

BOFIT Discussion Papers  
5 • 2021

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Laura Solanko

Who cares about sanctions?  
Observations from annual reports of  
European firms



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THE BANK OF FINLAND  
INSTITUTE FOR  
EMERGING ECONOMIES

BOFIT Discussion Papers  
Editor-in-Chief Zuzana Fungáčová

BOFIT Discussion Papers 5/2021  
19.4.2021

Denis Davydov, Jukka Sihvonen and Laura Solanko: Who cares about sanctions?  
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ISBN 978-952-323-372-0, online  
ISSN 1456-5889, online

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Bank of Finland  
Helsinki 2021

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Denis Davydov, Jukka Sihvonen and Laura Solanko

## Who cares about sanctions? Observations from annual reports of European firms

### Abstract

This paper uses textual analysis to examine how European corporations assess sanctions in their annual reports. Using observations from a panel of almost 11,500 corporate annual reports from 2014–2017, we document significant cross-country variation in how firms perceive Russia-related sanctions. Even after controlling for firm-level characteristics, cross-country differences remain for sentiments about sanctions and contexts in which sanctions are mentioned. We also examine the role of macroeconomic linkages in explaining these differences. We show that the Russia's inward and outward FDI stocks and high levels of imports and exports with Russia only partially explain the cross-country variation, leaving a nontrivial share of variation unexplained.

Keywords: sanctions, textual analysis, European firms, annual reports

JEL: D22; F51

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# 1 Introduction

European countries differ markedly in their views on Russia-related sanctions. Some countries express strong opposition to the current sanctions regime, while others are almost deferential. Decisions on renewing EU Russia-related sanctions regime have, however, always been unanimous, resulting in a rare show of European consensus (Portela et al., 2020). Nevertheless, the persisting differences among EU member states are clearly documented in speeches of EU MEPs (members of the European Parliament). Somewhat counterintuitively, representatives from countries where trade with Russia is most significant are among the most vocal proponents of economic sanctions against Russia (Silva and Selden, 2020). This finding contrasts with the traditional view of international relations that suggests that countries with extensive economic ties can be expected to refrain from disruptive behavior such as the imposition of sanctions out of their own self-interest (see e.g. Polachek, 1980).

Given the sharp differences among European countries on Russia-related sanctions, there is surprisingly little systematic evidence on how European firms view Russia-related sanctions. Some industry lobbies survey their member organizations, but such survey results are typically unavailable to outside researchers. A notable exception is the study of Gröschl and Teti (2021), which is based on a survey of 862 German companies to identify roadblocks to their operations caused by Russia-related sanctions. Around half of the surveyed companies expected to benefit from lifting the current restrictive measures.

Generalization of membership-based surveys across the entire population of European enterprises is highly problematic, however. The only study we are aware of using cross-country survey data on firm's views on Russia-related sanctions is Weber and Stepien (2020). Their final sample includes about 1,000 firms from the UK, Poland, Germany, France, and Italy. Although about a quarter of respondent firms were affected by sanctions, Weber and Stepien (2020) find that many of the affected firms had found ways to mitigate the impact of sanctions on their operations.

To the best of our knowledge, ours is the first paper to use the only publicly available and reasonably comparable data, i.e. firm annual reports, to gauge firm perceptions of Russia-related sanctions. We collect a representative database of almost 11,500 firm annual reports from 2014 to 2017, and then search the narrative sections of the reports for mentions of Russia-related sanctions.<sup>1</sup> In essence, we let the firms speak for themselves.

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<sup>1</sup> Firms tend to find ways to adjust to trade restrictions. These adjustments include diverting trade routes, finding new markets, and modifying their products (Luo, Sun, and Wan, 2020; Weber and Stepien, 2020). Here, we focus only on the year when major Russia-related sanctions were imposed and the following three years (i.e. 2014 plus 2015–2017).

Economic sanctions invariably inflict costs on both the target and the sender country. When it comes to Russia-related sanctions, however, the distinction between sender and target gets blurred. Almost all European countries are simultaneously senders and targets for restrictive measures. We thus sample firms from over 35 European countries, including Russia, to achieve a broad perspective suitable for analysis of cross-country variation.

Specifically, we are interested in detecting how firms mention Russia-related sanctions in their annual reports. For this purpose, we search for keywords in the narrative sections of the reports. We interpret the occurrence of the words “sanction” and “Russia” in reasonable proximity as a mention of Russia-related sanctions in the text. We find that a nontrivial share (11%) of all firms consider Russia-related sanctions worth mention in their annual reports. As the narrative sections of firm annual reports tend to primarily highlight positive news (see e.g. Li, 2010), this can be considered as a lower bound for firms that consider sanctions important for their past or future operations.

We also document high cross-country variation in the propensity of firms to mention sanctions in their annual reports. We use three standard methods of textual analysis (topic modeling, sentiment analysis, and text classification) to examine the tone and context where firms mention Russia-related sanctions. Even when controlling for firm-level variables, we document significant country-level variation in how firms perceive sanctions. Regardless of location, firms view restrictive measures in negative terms. But in a number of countries, the overall sentiment is extremely negative. Likewise, in some countries sanctions are mostly viewed as having a tangible impact on specific markets, whereas in other countries firms tend to view sanctions in terms of influencing the general business environment. Our analysis confirms that politicians and firms across Europe may view sanctions very differently from their neighbors.

Do standard macroeconomic factors explain these cross-country variations? To find out, we determine whether a firm’s vigilance to sanctions correlates with FDI or its trade links with Russian partners. While traditional country-level macroeconomic factors explain a good share of firm-level vigilance to sanctions, we find that the attitudes of firms to sanctions in some countries remain hard to fathom.

Our contribution is twofold. First, we bring textual analysis into the literature on firm-level effects of economic sanctions. Sentiment analysis has been used to analyze the effects of Russia-related tweets by US president Donald Trump on the Russian ruble’s exchange rate (Afanasyev, 2021), but this study is the first to rely on corporate annual reports in gauging firm perceptions of sanctions. We show that textual analysis can bring meaningful insights into how firms view economic sanctions. Second, we provide new insights on country-level variation into the rapidly growing literature on the effects of Russia-related sanctions on European firms.

The next section gives a short overview of the existing literature on Russia-related sanctions after 2014. Section 3 explains the annual report data used. Section 4 introduces the model used in analyzing country-level variation in sanction mentions. In section 5, we use three alternative methods of textual analysis (topic modeling, sentiment analysis, and text classification) to examine the tone of sanctions mentions across Europe. Section 6 provides analysis of the macroeconomic reasons for country-level variation in sanction mentions. Section 7 concludes.

## 2 Economic sanctions against Russia and Russian countermeasures

### 2.1 Background and overview

The EU, US, and their allies introduced sweeping economic and political sanctions against Russia in 2014 in response to Russia's actions in Ukraine. Initially, the restrictive measures were relatively mild, mostly consisting of travel restrictions and asset freezes of individuals directly linked to the illegal referendum that led to the annexation of Crimea. Business contacts with entities located in Crimea were also sanctioned. With flaring battles in the Donetsk and Luhansk regions of Ukraine and the downing of Malaysian Airlines MH-17 flight, sanctions were tightened considerably. Since July 2014, Western countries have enforced a broad set of economic sanctions against Russia. These include embargos on arms exports and exports of dual-use goods for military use. Western countries have also banned exports of goods and services related to deep-sea, Arctic and shale oil exploration and production. As export restrictions only applied to new contracts and a narrowly defined set of goods, their effect only began to be felt gradually over time.<sup>2</sup>

The most significant set of sanctions focused on financial market restrictions. These were adopted in July 2014 and effectively curtailed the largest Russian banks and energy companies from access to the EU and the US financial markets. Investors in the EU and the US were barred from providing funding with maturities longer than 90 days to Russia's largest state-owned banks, i.e. Sberbank, VTB, Gazprombank, Rosselkhozbank (Russian Agricultural Bank), and VEB (the state-owned development bank). The US also sanctioned several privately-owned financial institutions (Bank Rossiya, Sobinbank, Investkapitalbank, and SMP bank) for involvement in sanctioned businesses or political connections. This was a drastic measure as the four sanctioned state-owned commercial banks together hold over half of the assets of the Russian banking sector. The

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<sup>2</sup> For analysis of sanction effects on the oil sector, see Mitrova et al. (2018). For the gas sector, see Sun (2020). For Russia's defense sector, see Juola et al. (2019).

long-term financing ban was eventually extended to oil giant Rosneft, oil pipeline company Transneft, oil exploration and refiner Gazpromneft, as well as several companies operating in the military sector. The US also sanctioned Novatek, by far Russia's largest producer of liquified natural gas. Even if the net foreign indebtedness of Russian banks and corporates was generally moderate, the large Russian companies affected by sanctions had become reliant on access to long-term funding from international capital markets. When the funding option vanished, it caused a forced deleveraging of foreign debt (Korhonen, 2019). The restrictive measures imposed by the EU must be renewed every six months by unanimous vote. Remarkably, the member states have consistently shown solidarity in extending sanction measures (Portela et al., 2020).

Russia reacted to the sanctions regime in August 2014 by restricting imports of selected food products, including fruits and vegetables, from the US, the EU, Canada, Australia, and Norway. Products falling under the import ban accounted for less than 1% of total goods exports for the target countries. The sole outlier was Lithuania, where the embargoed goods comprised 3.7% of total goods exports in 2013 (Simola, 2014). Russia has since used government decrees to extend the import restrictions by 12 or 18 months at a time.

Since summer 2014, the economic sanctions against Russia have been slightly tightened and expanded. For example, the maturity limit on lending to sanctioned banks and corporates was cut to just 30 days. The overall sanctions regime was relatively stable up to April 2018, when the US unilaterally placed seven major oligarchs and their companies, as well as seventeen senior government officials, on the sanctions list. Given the extraterritorial nature of US sanctions and the notoriously opaque ownership structures of Russian corporates, these measures caused great uncertainty and forced all European companies to double-check their due diligence in all their contacts with Russian customers.

In response to the use of a military-grade nerve agent in Salisbury, the EU imposed travel bans and asset freezes on nine more individuals and one entity in early 2019. The EU added more travel bans and asset freezes in late 2020 in reaction to the alleged use of a nerve agent in a separate assassination attempt.

