

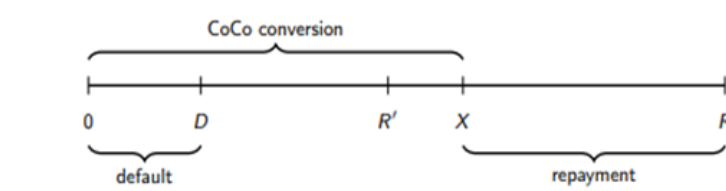
# Non-dilutive CoCo Bonds: A Necessary Evil?

Andrea Gamba, Yanxiong Gong, Kebin Ma  
Warwick Business School

## Abstract

We empirically document and theoretically investigate why non-dilutive CoCos are prevalent, even though advocates of CoCos suggest such securities should be dilutive to reduce bank risk-taking. In an agency model with two subsequent moral hazards, we show that while dilutive CoCos deter ex-ante risk-taking and prevent a bank from being undercapitalized, penalizing existing shareholders with dilution when the bank is already undercapitalized leads to risk shifting. CoCos' designs and risk implications depend on banks' equity capitalization, with non-dilutive CoCos particularly attractive to capital-constrained banks, because such securities can maximize the banks' financing capacity by tackling only the ex-post risk shifting.

## CoCo Designs



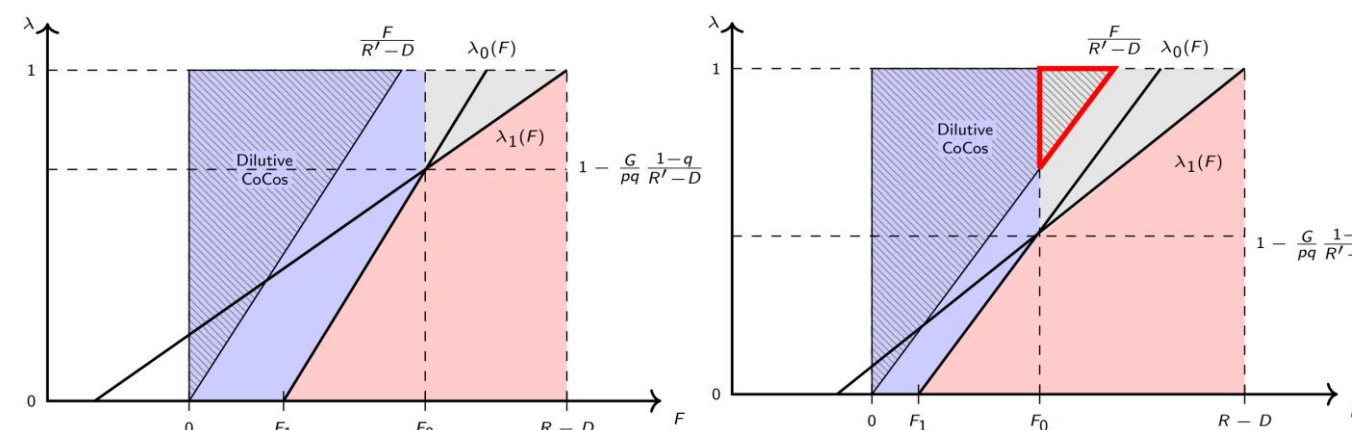
Cash flow	Banker	CoCo investors	Depositors	FDIC
R	$R - D - F$	F	D	0
R'	$(1 - \lambda)(R' - D)$	$\lambda(R' - D)$	D	0
0	0	0	D	-D

- X: conversion trigger CoCos are going-concern securities:  $X > R' > D$
- F: face value in the non-conversion state (R)
- $\lambda$ : fraction of shares to CoCo holder at conversion (R')
- A CoCo bond is dilutive if  $\lambda(R' - D) > F$

**Necessary Evil: a compromise in design that sacrifices ideal risk management for financing capacity.**

### Key Messages:

- Capital-constrained banks prefer the necessary-evil design of CoCo bonds because of its high financing capacity.
- The necessary-evil design must be non-dilutive.
- Non-dilutive CoCos discourage ex-post risk-shifting regardless of banks' equity capitalization.
- Dilutive CoCos avoid both ex-ante and ex-post risk-shifting when the bank is well-capitalized.
- Dilutive CoCos fail to correct incentives when the bank is undercapitalized.



\* In Figure 1-2, blue, red and grey zones represent possible designs of safe, necessary evil and risk-shifting, respectively.

