

The price of geoeconomic dependence: Sanction intensity and corporate credit spreads

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Question and Motivation

Increasing use of geoeconomic pressure and sanctions to pursue geopolitical or economic goals

- ▶ New approach to measuring **sanction intensity** as a specific dimension of geoeconomic pressure

Limited understanding of the interaction of geoeconomic policy with financial conditions

- ▶ Empirically estimate the effect of sanction intensity on **corporate financial conditions**
- ▶ **Real effects on firms** operating in an environment of elevated sanction intensity

This paper

Setting: The EU-Russia conflict over Ukraine from 2014

→ severe economic conflict under pronounced geoeconomic dependence

Identification of sanction intensity shocks

- ▶ SVAR identified by event-day heteroskedasticity using official sanction announcements
 - ▶ Sanction intensity shock: strength of covariance changes between gas prices, geopolitical risk, and financial variables on sanction announcement days
- captures weaponization of mutual dependence

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The effect of sanction intensity on financial conditions in the EU

- ▶ Corporate credit spreads: Separate direct channel through default risk from indirect channel through financial intermediaries
- ▶ Amplification of effects by firms' pre-war Russia risk and financial fragility
- ▶ The real costs of sanction intensity and tighter financial conditions: Corporate investment responses and bankruptcies

Key results

- ▶ Sanction intensity as observed at the start of the full-scale invasion elevates corporate spreads by 16 basis points on average
- ▶ Up to half of the increase in spreads explained by increased firm default risk, the remainder by financial intermediaries' risk-bearing capacity
- ▶ Firms with higher pre-war exposure to Russia and weaker fundamentals are stronger affected
- ▶ Reduced investment due to tighter financial conditions, and increased bankruptcy rates due to higher gas prices

1. **Goeconomic pressure and sanctions**

Clayton et al. (2025), Felbermayr et al. (2020), Itskhoki & Mukhin (2022), Fernández-Villaverde et al. (2025), Bai et al. (2026), Niepmann & Shen (2025), Garofalo et al. (2025), Federle et al. (2022), Alfaro et al. (2025)

→ Bridge goeconomic policy (sanctions) with corporate borrowing conditions

2. **The economic impact of the EU-Russia conflict:**

Bachmann et al. (2024), Ghironi et al. (2024)

→ Financial channel of the conflict

3. **Measuring geopolitical risk and fragmentation:**

Caldara & Iacoviello (2022), Fernández-Villaverde et al. (2024), Bondarenko et al. (2024), Clayton et al. (2025)

→ High frequency approach to measuring sanction intensity

Data

Sanction intensity shock

- ▶ Announcement days of sanction and countersanction measures

Calculation and decomposition of credit spreads

- ▶ Corporate bond yields: Unbalanced sample of up to 1364 bonds (366 NFCs) on euro area exchanges
- ▶ Risk-free rate: Interest rate on listed German federal securities estimated for different maturities
- ▶ Default risk: Bloomberg probability of default (5y-PD)

Additional variables

- ▶ Equity prices (Stoxx Europe 600), bond market volatility (VIXIE), the geopolitical risk index (GPRD), and EU gas prices (TTF front-month)
- ▶ Firm financials: Leverage (debt/equity), EBIT, investment (Δ log tangible capital)

Two samples:

- ▶ Short sample: Daily data between January 2022 and April 2024
- ▶ Long sample: Daily data between January 2014 and April 2024

Calculation and decomposition of credit spreads

- ▶ **Bond selection:** Senior-unsecured, euro-denominated bonds trading on euro area exchanges with at least 100 days of data
- ▶ **Spread (s) calculation:** Difference between the corporate bond yield and the maturity-matched German treasury rate
- ▶ **Spread decomposition (Gilchrist & Zakrajšek (2012))** into a default risk component ($\hat{s}_{ik,t}$) and an excess bond premium ($\hat{\epsilon}_{ik,t} = s_{ik,t} - \hat{s}_{ik,t}$):
$$\log(s_{ik,t}) = \alpha_{ik} + \beta_{ik} \text{DefaultRisk}_{i,t} + \gamma_{ik} \text{Duration}_{ik,t} + \epsilon_{ik,t}$$
- ▶ **Spread aggregation:** Unweighted average of bond-level credit spreads

summary statistics bond sample

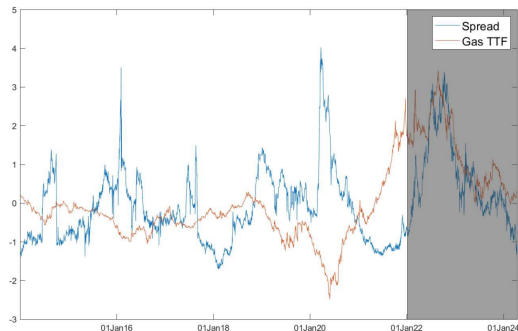


Figure: Spread and gas prices over time. Shaded area: intensified conflict starting in 2022 (full-scale invasion).

	pre 2022	post 2022
correlation	-0.56	0.76

→ EU-Russia geoeconomic conflict as correlating force

Sanctions after the annexation of Crimea (2014)

Sanctions imposed by the EU:

- ▶ Travel bans and asset freezes for individuals involved in annexation
- ▶ Broader economic and financial sanctions: Export of military/dual-use products and energy-related equipment (only with authorisation) restricted; trade in financial instruments of duration >30 days and loan provision to selected entities prohibited

Countersanctions imposed by Russia:

- ▶ Import ban on EU agricultural products

Sanctions after the full-scale invasion of Ukraine (2022-2024)

Sanctions imposed by the EU:

- ▶ 13 sanction packages until April 2024 after the military aggression of Russia against Ukraine ¹
- ▶ Products with export restrictions (among others): Sensitive machinery, luxury goods (including cars), chemicals, semiconductors, quantum computing, and to a lesser degree services
- ▶ Products with import restrictions (among others): oil and coal, construction materials, metal and steel, gold, spirits
- ▶ Financial restrictions

Countersanctions imposed by Russia:

- ▶ Financial restrictions on FX, cash withdrawals, profit payments, debt repayments, and corporate transactions among others (Decrees 79, 81, 254, 95, 295, and 126)
- ▶ Export bans and trade with sanctioned entities (Decrees 100 and 252)

¹ https://ec.europa.eu/commission/presscorner/detail/en/fs_22_1402

Methodology: Identifying the sanction intensity shock

Structural VAR

- ▶ Announcement days of (counter)sanction measures by the EU and Russia (44 over the sample period)
 - ▶ Identifying assumptions:
 - * lumpy information: Sanction shock has variance σ_1^2 and σ_0^2 for announcement and non-announcement days, respectively
 - * all other shocks have the same variance on all dates
 - both assumptions testable
- comparable to an event-study approach but under weaker assumptions and with system dynamics

list announcements

announcements and news (chart)

announcements and intensity (estimation)

