Proximity to War: The Stock Market Response to the Russian Invasion of Ukraine*

Jonathan Federle, André Meier,
Gernot J. Müller, and Victor Sehn

February 2023

Abstract

We identify a "proximity penalty" in the stock market response to the Russian invasion of Ukraine: the closer countries are to Ukraine, the lower their equity returns in a four-week window around the start of the war. This result holds even at the firm level within Ukraine's neighbors. Trade linkages explain two thirds of the proximity penalty. We attribute the remainder—1.1 percentage points in equity returns per 1,000 kilometers of extra distance—to military disaster risk. Evidence from other financial data, geopolitical risk indicators and aid flow statistics supports the relevance of military tail risk as a spillover channel.

Keywords: Rare Disasters, Proximity Penalty, War, Military Spillovers, International Conflicts, Russia, Ukraine, Trade, Neighbors

JEL Classification: F50, F51, G15

---

*Federle: Munich School of Management, LMU Munich (email: j.federle@lmu.de); Meier: Tudor Capital Europe LLP (email: Andre.Meier@alumni.eui.eu); Müller: Department of Economics, University of Tübingen, CEPR and CESifo (email: gernot.mueller@uni-tuebingen.de); Sehn: Munich School of Management, LMU Munich (email: sehn@lmu.de). The views expressed in this paper are those of the authors and do not necessarily reflect the views of the institutions they are affiliated with. We would like to thank our discussant Josefin Meyer as well as Mennatallah Balbaa, Benjamin Dillinger, Markus Glaser, François Gourio, Willi Kohler, Willi Mutschler, Samuel Mühlemann, Dominic Rohner, Thorsten Sellhorn, Paul Voss, and Sebastian Wichert for helpful comments. All remaining errors are ours. Victor Sehn acknowledges funding by the German Research Foundation (Deutsche Forschungsgemeinschaft), Project-ID 403041268 – TRR 266 Accounting for Transparency.

1 Introduction

The risk of rare economic disasters is critical for asset prices. Specifically, Rietz (1988), Veronesi (2004), and Barro (2006) have proposed large, if rare, economic disasters as the key driver of the equity risk premium. Precisely because they are rare, however, quantifying the size and probability of such disasters is challenging. In measuring actual disasters during the 20th century to calibrate disaster risk, Barro (2006) observes that the largest economic disasters are related to wars taking place on a country's soil. This is a fate that advanced economies have essentially escaped over the past several decades. But even for a country not directly involved in a war, one may hypothesize that disaster risk increases if a war breaks out in its vicinity. As stock markets are sensitive to changes in disaster risk, they should react accordingly (Berkman et al., 2011; Gourio, 2012).[1]

We provide quantitative support for this hypothesis by studying the stock market response, at the level of both countries and firms, to the Russian invasion of Ukraine. Our starting point is the observation that stock markets in countries close to Ukraine suffered significantly larger declines around the start of the war than those in countries further away. Working with a sample of 66 countries, we find this "proximity penalty" to be statistically and economically significant. While a direct neighbor to the conflict suffers a cumulative stock market decline of 23.1 percent by the end of the second week of the war, this effect empirically diminishes by about 2.6 percentage points for every 1,000 km of distance from Ukraine.

The apparent proximity penalty may have different causes. Trade linkages are one natural reason why countries closer to the war zone are likely to suffer greater adverse spillovers. After all, distance is a key barrier to trade, so neighbors tend to trade more and hence be more exposed to each other than countries far apart (Head and Mayer, 2014). We therefore augment our empirical model with variables meant to control for trade-related spillovers. The idea is to isolate a residual proximity penalty that captures the other candidate vector for adverse spillovers that we are interested in, namely disaster risk directly related to the war. Such disaster risk may unfold if initially uninvolved countries are drawn into the war, for instance, to support a neighbor under attack and deter future aggression. Even short of deliberate military involvement, countries could be exposed to spillovers from a nearby conflict, say, because of an accidental violation of borders or in the event of a nuclear incident. As these examples make clear, the risk of disaster facing third countries is likely to increase

[1] In the analysis of Farhi and Gabaix (2016) countries' riskiness differs when exposed to a common disaster because of different "recovery rates." Differences in distance offer a complementary and perhaps even more natural explanation of why the perceived riskiness of countries differs in the face of disasters.

in their geographic proximity to the original theater of the war. It thus represents another plausible explanation for the proximity penalty.

Accounting for trade spillovers reduces the proximity penalty at the country level from 2.6 to 1.1 percentage points per 1,000 km. We infer that trade effects are quantitatively important but still leave a meaningful role for non-trade related disaster risk in driving stock returns. This picture crystallizes further when we evaluate a much larger firm-level data set. In particular, we find that proximity also influences stock market returns *within* countries. Focusing on Ukraine's first- and second-degree neighbors in Western Europe, we find that individual companies headquartered closer to the war zone under-perform in the stock market, even after controlling for various other factors, in a way that is both supportive of our core hypothesis and surprisingly strong.

We further support the interpretation of the proximity penalty as at least partially capturing (military) disaster risk with evidence from other indicators, including geopolitical risk metrics, military aid flows to Ukraine and the tail risk priced in exchange-rate options. We also document that a gravity-based measure of distance loses significance in our regressions once we control for trade exposures, whereas geographic distance does not. This is again consistent with the notion that stock market responses vary systematically with their geographic distance from the war zone because of differences in the perceived risk of military spillovers.

From a methodological point of view, our analysis is straightforward insofar as it exploits a quasi-natural experiment. By assuming that the war in Ukraine is waged for extraneous geopolitical reasons, and by controlling for trade spillovers, we can identify the causal effect of changes in disaster risk on asset prices. A second aspect of the war in Ukraine makes it uniquely suited for our analysis. As we discuss in detail in the next section, the Russian invasion came as a significant surprise to global financial markets, whereas many other recent wars had been anticipated for longer and/or were of limited relevance for the financial markets of advanced economies. Given these specific circumstances, we recognize that our findings do not easily generalize to other contexts without resorting to a structural model (Fuchs-Schündeln and Hassan, 2016; Nakamura and Steinsson, 2018). Nonetheless, our main insight should have wider relevance: the market response to a foreign military conflict with inherent spillover risk depends crucially on geographic distance. This spatial dimension of disaster risk, and its relevance for asset prices, has not been previously elucidated by the literature.

