A Pecking Order in Contingent Convertible Bond (CoCo) Financing *

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Abstract

Originally designed as an equity-diluting disciplinary mechanism, contingent convertible bonds (CoCos) have evolved to permit less punitive nondilutive triggers. Using a novel measure of CoCo dilution and a comprehensive hand-collected dataset covering 27 countries, our empirical findings suggest a pecking order in CoCo issuance, where banks generally prefer less information sensitive, nondilutive (debt-like) structures, but shift to incentive-compatible (equity-like) dilutive CoCos to address risk shifting agency conflicts during periods of aggregate uncertainty. Negative abnormal returns are found for dilutive CoCo announcements, but not for nondilutive CoCos. This negative market reaction reverses during periods of heightened aggregate uncertainty, with dilutive CoCos generating positive announcement returns. The equity and CoCo bonds of banks issuing dilutive CoCos perform more favorably when aggregate uncertainty is elevated.

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1 Introduction

Contingent convertible bonds (CoCos) were initially designed to punitively dilute existing bank shareholders by converting into equity when the bank's financial condition reached a predetermined low point (i.e., at conversion). The early academic literature was based on the assumption that the threat of dilution acted as a deterrent against excessive risk-taking by bank managers (Flannery, 2005; French et al., 2010).[1] Around 2013, banks developed nondilutive CoCo designs, such as principal write-down CoCos (PWDs) that were less punitive. Studies such as Flannery (2014) and Avdjiev, Bogdanova, Bolton, Jiang, and Kartasheva (2020) suggest that bank equity holders prefer nondilutive CoCos.[2]

This leads to the puzzle that is addressed in this paper. Why do banks continue to issue both dilutive CoCos and nondilutive CoCos? Bank regulators grant nondilutive CoCos full regulatory capital credit and have mandated mechanical trigger levels using minimum regulatory capital standards.[3] Thus, the only CoCo design feature subject to issuer discretion is the choice of dilution level. We offer empirical support for pecking order preferences for less information-sensitive, debt-like nondilutive CoCos. However, during periods of aggregate uncertainty, equity-like dilutive CoCos better control managerial risk-shifting incentives.

Therefore, while bank shareholders may exhibit a strong preference for nondilutive CoCos due to their non-punitive nature (as demonstrated during the 2023 Credit Suisse collapse that preserved some equity value while writing off the CoCo debt), dilutive CoCos retain important merits inherent in their original design. Specifically, when managers anticipate severe dilution in the event of a trigger, they have stronger incentives to reduce risk to avoid such outcomes. For instance, under conditions of heightened aggregate uncertainty, investors

[1] Academic literature largely focused on the design of the appropriate trigger mechanisms to incentive management to control risk (Flannery and Perotti, 2011; Calomiris and Herring, 2013), McDonald (2013); Sundaresan and Wang (2015); Glasserman and Nouri (2016); Pennacchi and Tchistyi (2018).

[2] For example, Flannery (2014) argues "a CoCo's Principal Write-Down increases the value of common equity to the detriment of bondholders. PWD also affects traditional notions of seniority by placing shareholders ahead of CoCo bondholders." Avdjiev et al. (2020) posit "bank equity holders have little incentive to issue such [dilutive] CoCos, because doing so mostly benefits outstanding unsecured creditors."

[3] With currently nonbinding regulatory triggers, the only relevant conversion mechanism is the discretionary declaration of a Point of Non-Viability (PONV) by bank regulators.

may come to value these managerial incentives, recognizing the potential of dilutive CoCos to mitigate risk through stronger *ex ante* discipline. Indeed, in September 2023, UBS stressed that it was replacing the nondilutive CoCos issued by Credit Suisse with dilutive CoCos.[4]

This paper empirically investigates whether a pecking order among CoCos is shaped by their contingent dilution design and managerial incentives. The core empirical challenge we face is twofold: (a) quantifying contingent dilution at the CoCo security level and (b) testing the pecking order within CoCos. To address the first challenge, we develop a novel measure of contingent dilution that captures deviations from a permanent write-down CoCo structure. This enables the comparison across CoCos with varying dilution features relative to a fully nondilutive benchmark. To address the second challenge, we analyze the reaction of the financial market to specific CoCo features by focusing on issuance announcement returns and secondary market pricing so as to evaluate investors' responses and infer their preferences across the single remaining CoCo design variable: contingent dilution. This approach aligns with the central empirical implication of the pecking order theory, as argued by Harris and Raviv (1991): *"What are the empirical implications of Myers' "pecking order" theory? Probably the most important implication is that, upon announcement of an equity issue, the market value of the firm's existing shares will fall."*

Our empirical results are consistent with this assertion, but suggest a more nuanced view. We find negative abnormal returns following the issuance of dilutive CoCos that have equity-like properties. We also find that during periods of elevated uncertainty, the negative announcement effects of dilutive CoCos are significantly mitigated, or even reversed, consistent with the view that such instruments align managerial incentives by discouraging risk-shifting to avoid conversion. Further, we show that both the equity and debt returns of banks with any outstanding dilutive CoCos outperform relative to banks that only issued nondilutive CoCos during uncertain periods. Collectively, our results suggest that while shareholders generally prefer nondilutive CoCos, they recognize that dilutive CoCos align

[4] "UBS sounds out investors over first AT1 sale since Credit Suisse rescue," *Financial Times*, Sep. 2023.

managerial incentives and mitigate trigger risk under conditions of uncertainty.

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. 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 trigger levels. This approach enables us to define an indicator variable, *Dilutive*, that equals 1 for 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. This shows that dilutiveness of CoCos depends not only on their loss absorption mechanism but also on features like conversion price and *pari-passu* structure, which shape the wealth transfer between bondholders and shareholders.

In the first part of our paper, we document evidence of the baseline pecking order properties among CoCos. Applying our contingent dilution measure, we find that the 10-day cumulative abnormal returns when issuing dilutive CoCos are -1.68% (statistically significant at the 1% level).[5] 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 upon issue and

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

may be more expensive than nondilutive CoCos.

We examine the cross-section of the announcement returns across the distance from the trigger to assess whether the negative market reaction to dilutive CoCo reflects information asymmetry (Myers, 1984). Since CoCo conversion into equity is imminent for banks close to the trigger, the significantly more negative announcement effects are consistent with pecking order concerns about "issuing" information sensitive equity. That is, the costs of information asymmetries are particularly salient for banks that issue dilutive CoCos close to trigger conversion.

