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.

Outline

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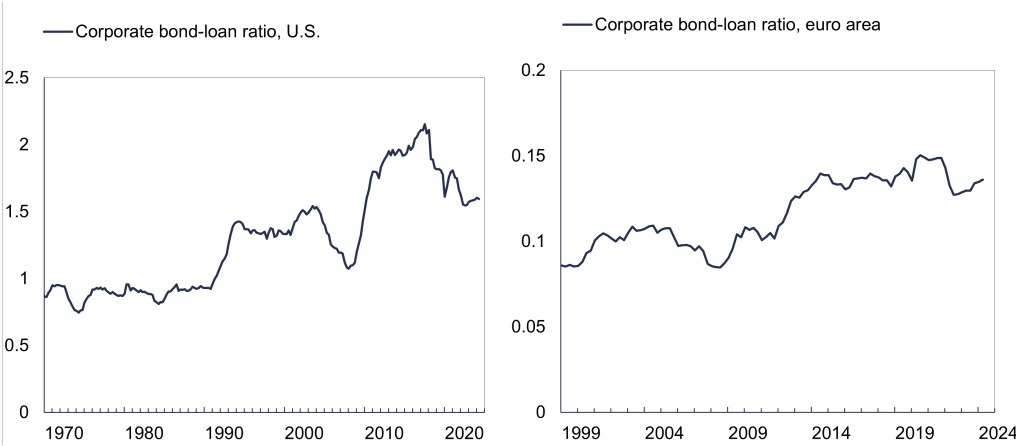
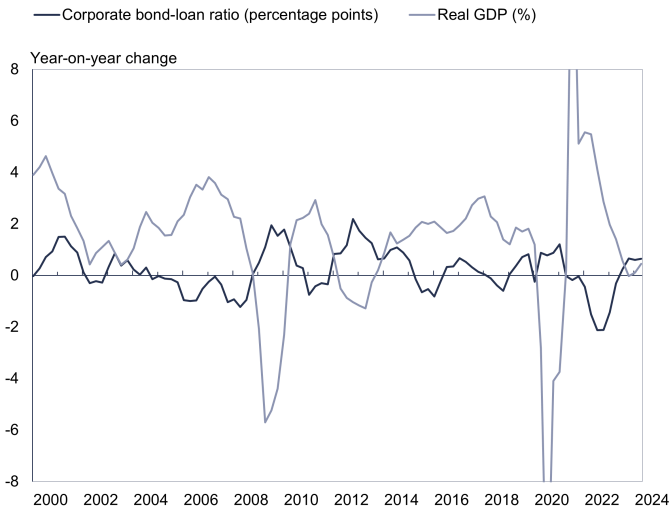
Corporate bond-to-loan ratio in the US and the euro area



Sources: Eurostat, Federal Reserve, authors' calculations.

Cyclicality of corporate debt structure in the euro area



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

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)

This paper

Our contribution: dynamic 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 monetary policy 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 monetary policy transmission?

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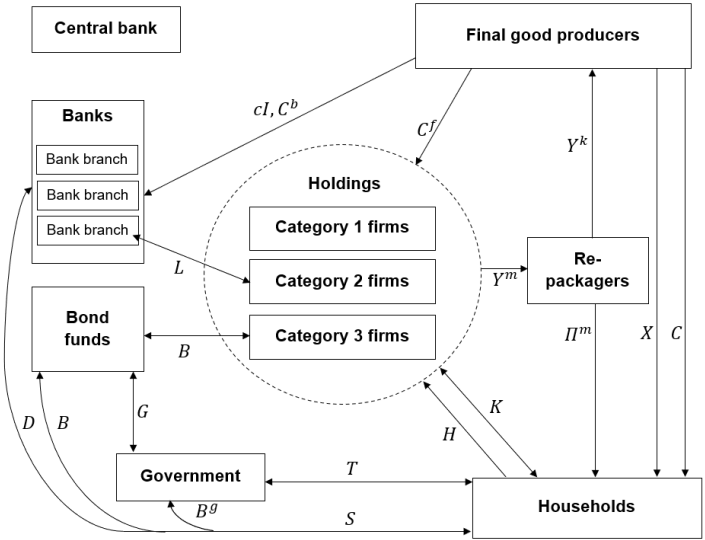
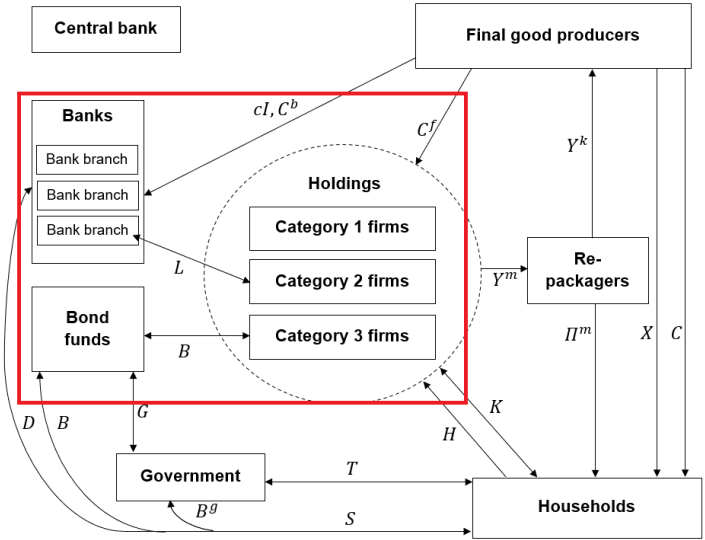
Overview of the model economy



