Corporate Debt Structure, Access to Credit, and Monetary Policy

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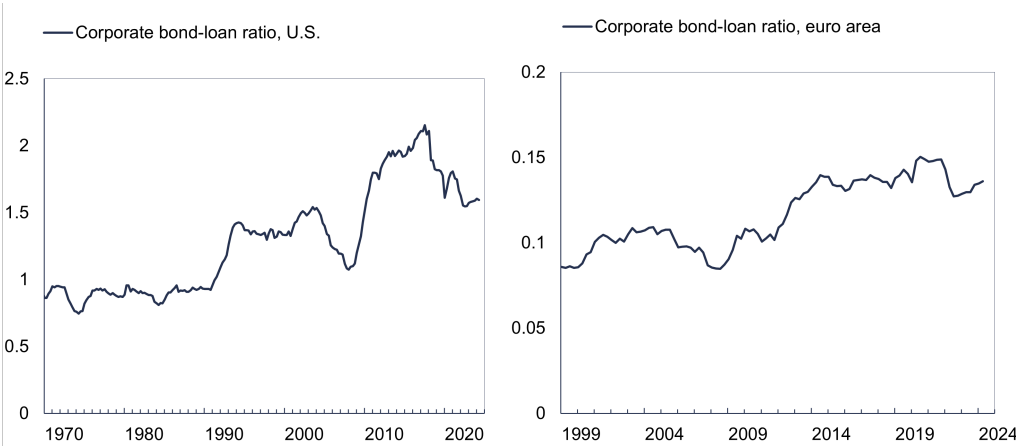
Work in progress

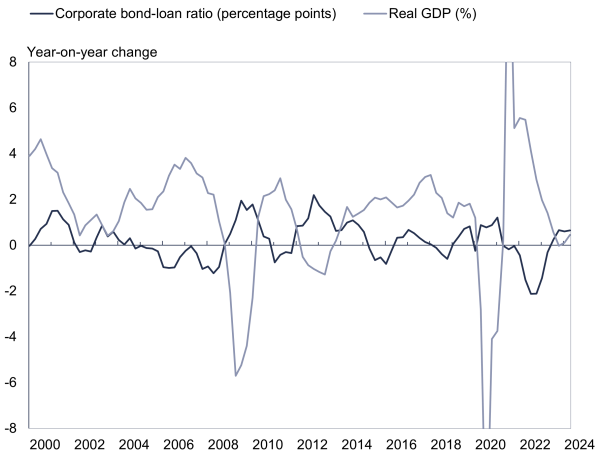
The views expressed in this paper are solely those of the authors and do not necessarily reflect the views of the Bank of Finland.

Corporate bond-to-loan ratio in the US and the euro area



Sources: Eurostat, Federal Reserve, authors' calculations.

Cyclicality of corporate debt structure in the euro area



Source: Eurostat, authors' calculations.

$$corr(B/L, GDP) = -0.45$$
$$corr(B\ flows, GDP) = -0.12$$
$$corr(L\ flows, GDP) = 0.38$$

Similar rebalancing following MP shocks: Becker and Ivashina (2014), Holm-Hadulla and Thürwächter (2020), Lhuissier and Szczerbowicz (2021).

This paper's contribution

New Keynesian model with endogenous corporate debt structure, in which:

- firms' access to credit and optimal choice between direct (bond-based) and intermediated (bank-based) finance is endogenous to the state of the economy (**optimal corporate debt structure**)
- bank equity matters and is not a substitute for deposits or debt (**bank lending channel**)
- banks face aggregate risk and cover for depositors, making bank leverage operational
- firms operate within an otherwise standard New Keynesian environment

