Financial Shock Transmission to Heterogeneous Firms: The Earnings-Based Borrowing Constraint Channel

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Motivation

Current environment: US corporate sector is hit simultaneously by 2 large shocks: *monetary policy (MP)* tightening and *global risk (GR)* aversion
What we know: Heterogeneity in firm fundamentals affects transmission of MP shocks to funding costs
What we understand less: how GR shocks may transmit heterogeneously, through which pricing channels, and due to which financial constraints

This paper's contribution

- We disentangle MP and GR shocks in an **integrated daily BVAR** exploiting **cross-asset price movements**
- We study two interrelated dimensions:
    (1) **firm heterogeneity**   (2) the **type of shocks**
  to understand how shocks transmit to firms' funding costs (bonds & equity) and default prospects
- We tease out mechanisms by contrasting **asset-based** with **earnings-based borrowing constraint** hypothesis, differentiating firms across **leverage** and earnings

Hypotheses

Heterogeneous effects across firms depending on **type of borrowing constraint**:
(1) **Asset-based collateral constraint**: Expect stronger responses of firms in upper tail of the leverage distribution (i.e. higher leveraged firms)
(2) **Earnings-based borrowing constraint**: Expect stronger responses of firms in lower tail of the earnings distribution (i.e. less profitable firms)

Shock identification

We exploit cross-asset price movements in a daily BVAR based on US financial conditions identified through *sign, relative magnitude, and narrative restrictions*:
- **US monetary tightening:** pushes up long-term yield (more than foreign monetary policy), depresses equity prices, USD appreciates
- **US positive macro risk:** supports long-term yield, boosts equity prices (more than foreign macro), compresses corp. spreads
- **Global risk shock:** flight to safety into bonds, out of equities, safe USD appreciates (more than foreign macro), as observed at Lehman collapse
- **Foreign monetary tightening:** spills over to US long-term yield, weighs on US equities, USD weakens
- **Foreign positive macro risk:** akin to US macro shock, but USD depreciates

Table 1: Sign restriction identification

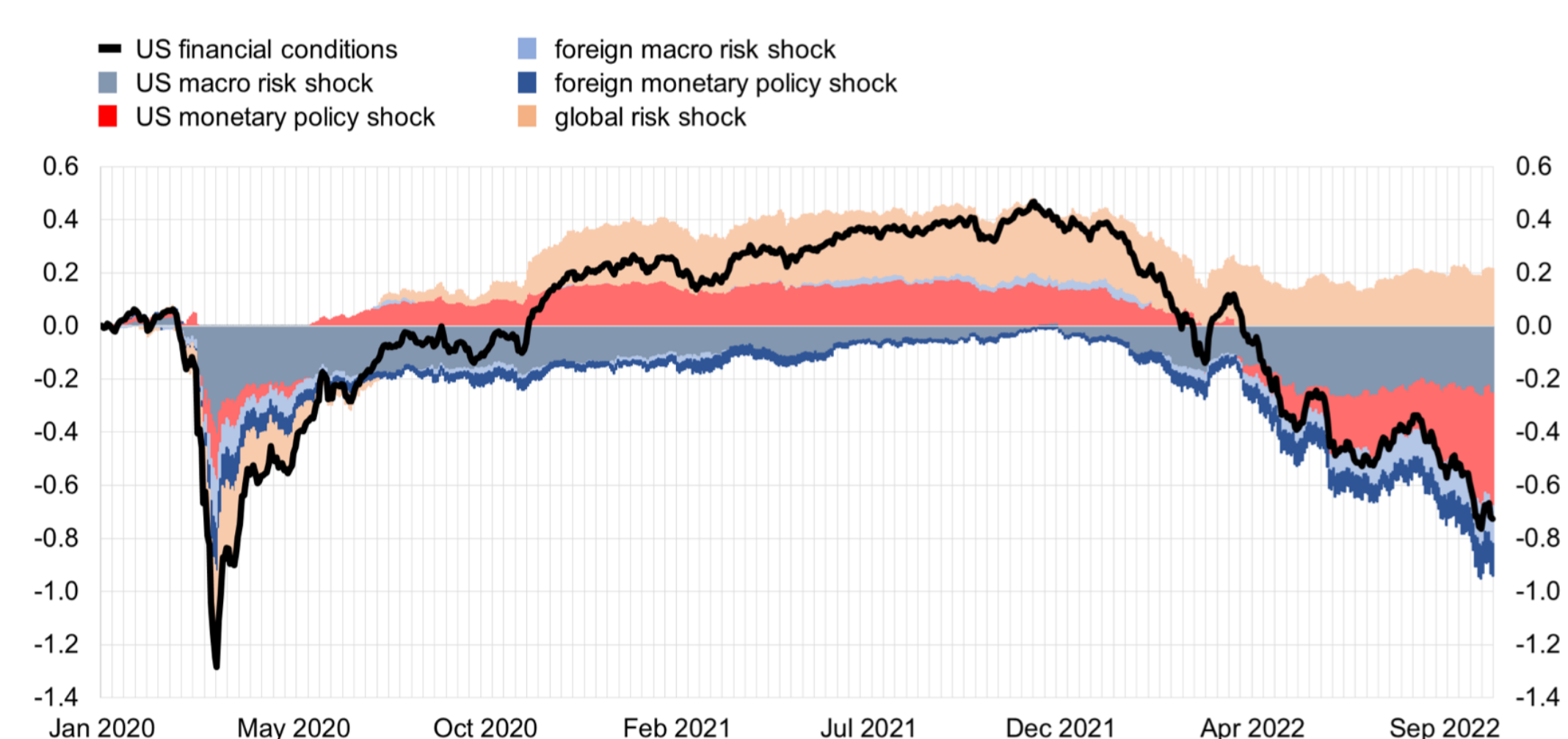|	US MP	US macro risk	global risk	foreign MP	foreign macro risk
Short-term yield	+				
Long-term yield	+ (> foreign MP)	+	−	+	+
Equities	−	+ (> foreign macro)	− (narrative)	−	+
Effective FX rate	+	+	+ (> foreign macro)	−	−
Corporate spread		−			

