A Pecking Order in Contingent Convertible Bond Financing *

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January 2025

Abstract

We study a pecking order that aligns stockholders' CoCo financing preferences with the degree of contingent dilution. Using a novel CoCo dilution measure and comprehensive hand-collected data across 27 countries, we find that dilutive CoCo issuances are associated with a negative abnormal announcement return (resembling equity issuance), which is not observable in nondilutive CoCos issuances (resembling debt issues). The announcement effects are more pronounced for CoCos closer to the conversion trigger and Maximum Distributable Amount (MDA) threshold. However, the announcement effects for dilutive CoCos diminish to zero or even reverse to positive effects in periods when aggregate uncertainties related to contingent trigger events are high. During these periods, nondilutive CoCos generate negative returns. Unique contractual features of CoCos offer empirical insights into the divergence between adverse selection and agency costs.

JEL classification: G14, G21, G32

Keywords: Contingent convertible bonds, Pecking order, Equity returns, Systemic risk

* We acknowledge the helpful comments of Tobias Berg, Mark Flannery, Christoph Herpfer, Richard Herring, Jens Hilscher, Armen Hovakimian, Hanh Le (discussant), Ziang Li (discussant), Elena Loutskina, Ben McCartney, Amiyatosh Purnanandam, Alon Raviv, Anthony Saunders, Rene Stulz, Brandon Zborowski, and participants in the Baruch Zicklin School Brownbag seminar series. All errors remain our own.

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1 Introduction

Contingent convertible capital instruments (hereafter, CoCos) play an increasingly important role in bank financing, as illustrated by the 2023 Credit Suisse collapse. CoCo design hinges on two critical features: the choice of conversion trigger design and the degree of contingent dilution. The theoretical literature largely explored the optimal trigger design (McDonald, 2013; Sundaresan and Wang, 2015; Glasserman and Nouri, 2016; Pennacchi and Tchistyi, 2018), yet regulators are agnostic toward trigger designs by allowing banks to simply comply with very low regulatory trigger minima. Typically, regulators dictate the point of conversion by declaring a Point of Non-Viability (PONV) and closing the bank.[1] This leaves issuing banks with one critical decision in designing CoCo securities—selecting the degree of contingent dilution.

The central empirical question of this paper is the issuers' preference over the degree of contingent dilution, which can range from terms that fully dilute existing shareholders upon conversion (dilutive CoCos) to terms that fully eliminate CoCo debt without affecting existing shareholders (nondilutive CoCos).[2] We posit that a combination of pre-contractual adverse selection and post-contractual agency cost shapes a pecking order in CoCo financing along the degree of contingent dilution. Under the adverse selection framework (Myers, 1984), pre-contractual concerns, such as banks' unobservable quality, generally affect shareholders to favor nondilutive CoCos over dilutive ones. Under this framework, nondilutive CoCos are preferred over dilutive CoCos. However, CoCos exhibit distinct post-contractual agency cost dynamics (Himmelberg and Tsyplakov, 2020; Fatouh, Neamt, and van Wijnbergen, 2022). That is, unlike traditional securities, while adverse selection costs increase with the degree of contingent dilution, agency costs decline. Nondilutive CoCos, which are in a

[1]In all past episodes, a regulatory declaration of a PONV triggered CoCo conversion while the banks' capital positions were far above the CoCo mechanical trigger level because they were set so low.

[2]Most of the theoretical literature assumes a negative relationship between contingent dilution and existing shareholders' value. Flannery (2005) relies on the argument that contingent dilution discourages banks from taking risky projects. A notable exception is a theory by Chen, Glasserman, Nouri, and Pelger (2017), which shows shareholders may prefer dilutive CoCos due to reductions in bankruptcy risks.

first-loss position to absorb losses before shareholders, may encourage risk-taking behavior (Fatouh et al., 2022). Dilutive CoCos, imposing dilution only upon a trigger event, incentivize managers to avoid bank failure and the subsequent dilution of existing shareholders (Himmelberg and Tsyplakov, 2020).[3] Under this framework, dilutive CoCos are preferred over nondilutive CoCos.

The results presented in this paper suggest that shareholders typically prefer nondilutive CoCos over dilutive CoCos but shift their preference to dilutive CoCos during periods of heightened aggregate uncertainties related to contingent trigger events. Using a novel CoCo dilution measure and comprehensive hand-collected data across 27 countries, we document that dilutive CoCo issuances are associated with a negative abnormal announcement return (resembling equity issuance), which is not observable in nondilutive CoCos issuances (resembling debt issues). The announcement effects are more pronounced for CoCos closer to the conversion trigger and Maximum Distributable Amount (MDA) threshold. Refinancing CoCos (i.e., CoCos that are being issued in place of a retiring one) are more likely to be nondilutive. However, the announcement effects for dilutive CoCos diminish to zero or even reverse to positive effects in periods when aggregate uncertainties related to contingent trigger events are high. During these periods, nondilutive CoCos generate negative returns.

We begin our analysis by constructing our novel contingent dilution measure. Building on Berg and Kaserer (2015), our measure aims to quantify deviations from a full write-down in contingent dilution. To do so, we uniquely incorporate the *pari-passu* loss absorption feature of temporary write-downs alongside mechanisms like share conversion. Berg and Kaserer (2015) estimate share conversion for 24 equity-converting CoCos using specific loss absorption terms. Building on their work, we (a) hand-collect conversion prices for all equity-converting CoCos issued between 2009 and 2021 and (b) account for temporary write-downs by proportionally allocating residual losses across outstanding instruments at the same

[3]Other theoretical studies that explore agency cost and CoCos include Koziol and Lawrenz (2012), Calomiris and Herring (2013), Hilscher and Raviv (2014), Pennacchi, Vermaelen, and Wolff (2014), and Goncharenko (2022).

trigger levels. This approach enables us to define an indicator variable, *Dilutive*, that equals 1 for the one-third of CoCos that are the farthest from a full write-down (i.e., highest tercile by contingent dilution) and 0 otherwise. Our analysis reveals significant variation in dilution across CoCo types, with 67.4% of equity conversion and 28.3% of temporary write-down CoCos classified as relatively dilutive.

Applying our contingent dilution measure, we examine the abnormal equity returns upon announcement of the dilution terms of new CoCo issues. Specifically, using our comprehensive, hand-collected database of all CoCo issues from 2009 through 2021, we find that the 10-day cumulative abnormal returns when issuing dilutive CoCos are -1.68% (statistically significant at the 1% level).[4] This finding resembles the vast evidence from seasoned equity offerings (Asquith and Mullins, 1986). Alternatively, upon issuing a nondilutive CoCo, there is a statistically insignificant positive stock price market reaction, resembling findings from bond issues or loans (Eckbo, 1986; James, 1987). The findings are robust to the definition of dilutive CoCos and changes to the assumptions of equity deterioration when constructing our contingent dilution measure. Further, our analysis includes coupon rates at issue to control for the possibility that dilutive CoCos are systematically mispriced at issue and are more expensive. Thus, our findings support the pecking order that stockholders prefer nondilutive CoCos over dilutive CoCos.

We then analyze the cross-section of announcement returns across two types of CoCo-specific thresholds that reflect adverse selection costs. First, we examine the distance to the trigger level, as CoCos closer to the trigger are expected to incur higher information costs and, consequently, higher adverse selection costs. Our results confirm that issuing dilutive CoCos with a closer distance to trigger produces more pronounced negative announcement effects. Second, we utilize hand-collected data on banks' Maximum Distributable Amount (MDA) thresholds to further validate that our finding relates to adverse selection. If the

[4] We use event windows extending up to a month post-announcement, as key information on the dilution level of CoCo issuances such as conversion price often becomes available only at issuance, typically weeks later. This delay affects the stock price on issuance day, which is then factored into the dilution measure.

regulatory MDA threshold is breached, the bank faces limits on payouts of bonuses and managerial compensation, dividends and even CoCo coupon payments. Unlike distance to the trigger, distance to the MDA threshold reduces agency costs by better aligning managerial and stockholder incentives to keep capital ratios above the threshold while also raising adverse selection costs. We observe that dilutive CoCos exhibit negative announcement effects primarily when they are closer to the MDA threshold, suggesting that adverse selection costs explain the stock market's response to dilutive CoCo issuances.

Given that the evidence largely supports a pecking order favoring nondilutive CoCos, we investigate whether banks are more likely to choose nondilutive CoCos upon refinancing. Our findings show that CoCos issued to refinance called CoCos[5] are more likely to be nondilutive, regardless of the CoCo type that is being retired. Specifically, 71.0% of nondilutive CoCos are refinanced with a nondilutive CoCo, and 63.9% of dilutive CoCos are refinanced with a nondilutive CoCo.

While our findings highlight a preference for nondilutive CoCos under adverse selection costs, we also consider the role of agency costs in shaping shareholder preferences between dilutive and nondilutive CoCos. This is motivated by Myers (2003) that agency costs should affect security preferences. To explore this, we examine two specific uncertainties that potentially increase CoCo agency costs by raising trigger likelihoods. First, we analyze periods of high volatility in Bloomberg's Global Contingent Capital Bond Index. Since CoCo yields are driven by trigger risks, elevated volatility indicates increased investor concern over potential trigger events, which raises the value of nondilutive CoCos' first-loss absorption feature but intensifies their agency problem. Shareholders, however, prefer dilutive CoCos during these times for their lower agency costs, as they incentivize managers to avoid triggering events. Second, we consider the global economic policy uncertainty index (Baker, Bloom, and Davis, 2016) to capture regulatory risks. Past cases like Banco Popular in 2017 and Credit Suisse in 2023 reveal that heightened regulatory uncertainty raises the perceived likelihood of a

[5] To receive AT1 regulatory capital status, CoCos need to have perpetual maturity, but can have a call option for the issuer, provided the first available call date is at least 5 years after issue date.

regulator-triggered Point of Non-Viability (PONV), thereby increasing expected trigger risk even when the mechanical trigger is not binding.

Using these two measures of uncertainty, we observe a dampening or even a reversal of the adverse selection-driven pecking order, indicating that agency costs also influence the CoCo-pecking order. Specifically, the average negative abnormal return of -4.07% over a 30-day trading window dampens under high CoCo index volatility, decreasing close to zero. We find that this dampening effect is driven by banks incorporated in emerging markets, where agency costs are a greater concern. For example, issuing a dilutive CoCo typically results in a -4.62% abnormal return over a 30-day window in developed countries with minimal dampening under high CoCo index volatility, while in emerging markets, the effect reduces to -1.74%. When using the global economic policy uncertainty (EPU) index, we find even stronger dampening effects and, in emerging countries, a reversal of the adverse selection impact where the announcement return reaches 6.27%.

Surprisingly, we find that such pricing of adverse selection and agency cost by shareholders is not limited to newly issued CoCos and have long-term consequences (Loughran and Ritter, 1995). We construct a monthly long-short portfolio that involves buying equity in banks issuing more dilutive CoCos and selling equity in banks issuing less dilutive CoCos in the previous three years. In periods of low aggregate uncertainty associated with contingent trigger events (using both CoCo index volatility and global EPU), these portfolios yield a statistically significant (at the 5% level) negative alpha of over 50 basis points monthly, reflecting the higher adverse selection costs of issuing higher dilution CoCos. Conversely, during periods of high aggregate uncertainty associated with contingent trigger events, the long-short portfolio achieves positive and statistically significant (at the 5% level) alpha exceeding 20 basis points monthly. During such times, banks issuing more dilutive CoCos generate positive equity alpha returns, aligning with the equity market's recognition of the reduced agency costs of dilutive CoCos.

Our paper contributes to several strands of literature. First, we contribute to the debate over the market's understanding of the specific terms of CoCo bonds. For instance, Bolton, Jiang, and Kartasheva (2023) interpret the widespread disapproval of Credit Suisse's CoCo write-down in March 2023 as evidence that the stock market misunderstood CoCos' primary function as going-concern instruments that absorb losses ahead of equity, implying that the stock market is misinformed. However, our findings highlight that the single decision parameter left to the discretion of CoCo issuers, which is the degree of dilution, is indeed priced by shareholders, thereby suggesting a more nuanced view of market engagement with CoCo design specifics involving the interplay between adverse selection and agency costs. That is, our findings reveal a sophisticated market calculus in CoCo evaluation by shareholders, balancing the adverse selection pecking order against agency costs across the degree of contingent dilution.

Second, our paper contributes to empirical tests of pecking order theory (Myers and Shyam-Sunder, 1999), which has faced criticism for inconsistent support (Jung, Kim, and Stulz, 1996; Frank and Goyal, 2009), with some, like DeAngelo (2022), calling for its abandonment due to managers' lack of information to accurately determine the optimal capital structure. We propose that CoCos offer a unique opportunity to address this debate. CoCos inherently reflect pre-contractual adverse selection and post-contractual agency costs, key elements of the theory, making their contingent dilution decisions a simplified proxy for broader capital structure choices. While bank capital structure has traditionally been excluded from pecking order tests due to regulatory requirements that force banks to issue certain forms of capital, CoCos present an exception. Banks are required to issue Tier 1 common equity, violating pecking order predictions, but CoCos allow banks to issue securities at any point on the capital spectrum simply by adjusting the degree of contingent dilution in the security's design. Thus, within a single instrument, CoCos can be positioned anywhere along the pecking order hierarchy: the more dilutive (or equity-like) the CoCo, the lower it falls on the hierarchy, while less dilutive (or more debt-like) CoCos rank higher. By examining CoCo issuance, we gain a clean empirical setting to explore adverse selection and agency costs while contributing valuable insights to the broader literature on capital structure.

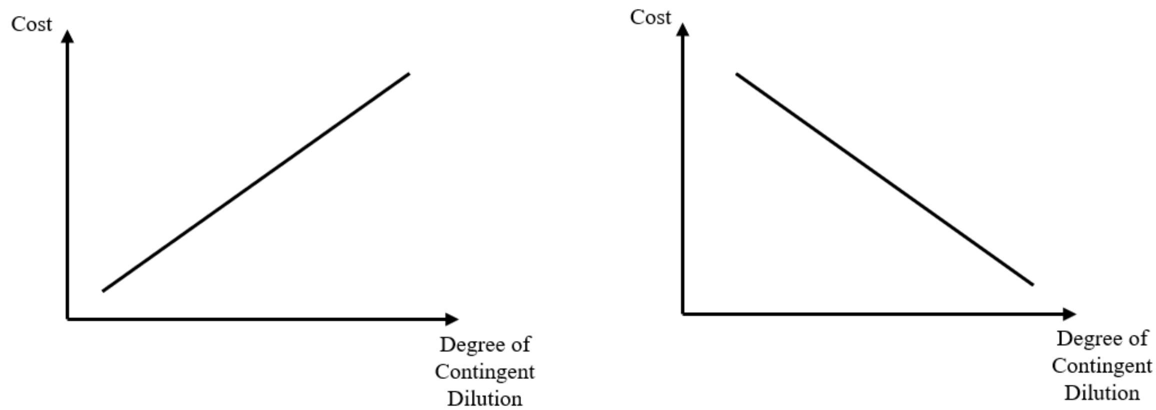
The rest of the paper is organized as follows. Section 2 presents our hypotheses. Section 3 introduces our novel contingent dilution measure and outlines our extensive CoCo database. Section 4 presents the results on adverse selection cost driven CoCo-pecking order. Section 5 presents the results on the effects agency costs on the CoCo-pecking order. Section 6 concludes the paper.