Key takeaways

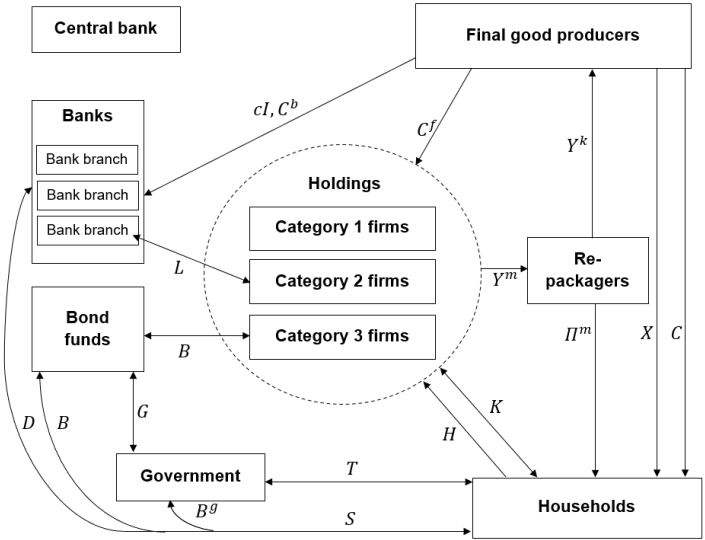
Our model rationalizes key empirical facts about corporate debt cyclicality:

- rebalancing from bank loans towards bonds following a contractionary MP shock
- bank loans become more expensive relative to bonds

The model allows us to ask counterfactual questions:

- How does the corporate debt structure affect MP transmission and its strength?
- What is the role of substitution between modes of external finance (intensive margin) and the access to external finance (extensive margin) in MP transmission?

Overview of the model economy



Financial frictions 1/4: firms need external funding

Intermediate good producing firms face a **cash-in-advance constraint**:

- face a common nominal working capital requirement I to produce in $t+1$
- obtain a common nominal amount of equity $K_t^f < I$ from parent holding
- obtain an idiosyncratic public signal ω_t^i about its future productivity z_{t+1}^i

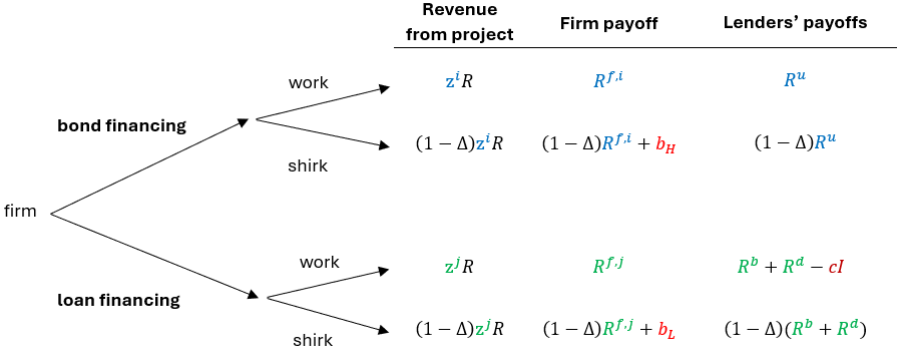
Financial friction 2/4: noisy signals and idiosyncratic default risk

$$\omega_t^i = z_{t+1}^i \epsilon_t^i$$

- A firm may turn out to be unable to repay its creditors *ex post* (low z_{t+1}^i) even though it appeared solvent *ex ante* (high ω_t^i)
- Unexpected losses from loan defaults are **absorbed by bank equity**

