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Design Matters: An event study of CoCo bond offering announcements

How does design affect equity and credit markets perception of CoCo's?

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Master Thesis, MSc, Finance

NORWEGIAN SCHOOL OF ECONOMICS

"Like teenagers, they spend many hours in their bedrooms, suspiciously quiet, you never knowing what they are up to, and then suddenly there's an outburst of sound and fury, the cause of which you never understand. Hybrid instruments and teenagers are both to be treated with love and understanding."

Paul Wilmott

Abstract

This thesis performs an event study on contingent convertible (CoCo) bond offering announcements made in the period 2009-2016. Using a sample of 95 announcements from 39 European banks and a standard event study methodology, we find that CoCo announcements on average lead to increased equity prices and reduced CDS spreads indicating that both equity and credit markets have a favorable view of CoCo's. Equity prices react more positively to CoCo design features implying high wealth transfer to shareholders at conversion. We also find some evidence suggesting that the positive reaction relates to a partial anticipation of equity. The increase in equity prices does not apply to a significant proportion of observation however, meaning that these findings can't be generalized to all individual CoCo announcements. The reduction CDS spreads suggest that CoCo's do reduce the perceived probability of default. Credit markets appear to have a preference for CoCo's with low implied wealth transfer to shareholders at conversion but the main determinant in explaining the reduction in CDS spreads is issue size. The reduction in spreads also appears to be more prominent for later issues indicating that the perception of CoCo's have changed, or that markets anticipates CoCo's more for later issues. Through a logit regression and a Cox proportional model we find that large banks are more likely to issue CoCo's and that the typical CoCo issuers have a higher degree of long term financing and higher Tier 1 ratios compared to their non-issuer counterparts.

Keywords: Contingent Convertible, CoCo, Announcement Effect, Basel III, Banking Regulations.

Acknowledgements

The master thesis concludes our Master of Science (M.Sc.) in Economics and Business Administration at Norwegian School of Economics (NHH). The purpose of this thesis is to contribute to the regulatory discussion of issuing CoCos with different design features and increasing the awareness of the incentive effects of issuing this type of securities. We have written our master thesis in the article format as per the precedent set by a multitude of academic research papers we have encountered while conducting our research.

Firstly, we would like to offer our gratitude to Tobias Berg and Christoph Kaserer for providing us with useful information giving us a good start on our thesis. Secondly, we would like to thank Manuel Ammann, Kristian Blickle and Christian Ehmann for pertinent material regarding the creation of the self-created index model we used on the CDS spreads. Thirdly, we greatly appreciated the opportunity to present and receive guidance from Kjell-Bjørn Nordal, Nicolas Stefano and Sindre Weme of Norges Bank. Feedback from our Norges Bank presentation provided us with useful insight into the regulatory point of view, as well as a comprehensive discussion surrounding the practical use of CoCo bonds.

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Borjan Duhonj

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Introduction

1.1 Background

Following the 08/09 financial crisis there has been an increased focus on implementing more robust capital requirements for banks. It was evident that banks were not resilient enough against turmoil in the financial markets, leading to a mass bailout financed by the taxpayers. The capital requirements prevailing at the time failed to provide any meaningful loss absorption and in order to avoid a further escalation of the crisis, governments were forced to step in and inject new funds. Regulators therefore started calling for more capital with better loss absorbing properties, which resulted in the new Basel III accords. Basel III is in the process of being phased in across many jurisdictions, and in addition to increasing the required amount of equity capital, it also allows for a new asset class to qualify as regulatory capital. That asset class is known as contingent convertible bonds (CoCo's).

CoCo's were first introduced in theoretical form by Flannery (2002), but remained in obscurity up until after the financial crisis when it received renewed attention as a way of strengthening banks' balance sheets. A CoCo will automatically convert in to equity or be written down if a bank's capital ratio falls below a predetermined level. This ensures that banks will receive an automatic recapitalization in times of financial distress, and thereby protect more senior claims like unsecured debt and deposits. The ability of CoCo's to absorb losses on a going-concern basis and the quick and effective way in which it's done has been cited by many[1] as its main attractive features. The automatization of the loss absorption process avoids the costly process of debt restructuring associated with other debt securities. CoCo's are also viewed as a significant improvement from the previous regulatory hybrids that proved to have insufficient loss absorbing properties on a going-concern basis.

[1] See French et al. (2010), Pennacchi et al. (2014), Flannery (2009).

CoCo bonds is classified as regulatory capital in the upcoming Basel III regulations. As a result, the CoCo market has gained traction in recent years as banks try to reach their capital requirements before Basel III is fully implemented in 2019. In 2015 alone there were in total 94 CoCo issues amounting to a total of 65 billion dollars and the size of the market is expected to exceed 200 billion dollars by 2020[2]. CoCo's are starting to become an integral part of capital regulations, therefore it is crucial to understand how these securities might affect the financial soundness of banks.

Many academics have raised concerns about the design of CoCo bonds. In a paper by Calomiris and Herring (2013), they argue that in order to be a good alternative to common equity in capital regulations, CoCo's must dilute existing shareholders at conversion. This design feature ensures that equity holders have incentives to keep the bank well capitalized and to avoid excessive risk-taking. Berg and Kaserer (2015) find that the majority of CoCo's in the market do not dilute shareholders. In fact, most CoCo's imply a wealth transfer to shareholders at conversion. This may entail some adverse incentive effects, giving rise to both a potential asset substitution problem and a debt overhang problem[3].

This thesis provides an empirical analysis of European CoCo bond announcements made in the period 2009 – 2016. Our objective can be divided in to three parts. First, we aim to examine the relationship between CoCo design and shareholder incentives by investigating how different design features are perceived by equity and credit markets. We do this by performing an event study where we examine how equity prices and CDS spreads is affected by CoCo announcements. This allows us to infer which design features are preferred by the different claimants and thereby evaluate the strength of the incentive effects presented in Berg and Kaserer (2015). Through this we also hope to make a contribution to the debate surrounding CoCo's role in bank regulations.

Secondly, we aim to compare the announcement effects from CoCo bonds to other securities. There is a large body of literature pertaining to event studies examining the announcement effects from security offerings[4]. The general conclusion is that

[2]See Avdjiev et al. (2013).
[3]See Myers (1977) and Jensen and Meckling (1976).
[4]Eckbo (1986),Asquith and Mullins (1986), Mikkelson and Partch (1986) among others.

stock market reactions form a hierarchy, also known as the pecking order theory[5], in which risky securities, like equity, are at the bottom with significantly negative announcement effect while less risky securities, like debt, are at the top with neutral announcement effects. We aim to place CoCo's in this landscape.

Finally, we attempt to answer what characterizes banks that issue CoCo's. In order to do this, we compare the characteristics of CoCo issuers to non-CoCo issuers through a logit regression and a Cox proportional hazards model.

This thesis makes several interesting findings. First, we find that most CoCo's are not dilutive and in fact imply a wealth transfer to shareholders at conversion. Second, equity prices on average react positively to CoCo announcements, and the effect is stronger for bonds with design features implying high wealth transfer. We also find some evidence suggesting that the positive reaction relates to a partial anticipation of equity. Third, CDS spreads tighten significantly upon announcement implying that CoCo's reduce the probability of default. The main determinants for this reduction is how junior the CoCo bond is and the size of the issue. Finally, we find that the typical CoCo issuer is a large bank with high degree of long term financing and high Tier 1 ratios.

Most of the existing literature on CoCo's concerns the theoretical implications of different design features. Our thesis makes a modest contribution to the limited field of empirical research on CoCo's by bridging the gap between theoretical analysis and real market development. To our knowledge, the only paper to perform an event study on CoCo bond announcement is Ammann et al. (2015) and we extend on this study in several ways. First, our thesis covers a longer period and thus significantly extending the data. Second, we also take a more refined approach in separating between different design features and are therefore better equipped in dealing with the heterogeneous nature of CoCo bonds. Avdjiev et al. (2015) performs a similar analysis to ours, although at issue date as opposed to announcement date. We believe that the information revealed at announcement is more relevant for inferring the implication of a CoCo issue for creditors and shareholders, and that abnormal returns on issue date mainly reflect the success of the issue itself and not the banks' decision to issue. In addition, we apply a larger dataset and focuses only

[5]Put forth by Myers and Majluf (1984).

on European issuers in order to ensure a certain degree of regulatory harmonization between issuers which makes them more comparable[6]. Finally, we contribute with knowledge on what separates CoCo issuers from other banks by performing a logit and Cox PHM analysis.

This thesis also makes a contribution to the large field of empirical research on announcement effects from security offerings. As CoCo's are a very recent phenomenon, their announcement effect is largely unexplored and our event study will therefore make a modest, but important, contribution to this field. Another field of research we contribute to is the relationship between CDS spreads and security offerings which to our knowledge is only covered by a few studies.

The remainder of this thesis is structured as follows. Section 2 provides a detailed overview of the anatomy of CoCo bonds. Section 3 describes the current regulatory framework and summarizes the academic literature on CoCo's. We present our theory and hypothesis in section 4 and section 5 presents a detailed description on methodology and data. Section 6 is a presentation of our empirical results, and finally section 7 concludes our thesis and provides further research.

[6]Through CRD IV, most European banks have similar frameworks for capital regulations.

Anatomy of CoCo bonds

2.1 CoCo Anatomy

In this section, we go more in detail describing the anatomy of CoCo bonds. This asset class is very heterogeneous in terms of design characteristics and there is no uniform definition that can be used to describe all CoCo bonds. It is therefore important to understand the underlying design features to not be confused. CoCo's have two main components; the loss absorption mechanism and the trigger event which activates it. We will in the following describe these two more in detail.

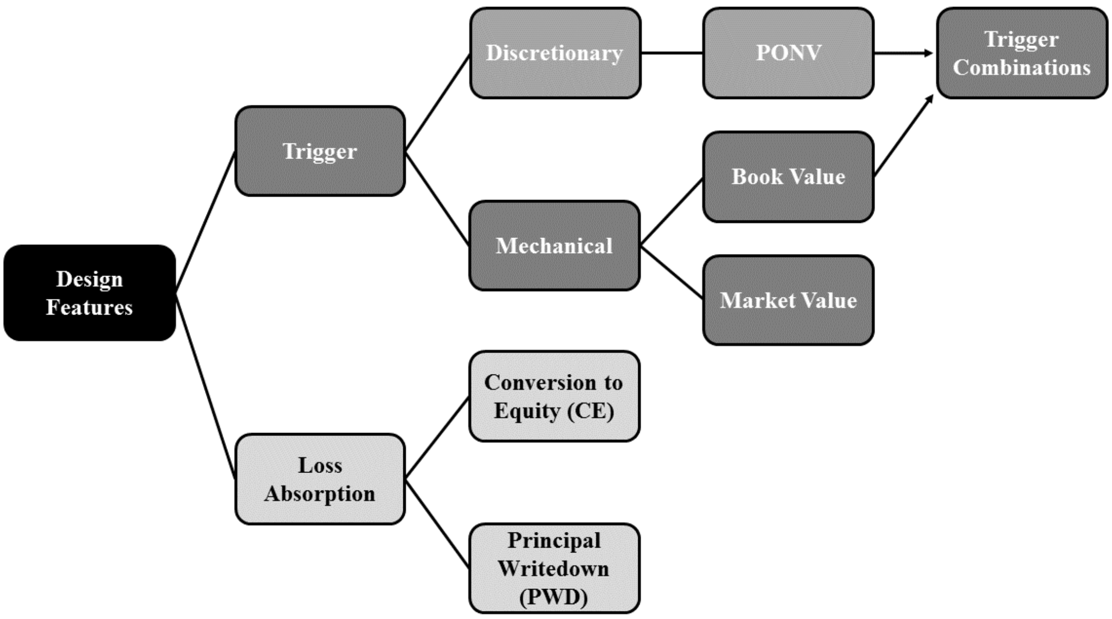


Figure 2.1: Structure of CoCo bonds

2.1.1 Loss Absorption

If the trigger event occurs, the bond will automatically be converted in to equity or written down. For share conversion CoCo's, henceforth referred to as CE (conversion to equity), the CoCo value is converted in to shares at a pre determined conversion rate. The number of shares CoCo holders receive at conversion is defined as the conversion ratio (C_r). If we denote the face value as N, the conversion price can be written as

$$C_p = \frac{N}{C_r}. \tag{2.1}$$

The loss/gain of a CoCo holder at conversion can thus be expressed as

$$\begin{aligned} L_{CoCo} &= N - C_r S^*, \\ &= N(1 - \frac{S^*}{C_P}), \\ &= N(1 - \pi_{CoCo}), \end{aligned} \tag{2.2}$$

where S^* is the market value of shares at time t^*, and π_{CoCo} is the recovery rate. This showcases the conflict of interest between shareholders and CoCo holders. Shareholders have an interest in defining a high conversion price in order to capture a wealth transfer at conversion. Conversion price is specified by the issuer in the CoCo contract and we will in the following discuss the three main ways of setting it and what it implies for shareholders incentives.

i) Floating: $C_P = S^*$

For floating, the conversion price is set equal to the share price at the trigger moment, and thereby CoCo holders recover the full value of their investment. This could dilute existing shareholders since the conversion is likely to happen at a very depressed rate. Shareholders are thereby incentivized to avoid a breach of the trigger.

ii) Fixed: $C_P = S_0$

For fixed, the conversion happens at a pre determined price, often the price at issue date[1]. This method would likely result in less or no dilution, making it more attractive for existing shareholders. If the price is set high enough, shareholders would gain from conversion and are thereby not incentivized to avoid a trigger.

iii) Floored: $C_P = max(S^*, S_F)$

Floored is a combination between the previous two. The conversion price is floating unless it's below a pre specified floor price[2]. This caps the conversion price and limits the potential dilution. A low enough floor price will also ensure that existing shareholders have incentives to avoid breaching the trigger.

Berg and Kaserer (2015) find that most CE CoCo's have a relatively high conversion price, implying low dilution and a potential wealth transfer to shareholders. The issues in our sample confirm these findings and most are made with either a fixed or floored conversion price.

For the principle write-down (PWD) the CoCo is either fully or partially written down. Full write down is equivalent to a complete deletion of debt, which greatly benefits shareholders at conversion. Partial write downs often involve a cash settlement for the remaining principal [3]. One issue with this form is that banks in distress would find it difficult pay off the remaining value due to liquidity restraints.

In some cases, the principal can be written back up when the bank is considered financially healthy. Almost 30% of the issues in our sample have this feature, and it seems to be more common among Scandinavian banks.[4] The write-down feature allows non listed banks to issue CoCo's, but it's extensively used by listed banks as well. PWD CoCo's has no risk of dilution and will result in a guaranteed wealth transfer to shareholders at conversion. They are thus less incentivized to avoid breaching the trigger.

As seen in figure 2.2, CE was more common in the beginning however in later

[1]Lloyds was in 2009 the first to use this method, and have since been used by several banks in our data.

[2]Credit Suisse was the first to use this method in their 2011 issue, with a capped conversion price at $20.

[3]Rabobank's issue in march 2010 had 75% write down and 25% cash settlement. A similar structure has also been used by Aurskog Sparebank, Danske Bank, Luzerner Kantonal bank and a few others. However, most of the write-down issues have been full write-down.

[4]Svenska Handelsbanken, Sparebanken Sor, Sparebank 1, Skjern Bank, SEB, Ostjydsk bank, Nordea and Melhus Sparebank are examples of banks who have issued with this feature.

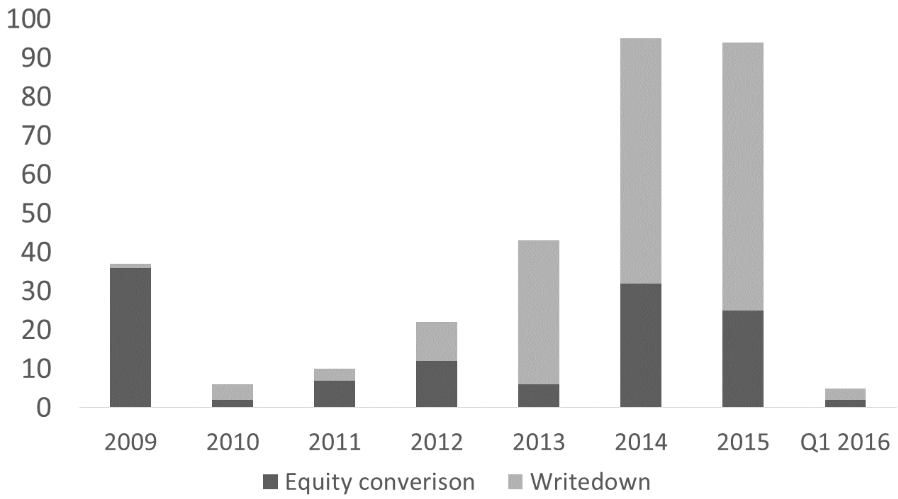


Figure 2.2: Development in the number of issues with the two different loss absorption mechanisms.

years PWD seems to dominate. There are several possible explanations for this. PWD avoids the risk of dilution and is therefore preferred by existing shareholders. The higher coupon paid on PWD's does not seem to stifle the supply suggesting that CoCo investors might be "chasing yield" in a low interest environment. There are also concerns regarding the marketability of CoCo's to potential investors. Many fixed income investors are mandated not to hold equity converting securities and are therefore only allowed to hold PWD CoCo's[5]. PWD's are also easier to price as investors know beforehand how much the potential loss will be.

2.1.2 Trigger

As stated above, the trigger defines the event in which the loss absorption mechanism is activated. This trigger can either be mechanical and/or discretionary.

A mechanical trigger activates when a bank's capital reserve falls below a pre specified level. The capital measure can be based either on:

i) Book Value

A book value trigger is an accounting measure referring to the book value of core tier 1 (CET1) capital over risk weighted assets (RWA)[6]. Under Basel III, every CoCo

[5]See Avdjiev et al. (2013) for more on this discussion.

[6]CET1 is a measure of the banks core equity capital, excluding preferred shares and other non-controlling interest. RWA weighs the assets based on risk, giving high risk asset a higher

should have an accounting based trigger in order to be categorized as regulatory capital. As such, all CoCo's issued so far have a trigger based on CET1-ratio.

ii) Market Value

A market value trigger is so far only a theoretical concept and has to our knowledge yet to show up in any CoCo issues. Potential candidates for market triggers are stock prices and CDS spreads, but there is currently no clear definition of how market triggers should be specified[7].

One of the disadvantages with book value triggers is that accounting numbers are published with considerable time lag. This time lag could lead to late triggering of CoCo's and long periods of uncertainty, which could be associated with the 2008-09 financial crisis where many banks had trouble without any significant warnings leading up to the crash. Accounting figures can also be manipulated and may not be a good representation of a banks current financial health[8].

Many academics[9] strongly advocate for market triggers, as these are less susceptible to manipulation, are forward looking and are continuously observable. However, market triggers also have a potential downside. Sundaresan and Wang (2015) argue that market trigger CoCo's that do not convert at par may create conflicting motives between equity holders and CoCo holders. This could lead to market manipulation when the equity price approaches the trigger level. If the CoCo dilutes equity holders, then they might start mass selling shares close to the trigger and thereby creating a self fulfilling prophecy also known as a "death spiral". Corcuera et al. (2013) however, shows that this effect can be limited by allowing for coupon cancellation.

A discretionary trigger seeks to meet some of the shortcomings of CET1 ratios by allowing the CoCo to be triggered at the discretion of regulators. This is also

weight than low risk assets.

[7]For further discussion see Flannery (2009), Calomiris and Herring (2013) and Hilscher and Raviv (2014).

[8]During the financial crisis, large institutions like Bear Stearns and Lehman Brothers had both capital ratios above 8% but still had to be bailed out. Most CoCo's have a trigger of 7% or lower meaning that these would never be converted (De Spiegeleer and Schoutens, 2011, p. 4).

[9]Flannery (2009), McDonald (2013), De Spiegeleer and Schoutens (2011), Calomiris and Herring (2013).

known as a point of non-viability (PONV) trigger. A government authority can intervene and trigger the CoCo when they deem the financial health of the bank as non-viable. One potential issue with this trigger is that it creates uncertainty in the market of whether or not a CoCo will be triggered. It becomes hard to accurately predict the probability of conversion which could hurt the marketability of CoCo's.

Most CoCo's include both a book value based CET1 trigger and a discretionary PONV trigger. The benefit from using both from a regulatory standpoint is that it provides a failsafe mechanism. If one trigger fails to convert the CoCo, the other acts as a backup, ensuring a broader basis for recapitalization. One example of this trigger combination is the Credit Suisse issue from 2011. It has a CET1 trigger ratio of 7%, and in addition Swiss regulators (FINMA) have the option to convert the CoCo at their discretion.

Basel III and Regulatory Debate

3.1 Basel III and Bank Regulations

Bank regulations aim to stabilize the financial system through two fronts. The first is to reduce the impact of bank failure on the economy and the second is to reduce the probability of failure. The latter category relates to capital requirements and in its simplest form the goal is to increase banks ability to endure losses. CoCo bonds falls within this category and we will in the following discuss the impact from regulators to frame the design of these securities.

The financial crisis made it clear that the Basel II accords provided an insufficient framework for capital requirements. Basel III seeks to meet some of these shortcomings, and is already in the process of being phased in (BCBS (2011), BCBS (2013c))[1]. One of the main objectives of Basel III from a capital requirement perspective is boosting the quality of regulatory capital. In Basel II, regulatory capital was fragmented and the definition of what capital belonged in which category was unclear and complex. In addition, some of the hybrids allowed as regulatory capital proved to be insufficient in absorbing losses. Basel III simplifies the structure and disallows certain hybrids that previously qualified as regulatory capital. Tier 3 is gone, upper and lower Tier 2 is combined into just Tier 2. The Tier 1 category is split in to CET1 top quality equity capital and Additional Tier 1 (AT1) (BCBS (2013a) and BCBS (2013b)). The calculation of risk weighted assets also received an overhaul.

Basel III also increases capital requirements. At a minimum, banks should hold 4.5% in CET1, 1.5% in AT1 and 2% in Tier 2. A counter cyclical buffer was introduced which requires banks to build up a buffer consisting of 0 – 2.5% in common equity. There is also a capital conservation buffer (CCB) requiring 2.5%

[1] A full implementation is expected to be finished in 2019.

in common equity as well. Lastly, in order to deal with the risk posed by "too-big-to-fail" banks, systematically important financial institution (SIFI) are required to hold an additional 1-3.5% in CET1. Figure 3.1 summarizes these requirements.