Overview of the model economy



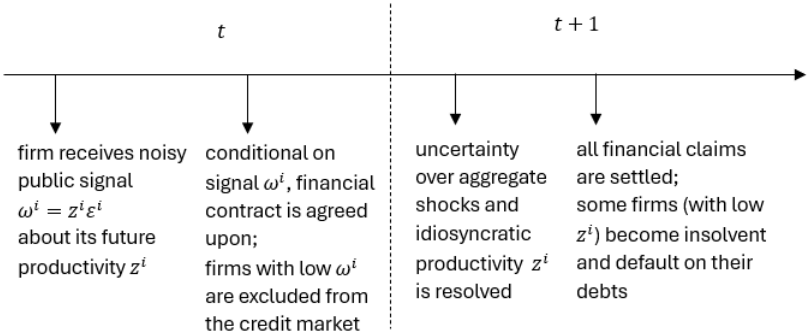
Financial frictions in the model: three key ingredients

1. Intermediate good firms face a **cash-in-advance constraint** to fund their production
2. **Imperfectly observable idiosyncratic productivity** of borrowers *ex ante* creates default risk *ex post*, the cost of which is borne by banks
3. Ability to raise external funding is limited by a **moral hazard problem** following Holmström and Tirole (1997); banks act as monitors

Financial frictions 1/4: external funding constraint of firms

- Intermediate good firms are constrained by a **cash-in-advance constraint**: to finance their working capital and produce in period $t+1$, need to raise external funding $I - K_t^f$ in period t
- Each firm has a common nominal working capital requirement I, obtains a common nominal amount of equity K_t^f from parent holding + an idiosyncratic public signal about its future productivity
- Firms use either direct market finance (bonds) or intermediated finance (loans); if they cannot obtain any external financing, they simply save their equity at nominally riskless rate

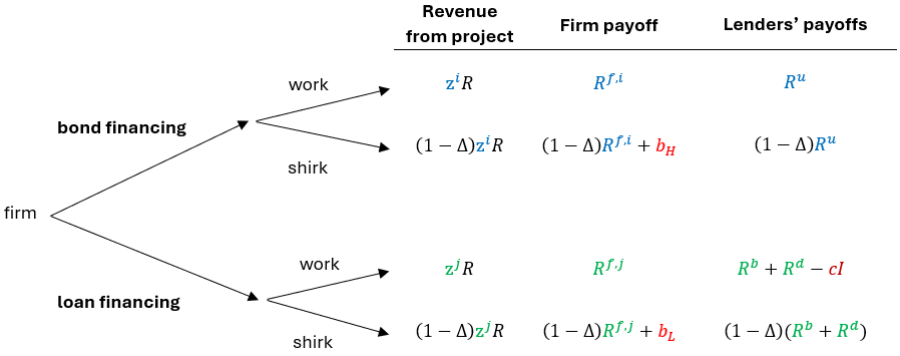
Financial friction 2/4: noisy signals and idiosyncratic default risk



- A debtor firm may turn out to be **insolvent** and unable to repay its creditors *ex post* (low z^i) even though it appeared solvent *ex ante* (high ω^i)
- Unexpected losses from loan defaults are **absorbed by bank equity**