Financial frictions 3/4: moral hazard and choice of external funding mode

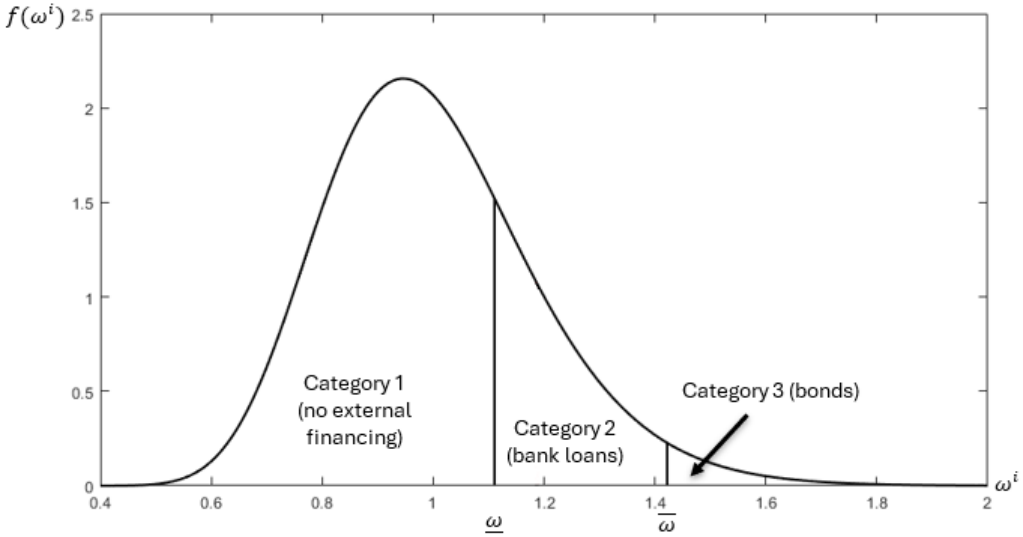
- Ability to raise external funding is modeled following the classic double moral hazard framework of Holmström and Tirole (1997):



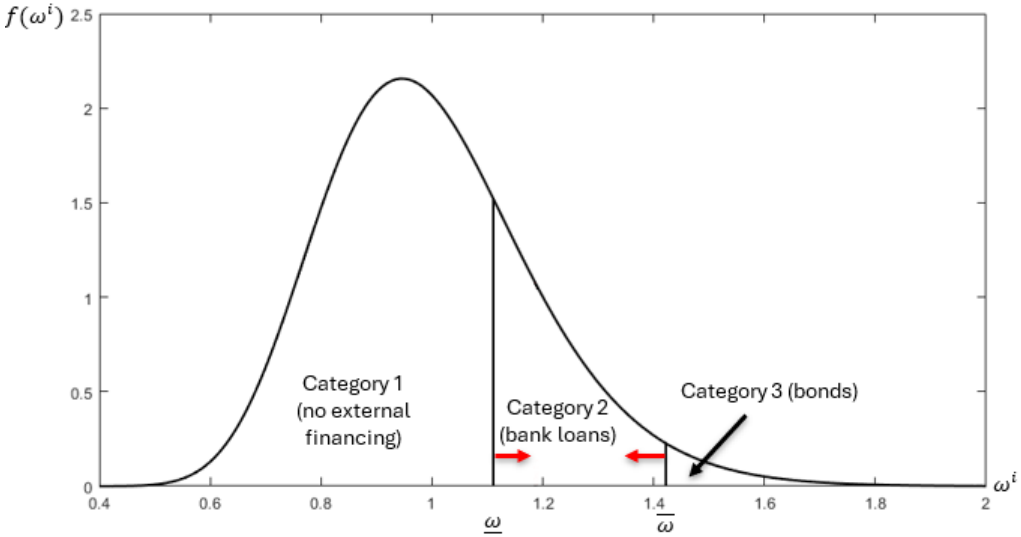
Financial frictions 4/4: banks as monitors

- Firms borrowing from banks are monitored:
  - this reduces the private benefit from b_H to b_L
- Banks bear non-verifiable monitoring cost $cI > 0$
- Banks need own equity stake in the loan to convince depositors that they will monitor the firms (moral hazard)
- Because monitoring is costly, loan rates are higher than bond rates