As teasing out the effects of subsequent unilateral actions from the coordinated sectoral sanctions is nearly impossible, we limit our analysis of how firms perceive Russia-related sanctions to the years 2014–2017.

## 2.2 Economic costs of sanctions

Both Western and Russian measures were crafted to inflict specific injury on the target country or set of countries, while having only a minor impact on the domestic economy. No sanction measures seek to cause widespread economic misery for a general population. As highlighted by e.g. Gould-



Davis (2018), Western sanctions are geared to deterring Russian military action, reaffirming principles of international order, and encouraging Russia to reach a political settlement. The sanctions policy has been vitally important in achieving these first two goals, while the more ambitious goal of political resolution of conflict in Ukraine has not been achieved. Russian import bans, in turn, aimed to send a clear political signal to European capitals and to bolster import-substitution policies in Russia's agriculture and food industries (Korhonen et al., 2018; Wegren and Elvestad, 2018).

Even these narrowly designed sanctions have caused sizable economic harm. Given the sheer size of US and EU economies compared to Russia, and a much broader scope of Western economic sanctions against Russia, it is natural that macroeconomic effects on Western countries are on average negligible. However, the variation in observed sanction effects in Europe, especially among sectors within countries, has been large. The negative impact of Russian import bans on individual companies and sectors has been substantial on some EU member countries. In the Baltic countries and Finland, for example, Russia's share in extra-EU exports of the banned agricultural and food products exceeded 50% (Korhonen et al., 2018).

Evaluating the costs of sanctions is not straightforward. Most of the existing literature focuses on estimating losses in bilateral goods trade. Belin and Hanousek (2020), using data for 2014–2017, assert that Western export restrictions had led to lost exports worth USD 1.5 billion, while Russian bans decreased imports by USD 12.6 billion. The real costs of trade sanctions, however, entail both enforcement costs and adjustment costs for actors both in the sender and target countries (Hufbauer and Jung, 2020; Weber and Stepien, 2020). Moreover, modern targeted sanctions also tend to affect trade in non-sanctioned goods (Crozet and Hinz, 2020).

Finally, trade restrictions represent a minor part of overall economic sanctions against Russia. Restricted access to global financial markets and increased uncertainty have restrained Russian economic development since 2014. Sanctions have had a negligible impact on the ruble's exchange rate, but the unanticipated restrictions have increased the currency's volatility (Dreger et al., 2016). Thus, while quantifying macroeconomic effects is difficult, most recent studies conclude that Western sanctions have had a clear negative effect on Russian GDP growth. The IMF's (2019) estimates suggest that sanctions reduced Russian economic growth by 0.2 percentage points annually between 2014 and 2018. Some other recent studies point to significantly larger effects, especially in the early years of the sanctions period (Korhonen, 2019).

### 2.3 Firm-level effects

Even if the literature on economic sanctions continues to expand rapidly, firm-level effects remain poorly understood. Firm-level studies typically use registry data or detailed customs data from a

single country to analyze sanction effects. Ahn and Ludema (2020), for example, examine whether sanctions had any implications for sanctions-targeted Russian firms. They identify about 3,000 Russian firms targeted by sanctions directly or through affiliated parties to examine whether these firms performed differently than their peers not directly targeted by sanctions. Based on firm balance sheet data, they argue that the sanctions regime had an explicit negative effect on firm performance. Their findings further suggest that firms defined as “strategic” by the government systematically outperform “non-strategic” peers under sanctions. This implies sizable additional costs for the sanctioned regime in the form of shielding strategically important firms.

Using a rich dataset of French firms, Crozet and Hinz (2020) show that the sanctions on financial instruments caused significant obstacles for firms that rely on financial intermediation and led to a sizable cut in sales in Russia. Gullstrand (2020) uses data on Swedish firms to show that the total short-run cost of sanctions was quite limited, but highly asymmetric. For a small number of companies and industries, the sanctions led to significant loss of firm value and ultimately financial distress. Gröschl and Teti (2021) use a survey of 862 German companies to analyze obstacles caused by Russia-related sanctions on firm operations. They found that around half of the companies surveyed felt they would benefit from a lifting of current restrictive measures.

Stone (2016) and Naidenova and Novikova (2018) show that announcements of imposition and prolongation of sanctions had an adverse impact on Russia’s listed companies (both targeted and non-targeted). These firms on average lost 0.17 percentage points of their daily returns around sanctions announcements. Moreover, announcements of sanctions by the US caused the most economically significant decline in stock prices, highlighting the central role of US financial institutions in global financial markets.

Existing micro-level studies suffer from their focus on a single particular economy. Given the large variation in economic structures within the EU, generalizing results from a single country to the entire population of European enterprises makes little sense. We still understand precariously little about how European companies assess sanctions or why otherwise similar companies in different countries have different views on sanctions effects. The only study we are aware of using cross-country survey data on firm’s views on Russia-related sanctions is the recent paper by Weber and Stepien (2020). Using an online survey of roughly 1,000 firms based in the UK, Poland, Germany, France, and Italy, they find that about a quarter of respondent firms were affected by sanctions. Notably, many of the affected firms had found ways to mitigate the impact of sanctions on their operations. We aim to contribute to this literature by examining heterogeneity in information and assessments of sanctions that European firms publicly provide to the stakeholders in the narrative sections of their annual reports.

### 3 Data and sanctions measures

Our analysis is based on a large set of publicly available corporate annual reports. Published annual reports are the main official channel for conveying information on the financial standing of firms and their prospects. As the financial statement sections of such reports are standardized, our interest turns to the narrative sections such as the foreword by the CEO or president, highlights of the past year, and discussion of risks and uncertainties confronting the firm. These sections in the document are designed to give shareholders an overview of the business environment and future developments relevant to the firm. If Russia-related sanctions are mentioned in these sections, we deem sanctions to be an important issue important for the firm.

Our sample on annual reports of European corporations for fiscal years 2014–2017 is derived from the Thomson Reuters Eikon database. We do not limit the geographic coverage of the sample to EU firms but include all firms in the Eikon database that are headquartered in Europe. As we endeavor to generate as large a dataset as possible, the initial data query was restricted to annual reports dated December 31 of a given year that include the words “annual” together with “report” or “review” in order to exclude scanned documents. As textual analysis tools for many European languages are still underdeveloped, we restrict our analysis to documents in English. Our initial sample consists of 18,586 annual reports from 3,888 organizations having an individual Thomson Reuters PermID. The majority (84%) of the annual reports in our sample are reports by public corporations.

We apply three criteria to clean up this initial sample. First, non-corporate organizations are excluded. This restriction excludes e.g. central banks, stock exchanges, and property funds in the final sample. Next, we exclude corporations with mean total assets of less than EUR 1 million. Third, we require that a corporation must have published at least three annual reports between 2014 and 2017, each at least 5,000 words in length. Reports that meet the minimum annual report frequency and length requirement equal the first percentile of the initial sample. Applying these three criteria reduces our final sample to 3,064 corporations and 11,485 firm-year observations. Table 1 below reports the number of observations in the initial and final samples.

Table 1 Sample selection and summary statistics

Panel A Sample selection procedure

	Firms	Firm-years
Initial sample	5,888	16,376
- non-corporates & other organizations	-571	-1,479
- small firms	-568	-966
- less than three reports	-1,685	-2,446
Final sample	3,064	11,485

Panel B Summary statistics for sanction mentions

Variable	Mean	Median	Std dev	Min	Max	N
Mention (0/1)	0.11	0.00	0.31	0.00	1.00	11,485
First page	68.71	77.55	25.54	1.59	99.43	1,257
Pages	1.29	1.00	1.09	0.09	10.61	1,257
TF-IDF	0.88	0.77	0.65	0.00	4.10	1,257

For the corporates in our final sample, we extract data on firm identifier, sector, country, region, and total assets from the Thomson Reuters Eikon database. Details on data and the exact data identifiers are reported in the Appendix.

The number of annual reports in our final sample is relatively evenly distributed across years varying between 2,733 reports in 2017 (24% of total) to 2,997 reports in 2015 (26% of total). Median size, measured as total assets of a sample firm is slightly above EUR 1 billion. The size distribution of firms follows logarithmic normal distribution relatively closely. The single largest sector represented in the sample is banking & investment services (13.8%), while the vast majority of firms are non-financial companies in manufacturing and services. Table 2 below describes the sectoral distribution of the sample firms.

The majority of the sample firms are headquartered in Northern and Western Europe, with about 700 firms located in Southern and Eastern Europe. Overall, our data includes firms from over 35 European countries. Table 2 presents details of the sample distribution across countries.

Table 2 Characteristics of sample firms

## Panel A Distribution of observations across sectors, organization subtypes, countries, and regions

<u>Sector</u>	<u>N</u>	<u>%</u>	<u>Country</u>	<u>Reg*</u>	<u>N</u>	<u>%</u>
Banking & Investment Services	423	13.8 %	United Kingdom	NE	611	19.9 %
Industrial & Commercial Services	246	8.0 %	Germany	WE	308	10.1 %
Industrial Goods	218	7.1 %	Sweden	NE	242	7.9 %
Software & IT Services	200	6.6 %	France	WE	180	5.9 %
Energy - Fossil Fuels	192	6.3 %	Switzerland	WE	162	5.3 %
Mineral Resources	160	5.2 %	Italy	SE	150	4.9 %
Cyclical Consumer Services	139	4.6 %	Norway	NE	137	4.4 %
Pharmaceuticals & Medical Research	142	4.7 %	Finland	NE	129	4.2 %
Cyclical Consumer Products	130	4.3 %	Netherlands	WE	123	4.0 %
Real Estate	124	4.1 %	Russia	EE	103	3.4 %
Food & Beverages	122	4.0 %	Poland	EE	98	3.2 %
Transportation	121	3.9 %	Denmark	NE	96	3.0 %
Technology Equipment	102	3.3 %	Spain	SE	78	2.6 %
Utilities	113	3.7 %	Belgium	WE	71	2.3 %
Chemicals	83	2.7 %	Ireland	NE	48	1.6 %
Insurance	81	2.6 %	Greece	SE	45	1.5 %
Automobiles & Auto Parts	78	2.6 %	Romania	EE	44	1.4 %
Healthcare Services & Equipment	78	2.6 %	Luxembourg	WE	42	1.4 %
Applied Resources	62	2.0 %	Austria	WE	40	1.3 %
Telecommunications Services	68	2.2 %	Jersey	NE	39	1.3 %
Retailers	46	1.5 %	Portugal	SE	40	1.3 %
Food & Drug Retailing	33	1.1 %	Cyprus	SE	30	1.0 %
Investment Holding Companies	28	0.9 %	Croatia	SE	27	0.9 %
Collective Investments	26	0.9 %	Lithuania	NE	25	0.8 %
Personal & Household Products & Services	16	0.5 %	Isle of Man	NE	21	0.7 %
Renewable Energy	18	0.6 %	Malta	SE	21	0.7 %
Industrial Conglomerates	15	0.5 %	Estonia	NE	19	0.6 %
			Guernsey	NE	17	0.6 %
			Latvia	NE	17	0.6 %
			Czech Republic	EE	15	0.5 %
			Hungary	EE	14	0.5 %
			Slovenia	SE	14	0.5 %
			Bulgaria	EE	10	0.3 %
			Ukraine	EE	10	0.3 %
			Other		38	1.2 %
<u>Subtype</u>	<u>N</u>	<u>%</u>				
Company	2,621	85.5 %				
Bank	220	7.2 %				
Investment Company	85	2.8 %				
Government-Owned Corporation	62	2.0 %				
Insurance Company	47	1.5 %				
Bank or Financial Holding Company	29	0.9 %				