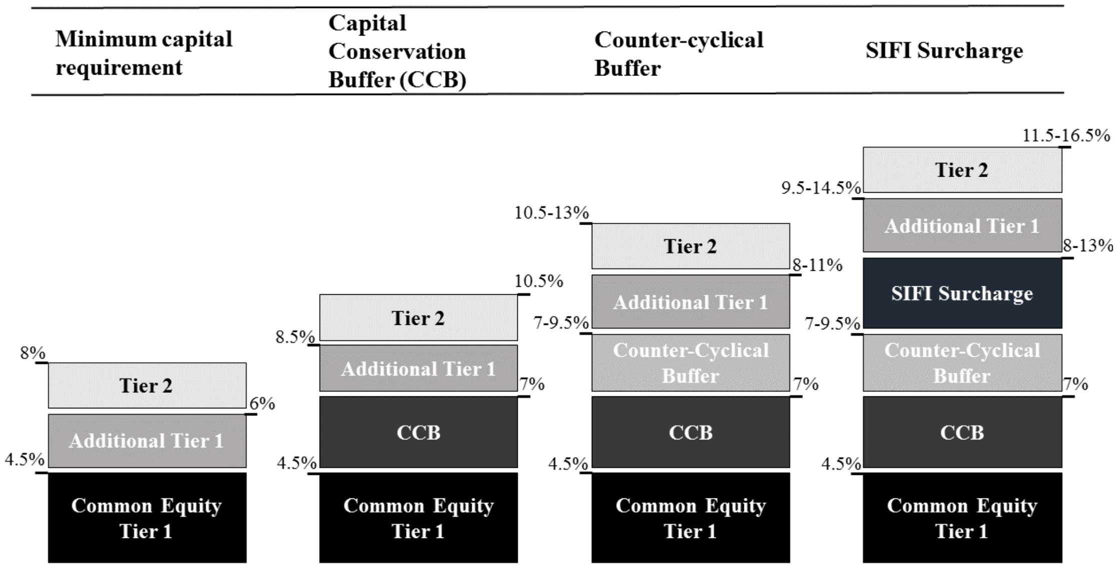


Figure 3.1: Basel III capital requirements

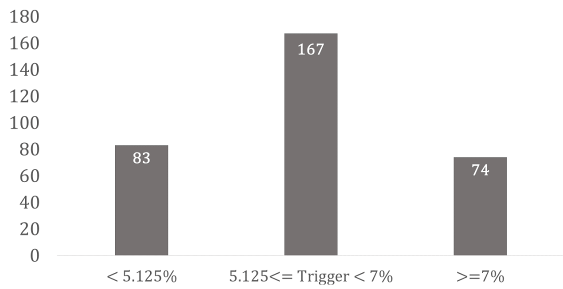
The new capital requirements have received criticism for being too lenient[2]. Many argue that banks and financial institutions were too successful in lobbying regulators keeping the requirements as low as possible. Banks seeks to minimize capital requirements ex ante, and thus increasing the probability of being bailed out during a crisis. McDonald (2013) argues that one of the problems with current capital requirements is that there is no quantitative theory supporting this specific level of capital. Nevertheless, most academics seem to agree that Basel III is a considerable improvement to Basel II.

Under Basel III CoCo's can qualify as either AT1 or Tier 2 capital. AT1 securities must have a trigger of at least 5.125% CET1 to RWA and a perpetual maturity date. In addition, the coupon payments can be canceled at the banks discretion if they breach the combined buffer requirements. Tier 2 CoCo's must have a lower trigger than AT1 and can have a fixed maturity date but above 5 years. Coupons are cancelable but cumulative (BCBS (2013a)).

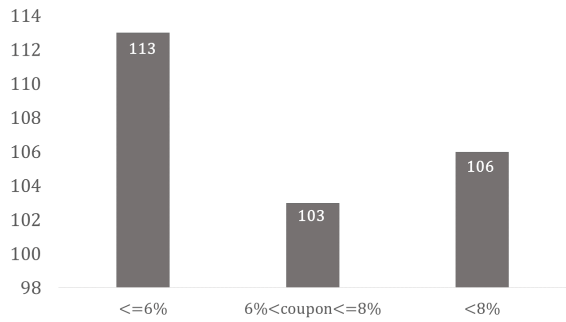
CoCo's first entered the financial landscape in November 2009 when Lloyds of-

[2]Admati and Pfleiderer (2010).

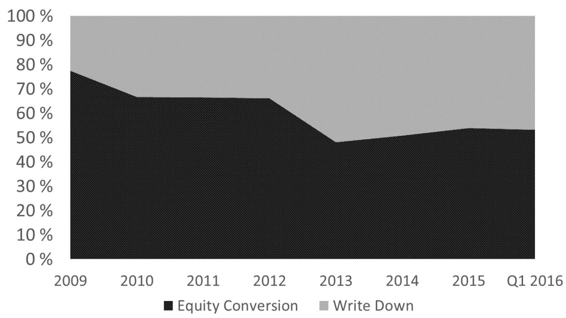
fered to exchange existing hybrids with this new asset class (De Spiegeleer and Schoutens (2011)). At this point it wasn't clear that CoCo's would qualify as regulatory capital. In 2010 the Basel Committee signaled that the loss absorbency of regulatory capital would be an important part in coming banking regulations, implying that CoCo's would become more relevant in times to come. This was further implied when the European Banking Authority (EBA) in 2011 released a framework for the use of CoCo's in banking regulations. However, the market didn't really gain traction until CRD IV ratified Basel III into EU law in 2013, where it is explicitly stated that CoCo's qualify as regulatory capital (BCBS (2011)). CoCo's have been well received by the market, with many banks experiencing oversubscription on their issues [3]. According to ECB (2014a), over one third of all securities issued by reviewed banks between July 2013 and August 2014 were CoCo's, while equity stood for just under two thirds. While majority of CoCo's qualify as AT1 instruments, some banks also issue Tier 2 CoCo's for different regulatory and credit rating objectives (ECB, 2014a, p.81).



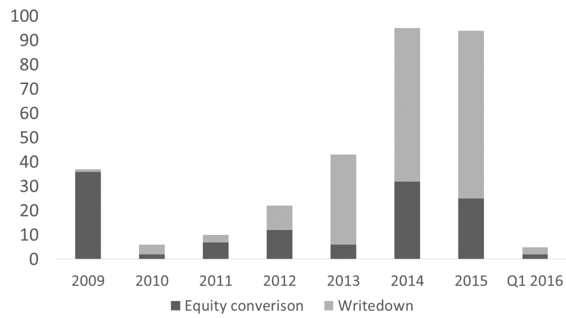
(a) Trigger



(b) Coupon



(c) Market share

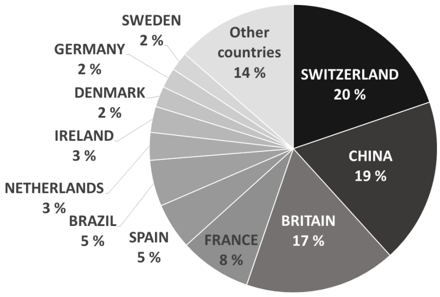


(d) Number of issues

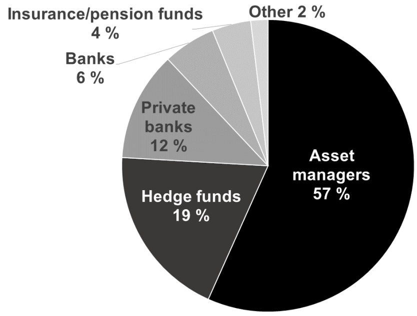
Figure 3.2: These figures provide a short summary of the CoCo market thus far. Figure (a) shows the number of issues based on trigger, Figure (b) shows the number of issues based on different coupon levels, figure (c) shows the development in the aggregated market share between CE and PWD CoCo's and figure (d) shows the number of issues made with a PWD or CE feature over the years

[3] Credit Suisse 2011 issue was more than ten times oversubscribed (Bolton and Samama (2012)).

Figure 3.2 provides a short summary of the CoCo issues made to date. Trigger levels varies from around 5% to 7% and triggers at the AT1 limit 5.125% appears to be most common. CoCo's yield relatively high interest, with 106 issues observed to pay coupon above 9%. A recent trend is that PWD CoCo's are starting to become more common. While PWD and CE's are close to equal in terms of market share, the number of PWD issues is by far larger than CE's suggesting that CE issues is larger in size.



(a) Issue Country



(b) CoCo Buyers

Figure 3.3: Panel **(a)** shows the allocation of CoCo issues by country of residence expressed in terms of amount issued (**Source:** Bloomberg and Thomson Reuters Datastream). Panel **(b)** shows allocation of CoCo buyers between Jan. 2013 and May. 2014 for 50% of public issues made within the EU (**Source:** Dealogic, Bloomberg and ECB (2014b) calculations).

European banks dominate the CoCo market accounting for 78% of its total size. Swiss and UK banks are the biggest European issuers followed by France and Spain. Asia, fronted by India and China, has in recent years also made its entry to the CoCo market. Latin America and Australia have also made a few modest issues. Note that American banks have yet to enter the CoCo market. This is likely due to the unfavorable tax treatment on coupon payments and its treatment as regulatory capital (Vallée, 2015, p.10-11).

As seen from figure 3.3 (b) the CoCo investor base is mainly dominated by asset managers followed by hedge funds, private banks and banks. Due to its complexity, some jurisdictions do not allow for CoCo's to be sold and marketed to the mass market.[4] For CoCo's to effectively transfer risk outside the financial sector it is important that banks themselves are not exposed to CoCo risk (Admati et al. (2012)). If one bank experiences a conversion then any bank holding the CoCo would take potential losses, leading to a contagion effect. Under Basel III, banks are subject to a prohibitive charge for holding CoCo's, so the reason they show up on the in-

[4]UK bans banks from selling to retail investors (Dakers (2016)).

vestor base is that they often act as intermediates towards the market (Avdjiev et al. (2015)).

The popularity of CoCo's can partly be attributed to the fact that they offer high yield in a low interest economy. Concerns have been raised whether or not investors fully understand the risks associated with these securities or if they are just "chasing yield". In February 2016, fear brewed in the market over a possible coupon cancelation of Deutche Banks AT1 securities. Under the current regulatory framework it is not clear that AT1 coupons should be prioritized over other payments like dividends. Deutche Bank later vowed to prioritize coupon payments but this event seems to have made a dent in the reputation of CoCo bonds. The market value of traded CoCo's fell drastically and planned issues have been put on hold. So far in 2016 only a few European issues have been made and many argue that the CoCo market will struggle to grow unless regulators simplifies the rules. However, many banks still vow to use CoCo's in the future to satisfy AT1 requirements but Deutche Bank stated that they aim to satisfy these requirements in other ways (Dakers (2016)).

These recent development have lead to a more vocal criticism of European regulators approach to CoCo bonds. Some investors view the European approach as too draconian and that too little thought have been put in to making CoCo's attractive to investors. CoCo's are needlessly complex and some argue that regulators should look to the American use of bail-in bonds as an alternative (Bow (2016)).

It should be noted that the regulatory requirements are not identical across jurisdictions. This thesis focuses on European CoCo bonds, and although Basel III has been ratified in to EU law through CRD IV, individual countries are still allowed to have additional regulations. Many countries have made additions in the capital requirements where one example is Switzerland who have a total capital requirement of 19%[5]. Swiss banks that carry large systemic risk like UBS and Credit Suisse are required to hold at least 5% in CoCo's while in some other jurisdictions holding CoCo's is optional. Although Basel III still makes up the foundation, different jurisdictions take different approaches to the treatment of CoCo bonds. The

[5]In the so called "Swiss Finish" the requirements are 4.5% in common equity, 8.5% in buffer where at least 5.5% is common equity and 3% is high trigger CoCo's and 6% in progressive component which must be made entirely with CoCo's (Authority (2011)).

lesson is that one should be careful directly comparing CoCo issues made between jurisdictions since they may vary in both design and regulatory objective.

3.2 Regulatory Debate

The concept of CoCo's first saw the light of day in Flannery (2002). As a way of recapitalizing firms ahead of losses he proposes an instrument called reverse convertible debentures (RCD), which is intended to convert in to equity if the capital ratio falls below a pre-determined level. The design should consist of a floating conversion price and a market based trigger, in order to ensures that shareholders takes the loss from their risk taking decisions and to avoid the upward bias and time lag associated with accounting triggers. However, this instrument remained in the theoretical realm up until after the financial crisis when it received renewed attention as a way of providing banks with more loss absorbing capital.

French et al. (2010) attempts to mitigate the "too big to fail" problem and reduce the systematic risk in the financial system and proposes a hybrid similar to Flannery's that recapitalizes banks without the use of taxpayer money. The proposal is very similar to the CoCo's we see today with a dual accounting and PONV trigger. Martino et al. (2010) suggests a dual trigger based on both the health of the individual bank and the general health of the financial system. The proposed instrument is called Countercyclical Contingent Capital (CCC) and the trigger setup would ensure that banks only would get recapitalized under a system wide crisis, while they are allowed to fail in other states.

McDonald (2013) provides a more specific version of this dual trigger, by suggesting a trigger based on individual stock price and one for a financial stock index. McDonald argue that this has the benefit of addressing some of the moral hazard concerns associated with CoCo's, but Haldane (2011) states that the complexity of the trigger mechanism might make CoCo's even harder to value.

Early CoCo proposals were strong advocates for market based equity triggers[6]. Sundaresan and Wang (2015) however, points out that if the conversion do not hap-

[6] Flannery (2002), Hilscher and Raviv (2014), Flannery (2009), Martino et al. (2010), De Spiegeleer and Schoutens (2011).

pen at par, the mere expectation of a trigger event might become a self fulfilling prophecy as shareholders sell their claim in order to avoid potential dilution. This is known as a "death spiral" and comes from the fact that there are no competitive equilibria. As a solution to this problem Pennacchi et al. (2014) proposes a call option enhanced reverse convertibles (COERCs). The COERCs will convert in to equity at a very dilutive rate, but existing shareholders are given the right to purchase these shares at the bond par value. They argue that the rights issue will always be a success since failure will severely dilute existing shareholders, and thus none of the problems associated with a "death spiral" is present. In addition the COERCs will be very low risk as bondholders are almost guaranteed to be paid back in full.

While most of the academic literature focuses theoretical design features, few seem to reconcile the fact that all CoCo's on the market today have accounting triggers and few have CE as a conversion feature. Calomiris and Herring (2013) argue that in order to be a good alternative to equity in capital requirements, CoCo's should dilute shareholders at conversion in order to discourage excessive risk taking. Berg and Kaserer (2015) finds that most CoCo's are not dilutive, in fact, most CoCo's imply a wealth transfer to shareholders at conversion. This is largely driven by the increasing tendency of banks to issue PWD CoCo's but also the fact that CE CoCo's have a relatively high conversion price.

The complexity of CoCo's has also been ground for criticism. Haldane (2011) looks at the nature of CET1 accounting triggers and argues that over 200 million calculations could be necessary in order to accurately determine a banks CET1 ratio. This, in addition to the regulatory PONV trigger makes CoCo's hard to value. As stated in Avdjiev et al. (2013), the rise of PWD CoCo's is likely an attempt to make CoCo's more marketable by making them easier to value.

Skeptics of CoCo's, like Admati et al. (2012), argue that they are too complex and that it has no advantages over equity in capital requirements. Equity performs as well as CoCo's in absorbing losses and has the added benefit of being easy to understand and avoids problems related to risk taking incentives and market manipulation. They also argue that CoCo's are not fundamentally different from the hybrids used prior to the crisis, and that they will have a limited ability to absorb losses before being bailed out by taxpayers. Both French et al. (2010) and Calomiris and Herring (2013) argue that relying just on equity in capital regulations has its problems, namely that managers will be reluctant to recapitalize banks during financial distress[7]. Equity is also considered to be more expensive and could therefore lead to a less efficient capital market.

To our knowledge no CoCo's to this day have been triggered, and therefore their ability to bail in distressed banks remains unknown. Vallée (2013) looks at conversion effects from hybrids with similar features to CoCo's in the European market. He finds that the decision to activate the trigger entails a reduction in CDS spreads likely due to a reduction in debt overhang. The stock market reaction is mixed and dependent on the type of relief a conversion gives. Exchange in to equity is received positively by both CDS spreads and equity prices, which is consistent with a reduction in debt overhang. He argue that this specific hybrid class did a good job in recapitalizing banks, which in turn might give some credibility to CoCo's ability to do the same.

[7]During the financial crisis, banks kept their capital ratios by selling of assets instead of issuing new equity. This fire sale amplified the panic in the financial markets and imposed costs on other financial institutions (French et al. (2010)).

Theory and Hypothesis

4.1 Market Efficiency

The efficient market hypothesis states that an efficient market is a market in which security prices reflect all available information. Malkiel and Fama (1970) argue that it can be divided in to three variants; weak, semi strong and strong form. There is extensive evidence suggesting that the market is at least weak form efficient, implying that excess return cannot be achieved by trading based on historical market data (Hudson et al. (1996)). Malkiel and Fama (1970) also finds evidence supporting semi strong efficiency which states that prices reflect all publicly available information. The strong form implies that all information, both public and private, is reflected in security prices. As stated by (Jensen, 1978, p.4) this "*is an extreme form which few people have ever treated as anything other than a logical completion of the set of possible hypotheses*". If this form of efficiency were to hold, the concept of event studies would be obsolete since the information contained in the "event" would already be reflected in the security prices. Therefore, an event study can be seen as a test for strong form efficiency. The intention of issuing CoCo's is private information up until the announcement date. At announcement, this information is made public and any abnormal changes in security prices would be evidence against strong form efficiency. Note that if no changes are observed, this does not mean that strong form holds. It is possible that the information contained in a CoCo announcement is irrelevant for the intrinsic value of the firm.

4.2 CoCo Announcement and Equity Prices

There is a large body of literature concerning the announcement effect from other security offerings. Bethel and Krigman (2008), Asquith and Mullins (1986) and

Mikkelson and Partch (1986) analyze the effect from equity offerings and finds that it is associated with significantly negative stock returns. Other hybrids like convertible bonds are also associated with negative returns (Eckbo (1986), Ammann et al. (2006), Abhyankar and Dunning (1999)). Eckbo (1986), Mikkelson and Partch (1986) and Dann and Mikkelson (1984) finds that straight debt offerings have no significant effect on stock prices. A small selection of prior empirical results is summarized in table 4.1.

Table 4.1: This table present the results from prior empirical research on announcement effects from convertible bonds (CB's), equity, debt and CoCo's. The window for all studies is (-1, 0), and *, ** and *** represent statistical significance at 10%, 5% and 1% respectively.

Author(s)	Security	Period	Obs.	CAAR(%)	Significance
Eckbo (1986)	CBs	1964-1981	75	-1.25	***
Mikkelson and Partch (1986)	CBs	1972-1982	33	-1.97	***
Hansen and Crutchley (1990)	CBs	1975-1982	67	-1.45	***
Abhyankar and Dunning (1999)	CBs	1982-1996	237	-0.01	**
Ammann et al. (2006)	CBs	1996-2003	55	-0.77	**
Asquith and Mullins (1986)	Equity	1963-1981	392	-3.00	***
Mikkelson and Partch (1986)	Equity	1972-1982	80	-4.46	***
Altınkılıç and Hansen (2003)	Equity	1990-1997	1703	-2.23	*
Heron and Lie (2007)	Equity	1980-1998	3658	-2.50	*
Bethel and Krigman (2008)	Equity	1992-2001	2592	-2.01	*
Dann and Mikkelson (1984)	Debt	1969-1979	150	-0.37	*
Mikkelson and Partch (1986)	Debt	1972-1982	171	-0.06	
Eckbo (1986)	Debt	1964-1981	648	-0.06	
Johnson (1995)	Debt	1977-1983	129	0.32	
Jung et al. (1996)	Debt	1977-1984	276	-0.09	
Ammann et al. (2015)	CoCos	2009-2014	87	1.18	***

One thing that is clear from examining the previous studies on security offerings, is that the Modigliani and Miller (1958) irrelevance of capital structure theory does not hold. Security offerings do appear to convey new and significant information to the market, which is further evidence that markets are not perfectly efficient. There are many competing explanations as to why security offerings entail abnormal announcement returns. One strain of these explanations can be summarized as the optimal capital structure theories. These theories emphasize that each method of financing has costs and benefits that has to be traded off in order to reach an optimal capital structure. Examples of costs and benefits from various securities might be tax advantage and cost of financial distress from debt (Brennan and Schwartz (1978)), and agency costs (Myers (1977), Jensen and Meckling (1976)). According to these theories, any use of external financing will signal an increased capacity to extract benefits from the specific security and thus, assuming benefits outweigh transaction cost, the announcement effects will be positive. However, most empirical studies find negative or non-positive returns related to security offerings implying that the optimal capital structure theory is not the dominant determinant driving announcement returns.

Another set of hypotheses relates to the presence of asymmetric information between insiders (managers) and outsiders (the market). Managers know more about the true value of the firm and by deciding to offer securities to the market they implicitly reveal some of their private information. Based on the decision, the market infers whether the firm was under- or overvalued and thus equity prices move following the announcement. In the models of Ross (1977), Brealey et al. (1977) and John and Williams (1985), security offerings that decrease leverage signals a reduction in expected future cash flows and thus would entail negative announcement effects. This is consistent with the results in table 4.1 where equity is associated with negative announcement effect. However, the model also predicts positive announcement effects from debt offerings which are not consistent with previous empirical findings. In the Miller and Rock (1985) framework, any larger than expected use of external financing would signal a lower than expected operating cash flow. This implies that all unexpected use of external financing would be associated with negative announcement effects. Previous studies partially support this, where both equity and convertible bond announcement result in negative returns. However, the model does not account for the insignificant effect from straight debt offerings, which should be equal to the other two given that the model does not discriminate between the choice of external financing.

Perhaps the most popular theory in explaining the observed dynamics of announcement effects relates to the adverse selection model of Myers and Majluf (1984). Managers, who are assumed to represent the interest of existing shareholders, will try to exploit their information advantage by issuing securities in states they are overvalued. The market, aware of their relative ignorance, will thus demand a discount in order to hedge against the risk of buying overvalued securities. The risk of overvaluation correlates with the riskiness of the security which means that the market will demand more discount for equity than debt. This gives rise to a hierarchy also known as the pecking order where risky securities like equity is assumed to entail more negative announcement effects than less risky securities like straight debt. As seen in table 4.1, there appears to be a hierarchy where equity and convertible bonds, which can be viewed as a delayed equity issue, is at the bottom with significantly more negative announcement effects than debt.

Frank and Goyal (2003) investigates the empirical foundations for the pecking order and finds that especially in more recent years, the evidence for the pecking order theory does not seem to be particularly strong. This does not mean that the announcement effect from security offering can't be partially explained by information asymmetries, but other competing explanations have to be taken in to account as well. The remaining question now is; what does this imply for the announcement effects from CoCo's?

It is tempting to categorize CoCo's as conventional hybrids like convertible bonds and thus postulate that the announcement effects will be similar. This however ignores some of the differences between CoCo offerings and the other offerings discussed in the literature. A CoCo issue is not necessarily a voluntary corporate decision but an involuntary one, made in order to satisfy regulatory requirements. The market, knowing that the issue is involuntary, will not learn any private information because the issue would have happened independent of state. Cornett and Tehranian (1994) performs an event study on equity offerings from commercial banks and finds that involuntary offerings done in order to meet capital requirements have no effect on share prices, while voluntary ones is associated with negative announcement effect, consistent with the pecking order. This implies that given a complete lack of discretion from the perspective of the bank, a CoCo issue signals no private information to the market. However, in the current regulatory framework, the Tier 1 ratio can either be increased by retained earnings, equity or CoCo's[1]. Even though the decision to raise capital is involuntary, the way it is done is for the most part a voluntary decision meaning that the choice of CoCo's may still signal meaningful information to the market.

This dynamic may give rise to a partial anticipation effect. Capital requirements and a bank's current capital ratio is public knowledge and the market may therefore

[1]Some jurisdictions like for example Switzerland and Denmark have specific targets for CoCo (or AT1) financing.

anticipate future issues based on how much capital a bank needs. However, the market will only partially anticipate CoCo's since they also put some probability on the next issue being equity. Bayless and Chaplinsky (1991) finds through a logit prediction model that equity is more negative when debt is expected. For CoCo's, this would imply that CoCo announcement will be more positive the more equity is anticipated. That is, assuming equity is the least preferred alternative.

4.3 CoCo Announcments and CDS Spreads

A CDS is a contract that provides bondholders with protection against default. If a default occurs, the CDS writer compensates the buyer for losses on his claim. The buyer of the contract pays fixed premiums to the seller also known as the CDS spread which is essentially the price of insuring a debt position on a firm. CDS spreads can therefore be seen as a measure of the pure default risk of a firm which is why they are of interest for this study. As mentioned, CoCo's belong to a branch of bank regulations aimed at reducing the probability of bank failure. Therefore, how CDS spreads react to a CoCo announcement might give crucial information to how effective the credit market perceive these bonds to be.

CDS markets reaction to security offerings is a relatively unexplored subject compared to stock market reactions. Angelopoulos et al. (2014) studies seasoned equity offerings and finds that they are associated with a significant reduction in CDS spreads. They find evidence suggesting that distance from target leverage is one of the key determinants of spread changes in addition to the firms' initial rating. Cornett et al. (2014) examines equity offerings from financial institutions before and during the financial crisis, and finds that offerings made during the financial crisis entailed a greater reduction in CDS spreads. They also find that low rated financial institutions experience greater reduction.