Our study brings together several strands of that literature. First, there is a body of relevant work on how financial markets respond to (expected) conflict (Leigh et al., 2003; Guidolin and La Ferrara, 2007; Zussman and Ørregaard Nielsen, 2008; Caldara and Iacoviello, 2022) and, more broadly, policy-related uncertainty (Baker et al., 2016; Born et al., 2019). Second, a limited number of studies have explicitly looked into the role of proximity as a determinant of conflicts and their spillovers (Murdoch and Sandler, 2002, 2004; Verdickt, 2020; Mueller et al., 2022). Third, adverse spillovers from wars via trade and production networks have been documented before, also based on the 2014 Russia-Ukraine conflict (Glick and Taylor, 2010; Couttenier and Piemontese, 2022; Korovkin and Makarin, 2023). Finally, two other papers independently study the stock market response to the war in Ukraine (Deng et al., 2022; Boungou and Yatié, 2022). What sets our work apart from these studies is that we exploit a quasi-natural experiment to identify the effect of disaster risk on stock market returns both at the country and at the firm level.

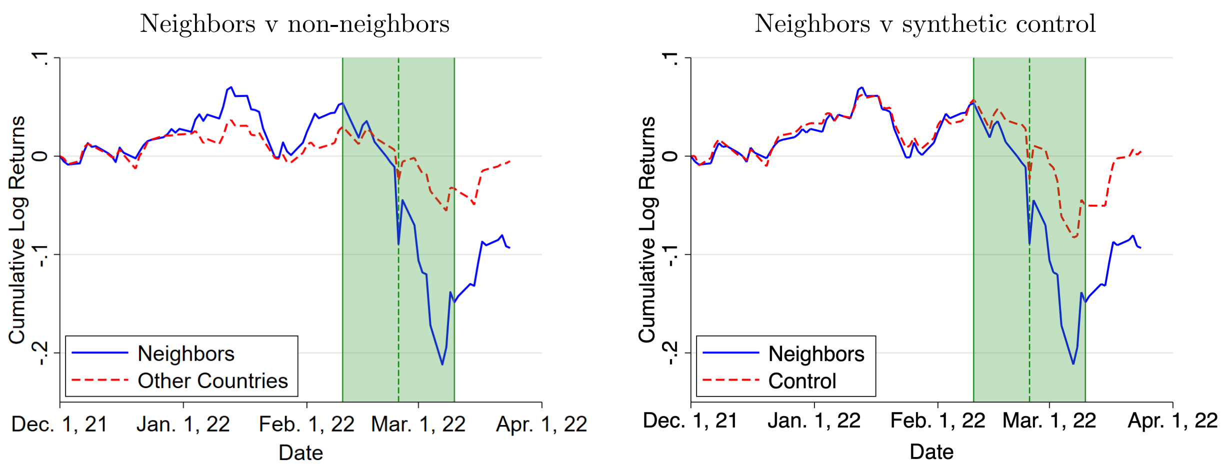
The remainder of the paper is organized as follows. The next section introduces our data and provides some additional background, including a systematic comparison of the stock market performance in Ukraine's neighbors around the start of the war against a synthetic control unit. We perform our main analysis and present results in Section 3. A final section offers brief conclusions.

2 Background and data

In this section, we introduce our data set and present evidence that the invasion of Ukraine was both impactful and largely unanticipated by financial markets. This sets the war in Ukraine apart from other wars in the last few decades. We also compare the stock market response in Ukraine's neighboring countries to countries further away, using a synthetic control unit to illustrate the "treatment effect" of the war on neighboring countries in a formal manner. In the same vein, we relate the stock market response to a measure of distance from Ukraine. Lastly, we provide descriptive statistics on the economic exposure of neighboring countries to motivate our empirical specification in Section 3 below.

The Russian invasion of Ukraine is uniquely suited to study the stock market response to war because it was both impactful and largely unanticipated. Figure 1 shows the stock market response to the war, measured in terms of cumulative returns since December 1, 2021. The vertical green dashed line indicates the start of the war on February 24, 2022. On that day,

Figure 1: Cumulative Stock Market Returns



Notes: Figure shows cumulative log return since December 1, 2021. "Neighbors" is unweighted average of 14 European first- and second-degree neighbors of Ukraine; "Other Countries" in left panel is average of remaining 52 countries in our sample. "Control" in right panel is synthetic control unit, see Table B3 in the appendix for country weights. Russia and Ukraine are excluded from sample. Returns are computed based on Morgan Stanley Capital International (MSCI) country indices. Green shaded area ("event window") demarcates period from two weeks prior to the start of the war until two weeks after, i.e., from February 10 to March 10, 2022.

Russia's President Putin announced a "special military operation" against Ukraine, and Russia started airstrikes and an invasion on multiple fronts. Up until that announcement, Russia's intentions had remained unclear. Although there were signs of escalation from early 2021 and Western intelligence services started warning of concrete Russian invasion plans later that year, a full-blown interstate war still seemed remote. For most observers, it became a concrete prospect not until Russia moved to recognize the two Russian-controlled statelets in the Donbas region of Ukraine on February 21, 2022. Against this background, we define an event window from two weeks prior to, until two weeks after, the start of the war, indicated by the green shaded area in the figure.

The pronounced market response to the war becomes apparent as we compare two sets of countries in the left panel of Figure 1: Ukraine's first- and second-degree neighbors in Europe ("Neighbors") and the group of "Other Countries" located further away from Ukraine. Here, and in what follows, we compile cumulative stock-market returns for 66 countries from around the globe based on country-specific MSCI indices. This data set includes all major stock markets. We classify 14 of the countries as neighbors, see Table B1 for details. The raw difference across groups is stark: Within the four weeks around the start of the war, the neighbors experienced an average stock market decline of over 20 percent (solid blue line), which contrasts with a decline of only six percent in the more distant countries (red dashed line).[2] In the subsequent weeks, the gap narrowed but remained large. Proximity to war appears to be crucial for the market response. At the same time, the panel clearly suggests that the invasion took markets by surprise. Relative to the sharp decline starting on February 24, anticipation effects look to have been small in the run-up to the invasion and absent prior to the event window.

The availability of rich and usable financial market data makes the war in Ukraine stand out among other wars since 1972, the year in which complete daily MSCI data coverage starts for some countries.[3] According to the database "Correlates of War", there have been 21 interstate wars since 1972 (Sarkees and Wayman, 2010). These wars were predominantly fought in low-income countries with small and illiquid domestic capital markets and located far from advanced financial centers. Consequently, there is little in the way of usable country-level equity market data for countries located close to the war zone for most historical wars. In fact, if we require at least three countries with daily MSCI data at the time of the war onset within a 1,000-kilometer radius around the war zone, this reduces the number of eligible wars to six. Even for these six wars, the average number of nearby countries per war is only 6.3. By contrast, for the war in Ukraine, there is daily MSCI data coverage for 20 different countries—including some with large and liquid financial markets—located within a 1,000-kilometer radius of Ukraine. A closer look at those earlier six wars also reveals that anticipation effects were significantly more pronounced than what appears to have been the case in the run-up to the war in Ukraine; see Figure B3 in the appendix.

