EUROPEAN CENTRAL BANK

EUROSYSTEM

Granular Shocks to Corporate Leverage and the Macroeconomic Transmission of Monetary Policy

Fédéric Holm-Hadulla and Claire Thürwächter

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Motivation

- Interaction between monetary policy and private sector indebtedness is a key determinant of macroeconomic outcomes (Fisher, 1933; Bernanke et al., 1996).

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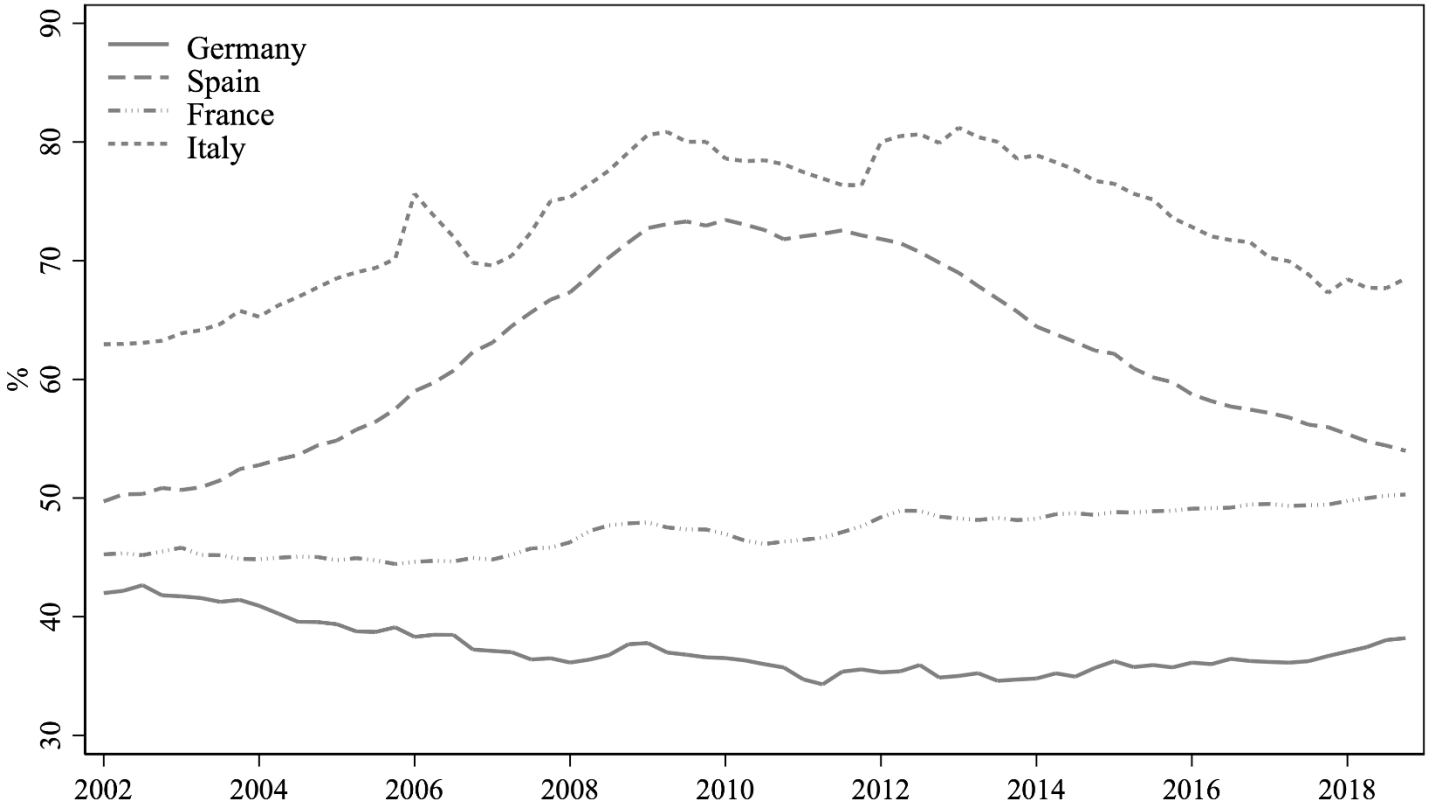
Corporate leverage in the big-4 euro area countries



Note: Leverage is calculated as the ratio of total debt to total assets of the non-financial sector multiplied by 100.