\*Thomson Reuters Eikon regions included are West Europe (WE), North Europe (NE), South Europe (SE), and East Europe (EE).

## Panel B Distribution of observations across size classes, regions, and fiscal years

size	10 <sup>6</sup>	10 <sup>7</sup>	10 <sup>8</sup>	10 <sup>9</sup>	10 <sup>10</sup>	10 <sup>11</sup>	10 <sup>12</sup>
	137	549	942	957	361	106	12
	4.5 %	18.0 %	30.8 %	31.3 %	11.6 %	3.4 %	0.4 %
region	Northern		Western		Southern		Eastern
	1,408		928		425		303
	46.0 %		30.3 %		13.9 %		9.9 %
year	FY2014		FY2015		FY2016		FY2017
	2,866		2,997		2,889		2,733

To detect mentions of Russia-related sanctions in corporate annual reports, we search for the words “*russia\**” and “*sanction\**” in the narrative sections of the reports. The search includes characters in upper case and lower case letters, as well as variations in form. Our baseline measure will be a binary variable *Mention*, which takes a value of one if both “*russia\**” and “*sanction\**” are mentioned on the same page at least once, and zero otherwise. The benefit of this approach is that it also captures indirect references to Russia-related sanctions. As an example, the text extract below would generate a *Mention* variable with the value of one:

*“Russia is one of Honkarakenne’s major business areas. Sanctions associated with the Ukrainian crisis, coupled with strong exchange rate fluctuations, are currently causing instability in the Russian market.”*

The *Mention* variable is well suited for comparisons between firms located in various geographic regions or different sectors of the economy. It may, however, generate false positives, and at least in theory, *Mention* may depend on the length of the annual report (Loughran, McDonald, and Yun, 2009). We, therefore, control for report length in the subsequent analysis.

In addition, we also examine three alternative measures to gauge sanctions mentions in the annual reports. Variable *First* accounts for the page number where Russia-related sanctions are first mentioned. It gets a value of 100 if Russia-related sanctions are mentioned on the first page of the annual report, and zero if no mentions are found in the document. Variable *Pages* reports the number of pages (normalized by the total number of pages) where sanctions are mentioned. The fourth measure *TFIDF* is based on the Term Frequency–Inverse Document Frequency methodology (Loughran and McDonald, 2011). The weight functions are used to generate a continuous variable with values increasing with the frequency of “*russia\**” and “*sanction\**” in the report.

Overall, “*russia\**” and “*sanction\**” are mentioned on the same page at least once in 11% of the sampled annual reports. About half of these mentions take place in the first quarter of the report, and on average are mentioned only once. However, in some annual reports, like Transatlantica for 2014, Russia-related sanctions are mentioned more than ten times. Panel B in Table 1 provides summary statistics for all four mentions indicators.<sup>3</sup> Statistics for *Mention* are based on the full final sample, whereas the statistics for other indicators are based on the sub-sample where *Mention* = 1.

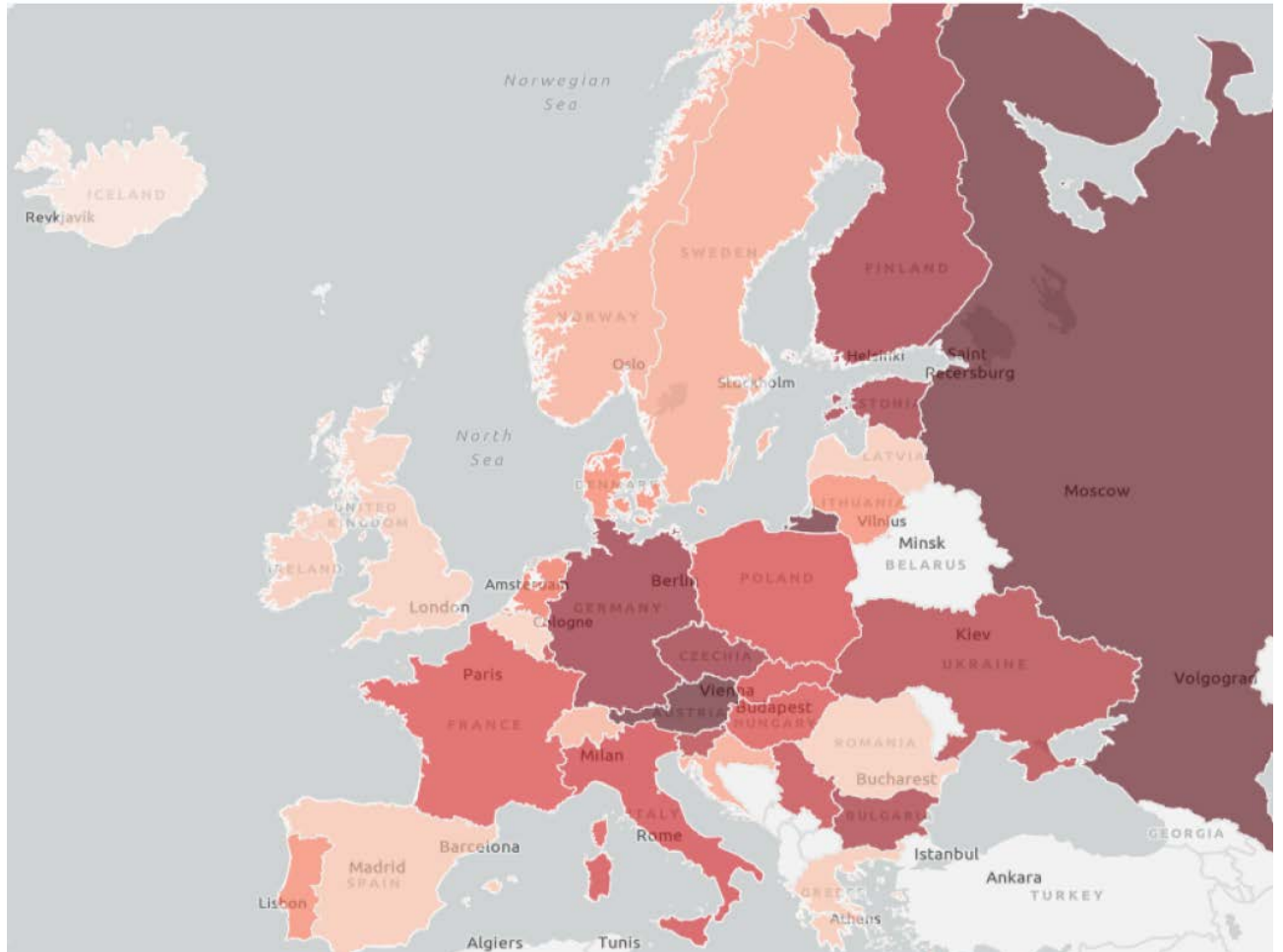
Sectoral distribution of firms mentioning Russia-related sanctions provides some interesting insights. As seen from Figure 2 below, the most affected sectors are automobiles and banking, whereas in many sectors such as IT and telecom services less than 10% of firms mention

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<sup>3</sup> Given that we obtain similar results with all four measures, we focus on the first measure (*Mention*) in reporting our empirical results as it is easiest to understand.