Turning back to the evidence in the left panel of Figure 1, we note that the apparent volatility of stock returns in the run-up to the war in Ukraine is somewhat higher among neighbors than in the average non-neighboring country. To adress the question if this higher volatility also explains the outsized negative reaction inside the event window, we construct a synthetic control unit from the pool of non-neighboring countries (Abadie and Gardeazabal, 2003; Abadie et al., 2010, 2015). We select weights on individual countries from this pool by minimizing the difference in cumulative returns vs the Neighbor group for the period from December 21, 2021 to February 10, 2022. The non-neighboring countries with the largest

[2] The decline in the "Neighbors" group corresponds to the 2nd percentile of the historical distribution of 4-week returns since 2002, underscoring the extreme magnitude of the sell-off.

[3] The first countries with daily coverage in Thomson Reuters Datastream starting in 1972 are Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Italy, Japan, Netherlands, Norway, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States. Daily coverage for the remaining countries started later, e.g., Ireland in 1988 and China in 1993.

weight turn out to be the UK (29.3%), Singapore (18.5%), India (12.4%), Italy (12.1%) and Mexico (9.0%), see Table B3 in the online appendix for a complete list of country weights. The right panel of Figure 1 shows the stock market return in the average neighboring country against the synthetic control unit. Although the variation in returns prior to the event window is now very similar (by design), the pattern observed during the event window remains stark, and similar to that seen in the left panel. This suggests that there is a genuine difference in the stock market reaction to the war between neighbors and other countries that is not explained by higher general volatility per se.

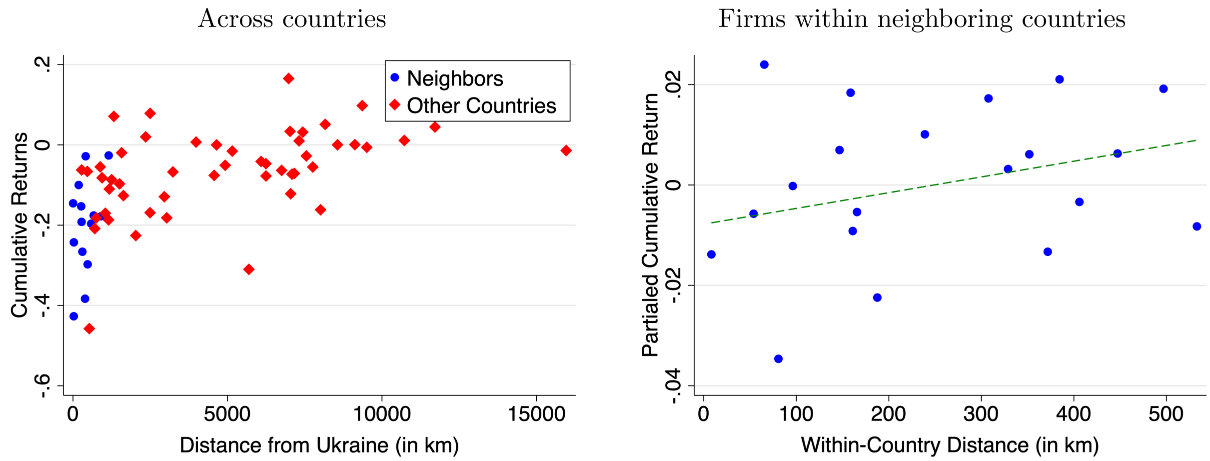
In the next section, we therefore proceed to quantify the role of distance in the stock market response to the war, both at the country and the firm level. For our country-level analysis, we measure the distance from Ukraine in kilometers, using the city database of Simplemaps, which contains over 40,000 cities and their geographical coordinates. We calculate the distance between two countries as the smallest distance between any possible pair of cities across those countries. Neighboring countries, accordingly, are coded to have very small distances of only a few kilometers. Intuitively, the closest countries to Ukraine are its direct neighbors, whereas the countries farthest from Ukraine include New Zealand (15,960 km), Chile (11,714 km), and Argentina (11,272 km). The average distance from Ukraine in our country sample is about 3,959 km, and the median distance is 2,494 km.

For firms, we likewise measure distance in kilometers starting from the postal codes of firms' headquarters obtained from Thomson Reuters Datastream. We supplement this information with the gazetteer database Geonames, which contains data on 4.8 million populated places around the globe.[4] We match the country-postal code combinations in our stock price sample with the Geonames database to obtain the latitudes and longitudes of the headquarters of each firm. For all firms, we then calculate the distance between their headquarters and the closest postal code in Ukraine. The firm located closest to Ukraine in our sample is headquartered in *Sanok*, a city in South-Eastern Poland located 35 km from the Ukrainian border. In contrast, the most distant Polish firm in our sample is located in *Szczecin*, which is 655 km from Ukraine.

We also record the cumulative log return at the firm level in our event window. We obtain both the country-level MSCI data and the firm-level pricing data from Thomson Reuters Datastream. Our sample comprises 16,929 different firms from 54 countries. Indices and firms pertaining to Russia and Ukraine are excluded from our samples since we focus on the

[4] *Simplemaps* provides greater country coverage for our MSCI sample, *Geonames* provides more granular data on a postal code level. Differences in the obtained distances are negligible.

Figure 2: Market Response and Distance to Wars



Notes: Left panel measures cumulative MSCI return within four weeks around war onset along vertical axis, horizontal axis measures distance from Ukraine. Each dot represents a different country. Right panel: binned scatter plot of firm-level returns of firms headquartered in first- or second-degree neighbor countries of Ukraine in the same period (using 20 equally-sized bins). Vertical axis: bin-wide average cumulative returns after partialing out country-wide effects, i.e., the cumulative firm returns minus the average returns of firms located in the same country. Horizontal axis: bin-wide average within-country distance of firms from Ukraine, i.e., the distance of firms' headquarters from Ukraine minus the smallest distance of any firm in the same country from Ukraine.

externalities of the war. We provide further details on data sources, the construction of our control variables, and sample selection in the online appendix.