Identification of sanction shocks

$$A(L)Y_t = \mu + u_t$$

The covariance matrix of reduced form errors for announcement days is

$$\Sigma_1 = E(u_t u_t') = E(B \varepsilon_t \varepsilon_t' B') = B E(\varepsilon_t \varepsilon_t') B' = b_1 b_1' \sigma_1^2 + \sum_{i=2}^k b_i b_i' \sigma_i^2$$

Subtracting the covariance matrix for non-announcement days we get

$$\Sigma_1 - \Sigma_0 = b_1 b_1' \sigma_1^2 - b_1 b_1' \sigma_0^2 = b_1 b_1' (\sigma_1^2 - \sigma_0^2)$$

normalising the difference in variance to one provides us with a moment condition. We can minimize the following GMM objective

$$J_W(b_1) = \text{vech}(\widehat{\Sigma}_1 - \widehat{\Sigma}_0 - b_1 b_1')' W^{-1} \text{vech}(\widehat{\Sigma}_1 - \widehat{\Sigma}_0 - b_1 b_1')$$

$\widehat{\Sigma}_1$ and $\widehat{\Sigma}_0$

Testing the identification assumptions

Sample	Ho: $\Sigma_1 = \Sigma_0$	Ho: $\Sigma_1 - \Sigma_0 = b_1 b_1'$
2014 to 2024	0.000	0.862
2022 to 2024	0.001	0.877

Table: Test identification assumptions (p-values)

Notes: P-values derived from the bootstrapped distribution of the Wald test statistics. Bootstrap performed with 1000 repetitions.

- Both assumptions hold when using the time period starting with the full-scale invasion (short sample) or starting with the annexation of Crimea (long sample)

test statistics

EU-Russia sanction intensity

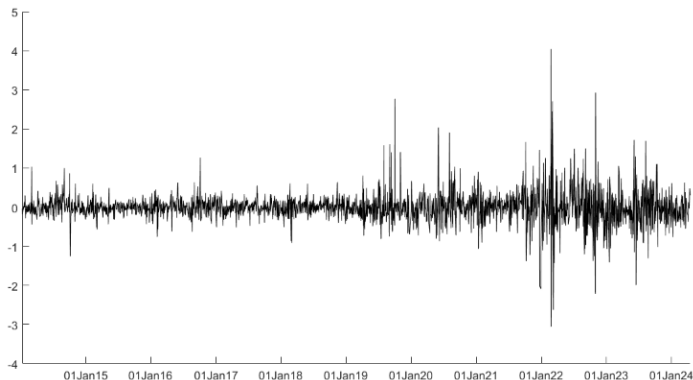


Figure: EU-Russia sanction intensity shock obtained by the baseline model specification.

sanction events

correlation alt. shocks

EU-Russia sanction intensity

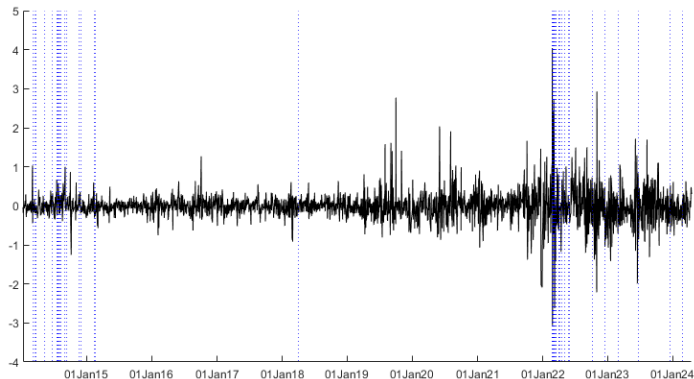


Figure: EU-Russia sanction intensity shock obtained by the baseline model specification.

sanction events

correlation alt. shocks

The aggregate impact on credit spreads

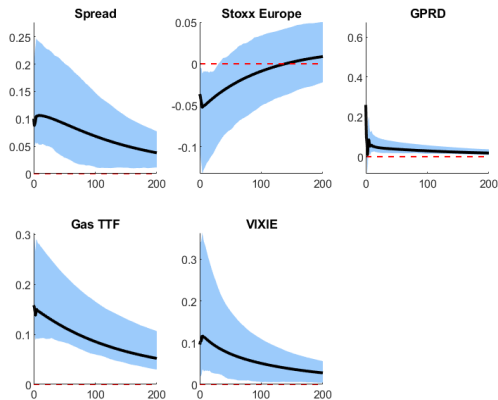


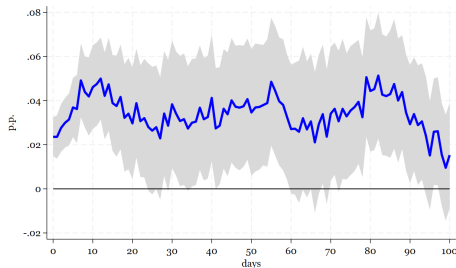
Figure: Impulse response functions to an adverse sanction intensity shock (January 2014 to April 2024). Shaded areas represent the 90% confidence interval. All variables are standardised.

Decomposing the impact on credit spreads

$$\Delta_h EBP_{t+h} = \alpha^h + \beta_1^h \epsilon_t^{sanction} + \sum_{l=1}^5 \beta_2^h \chi_{t-l}$$

$$\Delta_h \hat{s}_{t+h} = \alpha^h + \beta_1^h \epsilon_t^{sanction} + \sum_{l=1}^5 \beta_2^h \chi_{t-l}$$

EBP



Default component

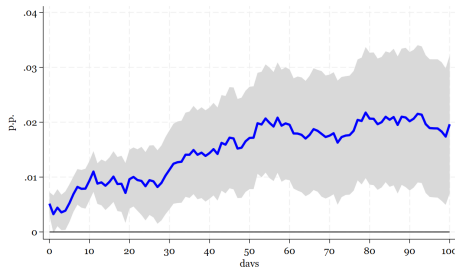


Figure: Effect of a sanction shock on the excess bond premium and the default risk component

Results

Heterogeneity

- ▶ Increase in credit risk for industries directly and strongly affected by sanctions **industries**
- ▶ Heterogeneous risk responses across countries depending on economic and geographic proximity to Russia **countries**
- ▶ Russia-dependent firms particularly affected **Russia exposure**
- ▶ Stronger increase in credit risk and risk premia for financially weaker firms **financial health**

Macro implications

- ▶ Investment declines due to elevated borrowing costs **investment** **channel**
- ▶ Rise in bankruptcies after one year due to higher gas prices **bankruptcy** **channel**