2 Hypothesis Development: CoCos and the Pecking Order Theory

The standard pecking order concept introduced by Steward Myers in his 1984 AFA Presidential address (Myers, 1984; Myers and Majluf, 1984) posits that firms will prioritize the issuance of less information sensitive securities to avoid the dilution of original stockholders' stakes. Knowing this, arms-length investors rationally infer that new equity issues are overpriced, and therefore, charge an adverse selection discount. Thus, adverse selection costs increase as dilution increases.

Myers (2003) later explains that Jensen and Meckling (1976)-type agency costs can also drive pecking order considerations by introducing conflicts of interest between debtholders and stockholders, termed "Jensen and Meckling's pecking order." This occurs because the costs of private benefits remain internalized with debt but are shared with outside shareholders when equity is issued. Consequently, agency costs are higher with equity, leading firms to favor debt issuance until they reach their debt capacity.

However, when agency costs are applied to dilutive and nondilutive CoCos, the hierarchy may differ due to two key conditions found in traditional external capital but not in CoCos: (a) debt is strictly senior to equity, and (b) common equity is dilutive upon issuance. First, nondilutive CoCos absorb losses before shareholders (first loss-absorbing provision). This conflicts with the seniority condition, which may increase agency costs for nondilutive CoCos, as bank managers may be incentivized to undertake riskier projects following an issuance of nondilutive CoCos (Goncharenko, Ongena, and Rauf, 2021). Second, dilutive CoCos only dilute shares upon a trigger event, deviating from the immediate dilutive impact of traditional equity. This creates conditional internalization of private benefits that incentivize managers to avoid trigger events and thereby reduce agency costs for dilutive CoCos.



Panel A: Adverse Selection Pecking Order

Panel B: Agency Pecking Order

Figure 1: Two Pecking Order Theories For CoCos

This paper examines two key pecking order hypotheses that yield similar predictions for standard capital structure decisions, but differ when applied to CoCos. Assuming that managers hold more information than the stock market, the first hypothesis follows the adverse selection cost pecking order theory (or standard pecking order theory), which posits that information-sensitive securities face higher information and adverse selection costs. Since dilutive CoCos are more information-sensitive than nondilutive CoCos, we expect adverse selection costs to rise with the degree of contingent dilution, as shown in Panel A of Figure 1.

Our second hypothesis extends agency cost pecking order theory (Myers, 2003) to the context of CoCos. The unique contractual features of CoCos may be associated with agency cost-driven pecking order predictions that differ from Myers (1984), depending on the degree of contingent dilution. Nondilutive CoCos, with their first-loss absorbing provision, can introduce moral hazard, thereby increasing shareholder agency costs. In contrast, dilutive CoCos help mitigate agency costs by aligning managerial incentives to avoid triggering events. This framework thus suggests that agency costs are inversely related to contingent dilution levels, as illustrated in Panel B of Figure 1

In this paper, we explore three possibilities. First, neither hypothesis may hold. Second, we examine whether only one of the hypotheses is supported. Finally, we assess the potential for both hypotheses to coexist since both adverse selection and agency cost may contribute to the pecking order (Myers, 2003).

3 Data, Measures, and Sample Description

3.1 Background: CoCo Security Design

At its inception, the history of CoCos was dominated by dilutive instruments with equity conversion loss absorption mechanisms. These CoCos' terms of conversion specify a predetermined conversion rate resulting from a contractually stipulated fixed or floor stock price to determine the number of shares that CoCo holders receive when the conditions of a trigger event are reached. For CoCos of this type, the direction of the contingent wealth transfer is always from diluted stockholders to CoCo bondholders, although the amount depends on the idiosyncratic terms of conversion and the projected value of the equity upon CoCo trigger.

However, over time, the industry has progressively shifted away from equity conversion loss absorption mechanisms in favor of principal write-down instruments. The earliest innovation was to issue permanent write-down CoCos, in which the CoCo principal is simply written down in full and permanently upon declaration of a trigger event. Thus, the wealth transfer of these CoCos' structures is unambiguously equal to their par value in favor of shareholders, denoted as a wealth transfer of +100%.[6]

As CoCo security design evolved further in 2014, the *temporary* write-down CoCo emerged as the dominant design, especially among European bank issuers. The loss-absorption mechanism of these instruments differs from the others in multiple ways. First, upon reaching their trigger level, they absorb losses by writing down only the portion of their notional value necessary to reestablish their issuer's compliance with regulatory capital minima. Second, they stipulate that they will absorb losses *pari passu* with other CoCos issued at the same trigger level. Finally, as their name implies, their contracts include provisions for the issuer to gradually write up their notional value following a trigger event when the bank's financial position recovers, potentially making the write-down event temporary.

Because of these features, the wealth transfer measures used in Berg and Kaserer (2015), Goncharenko et al. (2021), and Allen and Golfari (2023) are subject to ambiguity emanating from considering each CoCo debt instrument in isolation rather than the bank's entire CoCo capital structure. To illustrate this challenge, consider an issuer with three outstanding instruments at the common 5.125% mechanical trigger level but with three different loss absorption mechanisms: equity converting, permanent write-down, and temporary write-down. Upon a breach of the trigger level (regardless of the magnitude of the breach), any permanent write-down CoCos would be depleted completely, and any equity conversion would see its notional value converted to shares at the contractually predetermined price. However, for temporary write-down instruments, the results of the trigger event would be determined by considering the remaining need for recapitalization of the issuer. If the losses absorbed by equity conversion and permanent write-down instruments are sufficient to replenish the issuer's capital position, the temporary write-down CoCos would not need to be written

[6] A small number of *partial* permanent write-down instruments were issued in the years preceding the introduction of Basel III regulations. Upon reaching their trigger level, these CoCos write down a predetermined percentage of their notional value and disburse to CoCo holders a cash payment equal to the balance. The potential of such a loss absorption mechanism to exacerbate a liquidity crisis, by requiring the issuer to deplete its cash position in a moment of financial distress, possibly triggering asset fire sales (Flannery, 2014, 2016), led the Basel Committee on Banking Supervision to explicitly prohibit this design starting from 2013 (Basel Committee on Banking Supervision, 2011).

down at all. If further loss absorption capacity were indeed necessary, the loss would be spread among all the outstanding temporary write-down CoCos *pari passu*. Thus, calculating the shareholder wealth transfer on a temporary write-down CoCo entails evaluation of all securities in the capital structure at the point of conversion, and comparing the total to the bank's capital shortfall.

These CoCo design details impact inferences drawn from empirical analysis. For example, Avdjiev, Bogdanova, Bolton, Jiang, and Kartasheva (2020) find that CDS spreads are only significantly negative for the issuance of equity converting, AT1 CoCos. These CoCos are most likely to have dilutive wealth transfer mechanisms, consistent with the risk-reducing incentive effects we present in this paper. However, the loss absorption mechanism (equity converting versus permanent or temporary prinicpal write-down) is only imperfectly correlated with shareholder wealth transfers.[7] That is, upon conversion, whether equity converting CoCos transfer wealth from CoCo holders to shareholders or vice versa depends on the terms of the bond. Thus, we model and measure the shareholder wealth transfer in this paper because simply using their loss absorption mechanism is insufficient to differentiate between the economic impact of CoCo conversion on bank stockholders versus CoCo holders.

3.2 Measuring Contingent Wealth Transfer

The goal of our measure is to gauge how far away the contingent wealth transfer (i.e., the contingent dilution) can deviate from a full write-off, which can occur broadly in two ways: share conversion and *pari-passu* partial write-down. To achieve this, our novel method estimates wealth transfers upon CoCo trigger using the specific terms of conversion for all loss absorption mechanisms, as well as each CoCo instrument's position within the issuer's entire outstanding CoCo capital structure. Specifically, we are the first to consider the impact of a trigger event on temporary write-down CoCos.

For each CoCo issuance announced at time t, we estimate the expected market capital-

[7] Failure to measure the shareholder wealth transfer amounts for each loss absorption mechanism may explain the insignificant results on equity returns presented in Avdjiev et al. (2020).

ization at the trigger event T as follows:

$$MVE_T = \frac{Trigger\,Ratio}{Capital\,Ratio_t} \times MVE_t + Notional\,Value. \tag{1}$$

MVE_T is the bank's expected market capitalization at the date of the trigger event T. $Trigger\,Ratio$ is the contingent capital level of the trigger event. $Capital\,Ratio_t$ is the issuer's capital ratio at the time of issuance. The fraction captures the estimated market capitalization if the trigger were to occur ($Trigger\,Ratio$) relative to the current value ($Capital\,Ratio$). MVE_t is the market capitalization of the issuer at the announcement date. $Notional\,Value$ is the notional value of the CoCo (i.e., the amount issued). Following Berg and Kaserer (2015), this estimate relies on the assumption that the market price of equity would follow the movements in capital ratios one-to-one ($\frac{Trigger\,Ratio}{Capital\,Ratio_t}$).[8]

For equity conversion CoCos, we then estimate the expected wealth transfer to equity holders at the announcement date t using the following equation:

$$WT_t^0 = Notional\,Value - \frac{Shares\,CoCo_T}{Total\,Shares_T} \times MVE_T. \tag{2}$$

WT_t^0 is the expected wealth transfer to equity holders. $Shares\,CoCo_T$ is the number of shares CoCo holders receive in a trigger event. $Total\,Shares_T$ is the total outstanding shares after the trigger event. MVE_T is from Equation (1). A positive value of WT_t^0 indicates a net wealth transfer in favor of equity holders and negative to CoCo holders in a trigger event.

For permanent write-down CoCos, $Shares\,CoCo_T$ equals zero and the wealth transfer equals the CoCo's notional value ($Notional\,Value$). In other words, when the trigger level is reached, the instrument is entirely written down to zero and equity holders receive the full notional value without share conversions.

[8] For instance, if a bank issued a CoCo when its CET1 Ratio was 20% and the CoCo trigger level is 6%, then $MVE_T = \frac{6}{20}MVE_t$. CoCo triggers have occurred twice to date: Banco Popular's market capitalization fell to 10%, and Credit Suisse's to 16% upon each bank's failure, respectively, compared to the latest dates of their CoCo issues. While not reported, our results are robust under an alternative assumption that the ratio ($\frac{Trigger\,Ratio}{Capital\,Ratio_t}$) is 10%.

While $Shares\,CoCo_T$ is also zero for temporary write-downs, CoCos with this loss absorption mechanism are designed to absorb losses *pari passu* with all other outstanding CoCo instruments positioned at an identical trigger level, and only up to the amount necessary to reestablish the issuer's capital ratios to compliance with the regulatory minima. Thus, it is necessary to take into consideration the entirety of the CoCo stack outstanding when their trigger level is breached. To do so, we model a trigger event declared with a CET1 ratio that is 1.5% RWA below the trigger level and compute the total loss that needs to be absorbed to re-establish the issuer in compliance with the regulatory minima.[9] We refer to this amount as loss absorption capacity. Then, we consider the presence of equity conversion or permanent write-down CoCos at a higher or equal trigger level and deduct the notional values (i.e. amount issued) from the loss absorption capacity, as these CoCos will absorb losses in full before temporary write-downs are affected. Lastly, the residual loss is spread between all outstanding temporary write-down instruments positioned at the breached trigger level (*pari-passu*). This is measured by dividing the residual loss by the sum of all outstanding temporary write-down CoCos at the same trigger level, including the one being issued (i.e., Loss-Sharing Ratio = $\frac{\text{Residual loss}}{\sum_{\text{pari-passu}} \text{TWD}}$). The result is described in Equation (3).

$$Wealth\ transfer_t = \begin{cases} WT_t^0 \times LossSharingRatio, & \text{if temporary write-down} \\ WT_t^0, & \text{otherwise.} \end{cases} \tag{3}$$

The resulting wealth transfer measure for each instrument, $Wealth\ transfer_t$, is scaled by the individual CoCo notional values.

Our wealth transfer measure is bounded above by 100 representing the full write-down of a 100%. Lower values reflect CoCos deviating from full write-down, either through (a) share conversion (Equation (2)) or (b) *pari-passu* write-ups (Equation (3)). To capture the CoCos that are farther away from full write-down, we define *Dilutive*, which equals 1 if the

[9]The 1.5% RWA magnitude is chosen because it equals the amount of contingent convertible capital that baseline Basel III regulation allows in the Additional Tier 1 capital layer. Unreported results modeling larger breaches yielded similar results.

CoCo falls in the lowest tercile of the wealth transfer measure from Equation (3), and 0 otherwise. Intuitively, a CoCo with $Dilutive = 1$ is farther from full write-down and thus more dilutive upon a trigger event. In contrast, a CoCo with $Dilutive = 0$ is closer to full write-down, being less dilutive and transferring more wealth to shareholders as part of its equity loss-absorbing capacity.

It should be noted that while trigger events of temporary write-down CoCos do not result in the immediate creation of new shares, they deviate significantly from permanent write-down instruments by virtue of their contingent write-up feature. That is, while for equity conversion and permanent write-down CoCos a trigger event terminates any relationship between CoCo holders and the issuing bank, with temporary write-down the issuer assumes a promise to write-up the CoCo once its financial conditions improve[10]. This implies that following a trigger event, temporary write-down CoCo holders acquire an implicit claim to a portion of the issuer's cash flows that could otherwise be support dividend payments, roll-over costs or new projects (Goncharenko, 2022).

[Figure 2 about here]

Figure 2 plots the distribution of our wealth transfer measure by CoCo type. The first box plot shows that the median value of wealth transfer for all CoCos is 100, reflecting the prevalence of full write-down CoCos. The wealth transfer measure is left-skewed, indicating significant variations in the degree of dilution. The second box plot shows that most equity conversion CoCos yield low values consistent with share dilutions. As shown in the third box plot, the *pari-passu* write-ups affect some temporary write-down CoCos to deviate from 100%. Due to varying terms of conversion or existing CoCo stacks that affect the *pari-passu* write-ups, not all equity conversion and temporary write-down CoCos are classified as relatively dilutive. In our sample, 67.4% of equity conversion and 28.3% of temporary write-down CoCos are labeled as relatively dilutive.