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Research question

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➔ This paper studies how variation in corporate leverage shapes the transmission of monetary policy to the broader economy and inflation.

Method

1. Extract exogenous shifts in leverage from firm-level data (Granular IV, Gabaix & Koijen ’24)
2. Aggregate micro-level shifts to EA country level, using weights based on firms’ debt shares
3. Estimate macro-level transmission of monetary policy conditional on leverage shocks

$$Y_{j,t+h} = \alpha_{j,h} + (\beta_{0,h} + \beta_h GIV_{j,t-12})MP_t + controls + \epsilon_{j,t+h}$$

The paper in a nutshell

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Key findings

- MP transmission to price level strengthens in the presence of leverage shocks, whereas real effects of MP are unaffected
- Disconnect points to a price-competitiveness channel
  - ➢ Economies hit by adverse shock show stronger contraction in domestic demand
  - ➢ … counteracted by a weaker contraction in exports supported by falling prices

Details on implementation of Granular IV method

1. Compile comprehensive annual firm-level data from Orbis for ten euro area countries over the period from 2002 to 2018

2. For each country, estimate a separate panel regression with firms *(i)* and years *(t)*, as in:

$$Leverage_{i,t} = \alpha_i + controls + \varepsilon_{i,t} \quad \text{and} \quad \varepsilon_{i,t} = \lambda_{i,t}\eta_t + u_{i,t}$$

   - $\hat{\varepsilon}_{i,t}$ contains unobserved idiosyncratic component $\hat{u}_{i,t}$ *(exogeneity)*

2. Aggregate $\hat{\varepsilon}_{i,t}$ to country-year *(j,t)* using debt shares ($s_{i,j,t}$) as weights (with $\lambda_{i,t} = \lambda$ for $\forall_{i,t}$)

   - more weight on large firms *(relevance)*

$$GIV_{j,t} = \sum_i s_{i,j,t-1}\ \hat{\varepsilon}_{i,j,t} - \sum_i \frac{1}{N_{j,t}}\hat{\varepsilon}_{i,j,t} = \sum_i s_{i,j,t-1}\ \hat{u}_{i,j,t} - \sum_i \frac{1}{N_{j,t}}\hat{u}_{i,j,t}$$

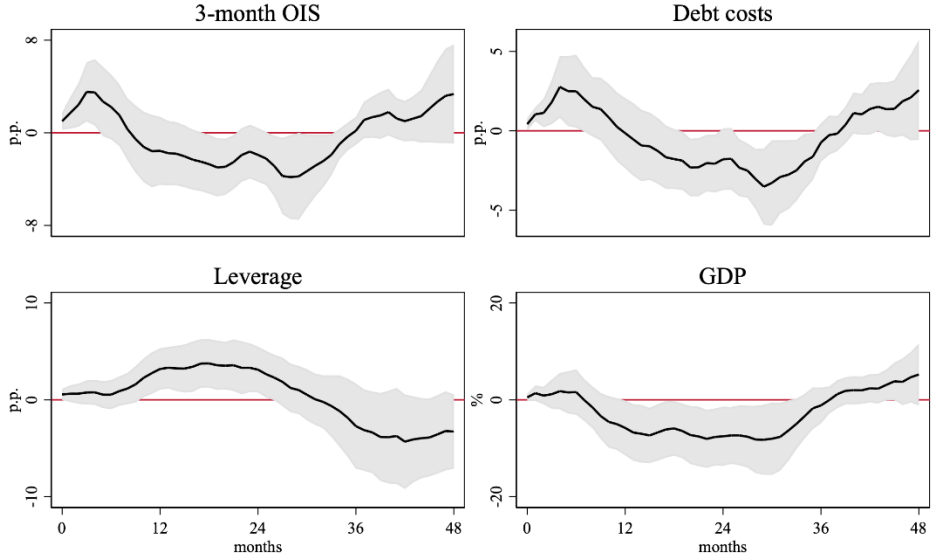
Macro transmission conditional on exogenous shifts in leverage

$$Y_{j,t+h} = \alpha_{j,h} + (\beta_{0,h} + \beta_h GIV_{j,t-12})MP_t + controls + \epsilon_{j,t+h}$$