Effects amplified by firms' Russia-dependence

	1-week ahead		2-weeks ahead		3-weeks ahead		4-weeks ahead	
	Spread	Spread	Spread	Spread	Spread	Spread	Spread	Spread
L.sanction_shock	0.014*** (0.001)	0.016*** (0.002)	0.019*** (0.002)	0.020*** (0.003)	0.018*** (0.002)	0.020*** (0.003)	0.016*** (0.003)	0.016*** (0.003)
High RU risk	0.001** (0.001)	0.000 (0.002)	0.001 (0.001)	-0.002 (0.003)	0.002 (0.002)	-0.004 (0.003)	0.003 (0.002)	-0.007 (0.004)
High RU risk*L.sanction_shock	0.005** (0.002)	0.005** (0.002)	0.008** (0.003)	0.007** (0.003)	0.009*** (0.002)	0.006*** (0.002)	0.008** (0.003)	0.006** (0.002)
N	582870	529126	577650	525549	574639	523928	574238	524717
Firms	162	162	162	162	162	162	162	162
Country FE	Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes	
Country-Industry FE	No	Yes	No	Yes	No	Yes	No	Yes
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Controls*L.sanction_shock	No	Yes	No	Yes	No	Yes	No	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table: Sanction impact for firms highly exposed to Russia (top quintile Russia risk by Hassan et al. (2024)).

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Effects amplified by corporate financial fragility

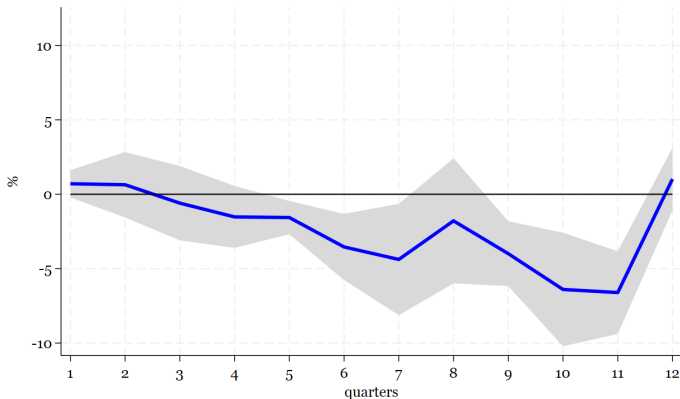
	Spread	EBP	Default risk	Spread	EBP	Default risk	Spread	EBP	Default risk
L.sanction_shock	0.042***	0.032***	0.010*	-0.003	0.020***	-0.023	0.038***	0.039***	-0.001
Low leverage				-0.120	0.001	-0.119			
High leverage				0.544**	-0.013	0.557**			
Low leverage*L.sanction_shock				0.030	0.000	0.030			
High leverage*L.sanction_shock				0.109**	0.039***	0.071**			
Low EBIT							0.594**	0.014	0.580**
High EBIT							-0.142**	-0.026**	-0.116**
Low EBIT*L.sanction_shock							0.025**	-0.009	0.033**
High EBIT*L.sanction_shock							-0.009	-0.011**	0.002
N	663749	663749	663749	663749	663749	663749	663749	663749	663749
Firms	209	209	209	209	209	209	209	209	209
Country and Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table: Testing for asset- and earnings-based borrowing constraints (firms are dynamically grouped into three equally sized bins according to their leverage and earnings levels).

Reduction in corporate investment after sanction intensity shock

$$\Delta_h Y_{i,t+h} = \beta^h \epsilon_{t-1}^{sanction} + \sum_{j=1}^3 \gamma_{1,j}^h \Delta Y_{i,t-j} + \sum_{j=1}^3 \gamma_{2,j}^h \Delta X_{i,t-j} + \gamma_3^h \epsilon_{t-2}^{sanction} + \gamma_4^h \epsilon_{t-3}^{sanction} + \alpha_c^h + \alpha_s^h + u_{i,t+h}$$



Notes: Impulse response function to an adverse sanction shock with 90% (shaded area) confidence intervals. The dependent variable Y is the log of tangible capital (PPE).

Borrowing costs explain investment response to sanction intensity

$h = 10$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$
L.sanction_shock	-0.066 ^{***}				
	(0.017)				
$\Delta Spread$					
ΔEBP					
N	1614	1614	1614	1614	1614
Firms	130	130	130	130	130
Controls	Yes	Yes	Yes	Yes	Yes
$\Delta Spread_{t+1}$ to $\Delta Spread_{t+h}$	No	No	No	Yes	No
ΔEBP_{t+1} to ΔEBP_{t+h}	No	No	No	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table: The effect of the sanction shock on corporate investment accounting for borrowing costs

Borrowing costs explain investment response to sanction intensity

$h = 10$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$
L.sanction_shock	-0.066*** (0.017)	-0.043*** (0.011)	-0.031*** (0.006)		
$\Delta Spread$		-0.217*** (0.014)			
ΔEBP			-0.315*** (0.027)		
<i>N</i>	1614	1614	1614	1614	1614
Firms	130	130	130	130	130
Controls	Yes	Yes	Yes	Yes	Yes
$\Delta Spread_{t+1}$ to $\Delta Spread_{t+h}$	No	No	No	Yes	No
ΔEBP_{t+1} to ΔEBP_{t+h}	No	No	No	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table: The effect of the sanction shock on corporate investment accounting for borrowing costs

Borrowing costs explain investment response to sanction intensity

$h = 10$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$	$\Delta_h \log(PPE)$
L.sanction_shock	-0.066*** (0.017)	-0.043*** (0.011)	-0.031*** (0.006)	-0.022** (0.010)	-0.001 (0.013)
$\Delta Spread$		-0.217*** (0.014)		-0.178*** (0.014)	
ΔEBP			-0.315*** (0.027)		-0.244*** (0.034)
N	1614	1614	1614	1614	1614
Firms	130	130	130	130	130
Controls	Yes	Yes	Yes	Yes	Yes
$\Delta Spread_{t+1}$ to $\Delta Spread_{t+h}$	No	No	No	Yes	No
ΔEBP_{t+1} to ΔEBP_{t+h}	No	No	No	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table: The effect of the sanction shock on corporate investment accounting for borrowing costs

This paper

- ▶ Studies the impact of sanction intensity for firms in the context of the EU-Russia conflict
- ▶ Proposes a new sanction intensity shock
- ▶ Documents a meaningful increase in firm financing costs and credit risk
- ▶ Finds significant responses of firm investment and bankruptcy rates

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Appendix

Bond sample statistics

	P25	Median	P75	Mean	SD	N	Firms	Bonds
Issuance amount	400 000 000	500 000 000	750 000 000	578 160 783	333 568 002	1562575	366	1364
Duration	4.04	6.07	8.52	6.70	3.78	1562575	366	1364
Excess Bond Premium	-0.22	-0.04	0.17	0.01	1.41	1562575	366	1364
Default risk component	0.99	1.30	1.94	2.13	4.13	1562575	366	1364
5y PD	0.01	0.02	0.03	0.03	0.04	1562575	366	1364
Spread	0.93	1.30	1.98	2.13	4.40	1562575	366	1364
Yield	0.92	2.35	3.84	2.94	4.60	1562575	366	1364

Notes: Summary statistics for the bond characteristics of the bonds included in the sample.