## Empirical Strategy

- Use (all-in-drawn) loan spreads from the syndicated loan market.
- CoCo issuances by G-SIBs from 2009 to 2019
- Treatment: bank being in a country where CoCo is AT1
- Event: issuance of CoCo (first occurrence in 2013)
- Each bank has its own event date.
- Empirical model at loan level:

$$Spread_{i,b,l,t} = \alpha_{b,t} + \beta_0 Treat_{i,t} + \beta_1 DiD_{i,t-1} + \beta_2 DiD_{i,t-1} * Treat_{i,t} + \gamma_1 X_{i,t-1} + \gamma_2 Y_{i,t} + \epsilon_{i,b,l,t}$$

[loan facility i, borrower b, lender l, year t]

## Empirical Findings

- CoCo issuers charge higher loan spreads than non-issuers.
- Well-capitalized CoCo issuers charge lower spreads compared to undercapitalized CoCo issuers.
- CoCo issuance reduce banks' risk appetite in lending activities.

VARIABLES	(1)	(2)	(3)	(4)	(5)
Post (DiD)	0.00281** (2.260)	0.0222*** (3.097)	0.0200*** (3.809)	0.0203*** (3.654)	0.0205*** (3.596)
Tier 1	0.00150*** (3.827)	0.00203*** (4.447)	0.00168*** (5.088)	0.00153*** (5.461)	0.00154*** (5.461)
Post-Tier 1		-0.00134*** (-2.767)	-0.00120*** (-3.208)	-0.00122*** (-3.067)	-0.00123*** (-3.030)
Treat	0.00178 (0.796)	0.00205 (0.977)	0.00229 (1.411)	0.00234 (1.185)	0.00218 (1.417)
Size				0.000512 (0.413)	0.000376 (0.271)
Deposits and Short-term Funding				-1.78e-06 (-0.984)	-1.32e-06 (-0.648)
Facility Amount			-0.0144*** (-9.560)	-0.0144*** (-9.555)	-0.0144*** (-9.556)
Net Income					-2.97e-05 (-0.246)
Constant	5.290*** (791.1)	5.283*** (703.8)	5.302*** (316.5)	5.302*** (264.7)	5.302*** (250.9)
Observations	79,253	79,253	79,253	79,253	79,253
R-squared	0.949	0.949	0.958	0.958	0.958
Borrower*Year FE	YES	YES	YES	YES	YES
Loan Type	No	No	YES	YES	YES
Primary purpose	No	No	YES	YES	YES

Robust t-statistics in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Contingent Convertibles(CoCos)

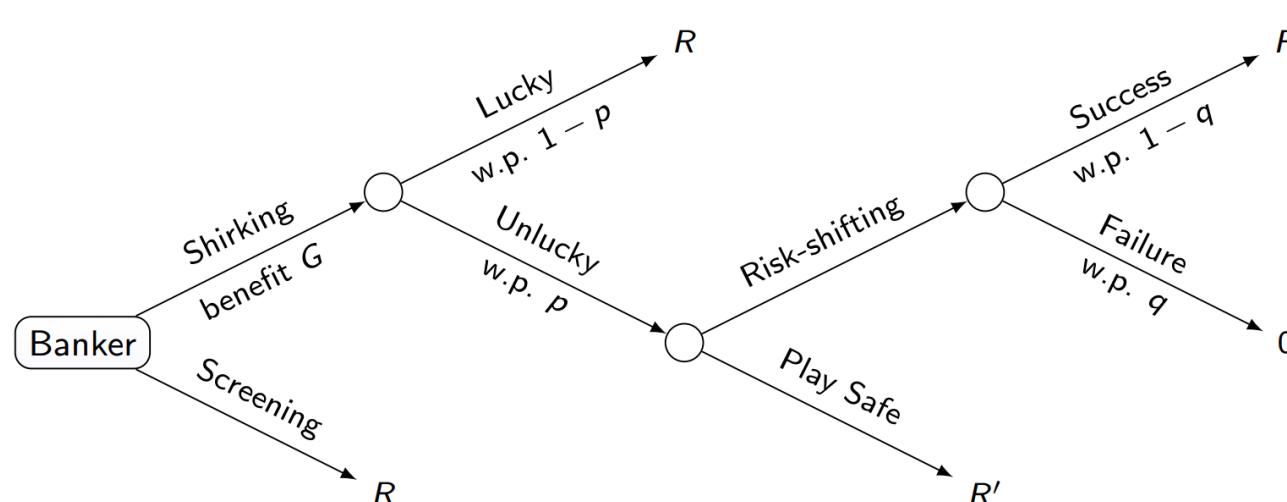
- Hybrid securities:
  - pay out like debt if the bank's Common Equity Tier 1 (CET1) over RWA above a trigger (e.g., 5.125%); otherwise,
  - converted to equity at a pre-set share ratio (Equity Conversion), or temporarily/permanently written off (Principle-Write Down/PWD).
- Additional Tier 1 (AT1) capital designation in Basel III
  - loss-absorbing capacity (unambiguous),
  - correcting risk-taking incentives (more debatable).
- Non-negligible part of regulatory capital:
  - 2009-20, non-US banks issued CoCos with a total face value of \$580 billions
  - G-SIBs alone contributing to about 50% of the total amount.