To set the stage for our subsequent analysis, Figure 2 relates the cumulative stock market return in the event window to distance from Ukraine, both across countries (left panel) and for firms within the neighboring countries (right panel). Consistent with the evidence presented so far, we observe that a smaller distance to Ukraine tends to be associated with a larger stock-market loss. This holds not only across countries but also within the countries which we classify as neighbors to Ukraine.

Before setting out our formal analysis in the next section, one additional set of statistical information is worth reporting, namely the importance of both Russia and Ukraine as trading partners for other countries. Unsurprisingly, neighbors are more exposed. Specifically, the top panel of Table 1 shows that neighbors' trade shares with Russia and Ukraine exceed those of the non-neighbors by a factor of 3 to 8. Similar ratios emerge from the comparison between neighbors and the synthetic control unit. As an alternative measure of trade dependencies,

Table 1: Trade Exposure to / Top-10 Commodity Exports of Russia & Ukraine

	Trade exposure to Russia and Ukraine (% of GDP)		
	Neighbors	Synthetic Control	Non-Neighbors
Exports to Russia	1.04	0.21	0.32
Imports from Russia	2.72	0.42	0.58
Exports to Ukraine	0.48	0.03	0.06
Imports from Ukraine	0.36	0.06	0.08
Sensitive Commodity Imports	5.04	7.42	5.02

	Market share (% of export market)		
Product Category	Russia	Ukraine	Combined
Coal, Coke and Briquettes	15.33	0.09	15.42
Fertilizers	13.86	0.35	14.21
Cork And Wood	10.03	1.08	11.11
Fixed Vegetable Fats and Oils ...	4.08	6.41	10.49
Cereals and Cereal Preparations	4.72	5.24	9.96
Petroleum, Petroleum Products ...	9.47	0.02	9.5
Gas, Natural and Manufactured	7.49	0.08	7.57
Iron and Steel	4.74	2.37	7.11
Nonferrous Metals	6.04	0.08	6.12
Inorganic Chemicals	4.48	0.32	4.8

Notes: Top panel shows trade exposure to Russia and Ukraine scaled by GDP. "Neighbors" denotes unweighted average of first- and second-degree neighbors. "Synthetic Control" reports trade exposure of a synthetic control group, see Figure 1. "Non-Neighbors" denotes unweighted average of all countries not in the "Neighbors" group. Bottom panel shows the top export products of Russia and Ukraine, measured in percent of the export market. Figures refer to year 2019 and were obtained from the Harvard Atlas of Economic Complexity. Product groups were summarized in two-digit SITC codes.

the bottom panel of the table lists the top-10 commodity exports (in terms of global market share) of both Russia and Ukraine. These include coal, fertilizers, natural gas, and petroleum, among other things. In our subsequent analysis, we take both dimensions into account, i.e., direct trade linkages and the dependence on imports of *sensitive commodities* whose prices may react particularly strongly to disruptions of the supply from Russia or Ukraine.

3 Quantifying the proximity penalty

We now turn to a systematic analysis of how geographic proximity shapes the stock market response to the Russian invasion of Ukraine. We start by presenting our empirical framework and then report our country- and firm-level results, which point to a significant proximity penalty. Subsequently, we test the robustness of these results by exploring the role of membership in supranational organizations, non-linear effects in the distance from Ukraine, and variation in the event window. Finally, we provide additional evidence which supports our interpretation of the proximity penalty as reflecting increased disaster risk due to potential military spillovers.

3.1 Empirical framework

Our main results are based on a set of simple ordinary least squares regressions:

$$CumRet_i^\tau = \alpha + \rho * DistanceUkraine_i + \gamma * controls_i + \varepsilon_i. \tag{1}$$

Here, i indexes either countries or firms, depending on the specification. τ indexes the event window in days relative to the start of the war. In our main analysis, we measure cumulative stock market returns, $CumRet_i^\tau$, in logs within a 4-week window, $\tau = [-14, 14]$, centered around February 24, 2022. The event window is centered around the start date of the war to capture possible anticipation effects observed in the days leading up to the Russian invasion, see again Figure 1 above. We consider event windows of different sizes in our robustness analysis below. The set of control variables differs for the country- and the firm-level specification, for which we discuss results in turn.

3.2 Country-level evidence

We first estimate the linear regression model (1) at the country level and report results in Table 2. As already suggested by Figure 1, we find that a country's geographic proximity to Ukraine is a significant differentiator of cumulative stock returns in the early stages of the war. Column (1) of Table 2 provides a simple benchmark that relates stock returns during our event window exclusively to countries' distance from Ukraine. We can infer from this regression that Ukraine's immediate neighbors (that is, countries at a distance of virtually

Table 2: Country-Level Stock Market Response to the Ukraine War

	(1) $CumRet_i^\tau$	(2) $CumRet_i^\tau$	(3) $CumRet_i^\tau$	(4) $CumRet_i^\tau$	(5) $CumRet_i^\tau$
$DistanceUkraine_i$	0.0263	0.0257	0.0256	0.0169	0.0116
	(0.00474)	(0.00458)	(0.00473)	(0.00455)	(0.00459)
	{0.000}	{0.000}	{0.000}	{0.000}	{0.015}
Historical Alpha		8.213	9.150	30.63	34.57
		(34.88)	(35.58)	(27.83)	(28.14)
		{0.815}	{0.798}	{0.276}	{0.225}
Historical Beta		-0.0565	-0.0583	-0.0272	-0.000778
		(0.0558)	(0.0564)	(0.0548)	(0.0557)
		{0.314}	{0.306}	{0.622}	{0.989}
$z(SensitiveCommodities_i)$			-0.00497	0.0108	0.00909
			(0.0181)	(0.0250)	(0.0272)
			{0.784}	{0.667}	{0.739}
$z(ImportsFromRussia_i)$				0.0282	-0.0145
				(0.0240)	(0.0613)
				{0.245}	{0.814}
$z(ExportsToRussia_i)$				-0.106	-0.0808
				(0.0205)	(0.0429)
				{0.000}	{0.065}
$z(ImportsFromUkraine_i)$				-0.00604	-0.00414
				(0.0287)	(0.0277)
				{0.834}	{0.882}
$z(ExportsToUkraine_i)$				-0.00108	0.00412
				(0.0124)	(0.0137)
				{0.931}	{0.765}
EU_i					-0.0709
					(0.0444)
					{0.117}
$EU_i * z(ImportsFromRussia_i)$					0.0499
					(0.0701)
					{0.479}
$EU_i * z(ExportsToRussia_i)$					-0.0331
					(0.0515)
					{0.522}
Constant	-0.231	-0.196	-0.194	-0.175	-0.149
	(0.0297)	(0.0450)	(0.0458)	(0.0413)	(0.0433)
	{0.000}	{0.000}	{0.000}	{0.000}	{0.001}
Adj. R^2	0.32	0.33	0.32	0.52	0.52
N	66	66	65	64	64

Notes: Table presents country-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) controlling for trade-related factors and countries' overall sensitivity to global market movements. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets. The event window is $\tau = [-14, 14]$.

zero) incurred, on average, a negative log return of 23.1% (p-value < 0.001) during the four-week period centered around the start of the war. Moving away from Ukraine improves the return by 2.6 percentage points per 1,000 km of distance (p-value < 0.001).