To further isolate the market's response to contingent dilution from confounding factors such as credit risk and the cost of capital, we exploit plausibly exogenous variations in CoCo design as instruments in a two-stage least squares analysis. Ideally, one would compare both CoCo types issued by the same bank within a reasonably short period, but such cases are rare. Instead, we rely on the observation that banks incorporated in common law and French civil law countries, where the risk of contract repudiation is higher and legal enforcement is weaker (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998), are significantly more likely to issue dilutive CoCos. Using this instrumental variable in the second stage, we find results consistent with our baseline results that dilutive CoCos are associated with negative market reactions, particularly when banks are near the CoCo trigger. Thus, we find empirical evidence of a pecking order among CoCos, with nondilutive designs being more highly valued by the stock market.

In the second part of our paper, we assess the value of managerial incentives embedded in dilutive CoCos. To do so, we examine how the announcement effects of dilutive CoCo issuance vary during periods of elevated aggregate uncertainty. We find that announcements of dilutive CoCo issuance during periods of high Global Economic Policy Uncertainty (as measured by Baker, Bloom, and Davis, 2016) are associated with a positive cumulative abnormal return of 1.1% over a 10-trading-day window. We find consistent results when using CoCo market volatility as an alternative proxy for aggregate uncertainty, specifically capturing the perceived likelihood of CoCo trigger events. These findings suggest that, in times of heightened uncertainty, shareholders place greater value on the managerial incentives stemming from dilutive CoCos.

Next, we examine the long-term performance of bank equity and bond yields. If dilutive CoCos are generally viewed unfavorably by investors, then banks issuing dilutive CoCos should experience weaker long-term equity performance reflecting pecking order issuance costs. However, this underperformance should diminish or reverse when aggregate uncertainty is high due to the embedded managerial incentives. Similarly, in the secondary CoCo market, dilutive CoCos should have higher yields relative to nondilutive CoCos, ceteris paribus, reflecting their lower pecking order value. However, this gap should narrow during periods of heightened aggregate uncertainty, as the value of the managerial incentives embedded in dilutive CoCos becomes more salient.

Our results show that banks that issue dilutive CoCos exhibit weaker long-term equity performance, although this underperformance reverses during periods of elevated aggregate uncertainty. 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 over a three year look-back window. During periods of low aggregate uncertainty associated with contingent trigger events, these portfolios yield a statistically significant (at the 5% level) negative alpha of over 94 basis points monthly, reflecting the higher adverse selection costs of issuing dilutive CoCos. Conversely, during periods of high aggregate uncertainty, 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 benefits of managerial incentives to prevent the conversion of dilutive CoCos.

We find analogous patterns in the bond market. Specifically, dilutive CoCos trade at higher yields in the secondary market, consistent with the CoCo pecking order. However, this yield premium narrows during periods of elevated aggregate uncertainty. A complementary bond portfolio analysis, in which we take a long position in dilutive CoCos and a short position in nondilutive CoCos with monthly rebalancing, yields results similar to the equity portfolio analysis. That is, the portfolio delivers higher returns during periods of high Global Economic Policy Uncertainty (EPU) compared to periods of low EPU, suggesting that the embedded managerial incentives are also valued by CoCo investors.

Lastly, we examine the systemic risk implications of dilutive CoCos. Consistent with the incentive-alignment features embedded in their design, we find that issuance of dilutive CoCos is negatively associated with the $\Delta CoVaR$ systemic risk measure of Adrian and Brunnermeier (2016). That is, issuers of dilutive CoCos exhibit a lower marginal contribution to systemic risk, supporting the view that they mitigate managerial risk-taking incentives and, in turn, enhance macroprudential stability.

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, 2003), 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, whereas the 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.

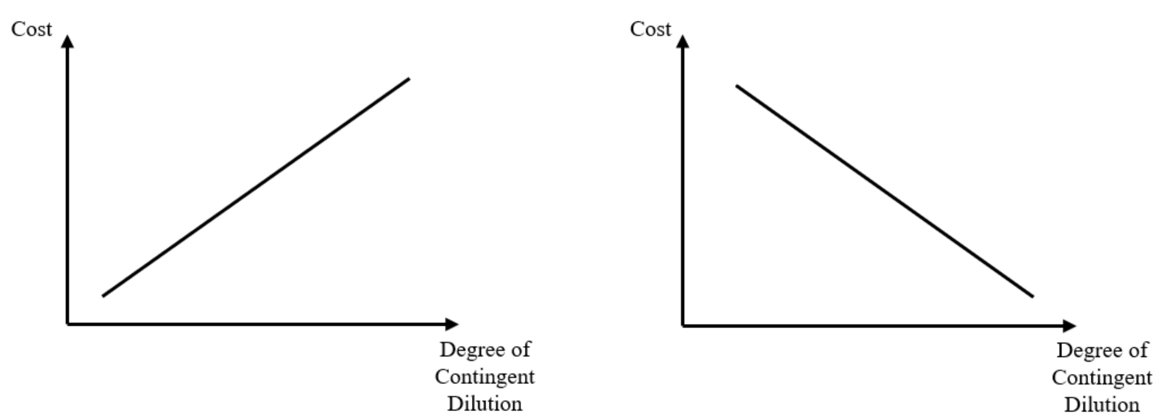
The rest of the paper is organized as follows. Section 2 outlines the testable hypotheses. Section 3 details the data sources, sample construction, and summary statistics. Section 4 presents the empirical analysis of the pecking order in CoCo issuances. Section 5 explores the value of managerial incentive alignment inherent in dilutive CoCos. Section 6 concludes the paper.

2 Hypothesis Development

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. 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, 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. Second, 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).



Panel A: Adverse Selection Cost

Panel B: Agency Cost

Figure 1: Information Asymmetry Costs Across the Degree of Contingent Dilution

We argue that two opposing forces shape the pecking order properties of CoCos, which we empirically investigate in our paper. The first is adverse selection: more dilutive CoCos are more information-sensitive, raising issuance costs and leading banks to prefer less dilutive instruments (Panel A, Figure 1). This is the standard pecking order. The second is agency cost: more dilutive CoCos strengthen managerial discipline by heightening the threat of dilution, thereby mitigating risk-taking incentives, while nondilutive CoCos may exacerbate moral hazard due to their lack of a dilution trigger (Panel B, Figure 1). These contrasting forces suggest that markets will react differentially to CoCo issuance, depending on whether adverse selection or agency concerns are more salient.

3 Data, Measures, and Sample Description

3.1 Background: CoCo Security Design

At its inception, the history of CoCos was dominated by 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 conversion 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 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 in favor of shareholders and equal to their par value, 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 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 (though no obligations) 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 within the bank's entire CoCo capital structure. To illustrate this challenge, consider an issuer with three outstanding instruments at a common 5.125% mechanical trigger level but with three different loss absorption mechanisms: equity conversion, 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 CoCo 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

[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).

written down at all. If further loss absorption capacity was 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 et al. (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 may be the most valued type of contingent dilution. This 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.