[10] Basel regulations prohibit this promise to be contractually binding, to avoid the possibility of enforceable write-ups deteriorating the financial conditions of a still fragile institution.

3.3 Data

We collect CoCo security level information from Bloomberg.[11] For equity conversion CoCos, we hand-collect the structure of the contractually predetermined terms of conversion from each instrument's prospectus. This process provides us with the conversion price (fixed or floor) upon reaching the conditions for a trigger event, so we can determine the number of shares issued to CoCo holders upon the trigger event.

Issuers' balance sheet information is collected from Capital IQ and BankFocus by tracking the issuer using ISINs and issuers' names. The stock price information is from Datastream matched using the bank's name and home country.Our baseline sample consists of 757 CoCo issues between January 2009 to December 2021 from banks in 27 countries with balance sheets and stock price information. See Allen and Golfari (2023) for a more complete description of the database and its construction.

To calculate cumulative abnormal returns (CARs) upon CoCo issue announcements, we use the market model (CAPM) to determine daily excess returns.[12] Market beta is estimated over a 250-day window, with at least 50 valid returns, ending 30 days before the CoCo announcement. Using market returns from Wharton Research Data Services (WRDS), excess returns are accumulated to measure CARs over various windows. The pre-announcement CAR ends the day before the announcement, and the post-announcement CAR starts on the announcement date.

3.4 Descriptive Statistics

Panel A of Table 1 presents the descriptive statistics of the cumulative abnormal returns across different windows. On average, issuing CoCos does not generate abnormal returns, which is consistent with Avdjiev et al. (2020). Panel B presents the descriptive statistics

[11] As of October 1st 2022, there are 1,236 CoCos issued including those that were retired due to maturity or exercise of a call option by the issuer.

[12] Since our sample includes issuers from 27 countries, we use the market returns of each country to account for country-specific returns around announcement dates. Fama-French factors are unavailable for all countries in our sample.

of the baseline sample used in the analysis. The average market beta of CoCo issuers is 1.190, showing the banks that issue CoCos are marginally more volatile than the national stock market in which the bank is incorporated. Equity conversion, permanent write-down, and temporary write-down CoCos account for 29.2%, 24.7%, and 46.1% of the sample respectively. 32.8% of CoCos in our sample are classified as CoCos farther away from full write-down and with a more contingent dilutive effect on equity value ($Dilutive = 1$).

[Table 1 about here]

Panel C of Table 1 reports the top ten countries and banks by the number of CoCo issues. Our sample shows that financial institutions domiciled in the United Kingdom, India, Norway, Switzerland, and China issued the largest number of CoCos. More specifically, Lloyds Banking Group, Credit Suisse, Societe Generale, BNP Paribas, and UBS Group were particularly active.

4 Equity Market Reaction to CoCo Issuance

4.1 Announcement Effects: Univariate Tests

Our main empirical analysis of testing the pecking order of CoCo financing decisions focuses on examining abnormal announcement returns. This stems from the empirical literature on corporate capital structure (e.g., see Harris and Raviv, 1991; Frank and Goyal, 2008). Our empirical predictions relate to the well-established evidence that seasoned equity offerings (lower in the pecking order hierarchy) typically are associated with negative announcement returns (Asquith and Mullins, 1986), whereas the evidence for debt issuances (higher in the pecking order hierarchy), such as bonds or loans, is more mixed (Eckbo, 1986; James, 1987).

As discussed in Section 2, we focus on two hypotheses: the adverse selection cost pecking order (hereafter Adverse-PO) and the agency cost pecking order (hereafter Agency-PO). Under Adverse-PO, issuing a more dilutive CoCo (i.e., those with contingent conversion terms closer to equity conversion than a full write-down) will result in negative abnormal announcement returns. In contrast, under Agency-PO, issuing a nondilutive CoCo will result in negative abnormal announcement returns.

Figure 3 plots the univariate tests of CARs across various windows that lie between 5 days before the announcement date and 29 days after the announcement date.[13] Panel A plots the CARs of the more dilutive CoCos in the sample ($Dilutive = 1$). Results show that issuing more dilutive CoCos leads to a persistent negative announcement effect. For instance, the negative abnormal return is estimated as roughly -1% for the first five trading days including the announcement date. The negative estimates increase in magnitude over time, reaching a CAR of -2.22% over 29 trading days.

[Figure 3 about here]

Our results further indicate that the CARs for less dilutive CoCos are insignificantly different from zero. Panel B of Figure 3 plots the univariate tests for less dilutive CoCos ($Dilutive = 0$). The CARs across various windows are estimated between -0.20% and 0.58% with no statistical significance. This is consistent with Adverse-PO: investors expect banks to choose the most favorable type of CoCo capital minimizing their adverse selection costs.

[Table 2 about here]

We further investigate the significance of the results on wealth transfer in Figure 3 by conducting mean-difference tests, comparing the estimates between Panels A and B. Table 2 reports the mean-difference tests, consistent with negative CARs for more dilutive CoCo issues (Column 3). Additionally, the tests reveal that the differences are statistically significant for post-announcement windows, but not the pre-announcement window (-5,-1). These

[13]Since not all relevant information is released upon announcement, but only closer to issuance, we incorporate an event window that includes issuance dates that often occur 20 days after the announcement. For example, some CoCo announcements leave blanks for certain parameters in the conversion terms or specify conversion terms based on the bank's closing stock price immediately before the issuance date. The median (mean) number of days from announcement to issuance is seven (eight).

findings suggest that the announcement effects primarily originate from the information that is made available after the announcement.

4.2 Announcement Effects: Regression Analyses

In this section, we revisit the univariate findings presented in the previous section using multivariate regression analysis. We use our database consisting of all CoCos issued during the period from 2009 through 2021 to shed light on conflicting results in the literature comprising studies using more restricted samples than ours that do not account for projected trigger point wealth transfers. For example, Liao, Mehdian, and Rezvanian (2017) report negative CARs for CoCos issued between 2010 to 2014, whereas Ammann, Blickle, and Ehmann (2017) document positive CARs for a small sample of CoCos issued between 2009 and 2014.

We estimate the following regression equation for a CoCo issue j in year t to evaluate the announcement effects on equity value:

$$CAR_{j,t} = \beta_1 Dilutive_{j,t} + Controls_{j,t} + \varepsilon_{j,t}. \tag{4}$$

The dependent variable is the cumulative abnormal return (CAR) as utilized in the univariate analysis presented in Section 4.1. To control for potential differential effects of CoCo issues across issuers' characteristics (e.g., see Goncharenko, 2022), we include a vector of control variables that are observable at the time of announcement ($Controls_{j,t}$). These variables are the natural log of market capitalization, profitability, the difference between the capital ratio and the CoCo trigger level, the sum of pre-existing and newly announced CoCos scaled by total liabilities, total liabilities, and coupon rate. We also include an indicator variable that equals 1 if the CoCo is a rollover, otherwise 0. Detailed variable descriptions are provided in Appendix A.1.

The regression results using Equation (4) are presented in Table 3.[14] Across all columns, estimates suggest negative CARs for more dilutive CoCos. Specifically, we find a -1.68% CAR within the first 9 trading days after the CoCo issue announcement (Column 2). Column 4 indicates the negative impact reaches a statistically significant (at the 1% level) coefficient of -2.13% by the 29$^{\text{th}}$ trading day after the announcement. The increase in the magnitude of our estimates from Column 1 to Column 4 is consistent with Panel A of Figure 3.

[Table 3 about here]

Since our analysis includes coupon rates at issue, our results are less likely to be driven by an alternative possibility that dilutive CoCos are mispriced, thereby increasing the bank's interest expenses. Further, we do not find evidence of a substantive difference in CoCo coupons and other pricing terms for dilutive versus nondilutive CoCos. Contrary to a common prior that risky securities have excessively higher interest rates and thus nondilutive CoCos should have higher yields at issue, anecdotal evidence suggests that nondilutive CoCos do *not* have higher yields as compensation for potential unfavorable wealth transfers from CoCo bondholders as compared to the yields on dilutive CoCos. For example, Santander announced two CoCos in September 2017 with different loss absorption mechanisms: an equity converting CoCo with an issue yield of 5.25% and a nondilutive permanent write-down CoCo with an issue yield of 4.91%. Similarly, in 2015, HSBC issued an equity converting CoCo with 6% yield and a nondilutive permanent write-down CoCo with a 5.95% yield.[15] Analyzing this issue, Appendix Table A.3 shows that the coupon rate at issuance is well explained by our control variables. We find that larger, more profitable banks pay lower coupon rates, and that CoCos with higher distance to trigger pay lower coupon rates. Additionally, although we observe a positive correlation between *Dilutive* and coupon rate, this effect is absorbed by country fixed effects, suggesting that the CoCo pricing terms are linked to regulations

[14] Our results are not sensitive to how *Dilutive* is defined as reported in Appendix A.2.

[15] Allen and Golfari (2023) show that while CoCo yields are sensitive to time to first call and other features, they do not reflect the CoCo's loss absorption mechanism.

and market conditions in the bank's home country. Thus, our baseline regression results are not consistent with differences in pricing features for dilutive versus nondilutive CoCos.

Avdjiev et al. (2020) also examine the impact of CoCo issuance on equity returns. They follow James (1987) and compute average cumulative prediction errors (ACPE) for a subsample of 170 CoCos in advanced economies that issued CoCos between January 2009 and December 2015. They find a statistically significant (at the 5% level) positive announcement effect for permanent write-down CoCos with mechanical triggers exceeding 5.125%.[16]

We conduct two robustness tests for comparability. First, in Appendix Table A.4, we estimated CARs for the 526 CoCos from developed economies in our comprehensive sample containing all CoCos issued between January 2009 and December 2021.[17] Results show that in developed countries, the cumulative abnormal returns are most significant in the 10-day window, aligning with the average number of days required until the information related to terms of conversions is made available. The coefficient estimates are smaller than the full sample, consistent with the lower degree of information asymmetry in developed countries. Second, we use the methodology employed by Avdjiev et al. (2020) and estimate ACPEs for our full sample. The results presented in Appendix Table A.5 are consistent with our results using CARs presented in Table 3.

4.3 Dilutive CoCos and the Distance To Trigger Levels

In this section, we examine the heterogeneity of the announcement effect across the distance from the CoCo trigger level to further test the Adverse-PO. When the CoCo trigger is far below the bank's current capital level, conversion is less imminent (although still possible given a regulator's ability to declare a PONV). However, as an issuing bank's capital ratio approaches the trigger level, conversion becomes relatively more likely, and thus *ceteris*

[16]These results are not generalizable since higher trigger CoCos are mandated by bank regulators in the U.K. and Switzerland.

[17]We classify developed countries as the United Kingdom, Norway, Switzerland, France, Spain, Japan, Denmark, Finland, Ireland, Sweden, Germany, Netherlands, Australia, Belgium, Austria, Italy, and Portugal. For more details, refer to the variable *Developed* in Table A.1.

paribus adverse selection costs are exacerbated. That is, issuing dilutive CoCos will be met by more negative equity market reactions the closer the issuing bank is to the CoCo trigger level (i.e. lower distance to trigger) under Adverse-PO. Conversely, we expect less (more) negative abnormal returns upon the announcement of dilutive CoCo issuances by banks more (less) distant from the trigger level.

Under the Agency-PO, however, the prediction is the opposite: dilutive CoCos also help mitigate agency costs by properly incentivizing managers to avoid a trigger event. In principle, equity markets could value such enhanced managerial incentives more, the closer the CoCo issuance is to the trigger level, as relative proximity to a trigger event increases their saliency. If that were the case, deviations from the CoCo pecking order (by issuing more dilutive CoCos) are expected to produce less negative equity market reactions, the closer the issuance is to the CoCo trigger, potentially turning into positive abnormal returns if enhanced managerial incentives outweigh adverse selection costs.

[Table 4 about here]

To test this, we include an interaction term between the distance from the trigger and the dilutive CoCo indicator variable in Equation (4). The results are presented in Table 4. Consistent with Adverse-PO, the distance from the trigger level generates heterogeneity in the negative announcement effects across all columns. For instance, in Column 1, estimates show that the announcement effect is -2.98% if the issuer's capital ratio is exactly at the trigger level, which is more than three times larger than the average effect we find in Column 1 of Table 3. This reflects the negative news revealed when the bank issues dilutive CoCos. That is, managers would not willingly issue dilutive CoCos when the bank's capital is at the trigger. The issuance of dilutive CoCos, therefore, communicates that primary CoCo investors demand enhanced managerial incentives as protection against imminent bank distress. Thus, the negative abnormal returns reflect the negative information contained in the bank's decision to issue dilutive CoCos around the trigger level. Further, this negative effect diminishes as the distance from the CoCo trigger level increases. For example, Column 4 indicates that if a bank's distance from the trigger is one standard deviation above the mean (approximately 10%), the announcement effect is close to zero. These findings are consistent with the negative announcement effect of violation of the CoCo pecking order being mitigated by the increased likelihood that a properly incentivized management will successfully prevent bank default and CoCo trigger. The value of managerial incentives can offset the fundamental pecking order hierarchy and may communicate positive information to stock market investors.

It is noteworthy that the heterogeneity across the distance from the trigger is unique to dilutive CoCos as evidenced by the insignificant estimate of *Distance to trigger* alone. This is explained by the fact that principal write-down CoCos pose no dilutive threat to shareholders and is consistent with Adverse-PO.

4.4 Dilutive CoCos, Distance To Trigger, and the MDA Threshold

In this section, we directly test whether our findings are more related to Adverse-PO than Agency-PO using the MDA threshold as described in Allen and Golfari (2023). Financial institutions with capital ratios below the MDA threshold face stricter restrictions on discretionary distributions, including dividends, employee bonuses, debt coupon payments (such as CoCos), and share buybacks.[18] Thus, a bank nearing the MDA threshold signals (a) higher risk for shareholders losing dividends, and (b) stronger incentives to issue CoCos to avoid this risk. Thus, CoCos closer to the MDA threshold face higher adverse selection costs but less agency costs.

