The Bond Lending Channel of Monetary Policy

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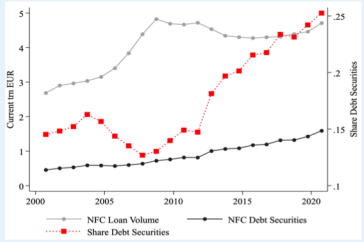
Does the effect of monetary policy depend on firms' bank/bond share?

Key trend: Bond financing is growing relative to bank lending in the eurozone.
End of 2020: Record share of bond financing.



Source: ECB SDW, BIS Debt Database, FRED St. Louis

Conventional view of monetary policy transmission: **Bank lending channel.**[1]
$r \uparrow \Longrightarrow Loan\ supply \downarrow$

This paper proposes: **Bond lending channel** of monetary policy.
Bond financing is not frictionless:[2]

- Dispersed ownership of bonds limits renegotiation ⟹ Higher cost of financial distress for bond-reliant firms.
- Monetary policy affects dis-proportionally bond-financed firms.

[1]Drechsler, Savov, and Schnabl (2017); Kashyap and Stein (2000)
[2]Bolton, Scharfstein (1996); Crouzet (2017); De Fiore, Uhlig (2015)

Theory is ambiguous about dominance of bank vs bond channel.

Environment:
Firm with cash **A** borrows to fund investment, **I**, subject to pledgeability constraint:

$$V = \max_{I,\beta} \left\{ \frac{1}{r} p_H(r)(1-\theta)RI \right\} \quad \text{s.t.} \quad I = m(\beta, r)A$$

- can only pledge **θ** ⟹ debt capacity **mA**
- chose bond share $\beta^* \in [0,1]$

Debt Structure Trade-off:

- Benefit: save loan intermediation costs c: $(1+c)r$
- Cost: higher cost of financial distress for bonds: $\chi(\beta) = \chi_0 - \frac{1}{2}\frac{\chi_1}{1+b_i}\beta^2$

Effect of Monetary Policy on Firm Value:

$$\frac{\mathrm{d}\log V}{\mathrm{d}r} = \underbrace{\frac{\partial \log\left(\frac{1}{r}\right)}{\partial r}}_{\substack{\text{Direct effect I}\\ \text{(discount rate)}}} + \underbrace{\frac{\partial \log p_H'(r)}{\partial r}}_{\substack{\text{Direct effect II}\\ \text{(economy's state)}}} + \underbrace{\frac{\partial \log m(\beta^*, r)}{\partial r}}_{\text{Constraint effect}}$$

Effect of Debt Structure Depends on Bank vs Bond Frictions:

$$\frac{\mathrm{d}}{\mathrm{d}b_i}\left\{\frac{\partial \log m(\beta_i^*, r)}{\partial r}\right\} = \left[\underbrace{c}_{\substack{\text{Bank lending}\\ \text{channel} > 0}} - \underbrace{\frac{\chi_1}{2}|p_H'(r)|\bar{\beta}}_{\substack{\text{Frictions in bond}\\ \text{financing} > 0}}\right]$$

⟹ Relative strength of bank vs bond lending frictions is an empirical question.

Model Implies Empirical Specification of the Form:

$$\mathrm{d}\log V_{i,t} \approx \underbrace{\frac{\mathrm{d}\partial \log m(\bar{\beta}_t, r_t)}{\mathrm{d}b\partial r}}_{\gamma = \text{Coeff. of interest}} \times \underbrace{b_i \mathrm{d}r_t}_{\substack{\text{Bond share}\\ \times \text{ MP shock}}} + \left[\underbrace{\frac{\partial \log m(\bar{\beta}_t, r)}{\partial r}}_{\text{Avg. effect}} + \underbrace{\frac{\partial \log \frac{1}{r_t}}{\partial r} + \frac{\partial \log p_H(r_t)}{\partial r}}_{\text{Direct effects, } D_{i,t}}\right] \mathrm{d}r_t$$

High-frequency evidence is consistent with *bond lending channel* in the eurozone.

Empirical Result:

- Firms with a larger share of bond debt are robustly more affected by monetary shocks in the eurozone.

Economic magnitude: For 25bps ↑ in rate, moving from 25th percentile to 75th of bond debt/assets ⇒ 104 bps lower stock return.

Robust to a large set of alternative hypotheses and measurements; including MP shock definition, information effect of MP, firm risk, age since incorporation, size, asset tangibility and leverage.

Sample:[3] Non-financial firms of the EURO STOXX sectoral indices (~ 85% of market capitalisation and approximately 80% of total bonds outstanding of NFCs in the eurozone). Dates include 147 ECB announcement days between 2001 and 07/2007 and 01/2013 and 12/2018.