- Estimate IRFs from local projections (Jordà, 2005) on euro area country panel
- $Y_{j,t+h}$ short-term rate; debt costs; corporate leverage; investment; GDP; deflator
- MP_t high-frequency changes monetary policy shocks (Altavilla et al., 2019)
- $GIV_{j,t-12}$ as per previous step
- $\beta_{0,h}$ transmission in absence of leverage changes; β_h differential effect of leverage shifts

Transmission in the absence of leverage shocks ($GIV_{j,t-12} = 0$)

$$Y_{j,t+h} = \alpha_{j,h} + (\beta_{0,h} + \beta_h GIV_{j,t-12})MP_t + controls + \epsilon_{j,t+h}$$



Transmission in the presence of leverage shocks ($GIV_{j,t-12}$ *at* $10th$ *vs.* $90th$ *pctl.*)

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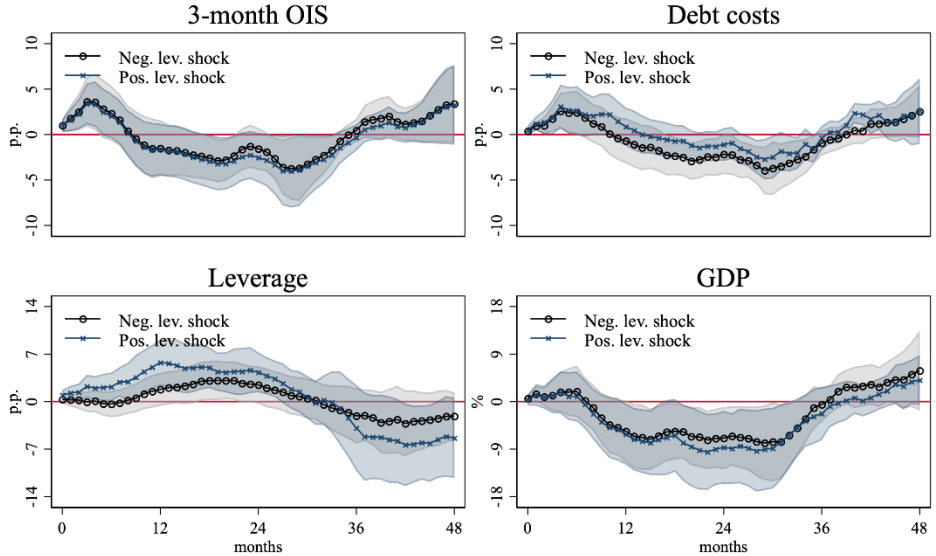