If our previous results are driven by Adverse-PO, then the results should be driven by CoCos that are closer to the MDA threshold. To test this, we include all interaction terms between the distance from the trigger, the dilutive CoCo indicator variable, and an indicator

[18]While MDA thresholds vary by jurisdiction, they are generally set above CoCo triggers, making them binding compared to the typically lower, nonbinding CoCo triggers. Moreover, CoCo issuance is valuable for managers and stakeholders as it can ease MDA constraints and reduce the risk of regulatory penalties aimed at raising capital. Banks that rely on common equity instead of CoCos to meet Additional Tier 1 capital requirements can issue AT1 CoCos to improve MDA compliance.

variable, *Close to MDA*, that equals 1 if the CoCo is close to the MDA threshold in Equation (4). The variable *Close to MDA* is constructed based on our hand-collected regulatory MDA thresholds for global or local systemically important banks, which constrains our sample to 407 CoCos instead of 757.

[Table 5 about here]

The results are presented in Table 5. First, our estimates indicate that the negative reaction to issuing dilutive CoCos predominantly comes from banks closer to their MDA threshold levels. When banks are relatively close to their MDA thresholds and issue nondilutive CoCos, the equity market reacts positively, though the estimates are not statistically significant.

Second, results show that the cross-sectional variation across the distance from the trigger level is driven by banks closer to their MDA threshold levels. Like the results from Panel B of Table 4, abnormal returns upon announcement of dilutive CoCo issuance if exactly at the trigger level (distance to trigger is 0%) are -5.83% for banks close to the MDA threshold (Column 4). Moreover, the further the CoCo trigger is below the bank's capital position, the less negative (and at times positive) the equity market reaction. Therefore, these findings suggest that our findings thus far are related to adverse selection costs and thus support the Adverse-PO.

4.5 Refinance CoCos and the CoCo Pecking Order

This section examines CoCo rollovers, which are cases when CoCos are refinanced. Rollover CoCos are well-suited for testing the hierarchy within CoCos since all CoCos typically require refinancing within five years.[19] At refinancing, the bank's primary choice is the type of CoCo to issue rather than whether to issue one. Thus, refinancing decisions focus primarily on selecting the loss absorption mechanism rather than deciding on issuance itself.

[19]To qualify as Additional Tier 1 capital, CoCos need to be perpetual with a time to first available call date no shorter than 5 years from issuance.

We hypothesize that, under the Adverse-PO, banks are more likely to issue nondilutive CoCos when refinancing existing CoCos. To test this, using 105 CoCos in our sample that are rollover CoCos, we examine the transition matrix and the corresponding flow diagram (alluvial diagram) to examine the CoCos being retired and those that are newly issued.

[Figure 4 about here]

Panel A of Figure 4 presents the visualized transition matrix. Consistent with the Adverse-PO, the diagonal terms of the transition matrix suggest that there is a large autocorrelation within nondilutive CoCo (71.0%) but not dilutive CoCos (36.1%). Further, we find that 63.9% of dilutive CoCos are replaced with nondilutive CoCos. The transition matrix is further visualized as a flow diagram in Panel B. The flows suggest that regardless of the previous CoCo type, banks prefer nondilutive CoCos upon refinancing.

4.6 The Hierarchy of CoCos and Legal Origins

This section addresses the endogeneity in CoCo security design to further investigate the hierarchy of CoCos and assess the impact of contingent dilution on shareholders.[20] We begin by analyzing how the legal infrastructure of the issuing banks' home countries influences CoCo design. As shown in Figure 5, we observe that legal origin, an exogenous factor for most banks, shapes a distinct and persistent pattern in their choices regarding CoCo issuance. Panel A shows that banks incorporated in common law origin countries most frequently issue dilutive CoCos as compared to banks in French civil law origin countries (Panel B). Nondilutive CoCos are the most common in other countries (Panel C).

[Figure 5 about here]

We formally test this by considering a regression with the dependent variable set to the dilution and wealth transfer measures from Equation (3), as follows for a CoCo issue j in

[20] Avdjiev et al. (2020) model the decision to issue CoCos. In this section, we model the design of CoCos conditional on their issuance to meet regulatory requirements. See Allen and Golfari (2023) for a discussion of incentive to issue CoCos to optimize protection against regulators' MDA penalties.

year t:

$$\begin{aligned} \textit{Wealth transfer}_{j,t} = & \beta_1 \textit{Common law origin}_j + \beta_2 \textit{French civil law origin}_j + \\ & \textit{Controls}_{j,t} + \varepsilon_{j,t}. \end{aligned} \tag{5}$$

The model includes two indicator variables, namely *Common law origin* and *French civil law origin*, which are assigned a value of 1 if the issuer is incorporated in common law or French-civil law country, respectively, and 0 otherwise (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998). The benchmark legal origins are German civil law, Scandinavian civil law, and China. Control variables are from Equation (4).

[Table 6 about here]

Results are reported in Table 6. In Column 1, we find that banks that are incorporated in common law countries tend to issue CoCos with low shareholder wealth transfer, or relatively more dilutive CoCos. In Columns 2 and 3, we replace the dependent variable with an indicator variable, *Dilutive*, and apply the linear probability model and probit regression. We find that consistent with the results in Column 1, banks incorporated in common law countries (French-civil law countries) are 35.0% (15.3%) more likely to issue CoCos that are dilutive (Column 2).

A potential explanation for this distinct and persistent pattern is the renegotiation environment the legal origins offer. La Porta et al. (1998) provide evidence of higher risks of contract repudiation by governments and weaker legal enforcement in common law and French civil law origin countries.[21] These risks may incentivize shareholders to issue CoCos that offer greater flexibility for modifications, anticipating potential renegotiations of terms during bankruptcy (e.g., conversion price and ratio).

[21] In La Porta et al. (1998), contract repudiation risk refers to the risk of a modification in a contract taking the form of a repudiation, postponement, or scaling down due to budget cutbacks, indigenization pressure, a change in government, or a change in government economic and social priorities. The quality of legal enforcement refers to a country having (i) an efficient judicial system, (ii) rule of law, (iii) low corruption, (iv) less risk of expropriation, and (v) less risk of contract repudiation by the government.

Next, using the findings on wealth transfer and legal origin, we re-estimate Equation (4) applying legal origins as instruments. That is, we estimate Equation (5) using the linear probability model as the first-stage regression (Column 2 of Table 6) and use the following equation as the second-stage regression:

$$CAR_{j,t} = \beta_1 \widehat{Dilutive}_{j,t} + Controls_{j,t} + \varepsilon_{j,t}. \tag{6}$$

We argue that while the legal origin indicators (*Common law origin* and *French civil law origin*) directly impact the CoCo design choices, they are not directly associated with the announcement abnormal returns, thereby satisfying the exclusion principle.

[Table 7 about here]

Panel A of Table 7 reports results from the second stage of this two-stage least square estimation (2SLS).[22] Across all columns, we find that the wealth transfer identified through the legal origins has a negative impact on the announcement returns. The effect is weaker than the previous results around the announcement date and in the first 10 trading days (Columns 1 and 2) but is larger in magnitude for the longer windows (Columns 3 and 4). The estimate reaches -6.39% after 30 trading days (Column 4).

In Panel B of Table 7, we re-estimate our results on the heterogeneity across the distance from the trigger level (Table 4). Our findings show that the *Distance to trigger* generates larger variation across all columns compared to Table 4. Specifically, in Column 4, if a bank's capital ratio is exactly at the trigger level, the announcement effect is -17.3%. However, one standard deviation above the average distance from the trigger (approximately 10%) results in an announcement effect of -1.4%. These results indicate that properly incentivized

[22]To ensure the validity of the legal origins as instruments for our wealth transfer measure, we report the statistics on the weak instrument test and the test of overidentifying restrictions. The first-stage F-statistics are statistically significant across all columns, thereby rejecting the null hypothesis that the legal origins are weak instruments. Additionally, the Sargan tests of overidentifying restrictions yield p-values exceeding 20%, which demonstrates the validity of the instruments and their correct exclusion from Equation (6).

management has the space and resources to resurrect the bank as long as it has not progressed too far into distress.

5 The Effects of Agency Costs on the CoCo-Pecking Order

5.1 Adverse Selection and Agency Cost of CoCos: Evidence From Announcement Effects

Our findings thus far align with the Adverse-PO theory, implying that shareholders generally have limited concerns about the agency costs associated with CoCos. Yet, our findings do not necessarily show that the Agency-PO theory is invalid for CoCos. For example, shareholders' balancing of adverse selection costs against agency conflicts may depend on the likelihood that a trigger event could occur. If a trigger event is more likely, then shareholders would value the enhanced managerial incentives exerted by dilutive CoCo issuances enough for agency costs to outweigh adverse selection costs; i.e., Agency-PO theory may dominate Adverse-PO. Given that CoCo-related agency costs tend to increase with the likelihood of a trigger event (e.g., first loss-absorbing provisions become more valuable when banks are at a higher risk of failure) such conditions should materialize when the probability of trigger events substantially increase, agency costs are consequently elevated, and thus CoCo features addressing them more valuable.

We test this by examining two measures of uncertainty catered to the anticipation of trigger events thereby increasing the agency costs associated with CoCos.[23] First, we examine periods of heightened volatility in the secondary market for CoCo yields. Given that CoCo

[23] Empirical designs that are purely cross-sectional at the bank or country level across the degree of agency costs or likelihood of trigger have several limitations. First, it is difficult to isolate the changes in moral hazard while keeping adverse selection constant because as the degree of information asymmetry increases, both adverse selection and moral hazard shifts (e.g., in emerging countries, both adverse selection and moral hazard will be more severe compared to developed countries). Second, the cross-section by trigger likelihood may capture the bank's quality (i.e., Good- versus Bad-type) thereby simply capturing the Adverse-PO.

yields are influenced by trigger risks, increased volatility signals growing investor unease about potential trigger events. Specifically, we define an indicator variable, *CoCo Index Volatility High*, which equals 1 if the CoCo announcement date falls within a period of elevated CoCo index volatility, and 0 otherwise. To measure volatility, we calculate the 100-day rolling volatility of Bloomberg's Global CoCo Bond Index. Periods of high volatility (i.e., *CoCo Index Volatility High* = 1) are periods that fall within the highest tercile of volatility between 2014 and 2019.[24]

Second, we consider periods when regulatory uncertainty is high. Historical cases, such as Banco Popular in 2017 and Credit Suisse in 2023, illustrate that rising regulatory uncertainty amplifies the perceived chances of a regulator-initiated Point of Non-Viability (PONV), thus elevating expected trigger risk even when the mechanical trigger remains non-binding. To measure regulatory uncertainty, we adopt the Global Economic Policy Uncertainty Index (EPU) by Baker et al. (2016) and define an indicator variable, *EPU High*, when the EPU index is in its highest tercile. In our regressions, we include the two indicator variables and their interaction terms with *Dilutive* and *Distance to trigger* in Equation (4).

[Table 8 about here]

The results are reported in Table 8. Panels A and B report results using *CoCo Index Volatility High* and Panels C and D report results using EPU. Our findings in Panel A highlight two key findings. First, issuing nondilutive CoCo yields a negative reaction during periods when *CoCo Index Volatility High*= 1. This is consistent with Agency-PO that nondilutive is not preferred. Second, dilutive CoCos generate announcement returns close to zero during periods when *CoCo Index Volatility High*= 1 echoing the findings of security issues that are preferred such as debt or loans (*Dilutive* and *CoCo Index Volatility High*).

In Panel B, we examine the cross-section across banks that are incorporated in developing countries to further understand whether the effects are driven by agency concerns.

[24] We exclude the high CoCo volatility period induced by the onset of the COVID-19 epidemic, as we are interested in tensions originating within the CoCo market. Nevertheless, our results are robust to extending our sample to include the 2020 COVID-19 downturn.

If agency concerns are driving our results, then we should see that Agency-PO-related results are more prominent in emerging countries. Oppositely, we should expect to see the Adverse-PO-related results persist in developing countries. Indeed, we find that during periods when *CoCo Index Volatility High*$= 1$, the negative announcement effect dampens only in emerging countries (-1.74%) while in developing countries, the estimate yields -4.62% (Column 4). Further, issuing nondilutive CoCo yields negative announcement effects for banks incorporated in emerging countries (from -2.28% to -5.04%) while we find effects relatively close to zero for banks incorporated in developed countries (*CoCo Index Volatility High* and *Developed*).

We find that our previous results are more pronounced when applying EPU as the uncertainty measure. For instance, banks in developed countries experience a -5.54% announcement return while banks in emerging countries experience a 6.27% announcement return (Column 4 of Panel D). This is consistent with Agency-PO and suggests that regulatory uncertainty contributes to concerns about the PONV trigger events, particularly for banks that are exposed to higher degrees of agency costs.

These findings suggest that under normal market conditions, equity markets expect financial institutions to adhere to the Agency-PO CoCo pecking order, reacting negatively when banks issue less-preferred dilutive CoCos instead of first-best nondilutive instruments. This is particularly true when issuance occurs closer to the CoCo's trigger level, where the risk of dilution is relatively more material. However, during periods of heightened risk of CoCo trigger, the value of managerial pre-commitment assumes central importance and dilutive CoCos elicit positive reactions from the stock market. By issuing dilutive CoCos, bank managers voluntarily commit to the necessary managerial choices that will minimize the risk of a trigger event for the entire time that the dilutive instrument will remain outstanding, and the value of such pre-commitment will be higher the closer the issuer's regulatory capital ratio is to the instrument's trigger level. This is consistent with the Agency-PO theory.

5.2 Adverse Selection and Agency Cost of CoCos: Evidence From a Long-Short Portfolio

Our results from the previous section suggest that stockholders consider and price the agency costs embedded in CoCos, especially during periods of high aggregate uncertainty associated with contingent trigger events. In this section, we explore whether this finding can be generalized by examining if the stock market prices banks with a higher proportion of dilutive CoCos outstanding, thereby reflecting the agency costs embedded in CoCos.

To test this, we construct an equally weighted long-short portfolio of bank equity based on the wealth transfer characteristics of all of the CoCos issued by each bank. Each month, we look back three years and collect all CoCo issues.[25] Then, we sort the CoCo issues by the wealth transfer measure from Equation (3). We take a long position in the stocks of banks that have issued at least one CoCo below the median wealth transfer measure (i.e., more dilutive) and a short position in the stocks of banks that have issued at least one CoCo above the median wealth transfer measure (i.e., less dilutive)[26]. The long-short long-short portfolio is rebalanced monthly. Due to the limited number of CoCo rollovers in the earlier part of our sample period, we construct long-short portfolios in October 2014 and continue until December 2021.