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Bond sample coverage

Year	Firms	Bonds	Average daily volume
2014	71	114	45 338 343 096
2015	97	164	72 787 643 409
2016	125	245	104 402 202 947
2017	164	340	158 889 104 123
2020	193	439	219 029 383 520
2019	245	615	295 310 037 217
2020	207	840	429 001 956 251
2021	330	1025	550 384 095 336
2022	343	1203	644 456 206 743
2023	358	1339	746 166 580 135
2024	353	1333	781 550 291 331

Notes: Coverage of firms and bonds over the complete sample period. Due to the limited data availability in the early years, all relevant bond market results are confirmed for the sub-period starting in 2022.

Summary statistics

	Mean	SD	P25	Median	P75
Spread	2.0798	0.36031	1.8094	2.024	2.2632
Default risk component	2.0958	0.17391	1.9569	2.0651	2.2107
EBP	-0.016046	0.24696	-0.1925	-0.051314	0.098335
Stoxx Europe 600	393.4004	46.8646	357.445	385.93	432.24
GPRD	116.435	53.2421	81.4733	106.857	140.8747
Gas TTF	33.7672	39.4071	15.38	19.99	20.4
VIXIE	41.3811	19.8446	29.6788	36.3907	46.9057

Notes: Summary statistics of the financial and news variables included in the SVAR estimation before the logarithmic transformation is applied to the Stoxx Europe 600, the GPRD, the Gas TTF, and the VIXIE series.

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Summary statistics firms

	Mean	SD	P25	Median	P75	N
Investment	0.015566	0.27926	-0.01375	0.007088	0.035536	2911
PPE (net, bn)	14.28687	35.0587	2.151	5.628	13.78	2911
Total Assets (bn)	48.47657	91.5569	10.3922	22.13814	50.0625	2911
Leverage	0.97544	23.68403	0.579405	0.995434	1.467415	2911
EBIT (mn)	702.034	1764.653	110.859	297.386	797.500	2880
Interest expense (mn)	-142.527	380.507	-114.371	-48.728	-23.180	2856
Spread	2.108984	4.386772	1.033244	1.378178	2.051838	2911

Notes: Summary statistics of the financial variables of bond issuing firms. Leverage is defined as total debt over total equity, investment as the log-difference in net property plant and equipment (PPE), and the spread is calculated as the unweighted average spread over all outstanding bonds per firm and quarter.

Variance-covariance on announcement and non-announcement days

$$\hat{\Sigma}_i = \frac{1}{\#T_i} \sum_{t \in T_i} \hat{u}_t \hat{u}_t' \text{ for sub-samples } i = 0, 1$$

$\hat{\Sigma}_0$	Spread	Estoxx	GPRD	VIXIE	TTF Gas
Spread	0.0036	-0.0001	-0.0001	0.0006	0.0000
Estoxx		0.0001	0.0001	-0.0004	0.0000
GPRD			0.1209	-0.0009	0.0002
VIXIE				0.0038	0.0000
TTF Gas					0.0019
$\hat{\Sigma}_1$	Spread	Estoxx	GPRD	VIXIE	TTF Gas
Spread	0.0037	-0.0001	-0.0006	0.0007	0.0030
Estoxx		0.0001	0.0002	-0.0007	-0.0010
GPRD			0.1215	0.0003	0.0115
VIXIE				0.0060	0.0057
TTF Gas					0.0170

Testing the identification assumptions

1) $H_0: \Sigma_1 = \Sigma_0$ (heteroskedasticity of conflict shock)

$$W = \text{vech}(\widehat{\Sigma}_1 - \widehat{\Sigma}_0)' \left(\frac{\widehat{V}_0}{T_0} + \frac{\widehat{V}_1}{T_1} \right)^{-1} \text{vech}(\widehat{\Sigma}_1 - \widehat{\Sigma}_0)$$

Bootstrap distribution of statistic by randomly scattering event days (remaining total event number) $\rightarrow \Sigma_1 = \Sigma_0$ by construction

2) $H_0: \Sigma_1 - \Sigma_0 = b_1 b_1'$ (constant variance other shocks)

$$W = \text{vech}(\widehat{\Sigma}_1 - \widehat{\Sigma}_0 - b_1 b_1')' \left(\frac{\widehat{V}_0}{T_0} + \frac{\widehat{V}_1}{T_1} \right)^{-1} \text{vech}(\widehat{\Sigma}_1 - \widehat{\Sigma}_0 - b_1 b_1')$$

P-value for both tests is the fraction of the bootstrapped statistics that exceed the sample statistic.

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Sanction announcements and sanction intensity

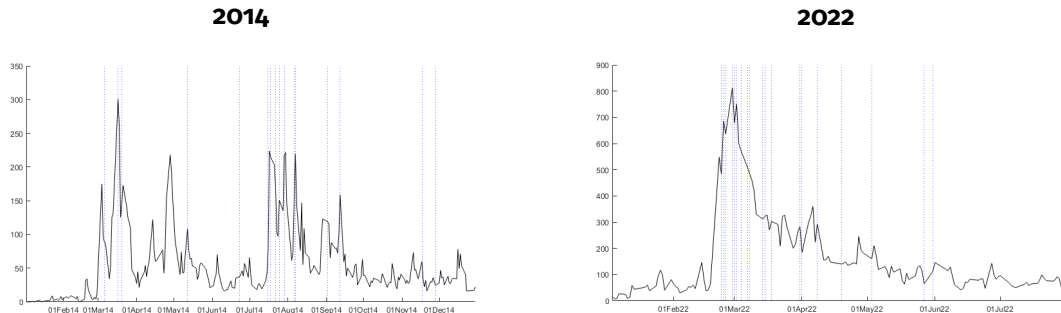


Figure: Official sanction announcements and the coverage of sanctions in the news

Notes: The black line shows the number of articles mentioning sanctions, Russia, and Ukraine in the Dow Jones Newswire, Reuters Newswire, or the Wall Street Journal. The interrupted blue lines indicate official (counter)sanction announcement days.

Sanction announcements and sanction intensity

	(1) Sanction news	(2) GPRD	(3) TTF gas price	(4) Δ Sanction news	(5) σ_{TTF}^2
announcement	1.520*** (0.161)	0.604*** (0.083)	0.754*** (0.136)	0.099* (0.059)	0.016** (0.007)
Observations	793	2512	2512	788	2511
R^2	0.122	0.034	0.017	0.002	0.046

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table: Official sanction announcements and sanction intensity

Notes: A logarithmic transformation is applied to the news indices and gas prices. The sanction news index captures the year 2014 as well as the period following the full-scale invasion in 2022.