Historical decomposition (example 2020-2022)

Figure 1: Model-based drivers of US financial conditions (cumulated contributions of shocks to standardized index, rebased to Jan 2020 =0). US financial condition index computed following Arrigoni et al. (2022).

Firm-level analysis

- We decompose corporate bond spreads into **expected default risk** and **excess bond premium (EBP)** (Gilchrist & Zakrajsek 2012)
- We assess how funding costs of weak/strong firms (by leverage, interest rate coverage, earnings) react differently to MP and GR shocks using **panel local projections** à la Jordá (2005):

$$\Delta_h y_{j,t-1} = \beta_h \underbrace{\epsilon_t^i}_{shock} + \sum_{q \in \{H,L\}} \beta_{h,q} \epsilon_t^i \times \underbrace{\mathbb{1}_{j,q,t}}_{tail\ firm} + \underbrace{\phi_{j,h}(L)X_{j,t-1}}_{controls} + \epsilon_{j,t+h} \quad for \quad h = 1,...H$$

(3)

$y_{j,t}$: credit spread, EBP, EDF, equity price (CDS spread)
ϵ_t^i : monetary policy shock ϵ_t^m, global risk shock ϵ_t^r
$\mathbb{1}_{j,q,t}$: dummy variable for $q = \{20^{th}, 80^{th}\}$ pct. of weak/strong firms by leverage, interest coverage ratio, expected earnings
$\phi_{j,h}(L)X_t$: 4 lags of VIX, CESI, GFC dummy, Covid dummy, industry FE

Firm-level results

Table 2: Sensitivity of asset prices of tail firms upon impact of shocks

	Spread	EBP	Default risk	ln(Equity Price)
Panel (a): Monetary policy shock				
ϵ_t^m	7.422***	5.971***	0.027*	-0.033***
LowLEV × ϵ_t^m	-1.155	-1.264	-0.003	0.000
HighLEV × ϵ_t^m	1.921	-0.402	0.044	-0.002
LowICR × ϵ_t^m	2.803	-0.984	0.071	-0.007*
HighICR × ϵ_t^m	-0.417	-0.191	-0.004**	0.001
LowEPSE × ϵ_t^m	2.004	-0.488	0.048*	-0.004*
HighEPSE × ϵ_t^m	0.057	0.480	-0.006	-0.001*
Panel (b): Global risk shock				
ϵ_t^r	18.628***	15.472***	0.056*	-0.069***
LowLEV × ϵ_t^r	-4.942	-5.107**	-0.006	-0.003
HighLEV × ϵ_t^r	10.456	5.000*	0.099	-0.002
LowICR × ϵ_t^r	18.773**	9.504**	0.176*	-0.022*
HighICR × ϵ_t^r	-3.616**	-2.995*	-0.011**	0.002
LowEPSE × ϵ_t^r	15.194***	8.416***	0.126**	-0.019***
HighEPSE × ϵ_t^r	-1.695	-0.788	-0.013	-0.005
Observations	222,060	219,513	220,710	220,964

