsche Bank	22.381	6.884	6.88 %	34.70 %
Italy	**16.989**	**221.344**	**44.27 %**	**69.34 %**
Banco BPM	3.655	17.250	17.25 %	64.10 %
BMPS	2.857	16.484	16.48 %	95.70 %
Sanpaolo	42.925	118.543	118.54 %	74.10 %
UniCredit	31.693	58.862	58.86 %	36.80 %
Unione	3.813	10.204	10.20 %	76.00 %
Netherlands	**35.803**	**0.043**	**0.02 %**	**0.00 %**
ABN Amro	22.156	0.043	0.04 %	0.00 %
ING Group	49.449	0.000	0.00 %	0.00 %
Spain	**31.694**	**12.912**	**2.19 %**	**1.10 %**
Banco de Sabadell	7.908	0.533	0.53 %	0.00 %
Bankia	10.152	1.195	1.20 %	2.48 %
BBVA	40.140	1.420	1.42 %	0.00 %
Caixa Bank	22.300	7.780	7.78 %	2.80 %
Santander	77.972	1.984	0.03 %	0.20 %
Grand Total	**27.666**	**263.181**	**13.75 %**	**22.75 %**

Appendix E

Rank	Bank	Sum Italian Sov Debt bn €	Size
1	Sanpaolo	118543.12	LARGE
2	Unicredit	58862.45	LARGE
3	BMPS	16483.90	LARGE
4	Unione	10204.30	LARGE
5	Commerzbank	8794.50	LARGE
6	Caixa	7780.16	LARGE
7	Deutsche Bank	6884.24	LARGE
8	Credit Agricole	6600.70	LARGE
9	BNP Paribas	3230.43	LARGE
10	KBC Group	2911.15	LARGE
11	Santander	1983.74	SMALL
12	Banco BPM	1725	SMALL
13	BBVA	1419.90	SMALL
14	Bankia	1195.19	SMALL
15	Sabadell	532.84	SMALL
16	Erste Group	342.25	SMALL
17	Societe Generale	119.46	SMALL
18	ABN Amro	43.17	SMALL
19	ING Group	0	SMALL

Appendix F

Significance test of coefficients	t stat
Italian vs. Euro Area banks	25.883
If Big vs. If Small	15.920
Before vs. After Election	3.761
Large holdings vs. Small holdings	10.924