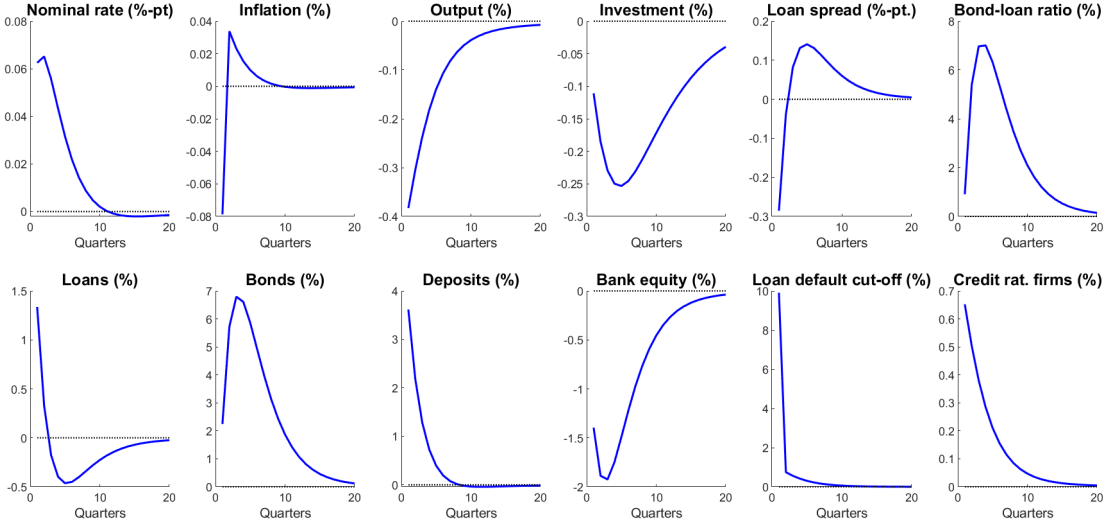
Financial market equilibrium: distribution of productivity signals