Bank (parent company)	Active CoCos (equity conversion)	% as Tier 1 capital	Conversion price	Market price of bank stock (as on 20 Apr 2020)
HSBC	13	13.59%	£2.70 per share	£4.16 per share
Barclays	11	19.57%	£1.65 per share	£0.91 per share
Lloyds	7	17.37%	£0.63 per share	£0.31 per share
RBS	3	11.32%	£2.28 per share	£1.33 per share
Standard Chartered	4	12.80%	£5.96 per share	£4.09 per share

Table 1: CoCos in UK banks

## Agency Problem

- Owner/manager banker, with endowment E and access to insured retail deposits D, runs a bank by investing in \$1 loan portfolio.
- Assuming  $D + E < \$1$ , she raises external financing by issuing CoCos.
  - We will compare CoCos to other forms of regulatory capital.
- Banker's moral hazard problems:
  - Inefficient ex-ante shirking
  - Ex-post risk-shifting



## AT1 designation of CoCos

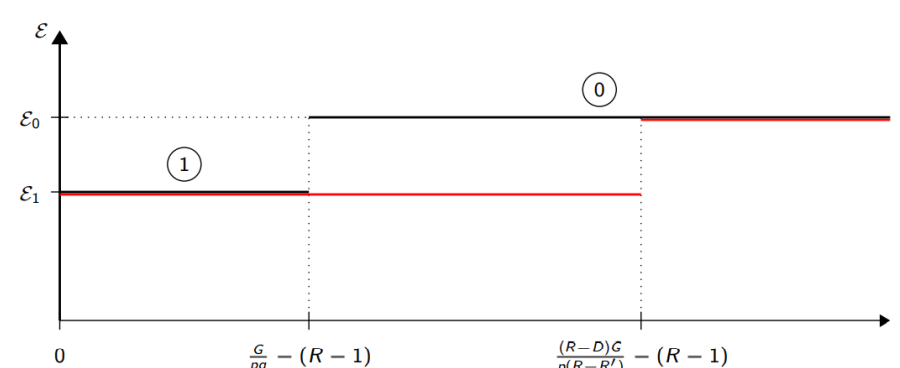


Figure 3: CoCo vs Non-voting Shares\*\*

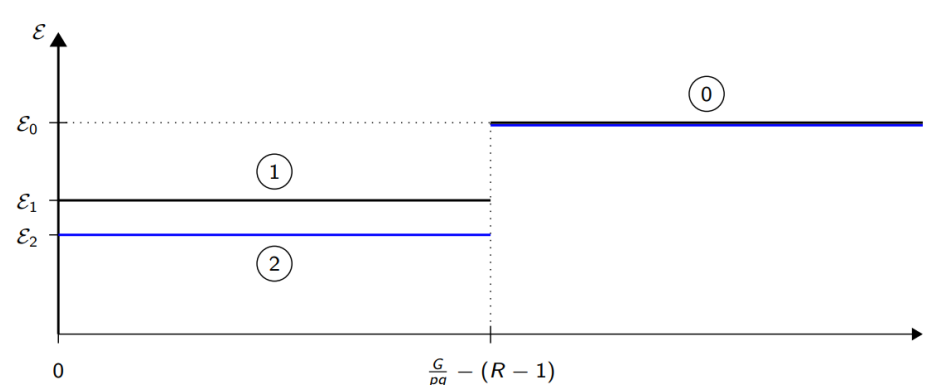


Figure 4: CoCo vs Subordinated Debt\*\*

\*\* In Figure 3-4, the numbers stand for the number of moral hazard problems allowed under the design. black, red and blue lines represent possible designs of CoCo, non-voting shares and subordinated debt, respectively.

## Conclusion

- The prevalence of non-dilutive CoCos:
  - We emphasize agency costs and financing capacity;
  - We show that non-dilutive CoCos offer higher financing capacities and therefore are preferred (necessary evil) by constrained banks;
- Evaluate and rationalize CoCos designation in the (AT1) capital stack:
  - better than subordinate debt and equity;
  - CoCos are no substitute for bank equity.

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