In what follows we include a progressively increasing set of control variables in order to isolate the effect of distance on the stock market response. A first set of controls is meant to account for national stock markets' sensitivity to world equity markets. Specifically, in column (2), we introduce as additional regressors the stock markets' historical "alpha" and "beta". They capture, respectively, the average excess return and sensitivity to global stock returns.[5] More sensitive (i.e., higher-beta) stock markets would tend to underperform during global sell-offs and vice versa. As such, the negative sign on the estimated coefficient is intuitive, although it is not statistically significant (p-value $= 0.314$). Similarly, the alpha is not significantly different from zero (p-value $= 0.815$). The other estimated coefficients are little affected.

Next, we include controls for commodity dependencies. Given the important role Russia and Ukraine play as commodity exporters, disruptions to their export flows may affect—via higher prices—even countries that procure the relevant commodities elsewhere on the world market. To allow for this indirect trade spillover, we include in regression (3) countries' total imports (again scaled by GDP) of all goods that are among the top 10 exports of Russia and Ukraine as listed in Table 1 above. The coefficient on this variable is negative, as one would expect, but not statistically significant (p-value $= 0.784$). Note, moreover, that including this variable does not materially affect the estimated distance effect. This appears consistent with the observation that neighboring countries are no more dependent on the top commodities exported by Russia and Ukraine than the other countries in our sample. These findings are also robust to including disaggregated imports of the top export products of Russia and Ukraine (see Table B4 in the online appendix).

We proceed to include additional control variables to purge any apparent distance effect that can be ascribed to spillovers related to bilateral trade. Specifically, in column (4), we turn to a regression that features measures of the country's trade linkages with Russia and Ukraine. Our trade variables are transformed into z-scores to facilitate the interpretation of coefficients. We include variables measuring countries' pre-war import and export dependence vis-à-vis Russia and Ukraine, scaled by a country's GDP. The idea is to capture the (negative) effect of close pre-war trade ties with one or both of the warring countries as such ties are likely to be disrupted by the war. The extent of trade dependence on Russia turns out to be both statistically and economically significant. Specifically, the log equity return

[5]We describe the construction of these and other control variables in the online appendix.

in our event window drops by 10.6 percentage points for a one-standard-deviation rise in the dependence on Russia as an export destination (p-value < 0.001). In our sample, one standard deviation represents 0.56% of GDP. We find this result plausible insofar as exports to Russia were set to suffer a particularly sharp collapse, given the breadth of sanctions put on the agenda right from the start of the war.[6] As illustrated in the top panel of Table 1 above, trade linkages were particularly close between neighbors to the war, on one side, and Ukraine and Russia, on the other. It is therefore natural to observe that the estimated effect of distance is quantitatively smaller once we control for direct trade linkages. Importantly, however, the effect of distance remains significant.

Finally, we also add, in regression (5), control variables for countries' membership in the EU, as this might affect the extent of spillovers. In particular, the preparation of EU-coordinated sanctions during the event window could intensify trade-related shocks.[7] We include not only the EU dummy but also its interaction with the countries' pre-war import and export levels with Russia. Neither of the coefficients turns out statistically significant. Meanwhile, the inclusion of these control variables reinforces the finding that our distance measure captures a distinct non-trade spillover channel: the distance coefficient remains statistically significant and suggests a 1.1-percentage point improvement in cumulative equity returns for every 1,000 km of distance from Ukraine (p-value $= 0.015$), all else fixed. In other words, countries close to Ukraine still appear to be suffering a notable proximity penalty even after controlling for trade-related spillovers in various ways. Throughout, our regressions explain between one-third and one-half of the total variation of returns in our cross-section of countries.

3.3 Firm-level evidence

We now take a more granular view and assess to what extent our results also hold at the firm level. Considering firm-level data offers two additional advantages. First, we are able to explore to what extent distance matters not only at the country level but also within countries. Second, we can shed light on how distance affects the stock market response across specific industries. Throughout, the firm-level regression features control variables for the stock's market capitalization. In contrast to the country-level regressions above, our

[6] The interpretation of coefficients is, however, affected by the high correlation between the different trade variables. Notably, imports from Russia are very highly (81.2%) correlated with exports to Russia. This is likely to explain the insignificant coefficient estimate for the import variable. Indeed, re-running the regression without the $ExportsToRussia_i$ variable leads the $ImportsFromRussia_i$ coefficient to become negative and highly significant.

[7] In a related study, Huang and Lu (2022) quantify the stock market response to sanctions.

Table 3: Firm-Level Stock Market Response to the Ukraine War

	(1) $CumRet_i^\tau$	(2) $CumRet_i^\tau$	(3) $CumRet_i^\tau$
$DistanceUkraine_i$	0.0112	0.00377	0.00368
	(0.000374)	(0.00287)	(0.00290)
	{0.000}	{0.190}	{0.205}
$DistanceUkraine_i \times Neighbor_i$			0.0450
			(0.0231)
			{0.052}
Constant	-0.252	-0.0841	-0.0891
	(0.0244)	(0.0533)	(0.0547)
	{0.000}	{0.114}	{0.103}
Country FE	No	Yes	Yes
Industry FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Adj. R^2	0.15	0.19	0.20
N	16,929	16,929	16,929

Notes: firm-level estimation of equation (1) relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$). Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets. The event window is $\tau = [-14, 14]$.

firm-level specification does not include direct measures for firms' trade exposure to Ukraine and Russia. However, all specifications for which we report firm-level results below include the firms' historical alphas and betas capturing sensitivities to the global equity market, the Russian equity market, and the Ukrainian equity market, respectively.[8]

Table 3 shows the results for three specifications. The first specification, for which we report results in column (1), includes industry fixed effects but no country fixed effects. The results corroborate the findings obtained from our country-level analysis displayed in Column (5) of Table 2: We find that the distance coefficient of the firm-level analysis (0.0112) is highly significant (p-value < 0.001) and nearly identical to the distance coefficient in our country-level analysis (0.0116).