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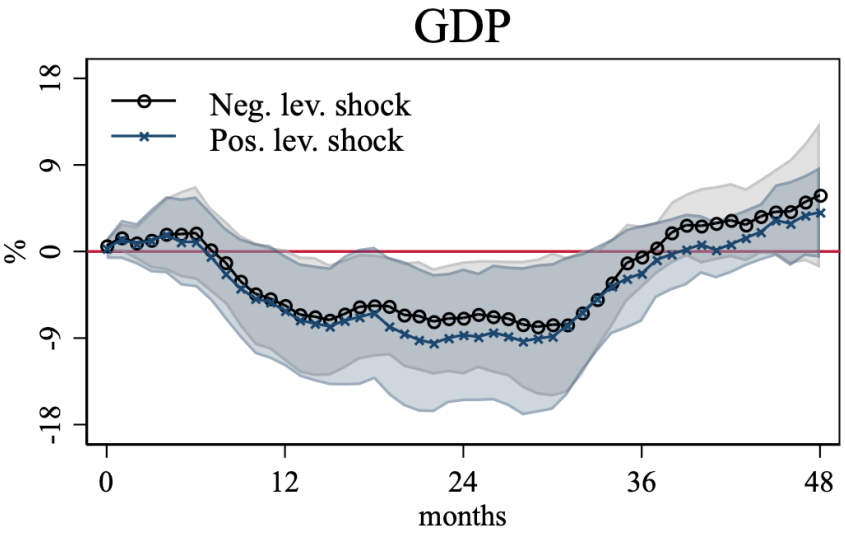
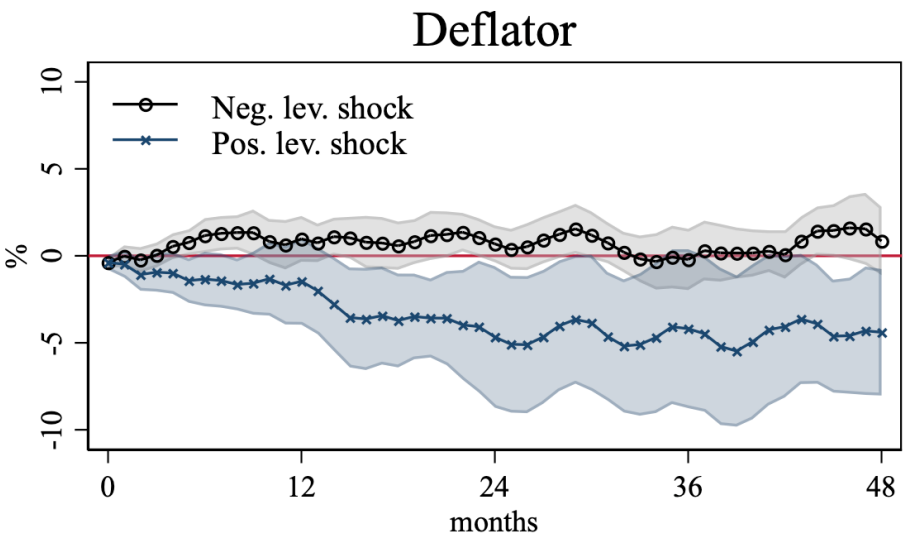
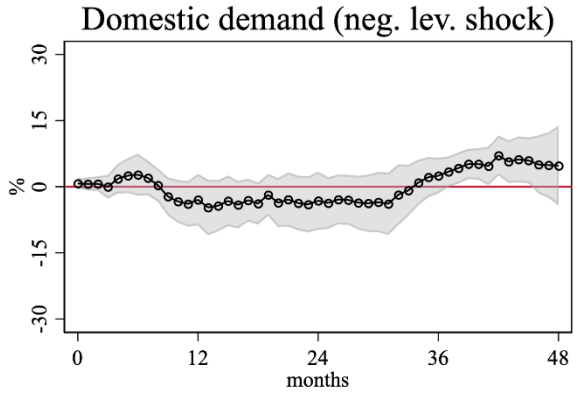
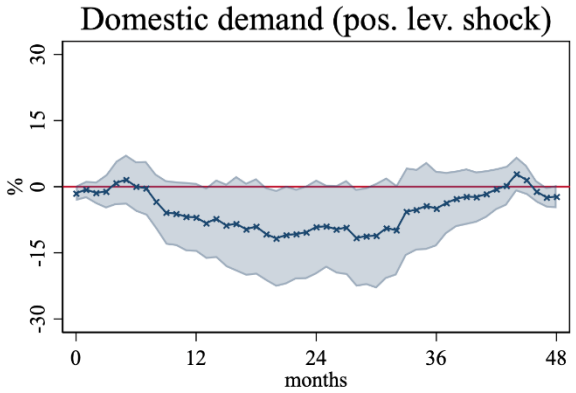
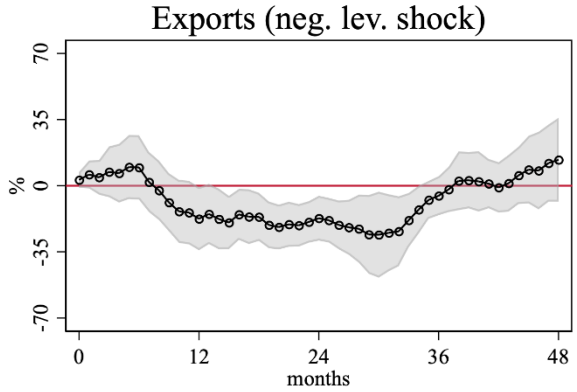