[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).

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

[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%.

notional value without share conversions.

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 the notional values 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)

[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.

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 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-downs, not all equity conversion and temporary write-down CoCos are classified as

[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.

relatively dilutive.

In our sample, 67.4% of equity conversion CoCos and 28.3% of temporary write-down CoCos are classified as relatively dilutive. Importantly, we use the term *dilutive* in the context of our wealth transfer measure, rather than simply on the CoCo's loss absorption mechanism. This approach allows for consistent comparisons across CoCos with different contingent dilution features by benchmarking each instrument against a fully nondilutive alternative (i.e., any permanent write-downs). For example, while any triggered equity-converting CoCo will issue new shares and appear nominally dilutive, it may result in a net wealth transfer favoring equity holders only if the value of the equity received by CoCo holders is less than the bond's notional amount. Conversely, temporary write-down CoCos do not issue new shares, but if they are issued at the same trigger level as other CoCos (e.g., equity-converting or principal write-down instruments), they may absorb losses only after a deeper trigger breach, particularly if those other instruments are more junior. Thus, some temporary write-down CoCos fall into the lowest tercile of projected wealth transfer and are classified as dilutive, while certain equity-converting CoCos with very high conversion prices may not be. Our measure of contingent wealth transfer thus captures not only the loss absorption mechanism but also the dilution potential embedded in features such as the conversion price and *pari-passu* structure.

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

[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.

the issuer using ISINs and issuers' names. The stock price information is from Datastream matched using the bank's name and home country, and for equity converting CoCos we match to the equity security contractually specified by the prospectus. 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 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]

[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.

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 A Pecking Order in Contingent Convertible Bonds

4.1 Announcement Effects: Univariate Tests

Our first set of empirical tests investigates the pecking order among CoCos, as predicted in prior studies (Flannery, 2014; Avdjiev et al., 2020). To do so, we employ our contingent dilution measure (Section 3.2) to analyze both announcement returns and secondary market pricing. This approach is grounded in the broader literature on corporate capital structure, which emphasizes the interplay between market valuation and financing decisions (e.g., see Harris and Raviv, 1991; Frank and Goyal, 2008).[13]

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.[14] Panel A plots the CARs of the more dilutive CoCos in the sample ($Dilutive = 1$). Results show that issuance of the most dilutive tercile of CoCos lead 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.

[13] 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).

[14] 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).

[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. These findings support the interpretation that markets differentiate among CoCos based on their equity-like versus debt-like characteristics. More dilutive, equity-like CoCos elicit negative market reactions, whereas less dilutive, debt-like CoCos generate no significant response, consistent with the predicted pecking order among CoCos.

[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 findings suggest that the announcement effects primarily originate from the information that is made available after the announcement, such as specific conversion prices for equity converting CoCos.

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 (*Distance to trigger*), 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. 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^{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]

While we control for the coupon yield at issuance, a potential concern remains regarding differences in the pricing terms of dilutive versus non-dilutive CoCos. Specifically, if nondilutive CoCos offer more favorable pricing for banks, the observed negative market reaction for dilutive CoCos could reflect investor concerns about cost rather than dilution risk. We address this issue in detail in Sections 4.4 and 5.2.

To assess the robustness of our findings, we conduct two additional tests. First, Appendix A.2 reports results using alternative definitions of the indicator variable *Dilutive*. The main findings remain unchanged, indicating that our results are not sensitive to how *Dilutive* is defined. Second, we use the methodology employed by Avdjiev et al. (2020).[15] As shown in Appendix A.4, the results are consistent with those based on CARs (Table 3).

4.3 Dilutive CoCos and the Distance To Trigger Levels

In this section, we examine how the announcement effect varies with a bank's distance from the CoCo conversion trigger. We hypothesize that if information costs (Myers, 1984) are driving the negative announcement returns of dilutive CoCos, then banks with CET1 ratios closer to the conversion trigger will experience more negative market reactions upon issuance. Consider a bank with a Common Equity Tier 1 (CET1) ratio just above the conversion threshold, indicating that a CoCo trigger event may be imminent. If dilutive CoCos are perceived to rank low in the pecking order among CoCo instruments, investors are likely to react more negatively to their issuance. Such reactions reflect heightened investor sensitivity to information about the issuing bank's underlying quality, particularly when the risk of CoCo trigger event is higher.

[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, reported in Table 4, support the pecking order among CoCos by showing that the negative announcement effect varies systematically with a bank's proximity to the trigger level. For example, in Column

[15] 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]

1, the baseline estimate for *Dilutive* is -2.98%. This effect becomes more pronounced as a bank's CET1 ratio closer to the trigger. Specifically, a hypothetical bank with a CET1 ratio exactly at the trigger level is estimated to experience a –2.98% announcement return over the five-day window. In contrast, a bank with a CET1 ratio 10 percentage points above the trigger level is estimated to experience a smaller –1.04% announcement return. These findings suggest that banks closer to the conversion trigger are more susceptible to adverse market reactions when issuing dilutive CoCos.

Notably, 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.

4.4 The Hierarchy of CoCos and Legal Origins

In this section, we isolate the market's response to contingent dilution from potential confounding influences such as the issuer's credit risk and cost of capital. An ideal empirical design would observe instances in which the same issuer, within a relatively short period, issues both dilutive and non-dilutive CoCos. Such within-issuer comparisons would provide a clean test by holding constant issuer characteristics and isolating the market's reaction to each CoCo type.

Because such cases are rare, we leverage a plausibly exogenous variation in CoCo design: the legal origin of the issuing bank's home country. As shown in Figure 4, legal origin, which is largely predetermined for most banks, shapes persistent and distinct patterns in issuance choices. Panel A shows that banks incorporated in common law countries most frequently issue dilutive CoCos, whereas banks in French civil law countries (Panel B) predominantly issue non-dilutive CoCos. In other jurisdictions (Panel C), non-dilutive CoCos are likewise the most common.

[Figure 4 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 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 regression 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 et al., 1998). The benchmark legal origins are German civil law, Scandinavian civil law, and China. Control variables are from Equation (4).

[Table 5 about here]

Results are reported in Table 5. Column 1 shows that banks that are incorporated in common law countries tend to issue more dilutive CoCos. In Columns 2 and 3, we replace the dependent variable with an indicator variable, *Dilutive*, and estimate both a linear probability model and a probit specification. Consistent with Column 1, We find that banks incorporated in common law (French-civil law) countries are 35.0% (15.3%) more likely to issue more dilutive CoCos (Column 2).