Note: Estimates at horizon h = 0, i.e. upon impact of the identified monetary policy ϵ_t^m (global risk shock ϵ_t^r). Shocks are calibrated to a 10 bps increase (decrease) in the US 10y yield. Indicator variables for leverage (LEV), interest coverage ratio (ICR), and expected earnings (EPSE) are computed based on the tails of firms (20th and 80th percentiles). SEs are clustered along the time and industry dimension.
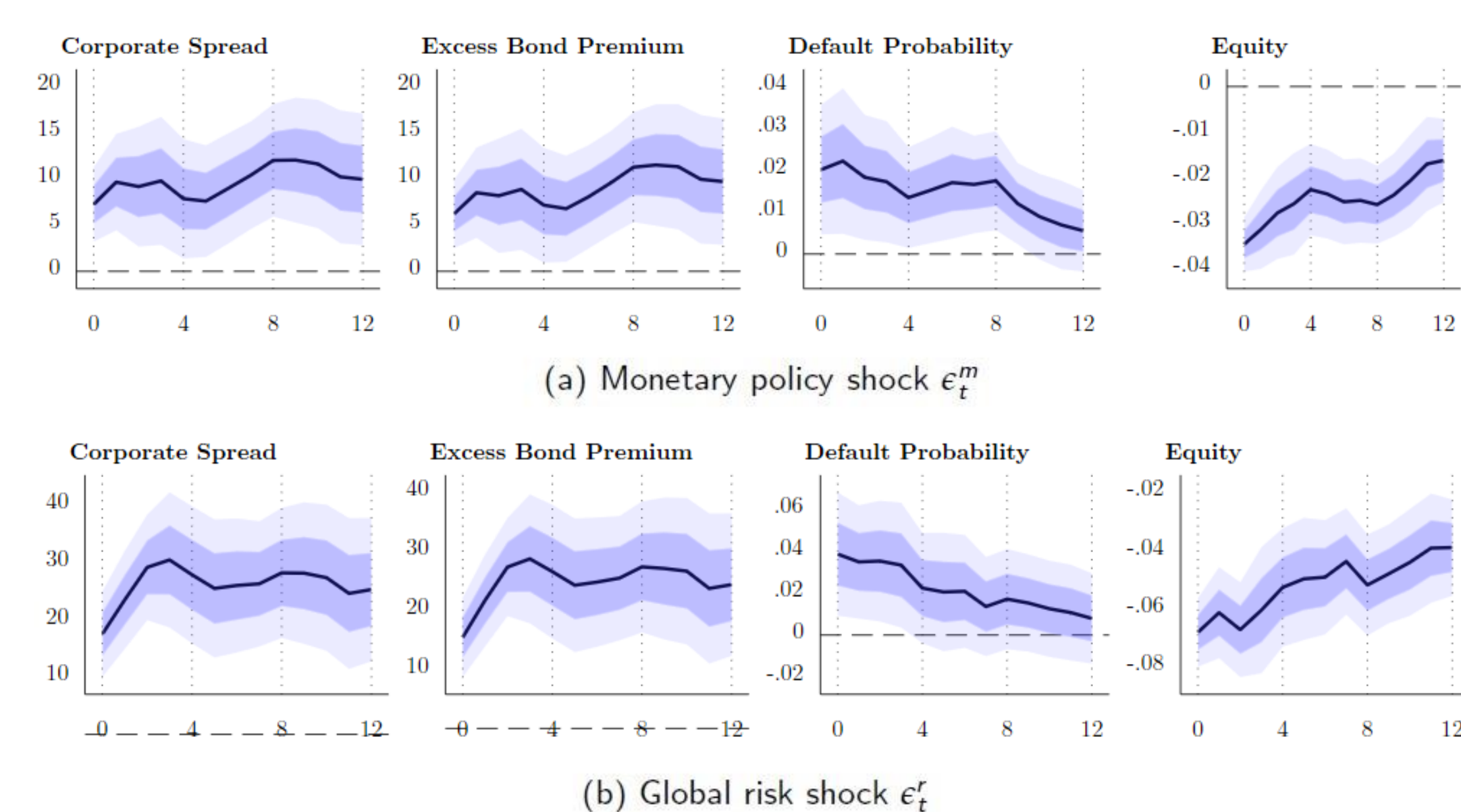

(a) Monetary policy shock ϵ_t^m

(b) Global risk shock ϵ_t^r

Figure 2: Cumulative responses to MP (GR) shock equiv. to 10 bsp increase (decrease) in US 10y yield

In a nutshell

Shocks:
- Global risk shocks have stronger and more heterogeneous effects on corporate funding costs, in particular for firms with low earnings/ cash flow coverage
- Monetary policy shocks have homogeneous impact across weak/strong firms
- Both shocks have a stronger and more persistent effect on the excess bond premium reflecting risk that is unexplained by firm fundamentals

Channels:
- Responses of firms' funding costs are not significant for the tails of firms with above and below average leverage ...
- … but significant and pronounced for the tails of firms with below average earnings in the distribution of firms

Robustness tests

- Modified sign restrictions in BVAR and model validation with other shocks
- Shorter sample period 2005-2021 to exclude years with fewer bonds
- Lagged dependent variables to account for autocorrelation in asset prices
- Week + week-industry FE → time-varying macro & industry-exposure
- Alternative measures of firm profitability
- Alternative definition of tails of firms (15th, 85th pct)
- Spread decomposition with log-spread, firm fundamentals as controls, only senior unsecured bonds

Conclusions

- We propose an integrated framework to identify MP and GR shocks
- We analyze to which extent these shocks affect corporate funding costs heterogeneously depending on the type of borrowing constraint
- Key Takeaway: **GR shocks** (relative to MP shocks) have **stronger** and **more heterogeneous effects** on corporate funding costs which depend on **firms' position** within the **earnings distribution**
    → the **earnings-based borrowing constraint transmission channel**

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