EU-Russia sanction intensity

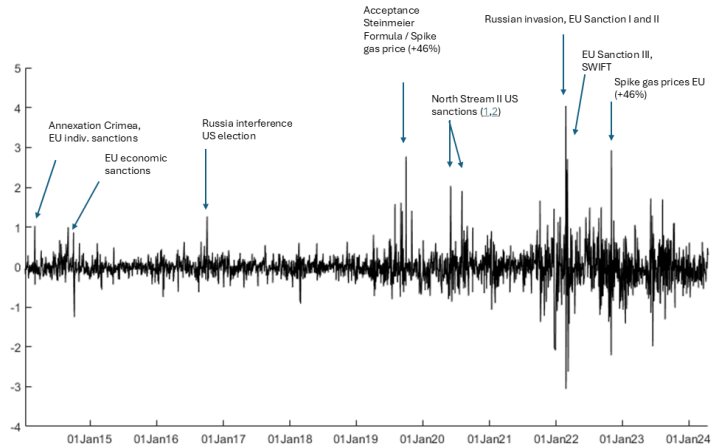


Figure: EU-Russia sanction intensity shock obtained by the baseline model specification.

The aggregate impact on credit spreads - 2022 to 2024

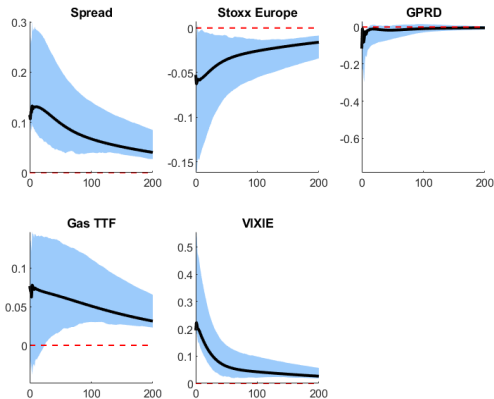


Figure: Impulse response functions to a one standard deviation conflict shock. Shaded areas represent the 90% bootstrapped confidence interval. All variables are standardised.

The aggregate impact on credit spreads - Proxy VAR

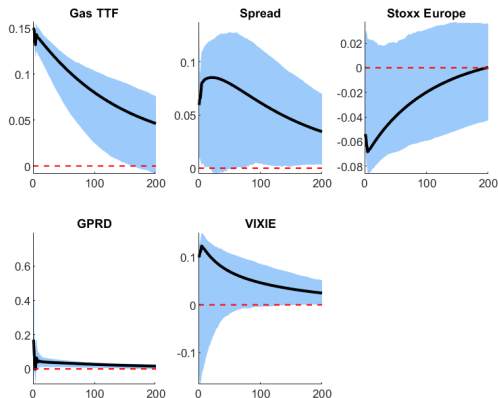


Figure: Effect of a sanction intensity shock on credit spreads, 2014 to 2024, Proxy VAR with gas price changes on sanction days.

The aggregate impact on credit spreads - Excluding economic events

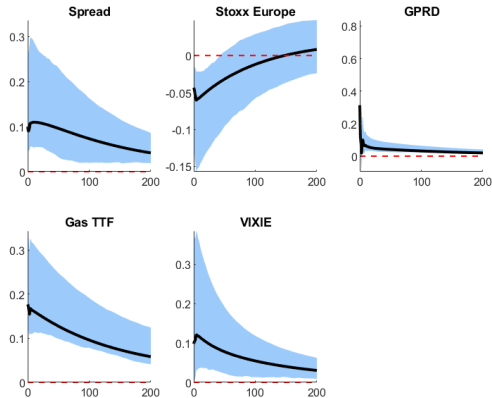


Figure: Effect of a sanction shock on credit spreads, 2014 to 2024, excluding economic events.

Correlation with alternative shocks

Jan. 2014 - Dec. 2023	Sanction	GPR	GPR DEU	GPR FRA	EPU Europe	EU Gas
Sanction Shock	1	0.120	0.165	0.135	0.083	0.412
GPR		1	0.833	0.686	0.270	0.048
GPR DEU			1	0.596	0.262	0.088
GPR FRA				1	0.061	0.012
EPU Europe					1	0.081
EU Gas Shock						1
Jan. 2022 - Dec. 2023	Sanction	GPR	GPR DEU	GPR FRA	EPU Europe	EU Gas
Sanction Shock	1	0.203	0.277	0.257	0.221	0.472
GPR		1	0.817	0.886	0.247	0.285
GPR DEU			1	0.934	0.096	0.246
GPR FRA				1	0.060	0.287
EPU Europe					1	-0.037
EU Gas Shock						1

Table: Monthly cross-correlations with alternative shock series

Notes: This table shows the monthly cross-correlation of the resulting sanction shock with alternative measures of geopolitical risk or general uncertainty. Country-specific and aggregate geopolitical risk indices (GPR) of [Caldara & Iacoviello \(2022\)](#), economic policy uncertainty (EPU) of [Baker et al. \(2016\)](#), and EU gas supply shocks of [Alessandri & Gazzani \(2025\)](#).

The aggregate impact on credit spreads - Excluding data releases

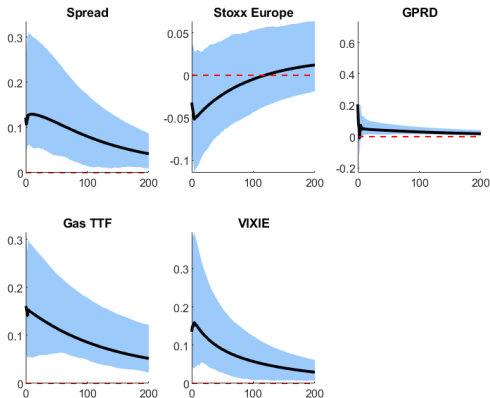


Figure: Effect of a sanction shock on credit spreads, 2014 to 2024, excluding economic data releases.

The aggregate impact on credit spreads - robustness lags

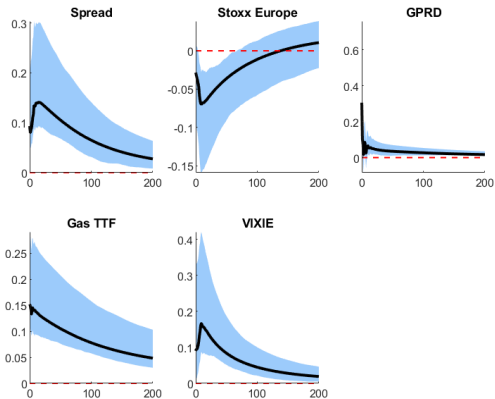


Figure: Effect of a sanction shock on credit spreads in model with 10-day lags.