The monthly portfolio returns are regressed on the Fama-French monthly five factors using the following time-series regression equation:[27]

$$\begin{aligned} Return_t =& \alpha + \beta_1 Market_t + \beta_2 Size_t + \beta_3 Value_t + \\ & \beta_4 Profit_t + \beta_5 Investment_t + \varepsilon_t. \end{aligned} \tag{7}$$

The focus of our analysis is on the relative performance of the long portfolio against the

[25]The choice of three years comes from the fact that the CoCos are typically called back by the banks within five years.

[26]Banks that have issued both types of CoCos within the three-year look-back period are included in the long portfolio

[27]Due to the sample of bank equities from multiple countries within the portfolios, we use the Fama-French developed countries factors.

short portfolio (estimate of α) after controlling for the differential exposures of the long and short portfolio to the Fama-French risk factors. The estimate of α will be positive if the issuance of more dilutive CoCos is associated with subsequent stock overperformance and vice versa.

Column 1 of Table 9 presents the results using Equation (7). The positive factor loadings of the market factor and the value factor suggest that the long portfolio is riskier in terms of these two factors than the short portfolio. We do not find any factor loadings that are negative and significant. This is consistent with the Adverse-PO that banks that have outstanding dilutive CoCos are riskier. Further, we find a negative but insignificant underperformance of the long portfolio relative to the short portfolio in the amount of 37.8 basis points per month. This is also consistent with Adverse-PO and how low-quality banks that issued dilutive CoCos underperform, although the results are statistically insignificant.

[Table 9 about here]

Next, we examine the excess returns of our long-short portfolio during periods when aggregate uncertainty associated with contingent trigger events is high. We predict that the portfolio will yield positive excess returns during these periods consistent with Agency-PO. That is, shareholders price the low agency cost associated with dilutive CoCos during periods when aggregate uncertainty associated with contingent trigger events is high.

We test this by including an indicator variable in Equation (7), denoted as *CoCo Index Volatility High*, which takes a value of 1 if the 100-day volatility of Bloomberg's Global CoCo Bond Index (measured in each month-end) is higher than the sample median and 0 otherwise. The regression equation for this model is as follows.

$$\begin{aligned} Return_t = \alpha_0 + \alpha_1 CoCo\ Index\ Volatility\ High_t + \beta_1 Market_t + \beta_2 Size_t + \\ \beta_3 Value_t + \beta_4 Profit_t + \beta_5 Investment_t + \varepsilon_t. \end{aligned} \tag{8}$$

In Equation (8), the sum of α_0 and α_1 estimate the relative performance of the long portfolio during periods of high aggregate uncertainty. In our analysis, we also substitute three alternative indicator variables for *CoCo Index Volatility High* to measure different dimensions of aggregate uncertainty. The first is denoted as *EPU High* and takes a value of 1 when the Global Economic Policy Uncertainty Index (Baker et al., 2016) is above the sample median, and 0 otherwise. The second is *VIX High* which takes a value of 1 when the VIX is higher than the sample median and 0 otherwise. The third is denoted as COVID and takes a value of 1 when the portfolio is formed during and after the onset of the COVID-19 pandemic period, and 0 otherwise.

The results are presented in Columns 2 through 5 in Table 9. Like Column 1, the factor loadings on the market and value factors are all positive across all columns suggesting that the long portfolio is riskier in terms of these two factors. In Column 2, we observe that the long portfolio underperforms by a statistically significant (at the 5% level) 98.2 basis points per month during months when *CoCo Index Volatility High*$= 0$, but outperforms by 14.8 basis points ($= 1.13\% - 0.982\%$) per month during months when *CoCo Index Volatility High*$= 1$. This result is consistent with the stock market pricing adverse selection and agency cost related to CoCos. Substituting *CoCo Index Volatility High* with an alternative indicator variable, *EPU High*, yields similar results with stronger magnitudes (Column 3). Like Table 8, this is consistent with agency cost being related to the concern over the regulators' PONV declaration.

Interestingly, in Columns 4 and 5, we replace the uncertainty variable with *VIX High* and *COVID*, which are broader measures of uncertainty. We find that the two measures produce similar estimates, yet the joint significance $p-$value drops to 0.085 or 0.059. This suggests that the uncertainty that is linked to CoCo agency costs is more associated with concerns over the contingent trigger event.

The results in this section demonstrate that the issuance of CoCos have a discernible impact on stock returns that varies by aggregate uncertainty associated with contingent trigger events. A plausible interpretation is that dilutive CoCos create incentives to de-risk to avoid dilutive CoCo conversions, thereby earning positive alpha equity returns during high-stress periods when the risk of contingent trigger events is relatively high. Importantly, these results highlight the original motivation for CoCo inclusion in regulatory capital. That is, CoCos were originally designed to dilute shareholders, and thereby incentivize more prudent behavior as the bank approaches the CoCo trigger level, which was to be set high enough to rescue the bank before its going concern value was irretrievably lost. With write-down CoCos now the standard form, our findings suggest these original prototypes have evolved into instruments to signal prudent intent, consistent with Agency-PO theory.

5.3 CoCo Pecking Order and Systemic Risk

Lastly, we explicitly examine the association between issues of dilutive CoCos and the level of systemic risk exhibited by banks. We focus on systemic risk for two reasons. First, CoCos were introduced to mitigate bank systemic risk exposure. Second, since systemic risk is external to the individual bank, it is not priced in equity returns. Similarly, our findings thus far suggest that shareholders price the macroprudential value of dilutive CoCos at times (Sections 5.1 and 5.2); however, this does not inherently confirm that these instruments effectively reduce systemic risk.

To test this, we use the following regression equation for CoCo issues j announced in year t:

$$Systemic\ Risk_{j,t+1} = \beta_1 Diluive_{j,t} + Controls_{j,t} + \varepsilon_{j,t+1} \tag{9}$$

where the disturbance term, $\varepsilon_{j,t+1}$, includes year-fixed effects. As dependent variables, we employ two measures that capture distinct dimensions of systemic risk. First, we use the ΔCoVaR, from Adrian and Brunnermeier (2016) to evaluate the issuer's contribution to systemic risk (i.e., the connectivity of the issuer). Second, we use the marginal expected shortfall (MES) to gauge the potential capital shortfall of the issuer in the event of market downturns that indicate systemic risk (i.e., the average loss a financial institution is expected to suffer when the overall market is in distress). The dependent variables are measured a year after the announcement. The control variables ($Controls$) are the same as in Equation (3), except we further include the most recent estimate of the systemic risk measures.[28]

[Table 10 about here]

The results are presented in Table 10. In Column 1, the result indicates that compared to nondilutive CoCos, dilutive CoCos are more negatively associated with the issuer's contribution to systemic risk. This finding is consistent with dilutive CoCos contributing more to stabilizing systemic risks, particularly in the interconnectedness dimension.

Columns 2 and 3 report results using the average post-announcement MES evaluated at 95% and 99% thresholds, respectively. We find that the potential capital shortfall is positively related more with dilutive CoCos than nondilutive CoCo. However, the estimates are not statistically significant. This suggests that the average loss a financial institution is expected to suffer when the overall market is in distress is similar for dilutive and nondilutive CoCos. This is consistent with Adverse-PO because a similar potential capital shortfall between dilutive CoCo and nondilutive CoCo may further incentivize banks to issue nondilutive CoCos thereby contributing to the formation of the Adverse-PO.

6 Conclusion

This paper investigates the preferences of contingent convertible capital instruments (CoCos), focusing on the degree of contingent dilution. By examining the interplay between pre-contractual adverse selection and post-contractual agency costs, we argue a pecking order in CoCo financing that aligns shareholder preferences with broader market dynamics. Our findings indicate that shareholders generally prefer nondilutive CoCos over dilutive CoCos consistent with adverse selection pecking order. However, during periods of heightened

[28] We do not include the lag of ΔCoVaR in Column 1 of Table 10 because of its slow-moving property.

aggregate uncertainty, preferences shift toward dilutive CoCos due to their ability to mitigate agency costs. This dynamic reflects a nuanced balance between competing forces of information asymmetry inherent in CoCo design.

Using a novel contingent dilution measure and comprehensive cross-country data, we show that announcement effects differ significantly based on dilution levels. Dilutive CoCos, typically associated with negative abnormal announcement returns resembling equity issuance, see diminished or even reversed effects during periods of heightened aggregate uncertainties related to contingent trigger events. Conversely, nondilutive CoCos generate no effect in normal conditions but experience negative effects under heightened aggregate uncertainties.

Our analysis extends the literature on pecking order theory and capital structure by offering a unique lens through CoCos. Unlike traditional instruments, CoCos are related to diverging adverse selection and agency costs, providing a simplified yet insightful framework for studying security design. By positioning CoCos along the degree of contingent dilution, banks can navigate the costs inherent in financing decisions, offering a valuable laboratory for theoretical predictions.

Finally, the results underscore the evolving role of CoCos as a key instrument in bank financing. The evidence suggests that shareholders, far from being passive observers, actively price the contingent dilution parameter of CoCos. This insight contributes to a deeper understanding of capital markets' sophistication in evaluating complex financial instruments and the behavior of banks in response to regulatory and market pressures.

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Figure 2: The Distribution of the Wealth Transfer Measure by CoCo Type

The figure plots the box plots of the wealth transfer measure in percentage by CoCo type and how the variable *Dilutive* is defined. From the left, each boxplot represents the wealth transfer measure distribution of all CoCos, equity conversion, temporary write-down, and permanent write-down, respectively. The horizontal dashed line represents the threshold that defines the variable *Dilutive*. The bold line represents the median.

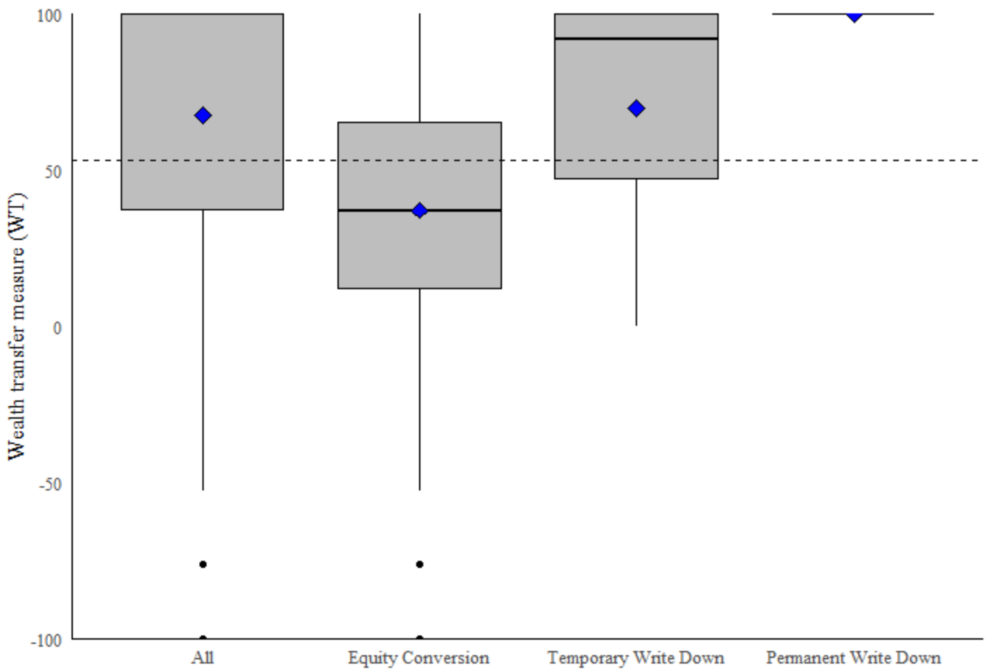
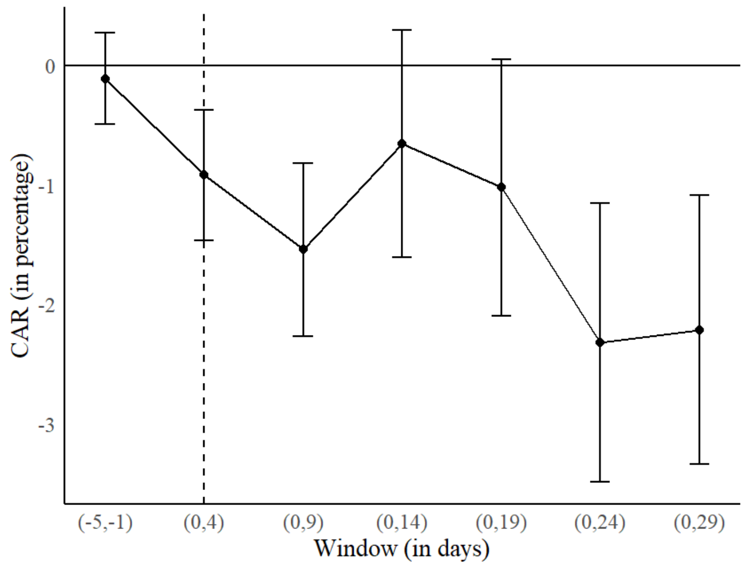
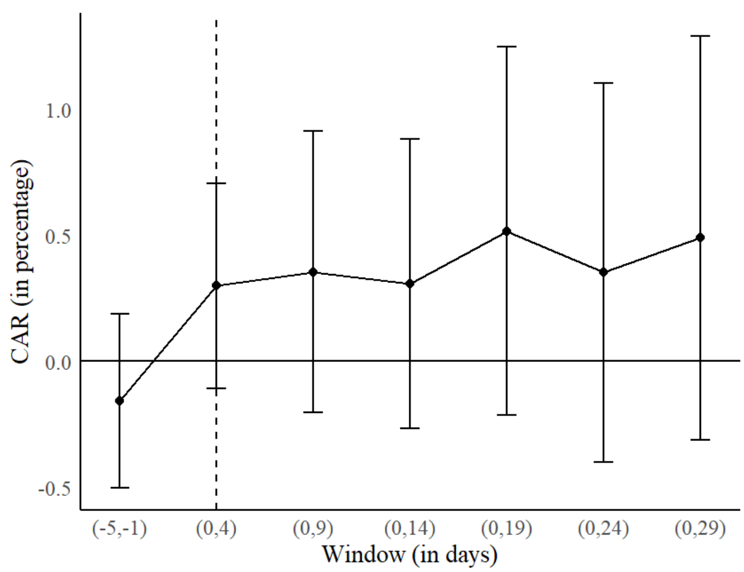


Figure 3: Cumulative Abnormal Returns: By *Dilutive*

This figure plots the announcement effect of CoCo issues on equity value. Cumulative abnormal returns are estimated with the market model (CAPM) on an estimation window of 250 days (with at least 50 valid returns) that ends 30 days before the CoCo issue announcement date. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. The solid lines represent the mean. The error bars represent the 95% confidence intervals. The vertical axis represents cumulative abnormal return in percentage. The horizontal axis represents estimation windows with 5 trading day increments.