Another way to examine credit markets reaction to security offerings is to look at bond prices. Kalay and Shimrat (1987) find that equity offerings entail a significant reduction in bond prices and suggest that this partially support the Miller and Rock (1985) model. Eberhart and Siddique (2002) studies equity offerings in the period 1980-1992 and find that they lead to a significant and persistent increase in bondholder wealth. They argue that this can partially be explained by a wealth transfer from shareholders. Elliott et al. (2009) also find that bond prices increase following equity offerings and argue that the reduction in leverage reduces the risk exposure of bondholders.

While all of the examined literature studies equity offerings, it still leaves some implications for how CDS spreads would react to CoCo announcements. Angelopoulos et al. (2014) proposes two competing hypothesis to how CDS spreads would react to equity offerings. On one hand, an increase could possibly be explained by the Miller and Rock (1985) model, where unexpected use of external financing signals a lower than expected firm value. In the CoCo framework, the market may expect the bank to raise a certain amount of capital internally and an unexpected CoCo issue signals a reduced ability to do so. On the other hand, a decrease in CDS spreads may relate to the reduction in leverage followed by an equity issue. In the CoCo framework, the implication of this hypothesis depends on whether or not CoCo's are viewed as added leverage. From the debt holder's perspective, one could make the case that CoCo's are essentially viewed as equity capital. CoCo bonds are designed to absorb losses on a "going-concern" basis and will be converted long before a bank reaches insolvency. Therefore we think it is likely that the leverage hypothesis implies a reduction in CDS spreads from CoCo announcements.

Partial anticipation might also have an impact on how CDS spreads react to announcement. However, it is not clear in which way it will affect CDS spreads since it is hard to argue that equity should be more (less) preferred than CoCo's. Both will provide bondholders with additional loss protection from a pure capital structure perspective, so the impact will partially depend on what the choice of CoCo's signals about risk of default. The impact might also depend on the design of the CoCo which may affect managers' risk taking incentives. This will be discussed more in detail in the next section.

4.4 CoCo Design and Risk Taking Incentives

One of the key goals behind CoCo's is to make banks more resilient against financial turmoil by providing an automatic recapitalization when capital reserves deteriorate.

However, many academics have pointed out that certain CoCo types may induce some adverse incentive effects[2]. Berg and Kaserer (2015) define two categories of CoCo's; convert-to-surrender and convert-to-steal. At conversion, the convert-to-surrender type will dilute existing shareholders and provide a wealth transfer to CoCo holders while the convert-to-steal type implies a wealth transfer to shareholders. Figure 4.1 provides a graphical representation of the CoCo types effect on equity payoff at conversion.

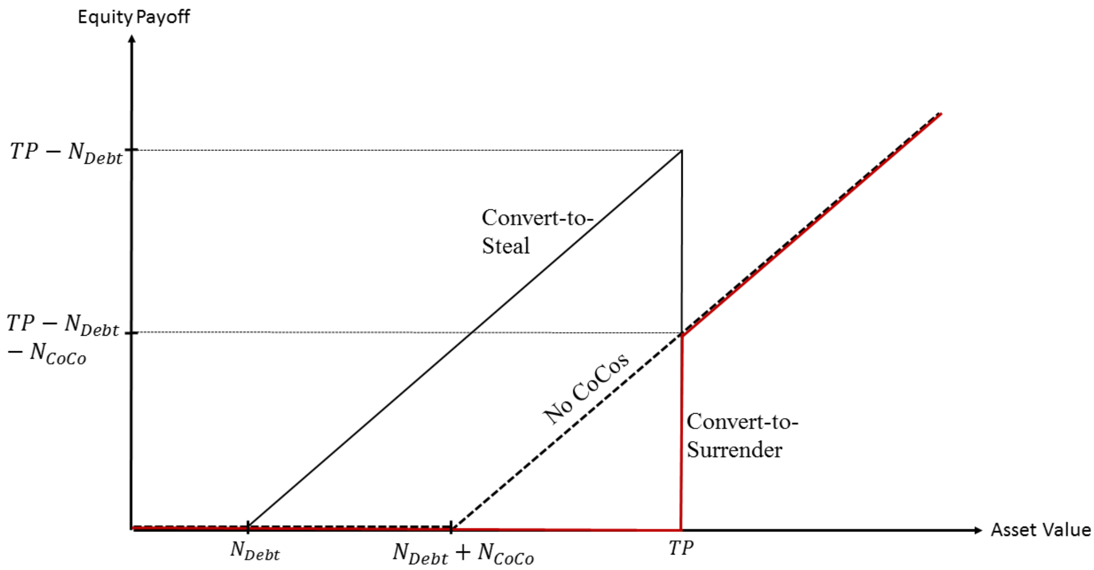


Figure 4.1: This figure depicts payoff to equity under three scenarios; with convert-to-steal, with convert-to-surrender and without CoCo's. TP is the implied asset value at the trigger point, N_{Debt} denotes the notional value of straight debt and N_{CoCo} denotes the notional value of the CoCo bond. In the no CoCo scenario, the notional CoCo value is replaced by straight debt. It is assumed that the bank is liquidated at conversion. **Source:** Berg and Kasserer (2015).

Berg and Kaserer (2015) finds through a structural Black and Cox (1976) model that the convert-to-steal type incentivizes risk taking and discourages voluntary recapitalization. This is also known as the asset substitution and debt overhang problem[3]. When a CoCo falls within the convert to steal category, the CoCo holders provide downside protection to existing shareholders and thereby incentivizes them to take more risk. Shareholders participate fully in the upside but shares part of the downside with CoCo holders and are therefore better off taking more risk. Furthermore, shareholders would rather be just below than just above the trigger. Allowing the CoCo to trigger provides an injection of new funds equivalent to receiv-

[2]Calomiris and Herring (2013), Martynova and Perotti (2015).

[3]See Jensen and Meckling (1976) and Myers (1977).

ing a wind fall profit. They are therefore discouraged from voluntarily providing new funds which denies them the opportunity of receiving the wealth transfer. Since risk weighted assets move slowly, this could lead to longer periods with underinvestment and limited credit supply. (Note: For more on how wealth transfer is calculated, see appendix A1). What does this imply about the relationship between CoCo design and announcement effects?

In a perfect capital market, every investor is adequately compensated for their risk meaning that the design of CoCo's would have no impact on announcement effects. Any implied wealth transfer from CoCo holders will be offset by higher yields and thus eliminating its impact. However, as pointed out by Avdjiev et al. (2013), there is a fear that CoCo investors are "chasing yield" and are not adequately compensated for their risk exposure. In that case, it is possible that the net implied wealth transfer is different from zero and thus gets reflected in abnormal changes in CDS spreads and equity prices. CoCo's that imply a high wealth transfer to shareholders would in isolation affect equity prices positively. Conversely, the risk incentives associated with high wealth transfer CoCo's would put upward pressure on CDS spreads. Trigger and distance to trigger might proxy for the probability of conversion. This implies that high(low) trigger(distance to trigger) in combination with positive wealth transfer would affect stock prices positively. For CDS spreads the picture is a bit more complicated. A high trigger will ensure earlier recapitalization and better protection for their claim which in isolation would reduce spreads. However, high trigger also amplifies the incentive effects associated with high wealth transfer CoCo's which increases the risk of their claims.

Finally, the choice of conversion mechanism might also affect announcement effects. PWD CoCo's has no risk of dilution and guarantees a wealth transfer at conversion which in isolation will affect both stock prices and CDS spreads positively. With CE CoCo's, shareholders risk dilution at conversion and might therefore be associated with negative (less positive) returns compared to PWD. Debt holders will likely prefer CE over PWD, and therefore CE CoCo's might entail a more negative spread change.

Data and Methodology

5.1 Methodology

5.1.1 Event Study

The methodological approach to measure announcement effects of CoCo's follows the classic event study methodology presented in MacKinlay (1997). This approach involves estimating a "normal" return model in a pre event window, and examining if the specified event entails abnormal returns significantly different from zero. In other words, if a CoCo announcement conveys new information to the market about the risk or value of a firm, the returns in the event window will be significantly different than those predicted by a pre-estimated return model. The methodology from MacKinlay (1997) is widely used in empirical finance and is compiled mainly from the previous work of Ball and Brown (1968), Fama et al. (1969) and Brown and Warner (1985). All of them conclude that this methodology is well suited for analyzing the effect of new information on market prices.

The first step is to determine the length of the estimation window. We have selected an estimation window that begins 250 days before and ends 16 days prior to the announcement date. An event window around this length is commonly used for most event studies [1]. It is a tradeoff between having it long enough to get a good estimate of normal returns but not so long that it captures old and irrelevant data.

When determining the event window, it is important to consider the fact that the event might affect security prices both before and after the actual event date. It is therefore common to choose an event window length as to include both pre- and post- announcement effects (MacKinlay, 1997, p. 15). For the event window we find it appropriate to apply a window starting 15 days before announcement

[1] Brown and Warner (1985) use 239 days and MacKinlay (1997) provide an example with 250.

and ending 10 days after. As suggested by MacKinlay, it is also important that the event window and estimation window do not overlap, which is why the estimation window ends one day prior to the event window (MacKinlay, 1997, p. 21)[2]. The length of the window is a tradeoff between being able to capture the whole effect and risking including non-event related noise that may influence the results. We therefore choose a heuristic approach by examining several smaller windows to best fit the particular analysis. The figure below summarizes the timing of our event study.

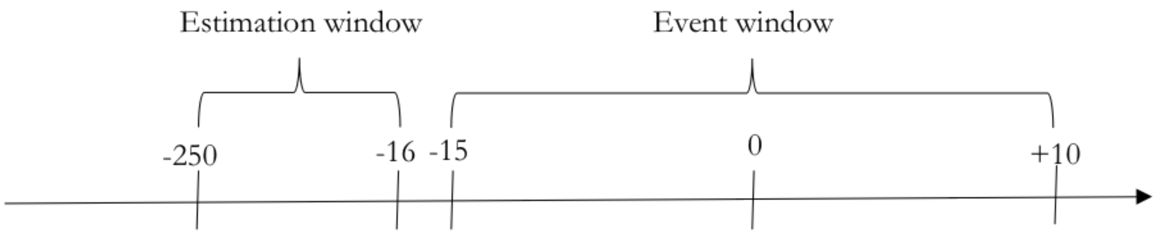


Figure 5.1: Timing of event study

When estimating normal returns we choose to apply the market model. The market model is a one factor model but one could make the case of using multiple factors like the Fama and French (1993, 1996) three factor model[3]. Including multiple factors could control for additional anomalies in the stock market and improve the precision of our measurements. However, according to Brown and Warner (1985) the market model is well suited for an event study using daily data, and there is not much to gain from applying more sophisticated models. In addition, a multifactor model would require us to calculate the factors for 14 different indexes which is beyond the scope of this study, and therefore we consider the use of the market model as justified. The Market Model can be expressed by the following equation

$$E(R_{i,t}) = \alpha_i + \beta_i R_{m,t}, \tag{5.1}$$

where $E(R_{i,t})$ is the expected return for security i at time t, α_i and β_i is the estimated parameters and $R_{m,t}$ is the return on the market index at time t. One of the disadvantages of using daily data is that non-synchronous trading might create

[2]An overlap might cause the estimation parameters to be influenced by the event and thus reducing its ability to detect abnormal returns.

[3]The two additional factors is size (small minus big) and value (high minus low book to market).

possible biases in the beta estimate which may threaten the internal validity. Scholes and Williams (1977) present a beta adjustment for non-synchronous trading and estimate that non-adjusted betas for thinly traded securities are approximately 10 to 20 percent smaller than the adjusted ones. Ajinkya and Jain (1989) on the other hand, argues that adjusting the beta will have a negligible effect on the distribution of abnormal returns. However, since it can only strengthen our analysis and our sample consists of some smaller firms with low trading volume, we choose to apply the beta adjustment. It can be written as,

$$\beta_{SW} = \frac{\beta_i^- + \beta_i + \beta_i^+}{1 + 2pm}, \tag{5.2}$$

where $\beta_i^-, \beta_i, \beta_i^+$ are lagged, matching and leading beta estimates respectively and pm is the first order correlation coefficient of market returns.

When the model has been estimated, abnormal returns can be found as the difference between realized and estimated returns as,

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{m,t}). \tag{5.3}$$

In order to draw general conclusion about the effect of the event, the abnormal returns are aggregated across time and between firms as,

$$CAAR(t_1, t_2) = \sum_{t=1}^{T} \bar{AR}_t \tag{5.4}$$

where $CAAR(t_1, t_2)$ is the cumulative average abnormal return between t_1 and t_2, and $\bar{AR}_t$ is the average abnormal return at time t. This aggregation method allows us to create various subsamples based on design and issuer characteristics, and thus test for any possible differences.

5.1.2 Inference

When doing inference we choose to use both a parametric and a non-parametric test. As a parametric test we use the J_1 test statistics provided by (MacKinlay, 1997, p. 23). It can be written as

$$J_1 = \frac{CAAR(t_1, t_2)}{\sqrt{\sigma^2(t_1, t_2)}} \sim N(1, 0) \tag{5.5}$$

where $\sigma^2(t_1, t_2)$ is the average estimatet standard error between t_1 and t_2. One of the problems with parametric tests is that they require strict assumptions about the probability distribution of abnormal returns. In J_1 it is assumed that abnormal returns are normally distributed, but as stated in Brown and Warner (1985) most financial market data are not normally distributed. Abnormal returns estimates typically suffer from skewness and excess kurtosis which reduces the power of parametric tests. Therefore we choose to include a non-parametric test which doesn't require any assumptions about the probability distribution of AR's. The generalized sign test was developed by Cowan (1992) and measures the proportions of positive to negative AR's over the relevant window, and under the null hypothesis the proportions is assumed to not systematically deviate from what was observed over the estimation window. The test statistic is mathematically expressed as

$$t_{GST} = \frac{P_0^+ + P_{Est}^+}{\sqrt{P_{Est}^+(1 - P_{Est}^+)/N}} \tag{5.6}$$

where P_0^+ and P_{Est}^+ denote the ratio of positive returns over the event and estimation window respectively. This test does not allow us to say anything about the magnitude of AR's, only the sign. It should therefore be viewed as a supplement to J_1 in order to verify its validity.

5.1.3 Cross Sectional Analysis

In order to further examine what factors explain the abnormal returns we apply a cross sectional regression. As the dependent variable we focus on CAR's representing both pre-and post-announcement effects. For the pre-announcement we use a (-3 , -1) window for stocks and a longer window (-5 , -1) for CDS, due to its earlier response. MacKinlay (1997) suggests using a (-1, 1) window for the announcement itself because firms can report to the stock exchange before trading starts and after it ends. For the post-announcement window we use (1 , 3). Our regression model can be expressed with the following equation,

$$
\begin{aligned}
CAR(t_1, t_2) = \alpha &+ \beta_1 PreCAR(-15, -5) + \beta_2 Coupon + \beta_3 Trigger \\
&+ \beta_4 PWD + \beta_5 IssueSize + \beta_6 Subsequent \\
&+ \beta_7 Leverage + \beta_8 SIB + \beta_9 After + \beta_{10} WealthTransfer \\
&+ \beta_{11} Trigger * WealthTransfer + \beta_{12} DistanceToTrigger \\
&+ \beta_{13} lnMC + \beta_{14} Rating(BBB - NIG).
\end{aligned}
\tag{5.7}
$$

Note that $Rating(BBB - NIG)$ only applies for CDS regression. For variable description see table A.4 in appendix. We also perform several diagnostic tests and conclude that the model satisfies the OLS assumptions. See table A.2 and A.3 for more detail.

5.2 Logit and Cox Proportional Hazard Model

In order to infer what separates banks that issue CoCo's from those that don not we choose to apply a both a logistic regression and a Cox (1972) Proportional Hazard Model (PHM). The choice of issuing CoCo's or not is a binary outcome which does not suit a standard linear regression. A linear regression requires assumptions on homoscedasticity and normality in errors which will not hold given the binary nature of the dependent variable, leading to invalid standard errors and spurious results. Both models allow us to compare the characteristics of CoCo issuers to non-CoCo issuers. The logistic regression examines the variables at current date while the Cox PHM directly incorporates time and examines variables at each point in time. Both yield comparable outputs, but the PHM's ability to model time might reveal some additional information.

5.2.1 Logistic Regression

In a logistic regression the dependent variable is binary which can take the values 1 or 0. In our model, 1 represents a bank that has issued CoCo's. The logit model regress the log of probability ratios on the explanatory variables and can mathematically be expressed as

$$log(\frac{Prob(y=1)}{1-Prob(y=1)}) = \sum_{i=1}^{n} \beta_i X_i. \tag{5.8}$$

For convenience, the coefficients can be exponentiated in order to express the output as odds ratios as,

$$Odds = \frac{Prob(y=1)}{1-Prob(y=1)} = e^{\sum_{i=1}^{n} \beta_i X_i}. \tag{5.9}$$

The coefficients can thus be interpreted as the multiplicative change in odds ratio. In other words, an exponentiated coefficient greater that 1 increases the odds of having issued, while an exponentiated coefficient smaller that 1 decreases it. In order to identify what characterizes a bank that issue CoCo's we logistically regress the binary outcome variable (Y) on various bank characteristics

$$\begin{aligned} Y = {} & \beta_1 Log(TotAss) + \beta_2 Return(08-09) + \beta_3 Return_{-1} \\ & + \beta_4 LongTermDebt + \beta_5 DebtRatio + \beta_6 Tier1_{-1} \\ & + \beta_7 Market/Book. \end{aligned} \tag{5.10}$$

For variable description see table A.5. Although the logit model avoids some of the assumptions associated with linear models, it still requires certain assumptions, namely a sufficient goodness of fit, no multicollinearity and no influential observation. The goodness of fit is assessed with the Hosmer et al. (1988) test reported in appendix A.2. We fail to reject the null stating that our model is well fitted. The model above has also been assessed against other alternative specifications without any improvement in goodness of fit. The variance inflation factor is reported in appendix table A.6 and no variables are above the VIF rule of thumb threshold of 10 (Wooldridge, 2015, p. 99). Influential observations are assessed graphically with Pearson residuals[4] which takes the standardized difference between observed and predicted frequency. No observations deviate from the residual sufficiently for us to exclude it.

[4] $p_i = \frac{y_i - \hat{y_i}}{\sqrt{\hat{y_i}(n-\hat{y_i})/n}}$.

5.2.2 Cox Proportional Hazard Model

The Cox Proportional Hazard Model (PHM) is a model used in survival analysis and was developed by Cox (1972). It is most commonly used in medical applications in order to model the effectiveness of different drugs, but the model can also be applied to other fields. Lane et al. (1986) were the first to apply the model in empirical finance by measuring risk of bank bankruptcy. It has since been used to examine different events of interest in the finance literature[5].

With survival data we are interested in measuring time to an event, which in our case is CoCo issues, and calculating the risk of an event happening based on the time exposed to the risk and a set of explanatory variables. When factoring in time, logit and other traditional regression models become unsuitable due to censoring[6] and non normality. As pointed out by Lane et al. (1986), one of the main advantages of using the PHM is the lack of assumptions needed but also its ability to directly incorporate time. The regression estimates the hazard function $h_i(t)$ for a bank based on a baseline hazard function $h_0(t)$ and a set of explanatory variables: $z = \sum_{i=1}^{n} \beta_i X_{i,t}$. The hazard function is defined as the risk of an event occurring in the next instance, and the regression can be written as

$$h_i(t) = h_0(t)e^z. \tag{5.11}$$

The explanatory variables are centralized so that a bank with mean values has z=0. From the expression above we see that this gives $h_i(t) = h_0(t)$ which means that a bank with mean values of all explanatory variables has a hazard function equal to the baseline. Any deviation from the mean will either increase or decreases the risk of experiencing an event relative to the baseline. There is some evidence from other scientific fields supporting that hazard functions follow this form (Cox and Oakes, 1984, p.71). One assumption underlying the PHM is that the hazard ratios between individuals are proportional across time. This means that the relative relationship between all hazard ratios is the same regardless of elapsed time. The

[5] Luoma and Laitinen (1991) predict company failure with a PHM, Hellmann and Puri (2002) use to predict the likelihood of a startup getting venture capital.

[6] Unknown time to event due to inadequate length of study. Our study ends at 31.12.2015 and banks who have yet to issue are considered censored.

log hazard ratio of bank i can thus be written as

$$log(\frac{h_i(t)}{h_0(t)}) = z = \sum_{i=1}^{n} \beta_i X_{i,t}. \tag{5.12}$$

In the output, the coefficients are exponentiated as to show the multiplicative change in hazard ratio, which can be interpreted as the percentage increase in risk of experiencing the event given one unit increase in the exponential of the relevant variable. The explanatory variables used are the same as for logit except they are measured at a yearly basis and not a fixed point in time.

The dependent variable is a combination of the binary CoCo issue variable and elapsed time. Time is measured in yearly intervals between 01.01.2008 and 31.12.2015. Once a bank issue CoCo's it is excluded from the sample. One issue with yearly data is that some CoCo issues will be reported at the exact same time. This is called tied survival times. We deal with this by applying the Efron (1977) likelihood approximation (See Efron (1977) for more detail). The validity of the assumption is also assessed with a global test based on Schoenfeld residuals[7]. Results can be found in appendix table A.7 and indicate that the assumptions hold.

5.3 Data

5.3.1 Data Gathering

The contingent capital market is a relatively young market whose modest entry dates back to Lloyds issue in November 2009. Since then 325 CoCo issues have been made. From Bloomberg we collect information on all announcements including characteristics like; coupon; trigger level; amount issued; conversion mechanism; Basel III designation; rating (Standard & Poor's) and other bond specific information. Additionally, we used the issue prospectus to find information on the conversion price used in calculating implied wealth transfer and to ensure the reliability of the Bloomberg data. Daily share price and CDS spreads data were retrieved from Thomson Reuters Datastream. We use the same source to collect various data on

[7]Test if the slope of the scaled residuals are 0. If not, the hazards are not proportional across time and the assumption is violated.

issuer characteristics such as; Leverage ratio; Tier 1 ratio; Market Cap and other firm specific variables.

For the estimation of abnormal returns we also need an appropriate market index. For stock prices we use the stock exchange in which the bank is listed. We adjust the index for the influence of the relevant bank so that the index itself does not contain the abnormal returns associated with the CoCo announcement. This approach also helps us adjust for country specific effects and thereby increasing the validity of our results.

For CDS spreads we create our own equally weighted index based on traded credit default swaps from European banks. As with stock prices, the index is purged of the influence from the relevant bank. Controlling for country specific effects is not possible with CDS spreads due to the limited number of traded instruments, but this approach has the added benefit of controlling for sector specific effects.

We choose to focus on the European market because of two primary reasons. First, there is a high degree of regulatory harmonization within the European region[8]. Secondly, the European market is by far the largest containing 78% of the total CoCo market today. This means that we are able to maintain a relatively large sample size while simultaneously making each issue comparable in terms of regulatory framework. We thus remove $82.44 billion in CoCo issues from non-European regions from our dataset[9].

Next, we removed all issues made by corporations not listed on a stock exchange, or lacking share price data in the estimation window. For our CDS sample, we also required that the issuer have credit default swaps on senior debt actively traded around announcement. Some issuers are not categorized as banks, and therefore do not follow the capital regulations set by Basel lll. Those are removed from our dataset as well. CoCo announcements made in quick succession from the same bank are also removed to avoid contaminating the results[10].

For the logit and Cox PHM analysis, we collect data on 97 European banks that have yet to issue CoCo's. From Datastream we gather yearly observations on Total

[8] CRD IV ratifies Basel lll into EU law, which affects all issuers in our European sample.

[9] We included non-European banks in one sample to explore whether or not their inclusion influences the result.

[10] We define "in quick succession" as CoCo announcements falling within the event window (-15 , 10) of another announcement. In such case both are removed.

Capital; Long Term Debt; Tier 1 ratio; Market-to-Book and Equity Return.