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

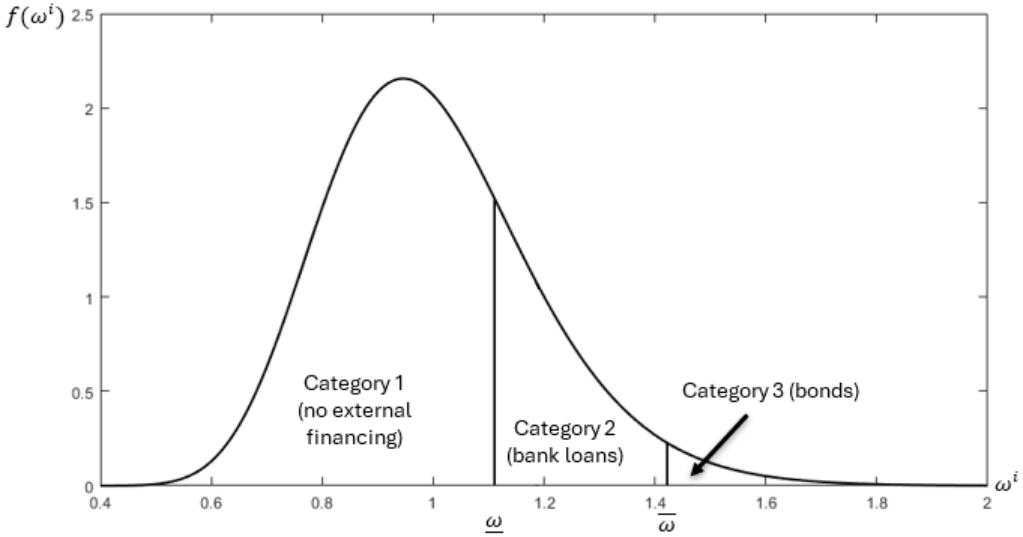
- Ability to raise external funding is limited by the classic double moral hazard model of Holmström and Tirole (1997), conditional on the signal about productivity z



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 their own equity stake in loan to convince depositors that they will monitor the firms
- Because monitoring is costly, loan rates are higher than bond rates

Financial market equilibrium: distribution of productivity signals

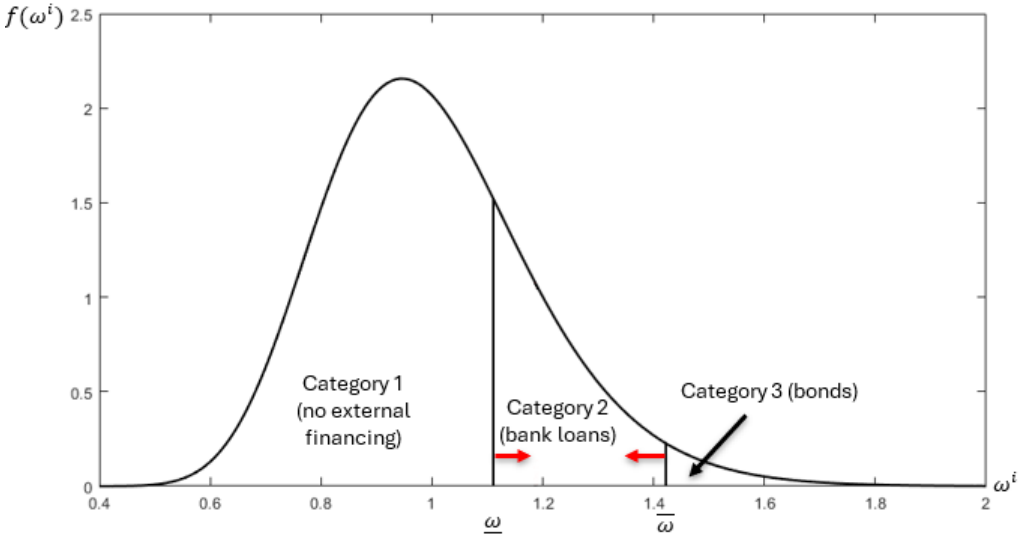


Calibration of the financial block and model fit

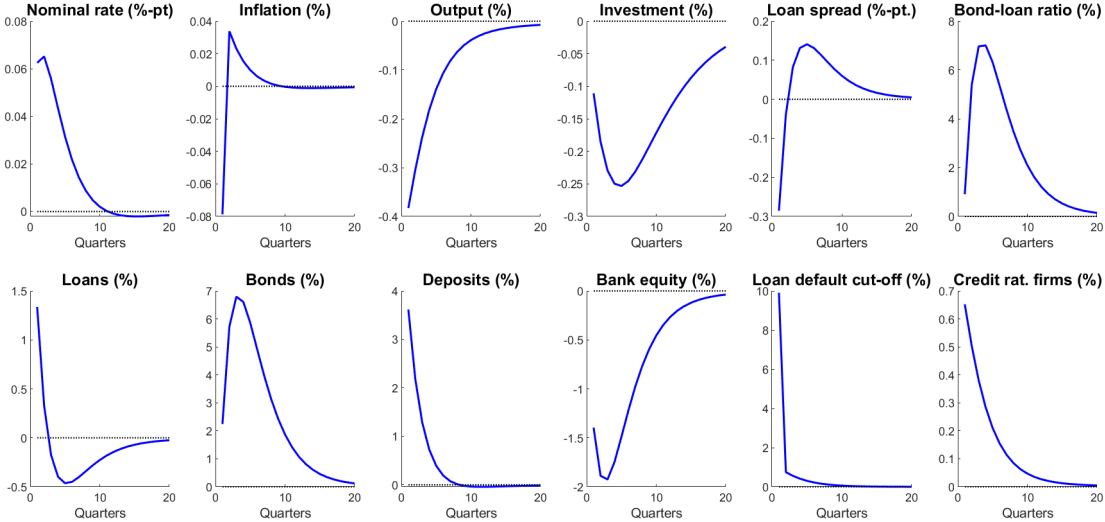
	EA	*Model*
Ratios matched directly		
Bank operating costs to bank assets (%)	0.34	0.34
Bank NFC loans to bank equity	2.20	2.20
Firm assets to equity	1.94	1.94
Firm net savings to equity	−0.20	−0.20
NFC bonds to loans ratio	0.12	0.12
Bank return on equity (%)	1.31	1.31
Targets matched in moment matching 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