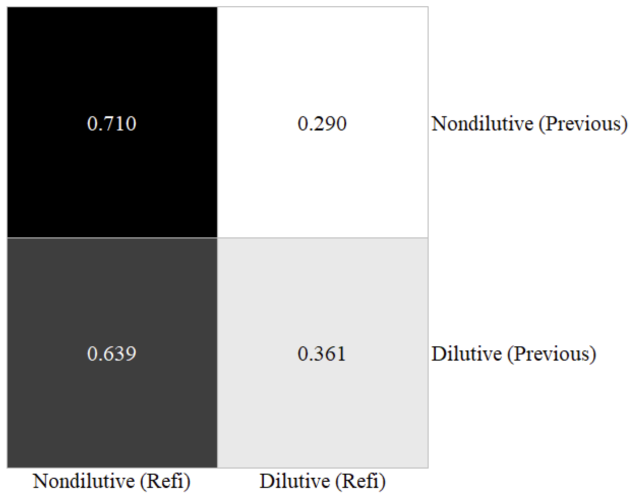
Panel A: $Dilutive = 1$



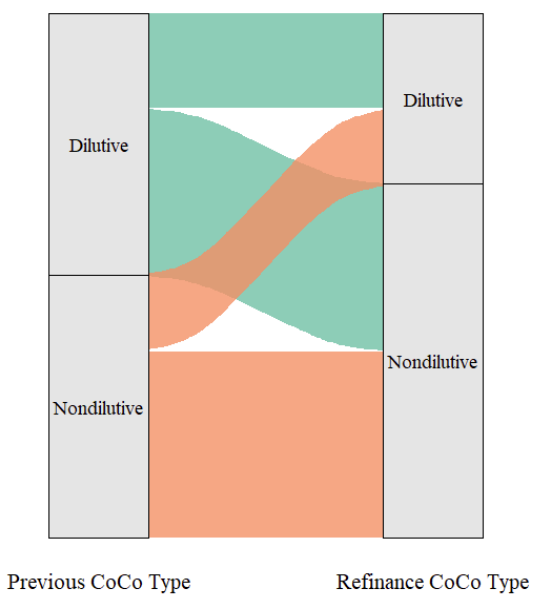
Panel B: $Dilutive = 0$

Figure 4: Transition Matrix and Flow Diagram of Refinance CoCos

This figure plots the transition matrix and the flow diagram of refinance CoCos. Panel A plots the transition matrix. The vertical axis represents the type of CoCo being retired (previous). The horizontal axis represents type of CoCo issued at refinancing. Panel B plots the flow diagram representing the CoCo-type transitions. The left strata represent the type of CoCo being retired (previous). The right strata illustrate the type of CoCo issued at refinancing. The flows depict the magnitudes of the transitions.



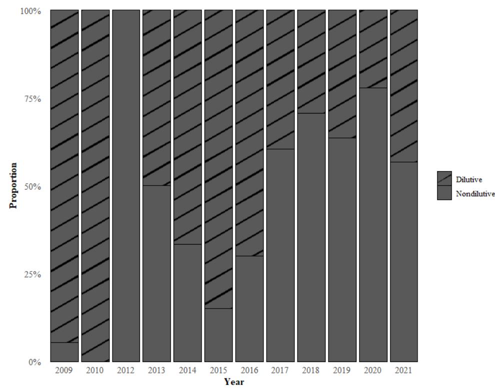
Panel A: CoCo Refinance Transition Matrix



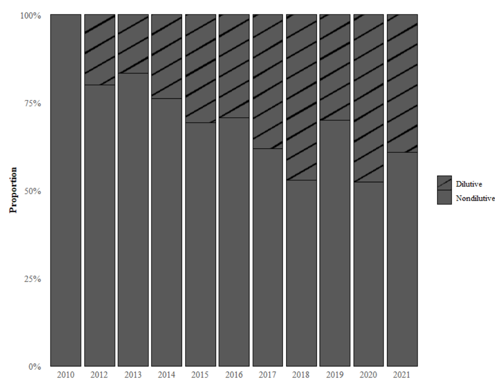
Panel B: CoCo Refinance Flow Diagram

Figure 5: Porportion of Dilutive CoCo Issues: By Legal Origin

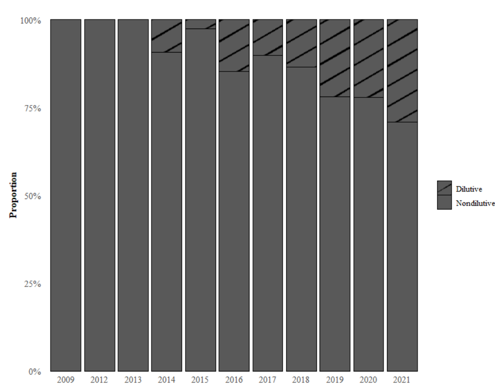
This figure plots the yearly proportion of dilutive and nondilutive CoCo issues by legal origin. The striped bars represent the proportion of dilutive CoCos ($Dilutive$ = 1) and the solid bars represent nondilutive CoCos ($Dilutive$ = 0). Panel A plots banks incorporated in common law origin countries. Panel B plots banks incorporated in French civil law origin countries. Panel C plots banks incorporated in German and Scandinavian civil law origin countries and China.



Panel A: Common law origin



Panel B: French civil law origin



Panel C: Others

Table 1: Descriptive Statistics

This table presents the descriptive statistics of the main variables used in the analysis. The baseline data consists of 757 CoCos issued between 2009 and 2021 in 27 countries. The level of observation is CoCo issues. Panel A reports the descriptive statistics. Panel B reports the top 10 countries and financial institutions by number of distinct CoCo issues. Detailed variable descriptions are provided in Table A.1.

Panel A. Descriptive Statistics (Cumulative Abnormal Returns)

Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**50%**	**Max**	$p-$**value** ($\mathbf{H_0}$: $\mu = 0$)
CAR(-2,2)	757	0.224	4.038	-15.86	0.0001	29.776	0.1269
CAR(0,9)	757	-0.267	6.299	-21.44	-0.338	75.967	0.2441
CAR(0,19)	757	0.013	8.518	-34.375	-0.687	95.039	0.9665
CAR(0,29)	757	-0.397	9.245	-37.198	-0.658	59.002	0.2384

Panel B. Descriptive Statistics (Other Variables)

Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**50%**	**Max**
Announcement to issuance (days)	757	8.073	6.975	0	7	48
Beta	757	1.19	0.635	-0.358	1.234	2.963
Wealth transfer	757	66.004	51.897	-374.433	100	100
Dilutive	757	0.328	0.47	0	0	1
Outstanding CoCos	757	1.925	3.994	0	0.892	35.537
Coupon rate	757	6.376	2.327	0.82	6.125	16.125
Equity conversion	757	0.292	0.455	0	0	1
Permanent write-down	757	0.247	0.432	0	0	1
Temporary write-down	757	0.461	0.499	0	0	1
Common law origin	757	0.341	0.474	0	0	1
French civil law origin	757	0.24	0.428	0	0	1
Market capitalization	757	16.425	2.17	7.776	17.154	20.666
Profitability	757	7.593	6.986	-24.735	7.64	37.308
Distance from trigger	757	6.828	3.451	-3.95	6.635	22.775
Total liabilities	757	92.945	2.849	73.478	93.56	98.145
Rollover	757	0.139	0.346	0	0	1
ΔCoVaR$(t+1)$	671	-0.851	0.527	-2.242	-0.86	0.172
MES95$(t+1)$	740	-1.565	1.545	-7.568	-1.115	0.958
MES99$(t+1)$	740	-2.601	3.231	-16.707	-1.61	3.704

Panel B. Number of CoCo Issued by Country and Issuer (Top 10)

Rank	Country	Issues	Issuer	Issues
1	United Kingdom	110	LBG Capital	38
2	India	97	Credit Suisse Group	22
3	Norway	75	Societe Generale	20
4	Switzerland	66	BNP Paribas	18
5	China	54	UBS Group	18
6	France	53	Banco Mercantil del Norte	16
7	Spain	38	Bank of Baroda	16
8	Japan	34	HSBC Holdings	16
9	Denmark	27	Barclays	15
10	Mexico	27	Credit Agricole	15

Table 2: Cumulative Abnormal Returns and CoCo Dilutiveness

This table compares the announcement effects for dilutive and nondilutive CoCo issuance through mean-difference tests. Column 1 reports the cumulative abnormal returns of dilutive CoCos. Column 2 reports the cumulative abnormal returns of nondilutive CoCos. Column 3 reports the difference in mean between the cumulative abnormal returns of dilutive and nondilutive CoCos. Column 4 reports the p-value of the mean differences. Cumulative abnormal returns are estimated with the market model (CAPM) on an estimation window of 250 days (with at least 50 valid returns) ending 30 days before the CoCo issue announcement date. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Cumulative abnormal return (CAR)		Diff (1-2)	$p-$value
	Dilutive	Nondilutive		
CAR window	(1)	(2)	(3)	(4)
(-1,-5)	-0.109	-0.157	0.049	0.853
(0,4)	-0.918***	0.299	-1.217***	0
(0,9)	-1.543***	0.355	-1.898***	0
(0,14)	-0.656	0.307	-0.962*	0.091
(0,19)	-1.02*	0.516	-1.536**	0.021
(0,24)	-2.32***	0.352	-2.672***	0
(0,29)	-2.215***	0.49	-2.705***	0
Observations	248	509	757	757

Table 3: Cumulative Abnormal Returns and CoCo Dilutiveness: Regression Analysis

This table examines the announcement effect of CoCo issues using OLS regressions. Cumulative abnormal returns are estimated with the market model (CAPM) on an estimation window of 250 days (with at least 50 valid returns) that ends 30 days before the CoCo issue announcement date. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. *Distance to trigger* is the distance between the capital ratio and the trigger level. Control variables include the natural log of market capitalization, profitability, total liabilities, rollover indicator, outstanding CoCos, and the coupon rate at issue. Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Dilutive	-0.862***	-1.68***	-1.26*	-2.13***
	(0.324)	(0.435)	(0.672)	(0.726)
Market capitalization	0.072	0.136	-0.186	-0.093
	(0.085)	(0.124)	(0.191)	(0.183)
Distance to trigger	-0.012	0.012	-0.013	0.143
	(0.055)	(0.100)	(0.115)	(0.128)
Profitability	-0.010	-0.086**	-0.049	-0.082
	(0.023)	(0.035)	(0.048)	(0.056)
Total liabilities	-0.092	-0.326*	-0.131	-0.147
	(0.089)	(0.186)	(0.180)	(0.192)
Rollover	0.363	0.432	0.105	0.598
	(0.429)	(0.627)	(1.02)	(1.14)
Outstanding CoCos	0.216***	0.228**	0.211*	0.325***
	(0.080)	(0.103)	(0.110)	(0.113)
Coupon rate	-0.090	-0.191**	-0.220*	-0.378***
	(0.065)	(0.083)	(0.115)	(0.140)
Adj. R2	0.074	0.106	0.047	0.092
Observations	757	757	757	757

Table 4: Cumulative Abnormal Returns and Distance to Trigger

This table examines the heterogeneous announcement effect of CoCos across the distance to trigger levels. Cumulative abnormal returns are estimated with the market model (CAPM) on an estimation window of 250 days (with at least 50 valid returns) ending 30 days before the CoCo issue announcement date. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. *Distance to trigger* is the distance between the capital ratio and the trigger level. Control variables include the natural log of market capitalization, profitability, total liabilities, rollover indicator, outstanding CoCos, and the coupon rate at issue. Conditional announcement effects report economic magnitudes of the raw variables and all interaction terms (excluding control variables). Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Distance to trigger × Dilutive	0.323***	0.274**	0.512***	0.671***
	(0.084)	(0.134)	(0.174)	(0.180)
Dilutive	-2.98***	-3.48***	-4.61***	-6.54***
	(0.616)	(1.03)	(1.47)	(1.49)
Distance to trigger	-0.129**	-0.087	-0.198	-0.100
	(0.062)	(0.109)	(0.136)	(0.148)
Market capitalization	0.074	0.137	-0.182	-0.089
	(0.084)	(0.125)	(0.191)	(0.183)
Profitability	-0.009	-0.085**	-0.047	-0.079
	(0.023)	(0.036)	(0.049)	(0.056)
Total liabilities	-0.062	-0.301	-0.083	-0.085
	(0.090)	(0.185)	(0.181)	(0.191)
Rollover	0.132	0.236	-0.262	0.117
	(0.437)	(0.631)	(1.03)	(1.16)
Outstanding CoCos	0.218***	0.229**	0.213*	0.328***
	(0.081)	(0.103)	(0.109)	(0.112)
Coupon rate	-0.052	-0.159*	-0.160	-0.300**
	(0.065)	(0.082)	(0.119)	(0.140)
Conditional announcement effects of dilutive CoCos:				
If Distance to trigger 0%:	-2.98%	-3.48%	-4.61%	-6.54%
If Distance to trigger 10%:	-1.04%	-1.61%	-1.47%	-0.83%
Adj. R2	0.074	0.106	0.047	0.092
Observations	757	757	757	757