5.3.2 Methodological Concerns

When doing statistical inference, most parametric tests require normality in the data. One factor which may influence the normality of the data is outliers. Including outliers may influence the statistical power of the tests by making the standard deviation unrepresentative of the population. Adjusting for outliers is a double edged sword. On one hand, an outlier may contain information relevant to the analysis and by excluding it we create a bias in the data, making the results unrepresentative. On the other hand, an outlier may contain noise related to non-CoCo information and thereby skew the results in a wrong direction. One possible solution is to manually inspect each issuer, and remove CoCo announcements made close to the release of other price sensitive information. This raises the question of what to consider as "noise". With today's media coverage, there is a constant stream of information to the market. Defining what is considered as price sensitive has to be based on our own judgment, which may create possible biases and threaten the internal validity of the results.

Therefore we have chosen to deal with outliers by following Fenn and Liang (2001), and winsorizing the sample at the 5th percentile. This has the advantage of reducing the influence from extreme observations while simultaneously maintaining the initial sample size. One disadvantage of this approach however, is that we end up with some constructed observations. From table A.1 we observe a reduction in skewness and kurtosis, thus making the data much closer to normal as evident from the Shapiro Wilk test.

5.3.3 Final Sample

The final sample for stocks consists of 95[11] announcements from 39 banks who in total issued $186.25 billons worth of CoCo's. The sample for CDS spreads consists of 65 announcements made by 24 banks who in total issued $162.85 billion worth of

[11] When including non-European announcements the sample increases to 122 issuers. No non-European banks had actively traded CDS's so this sample stays the same.

CoCo's. Table 5.1 provides a descriptive summary of our data.

Table 5.1: Summary descriptive of all CoCo bond isses between 2009- Q1 2016

(a) Issuer Statistic

	Stock	**CDS**
Number of international banking corporations	39	24
Number of announcements	95	65
Aggregrated value of amount issued (USDbn)	186.25	162.85
Number of corporations with 1 announcement	17	7
Number of corporations with 2-5 announcements	18	15
Number of corporations with over 5 announcements	4	2

(b) CoCo Characteristics

	Stock	**CDS**
Convertion mechanism (%)		
Principal writedown	60.44	61.54
Convertion to Equity	39.56	38.46
Regulatory capital classification (%)		
Additional Tier 1	81.32	76.92
Tier 2	18.68	23.08
Maturity in years (%)		
<5	2.20	3.08
5-10	18.68	21.54
>10	7.69	6.15
Perpetual	71.43	69.23
Rating senior debt (%)		
AAA-A	49.65	52.31
BBB-NIG	50.35	47.69
Classification (%)		
SIB	50.53	64.61
Non-SIB	49.47	35.39

(c) Variable Statistics

	Mean		**Median**		**Std. dev**		**Minimum**		**Maximum**	
	Stocks	CDS	Stocks	CDS	Stocks	CDS	Stocks	CDS	Stocks	CDS
Amt issued/market cap	10.02	5.78	3.97	3.68	18.19	7.32	0.09	0.54	142.41	50.17
Market cap (bn USD)	45.11	55.92	41.12	47.25	41.01	35.46	0.02	9.43	209.57	209.57
Wealth Transfer/market cap	5.96	3.09	2.88	2.90	10.24	4.54	-12.00	-12.00	53.99	18.00
Trigger (%)	5.71	5.60	5.13	5.13	1.24	1.08	2.00	2.00	12.00	7.00
Coupon (%)	6.70	6.93	6.69	6.75	1.81	1.31	4.00	4.00	11.50	11.50
Distance to trigger (%)	8.12	8.12	7.48	7.48	3.80	3.29	1.45	2.40	17.28	17.28
Leverage (%)	78.97	84.31	82.61	83.55	18.89	7.98	34.43	69.39	95.47	95.47

Most of the observations lost in the CDS sample appears to be smaller banks. This is no surprise given that an instrument like credit default swaps is more likely to have a market for larger and more liquid banks. Smaller banks are also less likely to have made multiple CoCo issues as evident from the fall of 10 in number of banks with 1 announcement. Interestingly, it appears also that smaller banks tend to make larger issues relative to market cap as evident by the lower median and average issue size for the CDS sample. This indicate that the CDS sample contains a bias towards large banks and small issue sizes, and are therefore less representative of the average CoCo issuer.

When examining the calculated implied wealth transfer, we see that both the median and mean is positive, indicating that most CoCo's are not dilutive. This is consistent with the findings of Berg and Kaserer (2015).

Our sample contains more PWD CoCo's than CE which is consistent with current market developments. Trigger levels are also consistent with market developments where it is increasingly common to issue CoCo's with trigger levels at the AT1 limit (5.125%).

Table 5.4: This table shows variable statistics for data used in the logit and Cox PHM analysis

	Mean	**Median**	**Std. dev**	**Minimum**	**Maximum**
CoCo issuers (39 total)					
$TotalAssets$ (USD in millions)	741.00	540.00	786.00	0.93	2580.00
$Return08-09$	27.15	28.97	33.38	-66.75	71.88
$Return_{-1}$	7.18	8.14	5.24	-4.95	13.09
$LongTermDebt$	14.91	13.05	12.66	0.07	49.50
$Debt-Ratio$	72.42	76.32	16.03	29.16	91.84
$Tier1$	14.90	13.65	4.05	9.58	26.90
$Market/Book$	1.05	0.94	0.43	0.47	2.03
Non-issuers (97 total)					
$TotalAssets$ (USD in millions)	158.00	30.00	377.00	0.63	2410.00
$Return08-09$	31.23	33.55	34.72	-108.40	147.16
$Return_{-1}$	7.87	6.36	15.19	-19.68	142.59
$LongTermDebt$	11.89	10.09	10.41	0.00	47.95
$Debt-Ratio$	67.88	76.17	20.69	12.73	97.37
$Tier1$	14.38	13.35	4.53	2.62	30.90
$Market/Book$	1.21	0.79	2.37	0.21	24.48

Table 5.4 provides a breakdown of the data applied in the logit and Cox PHM analysis. We have in total 136 banks of which 39 were observed to issue CoCo's between 01.01.2008 and 31.03.2016. The data above are based on figures for 2015 which are used for the logit regression. For the Cox PHM however, each variable is measured at yearly intervals.

Empirical Results

6.1 Event Study

6.1.1 Evidence From Stock Prices

Table 6.1 reports the impact on stock prices for three different time windows; (-3, -1), (-1, 1) and (1, 3), where t=0 is the official announcement date. Thus, (-3, -1) represent the pre announcement effect which may capture any leakage of information to the market prior to the official announcement date. (-1, 1) examines the effect from the official announcement as recommended by MacKinlay (1997). Including one day before and after is done in order to account for the possibility that the issue is announced before or after trading hours. The (1, 3) window represent the post announcement effect, which may capture any delayed effect from the information revealed at announcement. Additional windows are included in appendix B.1.1, which will occasionally be referred to during the analysis.

Figure 6.1 illustrate the cumulative development in abnormal stock returns for all European issuers. We observe a spike in abnormal returns starting at around t=-4 which persist up until t=1 followed by a small reduction. This raises the discussion surrounding the chronology of when certain information concerning the CoCo issue reaches the market. As discussed with regulators[1] and market participants, CoCo's are often presented to potential investors ahead of announcement. It is therefore possible that information on the contractual features reaches the market before the official announcement date and thus is reflected in both equity prices and CDS spreads. If this holds true, there is no uniform announcement date in which all information is revealed to the market but rather an interval of possible dates. Another

[1]As discussed with Nordal, K. B., Stefano, N., and Weme, S. at Norges Bank 1. March 2016. For further discussion on this see Avdjiev et al. (2015).

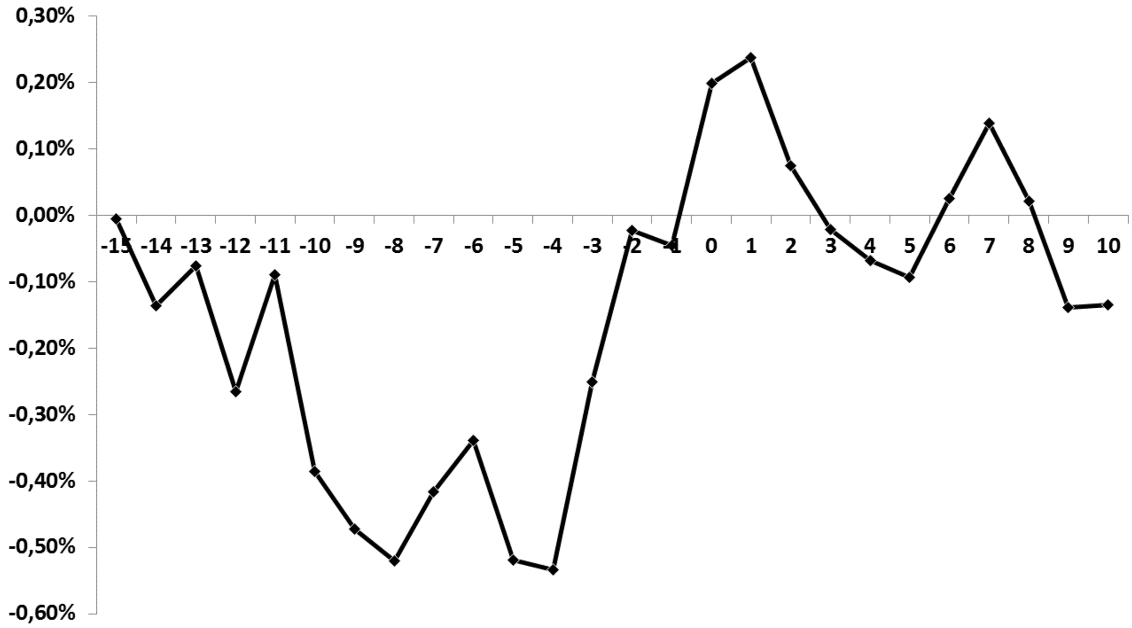


Figure 6.1: Cumulative abnormal stock price development for the full 26 day event window. The horrizontal axis represent days relative to announcement and the vertical axis shows cumulative abnomral returns.

possibility is that the pre-announcement effect reflect rumors of the bank's intention to issue CoCo's and that the limited reaction at announcement itself reflects that the contractual specifics are not relevant information for the markets perception of the bank's intrinsic value.

We observe that for all European issues, the equity markets react on average positively in the (-3, -1) window with an average abnormal stock return of 0.49% (J_1=1.622). Including Asian issuers also reveals a similar picture with an abnormal stock return of 0.43% (J_1=1.586). The effects are not significant at the 10% level but the J_1 statistic is relatively high. Note however that the sign test (GST) is not significant since there is almost an equal proportion of positive to negative returns, which implies that the positive stock reaction only applies to a few banks. In the (-1, 1) window the impact is still positive although less in terms of scale suggesting that the market already incorporates the information prior to the official announcement date. Interestingly, in the (1, 3) window, most banks experience negative stock returns as evident from the sign test, however the full marginal impact from CoCo announcement appears to be positive.

The fact that a CoCo announcement result in positive returns contradicts the adverse selection theories in Miller and Rock (1985). In the Miller and Rock (1985) framework, unexpected use of external financing signals a lower than expected operating cash flow, and thus should result in negative announcement returns. Furthermore, abnormal returns should correlate negatively with issue size which is why we create two subsample based on median issue size to market cap. We observe that larger issues are associated with more positive returns. The two subsamples based on issue size are not significantly different in any windows, but in the regression we observe that issue size is a significant and positive predictor for both (-3, -1) and (-1, 1) abnormal returns. On average, a one percentage point increase in issue size relative to market cap is estimated to increase the abnormal returns in these windows by 0.07% (t=3.29) and 0.08% (t=4.49) respectively.

The positive impact on stock prices might lend support for the optimal capital structure theory. It would certainly explain why size is positively correlated with abnormal returns. The optimal capital structure theory implies that issuing CoCo's signal an increased ability to extract benefits from this type of capital. From shareholders perspective, CoCo's are a form of leverage and thus the optimal capital structure theory predicts that low levered banks will, all else equal, have more to gain from issuing CoCo's. We therefore separate two subsamples based on the median debt to total capital value. In the (-3, -1) window, high levered issuers experience more significantly positive returns (0.92% (J_1=2.264)) compared to low levered issuers (0.03% (J_1=0.067)). In the (-1, 1) and (1, 3) windows however, we observe no significant difference between the samples. The regression indicates that leverage is positively correlated with abnormal returns where a 1 percentage point increase in leverage is estimated to increase abnormal returns by 0.0226% (t=1.06) and 0.0085% (t=0.49) in (-3, -1) and (-1, 1) respectively. This contradicts the predictions from the optimal capital structure theory, where leverage should be negatively correlated with abnormal returns. Note however that the effects are not significant, and there is no clear evidence suggesting that leverage have any effect on announcement effects.

As mentioned earlier, the most accepted theory in explaining the dynamics of announcement effects is the pecking order theory from the adverse selection model of Myers and Majluf (1984). CoCo's, being an "equity-like" risky security, should in this framework have a negative announcement effect similar to equity or convertible bonds[2]. The fact that we observe positive announcement effects related to CoCo's might appear to contradict this theory. However, doing this comparison at face value ignores the possible impact from partial anticipation.

A bank's capital ratio is public knowledge, meaning that the market knows how much capital a bank needs to raise in order to satisfy the regulatory requirements. This means that the market may infer an upcoming issue of regulatory capital but anticipates CoCo's only partially since they also put some probability on the upcoming issue being equity. Therefore the positive effect from CoCo announcements could be consistent with the pecking order theory since equity is assumed to be the least preferred alternative. We find some evidence suggesting that partial anticipation is present. As can be seen in figure 6.1, the stock price experience a negative drift prior to the positive jump at t=-4. In the period (-15, -5) shown in table B.3, abnormal returns are negative (-0.53% (J_1=-0.90)) suggesting that the market partially prices in an upcoming equity issue. Note however that the effect is not significant and the regression only partially support the notion that pre-announcement returns (-15, -5) are an important predictor. In the (-1, 1) window, pre-announcement returns are significant and negatively correlated with CAR, implying a 0.10% increase in CAR for every percentage point decrease in pre-announcement CAR.

In order to further investigate the claim of partial anticipation, we separate between first and subsequent issues. For first time issuers who have no previous experience with CoCo's, the market may anticipate equity more and thus the negative drift and the reaction on announcement will be greater. In the (-15, -5) window, we observe that first time issuers experience a negative drift of -0.94% (J_1=-0.884) while subsequent issuers experience a negative drift of -0.22% (J_1=-0.3527). The results are not significantly different and there's no clear evidence indicating that first time issuers experience more negative drift. However, first time issuers experience positive and significant abnormal returns in the (-3, -1) and (-1, 1) windows (1.43% (J_1=2.576), 1.05% (J_1=1.897)), while subsequent issuers experience negative, although insignificant abnormal returns in these windows (-0.17% (J_1=-0.507), -0.29% (J_1=-0.877)). The clear difference between the two may still relate to partial anticipation even though no significant negative drift is observed. It is possible

[2]See table 4.1.

that the market prices in their anticipation of equity months or even years before announcement and thus investigating the (-15,-5) window won't reveal anything. The market knows how much regulatory capital a bank has, and how much it needs and may therefore price in their anticipation long before a CoCo announcement. Another possible explanation to these findings which was put forth by Ammann et al. (2015) is that a first time CoCo issue signals a long term strategic change in the banks approach to regulatory capital. Opting to use CoCo's is taken as a signal that the bank is willing to shield its shareholders from the potential adverse effects related to equity issuance.

The sign test gives further legitimacy to the difference between first and subsequent issues with both samples being relatively close to significance in the (-3, -1) window, and the first sample having a significant proportion of positive returns in the (-1, 1) window. The regression confirms that first and subsequent is a relevant predictor where being a subsequent issue is estimated to reduce CAR in the (-3, -1) and (-1, 1) windows by 1.057% (t=-1.59) and 0.994% (t=-1.83) respectively.

In order to investigate if the markets anticipation of CoCo's has changed with time as CoCo's has become more common, we separate two samples based on the median date of issuance. Earlier issues do seem to entail a more positive stock reaction in the days prior to announcement. In the (-3, -1) window, the early subsample experience a positive and significant abnormal return of 1.03% (J_1=1.709), while the late subsample sees insignificant abnormal returns of 0.2% (J_1=0.778). This might indicate that the market put a higher probability on equity in the early days of CoCo's, but as with first and subsequent issues we see no clear evidence of negative drift in the (-15, -5) window. Judging from the dummy for issues made after 01.04.2014 in the regressions, it does not appear that reactions to CoCo announcement have changed over time as it is not statistically significant.

We further separate between market cap at the median level. Large banks are more closely followed by the market and thus the market may better infer an upcoming CoCo issue before announcement. This would imply that the market puts less probability on equity ahead of an upcoming issue from large banks, and thus the announcement effect would be smaller compared to small banks. However, due to their superior customer base for securities, large banks may also be more successful in designing CoCo's which are more advantageous to the shareholders. This may entail more positive announcement effects compared to smaller banks. The subsample for smaller banks yields more positive abnormal returns in all three windows and the effect is significant in the (-3, -1) window (0.93% (J_1=1.968)). This may support the claim that the market is better at predicting CoCo announcements for larger banks, but the sign test only partially support this. We do not observe that small banks experience significantly more negative drift prior to announcement but as mentioned, this is not necessarily evidence against partial anticipation. As we will show in the logit and Cox PHM analysis, large banks are more likely candidates to issue CoCo's which might indicate that the market anticipates CoCo's less from smaller banks. In the cross sectional regression however, market cap is associated with higher abnormal returns in all windows. A likely explanation for the discrepancy in results is that smaller banks tend to make larger issues relative to market cap and as shown earlier issue size is positively correlated with announcement returns.

As mentioned in section 3, systematically important banks (SIB)[3] are under Basel III required to hold more regulatory capital and in some jurisdictions they are also required to hold CoCo's specifically. This might imply that the market better infers upcoming CoCo issues from SIB banks, and that they anticipate equity more from non-SIB banks. As a result, SIB banks would experience a less prominent announcement effect compared to non-SIB issuers. We observe that non-SIB issuers experiences positive and partially significant returns in all windows, while issues from SIB banks entail no significant changes in stock prices. The sign test relatively high but not significant for non-SIB issuers in the (-3, -1) window. It is also worth noting that the GST test for SIB issuers is negative and significant, even though the CAAR is only -0.03% (J_1=-0.080).

Non-SIB banks also experience a significant negative drift in the (-15, -5) window (-1.67% (J_1=-1.7416)) which might reflect the markets high anticipation for equity. It should however be noted that SIB issuer are usually large banks, and that these effects might relate to size and not regulatory categorization. The regression partially support the notion that SIB banks experience less abnormal returns where being a SIB issuer is estimated to reduce (-3, -1) CAR by -0.985% (t=-1.43).

[3]Banks in our sample is categorized as systematically important following the classification from the European Banking Authority.

Table 6.1: Panel (a) shows the announcement effect from various subsamples. Column J_1 reports the test statistic for abnormal return, Pos:Neg reports the proportion of positive to negative results in the relevant window, while GST reports the test statistic from the generalized sign test. The table follows the chronology of the analysis. Panel (b) shows the regression where CAR in the relevant window is the dependent variable.

(a) Subsample table (-3,-1)

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All CoCo's (including Asia)		0.43	1.586	61 : 61	0.084	122
All European CoCo's		0.49	1.622	47 : 48	-0.094	95
Issue size	<median	0.25	0.719	23 : 24	-0.192	47
(Amt issued / MC)	≥median	0.72	1.480	24 : 24	0.058	48
Leverage	<median	0.03	0.067	23 : 23	-0.013	46
(Debt/Tot.assets)	≥median	0.92**	2.264	24 : 25	-0.118	49
First time issue		1.43**	2.576	23 : 16	1.225	39
Subsequent issue		-0.17	-0.507	24 : 32	-1.144	56
Before 01.04.2014		0.76	1.481	20 : 26	-0.817	46
After 01.04.2014		0.32	1.156	27 : 22	0.711	49
Market Cap	<median	0.93*	1.968	25 : 19	0.999	44
	≥median	0.23	0.585	22 : 29	-1.063	51
Issuer	SIB	-0.03	-0.080	17 : 29*	-1.698	46
	non-SIB	1.17**	2.341	30 : 19	1.641	49
PWD		0.38	1.179	31 : 30	0.223	61
CE		0.68	1.117	16 : 18	-0.455	34
Wealth Transfer	<median	-0.01	-0.031	18 : 28	-1.535	46
	≥median	0.95**	2.059	28 : 20	1.225	48
Trigger	<6%	0.23	0.642	31 : 29	0.323	60
	≥6%	1.66***	2.786	16 : 14	0.292	30
Distance to Trigger	<median	1.72***	2.743	26 : 17	1.138	43
	≥median	-0.04	-0.137	23 : 29	-0.709	52
Coupon	<median	0.31	1.005	23 : 24	-0.236	47
	≥median	0.68	1.294	24 : 24	0.106	48
Tier 1		0.52	1.562	40 : 40	0.001	80
Tier 2		0.31	0.455	7 : 8	-0.239	15

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

(b) Regression (-3,-1)

	(1)	(2)	(3)	(4)	(5)
Pre-CAR	0.0718*	0.0542	0.0232	0.0223	0.0542
	(1.78)	(1.12)	(0.51)	(0.49)	(1.17)
Coupon	-0.178	-0.214	0.163	0.128	0.0725
	(-0.89)	(-1.03)	(0.75)	(0.52)	(0.30)
Trigger	1.085***	1.112***	0.156	0.161	0.218
	(3.92)	(3.96)	(0.43)	(0.44)	(0.62)
PWD	0.155	0.384	-0.0356	0.0265	-0.0773
	(0.22)	(0.49)	(-0.05)	(0.03)	(-0.10)
Issue Size	0.0697***	0.0789***	0.0868***	0.0849***	0.0796***
	(3.26)	(3.08)	(3.64)	(3.43)	(3.29)
Subsequent	-0.435	-0.516	-0.641	-0.632	-1.057
	(-0.63)	(-0.73)	(-0.98)	(-0.96)	(-1.59)
Leverage	0.0461**	0.0505**	0.0443**	0.0421**	0.0226
	(2.39)	(2.47)	(2.32)	(2.05)	(1.06)
SIB	-0.462	-0.500	-0.322	-0.309	-0.985
	(-0.67)	(-0.72)	(-0.50)	(-0.48)	(-1.43)
After	-0.384	-0.424	0.446	0.400	0.576
	(-0.55)	(-0.61)	(0.65)	(0.57)	(0.83)
WealthTransfer		-0.0278	-0.336***	-0.326***	-0.160
		(-0.66)	(-3.75)	(-3.42)	(-1.39)
Trigger*WT			0.0496***	0.0480***	0.0334**
			(3.82)	(3.41)	(2.24)
DistanceToTrigger				-0.0313	-0.0231
				(-0.30)	(-0.23)
ln(MC)					0.685**
					(2.46)
Constant	-8.219***	-8.467***	-5.284*	-4.662	-19.16***
	(-2.75)	(-2.80)	(-1.81)	(-1.29)	(-2.80)
Observations	95	95	95	95	95
R^2	0.346	0.349	0.447	0.447	0.486

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(c) Subsample (-1, 1)