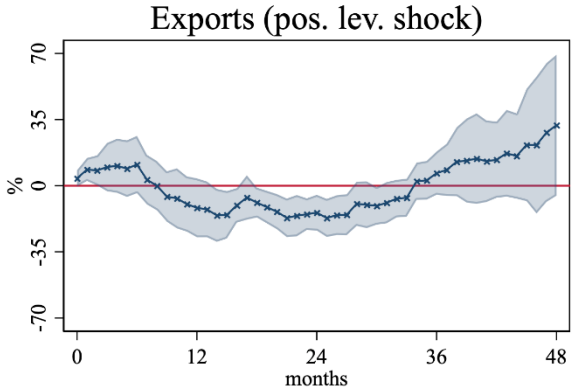


Explaining the disconnect between real vs. nominal variables









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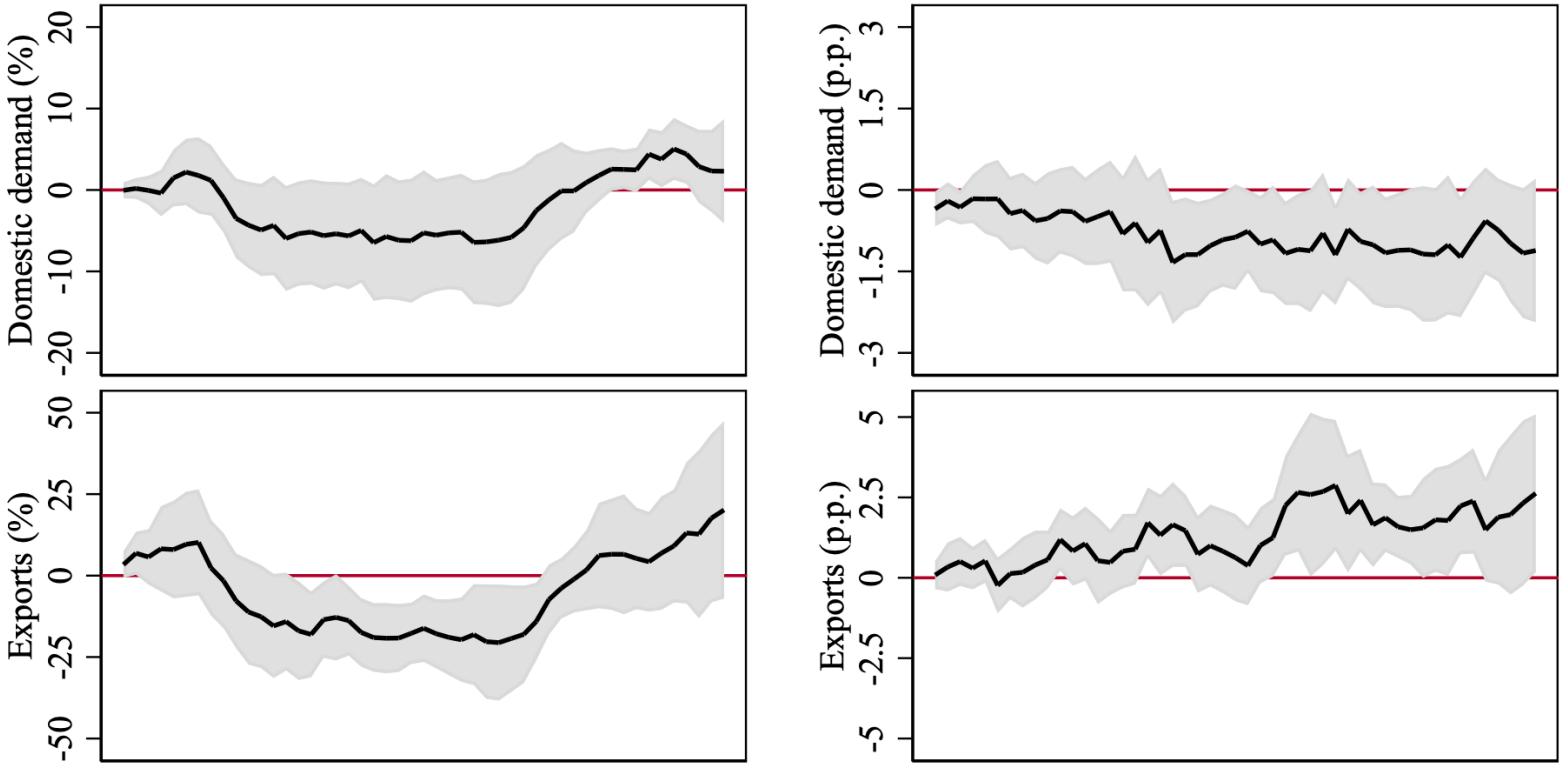
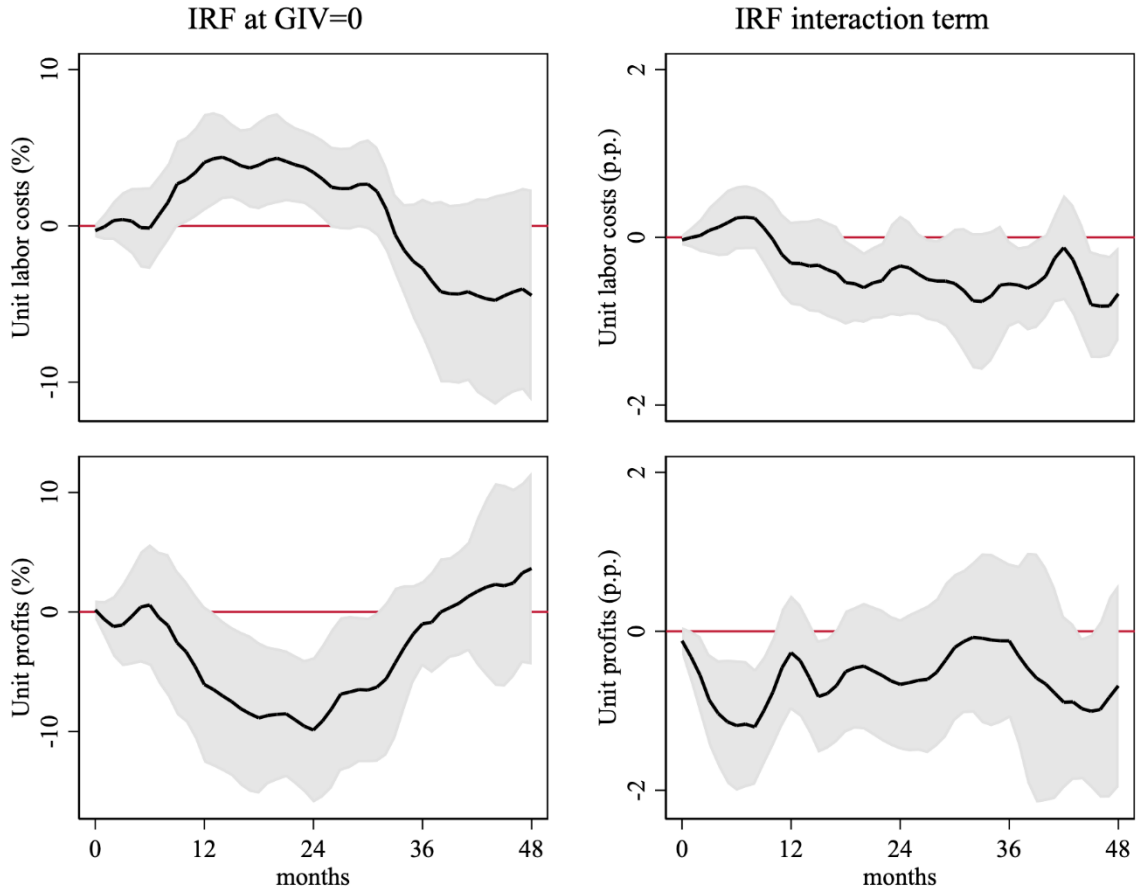