A plausible explanation for this robust pattern lies in the renegotiation environment associated with legal origin. La Porta et al. (1998) document higher risks of government contract repudiation and weaker legal enforcement in both common law and French civil law countries.[17] These conditions may lead shareholders to favor CoCos that allow greater contractual flexibility to anticipate possible renegotiations, such as adjustments to the conversion price or ratio, in the event of bankruptcy. In contrast, nondilutive CoCos, such as

[17]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) a rule of law, (iii) low corruption, (iv) less risk of expropriation, and (v) less risk of contract repudiation by the government.

write-down CoCos, are inherently less flexible, as a write-off would simply cancel the claim, leaving less room to renegotiate.

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 5) 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 6 about here]

Panel A of Table 6 reports results from the second stage of this two-stage least square estimation (2SLS).[18] 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 6, 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

[18] 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).

standard deviation above the average distance from the trigger (approximately 10%) results in an announcement effect of -1.4%.

5 Managerial Incentives of Dilutive CoCos

5.1 Announcement Effects Under Uncertainty

Our findings thus far suggest the existence of a pecking order within CoCos. In light of the agency costs and managerial incentive issues associated with CoCos (see Section 2), this indicates that shareholders generally exhibit limited concern about the agency costs stemming from CoCo issuance.

However, our results do not necessarily imply that more dilutive CoCos are unrelated to agency costs. For instance, shareholders may weigh adverse selection costs against agency conflicts based on the perceived likelihood of a trigger event. When the probability of a trigger increases, shareholders may place greater value on the stronger managerial discipline provided by dilutive CoCos, to the extent that agency cost mitigation outweighs adverse selection concerns. Since CoCo-related agency costs tend to rise with the likelihood of a trigger (e.g., first-loss absorbing features become more relevant as a bank's risk of distress increases), the value of CoCos designed to address these costs should increase correspondingly under such conditions.

We test this by focusing on periods of elevated aggregate uncertainty. Such macroeconomic conditions are largely exogenous to individual bank decisions, thereby mitigating endogeneity concerns while still affecting the perceived likelihood of CoCo trigger events. To capture uncertainty that is particularly relevant to the anticipation of such events, thereby amplifying the value of managerial incentive alignment embedded in dilutive CoCos, we employ two measures of uncertainty that are particularly relevant to the anticipation of trigger events.

First, 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).

Second, we analyze periods characterized by increased volatility in the secondary market for CoCo yields. Since CoCo yields incorporate information about trigger risk, heightened volatility reflects growing investor concern over the probability of a trigger event. We construct an indicator variable, *CoCo Index Volatility High*, which equals one if the CoCo issuance announcement occurs during a period of elevated CoCo market volatility, and zero otherwise. Specifically, we measure volatility as the 100-day rolling standard deviation of Bloomberg's Global CoCo Bond Index. High-volatility periods are defined as those falling in the top tercile of this distribution over the 2014 to 2019 sample period.

[Table 7 about here]

The results are reported in Table 7. Panel A reports estimates using the EPU as our measure of uncertainty. We find that the negative announcement returns associated with issuing more dilutive CoCos are significantly attenuated or even reversed during periods of elevated regulatory uncertainty. For example, Column 4 shows that while issuing dilutive CoCos generates a -3.95% return over the 30-day window, this effect reverses to a +1.99% return when the issuance occurs during high-EPU periods.

In Panel B, we find similar effects when replacing EPU with an indicator equal to one if the volatility of Bloomberg's Global CoCo Bond Index falls in the highest tercile. In this case, the negative effect is dampened when uncertainty is high. Specifically, issuing a dilutive CoCo results in a -4.07% return over 30 days under normal volatility conditions, but the effect is reduced to 0.26% when the issuance occurs during periods of elevated index volatility.

These findings are consistent with bank shareholders valuing the managerial incentive-alignment mechanism embedded in dilutive CoCos. When the likelihood of a trigger event increases, perhaps due to heightened regulatory uncertainty, investors react more favorably to dilutive CoCo bond issues because such instruments have the potential to better align managerial incentives with shareholder interests.

5.2 Bank Stock Performance After CoCo Issuance

Next, we examine the subsequent stock price performance after issuing CoCos. If our results thus far reflect the pecking order among CoCos, banks that issue dilutive CoCos should exhibit relatively weaker equity performance, compared to banks that issue nondilutive CoCos, reflecting their poorer quality. Further, if investors value the managerial incentive-alignment feature of dilutive CoCos, then this weaker performance should reverse or dampen during periods of elevated aggregate uncertainty since investors value managerial incentive alignment of dilutive 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.[19] 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)[20]. The portfolio is rebalanced monthly. We construct the portfolios in October 2014 and continue until December 2021 because there are limited number of CoCo rollovers in the earlier part of our sample period

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

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

and CoCos were originally introduced in dilutive forms only.

We estimate the following time-series regression to evaluate the performance of our long-short portfolio:

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

Monthly portfolio excess returns are regressed on the Fama-French five-factor model using developed market factors.[21] The regression assesses the relative performance of banks that issue dilutive CoCos (long leg) versus those that issue nondilutive CoCos (short leg), controlling for differential exposures to systematic risk factors. We hypothesize that $\alpha < 0$, indicating that banks that issued more dilutive CoCos subsequently underperform, consistent with the interpretation that such issuance indicates weaker bank fundamentals.

Column 1 of Table 8 presents the results applying Equation (7). In Column 1, we find an underperformance of the long portfolio relative to the short portfolio in the amount of 37.8 basis points per month (statistically insignificant). This is consistent with banks issuing dilutive CoCos being of lower quality.

[Table 8 about here]

Next, we investigate the performance of the long-short portfolio during periods of heightened aggregate uncertainty related to contingent trigger events. We hypothesize that the portfolio's performance reverses in such periods. This would suggest that, under elevated uncertainty, shareholders place greater value on the managerial incentive alignment features embedded in dilutive CoCos.

We test this by including an indicator variable in Equation (7), denoted as *EPU High*, which takes a value of 1 if the Global Economic Policy Uncertainty Index (Baker et al., 2016)

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

is above the median and 0 otherwise. The regression equation for this model is as follows.

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

In this equation, α_0 captures the relative performance of banks issuing dilutive CoCos during periods of low policy uncertainty, while $\alpha_0+\alpha_1$ reflects their relative performance during high uncertainty periods. To test the robustness of our findings and capture different dimensions of uncertainty, we replace EPU High with two alternative proxies. The first, *CoCo Index Volatility High*, equals 1 if the 100-day rolling volatility of Bloomberg's Global CoCo Bond Index (I30902US) exceeds its sample median (2014–2021), and 0 otherwise. The second, *VIX High*, takes a value of 1 when the VIX is above its sample median, and 0 otherwise.