Group		CAAR(%)	J_1	Pos:Neg	GST	Sample-Size
All CoCo's (including Asia)		0.13	0.476	64 : 58	0.627	122
All European CoCo's		0.26	0.866	49 : 46	0.317	95
Issue size	<median	-0.03	-0.089	24 : 23	0.100	47
(Amt issued / MC)	≥median	0.55	1.129	25 : 23	0.346	48
Leverage	<median	0.58	1.305	27 : 19	1.166	46
(Debt/Tot.assets)	≥median	-0.04	-0.106	22 : 27	-0.690	49
First time issue		1.05*	1.897	25 : 14*	1.866	39
Subsequent issue		-0.29	-0.877	24 : 32	-1.144	56
Before 01.04.2014		0.37	0.719	22 : 24	-0.227	46
After 01.04.2014		0.01	0.041	27 : 22	0.711	49
Market Cap	<median	0.69	1.464	27 : 17	1.602	44
	≥median	-0.07	-0.194	22 : 29	-1.063	51
Issuer	SIB	0.03	0.095	21 : 25	-0.505	46
	no SIB	0.57	1.143	28 : 21	1.070	49
PWD		0.26	0.805	33 : 28	0.735	61
CE		0.26	0.428	16 : 18	-0.455	34
Wealth Transfer	<median	0.32	0.815	23 : 23	-0.061	46
	≥median	0.21	0.447	25 : 23	0.359	48
Trigger	<6%	0.19	0.527	33 : 27	0.839	60
	≥6%	0.55	0.917	13 : 17	-0.803	30
Distance to Trigger	<median	0.76	1.194	23 : 20	0.489	43
	≥median	-0.05	-0.162	25 : 27	-0.132	52
Coupon	<median	0.14	0.482	27 : 20	0.918	47
	≥median	0.38	0.722	22 : 26	-0.478	48
Tier 1		0.22	0.646	41 : 39	0.225	80
Tier 2		0.51	0.735	8 : 7	0.278	15

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

(d) Regresssion (-1, 1)

	(1)	(2)	(3)	(4)	(5)
Pre-CAR	-0.0615 (-1.50)	-0.0892** (-2.07)	-0.111** (-2.41)	-0.111** (-2.38)	-0.104** (-2.21)
Coupon	-0.0301 (-0.20)	-0.0887 (-0.58)	0.00266 (0.02)	0.00879 (0.05)	-0.0204 (-0.10)
Trigger	0.232 (1.07)	0.299 (1.38)	0.0593 (0.21)	0.0584 (0.20)	0.0798 (0.28)
PWD	0.305 (0.58)	0.771 (1.34)	0.684 (1.18)	0.672 (1.11)	0.661 (1.09)
Issue Size	0.0664*** (4.25)	0.0869*** (4.63)	0.0890*** (4.74)	0.0893*** (4.57)	0.0878*** (4.49)
Subsequent	-0.626 (-1.20)	-0.776 (-1.49)	-0.827 (-1.59)	-0.829 (-1.58)	-0.994* (-1.83)
Leverage	0.00568 (0.40)	0.0166 (1.10)	0.0152 (1.01)	0.0156 (0.96)	0.00850 (0.49)
SIB	0.507 (0.98)	0.415 (0.81)	0.471 (0.92)	0.468 (0.91)	0.225 (0.40)
After	-0.0403 (-0.08)	-0.146 (-0.28)	0.0583 (0.11)	0.0665 (0.12)	0.130 (0.23)
WealthTransfer		-0.0525 (-1.91)	-0.140 (-1.91)	-0.141 (-1.82)	-0.0849 (-0.92)
Trigger*WT			0.0139 (1.28)	0.0142 (1.22)	0.00890 (0.71)
DistanceToTrigger				0.00554 (0.07)	0.00798 (0.10)
ln(MC)					0.247 (1.13)
Constant	-2.091 (-0.94)	-2.908 (-1.31)	-2.093 (-0.91)	-2.203 (-0.77)	-7.355 (-1.37)
Observations	95	95	95	95	95
R^2	0.316	0.345	0.357	0.357	0.367

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(e) Subsamples (1, 3)

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All CoCo's (including Asia)		-0.45*	-1.679	42 : 80***	-3.357	122
All European CoCo's		-0.22	-0.729	36 : 59**	-2.351	95
Issue size	<median	0.16	0.455	22 : 25	-0.483	47
(Amt issued / MC)	≥median	-0.59	-1.223	14 : 34***	-2.829	48
Leverage	<median	-0.20	-0.458	17 : 29*	-1.782	46
(Debt/Tot.Assets)	≥median	-0.23	-0.576	19 : 30	-1.546	49
First time issue		0.00	-0.003	20 : 19	0.264	39
Subsequent issue		-0.37	-1.113	16 : 40***	-3.283	56
Before 01.04.2014		-0.25	-0.479	17 : 29*	-1.701	46
After 01.04.2014		-0.21	-0.750	19 : 30	-1.575	49
Market Cap	<median	-0.16	-0.341	18 : 25	-0.963	44
	≥median	-0.22	-0.574	18 : 33**	-2.183	51
Issuer	SIB	0.01	0.040	16 : 29*	-1.996	45
	non-SIB	-0.39	-0.771	20 : 29	-1.216	50
PWD		-0.13	-0.403	26 : 35	-1.058	61
CE		-0.38	-0.624	10 : 24**	-2.513	34
Wealth Transfer	<median	0.00	-0.006	17 : 29*	-1.830	46
	≥median	-0.43	-0.942	18 : 30	-1.662	48
Trigger	<6%	-0.09	-0.258	25 : 35	-1.227	60
	≥6%	-0.30	-0.503	10 : 20*	-1.899	30
Distance to Trigger	<median	-0.47	-0.736	16 : 27**	-2.108	43
	≥median	0.04	0.148	22 : 30	-0.998	52
Coupon	<median	-0.22	-0.729	36 : 59**	-2.351	47
	≥median	-0.54	-1.022	14 : 33***	-2.812	48
Tier 1		-0.22	-0.729	36 : 59**	-2.351	80
Tier 2		0.18	0.266	6 : 9	0.855	15

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

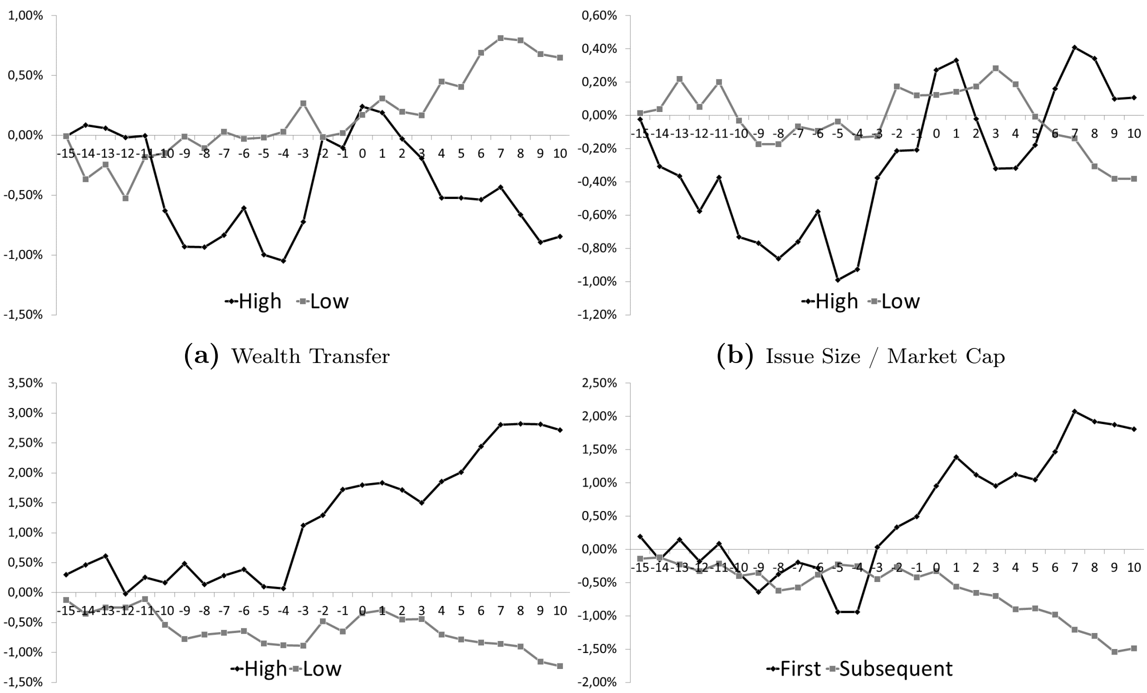
(f) Regression (1, 3)

	(1)	(2)	(3)	(4)	(5)
Pre-Car	0.00771 (0.21)	-0.0313 (-0.81)	-0.00625 (-0.15)	-0.000102 (-0.00)	0.000903 (0.02)
Coupon	-0.127 (-0.91)	-0.211 (-1.52)	-0.313** (-2.09)	-0.223 (-1.31)	-0.233 (-1.34)
Trigger	-0.245 (-1.25)	-0.153 (-0.79)	0.124 (0.49)	0.110 (0.44)	0.117 (0.46)
PWD	0.0612 (0.13)	0.634 (1.24)	0.738 (1.45)	0.576 (1.09)	0.575 (1.08)
Issue Size	-0.00298 (-0.21)	0.0237 (1.41)	0.0199 (1.19)	0.0244 (1.42)	0.0239 (1.37)
Subsequent	-0.682 (-1.45)	-0.856* (-1.87)	-0.807* (-1.78)	-0.828* (-1.82)	-0.883* (-1.85)
Leverage	-0.00452 (-0.35)	0.00965 (0.72)	0.0106 (0.79)	0.0159 (1.12)	0.0136 (0.89)
SIB	0.723 (1.55)	0.620 (1.37)	0.552 (1.23)	0.516 (1.15)	0.439 (0.90)
After	0.155 (0.33)	0.0137 (0.03)	-0.223 (-0.47)	-0.103 (-0.21)	-0.0835 (-0.17)
WealthTransfer		-0.0654** (-2.63)	0.0361 (0.56)	0.0148 (0.22)	0.0320 (0.40)
Trigger*WT			-0.0161* (-1.70)	-0.0125 (-1.24)	-0.0141 (-1.30)
DistanceToTrigger				0.0794 (1.09)	0.0801 (1.09)
ln(MC)					0.0787 (0.41)
Constant	2.326 (1.17)	1.264 (0.64)	0.366 (0.18)	-1.207 (-0.49)	-2.843 (-0.61)
Observations	95	95	95	95	95
R^2	0.076	0.146	0.175	0.186	0.188

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We further investigate the effect from different contractual design features in order to determine if there is something intrinsic to CoCo's themselves that drive abnormal stock reactions. The first contractual design feature we investigate is conversion mechanism, i.e the choice between PWD or CE. With PWD CoCo's, shareholders have no risk of dilution and are guaranteed a wealth transfer in case of conversion, which in isolation would imply a more positive announcement effect compared to CE CoCo's. We observe that neither conversion mechanism entail significant returns. However, in the post announcement window (1, 3) the CE sample has a significant proportion of negative returns (70.5%) compared to the PWD sample (57%). The lack of clear difference between the two is surprising given the amount of attention conversion mechanism has received in the literature. The regression indicate that conversion feature have no explanatory power for abnormal returns in none of the windows, suggesting that shareholders are indifferent between the choice of conversion mechanism. This might indicate that the market puts a negligible probability on a trigger event ever happening and thus are indifferent to the choice of conversion mechanism. Another possible explanation is that since PWD CoCo's exposes CoCo holders to more risk, they are more expensive to issue both in terms of coupon and the issue process itself, and this might counteract some of the positive aspects of PWD CoCo's.

Following the same methods as presented in Berg and Kasserer (2014) (see appendix A.1) we also separate between implied wealth transfer at the median level. High wealth transfer implies that CoCo holders provide additional downside protection for shareholders which in isolation would lead to a more positive announcement effect. We observe that the high wealth transfer sample is significantly positive in the (-3, -1) window with an abnormal return of 0.95% (J_1=2.059), while the low wealth transfer sample is insignificant with an abnormal return of -0.01% (J_1=-0.031). The sign tests are not significant however and the difference is not that clear in the other two windows. We suspect that the impact of implied wealth transfer will depend on the probability of conversion, which is why we include trigger level as an interaction term. All else equal, high trigger CoCo's have a higher probability of converting and are thereby more likely to result in a wealth transfer. This mechanism suggest that shareholders will be more positive to high trigger + high



(a) Wealth Transfer **(b)** Issue Size / Market Cap **(c)** Trigger **(d)** First and Subsequent

Figure 6.2: These figures shows cumulative abnormal returns for the subsamples Wealth Transfer, Issue Size, Trigger and First/Subsequent respectively. Horrisontal azis shows days realtive to announcement and vertical axis shows cumulative abnormal returns.

wealth transfer and less positive (negative) to high trigger + low(negative) wealth transfer. The interaction term is significant in the (-3, -1) and (1, 3) window and the marginal impact of wealth transfer in the (-3, -1) window can be written as $WealthTransfer(0.0334Trigger - 0.160)$. From this we observe that the marginal impact from wealth transfer is positive as long as $Trigger > 4.79$. If the trigger is too low, conversion is viewed as an improbable event making the convertible part of CoCo's irrelevant. A CoCo issue might then only be viewed as very expensive debt, and the cost of issuing will likely correlate positively with the implied wealth transfer which may explain why the direct effect of wealth transfer is negative (-0.160 (t=-1.39), -0.0849 (t=-0.92), -0.161 (t=-2.39)). Even though trigger and wealth transfer is not significant by themselves in the regression, we find through an F-test that both are in combination significant (F=2.56, F=5.91, F=3.73 for (-3, -1), (-1, 1) and (1, 3) respectively.).

Solving the interaction term for trigger, reveals that it will have a positive marginal impact as long as $WealthTransfer > -6.5269$. By our calculations, only two observations has a wealth transfer bellow this which might explain the very positive and significant impact from the high trigger subsample in the (-3, -1) window (1.66% (J_1=2.786)). This is further confirmed when looking at distance to trigger, where low distance to the trigger level entails more positive returns in the 3 days leading up to announcement.

We again note that the sign tests are not significant and therefore these results should be interpreted with caution. If we accept these results at face value, they convey some serious implications for CoCo's role as regulatory capital. As mentioned in Berg and Kaserer (2015), the unwillingness of shareholder to recapitalize and avoid a trigger event could result in longer periods of uncertainty and further destabilize the financial system. CoCo's are intended to help recapitalizing distressed banks, which they to some extent do through the conversion mechanism, but the fact that some of them appear to discourage voluntary recapitalization should worry regulators. However, this raises the question; if high trigger CoCo's are preferred by shareholders, why is it becoming increasingly common to issue low trigger (5.125%) CoCo's?

A possible explanation is that banks seeks to minimize the cost of capital by issuing low trigger CoCo's which is associated with lower coupon payments. In order to investigate this claim further, we separate between coupons at the median level. Perhaps surprisingly, the high coupon sample is more positive than the low sample in all windows, although neither the effect nor the difference is statistically significant. In the regression we observe that coupon is not significant for either windows, but the sign is negative indicating that all else equal, shareholders prefer low coupons. We thus conclude that there is no clear evidence suggesting the implied risk of the CoCo, i.e coupons, have any effect on abnormal returns. This might indicate that CoCo holders are adequately compensated for the risk and we find no support for the claim that they are "chasing yield". However, investigating CoCo yields might give better answers to this claim but we leave that to further research.

The final contractual feature we examine is regulatory capital classification. As discussed previously, Tier 1 CoCo's have a more junior standing on the balance sheet compared to Tier 2. Tier 1's have both higher trigger levels (5.125% or above) and allow for non-cumulative coupon cancellation, which provides additional loss protection for shareholders. However, we find no evidence suggesting that Tier 1 CoCo's are more preferred than Tier 2. Note also that the sample size for Tier 2 is small, and the statistical tests only carry limited power.

Several interesting conclusion can be drawn from this analysis. We find that average abnormal returns are positive ahead of a CoCo announcement suggesting that they on average are regarded as positive news by the shareholders. This result is also consistent with the findings of Ammann et al. (2015). Moreover, our analysis indicates that this positive effect might be related to a partial anticipation of equity. However, we also find some evidence suggesting that the positive reaction also might relate to the specific design features. Shareholders seem to prefer high trigger in combination with high wealth transfer. Perhaps surprisingly, conversion feature do not appear to have any significant effect on announcement returns.

These results are also interesting when compared to the results Avdjiev et al. (2015). They find that at issue date, equity markets reacts on average negatively, perhaps indicating that the market is overly optimistic to how successful the announced CoCo issue will be. As mentioned earlier, we believe that the effect on issue date mainly reflect the success of the issue process itself and not the bond specific details revealed at announcement. However, as with our results, their results also appears to be partly consistent with the Berg and Kaserer (2015) framework, where PWD and high trigger CoCo's experience less negative returns at issue date compared to CE and low trigger. This might indicate a lower demand for CE CoCo's than expected even though they in theory should be more attractive due to the limited wealth transfer to shareholders.

As a finishing note, we again like to point out that the sign test is almost consistently insignificant throughout this analysis. Therefore we are careful making too strong claims based on these results. The fact that average abnormal returns are significant while the sign test is not, suggest that the positive announcement effect is only experienced by a few banks. This restrains our ability to draw generalized conclusions on the relationship between CoCo announcement and equity market reaction.

6.1.2 Evidence From CDS Spreads

Table 6.4 reports the impact on CDS spreads from CoCo announcements in three different time frames (-5, -1), (-1, 1) and (1, 3). We have chosen to examine a longer

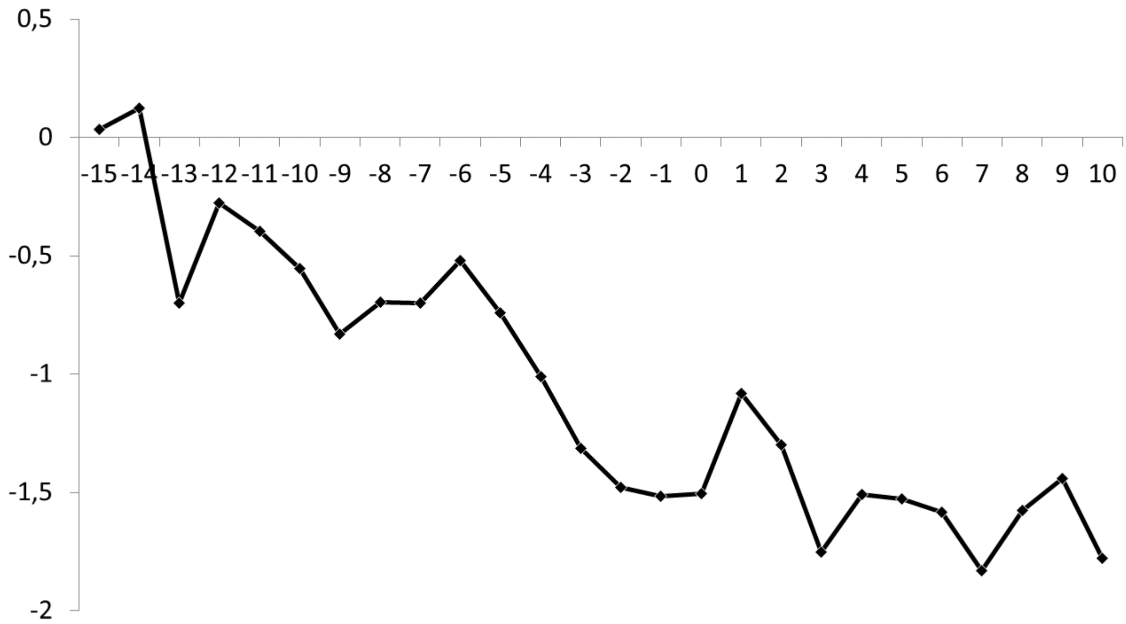


Figure 6.3: Cumulative abnormal development for the full 25 day window (-15,10). Horizontal axis represents days relative to announcement while the vertical shows abnormal changes in CDS spreads.

pre-announcement window than for stocks simply because we observe that CDS markets react earlier and are more persistent. This is consistent with the findings of Berndt and Ostrovnaya (2007), who showed that the CDS market reacts earlier than stock markets ahead of earnings announcements. Additional windows can be found in appendix B.1.2.

Figure 6.3 illustrate the cumulative development in abnormal spread changes over the whole event window (-15, 10). One interesting thing to note is that CDS spreads appears fall consistently throughout the whole window. Contrary to the stock market reaction, there is no clear spike, indicating that the information is gradually incorporated over time. These results are consistent with the findings of Angelopoulos et al. (2014) who finds that CDS spreads experience a consistent decrease in the 20 days leading up to an announcement of equity. Stock prices on the other hand, were observed to no significantly change until 2 days before announcement and they argue that this might imply that the CDS markets react to different information than equity markets. As mentioned earlier, credit markets might view both equity and CoCo's favorably, as they both provide additional loss protection. Therefore, CDS spreads might start to fall relatively early following a rumor regarding a bank's intention to issue capital and, assuming that bondholders are indifferent between CoCo's and equity, the revelation of a CoCo issue will have less effect. Equity markets however, may have a clearer preference between equity and CoCo's and thus stock prices will not react as much as CDS spreads until it is clarified what type of capital the bank intends to issue.

The gradual development in CDS spreads also indicate that the CDS market might be less efficient in incorporating new information. In the previous section we observed significant abnormal returns only in the (-3, -1) window. CDS spreads however, experience significant spread changes both before and after this window. In an efficient market, new information is immediately reflected in security prices and this is not consistent with the observed behavior in CDS spreads. One implication of this is that the notion of pre- and post-announcement effect becomes blurred and that we cannot directly compare two windows between the stock and CDS sample. As a result, viewing the full event window (-15, 10) will be more relevant for this analysis as it is harder to pinpoint a certain period of interest.

For the full sample, we observe that CDS spreads fall by -1.00% (J_1=-2.175) in the 5 days prior to announcement and the sign test is also significantly negative (63% negative). The fall in spreads is also evident for the full event window (-15, 10), in which CoCo announcers experience an average abnormal spread reduction of -1.78% (J_1=-1.698). The effect is not that prominent in (-1, 1) and (1, 3), and in (-1, 1) CDS spreads increase by 0.4% (J_1=1.114) although it is not significant. Overall, CoCo announcement appears to significantly reduce the risk exposure of senior debt holders. This is not that surprising. CoCo's do provide an extra capital cushion for senior claimants and this in isolation would suggest that CDS spreads would fall. It also suggests that the fall would correlate positively with the size of the issue because increased size results in increased protection against future losses. Our results partially confirm this hypothesis. When separating between issue size at the median level we observe that the high sample experience a more negative change in (-5, -1) and (-1, 1) (-1.73% (J_1=-2.777), -0.12% (J_1=-0.243)) compared to the low sample (-0.24% (J_1=-0.358), 0.93% (J_1=1.770)). However, in the post announcement window (1, 3) we observe that the low sample experience a significant decrease of -1.07% (J_1=-2.052), while the high sample experience an insignificant increase of 0.55% (J_1=1.144). The negative reaction from the low sample is also significant in terms of sign (68.7% negative). This might suggest that some additional information is revealed at the official announcement date that seems to favor small issue sizes.

For the full event window (-15, 10) however, we observe that creditors appear to have a marginal preference for larger issue sizes (-2.50% (J_1=-1.756) and -1.04% (J_1=-0.673) for large and small issues respectively). In the regression , we also observe that issue size is a negative predictor for all windows, and its effect is significant in the (-5, -1) window where a one percentage point increase in issue size relative to market cap is estimated to reduce CDS spreads by 0.225% (t=-2.77). The fact that size appears to be a relevant predictor indicate that the market reaction is not just based on signaling but that CoCo's have an intrinsic ability to reduce the risk exposure of debt holders. It also provides evidence against the Miller and Rock (1985) model which predicts a positive correlation with size.

Next, we examine two samples based on the Standard and Poor's credit rating of long term debt. Bondholders of banks with high rating may already consider their claim as safe, and therefore the effect from issuing more CoCo's will be less prominent as the additional loss protection is less needed. Both Angelopoulos et al. (2014) and Cornett et al. (2014) finds that equity issues have greater negative impact on CDS spreads from lower rated firms and under the assumption that CoCo's are viewed as equity capital by debt holders we expect to see the same here. Perhaps surprisingly, in the 5 days leading up to announcement, the high rating sample experiences a more significant reduction in spreads compared to the low rated sample (-1.45% (J_1=-2.379) and -0.50% (J_1=-0.723)). In the (1, 3) window however, low rated CoCo issuers experience a more negative spread change (-0.61% (J_1=-1.138)) compared to high rated issuers (0.08 (J_1=0.173)). The full event window also supports our initial hypothesis where the low rated sample experience a more significant reduction both in terms of scale and sign (-3.28% (J_1=-2.083)) compared to the high rated sample (-0.40% (J_1=-0.290)). The regression gives conflicting results however, where low rating is estimated to give a positive impact in (-5, -1) but turns negative, although insignificant, in (1, 3) and (-1, 1). This in relation to the clear and significant reduction low rated issuers experience in (-15, 10) indicate that the spread reduction takes place at a later or earlier point in time and therefore won't be captured by the regression. Overall, these findings support the leverage reduction hypothesis from

Angelopoulos et al. (2014).