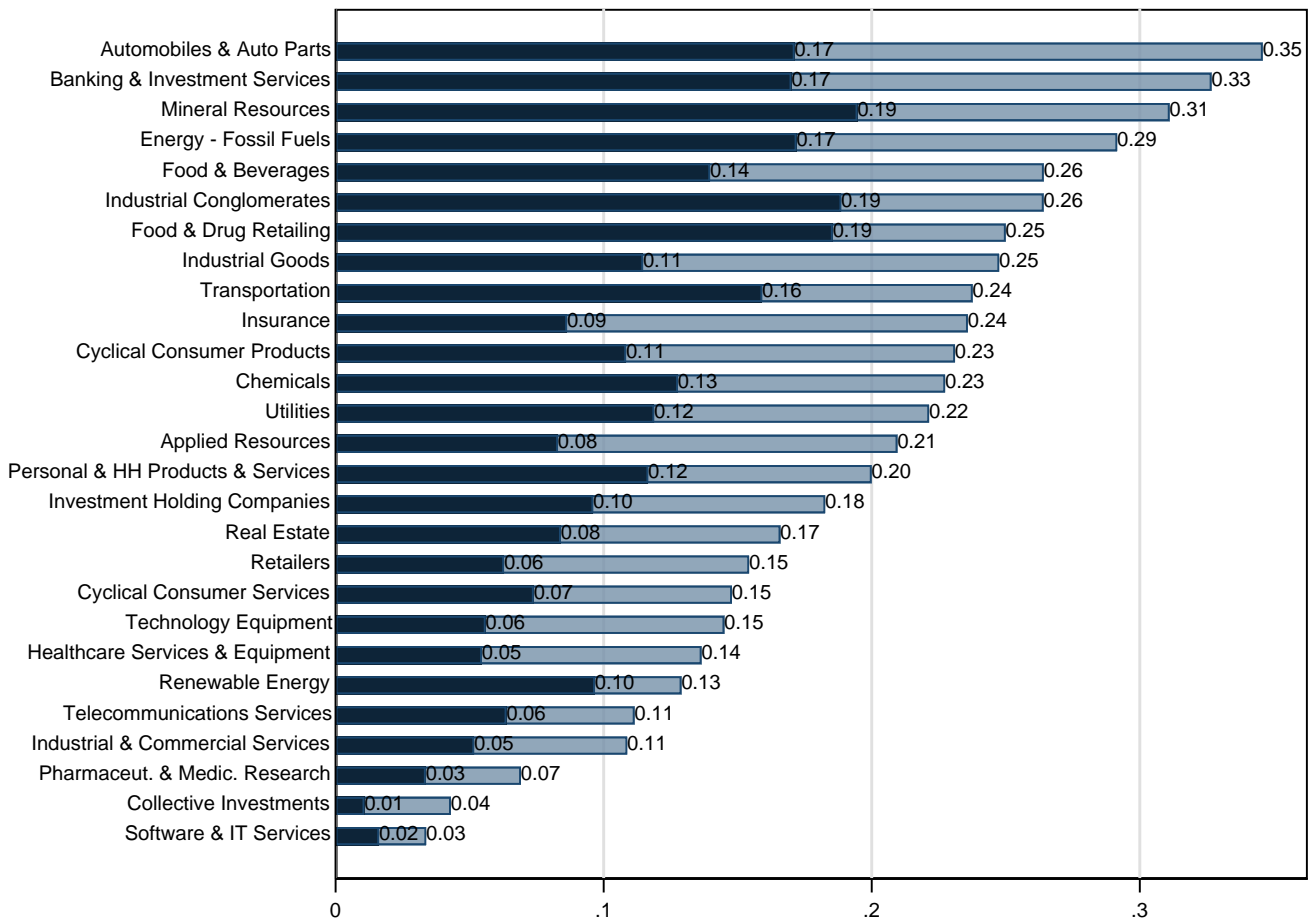
sanctions. The large sectoral variation makes it important to control for sector affiliation in the subsequent analysis.

Figure 1 Heatmap of sanctions mentions



The figure shows the heatmap distribution of the mean fraction of firms that mention sanctions in their annual reports in 2014. The darker the area, the higher the share of firms in the region mentioning sanctions.

Figure 2 Sanctions mentions by sector



The figure presents mentions of sanctions by sector. The outer bright line is the average percentage of firms mentioning sanctions at least once during 2014–2017. The inner dark line is the average percentage of firms mentioning sanctions over the entire sample period.

## 4 Methodology for searching systematic differences across countries

In the next sections, we turn to the analysis of context and reasons for sanction mentions in corporate annual reports. As seen from the heatmap in Figure 1, sanction mentions vary substantially across countries. Our aim is to examine the systematic differences across countries in how and why sanctions are mentioned in corporate annual reports.

We can assume our sample firms and their annual reports are a representative random sample of the European population in the dimensions of word count, year, size, and sector. Therefore, the effects of these variables on sanctions measures can be assumed systematic and treated as fixed. At the country level, however, our sample should be interpreted as consisting of random samples of various sizes of the country-level population. The country effects (or parameters of country variables to be more precise) will have to be treated as random in the estimation. Moreover, firm-level exposure to Russia-related sanctions should be treated as random as exposure most



likely is shaped by a multitude of network effects stemming e.g. for a firm's relations with its customers, financiers, and sub-contractors. This model set-up with both fixed and random effects is best estimated with a generalized linear mixed-effects model (GLME model). Hence, our empirical model can be represented as

$$f(y) = X\beta + Zu + \epsilon, \quad (1)$$

where  $f()$  is link function,  $y$  is the sanctions measure examined,  $X$  is the matrix of explanatory variables, where

$$X = (1, words_{it}, year_t, year_t^2, size_i, size_i^2, sector_i).$$

1 stands for the constant coefficient, *words* is the logarithm of total words in an annual report, *year* and *year*<sup>2</sup> are linear and quadratic year trends, *size* and *size*<sup>2</sup> are linear and quadratic trends for firm size measured in total assets, and *sector* is dummy variable for the sector firm operates.  $\beta$  is the parameter vector on fixed effects. Planning matrix for random effects  $Z$  is

$$Z = (country_i, firm_i),$$

and  $u$  is the parameter vector on random effects. Firm-level country variable records a firm's HQ location and firm is the firm effect. The regression error term is  $\epsilon$ , and the sub-indices  $i$  and  $t$  refer to firm and year, respectively. Model parameters are estimated using the maximum likelihood method.

Following Zipf's law, we expect annual report length (*words*) to have a positive coefficient in all specifications (Manning and Schütze, 1999; Loughran and McDonald, 2016). We expect a negative coefficient for *year* as Russia-related sanctions may have had the largest effects immediately after the introduction of the first round of sanctions in 2014. Firm *size* is assumed to have a positive coefficient as larger firms are more likely to have larger networks of contractors and customers, making exposure to sanctions more likely.

Table 3 reports the results of the GLME for the binary *Mention* variable. The simple baseline model specification (Model 1) includes only the intercept, report length, time and time squared, firm size and size squared, and country effects. As expected, report length has a positive coefficient, linear time has a negative coefficient, and firm size and size squared are positive. The second specification (Model 2) adds sectoral controls to the model. We note a significant sectoral variation in the propensity of firms to mention Russia-related sanctions in their annual reports. Finally, we control for firm effects in the third specification (Model 3). The signs and significance of the variables in our baseline model remain unchanged in all specifications.

Table 3 Mixed effects model for sanction mentions (0/1)

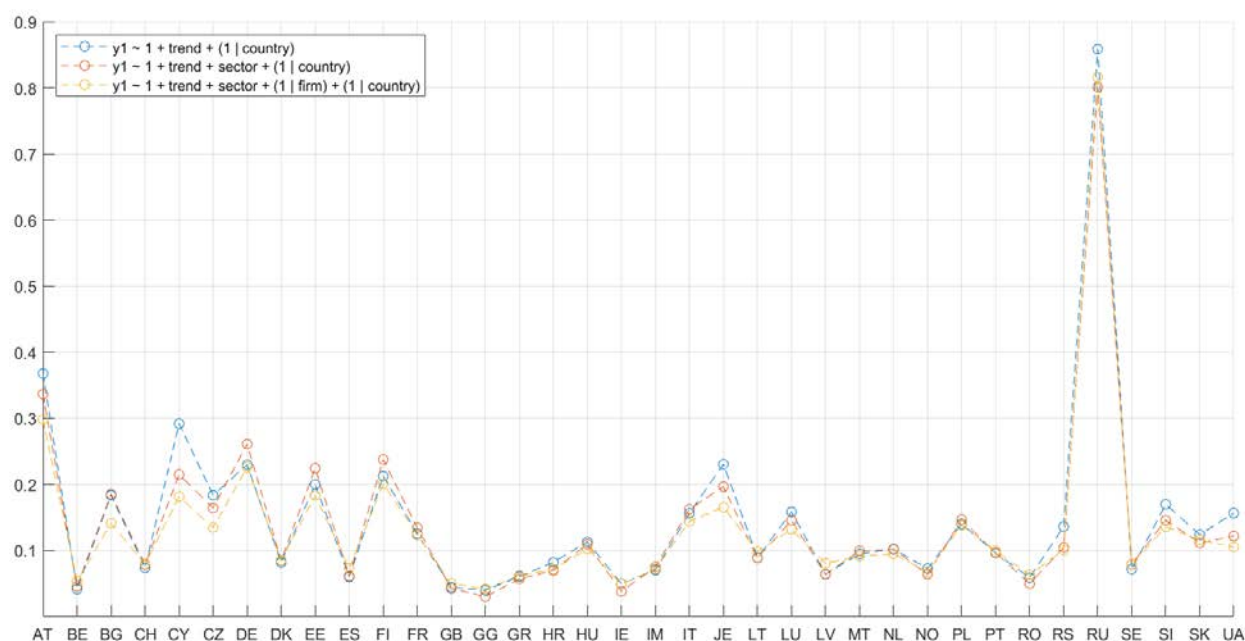
Variable	Model 1		Model 2		Model 3	
	coefficient	(t-stat)	coefficient	(t-stat)	coefficient	(t-stat)
(Intercept)	-11.30***	(-12.61)	-12.40***	(-12.90)	-12.02***	(-9.49)
words	0.84***	(10.80)	0.92***	(11.52)	0.90***	(8.40)
year	-0.98***	(-13.35)	-1.02***	(-13.56)	-1.20***	(-14.29)
year <sup>2</sup>	0.10	(1.39)	0.10	(1.36)	0.14*	(1.71)
size	1.11***	(5.13)	1.00***	(4.01)	1.27***	(3.45)
size <sup>2</sup>	0.66***	(3.77)	0.92***	(4.94)	1.01***	(3.61)
<i>Automobiles &amp; Auto Parts</i>			0.12	(0.48)	0.01	(0.03)
<i>Banking &amp; Investment Services</i>			-0.19	(-0.68)	-0.27	(-0.96)
<i>Chemicals</i>			-0.36	(-1.10)	-0.52	(-1.08)
<i>Cyclical Consumer Products</i>			0.35	(1.14)	0.23	(0.54)
<i>Cyclical Consumer Services</i>			-0.28	(-0.89)	-0.46	(-1.03)
<i>Energy - Fossil Fuels</i>			0.74***	(2.56)	0.64	(1.56)
<i>Food &amp; Beverages</i>			0.80**	(2.66)	0.69	(1.59)
<i>Food &amp; Drug Retailing</i>			0.42	(1.14)	0.21	(0.38)
<i>Healthcare Services &amp; Equipment</i>			-0.33	(-0.87)	-0.43	(-0.82)
<i>Industrial &amp; Commercial Services</i>			-0.49	(-1.61)	-0.71*	(-1.66)
<i>Industrial Conglomerates</i>			0.35	(0.71)	0.14	(0.19)
<i>Industrial Goods</i>			0.20	(0.71)	0.05	(0.12)
<i>Insurance</i>			-0.66*	(-1.90)	-0.77	(-1.57)
<i>Investment Holding Companies</i>			0.88**	(2.03)	0.72	(1.13)
<i>Mineral Resources</i>			0.77***	(2.63)	0.70*	(1.67)
<i>Personal &amp; Household Products &amp; Services</i>			0.77	(1.54)	0.50	(0.64)
<i>Pharmaceutical &amp; Medical Research</i>			-1.02***	(-2.79)	-1.24**	(-2.42)
<i>Real Estate</i>			-0.25	(-0.80)	-0.40	(-0.90)
<i>Renewable Energy</i>			0.01	(0.03)	-0.36	(-0.44)
<i>Retailers</i>			-0.58	(-1.36)	-0.78	(-1.27)
<i>Software &amp; IT Services</i>			-1.61***	(-4.06)	-1.90***	(-3.55)
<i>Technology Equipment</i>			-0.45	(-1.28)	-0.60	(-1.21)
<i>Telecommunications Services</i>			-1.28***	(-3.15)	-1.52**	(-2.60)
<i>Transportation</i>			0.44	(1.47)	0.26	(0.59)
<i>Utilities</i>			-0.57*	(-1.78)	-0.83*	(-1.80)
Mean absolute error		0.15		0.14		0.10
Loglikelihood		-33349		-33972		-33218
Fixed effects		102.76***		22.34***		15.48***
Random effects	<i>country</i>	(332.89***)	<i>country</i>	(536.52***)	<i>country &amp; firm</i>	(161.04***)