Table 5: Cumulative Abnormal Returns, Distance to Trigger, and MDA Threshold

This table examines the heterogeneous announcement effect of CoCos across the distance to trigger levels and MDA thresholds. Cumulative abnormal returns are estimated with the market model (CAPM) on an estimation window of 250 days (with at least 50 valid returns) ending 30 days before the CoCo issue announcement date. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. *Distance to trigger* is the distance between the capital ratio and the trigger level. *Close to MDA* is an indicator variable that equals 1 if the distance from the MDA threshold is in the lowest tercile and 0 otherwise. Control variables include the natural log of market capitalization, profitability, total liabilities, rollover indicator, outstanding CoCos, and the coupon rate at issue. Conditional announcement effects report economic magnitudes of the raw variables and all interaction terms (excluding control variables). Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Distance to trigger × Dilutive × Close to MDA	-0.202	1.02**	2.03***	2.13***
	(0.291)	(0.479)	(0.776)	(0.798)
Dilutive × Close to MDA	0.659	-6.87**	-13.6***	-13.7***
	(1.89)	(3.03)	(4.94)	(5.14)
Distance to trigger × Dilutive	0.090	-0.502*	-0.454	-0.579
	(0.216)	(0.288)	(0.514)	(0.496)
Dilutive	-0.619	3.26	4.14	4.46
	(1.47)	(2.05)	(3.61)	(3.49)
Distance to trigger × Close to MDA	-0.046	-0.075	-0.315	-0.569*
	(0.115)	(0.193)	(0.315)	(0.327)
Close to MDA	0.436	0.943	2.78	3.41
	(1.03)	(1.54)	(2.52)	(2.79)
Distance to trigger	-0.055	0.069	0.013	0.214
	(0.076)	(0.130)	(0.177)	(0.203)
Market capitalization	-0.043	-0.153	-0.033	0.079
	(0.168)	(0.243)	(0.330)	(0.404)
Profitability	0.029	-0.056	0.018	0.078
	(0.035)	(0.038)	(0.071)	(0.072)
Total liabilities	-0.074	-0.294	0.220	0.257
	(0.152)	(0.186)	(0.212)	(0.250)
Rollover	0.233	0.426	-0.422	-0.414
	(0.469)	(0.614)	(1.07)	(1.15)
Outstanding CoCos	-0.261	0.117	0.656	0.643
	(0.182)	(0.174)	(0.574)	(0.464)
Coupon rate	0.031	-0.122	-0.139	-0.186
	(0.069)	(0.107)	(0.161)	(0.179)
Conditional announcement effects of dilutive CoCos if *Close to MDA*= 1:				
If Distance to trigger 0%:	0.48%	-2.67%	-6.68%	-5.83%
If Distance to trigger 10%:	-6.52%	-1.5%	1.67%	0.54%
Adj. R2	-0.005	0.008	0.015	0.014
Observations	407	407	407	407

Table 6: Determinants of Dilutive CoCo Issues and Legal Origins

This table examines the impact of legal origin on the banks' choice of CoCo loss absorption mechanisms. *Wealth transfer* is the estimated contingent wealth transfer from CoCo bondholders to stockholders, as a share of CoCo notional value. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. *Common law* is an indicator variable that equals 1 if the issuer is incorporated in a common law jurisdiction and else 0. *French civil law* is an indicator variable that equals 1 if the issuer is incorporated in a French civil-law jurisdiction and else 0. The legal origins across countries are classified following La Porta et al. (1998). Control variables include the natural log of market capitalization, profitability, distance between the capital ratio and the trigger level, total liabilities, rollover indicator, outstanding CoCos, and the coupon rate at issue. Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Dependent Variables:	Wealth transfer (1)	Dilutive (2)	Dilutive (3)
Common law origin	-25.7*** (5.55)	0.350*** (0.047)	1.06*** (0.158)
French civil law origin	-0.988 (5.95)	0.153*** (0.047)	0.516*** (0.154)
Market capitalization	-2.07 (1.65)	0.003 (0.009)	0.009 (0.033)
Profitability	0.461** (0.221)	-0.007** (0.003)	-0.021** (0.008)
Distance to trigger	-1.69 (1.03)	0.005 (0.006)	0.024 (0.022)
Total liabilities	-2.33*** (0.687)	0.020** (0.009)	0.062* (0.034)
Rollover	3.34 (6.45)	-0.069 (0.052)	-0.199 (0.170)
Outstanding CoCos	-0.183 (0.402)	-0.001 (0.004)	-0.003 (0.014)
Coupon rate	-2.19* (1.27)	0.009 (0.008)	0.028 (0.028)
Model	OLS	LPM (OLS)	Probit
Adj. R2	0.085	0.106	–
Pseudo R2	–	–	0.131
Observations	757	757	757

Table 7: Cumulative Abnormal Returns, CoCo Dilutiveness, and Legal Origins: 2SLS

This table examines the causal impact of CoCo dilutiveness on equity value. 1^{st} stage estimates are provided in Column 2 of Table 6. Cumulative abnormal returns are estimated with the market model (CAPM) on an estimation window of 250 days (with at least 50 valid returns) ending 30 days before the CoCo issue announcement date. Panel A reports the results of the second-stage estimates. Panel B reports the results of the second-stage estimates including an interaction term with *Distance to trigger*. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. Control variables include the natural log of market capitalization, profitability, distance between the capital ratio and the trigger level, total liabilities, rollover indicator, outstanding CoCos, and the coupon rate at issue. Conditional announcement effects report economic magnitudes of the raw variables and all interaction terms (excluding control variables). Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Panel A. Second Stage Estimate				
Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
$\widehat{\text{Dilutive}}$	-0.498	-1.15	-5.02*	-6.39**
	(1.27)	(1.84)	(2.75)	(3.07)
Controls	Yes	Yes	Yes	Yes
Observations	757	757	757	757
F-test (1st stage)	28.6	28.6	28.6	28.6
1st stage $F-$test $p-$value (weak inst.)	0.000	0.000	0.000	0.000
Sargan $p-$value (overid.)	0.994	0.016	0.388	0.366
Panel B. Second Stage Estimate: Heterogeneity Test				
Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
$\widehat{\text{Dilutive}}$ × Distance from trigger	1.11***	2.90***	1.89**	2.27**
	(0.421)	(0.987)	(0.797)	(1.01)
$\widehat{\text{Dilutive}}$	-6.58***	-15.5***	-13.9***	-17.3***
	(1.92)	(4.46)	(3.95)	(4.44)
Distance from trigger	-0.399**	-0.987**	-0.698**	-0.680*
	(0.174)	(0.423)	(0.309)	(0.357)
Conditional announcement effects of dilutive CoCos:				
If Distance to trigger 0%:	-6.58%	-15.5%	-13.9%	-17.3%
If Distance to trigger 10%:	0.53%	3.63%	-1.98%	-1.4%
Controls	Yes	Yes	Yes	Yes
F-test (1st stage)	28.6	28.6	28.6	28.6
1st stage $F-$test $p-$value (weak inst.)	0.000	0.000	0.000	0.000
Sargan $p-$value (overid.)	0.125	0.871	0.756	0.705
Observations	757	757	757	757

Table 8: Cumulative Abnormal Returns, Uncertainty, and CoCo-Market Volatility

This table examines the announcement effects of dilutive CoCos during periods of high uncertainty associated with CoCo trigger events. Cumulative abnormal returns are estimated with the market model (CAPM) on an estimation window of 250 days (with at least 50 valid returns) that ends 30 days before the CoCo issue announcement date. Panels A and B report results using *CoCo Index Volatility High* as the uncertainty measure. Panels C and D report results using *EPU High* as the uncertainty measure. *CoCo Index Volatility High* is an indicator variable that equals 1 if the announcement date falls within periods when the 100-trading day volatility of the Bloomberg's Global CoCo Bond Index (I30902US) is in the highest tercile between 2014 and 2019 and else 0. *EPU High* is an indicator variable that equals 1 if the Global Economic Policy Uncertainty of Baker et al. (2016) is in the highest tercile and else 0. *Developed* is an indicator variable that equals 1 if the bank is incorporated in a developed country and else 0. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. *Distance to trigger* is the distance between the capital ratio and the trigger level. Control variables include legal origins, the natural log of market capitalization, profitability, distance between the capital ratio and the trigger level, total liabilities, rollover indicator, outstanding CoCos, and the coupon rate at issue. Conditional announcement effects report economic magnitudes of the raw variables and all interaction terms (excluding control variables). Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Panel A. CoCo Market Volatility				
Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Dilutive × CoCo Index Volatility High	1.21*	4.15***	2.76**	4.33***
	(0.696)	(1.09)	(1.29)	(1.41)
Dilutive	-1.25**	-3.55***	-3.28***	-4.07***
	(0.550)	(0.770)	(0.880)	(1.05)
CoCo Index Volatility High	-0.757*	-1.39**	0.055	-0.703
	(0.407)	(0.703)	(0.936)	(0.903)
Controls	Yes	Yes	Yes	Yes
Adj. R2	0.035	0.082	0.037	0.073
Observations	589	589	589	589

Panel B. CoCo Market Volatility: Developed vs Emerging				
Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Developed × Dilutive × CoCo Index Volatility High	-0.607	-9.11***	-10.9***	-10.6***
	(2.21)	(2.88)	(3.71)	(4.11)
Dilutive × CoCo Index Volatility High	1.34	10.5***	10.4***	11.6***
	(2.11)	(2.77)	(3.53)	(3.87)
Developed × CoCo Index Volatility High	2.37***	5.09***	7.02***	6.56***
	(0.910)	(1.56)	(1.79)	(1.92)
Developed × Dilutive	0.442	4.00**	5.83**	6.12*
	(1.81)	(1.80)	(2.83)	(3.12)
Dilutive	-1.46	-6.45***	-7.64***	-8.30***
	(1.81)	(1.88)	(2.87)	(3.12)
CoCo Index Volatility High	-2.28***	-4.69***	-4.48***	-5.04***
	(0.839)	(1.56)	(1.52)	(1.73)
Developed	-1.31**	-2.72***	-3.80***	-4.96***
	(0.652)	(0.829)	(1.17)	(1.44)
Conditional announcement effects of dilutive CoCos if *CoCo Index Volatility High*= 1:				
If *Developed* = 1:	-1.22%	-3.38%	-3.57%	-4.62%
If *Developed* = 0:	-2.4%	-0.64%	-1.72%	-1.74%
Controls	Yes	Yes	Yes	Yes
Adj. R2	0.045	0.105	0.063	0.097
Observations	589	589	589	589

Table 8: *(Continued)*

Panel C. Global Economic Policy Uncertainty				
Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Dilutive × EPU high	0.375	4.01***	5.75***	5.94***
	(0.669)	(1.10)	(1.56)	(1.49)
Dilutive	-0.982**	-2.91***	-3.02***	-3.95***
	(0.384)	(0.538)	(0.817)	(0.889)
EPU high	-0.507	-0.737	-1.48*	-1.61*
	(0.373)	(0.608)	(0.771)	(0.832)
Controls	Yes	Yes	Yes	Yes
Adj. R2	0.054	0.072	0.034	0.065
Observations	757	757	757	757

Panel D. Global Economic Policy Uncertainty: Developed vs Emerging				
Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Developed × Dilutive × EPU High	-0.605	-7.96***	-13.2***	-11.6***
	(2.08)	(2.81)	(4.95)	(4.24)
Dilutive × EPU High	0.799	10.0***	15.8***	14.7***
	(1.97)	(2.67)	(4.77)	(4.03)
Developed × EPU High	0.406	0.990	1.34	0.691
	(0.865)	(1.26)	(1.53)	(1.84)
Developed × Dilutive	0.429	1.66	3.17	3.68
	(1.19)	(1.26)	(2.13)	(2.32)
Dilutive	-1.34	-4.06***	-5.15**	-6.34***
	(1.17)	(1.30)	(2.09)	(2.25)
EPU High	-0.756	-1.32	-2.30*	-2.09
	(0.775)	(1.19)	(1.30)	(1.53)
Developed	-0.112	-0.639	-1.53	-2.30*
	(0.559)	(0.633)	(1.17)	(1.29)
Conditional announcement effects of dilutive CoCos if *EPU High* = 1:				
If *Developed* = 1:	0.00%	-2.02%	-4.85%	-5.54%
If *Developed* = 0:	-1.30%	4.62%	8.35%	6.27%
Controls	Yes	Yes	Yes	Yes
Adj. R2	0.050	0.082	0.054	0.081
Observations	757	757	757	757

Table 9: Monthly Long-Short Portfolio Returns by Dilutiveness

This table examines the relationship between outstanding CoCo and stock returns. Each month, we track the CoCo issue within the past 3 years and sort based on the wealth transfer measure. The equally weighted portfolio longs the issuers of the CoCos with below median wealth transfer and shorts CoCos with above median wealth transfer. The dependent variable is the monthly long-short portfolio returns. *CoCo Index Volatility High* is an indicator variable that equals 1 if the 100-trading day volatility of Bloomberg's Global CoCo Bond Index (I30902US) is higher than the sample median between 2014 and 2021 (using the values for each month-end) *EPU High* is an indicator variable that equals 1 if the Global Economic Policy Uncertainty Index (Baker et al., 2016) in the period when the portfolio is constructed is above the sample median. *VIX High* is an indicator variable that equals 1 if the CBOE S&P 500 VIX in the period when the portfolio is constructed is above the sample median. *COVID* is an indicator variable that equals 1 if the portfolio is constructed after January 2020 and else 0. Market, Size, Value, Profit, and Investment are the Fama-French developed countries market, size, value, profitability, and investment factors respectively. The portfolio is rebalanced each month. The portfolio is formed from October 2014 to December 2021. Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses.

Dependent Variables:	Monthly long-short portfolio return				
Model:	(1)	(2)	(3)	(4)	(5)
Alpha	-0.378 (0.289)	-0.982** (0.379)	-0.940** (0.397)	-0.995** (0.405)	-0.678** (0.320)
CoCo Index Volatility High		1.13** (0.563)			
EPU High			1.25** (0.527)		
VIX High				1.23** (0.576)	
COVID					1.20** (0.597)
Market	0.229*** (0.074)	0.215*** (0.072)	0.216*** (0.073)	0.278*** (0.076)	0.216*** (0.073)
Size	-0.119 (0.201)	-0.088 (0.196)	-0.164 (0.199)	-0.198 (0.201)	-0.118 (0.198)
Value	0.476** (0.191)	0.487** (0.186)	0.527*** (0.189)	0.429** (0.188)	0.478** (0.188)
Profit	0.088 (0.263)	0.079 (0.256)	0.191 (0.263)	-0.073 (0.268)	0.046 (0.259)
Investment	-0.228 (0.320)	-0.273 (0.311)	-0.193 (0.314)	-0.230 (0.313)	-0.218 (0.314)
Joint significance p-value (Alpha & Uncertainty)	-	0.035	0.037	0.085	0.059
Adj. R2	0.223	0.251	0.265	0.255	0.251
Observations	87	87	87	87	87

Table 10: Systemic Risk and CoCo Issues

This table examines the systemic risks of banks after the announcement of CoCo issues. ΔCoVaR$(t+1)$ is the average post-announcement systemic risk measure from Adrian and Brunnermeier (2016). MES95$(t+1)$ and MES99$(t+1)$ are the average post-announcement Marginal Expected Shortfall using a 5% and 1% negative tail of market return, respectively. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. *Outstanding CoCos* is the outstanding amount of CoCo bonds scaled by total liabilities. MES95 and MES99 are the average pre-announcement Marginal Expected Shortfall using a 5% and 1% negative tail of market return, respectively. ΔCoVaR is the average pre-announcement systemic risk measure from Adrian and Brunnermeier (2016). Control variables include profitability (ROE), market capitalization, distance from the trigger level, book leverage, and rollover indicator variable. Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Dependent Variables:	Measures of systemic risk		
Risk measures:	ΔCoVaR$(t+1)$	MES95$(t+1)$	MES99$(t+1)$
Model:	(1)	(2)	(3)
Dilutive	-0.186**	0.014	0.177
	(0.069)	(0.092)	(0.185)
Outstanding CoCos	-0.012	-0.024**	-0.044*
	(0.009)	(0.009)	(0.021)
MES95		-0.031	
		(0.155)	
MES99			-0.204
			(0.199)
ΔCoVaR		0.882***	1.51**
		(0.267)	(0.538)
Controls	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Adjusted R^2	0.361	0.493	0.411
Observations	671	671	671

Table A.1: Variable Description

The below table provides the description and construction of variables used in the paper. Prospectus indicates hand-collected security-level information that is collected directly from the prospectuses. We follow the information in the prospectus over what is recorded in Bloomberg (the full correction is available in an R code).