Rating may also be proxy for the amount of debt, which is why we also examine the effect from leverage. Investors holding claims on high levered firms have less protection against losses and may therefore appreciate CoCo's more. However, we find no evidence supporting this claim. Even though the high leverage sample experiences a more significant reduction in the (-5, -1) window (-1.22% (J_1=-2.051) for high, -0.73% (J_1=-1.012) for low), the sign test is more significant for the low leverage sample (69% negative) and both the regression and the remaining windows show no indication that claimants on high levered firms appreciate CoCo's more. The full event window (-15, 10) indicate the opposite, where low levered banks experience a more significant reduction both in terms of scale and sign (-3.36% (J_1=-2.045), (65.5% negative)) compared to high levered banks (-0.51% (J_1=-0.375), (52.7% negative)). A possible explanation is that claimants on high levered banks may expect, or favor equity more because the bank have less capacity to handle the leverage-like features of CoCo's. CoCo's acts like debt in "normal" times and might therefore put additional strain on the bank's liquidity. As opposed to the results for rating, these findings go against the leverage reduction hypothesis and therefore we conclude that the relationship between CoCo's announcement effect and banks' perceived risk is unclear.

In order to investigate the effect of partial anticipation, we also here separate between first and subsequent issues. It is not clear from the outset that bondholders will have a clear preference between equity and CoCo's. Both will provide additional loss protection. Cornett et al. (2014) finds that equity issues from financial firms entail a significant reduction in CDS spreads suggesting that bondholders do at least appreciate equity. Leading up to announcement (-15, -5), the two samples are neither significant in scale nor difference, however, first time issues have a significant sign test with 70.83% of issues experiencing negative abnormal changes in CDS spreads which might indicate a higher anticipation of equity. In the (-5, -1) window subsequent issues experiences a significant reduction of -1.60% (J_1=-2.830), while first time issuers experience an insignificant increase (0.03% (J_1=0.045)). This might be consistent with partial anticipation assuming equity is the preferred alternative. If equity is preferred and more anticipated for first time issuers, one would expect to see a less significant fall (increase) compared to subsequent issuers. For the full event window (-15, 10) we observed that subsequent issues entail a larger and significant spread reduction (-2.96% (J_1=-2.283)) than first time issues (0.24% (J_1=0.136)). The regression also indicate that subsequent issues experience a more prominent spread reduction where being a subsequent issue is estimated to reduce CDS spreads in (-5, -1) by -1.567% (t=-1.36). All things consider, these results might imply a higher anticipation of equity from first time issuers. However, this conclusion hinges on the assumption that equity is more preferred than CoCo's. It might also be the case that the market's perception of CoCo's has changed over time. Issues in the first time sample are likely made at an earlier point in time than the subsequent sample and therefore the observed effect might reflect a change in opinion of CoCo's over time. As with stocks, we therefore create two samples based on the median issue date (28.03.2014).

We observe that announcements made after 28.03.2014 (late issues) experience a more significant spread reduction in (-5, -1) (-1.87% (J_1=-2.782)) compared to early issues (-0.10% (J_1=-0.163)), and the sign test is also more significant (76% and 50% negative for late and early respectively). Earlier issues also experience a greater increase in the (-1, 1) window, further indicating the preference for late issues. For the full event window (-15, 10), late issues experience a more significant spread reduction both in terms of scale and sign (-2.99% (J_1=-1.951) (60.6% negative) and -0.53% (J_1=-0.373) (56.2% negative) for late and early respectively). The regression confirms that issues made after 28.03.2014 entail larger spread reductions. In the (-5, -1) window, being a late issue is estimated to reduce CDS spreads by -2.920% (t=-2.18). The effect is also negative in the other windows, although not significant. These results indicate that there has been a significant change in credit markets reaction to CoCo announcements over time. As mentioned, one explanation might be that equity was more anticipated in the early days when CoCo's was less common. It may also reflect a pure change of opinion over time. Given the available evidence, we have no way of disentangling these effects as they both predict the same basic market reaction (assuming equity is more preferred). As an overarching conclusion, we can only state that credit markets appear react more favorably to more recent issues.

We next separate between market cap at the median level, in order to investigate if the market reacts differently to issues made by large banks. One important thing to note is that the CDS spread sample has a clear bias towards larger banks given that small ones are less likely to have traded CDS's. This bias might imply that all banks are relatively closely followed by the market and therefore the announcement effect will be roughly equal for both subsamples.

We observe that the small bank sample experience a more negative and significant spread change in (-5, -1) (-1.76% (J_1=-2.748)) compared to the big bank sample (-0.52% (J_1=-0.832)). The sign test is also significant and negative in (-5, -1) with 68% of small bank issuers experiencing an abnormal reduction in spreads. The small bank sample also experiences a marginally greater reduction in (-1, 1) and in (1, 3) the effect is roughly equal. In the full event window (-15, 10) however, we observe that the big bank sample is more negative both in terms of scale and sign, but the effect is not significant. In the regression, market cap is far from significant suggesting that the observed significance from the small bank sample in (-5, -1) may relate to other characteristics of the issues. As mentioned earlier, smaller banks tend to make larger issues and as seen in the regression, issue size is negatively correlated with spread change. We also note that the small bank sample has a significant proportion of negative to positive spread changes in the (-15, -5) window leading up to announcement (72% negative for small, 50% negative for big), which goes against the claim that the market better infers upcoming issues from large banks. All things considered, we find no clear indication that size has any effect on spread changes.

We next compare the impact from SIB to non-SIB issuers. SIB issuers experience a more negative impact on CDS spreads in the 5 days leading up to announcement (-1.19% (J_1=-2.328)) compared to non-SIB issuers (-0.22% (J_1=-0.211)). The sign test is also significant for SIB issuers (63.5%) and the difference in spread changes is also evident in the other examined windows. This is surprising since we postulated earlier that since SIB issuers are required to hold more capital and are in some jurisdictions required to hold CoCo's specifically, the market might better infer upcoming issues. The regression confirms that being a SIB issuer is associated with more negative spread changes and is estimated to reduce spreads in the (-5, -1) window by -1.284% (t=-1.13). The effect is not significant however, and note also that the non-SIB sample size is small and the tests therefore carry limited power. We are therefore careful in making strong conclusions based on these results.

Moving on to the contractual features of CoCo's, we observe that PWD CoCo's experience a more significant spread reduction leading up to announcement (-1.25% (J_1=-2.180)) compared to CE CoCo's (-0.62% (J_1=-0.786)). However, in the post announcement window (1, 3) CE CoCo's experience a greater reduction in spreads (-0.60% (J_1=-1.001)) with a significantly negative sign test (68% negative), while PWD CoCo's experience an insignificant decrease in both sign and scale (-0.03% (J_1=-0.069)). For the full event window (-15, 10) we also observe that CE CoCo's are regarded as more positive news by bondholders, with the CE sample decreasing by -3,97% (J_1=-2.265) compared to the PWD samples decrease of -0.41% (J_1=-0.315). In the framework of Berg and Kaserer (2015), PWD CoCo's incentivizes managers to take more risk given that it guarantees the shareholders a wealth transfer at conversion. This dynamic will, all else equal, increase the risk exposure of debt holders and therefore a PWD issue should lead to a positive (less negative) spread change. The regression confirms these findings where PWD issues are associated with positive changes in CDS spreads for all windows, although the effect is not significant.

When examining implied wealth transfer, we observe that in the (-5, -1) window the high wealth transfer sample experiences a more significant and negative spread change (-1.30% (J_1=-2.104)) compared to the low sample (-0.69% (J_1=-1.011)). However, in the post announcement window (1, 3), the low sample is more negative in terms of scale and sign. The fact that bondholders prefer low wealth transfer CoCo's is also confirmed by looking at the full window (-15, 10) where the low sample experiences a significant decrease of -3.74% (J_1=-2.405) compared to the high sample (0.12% (J_1=0.088)). These results are in line with what we postulated earlier. With low (negative) implied wealth transfer, the cost of risk taking increases for the bank's shareholders and thus they are more incentivized to reduce risk taking and to voluntarily recapitalize in order to avoid a trigger event. This incentive structure ensures better protection of senior debt holders and therefore CDS spreads is reduced more. As with stocks, the impact of wealth transfer in the regression has to be viewed in relation to trigger level. In isolation, trigger level may have two opposite effects

Table 6.4: Panel (a) shows the announcement effect from various subsamples. Column J_1 reports the test statistic for abnormal changes, Pos:Neg reports the proportion of positive to negative results in the relevant window, while GST reports the test statistic from the generalized sign test. The table follows the chronology of the analysis. Panel (b) shows the regression where CAR in the relevant window is the dependent variable.

(a) Subsample table (-5,-1)

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All European CoCo's		-1.00**	-2.175	24 : 41**	-2.064	65
Issue size	<median	-0.24	-0.358	12 : 20	-1.359	32
(Amt issued / MC)	≥median	-1.73***	-2.777	12 : 21	-1.558	33
Leverage	<median	-0.73	-1.012	9 : 20**	-2.066	29
(Debt/Tot.assets)	≥median	-1.22**	-2.051	15 : 21	-0.919	36
First time issue		0.03	0.045	10 : 14	-0.811	24
Subsequent issue		-1.60***	-2.820	14 : 27*	-1.978	41
Before 28.03.2014		-0.10	-0.163	16 : 16	0.044	32
After 28.03.2014		-1.87***	-2.782	8 : 25***	-2.940	33
Market Cap	<median	-1.76**	-2.748	8 : 17*	-1.828	25
	≥median	-0.52	-0.832	16 : 24	-1.186	40
Issuer	SIB	-1.19**	-2.328	19 : 33*	-1.781	52
	non-SIB	-0.22	-0.211	5 : 8	-1.056	13
Issuer	AAA-A	-1.45**	-2.379	13 : 21	-1.355	34
	BBB-NIG	-0.50	-0.723	11 : 20	-1.569	31
PWD		-1.25**	-2.180	15 : 25	-1.565	40
CE		-0.62	-0.786	9 : 16	-1.348	25
Wealth Transfer	<median	-0.69	-1.011	12 : 20	-1.337	32
	≥median	-1.30**	-2.104	12 : 21	-1.580	33
Trigger	<6%	-1.63***	-3.048	15 : 29**	-2.024	44
	≥6%	0.33	0.373	9 : 12	-0.701	21
Distance to Trigger	<median	-0.97	-1.423	10 : 22**	-2.075	32
	≥median	-1.03	-1.660	14 : 19	-0.853	33
Coupon	<median	-0.99	-1.569	13 : 17	-0.662	30
	≥median	-1.01	-1.526	11 : 24*	-2.200	35
Tier 1		-1.39***	-2.719	18 : 35**	-2.272	53
Tier 2		0.74	0.718	6 : 6	-0.029	12

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

(b) Regression (-5,-1)

	(1)	(2)	(3)	(4)	(5)
Pre-CAR	-0.0964 (-1.46)	-0.103 (-1.44)	-0.0921 (-1.12)	-0.0953 (-1.17)	-0.0921 (-1.12)
Coupon	-0.585 (-1.44)	-0.621 (-1.43)	-0.633 (-1.44)	-0.987* (-2.00)	-0.832 (-1.46)
Trigger	0.593 (1.21)	0.614 (1.23)	0.723 (1.14)	0.755 (1.20)	0.651 (0.99)
PWD	0.0850 (0.08)	-0.116 (-0.09)	-0.0560 (-0.04)	0.0537 (0.04)	0.279 (0.20)
Issue Size	-0.216*** (-3.31)	-0.226*** (-2.93)	-0.229*** (-2.91)	-0.236*** (-3.04)	-0.225*** (-2.77)
Subsequent	-1.931* (-1.84)	-1.880* (-1.75)	-1.883* (-1.74)	-1.458 (-1.32)	-1.526 (-1.36)
Leverage	0.0779 (1.22)	0.0768 (1.19)	0.0736 (1.11)	0.0705 (1.08)	0.0738 (1.12)
Rating(BBB-NIG)	1.199 (1.16)	1.239 (1.18)	1.186 (1.10)	0.700 (0.63)	0.618 (0.55)
SIB	-0.893 (-0.85)	-0.871 (-0.82)	-0.969 (-0.86)	-1.234 (-1.10)	-1.284 (-1.13)
After	-2.232* (-1.99)	-2.242* (-1.98)	-2.376* (-1.92)	-3.071** (-2.35)	-2.920** (-2.18)
WealthTransfer		0.0402 (0.25)	0.269 (0.33)	0.422 (0.52)	0.306 (0.36)
Trigger*WT			-0.0398 (-0.28)	-0.0645 (-0.46)	-0.0480 (-0.34)
DistanceToTrigger				-0.258 (-1.52)	-0.222 (-1.22)
ln(MC)					0.669 (0.56)
Constant	-2.900 (-0.43)	-2.684 (-0.40)	-2.853 (-0.41)	2.247 (0.30)	-15.19 (-0.48)
Observations	65	65	65	65	65
R^2	0.309	0.310	0.311	0.341	0.345

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(c) Subsample (-1, 1)

Group		CAAR(%)	J_1	Pos:Neg	GST	Sample-Size
All European CoCo's		0.40	1.114	34 : 31	0.417	65
Issue size	<median	0.93*	1.770	18 : 14	0.762	32
(Amt issued / MC)	≥median	-0.12	-0.243	16 : 17	-0.165	33
Leverage	<median	0.38	0.682	18 : 11	1.277	29
(Debt/Tot.assets)	>=median	0.41	0.891	16 : 20	-0.586	36
First time issue		0.31	0.519	14 : 10	0.822	24
Subsequent issue		0.45	1.012	20 : 21	-0.104	41
Before 28.03.2014		0.71	1.460	19 : 13	1.105	32
After 28.03.2014		0.10	0.183	15 : 18	-0.503	33
Market Cap	<median	-0.19	-0.389	13 : 12	0.173	25
	≥median	0.76	1.566	21 : 19	0.395	40
Issuer	SIB	0.19	0.479	24 : 28	-0.394	52
	non-SIB	1.22	1.527	10 : 3	1.723	13
Issuer	AAA-A	0.16	0.338	17 : 17	0.017	34
	BBB-NIG	0.66	1.224	17 : 14	0.586	31
PWD		0.34	0.759	24 : 16	1.281	40
CE		0.49	0.828	10 : 15	-0.948	25
Wealth Transfer	<median	0.38	0.727	14 : 18	-0.630	32
	≥median	0.41	0.854	20 : 13	1.206	33
Trigger	<6%	-0.16	-0.389	22 : 22	0.087	44
	≥6%	1.56**	2.310	12 : 9	0.608	21
Distance to Trigger	<median	0.41	0.784	16 : 16	0.046	32
	≥median	0.38	0.793	18 : 15	0.540	33
Coupon	<median	0.21	0.440	16 : 14	0.434	30
	≥median	0.55	1.078	18 : 17	0.167	35
Tier 1		0.16	0.403	27 : 26	0.201	53
Tier 2		1.44*	1.798	7 : 5	0.549	12

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

(d) Regression (-1, 1)

	(1)	(2)	(3)	(4)	(5)
Pre-CAR	0.00501	0.0492	0.104	0.0868	0.0851
	(0.06)	(0.57)	(1.17)	(0.96)	(0.94)
Coupon	-0.267	-0.0166	-0.120	-0.411	-0.294
	(-0.56)	(-0.03)	(-0.24)	(-0.73)	(-0.46)
Trigger	0.362	0.253	1.062	1.056	0.965
	(0.63)	(0.44)	(1.53)	(1.52)	(1.31)
PWD	0.0879	1.496	1.918	1.941	2.103
	(0.07)	(0.98)	(1.28)	(1.29)	(1.34)
Issue Size	-0.0441	0.0270	0.000998	-0.00947	-0.00141
	(-0.57)	(0.30)	(0.01)	(-0.11)	(-0.02)
Subsequent	0.228	-0.0301	0.0283	0.305	0.244
	(0.18)	(-0.02)	(0.02)	(0.24)	(0.19)
Leverage	-0.0320	-0.0237	-0.0403	-0.0397	-0.0362
	(-0.43)	(-0.32)	(-0.56)	(-0.55)	(-0.49)
Rating(BBB-NIG)	0.351	0.0643	-0.315	-0.664	-0.723
	(0.29)	(0.05)	(-0.26)	(-0.54)	(-0.58)
SIB	-0.491	-0.707	-1.442	-1.582	-1.605
	(-0.40)	(-0.57)	(-1.14)	(-1.25)	(-1.25)
After	-0.860	-0.665	-1.417	-1.956	-1.829
	(-0.66)	(-0.51)	(-1.08)	(-1.38)	(-1.25)
WealthTransfer		-0.266	1.380	1.469*	1.365
		(-1.48)	(1.62)	(1.71)	(1.51)
Trigger*WT			-0.282*	-0.295**	-0.279*
			(-1.97)	(-2.05)	(-1.86)
DistanceToTrigger				-0.200	-0.173
				(-1.04)	(-0.84)
ln(MC)					0.525
					(0.39)
Constant	3.707	1.817	-0.138	3.856	-9.814
	(0.48)	(0.24)	(-0.02)	(0.45)	(-0.27)
Observations	65	65	65	65	65
R^2	0.033	0.072	0.136	0.154	0.157

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(e) Subsample (1, 3)

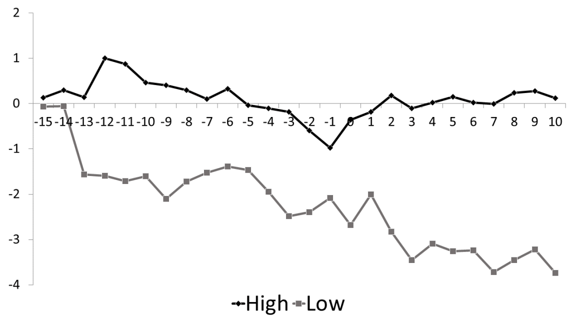
Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All European CoCo's		-0.25	-0.697	28 : 37	-1.071	65
Issue size	<median	-1.07**	-2.052	10 : 22**	-2.066	32
(Amt issued / MC)	≥median	0.55	1.144	18 : 15	0.531	33
Leverage	<median	-0.79	-1.421	11 : 18	-1.323	29
(Debt/Tot.Assets)	≥median	0.19	0.414	17 : 19	-0.252	36
First time issue		-0.06	-0.101	10 : 14	-0.811	24
Subsequent issue		-0.36	-0.812	18 : 23	-0.728	41
Before 28.03.2014		-0.25	-0.697	28 : 37	-1.071	32
After 28.03.2014		-0.14	-0.263	18 : 15	0.542	33
Market Cap	<median	-0.24	-0.476	13 : 12	0.173	25
	≥median	-0.26	-0.523	15 : 25	-1.502	40
Issuer	SIB	-0.27	-0.676	21 : 31	-1.226	52
	non-SIB	-0.17	-0.207	7 : 6	0.056	13
Issuer	AAA-A	0.08	0.173	17 : 17	0.017	34
	BBB-NIG	-0.61	-1.138	11 : 20	-1.569	31
PWD		-0.03	-0.069	20 : 20	0.016	40
CE		-0.60	-1.001	8 : 17	-1.748*	25
Wealth Transfer	<median	-0.77	-1.461	10 : 22**	-2.044	32
	≥median	0.26	0.545	18 : 15	0.509	33
Trigger	<6%	-0.15	-0.361	22 : 22	0.087	44
	≥6%	-0.45	-0.671	6 : 15*	-2.010	21
Distance to Trigger	<median	-0.19	-0.368	12 : 20	-1.368	32
	≥median	-0.30	-0.626	16 : 17	-0.157	33
Coupon	<median	-0.03	-0.058	17 : 13	0.799	30
	≥median	-0.44	-0.851	11 : 24**	-2.200	35
Tier 1		-0.19	-0.478	24 : 29	-0.623	53
Tier 2		-0.50	-0.630	4 : 8	-1.184	12

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

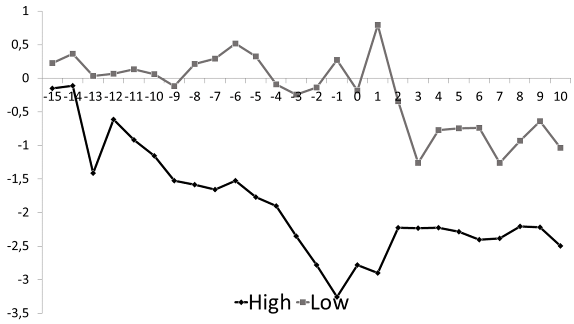
(f) Regression (1, 3)

	(1) CAR(0)	(2) CAR(0)	(3) CAR(0)	(4) CAR(0)	(5) CAR(0)
Pre-CAR	-0.00739	-0.0178	0.0155	0.0190	0.0196
	(-0.16)	(-0.38)	(0.33)	(0.39)	(0.40)
Coupon	0.0707	-0.0143	-0.0923	-0.0392	-0.0617
	(0.25)	(-0.05)	(-0.32)	(-0.12)	(-0.16)
Trigger	0.138	0.187	0.738	0.739	0.757
	(0.41)	(0.54)	(1.83)	(1.81)	(1.74)
PWD	0.647	0.154	0.410	0.405	0.374
	(0.91)	(0.17)	(0.47)	(0.46)	(0.41)
Issue Size	0.0391	0.0154	-0.00581	-0.00388	-0.00539
	(0.85)	(0.29)	(-0.11)	(-0.07)	(-0.10)
Subsequent	-0.718	-0.605	-0.568	-0.615	-0.603
	(-0.96)	(-0.80)	(-0.78)	(-0.82)	(-0.79)
Leverage	0.0603	0.0559	0.0456	0.0454	0.0447
	(1.38)	(1.27)	(1.08)	(1.06)	(1.03)
Rating	-0.210	-0.107	-0.381	-0.320	-0.309
	(-0.29)	(-0.15)	(-0.54)	(-0.44)	(-0.41)
SIB	-0.109	-0.0652	-0.512	-0.483	-0.478
	(-0.15)	(-0.09)	(-0.71)	(-0.66)	(-0.65)
After	0.536	0.458	-0.0388	0.0619	0.0378
	(0.70)	(0.59)	(-0.05)	(0.07)	(0.04)
WealthTransfer		0.0928	1.258**	1.244**	1.265*
		(0.89)	(2.49)	(2.44)	(2.34)
Trigger*WT			-0.198**	-0.196**	-0.200**
			(-2.36)	(-2.31)	(-2.23)
DistanceToTrigger				0.0361	0.0310
				(0.31)	(0.25)
ln(MC)					-0.103
					(-0.13)
Constant	-6.928	-6.208	-7.616*	-8.341	-5.661
	(-1.53)	(-1.34)	(-1.70)	(-1.64)	(-0.27)
Observations	65	65	65	65	65
R^2	0.100	0.113	0.198	0.200	0.200

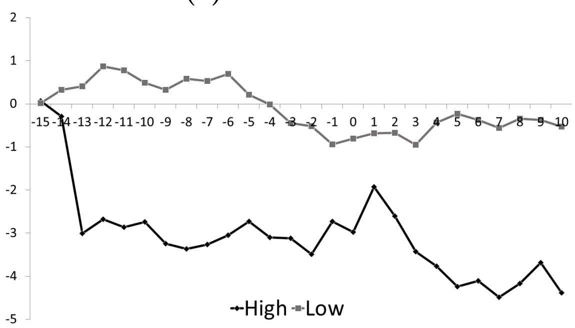
t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$



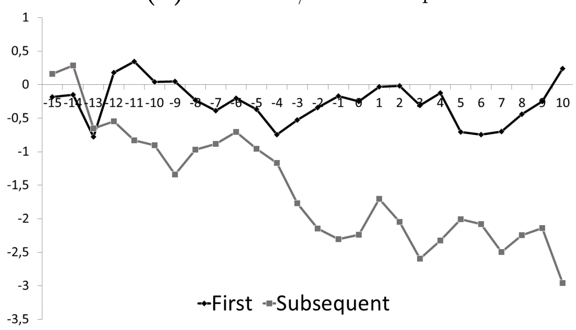
(a) Wealth Transfer



(b) Issue Size / Market Cap



(c) Trigger



(d) First and Subsequent

Figure 6.4: These figures shows cumulative abnormal spread change for the subsamples Wealth Transfer, Issue size, Trigger and First/Subsequent. Days relative to announcement are denoted on the horizontal axis while abnormal spread change is denoted on the vertical axis

on CDS spreads. On one hand, a high trigger ensures earlier recapitalization of the bank, thereby providing more protection for bondholders compared to low trigger. This effect implies a negative correlation between trigger and CDS spreads. On the other hand, high trigger may amplify the adverse risk taking incentives associated with high wealth transfer CoCo's, which will put upward pressure on CDS spreads.