The aggregate impact on credit spreads - gas price residual

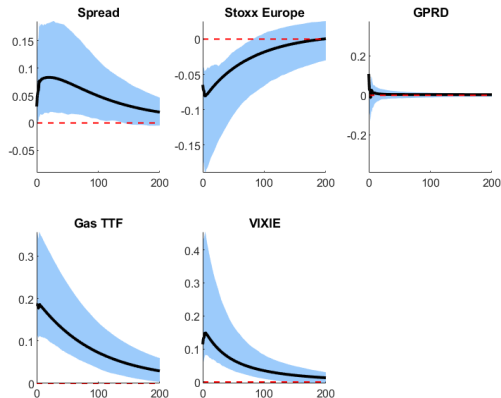


Figure: Effect of a sanction shock on credit spreads, 2014 to 2024, gas price component orthogonal to oil prices.

The aggregate impact on credit spreads - placebo exercise

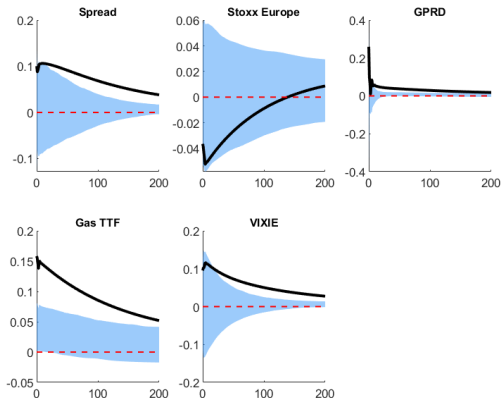


Figure: Effect of a sanction shock together with the placebo distribution (events proportionally scattered over the pre-2022 and post-2022 periods)

The aggregate impact on credit spreads - sanction excluded countries

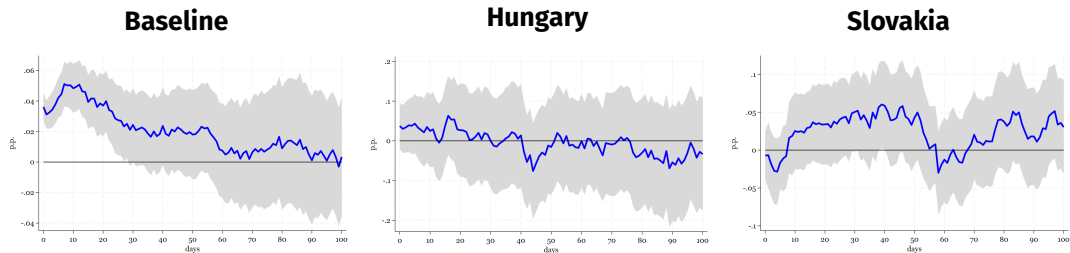


Figure: Effect of a sanction shock on the aggregate spread and selected sanction-exempted EU countries.

The aggregate impact on credit spreads - event study

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Spread	h=1 EBP	Default risk	Spread	h=5 EBP	Default risk	Spread	h=10 EBP	Default risk
announcement	0.017*** (0.003)	0.014*** (0.004)	0.003** (0.001)	0.053*** (0.006)	0.040*** (0.008)	0.013*** (0.003)	0.047*** (0.006)	0.031*** (0.007)	0.016*** (0.002)
Observations	1463467	1463467	1463467	1458011	1458011	1458011	1451191	1451191	1451191
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table: Official sanction announcements and corporate spreads

Note: This table examines the effect of sanction announcements on corporate spreads in a panel regression setting covering the period from January 2014 to April 2024. The dependent variable is the credit spread over various horizons (1, 5 and 10 days ahead).

Comparison alternative shocks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Δ Spread	Δ Spread	Δ Spread	Δ Spread	Δ Default risk	Δ Default risk	Δ Default risk	Δ Default risk
Sanction intensity	0.036** (0.018)				0.018*** (0.006)			
EU gas supply		0.020 (0.017)				0.003 (0.005)		
GPR			0.030** (0.013)				0.010* (0.005)	
EPU Europe				0.027 (0.020)				0.008 (0.010)
Observations	123	123	123	123	123	123	123	123
R ²	0.041	0.013	0.028	0.023	0.038	0.001	0.012	0.008

Standard errors in parentheses

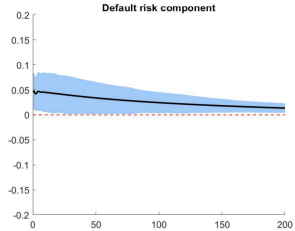
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table: Comparison of the sanction shock to related shock series

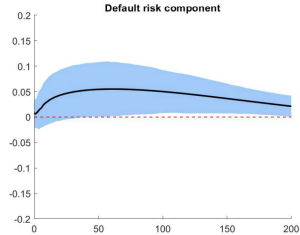
Notes: Monthly data between January 2014 and April 2024. All shocks are standardized to have mean zero and unitary variance.

Industries directly affected by trade restrictions

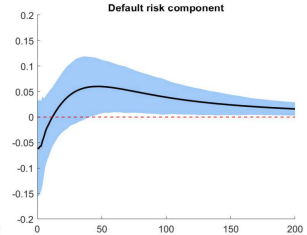
Car Manufacturers



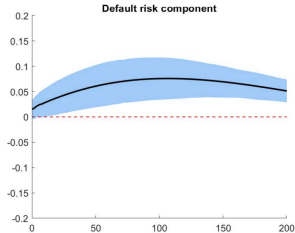
Electrical Equipment



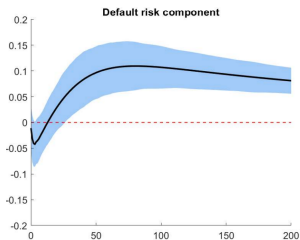
Machinery



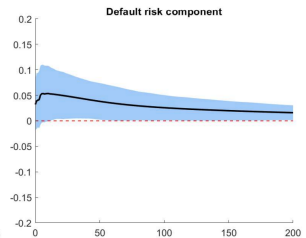
Materials



Wood and Paper

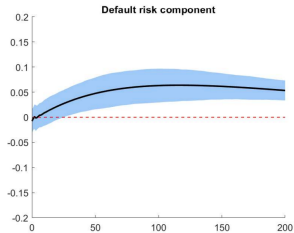


Iron and Steel

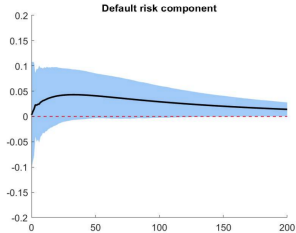


Country heterogeneity

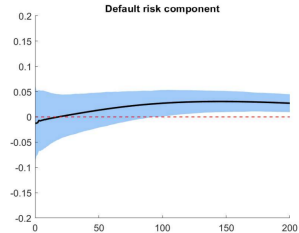
Germany



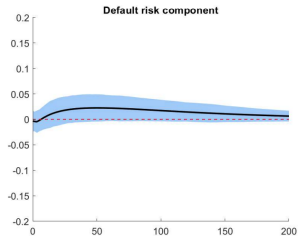
France



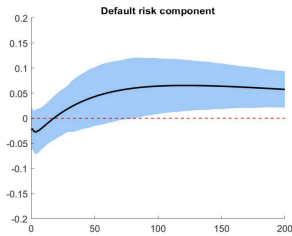
Italy



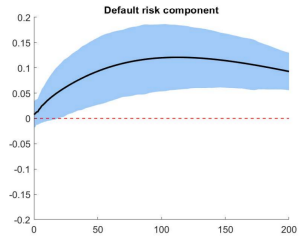
Spain



Finland



Sweden



Methodology: Local projections for business statistics

Panel local projection for the monthly EU-Russia conflict shock:

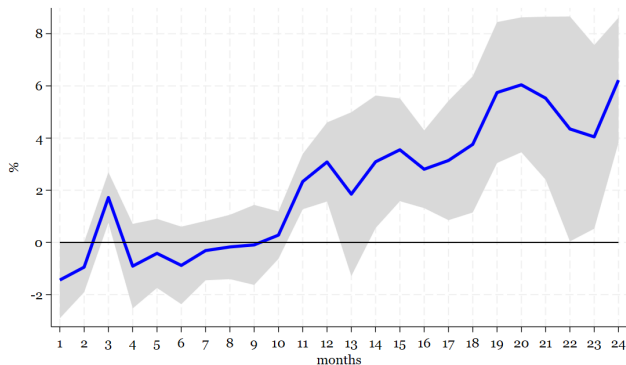
$$\begin{aligned}\Delta_h Y_{i,c,t+h} = & \beta_h * \epsilon_{t-1}^{conflict} + \sum_{j=1}^3 \gamma_{j,h}^1 \Delta Y_{i,c,t-j} + \sum_{j=1}^3 \gamma_{j,h}^2 \Delta X_{c,t-j} \\ & + \gamma_h^3 * \epsilon_{t-2}^{conflict} + \gamma_h^4 * \epsilon_{t-3}^{conflict} + \alpha_i^h + \alpha_c^h + \alpha_{m(t)}^h + u_{i,c,t+h}\end{aligned}$$

where

- ▶ $\Delta_h Y_{i,c,t+h}$: Cumulative change in bankruptcies and industrial import prices
- ▶ $X_{c,t-1}$: Country controls (IP, CPI, 10y yield, NEER)
- ▶ $\alpha_{i/c}^h$: Industry and country FEs
- ▶ $\alpha_{m(t)}$: Month indicator (seasonality)

Increase in bankruptcies after sanction intensity shock

$$\Delta_h Y_{s,c,t+h} = \beta^h \epsilon_{t-1}^{sanction} + \sum_{j=1}^3 \gamma_{1,j}^h \Delta Y_{s,c,t-j} + \sum_{j=1}^3 \gamma_{2,j}^h \Delta X_{c,t-j} \\ + \gamma_3^h \epsilon_{t-2}^{sanction} + \gamma_4^h \epsilon_{t-3}^{sanction} + \alpha_s^h + \alpha_c^h + \alpha_{m(t)}^h + u_{s,c,t+h}$$



Notes: The dependent variable Y is the log of the bankruptcy index. Country controls include consumer prices, industrial production, 10-year sovereign bond yields, and the nominal effective exchange rate.

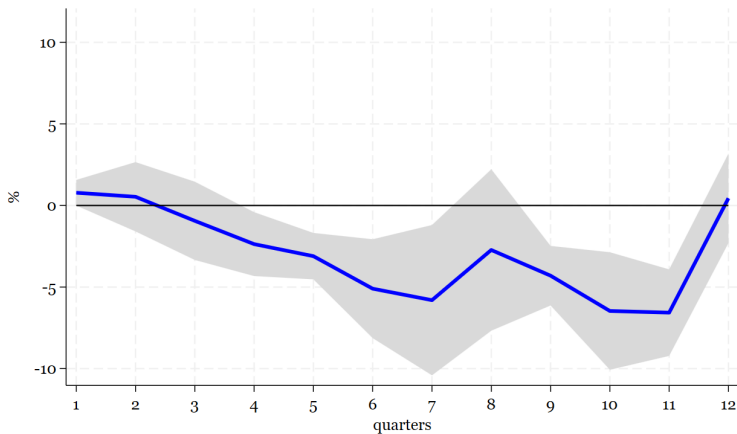
Gas prices explain bankruptcy response to sanction intensity

	F=0			F=h
	$\Delta_h \log(\text{bankruptcy})$	$\Delta_h \log(\text{bankruptcy})$	$\Delta_h \log(\text{bankruptcy})$	$\Delta_h \log(\text{bankruptcy})$
L.sanction_shock	0.062 ^{***} (0.015)	0.067 ^{***} (0.015)	0.004 (0.018)	-0.006 (0.021)
ΔSpread		-0.158 (0.105)		
$\Delta \text{Gas TTF}$			0.831 ^{**} (0.307)	0.156 (0.184)
<i>N</i>	5521	5521	5521	5521
Controls	Yes	Yes	Yes	Yes
$\Delta \text{GasTTF}_{t+1}$ to $\Delta \text{GasTTF}_{t+h}$	No	No	No	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table: The effect of the sanction shock on corporate bankruptcies accounting for borrowing costs and gas prices

Conflict and corporate investment - Firm FE



Notes: Impulse response function to an adverse conflict shock with 90% (shaded area) confidence intervals. Standard errors are clustered at the country level. The dependent variable Y is the log of tangible capital (PPE). Firm controls X , and firm fixed effects α_i^h are included.