[3]We show robustness for a broader sample of public firms (sample is analogous to Compustat universe in the United States).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ OIS1M × Bond debt over assets	-24.51***					-29.99***	-32.93***	
	(4.587)					(6.373)	(7.558)	
Bond debt over assets	-12.74					-40.12	-32.38	
	(24.85)					(22.52)	(24.86)	
Δ OIS1M × bond outstanding		-2.766***						
		(0.701)						
Market fin. outstanding		-5.074						
		(5.323)						
2. Tercile Bond debt over assets × Δ OIS1M			-2.737***					
			(0.737)					
3. Tercile Bond debt over assets × Δ OIS1M			-4.463***					
			(1.077)					
Δ OIS1M × Bond debt over debt				-8.680***				
				(2.303)				
Δ OIS1M × Debt over assets				0.907	-0.494	7.580*		-4.737
				(4.266)	(4.196)	(4.463)		(3.681)
Bond debt over debt				-12.45*				
				(7.088)				
Debt over assets				43.69	41.45	58.86*		40.27
				(31.62)	(31.72)	(30.91)		(32.23)
2. Tercile Bond debt over debt × Δ OIS1M					-1.678			
					(1.026)			
3. Tercile Bond debt over debt × Δ OIS1M					-4.959***			
					(1.272)			
R^2	0.383	0.382	0.382	0.383	0.383	0.383	0.384	0.382
Duration control	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓
Firm controls	✓	✓	✓	✓	✓	✓	✓	✓
Sector × Date FE	✓	✓	✓	✓	✓	✓	✓	✓
Lev. Quintile Interaction							✓	
Observations	22239	22239	22239	22239	22239	22239	22239	22239

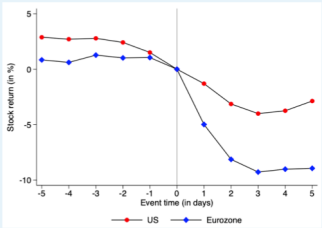
The dependent variable is daily stock return, and MP shocks are from Altavilla, Brugnolini, Gürkaynak, Motto, and Ragusa (2019). Bond debt includes senior, subordinated bonds and commercial paper. Column (3) and column (5) estimate the differential effect with respect to the first tercile of the bond measure. Controls include firm fixed effects, date-times-sector fixed effects and time varying firm controls (all lagged to preceding year): log assets, cash over assets, earnings over assets, debt over earnings, earnings over interest expenses, fixed assets over assets and log market-to-book. The sector is defined based at the 2 digit SIC code level. Balance sheet data come from Worldscope, market financing from Capital IQ and stock market information from Datastream. Standard errors are double-clustered at the firm and date level. *,**, *** indicates significance at the 0.1, 0.05, 0.01 level respectively.

$$\Delta \log P_{i,t} = \alpha_i + \nu_{s,t} + \gamma BondShare_{i,t-1} \times \Delta MP_t + \beta_{Dur} Dur_{i,t} \times \Delta MP_t + \delta Z_{i,t} \times \Delta MP_t + \varepsilon_{i,t}$$

Legal and information frictions support bond lending channel.

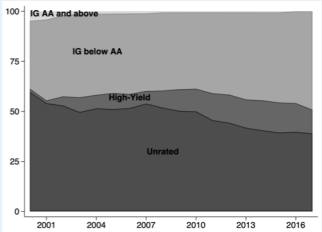
- **Legal Frictions:** Legal scholars argue that European bankruptcy law is tailored towards relationship lending; not bond-financing.
  "A change in the body of creditors' structure puts the law for restructuring and insolvency law to the test... A law which produces an efficient outcome in times of pre-dominant relationship-lending does not necessarily promote successful bond restructurings" - Ehmke (2018)

  Valuation response to rating downgrades support this view: eurozone firms have, on average, an approximate five percentage point lower equity response relative to firms in the United States after a downgrade from investment grade (BBB- and above) to speculative-grade.



For details confer Figure 4, page 38.

- **Information Frictions:** Low presence of rating agencies in 2004, 11% of large firms rated vs 92% in the United States. Only 50% to 70% of firms are rated in our sample of the largest firms in the eurozone.



Record share of bond financing may impose policy constraint.

- **Distributional Consequences:** Next tightening cycle may induce uneven effects on firms given their heterogeneity in capital structure. Entry of smaller and riskier bond issuers in recent years may lead to unintended policy side effect.
- **Bond Market Frictions as a Constraint to Monetary Policy:** Record share of bond financing requires acceleration of current EU initiatives for better resolution of corporate insolvency and restructuring of market based debt; otherwise it may impose a constraint on the conduct of monetary policy.