We next add country fixed effects. This allows us to control for country-specific characteristics or policies that might explain part of the stock market reaction. More important, we may thus interpret the coefficient ρ in model (1) as the effect on stock returns of an *intra-country* increase in the distance from Ukraine. Column (2) of Table 3 shows results for

[8]In this way, we control for the historical comovement with the Russian and Ukrainian equity markets and hence for economic interdependence. Still, we acknowledge the lack of a *direct* measure of trade exposure to Russia and Ukraine in our firm-level analysis.

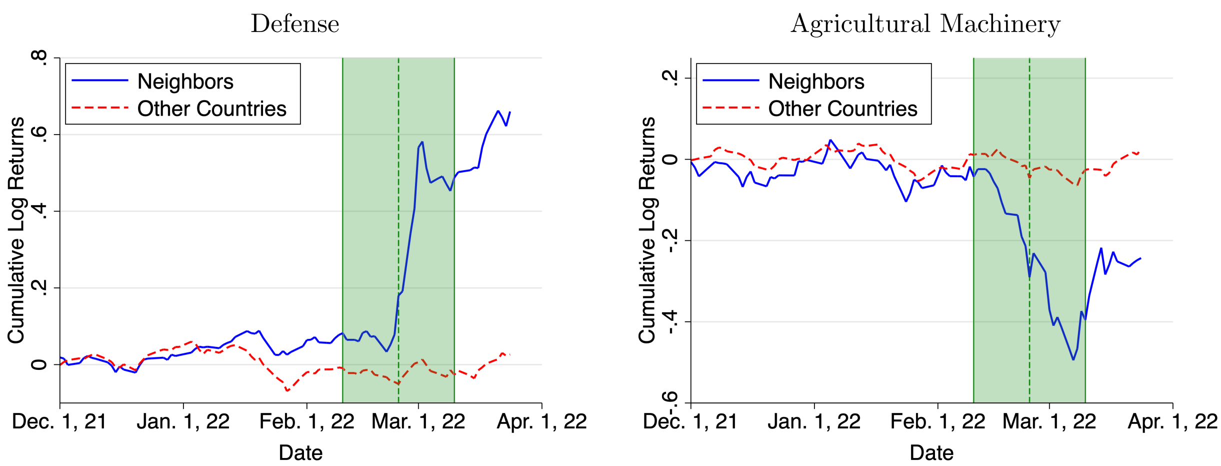
the full sample of firms. While the distance coefficient remains positive, it is not significant anymore, suggesting that within-country distance is not a key factor in the full sample.

The third specification shown in Table 3 allows both the distance term and the control variables to differ for neighbors and non-neighbors. $Neighbor_i$ is a dummy indicating whether country i is a first- or second-degree neighbor of Ukraine. Interestingly, we now find distance from Ukraine to be a determinant for (abnormal) stock market returns within these neighboring countries. Specifically, an increase in the firms' distance from Ukraine by 1,000 km is associated with an increased return of 4.5 percentage points (p-value = 0.052), after controlling for all fixed effects. No such significant effect is apparent once we consider non-neighboring countries. On closer reflection, this seems intuitive. To give a concrete example, unlike for different regions within, say, Poland or Romania, we would not expect the northeast of Argentina to be more affected by its relative proximity to Ukraine than the southwest of Argentina.[9]

Proximity to the war thus carries a penalty, both across and within countries. Yet, within the neighboring countries, the penalty may still vary systematically across firms. In fact, there may not only be losers but also winners, depending on the industry in which firms operate. To illustrate this point, we show cumulative stock returns in Figure 3, now zooming in on two specific industries. The left panel of the figure shows the performance of the defense sector in neighboring and non-neighboring countries. The right panel, instead, depicts the market performance of the agricultural machinery sector. Industries are identified using Datastream Industrial Classification codes. Overall, our sample comprises 173 different sectors. The pattern in the two panels is quite distinct. The performance of the defense sector in the neighboring countries is very strong, consistent with the notion that the sector is a beneficiary of military escalation (Phillips, 2015). Yet while companies in this sector experience average positive returns as high as 60% in the neighbor group, their peers in other countries show zero returns. This is remarkable if we consider that there are bound to be some positive spillovers for global defense companies, irrespective of where they are located. The right panel provides the mirror image. The agricultural machinery sector is seen to perform particularly poorly, as stock prices drop by over 40% in the neighbor group, whereas returns in the non-neighboring countries seem to be largely unaffected. This pattern may reflect the fact that Ukraine is one of the largest producers of agricultural goods and hence a likely customer of specialized machinery firms in neighboring countries.

[9]In an alternative specification we include a Europe dummy in addition to a neighbor dummy and find that distance within European countries matters to a similar extent as among neighboring countries. Results are available on request.

Figure 3: Cumulative Stock Market Returns for Specific Industries



Notes: Left and right panel show the returns of defense equities and agricultural machinery equities, respectively. Russia and Ukraine are excluded from both panels. Sectors refer to Datastream Industrial Classification codes. Both industries are among the top industries in terms of the size of the proximity penalty (or premium).

In what follows, we attempt to quantify the industry-specific proximity penalty (or premium) systematically, based on the following regression:

$$\begin{aligned} CumRet_i^{\tau} = \alpha + \rho * DistanceUkraine_i + \sum_{j \in J} \eta_j * Industry_{i,j} \\ + \sum_{j \in J} \zeta_j * Industry_{i,j} * DistanceUkraine_i + \gamma * controls_i + \varepsilon_i \end{aligned} \tag{2}$$

Where i, again, indexes firms and j indexes industries. We measure the cumulative stock market returns, $CumRet_i^{\tau}$, in logs within the same 4-week window as before. $Industry_{i,j}$ is a dummy indicating whether firm i belongs to industry j. Thus, η_j measures the performance of a specific industry, ρ yields the industry-independent proximity penalty, and ζ_j denotes the industry-specific proximity penalty (premium). The control variables comprise, as before, the stock's market capitalization, alphas and both general and Russia-/Ukraine-specific betas. We exclude all industries for which we do not have at least 10 firms.