Origins of gains in price competitiveness



Main takeaways

1. MP transmission to real activity only mildly affected by leverage shocks

2. MP transmission to price level reinforced (dampened) if leverage expands (contracts)

3. Disconnect consistent with price-competitiveness gains in economies hit by adverse shock

Background

Links to the related literature

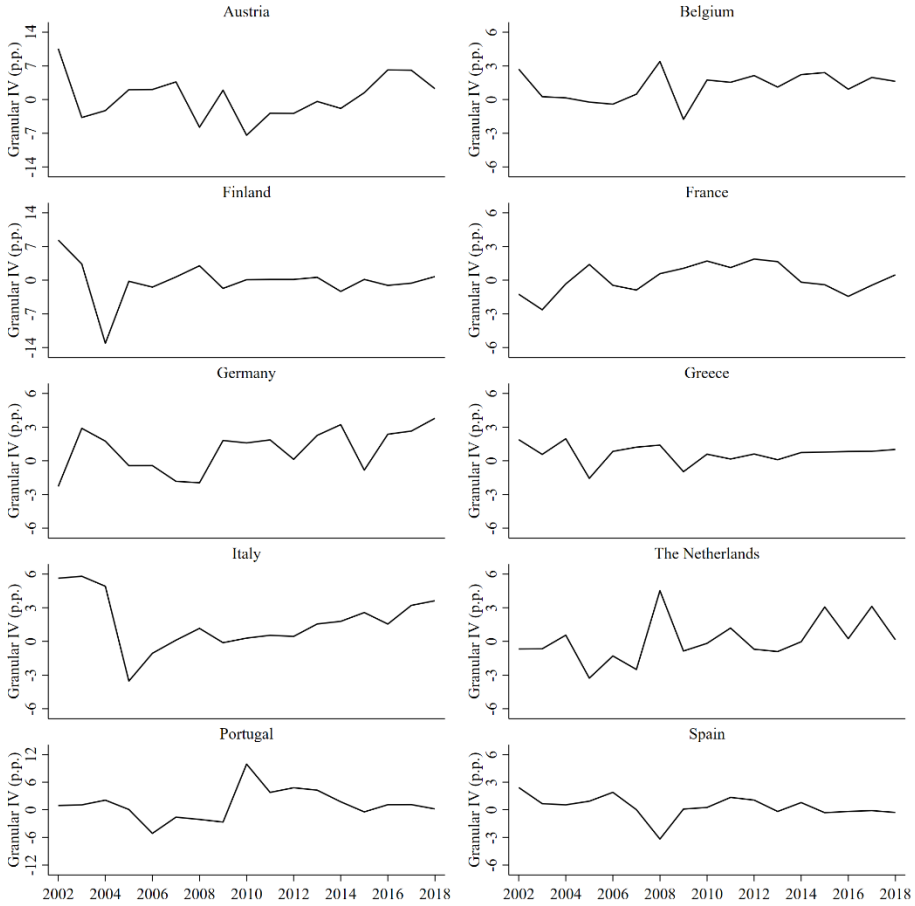
Competing hypotheses on micro-level

Financial accelerator (BGG 1999)	Ottonello & Winberry 2020
• Credit frictions (e.g., risk from high debt) amplify monetary policy shocks	• Riskier (e.g., more levered) firms have steeper marginal cost curve of investment
> MP more effective as firms more indebted	> MP less effective as firms more indebted