The results are reported in Columns 2 through 4 of Table 8. Column 2 shows that the long portfolio underperforms by 98.2 basis points per month, statistically significant at the 5% level, during periods when CoCo Index Volatility High equals 0. In contrast, during high-volatility periods (*CoCo Index Volatility High*= 1), the portfolio yields a positive excess return of 14.8 basis points per month (=1.13% - 0.982%). This finding supports the interpretation that banks issuing dilutive CoCos are generally of lower quality, but that investors value the incentive-alignment features of dilutive CoCos under heightened uncertainty.

In Column 3, we replace *CoCo Index Volatility High* with *EPU High* as an alternative proxy for uncertainty and obtain similar results. Consistent with Table 7, these findings suggest that managerial incentive alignments are particularly salient when concerns over trigger events are elevated. Column 4 reports results using VIX High as a broad measure of equity markets uncertainty. Although the estimates remain qualitatively similar, the joint significance $p-$value increases to 0.085, suggesting that the uncertainty most relevant to CoCo-related agency costs is more closely tied to concerns surrounding contingent trigger events (captured by *EPU High* or *CoCo Index Volatility High*) rather than general market volatility (VIX).

5.3 CoCo Bond Yields After Issuance

Our results thus far suggest that bank shareholders recognize the managerial incentive alignment features embedded in dilutive CoCos, which may help banks avoid the capital deterioration that could lead to trigger events. In this section, we turn to the pricing of CoCo bonds themselves to assess whether CoCo investors, who are arguably more directly exposed to trigger risk, also incorporate these incentive mechanisms into their calculations. This analysis is essential, as the validity of the pecking order and the value of managerial incentives embedded in dilutive CoCos hinges on a shared understanding among all market participants regarding the valuation of CoCos.

We hypothesize that dilutive CoCos are associated with higher yields, reflecting the issuers' quality. Further, we predict that the yield differences between dilutive and nondilutive CoCos narrows during periods of heightened aggregate uncertainty. This convergence is consistent with investors placing greater value on the incentive-alignment features of dilutive CoCos, which may mitigate the likelihood of trigger events during uncertain times.

To test this, we analyze monthly CoCo bond yields using the following regression equation:

$$\begin{aligned} Yield_{c,t} = & \beta_1 Dilutive_{c,t} + \beta_2 Dilutive_{c,t} \times EPU\ High_t \\ & + \beta_3 EPU\ High_t + \eta_{b,t} + \lambda_{f,t} + \gamma_{f,t} + \varepsilon_{i,t}. \end{aligned} \tag{9}$$

The dependent variable, *Yield*, is the monthly CoCo bond yields. For the aggregate uncertainty measure, we apply *EPU High* that equals 1 if the Global Economic Policy Uncertainty Index (Baker et al., 2016) is above the median and 0 otherwise.[22] To account for issuers' credit risks and currency risks associated with the CoCos, our most rigorous specification includes bank-month fixed effects, currency of the issuer's country of incorporation fixed effects, and CoCo currency fixed effects.

[Table 9 about here]

[22] In the CoCo bond yield analysis, we do not use *CoCo Index Volatility High* because of endogeneity issues.

Panel A of Table 9 reports the results. Each column applies Equation (9) but with different fixed effects. Across all columns, we find that dilutive CoCos trade at higher yields, but such difference dampens during periods of heightened uncertainty. For instance, in our most rigorous specification (Column 4), we find that dilutive CoCos trade at a 23.6 basis points higher yield, but this yield gap becomes economically insignificant (0.2 basis points) during periods when EPU is high.

We further examine the pricing implications of dilutive CoCos in a time-series setting by analyzing the monthly yield differential between dilutive and nondilutive CoCos. This allows us to rule out concerns that our yield results are driven by outliers. Specifically, we construct an equally weighted long position in dilutive CoCos and a short position in nondilutive CoCos, calculating the monthly change in average yield for each position. The resulting differential in yield changes increases when the long portfolio (dilutive CoCos) underperforms relative to the short portfolio (nondilutive CoCos), and vice versa.

We use this differential in yield changes as the dependent variable in the following time-series regression:

$$\begin{aligned} \textit{Differential in Yield Change}_t = \alpha_0 + \alpha_1 EPU_t + \beta_0 \textit{10Y-2Y Spread} \\ + \beta_1 Market_t + \beta_2 Size_t + \beta_3 Value_t + \beta_4 Profit_t + \beta_5 Investment_t + \varepsilon_t. \end{aligned} \tag{10}$$

We hypothesize that $\alpha_0 > 0$ and $\alpha_1 < 0$, indicating that the dilutive CoCo bond yield performance will be poorer on average ($\alpha_0 > 0$), but it will reverse during periods of aggregate uncertainty ($\alpha_1 < 0$).

Panel B of Table 9 presents the results, with each column incrementally adding time-series factors. Across all specifications, we find that the yield spread between dilutive and nondilutive CoCos tends to widen during periods of low aggregate uncertainty ($\alpha_0 > 0$), but tighten when uncertainty is elevated ($\alpha_1 < 0$). Notably, in Column 4, the estimated yield spread between dilutive and nondilutive CoCos is expected to narrow under high uncertainty. These findings suggest that CoCo bond investors, like shareholders, recognize and price the managerial incentive alignment features embedded in dilutive CoCos.

5.4 Dilutive CoCos and Systemic Risk

In this section, 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, while our findings thus far suggest that shareholders and CoCo bond investors price the managerial incentive alignment of dilutive CoCos at times, 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:

$$Systemic\ Risk_{j,t+1} = \beta_1 Diluive_{j,t} + Controls_{j,t} + \varepsilon_{j,t+1} \tag{11}$$

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.[23]

[Table 10 about here]

The results are presented in Table 10. Column 1 shows that, relative to nondilutive CoCos, dilutive CoCos are more negatively associated with the issuing bank's contribution

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

to systemic risk. This finding suggests that dilutive CoCos play a greater role in mitigating systemic risk, particularly through reduced interconnectedness. Columns 2 and 3 present results using the average post-announcement Marginal Expected Shortfall (MES), evaluated at the 95% and 99% thresholds, respectively. While we find that potential capital shortfall is more positively associated with dilutive CoCos than with nondilutive CoCos, the estimates are not statistically significant. Taken together, the results suggest that dilutive CoCos may contribute more effectively to reducing bank interconnectedness, thereby supporting financial stability.

6 Conclusion

This paper provides novel evidence on the existence of a pecking order in contingent convertible bonds (CoCos), demonstrating that market participants distinguish sharply between dilutive, equity-like CoCos and non-dilutive, debt-like CoCos. Using a comprehensive dataset, we show that dilutive CoCos are consistently associated with negative announcement returns, with effects that grow in magnitude over longer event windows. By contrast, non-dilutive CoCos elicit no significant equity market reaction. These results are robust to multiple empirical specifications, including regressions controlling for issuer characteristics, alternative definitions of dilutiveness, and an instrumental-variables approach exploiting variation in legal origin.