Table 4 reports the estimates based on specification (2). The top panel shows that there is a negative abnormal return of 22.2 percentage points (p-value < 0.001) overall. Furthermore, there is an industry-independent proximity penalty of 2.3 percentage points (p-value $<$

Table 4: Industry Effects in the Firm-Level Response to the Ukraine War

	$Coefficient$	$Industry_{i,j} \times DistanceUkraine_i$
$Intercept$	-0.222	
	(0.019)	
	{0.000}	
$DistanceUkraine_i$	0.023	
	(0.003)	
	{0.000}	
Top 3 Proximity Premium Industries		
Defense	0.394	-0.047
	(0.075)	(0.011)
	{0.000}	{0.000}
Offshore Drill & Services	0.292	-0.037
	(0.079)	(0.016)
	{0.000}	{0.020}
Insurance Brokers	0.255	-0.029
	(0.114)	(0.011)
	{0.025}	{0.009}
Top 3 Proximity Penalty Industries		
Hotel & Lodging REITs	-0.125	0.021
	(0.120)	(0.015)
	{0.298}	{0.171}
Machinery: Engines	0.011	0.014
	(0.061)	(0.014)
	{0.852}	{0.309}
Drug Retailers	-0.052	0.008
	(0.097)	(0.011)
	{0.594}	{0.508}
N	16,946	

Notes: estimates based on equation (2), relating cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) and to interaction effects of the distance with sector dummies. Sectors refer to Datastream Industrial Classification codes. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets. The event window is $\tau = [-14, 14]$.

0.001) per 1000 km distance from Ukraine, broadly consistent with the results reported in Table 2 above. We report results for specific industries in the middle and the bottom panel of the table. Consider first the top-3 industries, ranked according to their proximity penalty/premium within the event window, as captured by the estimate of ζ_j, shown in the right column.

Intuitively, the defense industry exhibits the highest proximity *premium.* While defense stocks, on average, reaped a positive abnormal return of 39.4 percentage points (p-value $<$ 0.001), the excess return declined by 4.7 percentage points (p-value < 0.001) per 1000 km distance from Ukraine as compared to the baseline. This again suggests that markets quickly priced in a more positive business outlook, especially for defense companies in countries close to Ukraine. Heightened perceptions of military risk among such neighbors, coupled with a bias for national defense contractors in military procurement, could readily account for this. Next, companies in "offshore drilling & services" experienced a significant proximity premium, as well. This may reflect an anticipated rise in demand for new investment in hydrocarbon production outside of Russia. In particular, the sector's firms reaped positive abnormal returns of 29.2 percentage points (p-value < 0.001), which were, however, reduced by 3.7 percentage points per 1000 km of distance from Ukraine (p-value $= 0.020$) as compared to the baseline. Lastly, companies in the "insurance brokers" sector also exhibited a particularly strong proximity premium of 2.9 percentage points per 1000 km of distance from Ukraine (p-value $= 0.009$) as compared to the baseline, which we speculate might result from heightened risk assessments and related insurance demand in the aftermath of the war onset.

At the other end of the spectrum, we do not find evidence of industries exhibiting a significant excess proximity penalty, notwithstanding the suggestive case in the right panel of Figure 3. All of the reported coefficients in Table 4 remain insignificant, implying that there are no industries that suffer a particularly strong proximity penalty.

It is noteworthy that, for all of the significant point estimates in this exercise, the sign of the industry coefficient is consistently the opposite of the sign on the industry-distance interaction. This indicates that industries whose stock prices reacted most negatively to the war in Ukraine were also those exhibiting the largest proximity penalty. More broadly, our industry-level results suggest that distance from the war zone may affect firms' economic prospects in different ways. The defense sector, notably in neighboring countries, was seen as benefiting from (expected) military escalation, whereas the market downgraded prospects for other industries, presumably reflecting negative spillovers via trade linkages or military escalation risk.

3.4 Robustness

To ensure the robustness of our results, we test a variety of alternative model specifications. Specifically, we account for countries' memberships in supranational organizations, nonlinearities in the effects of distance, and different event window specifications.[10] We find that the stock markets of North Atlantic Treaty Organization (NATO) members and of former Soviet Union countries exhibit significant negative excess returns. This seems intuitive as both groups of countries are arguably exposed to a higher probability of military involvement in the conflict. However, upon inclusion of our distance measure in the regression, both NATO and former Soviet Union affiliation become insignificant, suggesting that distance from Ukraine captures the ostensible link between the NATO/Soviet Union affiliations and stock returns.

To account for a potential non-linear relationship between distance from Ukraine and stock returns, we reconsider the country-level results shown in Table 2 and include a squared term of the distance from Ukraine in the regression model. The point estimates suggest that the proximity penalty increases more than proportionally in the proximity to Ukraine. However, the measured non-linear effects meet the threshold of statistical significance only in the more parsimonious model specifications. We therefore prefer to focus attention on the linear model.

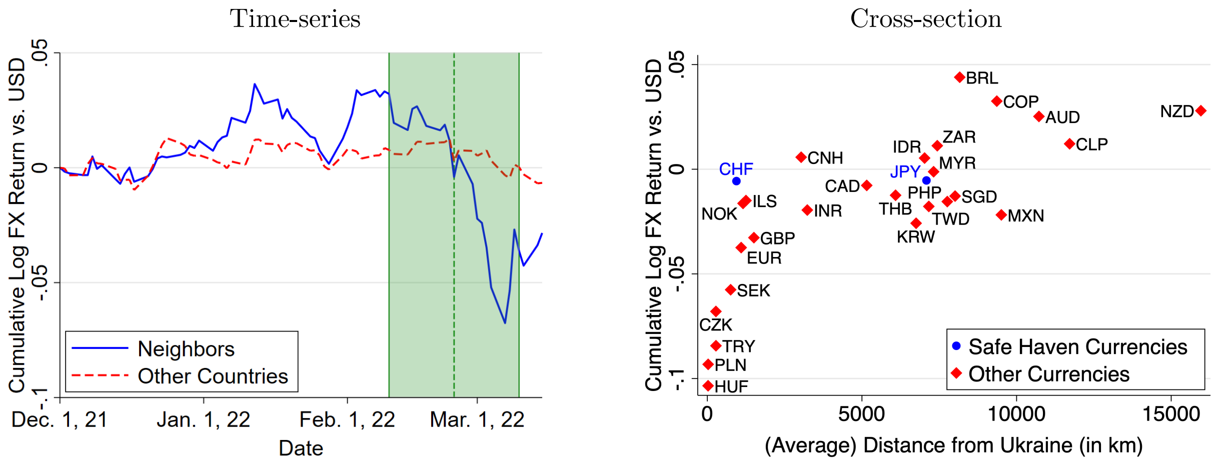
Next, we consider alternative event window lengths. Specifically, we replicate our main results outlined in Tables 2 and 3 for all τ with $\tau \in \{[-1,7],[-7,7],[-1,14],[-14,14],[-28,28]\}$. The results largely mirror our earlier findings. The economic and statistical significance of the $DistanceUkraine_i$ coefficient, however, appears to increase in the event window size. This is consistent with random noise cancelling out in longer observation periods and with the notion of perceived spillover risk building up over a period of time. In particular, it is plausible that, due to anticipation effects, some of the proximity penalty started seeping into market prices a few days prior to the Russian invasion of Ukraine. Similarly, perceived spillover risks may have increased in the weeks following the start of the war, as concrete examples of potential regional escalation emerged. A case in point is rising tensions in Moldova amid reported Russian plans to advance toward the South-west of Ukraine.[11]