In the (-5, -1) window, the low trigger sample is more significant spread reduction (-1.63% (J_1=-3.048)) compared to the high trigger sample (0.33% (J_1=0.373). However, both the (-1, 1) and (1, 3) window shows that the high trigger sample is associated with a more negative spread change both in terms of scale and sign. The full event window also confirms the preference for high trigger CoCo's, with the high trigger sample experiencing a more significant decrease in spreads (-4.49% (J_1=-2.201)) compared to the low trigger sample (-0.53% (J_1=-0.315)). This implies that the effect from earlier loss absorption dominates the incentive effects associated with high trigger plus high wealth transfer. In the regression, the interaction term in combination with wealth transfer and trigger are not relevant predictors except for in the (-1, 1) window. There we observe that the marginal impact from trigger is only negative when implied wealth transfer is high (>3.427). Conversely, the marginal impact from wealth transfer is only negative when the trigger is high (>4.892). This indicates that the relationship between trigger and wealth transfer is the opposite of what we expected. However, this result is only valid for one window (-1, 1), and overall the results seems to indicate a preference for high trigger and low wealth transfer CoCo's.

Next we examine the effect of coupon by creating two samples based on the median coupon payment. In the (-5, -1) and (-1, 1) we observe that the two samples are almost equal in terms of scale, but in (-5, -1) the high coupon sample has a greater proportion of negative returns (68.5%). The high sample is also negatively significant in terms of sign in the (1, 3) window (68.5%) and as evident from the full event window (-15, 10), high coupon issues seem to entail a more significant spread reduction (-3.11% (J_1=-2.065)) compared to low coupon issues (-0.22% (J_1=-0.154)). CoCo's with high coupons are likely to expose CoCo holders to more risk, i.e increased risk of conversion. This means that high coupon CoCo's are likely more junior in the capital structure and thus provide bondholders with earlier loss protection. The regression also confirms the negative relationship between coupons and spread changes although the effect is not significant.

Tier 1 CoCo's are more junior than Tier 2's and thus should entail a bigger spread reduction. We observe that Tier 1's are more negative both in terms of scale and sign in all windows, which is in line with what we expect. Also note the small sample size for Tier 2 which limits the statistical power of the tests.

The main conclusions from this analysis can be summarized as follows. First, CDS spreads are on average reduced around CoCo announcements suggesting that they reduce the risk exposure of senior bondholders. This is consistent with the findings of Ammann et al. (2015) and indicates that CoCo's do reduce the probability of bank failure. Second, the CDS market appears to incorporate information less efficiently than stock markets as evident by the persistent reduction in CDS spreads over the whole window. Third, credit markets appear to have a clearer preference between CE and PWD than equity markets. CE is more preferred which likely relates to its ability to incentivize less risk taking by managers. Fourth, credit markets appear to favor more junior CoCo's as evident from negative correlation with trigger level.

It is also interesting to compare these results with the findings of Avdjiev et al. (2015). They find that at issue date, CDS spreads only experience a limited reduction indicating that the information revealed at announcement is more relevant for determining the change of default risk. The significance that is observed is the reduction for CE and high trigger CoCo's which lends support to the risk taking incentive framework of Berg and Kaserer (2015). This is in line with our findings as well.

All things considered, the results from this analysis carry more validity than the results for stock prices, given that the sign test is more consistently significant. This strengthens our ability in making generalized conclusions as the observed spread change applies to a significant proportion of banks as well.

6.2 Logit and Cox PHM

In order to identify what characterizes a typical CoCo issuer we perform a logit and Cox proportional hazard model regression, where we compare the characteristics of non-CoCo issuers to CoCo issuers.

Table 6.7 reports the results. The size of the bank appears to be an important predictor for who issue CoCo's. In the logit regression, we observe that an increase of 1 in the log of total assets is estimated to increase the odds of the bank having issued CoCo's by 116.7%. The Cox PHM also confirms the importance of size, where an increase of 1 in the log of total assets is estimated to increase the hazard ratio by 60.3%. There are several possible explanations for this. In Basel III and other banking regulations, SIBs, that are usually large banks, are required to hold more capital, meaning that they are more likely to have made an issue in the examination period. It is also possible that large banks are more inclined to be early adopters of new securities, as they are more likely to spearhead new financial innovations. The marketability of CoCo's might also be an issue. Since CoCo's is a relatively marginal asset class with fewer natural buyers than other securities, smaller banks might have concerns reaching a large enough buyer base.

Equity return during the crisis does not show any significance. The 1 year lagged equity return does not appear to have any predictive powers either, indicating that

Table 6.7: Panel (a) and (b) reports the results from the logit and Cox regression respectively. The output is reported as odds ratios for logit and hazard ratios for the Cox PHM, so a number greater than 1 implies positive coefficient while smaller than 1 implies negative coefficients. Significance is reported based on the Wald test.

(a) Logit

	(1)	(2)	(3)	(4)
$Log(TotAss)$	1.983***	2.091***	2.161***	2.166***
	(4.33)	(4.38)	(4.46)	(4.44)
$Return08-09$	0.995	0.994	0.993	0.993
	(-0.54)	(-0.74)	(-0.8)	(-0.8)
$Return_{-1}$	1.002	1.005	1.003	1.003
	(0.14)	(0.32)	(0.18)	(0.17)
$LongTermDebt$	1.003***	1.003***	1.003***	1.003***
	(2.91)	(3.01)	(3.10)	(3.10)
$Debt-Ratio$		0.982	0.982	0.983
		(-1.07)	(-1.06)	(-1.05)
$Tier1$			1.090	1.088
			(1.34)	(1.28)
$Market/Book$				1.020
				(0.13)
Observations	136	136	136	136
Pseudo R^2	0.246	0.254	0.267	0.267

Chi^2 statistics from Wald test in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(b) Cox PHM

	(1)	(2)	(3)	(4)
$Log(TotAss)$	1.542***	1.556***	1.609***	1.603***
	(4.83)	(4.70)	(4.89)	(4.82)
$Return08-09$	1.001	1.001	0.999	0.999
	(0.37)	(0.33)	(-0.03)	(-0.03)
$Return\_1$	1.003	1.003	1.006	1.006
	(0.15)	(0.14)	(0.59)	(0.59)
$LongTermDebt$	1.018**	1.018**	1.020**	1.020**
	(2.32)	(2.33)	(2.56)	(2.55)
$Debt-Ratio$		0.997	0.999	0.999
		(-0.30)	(-0.07)	(-0.09)
$Tier1$			1.082**	1.084**
			(2.09)	(2.11)
$Market/Book$				0.965
				(-0.25)
Observations	1145	1145	1145	1145

Chi^2 statistics from Wald test in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

the use of CoCo's are not correlated with recent performance. Long term debt is statistically significant but the economic significance is more questionable. One percentage point increase in long term debt increases the odds of having issued CoCo's by only 0.3% in the logit regression. For the Cox model the effect is also small with an estimated impact of 2%. In the logit regression, a one percentage point increase in debt ratio reduces the odds of issuing by 1.8% implying that high leverage banks are less likely to take on more leverage through CoCo's. However, the results are not significant, which is also the case in the Cox regression.

Interestingly, an increase of Tier 1 ratio appears to increase the probability of having issued CoCo's. This might seem counter intuitive as banks with high Tier 1 ratios should have less need for CoCo's. A possible explanation might lie in the different capital regulations between countries. Switzerland for example, requires their banks to hold more capital than what is stipulated in Basel and they also aim to implement these regulations earlier. Banks in such jurisdictions will be more likely to adopt CoCo's earlier and will on average have higher Tier 1 ratios.

Market to book is not significant implying that CoCo's are not used to signal undervaluation. However, this analysis is too broad to answer this question as it examines the average 12 month value of market to book in the announcement year. A more precise measure would be to examine it on a daily or weekly basis around announcement, but we leave that to further research.

Conclusion and Further Research

This thesis studies the effect from CoCo announcements on equity prices and CDS spreads. The main conclusions can be summarized as follows. First, stock prices increases on average ahead of a CoCo announcement indicating that equity markets view CoCo's favorably. This is also consistent with the findings of Ammann et al. (2015). We find some evidence suggesting that the positive impact relates to a partial anticipation of equity implying that the results not necessarily goes against the generally accepted pecking order which assumes equity is the least preferred form of financing. Additionally, the design of CoCo's also appears to impact the reaction in equity prices. High implied wealth transfer and high trigger appears to be favored by shareholders which is consistent with the theories of Berg and Kaserer (2015). However, the statistical significance of these findings is questionable.

Second, CDS spreads tighten significantly around the news of a CoCo announcement indicating that debt holders perceive CoCo's to reduce the probability of default. One interesting result is that the CDS market appears to digest the news incrementally given that the reduction in spreads is consistent throughout the whole window and no clear spike is observed. The size of the issue appears to be the most important determinant for spread reduction indicating that the pure capital cushion provided by CoCo's is appreciated by debt holders. Additionally, the timing of the issue also appears to be a significant determinant where issues made after 28.03.2014 appears to entail a larger spread reduction than issues made before. This might indicate that creditors perception of CoCo bonds have changed over time. Subsequent issues appear to entail a larger spread reduction than first time issues. We find no evidence suggesting that this is due to partial anticipation but an alternative explanation might be the strategic signalling effect from a first time issue.

The design of CoCo's appear to have limited impact on spread changes, although debt holders seem to have a marginal preference for high trigger CoCo's which provides them with earlier loss protection.

Finally, when attempting to answer what banks issue CoCo's we find that the typical CoCo issuer is characterized as a large bank with high degree of long term financing and high Tier 1 ratio.

We have analyzed the reaction from the banks claimants. One suggestion for further research is to look at the buyer side of CoCo's, and investigate how design features affect long term performance and yield. Avdjiev et al. (2013) suggests that CoCo investors might be chasing yield and are not adequately compensated for their risk exposure. This claim can be investigated by examining the relationship between various design features, asset volatility and the yield CoCo buyers get on their investment. Another interesting aspect to investigate, is to examine if CoCo risk really are transferred outside the banking system and if banks assets are sufficiently shielded from CoCo conversion risk.

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Appendix A

A.1 Calculation of Wealth Transfer

For PWD CoCo's the wealth transfer is simply the amount written down at conversion. A CoCo issue of $100 with a 100% write down implies a wealth transfer of $100 at conversion. Deleting debt is equivalent to transferring the principal to equity holders. For CE CoCo's the wealth transfer will depend on the conversion price. Issues with floating conversion price are assumed to convert at par leading to no wealth transfer. For issues with fixed or floored conversion price we first need to make some assumptions about the CET1 ratio and its relationship with the market value of equity. These are assumed to have a one to one relationship, meaning that the market cap at conversion is,

$$MarketCap@Conversion = MarketCapToday * \frac{CoCoTrigger}{CET1Ratio} + CoCoValue. \tag{A.1}$$

Further it is assumed that the amount of shares outstanding stays the same. Next we determine the number of shares issued at conversion.

$$NewShares = \frac{CoCoValue}{ConversionPrice} \tag{A.2}$$

If market cap at conversion implies a higher share price than the floor, floored CE is assumed to convert at par. Wealth transfer is formulated as the amount going to shareholders at conversion and can be formulated as,

$$WT = CoCoValue - \frac{NewShares}{SharesOutstanding} * MarketCap@Conversion. \tag{A.3}$$

This method is likely to give a conservative estimate of wealth transfer for a number of reasons. Firstly, market values move faster and earlier than accounting figures like CET1. Secondly, accounting numbers are observed with a considerable time lag meaning that the "real" CET1 ratio is likely to be much lower than the trigger at conversion. All in all this approach provides a lower boundary for wealth transfer, and it should be suitable for comparing different issues in our event study. Note that this method does not attempt to model a possible PONV trigger or account for differences in asset volatility. It is intended as a quick, back of an envelope way to categorize different CoCo issues.

A.2 Regression Diagnostics

A.2.1 Cross Sectional

Table A.1: Panel (a) shows the effect from windsorzing abnormal returns for stocks for while panel (b) shows the same effect for abnormal CDS spread changes.

(a) Stocks

	Not Winsorized				Winsoriszd			
	(-15,10)	(-3,-1)	(-1,1)	(1,3)	(-15,10)	(-3,-1)	(-1,1)	(1,3)
Mean	-0.406	0.529	0.284	-0.33	-0.134	0.493	0.261	-0.224
Median	-0.215	-0.037	0.129	-0.224	-0.215	-0.037	0.129	-0.224
Max	36.560	19.564	13.620	14.227	12.878	10.246	6.751	6.164
Min	-42.781	-9.837	-6.036	-7.947	-19.875	-5.879	-3.632	-3.259
St.Dev	9.159	3.603	2.641	2.589	6.877	2.811	2.206	2.005
Skewness	-0.152	2.224	1.681	1.591	-0.441	1.104	0.800	0.860
Kurtoisis	7.418	11.187	7.012	9.744	0.726	3.495	1.142	1.319
Shapiro Wilk p-value	0.003	0.000	0.002	0.000	0.119	0.092	0.085	0.231

(b) CDS

	Not Windzorised				Windzorised			
	(-15,10)	(-5,-1)	(-1,1)	(1,3)	(-15,10)	(-5,-1)	(-1,1)	(1,3)
Mean	-1.836	-1.012	0.423	-0.282	-1.781	-1.004	0.402	-0.248
Median	-1.067	-0.478	0.020	-0.186	-1.067	-0.478	0.020	-0.186
Max	16.187	6.004	22.552	12.310	14.077	5.402	6.162	4.153
Min	-42.058	-14.521	-10.143	-7.402	-23.560	-9.825	-3.599	-6.025
St.Dev	9.615	3.864	3.812	3.147	8.436	3.528	2.328	2.596
Skewness	-1.295	-1.017	2.809	0.746	-0.563	-0.660	0.658	-0.323
Kurtoisis	4.208	2.075	17.901	3.236	0.739	0.598	0.379	-0.429
Shapiro Wilk p-value	0.003	0.000	0.002	0.000	0.119	0.092	0.085	0.231

Table A.2: Regression diagnostics for the cross sectional analysis. Breusch-Pagan tests for heteroskedasticity, Shapiro-Wilk tests for non normality in the residuals while the linktest tests for specification problems. Each test fails to reject H0 implying that our regression does not suffer from any of these issues

(a) Stocks

	(1)	(2)	(3)
	CAAR (-3,-1)	CAAR (-1,1)	CAAR (1,3)
Breusch-Pagan hettest	0.012	0.556	1.684
	(0.911)	(0.456)	(0.265)
Shapiro-Wilk normality test	-1.885	0.643	(1.465)
	(0.970)	(0.260)	(0.197)
Linktest	0.07	-1.428	1.025
	(0.944)	(0.157)	(0.308)

p-value in parentheses

(b) CDS

	(1)	(2)	(3)
	CAAR (-5,-1)	CAAR (-1,1)	CAAR (1,3)
Breusch-Pagan hettest	2.084	2.641	1.972
	(0.149)	(0.102)	(0.160)
Shapiro-Wilk normality test	1.84	1.796	1.891
	(0.084)	(0.072)	(0.058)
Linktest	0.272	1.759	1.59
	(0.787)	(0.084)	(0.1152)

p-value in parentheses

Table A.3: This table shows the variance inflation factors for the cross sectional variables. It tests for multicollinearity. As a rule of thumb, a VIF over 10 should warrant further investigation (Wooldridge, 2015, p. 99). However, for interaction terms like Trigger*WealthTransfer, a VIF over 10 is acceptable as the impact from the two variables are interpreted in combination with the two terms

(a) Stocks

	(1)	(2)	(3)
	CAR (-3,-1)	CAR (-1,1)	CAR (1,3)
Pre-CAR	3.61	3.59	3.63
Coupon	1.28	1.28	1.28
Trigger	1.25	1.27	1.26
PwD	1.48	1.49	1.51
Issue size	1.63	1.63	1.63
Wealth Transfer	3.79	3.76	3.82
Subsequent	1.07	1.05	1.1
Leverage	1.56	1.54	1.53
Distance to trigger	1.48	1.46	1.5
log(MC)	2.9	2.92	2.94
SIB	1.45	1.44	1.41
After	1.42	1.43	1.45
Trigger*WT	8.42	8.52	8.69
Wealth Transfer	8.79	8.46	8.79

(b) CDS

	(1)	(2)	(3)
	CAAR (-5,-1)	CAAR (-1,1)	CAAR (1,3)
Pre-CAAR	1.37	1.41	2.3
Coupon	2.03	2.03	2.03
Trigger	1.26	2.31	1.33
PwD	1.85	1.81	1.77
Issue size	1.47	1.48	1.47
Subsequent	2.29	2.29	2.28
Leverage	2.39	1.31	1.35
Rating	1.38	1.39	1.39
SIB	1.53	1.55	1.63
After	2.04	1.93	1.95
Wealth Transfer	11.56	11.49	11.45
Trigger*WT	11.35	11.39	11.32
Distance to trigger	1.44	1.47	1.39
log(MC)	1.7	1.71	1.73

Table A.4: Variable description for cross sectional analysis

Variables	**Description**
Pre CAR	CAR -15 to -5 prior to event
Coupon	Coupon payment in percentage points
Trigger	CET1 ratio trigger level in percentage points
PWD	Dummy taking value of 1 if PWD
IssueSize	Amount issued relative to market cap at announcement
Subsequent	Dummy taking value of 1 if subsequent issue
Leverage	Debt to total capital
After	Dummy taking value of 1 if issue was made after 01.04.2014 (stocks) and 28.03.2014 (CDS)
WealthTransfer	Calculated Wealth Transfer relative to market cap at announcement
Distance to trigger	Difference between CET1 ratio and trigger at announcement
lnMC	Natural logarithm of market cap today
Rating	Dummy taking value 1 if rating <= BBB
TriggWT	Trigger * WealthTransfer. Interaction term

A.2.2 Logit and Cox

Table A.5: Variable description for logit and Cox PHM regression

Variables	**Description**
$Log(TotAss)$	Natural log of total assets
$Return08-09$	Return on equity in financial crisis (2008 and 2009)
$EquityReturn_{-1}$	One year lagged equity return
$LongTermDebt$	Long term debt relative to total assets
$Debt-Ratio$	Total debt relative to total assets
$Tier1$	One year lagged Tier 1 ratio
$Market/Book$	12 month average market to book ratio

Table A.6: This table shows the variance inflation factors for the variable used in the logit regression and Cox the Hosmer Lemeshow (1986) goodness of fit test. No VIF's are observed above the rule of thumb threshold of 10, and the Hosmer Lemeshow test fails to reject the null stating that the model is not well fitted

	(1)	(2)	(3)	(4)
$Log(TotAss)$	1.05	1.26	1.27	1.13
$Return08-09$	1.01	1.1	1.1	1.1
$Return_{-}1$	1.01	1.02	1.03	1.04
$LongTermDebt$	1.05	1.05	1.06	1.06
$Debt-Ratio$		1.29	1.33	1.33
$Tier1$			1.07	1.13
$Market/Book$				1.09
Hosmer-Lemeshow	7.93	9.18	8.33	8.38
(p-value)	(0.44)	(0.33)	(0.40)	(0.40)

Table A.7: This table reports the results from testing is the slope from schofeld residuals are significantly different from zero. Chi^2 statistics are reported in parenthesis. Slope is not significantly different from zero and the PHM assumptions hold

	(1)	(2)	(3)	(4)
$Log(TotAss)$	0.03324	0.02823	0.0442	0.04594
	(0.10)	(0.07)	(0.19)	(0.20)
$Return(08-09)$	-0.01305	-0.00327	-0.04072	-0.04971
	(0.01)	(0.00)	(0.00)	(0.00)
$Return_{-1}$	0.02174	0.02607	0.03074	0.03032
	(0.00)	(0.01)	(0.01)	(0.01)
$LongTermDebt$	0.0658	0.06487	0.07812	0.08007
	(0.11)	(0.11)	(0.16)	(0.17)
$Debt-Ratio$		0.01573	0.0036	0.00614
		(0.01)	(0.00)	(0.00)
$Tier1$			0.05132	0.04767
			(0.11)	(0.09)
$Market/Book$				0.09138
				(0.06)
Global Test (Chi2)	0.16	0.18	0.33	0.40

Appendix B

B.1 Additional Windows for Event Study

B.1.1 Stocks

Table B.1: This table show our results for the 26 day event window (-15, 10) for stocks.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All CoCo's (including Asia)		-0.34	-0.431	57 : 65	-0.641	122
All European CoCo's		-0.13	-0.152	45 : 50	-0.504	95
Issue size	<median	-0.38	-0.366	23 : 24	-0.192	47
(Amt issued / MC)	≥median	0.11	0.076	22 : 26	-0.520	48
Leverage	<median	-0.31	-0.236	21 : 25	-0.603	46
(Debt/Tot.Assets)	≥median	0.03	0.026	24 : 25	-0.118	49
First time issue		1.81	1.106	23 : 16	1.225	39
Subsequent issue		-1.49	-1.518	22 : 34*	-1.679	56
Before 01.04.2014		0.38	0.255	22 : 24	-0.227	46
After 01.04.2014		-0.09	-0.107	23 : 26	-0.432	49
Market Cap	<median	0.41	0.292	23 : 21	0.396	44
	≥median	-0.81	-0.718	22 : 29	-1.063	51
Issuer	SIB	0.56	0.587	22 : 24	-0.207	46
	non-SIB	-0.67	-0.456	23 : 26	-0.359	49
PWD		0.18	0.192	31 : 30	0.223	61
CE		-0.71	-0.395	14 : 20	-1.141	34
Wealth Transfer	<median	0.65	0.559	22 : 24	-0.356	46
	≥median	-0.84	-0.624	23 : 25	-0.218	48
Trigger	<6%	-1.23	-1.166	27 : 33	-0.710	60
	≥6%	2.72	1.550	17 : 13	0.657	30
Distance to Trigger	<median	1.06	0.568	24 : 14	1.463	38
	≥median	-0.73	-0.850	18 : 30	-1.576	48
Coupon	<median	0.86	0.986	23 : 24	-0.236	47
	≥median	-1.15	-0.736	22 : 26	-0.478	48
Tier 1		-0.42	-0.424	37 : 43	-0.669	80
Tier 2		1.37	0.683	08 : 07	0.278	15