Our findings further highlight the role of managerial incentive alignment mechanisms embedded in dilutive CoCos. Specifically, while dilutive CoCos are generally penalized by markets under normal conditions, we show that investor reactions are significantly attenuated, and can even reverse, during periods of heightened regulatory or market uncertainty. In such environments, shareholders and bondholders appear to value the incentive-alignment features of dilutive CoCos, recognizing their potential to discipline management and mitigate agency costs when the probability of a trigger event is elevated. Consistent with this interpretation, banks issuing dilutive CoCos tend to underperform in normal times but show relative resilience during high-uncertainty periods, and CoCo bond yield spreads likewise narrow in such cases. Importantly, we find that dilutive CoCos are more strongly associated with reductions in systemic interconnectedness, suggesting that these instruments can play a stabilizing role for the broader financial system. These findings suggest that the valuation and effectiveness of CoCos are state-contingent: dilutive structures are costly when uncertainty is low but become valuable tools of incentive alignment and systemic risk mitigation when uncertainty is high.

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.

References

Adrian, Tobias and Brunnermeier, Markus K. CoVaR. *The American Economic Review*, 106(7):1705–1741, 2016.

Allen, Linda and Golfari, Andrea. Do Cocos serve the goals of macroprudential supervisors or bank managers? *Journal of International Financial Markets, Institutions and Money*, 84:101761, 2023.

Ammann, Manuel; Blickle, Kristian, and Ehmann, Christian. Announcement effects of contingent convertible securities: Evidence from the global banking industry. *European Financial Management*, 23(1):127–152, 2017.

Asquith, Paul and Mullins, David W. Equity issues and offering dilution. *Journal of Financial Economics*, 15(1):61–89, 1986.

Avdjiev, Stefan; Bogdanova, Bilyana; Bolton, Patrick; Jiang, Wei, and Kartasheva, Anastasia. CoCo issuance and bank fragility. *Journal of Financial Economics*, 138(3):593–613, 2020.

Baker, Scott R.; Bloom, Nicholas, and Davis, Steven J. Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics*, 131(4):1593–1636, 2016.

Basel Committee on Banking Supervision, . Basel III annex - Minimum requirements to ensure loss absorbency at the point of non-viability. https://www.bis.org/press/p110113.pdf, 2011.

Berg, Tobias and Kaserer, Christoph. Does contingent capital induce excessive risk-taking? *Journal of Financial Intermediation*, 24:884–904, 2015.

Bolton, Patrick; Jiang, Wei, and Kartasheva, Anastasia. The Credit Suisse CoCo Wipeout: Facts, Misperceptions, and Lessons for Financial Regulation. *Journal of Applied Corporate Finance*, Forthcoming, 2023.

Calomiris, Charles W. and Herring, Richard J. How to Design a Contingent Convertible Debt Requirement That Helps Solve Our Too-Big-to-Fail Problem. *Journal of Applied Corporate Finance*, 25:39–62, 2013.

DeAngelo, Harry. The Capital Structure Puzzle: What Are We Missing? *Journal of Financial and Quantitative Analysis*, 57(2):413–454, 2022.

Eckbo, E. Valuation Effects of Corporate Debt Offerings. *Journal of Financial Eoconomics*, 15:119–152, 1986.

Flannery, Mark J. No pain, no gain? Effecting market discipline via reverse convertible debentures. *Capital Adequacy Beyond Basel: Banking, Securities, and Insurance*, page 171–196, 2005.

Flannery, Mark J. Contingent capital instruments for large financial institutions: A review of the literature. *Annual Review of Financial Economics*, 6(1):225–240, 2014.

Flannery, Mark J. Stabilizing Large Financial Institutions with Contingent Capital Certificates. *Quarterly Journal of Finance*, 1:1–26, 2016.

Flannery, Mark J. and Perotti, E. Coco Design as a Risk Preventive Tool. *Duisenberg School of Finance Policy Paper Series*, ZDB-ID 2624171-7(11):1–9, 2011.

Frank, Murray Z. and Goyal, Vidhan K. Testing the pecking order theory of capital structure. *Journal of Financial Economics*, 67:217–248, 2003.

Frank, Murray Z. and Goyal, Vidhan K. Trade-off and pecking order theories of debt. *Handbook of empirical corporate finance*, pages 135–202, 2008.

French, Kenneth R.; Baily, Martin N.; Campbell, John Y.; Cochrane, John H.; Diamond, Douglas W.; Duffie, Darrell; Kashyap, Anil K; Mishkin, Frederic S.; Rajan, Raghuram G.; Scharfstein, David S.; Shiller, Robert J.; Shin, Hyun Song; Slaughter, Matthew J.; Stein, Jeremy C., and Stulz, René M. *Chapter 7. An Expedited Mechanism to Recapitalize Distressed Financial Firms: Regulatory Hybrid Securities*, pages 86–94. Princeton University Press, Princeton, 2010. ISBN 9781400835805. doi: doi:10.1515/9781400835805-009. URL https://doi.org/10.1515/9781400835805-009.

Glasserman, Paul and Nouri, Behzad. Contingent Capital with a Capital-Ratio Trigger. *Econometrica*, 84(6):2113–2153, 2016.

Goncharenko, Roman. Fighting Fire with Gasoline: CoCos in Lieu of Equity. *Journal of Money, Credit and Banking*, 54(2-3):493–517, 2022.

Goncharenko, Roman; Ongena, Steven, and Rauf, Asad. The agency of CoCos: Why contingent convertible bonds are not for everyone. *Journal of Financial Intermediation*, 48, 2021.

Harris, Milton and Raviv, Artur. The theory of capital structure. *The Journal of Finance*, 46(1):297–355, 1991.

Hasse, Jean-Baptiste. SystemicR: Monitoring systemic risk. 2020. URL https://CRAN.R-project.org/package=SystemicR.

Ho, Daniel E.; Imai, Kosuke; King, Gary, and Stuart, Elizabeth A. priceR: Economics and pricing tools. 2022. URL https://CRAN.R-project.org/package=priceR.

James, Christopher. Some evidence on the uniqueness of bank loans. *Journal of Financial Economics*, 19(3):217–235, 1987.

Jensen, Michael C. and Meckling, William H. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4):305–360, 1976.

Jung, Kooyul; Kim, Yong-Cheol, and Stulz, René M. Timing, investment opportunities, managerial discretion, and the security issue decision. *Journal of Financial Eoconomics*, 42(2):159–185, 1996.

La Porta, Rafael; Lopez-de-Silanes, Florencio; Shleifer, Andrei, and Vishny, Robert W. Law and Finance. *Journal of Political Economy*, 106(6):1113–1155, 1998.