Variable	Description	Source
CAR (0,T)	Cumulative abnormal return around a daily window (0,T) measured using the decimal values of the daily stock price return of issuers and the market index of the country of incorporation. The market model (CAPM) is estimated on an estimation window of 250 days (with at least 50 valid returns) that ends 30 days before the CoCo issue announcement date. Country level market index is from WRDS World Indices. Risk-free rate is from Kenneth French's website (FF Factor Daily Developed Countries).	Datastream, WRDS
Equity conversion	An indicator variable that equals 1 if the CoCo is an equtiy conversion CoCo. We hand collect the prospectuses and correct any errors made in Bloomberg.	Bloomberg, prospectus
Temporary write-down	An indicator variable that equals 1 if the CoCo is an temporary write-down CoCo. We hand collect the prospectuses and correct any errors made in Bloomberg.	Bloomberg, prospectus
Permanent write-down	An indicator variable that equals 1 if the CoCo is an permanent write-down CoCo (including partial permanent write down). We hand collect the prospectuses and correct any errors made in Bloomberg.	Bloomberg, prospectus
Wealth transfer	Contingent wealth transfer measure of the CoCo issue estimated using Equation (3).	Bloomberg, Capital IQ, Datastream
Dilutive	An indicator variable that equals 1 if the wealth transfer measure (WT) is in the lowest tercile and else 0.	Bloomberg, Capital IQ, Datastream
Outstanding CoCo	Outstanding CoCos of the issuer calculated as sum of the amount of the currently issuing and the pre-existing outstanding CoCos with trigger levels that are greater than or equal to the current issue scaled by total liabilities	Bloomberg, Capital IQ, Datastream
Distance to trigger	The difference between the trigger level of the CoCo and the corresponding capital ratio of the issuer.	Bloomberg, Capital IQ, Datastream
Market capitalization	The natural log of market capitalization (p $\times$ shout) of the issuer in USD at the announcement date. The daily exchange rate is from the *freecurrencyapi* package (Ho, Imai, King, and Stuart, 2022)	Datastream
Total liabilities	Total liabilities of banks measured as the total liabilities scaled by the total assets.	Capital IQ, Bankfocus
Profitability	Profitability of the banks measured by the return on equity (ROE) collected directly from the data sources.	Capital IQ, Bankfocus
Rollover	An indicator variable that equals 1 if the CoCo is issued within +/- 90 days of the first call date of an outstanding CoCo by the same issuer.	Bloomberg
Close to MDA	An indicator variable that equals 1 if the distance from the MDA trigger level of the issuer is in the lowest tercile and 0 otherwise.	Hand-collected
Shift	An indicator variable that equals 1 if the issue shiftes from dilutive to nondilutive (and vice versa) compared to the CoCo that is being retired and 0 otherwise (missing if the CoCo is not a rollover CoCo).	-
Retired CoCo is dilutive	An indicator variable that equals 1 if the CoCo being retired is dilutive, and 0 otherwise (missing if the CoCo is not a rollover).	-
CoCo Index Volatility High	For abnormal return analysis, it is an indicator variable that equals 1 if the announcement date falls within periods when the 100-trading day volatility of Global CoCo Bond Index from Bloomberg (ticker I30902US) is in the highest tercile between 2014 and 2019 and else 0. For portfolio analysis, it is an indicator variable that equals 1 if the 100-trading day volatility of I30902US is higher than the sample median between 2014 and 2021 (using the values for each month-end).	Bloomberg
EPU High	For abnormal return analysis, it is an indicator variable that equals 1 if the Global Economic Policy Uncertainty Index (Baker et al., 2016) is in the highest tercile and else 0. For portfolio analysis, it is an indicator variable that equals 1 if the index in the period when the portfolio is constructed is above the sample median.	EPU website
VIX High	An indicator variable that equals 1 if the CBOE S&P 500 VIX in the period when the portfolio is constructed is above the sample median and else 0.	WRDS
COVID	An indicator variable that equals 1 if the monthly portfolio is constructed after January 2020 and else 0.	-

Table A.1: *(Continued)*

Variable	Description	Source
Common law origin	An indicator variable that equals 1 if the bank is incorporated in a common law country and else 0. The countries are: GB, IN, MY, IE, AU, TH, and ZA (in ISO Alpha-2 codes)	La Porta et al. (1998)
French civil law origin	An indicator variable that equals 1 if the bank is incorporated in a French-civil law country and else 0. The countries are: FR, ES, MX, IT, BR, NL, BE, CO, TR, ID, and PT (in ISO Alpha-2 codes)	La Porta et al. (1998)
Developed	An indicator variable that equals 1 if a bank is incorporated in a developed country and else 0. Developed countries include the United Kingdom, Norway, Switzerland, France, Spain, Japan, Denmark, Finland, Ireland, Sweden, Germany, Netherlands, Australia, Belgium, Austria, Italy, and Portugal. Countries that are classified as emerging countries are Brazil, Mexico, India, Malaysia, China, Indonesia, Turkey, Hungary, Thailand, and South Africa.	-
MES95	The average pre-announcement Marginal Expected Shortfall. Marginal Expected Shortfalls are measured daily as the mean equity return of the bank in the 5% negative tail of market returns (5% worst days by market return) with a one year look back period. We take the average of the estimated Marginal Expected Shortfall one year before the announcement of the CoCo issues. We use S&P500 returns as the market returns.	Datastream
MES99	The average pre-announcement Marginal Expected Shortfall. Marginal Expected Shortfalls are measured daily as the mean equity return of the bank in the 1% negative tail of market returns (1% worst days by market return) with a one year look back period. We take the average of the estimated Marginal Expected Shortfall one year before the announcement of the CoCo issues. We use S&P500 returns as the market returns.	Datastream
MES95$(t+1)$	The average post-announcement Marginal Expected Shortfall. Marginal Expected Shortfalls are measured daily as the mean equity return of the bank in the 5% negative tail of market returns (5% worst days by market return) with a one year look back period. We take the average of the estimated Marginal Expected Shortfall one year after the announcement of the CoCo issues. We use S&P500 returns as the market returns.	Datastream
MES99$(t+1)$	The average post-announcement Marginal Expected Shortfall. Marginal Expected Shortfalls are measured daily as the mean equity return of the bank in the 1% negative tail of market returns (1% worst days by market return) with a one year look back period. We take the average of the estimated Marginal Expected Shortfall one year after the announcement of the CoCo issues. We use S&P500 returns as the market returns.	Datastream
$\Delta CoVaR$	The systemic risk measure from Adrian and Brunnermeier (2016). To estimate this, we use the R package *SystemicR* (Hasse, 2020). Daily equity returns of banks are collected from January 2008 to September 2022. We use weekly state variables, lagged by one period, known to capture time variation in the conditional moments of asset returns. These state variables include: (i) The change in the 3-Month T-bill yield rate, (ii) the change in the slope of the yield curve, measured as the change in the difference between the yields on 30-Year Treasury bonds and 3-Month T-bills, (iii) the change in the credit spread between Moody's Baa-rated bonds and 10-year Treasury rate, (iv) the real estate sector excess (weekly) return over the financial sector (v) The market return from the S&P 500 index, and (vi) the VIX index of equity volatility. The state variables are from Federal Reserve Bank of St. Louis (FRED). For CoCo issues, we measure the average of the daily ΔCoVaR a year after the announcement date.	Datastream, *SystemicR*, CRSP, FRED

Table A.2: Cumulative Abnormal Return and Dilutive CoCos: Robustness

This table examines the robustness of the announcement effect of CoCo issues using OLS regressions. Cumulative abnormal returns are estimated with the market model (CAPM) on an estimation window of 250 days (with at least 50 valid returns) that ends 30 days before the CoCo issue announcement date. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer quartile (Panel A) or quintile (Panel B) and else 0. *Wealth transfer* is the contingent wealth transfer measure from Equation (3). Control variables include the natural log of market capitalization, profitability, distance between the capital ratio and the trigger level, total liabilities, rollover indicator, outstanding CoCos, and the coupon rate at issue. Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Panel A. *Dilutive* defined as the lowest quartile				
Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Dilutive	-1.19***	-2.12***	-1.58**	-2.03***
	(0.376)	(0.516)	(0.740)	(0.780)
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.058	0.058	0.017	0.045
Observations	757	757	757	757
Panel B. *Dilutive* defined as lowest quintile				
Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Dilutive	-1.46***	-2.72***	-2.14**	-2.57***
	(0.447)	(0.601)	(0.909)	(0.914)
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.062	0.065	0.020	0.048
Observations	757	757	757	757
Panel C. Applying the wealth transfer measure				
Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Wealth transfer	0.007**	0.018***	0.009	0.014**
	(0.003)	(0.004)	(0.006)	(0.006)
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.062	0.065	0.020	0.048
Observations	757	757	757	757

Table A.3: Coupon Rate At Issue and Dilutive CoCos

This table examines the coupon rates at issues using OLS regressions. The dependent variable, *Coupon rate*, is the coupon rate at issue in percentages. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. Control variables include the natural log of market capitalization, profitability, distance between the capital ratio and the trigger level, total liabilities, rollover indicator, and outstanding CoCos. Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Dependent Variables:	Coupon rate					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Dilutive	1.04***	0.707***	0.686***	0.565***	0.111	0.080
	(0.183)	(0.163)	(0.158)	(0.148)	(0.144)	(0.128)
Market capitalization			-0.145***	-0.154***	-0.073*	-0.127***
			(0.036)	(0.037)	(0.043)	(0.042)
Profitability			-0.041***	-0.046***	-0.012	-0.016
			(0.011)	(0.010)	(0.012)	(0.010)
Distance from trigger			-0.311***	-0.223***	-0.196***	-0.030
			(0.027)	(0.027)	(0.029)	(0.026)
Total liabilities			-0.195***	-0.235***	-0.079*	-0.085***
			(0.036)	(0.032)	(0.042)	(0.033)
Rollover			-0.434**	0.290	-0.685***	0.204
			(0.188)	(0.212)	(0.145)	(0.161)
Outstanding CoCos			0.036**	0.050***	0.003	0.003
			(0.017)	(0.018)	(0.014)	(0.014)
Year fixed effects	-	Yes	-	Yes	-	Yes
Country fixed effects	-	-	-	-	Yes	Yes
Adj. R2	0.255	0.326	0.255	0.326	0.368	0.451
Observations	757	757	757	757	757	757

Table A.4: Cumulative Abnormal Return and Dilutive CoCos: Regression analysis (Banks From Developed Countries)

This table examines the announcement effect of CoCo issues using OLS regressions with a subsample consisting of banks that are in developed countries. Cumulative abnormal returns are estimated with the market model (CAPM) on an estimation window of 250 days (with at least 50 valid returns) that ends 30 days before the CoCo issue announcement date. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. Control variables include the natural log of market capitalization, profitability, distance between the capital ratio and the trigger level, total liabilities, rollover indicator, outstanding CoCos, and the coupon rate at issue. Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Dilutive	-0.592**	-1.41***	-0.923	-1.46*
	(0.295)	(0.428)	(0.669)	(0.767)
Market capitalization	0.106	0.039	-0.384*	-0.291
	(0.092)	(0.102)	(0.233)	(0.207)
Profitability	-0.024	-0.074*	-0.044	-0.115
	(0.028)	(0.042)	(0.058)	(0.076)
Distance from trigger	0.037	0.133*	0.123	0.308**
	(0.050)	(0.074)	(0.130)	(0.135)
Total liabilities	-0.154**	-0.112	0.133	0.142
	(0.078)	(0.098)	(0.148)	(0.178)
Rollover	0.364	0.832	-0.554	-0.452
	(0.411)	(0.598)	(0.977)	(1.24)
Outstanding CoCos	-0.094	-0.019	-0.003	0.177
	(0.083)	(0.148)	(0.166)	(0.318)
Coupon rate	-0.109	-0.283***	-0.284**	-0.543***
	(0.072)	(0.087)	(0.130)	(0.152)
Adjusted R^2	0.028	0.082	0.020	0.069
Observations	526	526	526	526

Table A.5: Average Cumulative Prediction Errors and Dilutive CoCos: Regression Analysis

This table examines the announcement effect of CoCo issues using OLS regressions. Average cumulative prediction errors (ACPE) are estimated with the market model (CAPM) on an estimation window of 250 days (with at least 50 valid returns) that ends 30 days before the CoCo issue announcement date. *Dilutive* is an indicator variable that equals 1 if the CoCo is in the lowest wealth transfer tercile and else 0. Control variables include the natural log of market capitalization, profitability, distance between the capital ratio and the trigger level, total liabilities, rollover indicator, outstanding CoCos, and the coupon rate at issue. Detailed variable descriptions are provided in Table A.1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Dependent Variables:	Average cumulative prediction error (ACPE)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Dilutive	-0.170***	-0.335***	-0.257**	-0.430***
	(0.063)	(0.085)	(0.130)	(0.148)
Market capitalization	0.014	0.024	-0.030	-0.017
	(0.017)	(0.023)	(0.034)	(0.036)
Profitability	-0.002	-0.017**	-0.010	-0.017
	(0.005)	(0.007)	(0.009)	(0.011)
Distance from trigger	-0.002	0.008	0.004	0.036
	(0.011)	(0.018)	(0.022)	(0.025)
Total liabilities	-0.017	-0.055*	-0.020	-0.019
	(0.017)	(0.031)	(0.033)	(0.037)
Rollover	0.068	0.097	-0.012	0.084
	(0.083)	(0.119)	(0.193)	(0.221)
Outstanding CoCos	0.040***	0.040**	0.038**	0.060***
	(0.015)	(0.017)	(0.019)	(0.020)
Coupon rate	-0.020	-0.041**	-0.048**	-0.082***
	(0.013)	(0.017)	(0.022)	(0.028)
Adjusted R^2	0.051	0.058	0.017	0.050
Observations	757	757	757	757