The table reports the results of the GLME for the binary *Mention* variable. Model 1 only includes the intercept, report length, time and time squared, firm size and size squared, and country effects. Model 2 adds sectoral controls. Model 3 includes firm effects. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables follow the Appendix definitions.

Any systematic variation across firms in different countries is best seen by analyzing marginal country means derived from the GLME model, i.e. average fraction of firms in a country mentioning sanctions in their annual reports controlling for report-, industry-, time-, and firm-specific characteristics. Figure 3 below plots these marginal means from the three model specifications in

Table 3 for all 36 countries in our sample. The immediate, and somewhat surprising, observation is that adding firm effects does not significantly affect the country means. As seen from the figure, firms in Russia are significantly more likely to mention sanctions in their annual reports than firms in any other country. The fact that marginal country mean is over 0.8 in Russia implies that over 80% of Russian firms mention sanctions after controlling for report-, industry-, time-, and firm-specific characteristics. Notably, firms in Austria, Jersey, Finland, Estonia, Germany, and Cyprus also appear to be strongly affected by Russia-related sanctions measures.

Figure 3 Marginal country means for the sanction mentions (0/1)



The figure plots the average fraction of firms in a country that mention sanctions in their annual reports, controlling for report-, industry-, time-, and firm-specific characteristics. Marginal country means are derived from the GLME model specifications as in Table 3 for all 36 countries in the sample.

## 5 Understanding the sentiment and context of sanction mentions

It would be arbitrary to assume that all mentions of sanctions are equal as firms likely discuss them in different contexts. For example, a firm could treat sanctions as a threat to their business. Another could see sanctions as an opportunity that could open up new income-generating sources. To account for such differences, we examine the sentiment and context of sanction mentions in the annual reports. Specifically, we extract 60-word text snippets ( $-45, +15$ ) around the term “sanction”, conditional on the term being associated with Russia. For each text snippet, we normalize, tokenize, and lemmatize words, as well as exclude stopwords. These text snippets are then ana-

lyzed with three methods of textual analysis: *topic modeling*, *sentiment analysis*, and *text classification*. Throughout the analysis, our focus is on the systematic country-level variation in how firms mention Russia-related sanctions in their annual reports.

## 5.1 Sentiment vary across countries

We examine the tone and sentiment in the text snippets of the annual reports using Loughran and McDonald (2011) lexicon for financial documents (the 2018 updated version) and VADER (Valence Aware Dictionary and sEntiment Reasoner) sentiment algorithm. The Loughran and McDonald sentiment lexicon (word list) annotates words with a sentiment score ranging from  $-1$  to  $1$ , where scores close to  $1$  indicate strong positive sentiment, scores close to  $-1$  indicate strong negative sentiment and scores close to zero indicate neutral sentiment. Loughran and McDonald's (2011) lexicon has been widely used to measure tone e.g. in newspaper articles/columns and corporate press releases.<sup>4</sup> The VADER algorithm is a parsimonious rules-based model for sentiment analysis that accounts for negations such as “*Was very good*” vs. “*Was not very good*” (Hutto and Gilbert, 2014). For every text snippet, the algorithm calculates a sentiment score as the sum of negative and positive words divided by the total number of words in the text.

Our first observation in this analysis is that the tone of sanctions discussion in the annual reports of our sample firms is noticeably skewed towards the negative side. The mean sentiment score in our data is negative at  $-0.56$ . Given the increase in economic uncertainty and outright economic costs associated with Russia-related sanctions, this is exactly what one should expect. Table 4 lists the top-25 most pessimistic firms in our dataset. The most pessimistic corporates are headquartered either in Russia or have direct business exposure to Russia either via trade or investment links. The impact of economic sanctions is clearly seen in negative terms, even if only one corporation (Sberbank) in the top-25 list was directly targeted by the Western sanctions. The sanctions on financial markets have created negative sentiments, especially in the banking sector as two of the top-25 most pessimistic corporations are large international banking groups (Société Générale and HSBC).

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<sup>4</sup> For an overview on textual analysis and use of alternative lexicons, see the survey by Loughran and McDonald (2016).

Table 4 Most-pessimistic firms based on sentiment analysis

y	Name	Country	Sector
-0.84	MD Medical Group Investments PLC	CY	Healthcare Services & Equipment
-0.83	Sibur Holding PAO	RU	Energy - Fossil Fuels
-0.80	AFK Sistema PAO	RU	Industrial Conglomerates
-0.80	O'key Group SA	LU	Food & Drug Retailing
-0.79	FSK YeES PAO	RU	Utilities
-0.77	Gazprom PAO	RU	Energy - Fossil Fuels
-0.76	Mobil'nye Telesistemy PAO	RU	Telecommunications Services
-0.76	Societe Generale SA	FR	Banking & Investment Services
-0.76	HSBC Holdings PLC	GB	Banking & Investment Services
-0.76	Severstal PAO	RU	Mineral Resources
-0.76	MKHK EuroChem AO	RU	Chemicals
-0.74	Gruppa LSR PAO	RU	Real Estate
-0.74	Gruppa Kompaniy PIK PAO	RU	Cyclical Consumer Products
-0.74	Nord Gold SE	NL	Mineral Resources
-0.73	DZ Bank AG Deutsche Zentral Genossenschaftsbank	DE	Banking & Investment Services
-0.73	TransContainer PAO	RU	Transportation
-0.73	Nokian Tyres PLC	FI	Automobiles & Auto Parts
-0.73	EuroHold Bulgaria AD	BG	Insurance
-0.73	Ferronordic Machines AB	SE	Industrial Goods
-0.72	Uponor Oyj	FI	Cyclical Consumer Products
-0.72	Federal Hydro-Generating Company RusHydro PAO	RU	Utilities
-0.71	Sberbank Rossii PAO	RU	Banking & Investment Services
-0.70	NK Lukoil PAO	RU	Energy - Fossil Fuels
-0.70	Pertopavlovsk PLC	GB	Mineral Resources
-0.68	EVRAZ PLC	GB	Mineral Resources

The table lists the top-25 most-pessimistic firms in the dataset based on their sentiment scores calculated as the sum of negative and positive words divided by the total number of words in the text using the Loughran and McDonald (2011) lexicon for financial documents and the VADER sentiment algorithm.

We next strive to explain variation in sentiment scores by estimating the GLME model similar to as in Equation (1) but for sentiment scores. To be more precise, we estimate

$$f(y) = X\beta + Zu + \epsilon, \quad (2)$$

where  $f()$  is link function,  $y$  is the sentiment score,<sup>5</sup>  $X$  is the matrix of explanatory variables, where  $X = (1, words_{it}, year_t, year_t^2, size_i, size_i^2, sector_i)$ , and  $Z = (country_i, firm_i)$ .

Instead of reporting full estimation results, we focus on country-level variation.<sup>6</sup> Figure 4 below shows partial country effects for sentiment scores implied by the GLME model. Each value in the

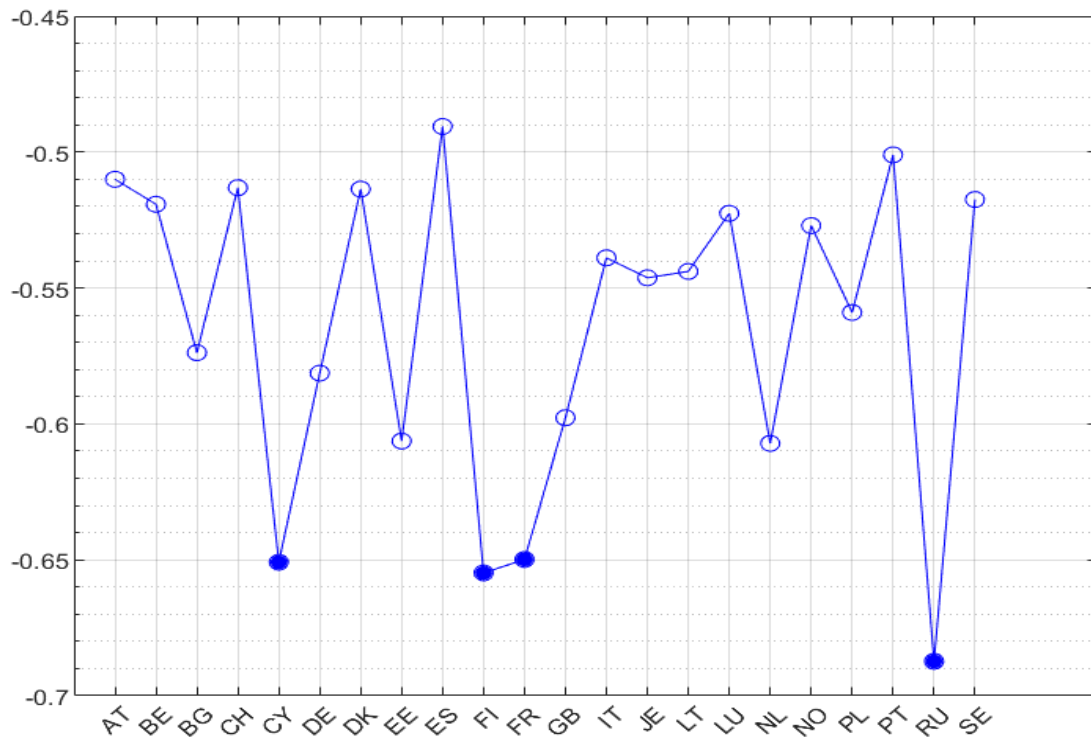
<sup>5</sup> Our analysis groups those few countries with a few observations that share a common geographic or economic area. Lichtenstein, for example, is grouped with Switzerland and reported as CH. Gibraltar is grouped with Great Britain. Excluding countries with insufficient number of observations does not change our results.