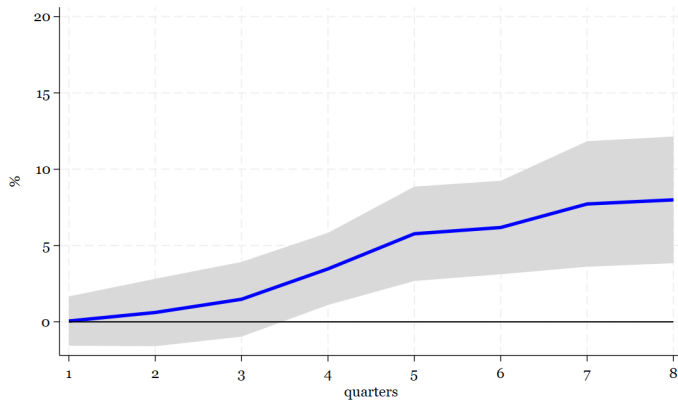
Testing borrowing constraints - Firm FE

	Spread	EBP	Default risk	Spread	EBP	Default risk
L.sanction_shock	0.008	0.020 ^{**}	-0.012	0.043 ^{***}	0.039 ^{***}	0.004
Low leverage	0.109	0.002	0.108			
High leverage	0.127	-0.030	0.157			
Low leverage*L.sanction_shock	0.012	-0.000	0.013			
High leverage*L.sanction_shock	0.080 ^{**}	0.038 ^{***}	0.042 [*]			
Low EBIT				0.045	0.022	0.024
High EBIT				-0.075 [*]	-0.036	-0.039
Low EBIT*L.sanction_shock				-0.001	-0.010	0.009
High EBIT*L.sanction_shock				-0.013	-0.012	-0.002
N	663749	663749	663749	663749	663749	663749
Firms	209	209	209	209	209	209
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table: Testing for asset- and earnings-based borrowing constraints (firms are dynamically grouped into three equally sized bins according to their leverage and earnings levels).

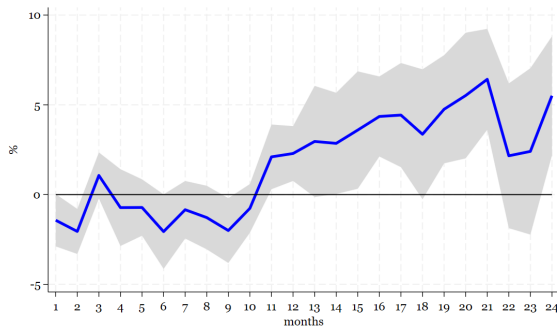
Increase in bankruptcies after sanction intensity shock - quarterly



Notes: The dependent variable Y is the log of the bankruptcy index. Country controls include consumer prices, industrial production, 10-year sovereign bond yields, and the nominal effective exchange rate.

Increase in bankruptcies after sanction intensity shock - robustness

Control alternative shocks



Excluding COVID-19 period

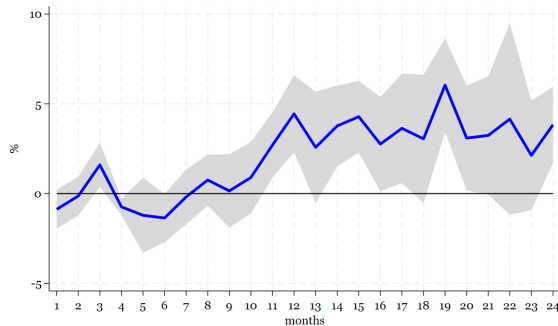


Figure: Effect of a sanction shock on bankruptcy rates

Notes: Left: Additional controls are the European EPU index, the GPR index, the EU gas price shocks of [Alessandri & Gazzani \(2025\)](#), and EA monetary policy shocks of [Jarociński & Karadi \(2020\)](#). Right: Sample period excludes January 2020 to September 2021.

(Counter)sanction announcements

Date	Event	Announcement by
06.03.2014	Extraordinary meeting EU heads of state; Start preparation individual sanctions	EU
17.03.2014	Introduction of a first set of restrictive measures against 21 Russian and Ukrainian officials	EU
20.03.2014	EU leader request preparation of broader economic sanctions; further names added to individual sanctions	EU
12.05.2014	Agreement on new set of sanctions	EU
23.06.2014	Import ban on goods from Crimea	EU
16.07.2014	Meeting European Council: 6 additional restrictive measures against Russia	EU
18.07.2014	Ukraine crisis: EU broadens remit of sanctions	EU
22.07.2014	Council demands sanctions in four sectors after downing of MH17	EU
25.07.2014	Further EU sanctions over situation in Eastern Ukraine	EU
29.07.2014	Adoption of economic sanctions against Russia	EU
06.08.2014	Russia bans the import of foodstuffs from sanctioning countries	RU
07.08.2014	Russia defines list of sanctioned products and countries	RU
30.08.2014	European Council asks for preparation of new economic sanctions	EU
12.09.2014	Further economic sanctions on Russia	EU
17.11.2014	EU ministers ask for proposal on further economic sanctions	EU
28.11.2014	EU strengthens sanctions against separatists in Eastern Ukraine	EU
12.02.2015	Minsk II	EU/RU
16.02.2015	EU strengthens sanctions against separatists in Eastern Ukraine	

Table: List of announcement days of restrictive measures by the EU and Russia

(Counter)sanction announcements

Date	Event	Announcement by
30.03.2018	Russia orders diplomats out (Skripal)	RU
23.02.2022	First package of sanctions against Russia	EU
24.02.2022	Russian full-scale invasion of Ukraine starts; EU leaders agree on further sanctions	EU/RU
25.02.2022	Second package of sanctions in response to Russia's invasion of Ukraine	EU
28.02.2022	Third package of sanctions / FX restrictions to balance ruble (Decree 79) / Ban EU air carriers	EU/RU
01.03.2022	Restrictions cash withdrawal (Decree 81)	RU
02.03.2022	SWIFT ban Russian banks	EU
04.03.2022	Profit payments to foreigners (Decree 254), Sanctions on individuals (Decree 30-FZ)	RU
06.03.2022	Procedure permits for transactions (Decree 295)	RU
08.03.2022	Export ban (Decree 100, Government order 311)	RU
14.03.2022	Ban on transactions of RU insurance corporations with foreign (Law 55-FZ)	RU
15.03.2022	Fourth package of sanctions in response to Russia's invasion of Ukraine	EU
18.03.2022	Additional restrictions of FX and transactions (Decree 126)	RU
31.03.2022	Payment gas in rubles (Decree 172)	RU
01.04.2022	Foreign banks not allowed to buy other currencies in Russia	RU

Table: List of announcement days of restrictive measures by the EU and Russia

(Counter)sanction announcements

Date	Event	Announcement by
08.04.2022	Fifth package of sanctions in response to Russia's invasion of Ukraine	EU
16.04.2022	Ban on issuance and trade of depositary receipts outside Russia (114-FZ)	RU
03.05.2022	Trade with sanctioned individuals (Decree 252)	RU
27.05.2022	Payments for IP via special accounts (Decree 322)	RU
31.05.2022	European Council agrees on sixth sanctions package	EU
06.10.2022	Eighth package of sanctions in response to Russia's invasion of Ukraine	EU
16.12.2022	Ninth package of sanctions in response to Russia's invasion of Ukraine	EU
25.02.2023	Tenth package of sanctions in response to Russia's invasion of Ukraine	EU
23.06.2023	Eleventh package of sanctions in response to Russia's invasion of Ukraine	EU
18.12.2023	Twelfth package of sanctions in response to Russia's invasion of Ukraine	EU
23.02.2024	EU adopts 13th package of sanctions against Russia	EU

Table: List of announcement days of restrictive measures by the EU and Russia