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

Table B.2: This table show our results for the 5 day event window (-15 , -10) for stocks.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All CoCo's (including Asia)		-0.34	-0.900	52 : 70	-1.546	122
All European CoCo's		-0.39	-0.905	41 : 54	-1.325	95
Issue size	<median	-0.03	-0.061	22 : 25	-0.483	47
(Amt issued / MC)	≥median	-0.73	-1.069	19 : 29	-1.386	48
Leverage	<median	-0.36	-0.568	21 : 25	-0.603	46
(Debt/Tot.Assets)	≥median	-0.41	-0.714	20 : 29	-1.261	49
First time issue		-0.36	-0.456	18 : 21	-0.376	39
Subsequent issue		-0.41	-0.857	23 : 33	-1.412	56
Before 01.04.2014		-0.34	-0.474	18 : 28	-1.406	46
After 01.04.2014		-0.19	-0.486	23 : 26	-0.432	49
Market Cap	<median	-0.37	-0.554	21 : 23	-0.207	44
	≥median	-0.33	-0.599	20 : 31	-1.623	51
Issuer	SIB	0.14	0.306	18 : 28	-1.400	46
	non-SIB	-0.78	-1.098	23 : 26	-0.359	49
PWD		-0.20	-0.437	30 : 31	-0.034	61
CE		-0.72	-0.834	11 : 23**	-2.170	34
Wealth Transfer	<median	-0.15	-0.265	20 : 26	-0.946	46
	≥median	-0.63	-0.971	20 : 28	-1.084	48
Trigger	<6%	-0.54	-1.062	26 : 34	-0.968	60
	≥6%	0.17	0.199	14 : 16	-0.438	30
Distance to Trigger	<median	-0.69	-0.773	14 : 24	-1.783	38
	≥median	0.05	0.117	25 : 23	0.446	48
Coupon	<median	-0.16	-0.391	22 : 25	-0.525	47
	≥median	-0.61	-0.818	19 : 29	-1.353	48
Tier 1		-0.61	-1.292	32 : 48	-1.788	80
Tier 2		0.81	0.844	9 : 6	0.794	15

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

Table B.3: This table show our results for the 11 day event window (-15 , -5) for stocks.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All CoCo's (including Asia)		-0.38	-0.733	57 : 65	-0.641	122
All European CoCo's		-0.52	-0.901	46 : 49	-0.299	95
Issue size	<median	-0.04	-0.056	23 : 24	-0.192	47
(Amt issued / MC)	≥median	-0.99	-1.069	23 : 25	-0.231	48
Leverage	<median	-0.83	-0.966	23 : 23	-0.013	46
(Debt/Tot.Assets)	≥median	-0.23	-0.297	23 : 26	-0.404	49
First time issue		-0.94	-0.885	21 : 18	0.585	39
Subsequent issue		-0.22	-0.353	25 : 31	-0.877	56
Before 01.04.2014		-0.27	-0.274	21 : 25	-0.522	46
After 01.04.2014		-0.12	-0.219	25 : 24	0.139	49
Market Cap	<median	-0.86	-0.941	23 : 21	0.257	44
	≥median	-0.46	-0.627	23 : 28	-0.783	51
Issuer	SIB	0.47	0.751	22 : 23	-0.207	45
	non-SIB	-1.62*	-1.716	24 : 26	-0.223	50
PWD		-0.21	-0.343	33 : 28	0.735	61
CE		-1.07	-0.920	13 : 21	-1.484	34
Wealth Transfer	<median	-0.02	-0.023	21 : 25	-0.651	46
	≥median	-1.00	-1.134	25 : 23	0.359	48
Trigger	<6%	-0.85	-1.243	26 : 34	-0.968	60
	≥6%	0.10	0.089	18 : 12	1.023	30
Distnace to Trigger	<median	-1.12	-0.929	23 : 20	0.489	43
	≥median	-0.09	-0.165	24 : 28	-0.421	52
Coupon	<median	0.42	0.747	25 : 23	0.341	47
	≥median	-1.48	-1.462	21 : 26	-0.770	48
Tier 1		-0.79	-1.231	38 : 42	-0.446	80
Tier 2		0.91	0.694	8 : 07	0.278	15

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

Table B.4: This table show our results for the 5 day event window (-10 , -5) for stocks.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All CoCo's (including Asia)		-0.21	-0.564	61 : 61	0.084	122
All European CoCo's		-0.43	-1.010	48 : 47	0.112	95
Issue size	<median	-0.24	-0.478	25 : 22	0.392	47
(Amt issued / MC)	≥median	-0.62	-0.901	23 : 25	-0.231	48
Leverage	<median	-0.59	-0.935	23 : 23	-0.013	46
(Debt/Tot.Assets)	≥median	-0.28	-0.486	25 : 24	0.168	49
First time issue		-1.03	-1.308	18 : 21	-0.376	39
Subsequent issue		-0.01	-0.029	30 : 26	0.459	56
Before 01.04.2014		-0.08	-0.115	22 : 24	-0.227	46
After 01.04.2014		-0.21	-0.532	26 : 23	0.425	49
Market Cap	<median	-1.06	-1.583	20 : 24	-0.509	44
	≥median	-0.22	-0.402	28 : 23	0.618	51
Issuer	SIB	0.21	0.449	23 : 23	0.091	46
	non-SIB	-1.39*	-1.961	24 : 25	-0.073	49
PWD		-0.41	-0.887	33 : 28	0.735	61
CE		-0.47	-0.549	15 : 19	-0.798	34
Wealth Transfer	<median	0.16	0.294	25 : 21	0.529	46
	≥median	-0.99	-1.528	23 : 25	-0.218	48
Trigger	<6%	-0.75	-1.469	30 : 30	0.065	60
	≥6%	-0.16	-0.185	17 : 13	0.657	30
Distance to Trigger	<median	-1.01	-1.129	23 : 15	1.138	38
	≥median	-0.26	-0.640	21 : 27	-0.709	48
Coupon	<median	0.38	0.913	22 : 25	-0.525	47
	≥median	-1.26*	-1.682	26 : 22	0.689	48
Tier 1		-0.52	-1.097	40 : 40	0.001	80
Tier 2		0.04	0.040	8 : 7	0.278	15

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

Table B.5: This table show our results for the 4 day event window (-5 , -1) for stocks.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All CoCo's (including Asia)		0.14	0.392	64 : 58	0.627	122
All European CoCo's		0.29	0.754	52 : 43	0.932	95
Issue size	<median	0.21	0.469	27 : 20	0.976	47
(Amt issued / MC)	≥median	0.37	0.592	25 : 23	0.346	48
Leverage	<median	-0.34	-0.591	24 : 22	0.282	46
(Debt/Tot.Assets)	≥median	0.89*	1.696	28 : 21	1.025	49
First time issue		0.77	1.074	23 : 16	1.225	39
Subsequent issue		-0.04	-0.092	29 : 27	0.192	56
Before 01.04.2014		0.73	1.098	24 : 22	0.363	46
After 01.04.2014		0.11	0.320	28 : 21	0.996	49
Market Cap	<median	0.32	0.520	24 : 20	0.697	44
	≥median	0.05	0.101	28 : 23	0.618	51
Issuer	SIB	-0.03	-0.072	24 : 22	0.390	46
	non-SIB	0.63	0.969	28 : 21	1.070	49
PWD		0.15	0.348	35 : 26	1.247	61
CE		0.56	0.711	17 : 17	-0.112	34
Wealth Transfer	<median	0.05	0.097	23 : 23	-0.061	46
	≥median	0.54	0.848	28 : 20	1.225	48
Trigger	<6%	-0.01	-0.018	33 : 27	0.839	60
	≥6%	1.34*	1.741	19 : 11	1.388	30
Distance to Trigger	<median	1.33	1.630	25 : 13*	1.787	38
	≥median	-0.36	-0.967	24 : 24	0.157	48
Coupon	<median	0.58	1.537	27 : 20	0.918	47
	≥median	0.01	-0.007	25 : 23	0.398	48
Tier 1		0.35	0.807	43 : 37	0.672	80
Tier 2		0.00	0.001	9 : 6	0.794	15

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

Table B.6: This table show our results for the 1 day event window (0) for stocks.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All CoCo's (including Asia)		0.19	1.203	58 : 64	-0.460	122
All European CoCo's		0.24	1.405	46 : 49	-0.299	95
Issue size	<median	0.00	0.009	23 : 24	-0.192	47
(Amt issued / MC)	≥median	0.48*	1.722	23 : 25	-0.231	48
Leverage	<median	0.25	0.950	23 : 23	-0.013	46
(Debt/Tot.Assets)	≥median	0.24	1.039	23 : 26	-0.404	49
First time issue		0.46	1.442	18 : 21	-0.376	39
Subsequent issue		0.09	0.479	28 : 28	-0.075	56
Before 01.04.2014		0.47	1.582	26 : 20	0.953	46
After 01.04.2014		0.09	0.583	21 : 28	-1.004	49
Market Cap	<median	0.36	1.330	20 : 24	-0.509	44
	≥median	0.15	0.679	27 : 24	0.338	51
Issuer	SIB	0.06	0.347	24 : 22	0.390	46
	non-SIB	0.42	1.465	22 : 27	-0.645	49
PWD		0.33*	1.734	30 : 31	-0.034	61
CE		0.12	0.282	16 : 18	-0.455	34
Wealth Transfer	<median	0.15	0.660	24 : 22	0.234	46
	≥median	0.35	1.308	22 : 26	-0.507	48
Trigger	<6%	0.30	1.469	31 : 29	0.323	60
	≥6%	0.07	0.212	12 : 18	-1.169	30
Distance to Trigger	<median	0.38	1.047	17 : 21	-0.809	38
	≥median	0.12	0.699	24 : 24	0.157	48
Coupon	<median	0.18	1.072	22 : 25	-0.525	47
	≥median	0.31	1.006	24 : 24	0.106	48
Tier 1		0.25	1.297	39 : 41	-0.222	80
Tier 2		0.21	0.543	7 : 8	-0.239	15

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

Table B.7: This table show the daily development in abnormal returns for the full event window

t	**AAR(%)**	J_1
-15	-0.05	-0.19
-14	-0.33	-1.17
-13	0.18	0.66
-12	-0.31	-1.13
-11	0.21	0.75
-10	-0.50	-1.82
-9	-0.65**	-2.33
-8	0.02	0.09
-7	0.27	0.98
-6	0.02	0.07
-5	-0.51	-1.83
-4	-0.20	-0.73
-3	0.66**	2.38
-2	0.40	1.45
-1	-0.01	-0.05
0	0.40	1.46
1	0.11	0.38
2	-0.20	-0.74
3	-0.25	-0.91
4	-0.34	-1.22
5	-0.08	-0.30
6	0.23	0.81
7	0.23	0.83
8	0.01	0.03
9	-0.37	-1.34
10	0.08	0.27

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

B.1.2 CDS

Table B.8: This table show our results for the 1 day event window (0) for CDS.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All European CoCo's		0.01	0.059	25 : 40*	-1.816	65
Issue size	<median	-0.46	-1.530	9 : 23**	-2.420	32
(Amt issued / MC)	≥median	0.47*	1.692	16 : 17	-0.165	33
Leverage	<median	-0.18	-0.544	12 : 17	-0.952	29
(Debt/Tot.Assets)	≥median	0.16	0.615	13 : 23	-1.586	36
First time issue		-0.08	-0.228	10 : 14	-0.811	24
Subsequent issue		0.07	0.258	15 : 26	-1.665	41
Before 28.03.2014		0.14	0.495	14 : 18	-0.663	32
After 28.03.2014		-0.11	-0.367	11 : 22*	-1.895	33
Market Cap	<median	0.17	0.609	10 : 15	-1.028	25
	≥median	-0.09	-0.316	15 : 25	-1.502	40
Issuer	SIB	0.01	0.024	19 : 33*	-1.781	52
	non-SIB	0.04	0.084	6 : 7	-0.500	13
Issuer	AAA-A	0.38	1.402	14 : 20	-1.012	34
	BBB-NIG	-0.39	-1.276	11 : 20	-1.569	31
PWD		0.37	1.460	18 : 22	-0.617	40
CE		-0.57	-1.645	7 : 18**	-2.148	25
Wealth Transfer	<median	-0.60*	-1.976	8 : 24***	-2.751	32
	≥median	0.61**	2.205	17 : 16	0.161	33
Trigger	<6%	0.14	0.580	17 : 27	-1.421	44
	≥6%	-0.25	-0.647	8 : 13	-1.138	21
Distance to Trigger	<median	-0.02	-0.066	13 : 19	-1.014	32
	≥median	0.04	0.156	12 : 21	-1.549	33
Coupon	<median	0.10	0.348	12 : 18	-1.027	30
	≥median	-0.06	-0.207	13 : 22	-1.523	35
Tier 1		-0.17	-0.722	16 : 37***	-2.821	53
Tier 2		0.80	1.721	9 : 3	1.703	12

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

Table B.9: This table show our results for the 25 day event window (-15 , 10) for CDS.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All European CoCo's		-1.78*	-1.698	27 : 38	-1.319	65
Issue size	<median	-1.04	-0.673	13 : 19	-1.006	32
(Amt issued / MC)	≥median	-2.50*	-1.756	14 : 19	-0.862	33
Leverage	<median	-3.36*	-2.045	10 : 19	-1.695	29
(Debt/Tot.Assets)	≥median	-0.51	-0.375	17 : 19	-0.252	36
First time issue		0.24	0.136	12 : 12	0.005	24
Subsequent issue		-2.96**	-2.283	15 : 26	-1.665	41
Before 28.03.2014		-0.53	-0.373	14 : 18	-0.663	32
After 28.03.2014		-2.99*	-1.951	13 : 20	-1.199	33
Market Cap	<median	-1.28	-0.876	12 : 13	-0.228	25
	≥median	-2.09	-1.455	15 : 25	-1.502	40
Issuer	SIB	-2.00*	-1.710	21 : 31	-1.226	52
	non-SIB	-0.89	-0.379	6 : 7	-0.500	13
Issuer	AAA-A	-0.40	-0.290	17 : 17	0.017	34
	BBB-NIG	-3.28**	-2.083	10 : 21*	-1.929	31
PWD		-0.41	-0.315	19 : 21	-0.300	40
CE		-3.97**	-2.265	8 : 17*	-1.748	25
Wealth Transfer	<median	-3.74**	-2.405	11 : 21*	-1.691	32
	≥median	0.12	0.088	16 : 17	-0.187	33
Trigger	<6%	-0.53	-0.437	20 : 24	-0.516	44
	≥6%	-4.39**	-2.201	7 : 14	-1.574	21
Distance to Trigger	<median	-0.99	-0.637	13 : 19	-1.014	32
	≥median	-2.55*	-1.799	14 : 19	-0.853	33
Coupon	<median	-0.22	-0.154	17 : 13	0.799	30
	≥median	-3.11**	-2.065	10 : 25**	-2.538	35
Tier 1		-2.80**	-2.398	19 : 34*	-1.997	53
Tier 2		2.74	1.162	8 : 4	1.126	12

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

Table B.10: This table show our results for the 6 day event window (-15 , -10) for CDS.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All European CoCo's		-0.56	-1.104	37 : 28	1.161	65
Issue size	<median	0.06	0.082	18 : 14	0.762	32
(Amt issued / MC)	≥median	-1.15	-1.686	19 : 14	0.879	33
Leverage	<median	-1.7**	-2.162	15 : 14	0.163	29
(Debt/Tot.Assets)	≥median	0.37	0.571	22 : 14	1.415	36
First time issue		0.04	0.050	14 : 10	0.822	24
Subsequent issue		-0.90	-1.453	23 : 18	0.834	41
Before 28.03.2014		-1.13	-1.653	20 : 12	1.459	32
After 28.03.2014		0.00	0.005	17 : 16	0.194	33
Market Cap	<median	0.25	0.360	14 : 11	0.573	25
	≥median	-1.06	-1.535	23 : 17	1.028	40
Issuer	SIB	-0.44	-0.792	7 : 21	1.548	52
	non-SIB	-1.00	-0.882	6 : 7	-0.500	13
Issuer	AAA-A	0.90	1.341	22 : 12*	1.732	34
	BBB-NIG	-2.15***	-2.836	15 : 16	-0.133	31
PWD		0.24	0.381	22 : 18	0.648	40
CE		-1.82**	-2.169	15 : 10	1.053	25
Wealth Transfer	<median	-1.61**	-2.149	17 : 15	0.431	32
	≥median	0.46	0.686	20 : 13	1.206	33
Trigger	<6%	0.48	0.827	27 : 17	1.594	44
	≥6%	-2.73***	-2.856	10 : 11	-0.265	21
Distance to Trigger	<median	0.08	0.114	20 : 12	1.461	32
	≥median	-1.18*	-1.728	17 : 16	0.192	33
Coupon	<median	0.23	0.338	16 : 14	0.434	30
	≥median	-1.23*	-1.698	21 : 14	1.181	35
Tier 1		-0.58	-1.028	6 : 23	1.025	53
Tier 2		-0.46	-0.406	7 : 5	0.549	12

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

Table B.11: This table show our results for the 11 day event window (-15 , -5) for CDS.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All European CoCo's		-0.74	-1.085	27 : 38	-1.319	65
Issue size	<median	0.32	0.324	14 : 18	-0.652	32
(Amt issued / MC)	≥median	-1.77*	-1.913	13 : 20	-1.210	33
Leverage	<median	-1.6	-1.502	12 : 17	-0.952	29
(Debt/Tot.Assets)	≥median	-0.04	-0.048	15 : 21	-0.919	36
First time issue		-0.37	-0.319	7 : 17*	-2.036	24
Subsequent issue		-0.96	-1.134	20 : 21	-0.104	41
Before 28.03.2014		-0.8	-0.868	15 : 17	-0.309	32
After 28.03.2014		-0.68	-0.679	12 : 21	-1.547	33
Market Cap	<median	-0.71	-0.753	7 : 18**	-2.228	25
	≥median	-0.75	-0.807	20 : 20	0.079	40
Issuer	SIB	-0.48	-0.634	23 : 29	-0.671	52
	non-SIB	-1.77	-1.155	4 : 09	-1.612	13
Issuer	AAA-A	0.26	0.283	14 : 20	-1.012	34
	BBB-NIG	-1.83*	-1.785	13 : 18	-0.851	31
PWD		0.10	0.123	16 : 24	-1.249	40
CE		-2.09*	-1.833	11 : 14	-0.548	25
Wealth Transfer	<median	-1.47	-1.452	14 : 18	-0.630	32
	≥median	-0.03	-0.035	13 : 20	-1.232	33
Trigger	<6%	0.21	0.267	19 : 25	-0.818	44
	≥6%	-2.73**	-2.107	8 : 13	-1.138	21
Distance to Trigger	<median	0.52	0.518	13 : 19	-1.014	32
	≥median	-1.96**	-2.129	14 : 19	-0.853	33
Coupon	<median	-0.61	-0.655	11 : 19	-1.392	30
	≥median	-0.85	-0.866	16 : 19	-0.509	35
Tier 1		-0.97	-1.272	21 : 32	-1.448	53
Tier 2		0.27	0.173	6 : 06	-0.029	12

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

Table B.12: This table show our results for the 6 day event window (-10 , -5) for CDS.

Group		**CAAR(%)**	J_1	**Pos:Neg**	**GST**	**Sample-Size**
All European CoCo's		-0.34	-0.680	31 : 34	-0.327	65
Issue size	<median	0.19	0.255	20 : 12	1.470	32
(Amt issued / MC)	≥median	-0.86	-1.253	11 : 22*	-1.906	33
Leverage	<median	0.01	0.012	15 : 14	0.163	29
(Debt/Tot.Assets)	≥median	-0.62	-0.962	16 : 20	-0.586	36
First time issue		-0.71	-0.838	7 : 17*	-2.036	24
Subsequent issue		-0.12	-0.201	24 : 17	1.146	41
Before 28.03.2014		0.06	0.094	18 : 14	0.751	32
After 28.03.2014		-0.74	-1.000	13 : 20	-1.199	33
Market Cap	<median	-1.25*	-1.784	7 : 18**	-2.228	25
	≥median	0.23	0.326	24 : 16	1.344	40
Issuer	SIB	-0.15	-0.259	26 : 26	0.161	52
	non-SIB	-1.13	-0.998	5 : 8	-1.056	13
Issuer	AAA-A	-0.74	-1.102	13 : 21	-1.355	34
	BBB-NIG	0.09	0.121	18 : 13	0.945	31
PWD		-0.43	-0.689	18 : 22	-0.617	40
CE		-0.20	-0.237	13 : 12	0.253	25
Wealth Transfer	<median	0.24	0.327	20 : 12	1.492	32
	≥median	-0.91	-1.348	11 : 22*	-1.928	33
Trigger	<6%	-0.57	-0.968	19 : 25	-0.818	44
	≥6%	0.13	0.136	12 : 9	0.608	21
Distance to Trigger	<median	0.33	0.438	16 : 16	0.046	32
	≥median	-0.99	-1.454	15 : 18	-0.505	33
Coupon	<median	-1.15	-1.669	10 : 20*	-1.757	30
	≥median	0.35	0.483	21 : 14	1.181	35
Tier 1		-0.48	-0.863	24 : 29	-0.623	53
Tier 2		0.29	0.253	7 : 5	0.549	12

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

Table B.13: This table show our results for the 3 day event window (-3 , -1) for CDS.

Group		CAAR(%)	J_1	Pos:Neg	GST	Sample-Size
All European CoCo's		-0.50	-1.419	29 : 36	-0.823	65
Issue size	<median	0.37	0.707	16 : 16	0.055	32
(Amt issued / MC)	≥median	-1.35***	-2.799	13 : 20	-1.210	33
Leverage	<median	0.08	0.141	15 : 14	0.163	29
(Debt/Tot.Assets)	≥median	-0.97**	-2.123	14 : 22	-1.252	36
First time issue		0.57	0.955	14 : 10	0.822	24
Subsequent issue		-1.14**	-2.580	15 : 26	-1.665	41
Before 28.03.2014		-0.16	-0.324	16 : 16	0.044	32
After 28.03.2014		-0.84	-1.619	13 : 20	-1.199	33
Market Cap	<median	-1.00*	-2.027	10 : 15	-1.028	25
	≥median	-0.19	-0.395	19 : 21	-0.237	40
Issuer	SIB	-0.75*	-1.885	22 : 30	-0.948	52
	non-SIB	0.47	0.591	7 : 6	0.056	13
Issuer	AAA-A	-1.03**	-2.171	16 : 18	-0.326	34
	BBB-NIG	0.07	0.127	13 : 18	-0.851	31
PWD		-0.83*	-1.869	17 : 23	-0.933	40
CE		0.01	0.019	12 : 13	-0.148	25
Wealth Transfer	<median	-0.13	-0.252	14 : 18	-0.630	32
	≥median	-0.87*	-1.810	15 : 18	-0.535	33
Trigger	<6%	-0.92**	-2.229	19 : 25	-0.818	44
	≥6%	0.37	0.551	10 : 11	-0.265	21
Distance to Trigger	<median	-0.45	-0.857	15 : 17	-0.307	32
	≥median	-0.56	-1.159	14 : 19	-0.853	33
Coupon	<median	-0.39	-0.795	13 : 17	-0.662	30
	≥median	-0.61	-1.183	16 : 19	-0.509	35
Tier 1		-0.78*	-1.954	22 : 31	-1.173	53
Tier 2		0.69	0.861	7 : 5	0.549	12

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

Table B.14: This table show the daily development in abnormal returns for the full event window

t	AAR(%) for CDS	J_1
-15	0.0024	0.0121
-14	0.0634	0.3233
-13	-0.8255***	-4.2093
-12	0.4316**	2.2008
-11	-0.1281	-0.6533
-10	-0.1706	-0.8698
-9	-0.2886	-1.4715
-8	0.1351	0.6888
-7	0.0109	0.0554
-6	0.1858	0.9475
-5	-0.2162	-1.1026
-4	-0.2694	-1.3738
-3	-0.3062	-1.5614
-2	-0.1999	-1.0190
-1	-0.0533	-0.2717
0	0.0176	0.0895
1	0.4085**	2.0827
2	-0.2228	-1.1362
3	-0.4506**	-2.2974
4	0.2451	1.2495
5	-0.0155	-0.0792
6	-0.0524	-0.2672
7	-0.2551	-1.3009
8	0.2418	1.2328
9	0.1406	0.7168
10	-0.3602*	-1.8368

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