<sup>6</sup> Full estimation results of the GLME model (2) are not reported, but available upon request.

plot is the sentiment on the country variable obtained by marginalizing over the other variables from Equation (2). Statistically significantly ( $p < 0.05$ ) low sentiment countries are marked with a filled circle.

Corporates from Cyprus, Finland, France, and Russia tend to have significantly more negative sentiments about Russia-related sanctions. The fact that Russian firms are especially negative should not come as a surprise, but the negative sentiments in Cyprus, Finland, and France deserve further inquiry.

Figure 4 Estimated sentiments at the country-level



The figure plots partial country effects for sentiment scores implied by the GLME model. Each value in the plot is a predicted sentiment on the country variable by marginalizing over the other variables from Equation (2). Statistically significantly ( $p < 0.05$ ) low sentiment countries are marked with a filled circle.

## 5.2 Thematic structure of sanctions mentions

Having established clear cross-country variation in the sentiment of Russia-related sanction mentions, we next examine the thematic structure of our collection of text snippets. Topic modeling attempts to identify common themes (topics) in a text and to derive patterns in the text structure. We use the Latent Dirichlet Allocation (LDA) statistical technique. LDA is a generative, unsupervised method for identifying latent attributes. It is essentially cluster analysis for words, producing “topics”, i.e. word groups with common context (Loughran and McDonald, 2016). Using LDA cross-validation tests in combination with inspection of perplexity and loglikelihood measures, we

find that three topics in our sample account for most of the sample variation.<sup>7</sup> Figure 5 shows the topic-specific word clouds for the identified three topics.

Figure 5 Word clouds for the three LDA topic groups of Russia-related sanctions



The topic-specific word clouds for the identified three topics account for most of the sample variation using a generative, unsupervised method for identifying latent attributes.

Topic 1 can be labeled as a numbers-related theme on the macroeconomic environment. In this topic group, our Russia-related sanctions text snippets typically include numbers and words such as “growth,” “year,” “2014,” and “economic.” To exemplify the context from this topic area, below is an extract from an annual report, which is assigned to Topic 1:

*“... The first few months of the 2014 financial year were still characterized by economic optimism. However, the situation became gloomier as the year progressed in view of emerging geopolitical uncertainties. There was increasing uncertainty from the unresolved conflict over parts of Ukraine and the EU’s sanctions against Russia. Germany’s main share index, the DAX, topped the 10,000 points mark on a number of occasions during 2014 but closed the year with relatively moderate year-on-year growth of just over 2.5 percent...”*

Discussions in text snippets assigned to the second group (Topic 2) tend to be more narrowly focused on market reactions and potential direct effects on firm operations. In this topic group, our text snippets typically include words such as “economic,” “market,” “financial,” and “impact.” To illustrate the difference between these topics, below is an example of a text snippet assigned to Topic 2:

*“... In 2014, the Russian economy was negatively impacted by a significant drop in crude oil prices and a significant devaluation of the Russian Rouble, as well as sanctions imposed on Russia by several countries. In December 2014, the*

<sup>7</sup> Results of cross-validation tests, perplexity, and loglikelihood measures are available upon request.

*Rouble interest rates have increased significantly after the Central Bank of **Russia** raised its key rate to 17%. The combination of the above resulted in reduced access to capital, a higher cost of capital, increased inflation and uncertainty regarding economic growth, which could negatively affect the Group’s future financial position, results of operations and business prospects...”*

The third group (Topic 3) captures a “disclaimer” type of discussion in the sanctions talk, picking a somewhat general description of the sanctions timeline and general legal or business impacts. An example of Topic 3 discussions is:

*“Lastly, Danone conducts business in certain countries, notably Iran and **Russia**, which may be targeted by economic and financial **sanctions** imposed in particular by U.S. or European regulations. These regulations prohibit notably transactions with certain financial institutions and require prior authorization with the proper authorities before executing any fund transfers. If the Company and/or its subsidiaries do not comply with these regulations, Danone could be the subject of criminal penalties and/or significant financial penalties.”*

We next focus on country-level effects, controlling for year, size, sector, and firm effects. We estimate the GLME model in Equation (1) separately for each topic group. To be more precise, we estimate

$$f(y) = X\beta + Zu + \epsilon, \tag{3}$$

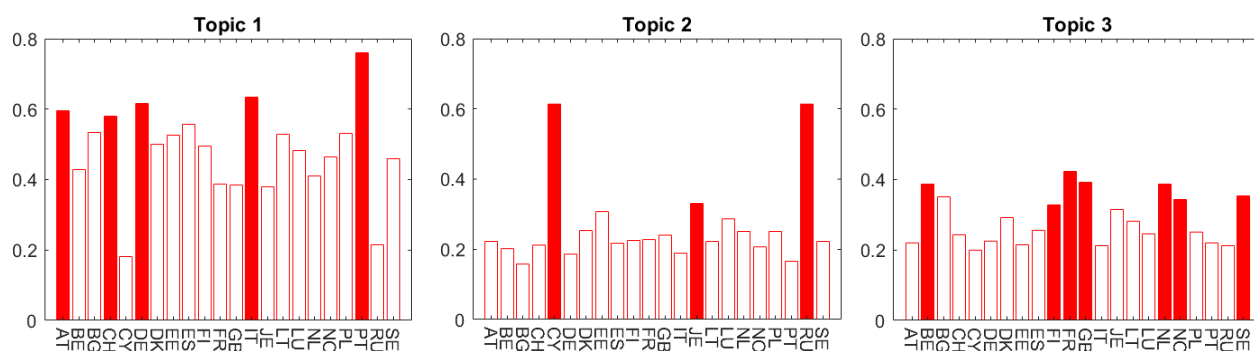
where  $y = p(\text{Topic1\_membership})$ , or  $p(\text{Topic2\_membership})$  or  $p(\text{Topic3\_membership})$ ,  $X = (1, \text{words}_{it}, \text{year}_t, \text{year}_t^2, \text{size}_i, \text{size}_i^2, \text{sector}_i)$  and  $Z = (\text{country}_i, \text{firm}_i)$ .

Figure 6 shows partial country effects (i.e. estimated marginal means) from the mixed-effect GLME model in Equation (3).<sup>8</sup> Filled bars denote a statistically significantly higher likelihood of topic membership at the conventional levels.

<sup>8</sup> Full estimation results of the GLME model in Eq. (3) are not reported, but available upon request.



Figure 6 Country-level likelihood of LDA topic membership



The figure shows partial country effects (i.e. estimated marginal means) from the mixed-effect GLME model in Equation (3). Filled bars denote a statistically significantly higher likelihood of topic membership at conventional levels.

These partial country effects reveal three distinctive country groups in how firms tend to discuss Russia-related sanctions. Controlling for sector and firm effects, we find that Austrian, Swiss, German, Italian, and Portuguese companies are statistically significantly more probable to mention sanctions under Topic 1 (macroeconomic environment). Only Russian, Cypriot, and Jersey firms are statistically significantly more prone to mention sanctions under Topic 2 (market impact). Firms headquartered in Russia, Cyprus, and Jersey clearly tend to use the same topic vocabulary when mentioning sanctions. Russian and Cypriot firms also tended to discuss sanctions in most negative terms, as shown in our sentiment analysis. This apparent similarity of Russian and Cypriot firms may be explained by close trade and FDI relations of the two economies. A nontrivial share of Cypriot firms in the sample either have direct business exposure to Russia, or are owned by Russian nationals, or both. Finally, firms from Nordic and Benelux countries, along with those from France and Great Britain were more likely to mention sanctions under Topic 3 (disclaimer).

### 5.3 Text classification analysis

While topic modeling provides a fully unsupervised method to group various text snippets, text classification is about assigning each sanction mention to a predetermined thematic context – or a class. In our analysis, the natural candidates for predetermined classes are the various sections in a typical annual report. As the annual filings of 10-K reports (annual reports of listed US corporations) have received considerable attention in accounting and finance literature we can consider four pre-trained contexts: “Business,” “Risk Factors,” “Management Discussions & Analysis,” and “Financial Statements.” These correspond to SEC 10-K items 1, 1A, 7, and 8, respectively, and cover almost 90% of all estimated contexts.

These items are described in SEC (2021) as:

**Item 1 “Business”** requires a description of the company’s business, including its main products and services, what subsidiaries it owns, and what markets it operates in. This section may also include information about recent events, competition the company faces, regulations that apply to it, labor issues, special operating costs, or seasonal factors. This is a good place to start to understand how the company operates.

**Item 1A “Risk Factors”** includes information about the most significant risks that apply to the company or its securities. Companies generally list the risk factors in order of their importance. In practice, this section focuses on the risks themselves, not how the company addresses those risks. Some risks may be true for the entire economy, some may apply only to the company’s industry sector or geographic region, and some may be unique to the company.

**Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” (MD&A)** gives the company’s perspective on the business results of the past financial year. The company’s operations and financial results, including information about the company’s liquidity and capital resources and any known trends or uncertainties that could materially affect the company’s results. This section may also discuss management’s views of key business risks and what it is doing to address them.