Liao, Qunfeng; Mehdian, Seyed, and Rezvanian, Rasoul. An examination of investors' reaction to the announcement of coco bonds issuance: A global outlook. *Finance Research Letters*, 22:58–65, 2017.

McDonald, Robert L. Contingent Capital With a Dual Price Trigger. *Journal of Financial Stability*, 9(2):230–241, 2013.

Myers, Stewart and Shyam-Sunder, Lakshmi. Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics*, 51(2):219–244, 1999.

Myers, Stewart C. The capital structure puzzle. *The Journal of Finance*, 39(3):574–592, 1984.

Myers, Stewart C. Financing of corporations. *Handbook of the Economics of Finance*, 1: 215–254, 2003.

Myers, Stewart C. and Majluf, Nicholas S. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2):187–221, 1984.

Pennacchi, George and Tchistyi, Alexei. Contingent Convertibles with Stock Price Triggers:

The Case of Perpetuities. *The Review of Financial Studies*, 32(6):2302–2340, 08 2018. ISSN 0893-9454. doi: 10.1093/rfs/hhy092. URL https://doi.org/10.1093/rfs/hhy092.

Sundaresan, Suresh and Wang, Zhenyu. On the Design of Contingent Capital with a Market Trigger. *The Journal of Finance*, 70(2):881–920, 2015.

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

This 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.

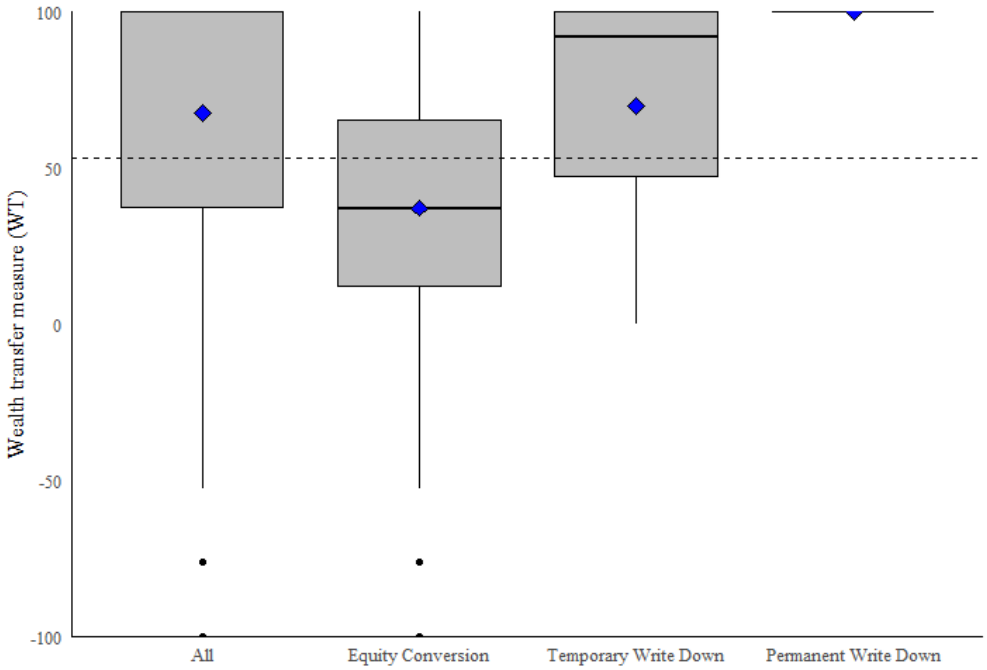
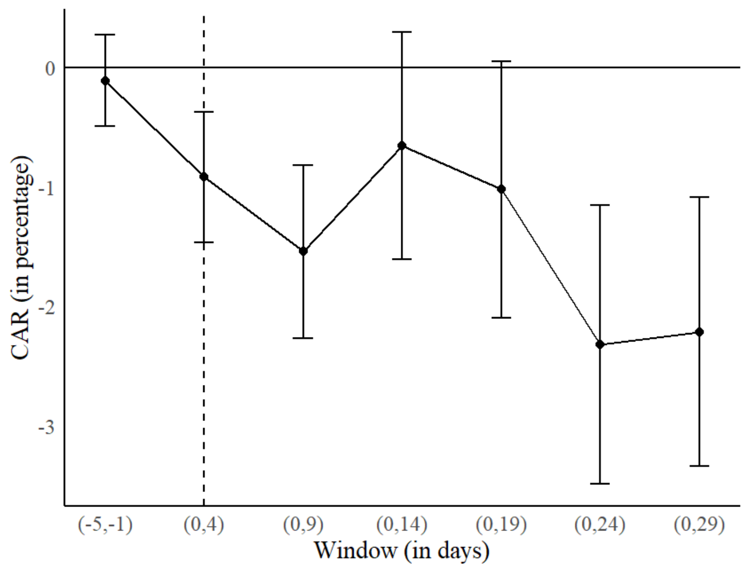
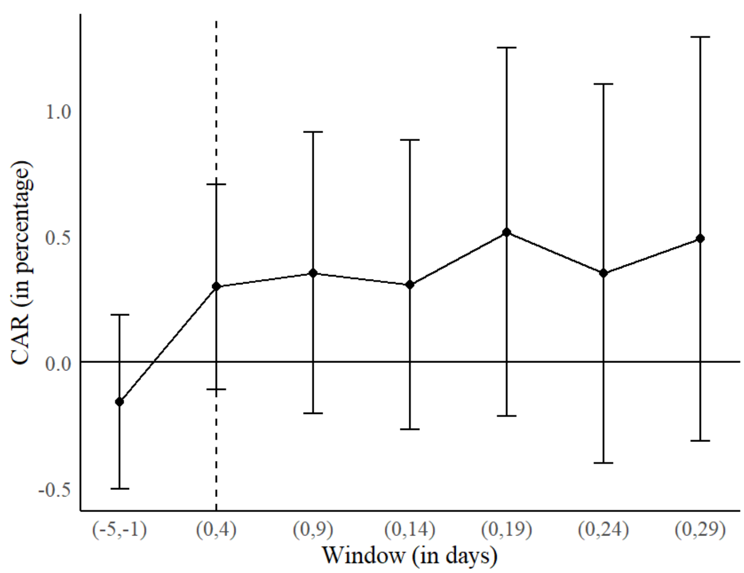


Figure 3: Cumulative Abnormal Returns: By *Dilutive*

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.