Outline

Aggregate bond-loan substitution following MP contraction



Model simulation: a 25 bp contractionary MP shock



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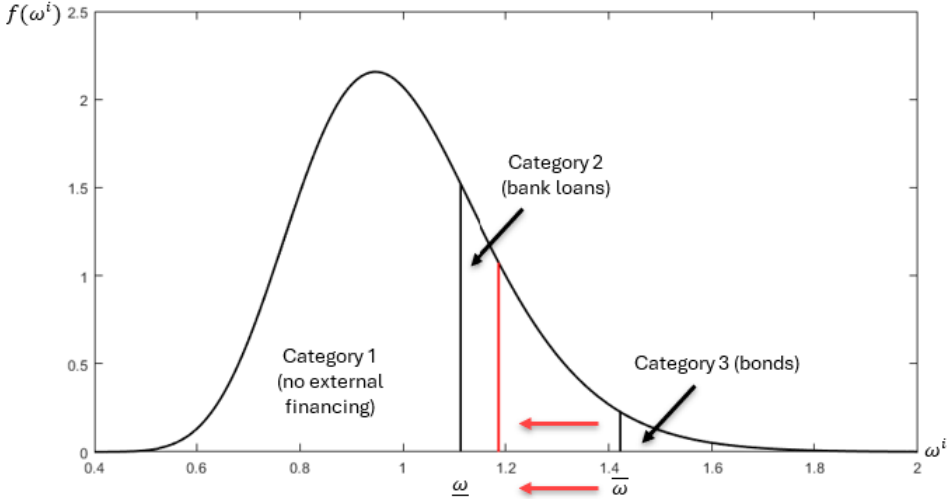
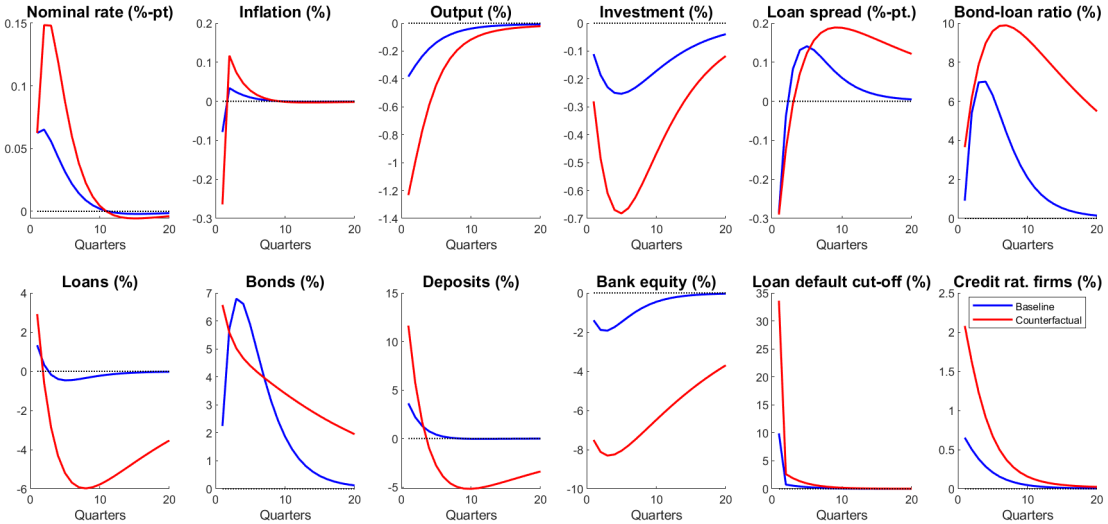
Counterfactual: EA with US bond-loan ratio

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



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Conclusions

- We develop a tractable New Keynesian DSGE model with endogenous and optimal determination of the corporate debt structure and credit access
- It allows to rationalize the observed cyclical patterns in corporate debt following MP shocks
- Operationalizes the bank lending channel, where MP contraction leads to a squeeze in bank equity and loan supply
- Counterfactual analysis: corporate debt structure affects 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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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