**Item 8 “Financial Statements and Supplementary Data”** requires the company’s audited financial statements. This includes the company’s income statement (which is sometimes called the statement of earnings or the statement of operations), balance sheets, statement of cash flows and statement of stockholders’ equity. The financial statements are accompanied by notes that explain the information presented in the financial statements.

The contexts are classified using Facebook’s fastText algorithm (Joulin et al., 2016), which was trained on the sections of 22,633 10-K filings from 2013–2016 retained in the US Security and Exchange Commission’s EDGAR database. We assign a probability for each mention of Russia-related sanctions in our data to belong to one of these four contexts.

Once again, we run the GLME model and report the marginal probabilities of firms in selected countries reporting within a specific context. To be more precise, we estimate

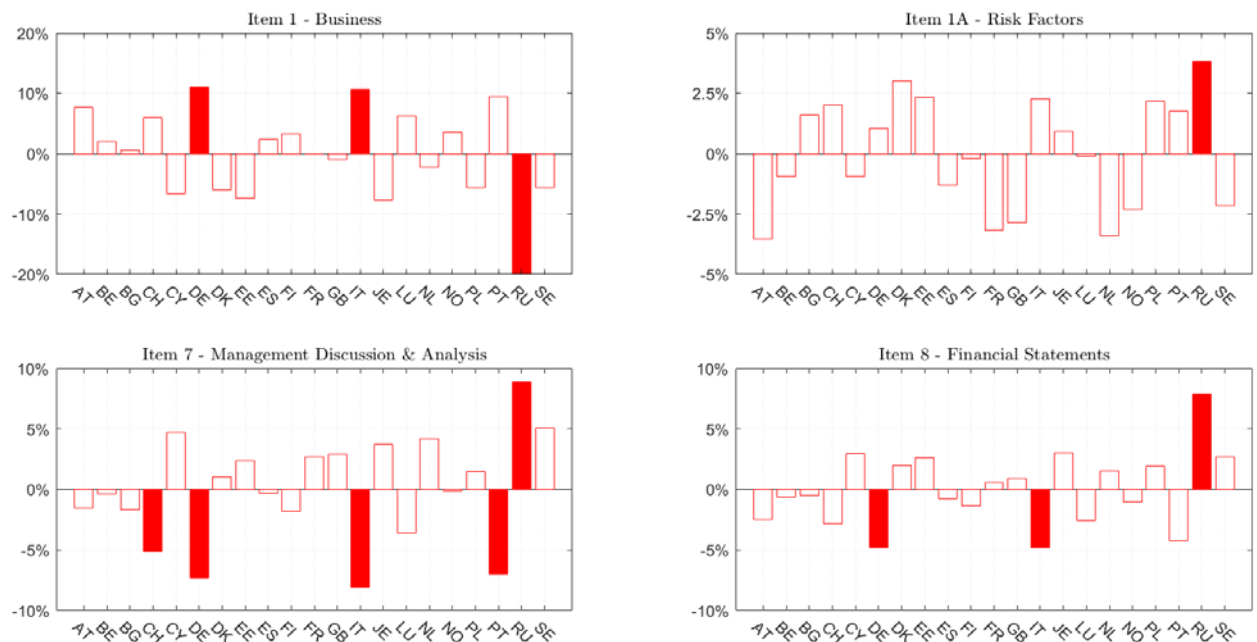
$$f(y) = X\beta + Zu + \epsilon, \tag{4}$$

where  $y = p(\text{Item1\_membership})$ , or  $p(\text{Item1A\_membership})$ ,  $p(\text{Item7\_membership})$ , or  $p(\text{Item8\_membership})$

$$X = (1, \text{words}_{it}, \text{year}_t, \text{year}_t^2, \text{size}_i, \text{size}_i^2, \text{sector}_i) \text{ and } Z = (\text{country}_i, \text{firm}_i).$$

Figure 7 below shows the marginal probabilities of firms in selected countries reporting in a specific context, compared to the baseline. Filled bars denote statistical significance at traditional levels.<sup>9</sup>

Figure 7 Country-level estimated reporting contexts compared to the baseline



The figure shows the marginal probabilities of firms in selected countries reporting in a specific context, compared to the baseline. Filled bars denote statistical significance at traditional levels.

In contrast to other European countries, and especially Germany and Italy, Russian firms are over 20% less likely to report sanctions in the “Business” context. Instead, they are over 20% more likely to mention sanctions in the contexts of “MD&A,” “Financial Statement,” or somewhat less in “Risk Factors.” In stark contrast to other European countries, Russian firms also report about sanctions here in a more operative context. The differences among countries excluding Russia are surprisingly small. Italian, Danish, and Portuguese firms tend to discuss Russia-related sanctions more often in the MD&A context. Otherwise, in comparison to topic modeling results, the differences are relatively mild.

<sup>9</sup> Full estimation results of the GLME model in Eq. (4) are not reported, but available upon request.

## 6 Explaining cross-country differences

In the final step of our analysis, we take a closer look at the potential causes for cross-country variation in sanctions mentions in corporate annual reports. Given that some companies may have been directly exposed to the sanctions, it is reasonable to assume that direct investments or trade relationships between the firm's home country and Russia can explain the mention of sanctions in their annual reports. Hence, firms domiciled in countries with large stock of inward direct investment in Russia or outward direct investment from Russia, as well as those with significant import or export relationships with Russia, would presumably mention sanctions more frequently. To test this hypothesis, we take the regression coefficient estimated for each country as in Equation (1) and correlate them against country-level macroeconomic factors. As we are interested in cross-country variation, we plot the estimation results for better illustration instead of reporting full linear regression model outcomes.<sup>10</sup>

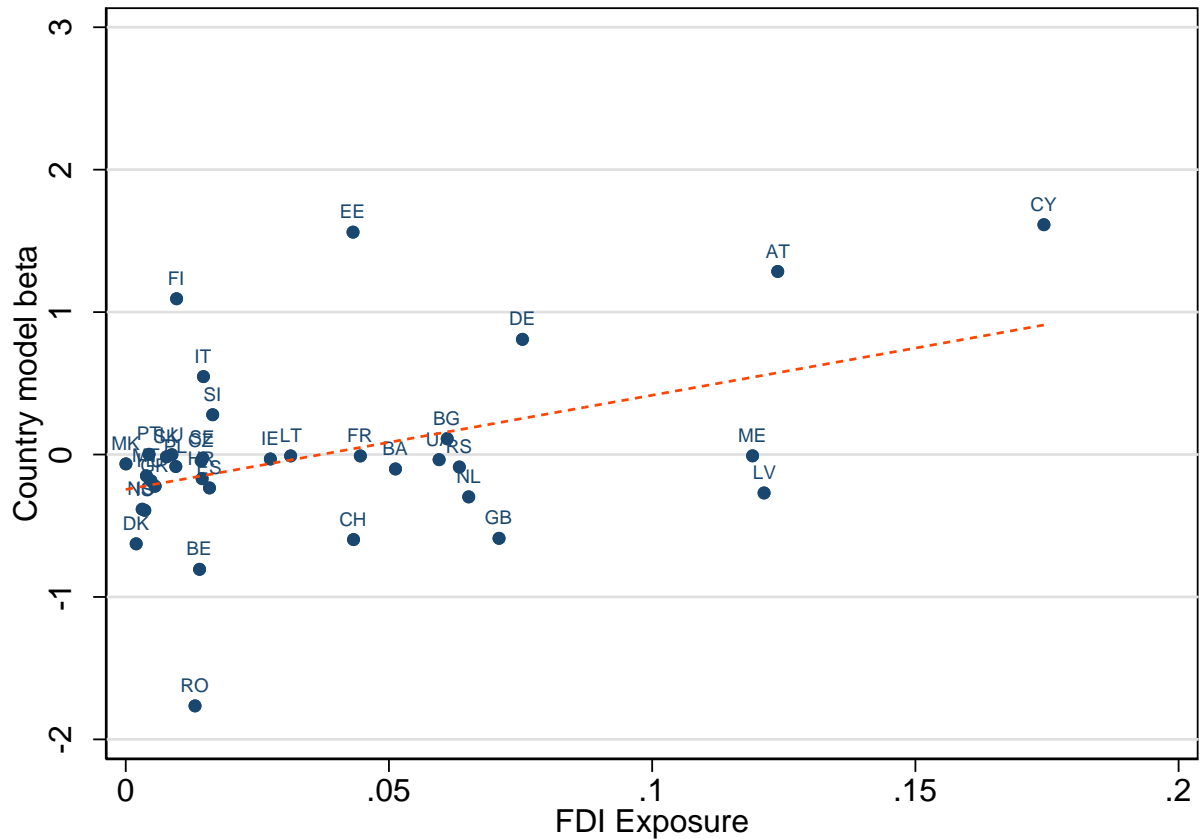
Figure 8 shows the correlation between country model betas and inward/outward FDI exposure to Russia. We obtain the data on inward FDI stock (by ultimate investing country) from the UNCTAD World Investment Report (2017). This dataset provides an estimate for the share of Russia in a country's FDI stock in 2017.<sup>11</sup> As can be seen from the figure, a firm's decision to mention sanctions is positively associated with the inward and outward FDI stocks of corresponding countries and Russia. For example, Austria and Cyprus have the largest share of inward FDI stock originating from Russia (Austria 12.4% and Cyprus 17.4%), while Germany, Netherlands, UK, and France have a significant fraction of FDI exposure to Russia (ranging from 4.3% to 7.1%). This country-level FDI exposure may partially explain the cross-country variation in corporates' propensity to mention Russia-related sanctions. Close investment links with Russia are likely to reinforce the effects Russia-related sanctions have on the overall macroeconomic outlook in a country or the region. Furthermore, sizable Russian FDI stocks in a country should signify notable Russian ownership in at least some corporations in the host country. In an environment characterized with significant ownership by Russian nationals, a corporation may consider Russia-related sanctions worth a mention even if the company or the sector is not directly targeted.

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<sup>10</sup> The regression results are available upon request.

<sup>11</sup> Given that changes in FDI shares tend to be very slow, we assume that shares in 2017 are a good proxy for shares in 2014–2016.