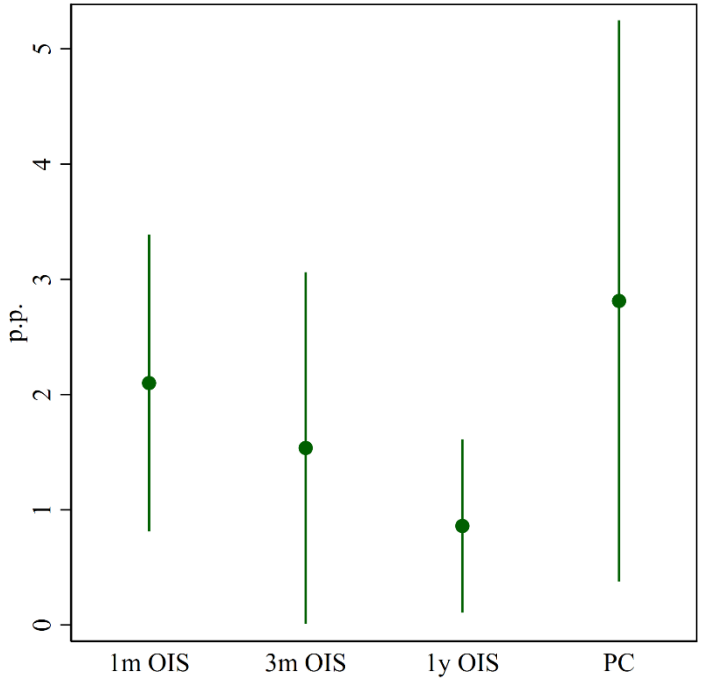
Contribution of the current paper:

- Study interaction of corporate leverage and transmission to the *macroeconomy*
- Apply novel 'micro-to-macro approach' to identify *exogenous changes* in aggregate leverage

Background – GIV time series



Background – MP identification: 3-month OIS impact response (at $GIV_{j,t-12} = 0$)



Background – baseline estimates

$Y_{j,t}$		$h=0$	$h=3$	$h=12$	$h=24$	$h=36$	$h=39$
3-month OIS	$\beta_{0,h}$	0.844**	2.995**	-1.397	-1.506	0.023	1.035
		(0.375)	(1.272)	(1.569)	(1.116)	(0.775)	(1.111)
	β_h	-0.003	-0.024	-0.008	-0.134	-0.113	-0.146**
		(0.017)	(0.068)	(0.123)	(0.203)	(0.086)	(0.073)
Debt costs	$\beta_{0,h}$	0.311	1.454**	-0.125	-1.322	-0.569	0.364
		(0.194)	(0.677)	(1.172)	(0.915)	(0.637)	(0.564)
	β_h	0.011	-0.009	0.144	0.030	0.030	0.081
		(0.031)	(0.145)	(0.173)	(0.216)	(0.114)	(0.109)
Leverage (D/A)	$\beta_{0,h}$	0.006*	0.009	0.030***	0.029**	-0.018	-0.027
		(0.003)	(0.007)	(0.011)	(0.013)	(0.029)	(0.029)
	β_h	-0.000	0.002	0.001	-0.002	-0.002	-0.002
		(0.001)	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
Investment	$\beta_{0,h}$	4.818*	5.337	-13.705	-19.016**	-2.534	1.834
		(2.867)	(5.271)	(10.253)	(8.450)	(7.381)	(10.292)
	β_h	0.761	-0.331	-0.387	-2.385	-1.525	-2.212**
		(0.946)	(0.959)	(1.157)	(1.442)	(0.959)	(1.100)
GDP	$\beta_{0,h}$	0.267	0.779	-5.199	-6.713**	-1.472	0.793
		(0.425)	(1.679)	(3.284)	(3.161)	(3.029)	(3.607)
	β_h	-0.015	-0.003	-0.067	-0.083	-0.412	-0.576*
		(0.072)	(0.152)	(0.332)	(0.311)	(0.280)	(0.339)
Deflator	$\beta_{0,h}$	-0.360**	-0.367	-0.210	-1.563*	-1.700	-1.884**
		(0.158)	(0.361)	(0.754)	(0.808)	(1.067)	(0.789)
	β_h	-0.012	-0.113	-0.254	-0.586**	-0.486	-0.749*
		(0.035)	(0.104)	(0.180)	(0.287)	(0.340)	(0.389)
N		1,900	1,870	1,780	1,660	1,540	1,510
N (debt costs)		1,792	1,762	1,672	1,552	1,432	1,402

Corporate leverage shows occasional shifts & pronounced cross-country heterogeneity

Corporate leverage (100*debt/assets)