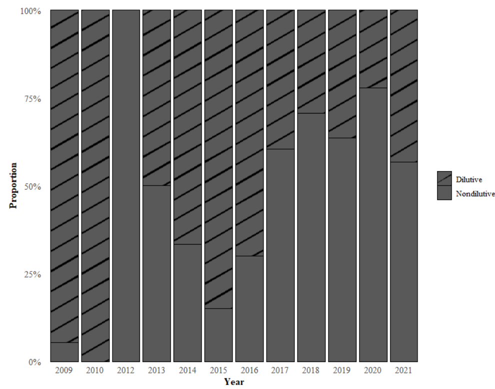
Panel A: *Dilutive* = 1



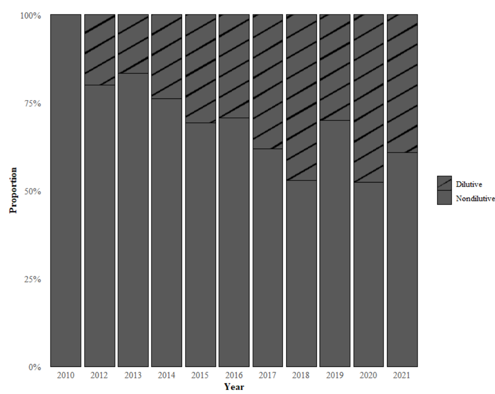
Panel B: *Dilutive* = 0

Figure 4: Porportion of Dilutive CoCo Issues: By Legal Origin

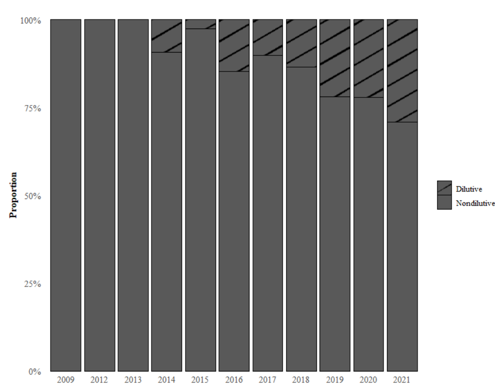
This figure plots the yearly proportion of dilutive and nondilutive CoCo issues by legal origin. The striped bars represent the proportion of dilutive CoCos (*Dilutive* = 1) and the solid bars represent nondilutive CoCos (*Dilutive* = 0). Panel A plots banks incorporated in common law origin countries. 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 in %)

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 C. 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 (%)		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)
	(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 based on *Distance to trigger*, *Dilutive*, and the interaction term when *Dilutive* equals 1. 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)
	(1)	(2)	(3)	(4)
Dilutive	-2.98***	-3.48***	-4.61***	-6.54***
	(0.616)	(1.03)	(1.47)	(1.49)
Distance to trigger × Dilutive	0.323***	0.274**	0.512***	0.671***
	(0.084)	(0.134)	(0.174)	(0.180)
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 (*Dilutive* = 1):				
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: 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 6: Cumulative Abnormal Returns, CoCo Dilutiveness, and Legal Origins: 2SLS

This table examines the causal impact of CoCo dilutiveness on equity value. 1st stage estimates are provided in Column 2 of Table 5. 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 based on *Distance to trigger*, *Dilutive*, and the interaction term when *Dilutive* equals 1. 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)
	(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 (%)			
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 7: Cumulative Abnormal Returns and Aggregate Uncertainty

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. Panel A reports results using *CoCo Index Volatility High* as the uncertainty measure. Panel B reports 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 based on *Developed*, *Dilutive*, *CoCo Index Volatility High*, and the interaction terms when *Dilutive* equals 1. 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. Global Economic Policy Uncertainty				
Dependent Variables:	Cumulative abnormal returns (%)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Dilutive	-0.982**	-2.91***	-3.02***	-3.95***
	(0.384)	(0.538)	(0.817)	(0.889)
Dilutive × EPU high	0.375	4.01***	5.75***	5.94***
	(0.669)	(1.10)	(1.56)	(1.49)
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 B. CoCo Market Volatility				
Dependent Variables:	Cumulative abnormal returns (CAR)			
Window:	(-2,2)	(0,9)	(0,19)	(0,29)
Model:	(1)	(2)	(3)	(4)
Dilutive	-1.25**	-3.55***	-3.28***	-4.07***
	(0.550)	(0.770)	(0.880)	(1.05)
Dilutive × CoCo Index Volatility High	1.21*	4.15***	2.76**	4.33***
	(0.696)	(1.09)	(1.29)	(1.41)
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

Table 8: Monthly Long-Short Portfolio Returns and Aggregate Uncertainty

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

Table 9: CoCo Bond Yields and Aggregate Uncertainty

This table examines the monthly bond yields, bond yield change differentials, and aggregate uncertainty. In Panel A, the dependent variable is monthly individual bond yields. In Panel B, the dependent variable is the monthly average yield differentials between dilutive and nondilutive CoCos. The variable *EPU High* is an indicator variable that equals 1 if the Economic Uncertainty Index is above the median. The variable *10Y-2Y Spread* is the difference between 10-year and 2-year treasury rates. 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.

Panel A. Monthly Individual CoCo Bond Yields

Dependent variables:	Monthly CoCo Bond Yield (%)			
	(1)	(2)	(3)	(4)
Dilutive	1.81***	2.09***	0.236***	0.236**
	(0.060)	(0.275)	(0.091)	(0.104)
Dilutive × EPU High	-0.176**	-1.79***	-0.234**	-0.234**
	(0.075)	(0.280)	(0.097)	(0.111)
EPU High	-0.648***			
	(0.058)			
Issuer × Time FE	–	Yes	Yes	Yes
Bank Currency × Time FE	–	–	Yes	Yes
CoCo Currency × Time FE	–	–	Yes	Yes
Bank Incorporated Country × Time FE	–	–	–	Yes
Adjusted R^2	0.106	0.842	0.897	0.866
Observations	21,291	21,291	21,291	21,291

Panel B. Monthly Changes in Yield Differentials Between Dilutive and Nondilutive CoCos

Dependent variables:	Monthly Differentials in Yield Changes (%)			
	(1)	(2)	(3)	(4)
Intercept	0.072*	0.057*	0.055*	0.043
	(0.037)	(0.030)	(0.030)	(0.031)
EPU High	-0.087**	-0.082**	-0.078**	-0.078**
	(0.038)	(0.032)	(0.033)	(0.033)
10Y-2Y Spread		0.014	0.016	0.028
		(0.035)	(0.036)	(0.037)
Market			-0.003	-0.002
			(0.004)	(0.004)
Size				-0.014
				(0.014)
Value				-0.007
				(0.008)
Profit				-0.009
				(0.010)
Investment				0.004
				(0.011)
Adjusted R^2	0.073	0.064	0.061	0.041
Observations	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$(t+1)$ (1)	MES95$(t+1)$ (2)	MES99$(t+1)$ (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
Δ*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: 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