Figure 8 Cross-level exposure to Russian inward and outward foreign direct investment and firm vigilance to sanctions



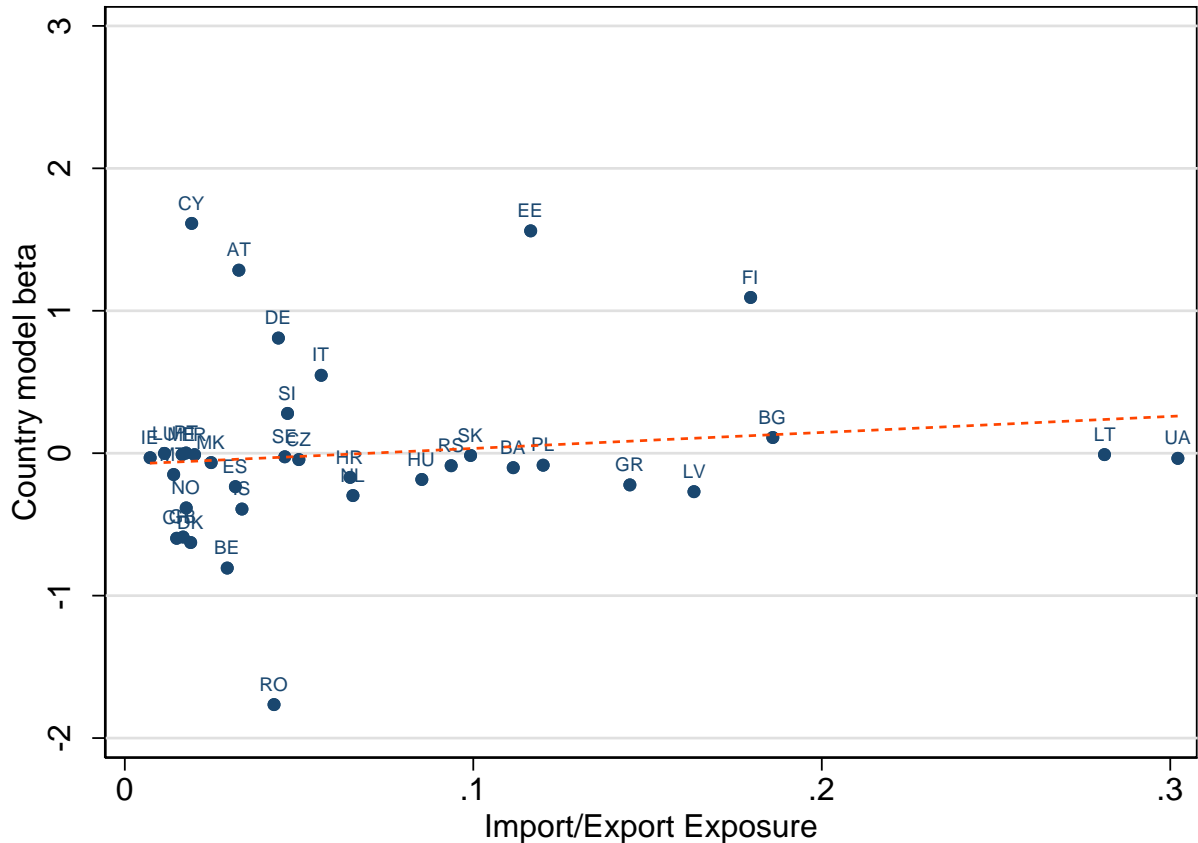
The figure plots the regression coefficients estimated from the country-model as in Equation (1) for each country separately against the share of inward FDI stock in Russia or Russian share in the country’s inward FDI stock (whichever is greater). The dotted line depicts linear prediction for coefficient “beta” from a linear regression model.

While Russian FDI exposure may potentially explain why firms in some countries mention sanctions, it is less clear why firms from countries with little or no FDI exposure discuss sanctions in their annual reports. One additional motivation for mentioning sanctions could be home country trading relationships with Russia. We, therefore, turn to the analysis of the share of Russia in total exports and imports. The data on merchandise trade are obtained from the IMF Direction of Trade Statistics database. Figure 9 plots shares of countries’ export and import exposure to Russia.<sup>12</sup> As can be noted from the figure, import and export relationships with Russia could explain more frequent mentions of sanctions by firms in the Baltic region (Lithuania, Latvia, Estonia, and Finland), as well as Eastern Europe (Ukraine, Bulgaria, Poland, and Hungary). In these countries, the share of Russia in total imports and exports is relatively high (9–22%). As we focus on macroeconomic linkages, we are not able to explore the exact mechanisms on how country-level trade relations increase firm propensity to mention Russia-related sanctions. But many of the economies that have significant trade links with Russia are also geographically close to Russia, and in some

<sup>12</sup> The full regression results are available upon request.

cases share a common history or cultural background or have Russian-speaking minorities. All of these can influence how firms in a given country assess the effects of Russia-related sanctions on their business environment. Overall, it is not surprising that firms domiciled in countries with close trade relations with Russia mention sanctions more often.

Figure 9 Country-level shares of exports to Russia and imports from Russia



The figure plots the regression coefficients estimated from the country-model as in Equation (1) for each country separately against the import or export share (whichever is greater) with Russia. The dotted line depicts linear prediction for coefficient “beta” from a linear regression model.

Collectively, Figures 8 and 9 suggest a rational basis for the sensitivity of firms from particular countries to recent cases involving Russian sanctions. While firms from some countries report sanctions due to larger exposure to trading relationships with Russia, it seems that firms from countries with the largest fraction of mentioning firms (Austria and Cyprus) underline sanctions in their annual reports due to their home country’s heightened exposure to inbound Russian FDI. In additional unreported tests, we also plot regression coefficients estimated for sentiment scores as in Equation (2) against FDI and trade exposure figures.<sup>13</sup> We observe a similar correlation between the negativity of sentiments and macroeconomic exposure as with the frequency of sanction mentions.

<sup>13</sup> Results are available upon request.

In general, country-level macroeconomic factors can explain a good share of firm-level vigilance to sanctions. However, mentions by firms from some countries cannot be explained by FDI or trading relationships with Russia. For example, a third of Czech firms in our sample mention sanctions in their annual reports. The Czech Republic's export and import shares with Russia are below 5%, and both inward and outward FDI stocks are less than 1%. Hence, it is reasonable to assume that some other factors are influencing their vigilance to sanctions. We also observe that about 55% of Italian firms in the banking and investment sector mention Russian sanctions in their annual reports. While this may seem surprising at first glance, we note that large Italian banking groups (Intesa and Unicredit) have 100% subsidiaries in Russia. Given that the largest financial institutions in Russia are sanctioned directly, European banks that are part of larger banking conglomerates with operations in Russia most likely consider these restrictions as a potential risk, which is reflected in their annual reports.

## 7 Conclusions

Economic sanctions have become an increasingly popular international policy tool in recent years and even the preferred foreign policy tool of the US and EU in some cases. Globally, the number of sanctions in force almost doubled between 2006 and 2014 (Felbermayr et al., 2020). The evidence on the effects and effectiveness of sanctions, however, is still sketchy. Our paper aims to increase the understanding of how firms in both the sender and in the target country view sanctions and what may explain cross-country differences in firm attitudes.

Based on data collected from almost 11,500 annual reports of European corporations from 2014 – 2017, we analyzed how firms assess Russia-related sanctions imposed in 2014 and later extended. Both the multilateral sanctions on Russia and Russian import restrictions apply only to specific goods and services, and in most cases apply only to a small set of corporations in military industries, specific companies in the finance and energy sectors, or both. Sanctions are, however, a cause of concern for a nontrivial share of companies in all sectors. We show that about 11% of annual reports in our sample mention Russia-related sanctions. The sentiment about those measures in the annual reports is clearly negative. Controlling for firm size and sector, corporates from Cyprus, Finland, France, and Russia tend to have significantly more negative sentiments towards Russia-related sanctions.

We have used topic modeling to explore thematic structure in the text snippets around Russia-related sanctions in the annual reports. Controlling for firm-level characteristics, we establish three distinctive country groups in how firms tend to discuss Russia-related sanctions. We found that Austrian, Swiss, German, Italian, and Portuguese companies were likely to discuss

sanctions as a factor in the general macroeconomic environment. Firms from Nordic and Benelux countries, as well as from France and Great Britain, tended to mention sanctions in relatively narrow, disclaimer-type discussions. Only Russian, Cypriot, and Jersey firms mentioned sanctions in terms of direct market impact.

These significant country-level differences clearly call for an explanation. In the spirit of the traditional view of international relations (trade-conflict literature) suggesting that countries with extensive economic ties are expected to avoid disrupting trade relations, we explored the role of international trade and foreign direct investments in shaping a firm's decision to mention sanctions in its annual report.<sup>14</sup> We show that the FDI stocks in or from Russia and high shares of imports or exports with Russia are useful in explaining the cross-country variation. Our analysis also reveals that a nontrivial share of variation remains unexplained. We hope our findings will serve as useful first step in guiding future research.

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<sup>14</sup> For additional perspective, see the recent critical contribution to the trade-conflict literature of Peterson and Zheng (2021).



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# Appendix

## Definition of variables

<i>Variable</i>	<i>Eikon data item</i>	Type	Description
$i$		discrete	A subscript indexing observations across firms.
$t$		discrete	A subscript indexing observations across time.
$firm_i$	<i>TR.OrganizationPermID</i>	categorical	An organization level permanent identifier for firm $i$ .
$assets_{it}$	<i>TR.TotalAssetsReported</i>	continuous	Total assets of public firm $i$ at the end of fiscal year $t$ .
	<i>TR.PCTotAsset</i>	continuous	Total assets of private firm $i$ at the end of fiscal year $t$ .
$sector_i$	<i>TR.TRBCBusinessSectorName</i>	categorical	The primary Thomson Reuters Business Classification (TRBC) business sector of firm $i$ .
$country_i$	<i>TR.HeadquartersCountry</i>	categorical	The country of firm $i$ headquarters (domicile).
$region_i$	<i>TR.HQMinorRegion</i>	categorical	The geographical region of firm $i$ headquarters.
$size_i$		discrete	The size class of firm $i$ defined as the greatest integer below the Briggs logarithm of the average total assets, or $floor(\log_{10}(\overline{assets}_{it}))$
$year_t$		discrete	The fiscal year of observation $t$ .

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