Aggregate bond-loan substitution following MP contraction

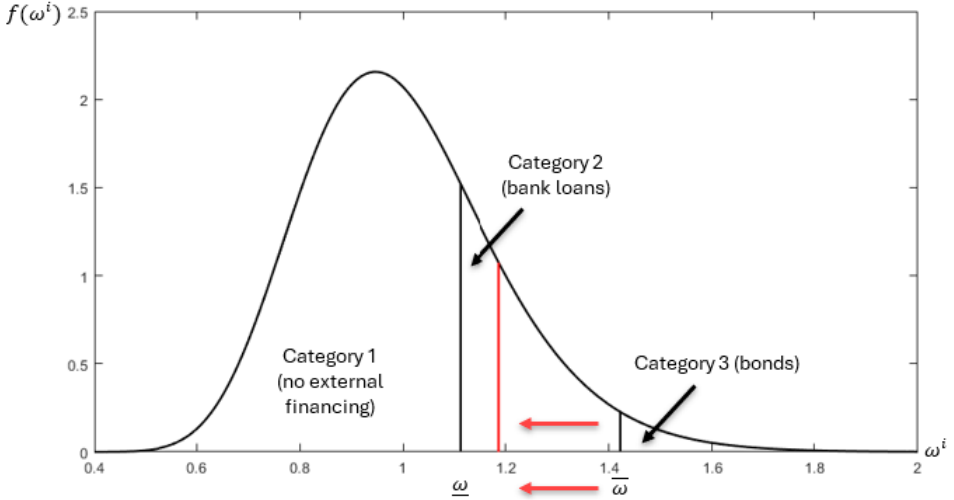


Model simulation: a 25 bp contractionary MP shock

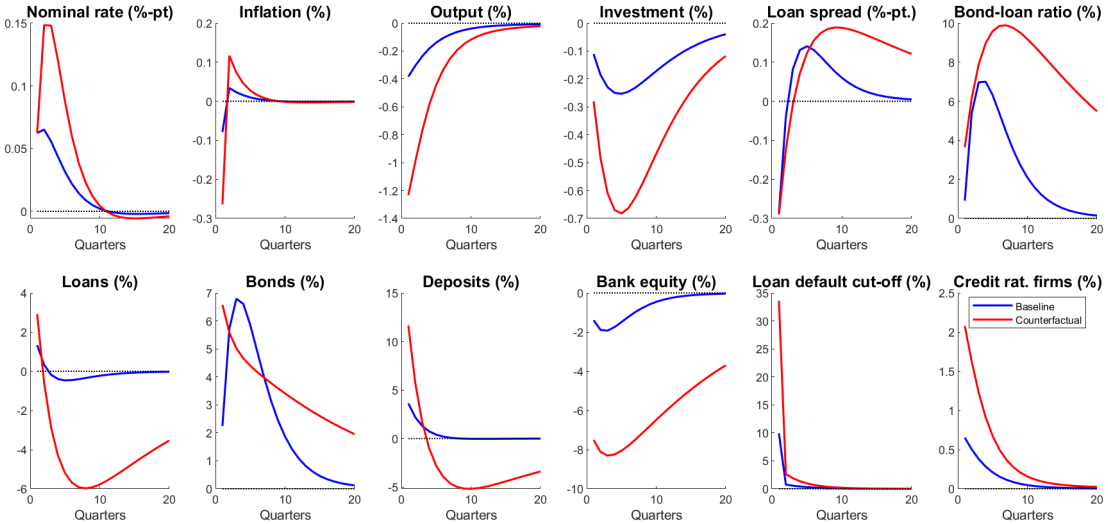


Counterfactual: EA with US bond-loan ratio

US counterfactual bond-to-loan ratio 1.658 is obtained by reducing the degree of moral hazard of unmonitored firms b_H.



Counterfactual: a 25 bp contractionary MP shock with higher BL ratio



Conclusions

- We develop a tractable NK DSGE model with endogenous and optimal determination of the corporate debt structure and credit access
- Model rationalizes observed cyclical patterns in corporate debt following MP shocks
- It operationalizes the bank lending channel, where MP contraction leads to a squeeze in bank equity and loan supply
- Counterfactual analysis: corporate debt structure matters for MP transmission!
- Expanding access to bond finance amplifies transmission, if it makes average bank borrower less creditworthy (through pecking order mechanism)

Thank you!

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Previous literature

- **Bank lending vs. broad credit channels** of MP transmission, starting with Bernanke and Gertler (1989), Kashyap and Stein (1994), Oliner and Rudebusch (1996), ...
- **Bond-loan substitution following MP shocks** in firm-level and aggregate data: Becker and Ivashina (2014), Holm-Hadulla and Thürwächter (2020), Lhuissier and Szczerbowicz (2021)
- **Aggregate dynamic models** with corporate bond/loan debt structure: De Fiore and Uhlig (2011, 2015), Verona et al. (2013), Chang et al. (2017), Zivanovic (2019)

Calibration of the financial block and model fit

	EA	*Model*
Ratios matched directly		
Bank operating costs to bank assets (%)	0.34	0.34
Bank NFC loans to bank equity	2.20	2.20
Firm assets to equity	1.94	1.94
Firm net savings to equity	−0.20	−0.20
NFC bonds to loans ratio	0.12	0.12
Bank return on equity (%)	1.31	1.31
Targets matched in moment matching exercise		
Default rate on bonds (%)	0.008	0.008
Default rate on loans (%)	0.18	0.19
Firm (1-) dividends to equity	0.98	0.96
Key implied ratios		
Firm return on equity (%)	5.37	4.04
Firm return on assets (%)	1.89	0.87
NFC loans to output	3.51	0.55
NFC bonds to output	0.41	0.07

Aggregate evidence from the euro area: A Monetary SVAR

- A Bayesian SVAR following the approach in Jarocinski and Karadi (2020)
- Monthly data over sample 2001M1–2023M10 (omitting the COVID period 2020M1–2020M12) with:
  - 6 macro variables: euro area real GDP, HICP, 2-year OIS rate, stock of corporate loans, stock of corporate bonds, the "intermediation wedge" (i.e. corporate loan spread – bond spread)
  - 2 high-frequency financial series: intra-day changes in OIS rates and STOXX50 index within narrow (30 min) windows around ECB monetary policy events

- Identify structural MP shock through:
  - **High-frequency identification**: the high-frequency surprises are only affected by the central bank announcements, and not affected by other shocks
  - **Sign restrictions**: Following an MP shock, market interest rates and stock prices move in **opposite** directions

Aggregate bond-loan substitution following a contractionary MP shock