Our next exercise serves to investigate whether equity market moves around the start of the war represented a broad reassessment across financial markets or perhaps just outlier behavior. To this end, we assess whether the distance from Ukraine also shaped the response

[10] Detailed results are available in the online appendix: The robustness tests regarding international organization membership are provided in Table B5; our analysis regarding non-linear distance effects is provided in Table B6; and the results of the country-level and firm-level event window variations are presented in Tables B7-B8 and C4-C6, respectively.

[11] See "Ukraine war casts shadow over Transnistria as security alerts sow fear," Financial Times, May 3, 2022.

Figure 4: Exchange Rate Spot Returns



Notes: Left panel shows the cumulative foreign exchange spot return of first- and second-degree neighbors and other countries against USD. Right panel is a cross-sectional scatter plot of the currency returns in the four-week window around the war onset.

of exchange rates—another key asset price. We compile a version of the chart shown in the left panel of Figure 1, now using countries' exchange rates against the US dollar instead of stock indices. As before, we distinguish between neighbors and other countries. The results are displayed in Figure 4. Note that the two samples are now smaller than before, as the list of countries with flexible exchange rates and reasonably liquid currency markets is much shorter than the list of countries with MSCI equity indices.[12] Nonetheless, the broad picture is remarkably similar to Figure 1. Although the currencies of neighbors and other countries showed limited divergence prior to the event window, the neighboring countries' exchange rates started to weaken significantly more than the other countries' exchange rates as tensions in Ukraine escalated and especially once the Russian invasion got underway. Moreover, the right panel of Figure 4 again points to a strong proximity penalty, with distance being a particularly clear differentiator among nearby countries. The depreciation of national currencies could be related, for instance, to declining exports to the countries at war, generally weaker growth prospects as a result of economic, political or military disruption, or broader threats to economic and political stability that discourage capital inflows.

Finally, we address another potential concern about the interpretation of our findings. Is it possible that countries close to Ukraine stand out not because of their geographic location

[12]Details are provided in Section D of the online appendix.

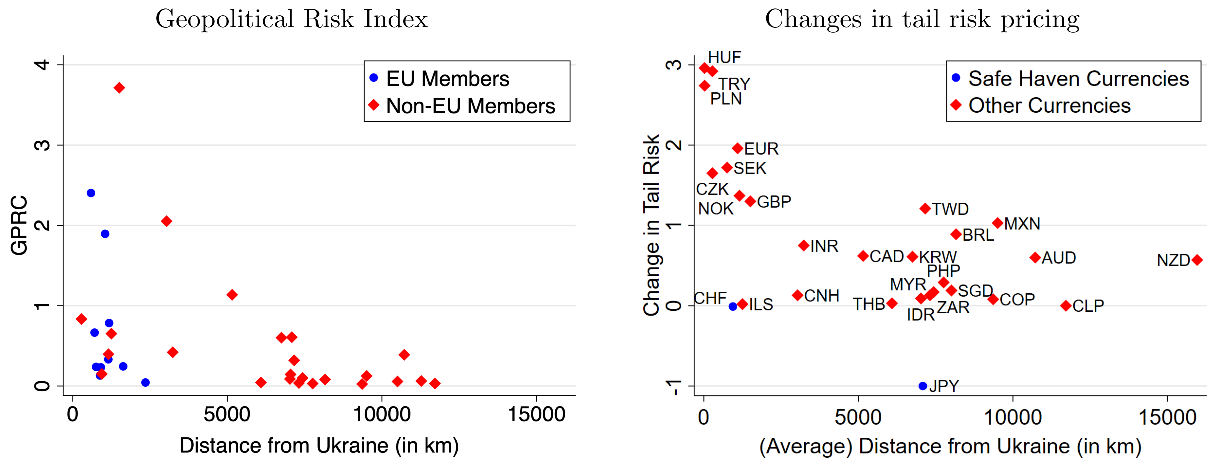
but because they happen to have generally lower capacity to cope with (economic) crisis? In this case, we would expect their financial markets to show outsized responses to other global crisis situations as well. Figure B2 in the online appendix performs this "placebo" test by examining a series of other crisis events that significantly affected global stock markets. In all of the examined crises, except for the specific two instances of the Russia/Ukraine conflict in 2014 and 2022, the returns of Ukraine's neighbors are similar to those of other countries, suggesting no systematic difference.

3.5 Further evidence

Our findings reveal a sizeable and robust stock market response to the war in Ukraine, differentiated across countries and firms. We find that stock prices suffer larger declines in economies closest to the conflict zone, even after controlling for EU membership and trade relations with the countries at war. Similar findings also apply to firm-level stock prices and even exchange rates. We attribute the residual proximity penalty to the risk of direct military entanglement or serious collateral damage from the nearby war. The latter could arise, for instance, from the potential use of weapons of mass destruction in the neighboring country, or from military activity causing an accident in a nuclear power plant—both commonly discussed as potential risks for the war in Ukraine. Put differently, the fighting in Ukraine creates a (tail) risk of economic disaster for other economies, and this risk increases in the proximity to Ukraine. Incidentally, a perceived rise in this risk may not just be an inevitable consequence of "fighting next door". Rather, it could also be deliberately provoked by a warring party to deter other countries from supporting its adversary. This is certainly one way to interpret Russia's repeated references to the risk of nuclear escalation.

In the remainder of this section, we consider four pieces of evidence that support the relevance of military spillover risk and, hence, an increased probability of disaster as an important differentiator in the current context. First, we show in the left panel of Figure 5 how our distance measure relates to an independent and objective measure of geopolitical risk, namely the Geopolitical Risk Index for individual countries (GPRC) compiled by Caldara and Iacoviello (2022). The GPRC should capture the geopolitical risk affecting countries in our sample as the war in Ukraine unfolded. As is clear from the figure, geopolitical risk increases in the proximity to Ukraine. This conforms with the view that neighbors face greater risks of direct kinetic escalation or other military spillovers compared to faraway

Figure 5: Proximity to War and Military Spillover Risk



Notes: Panels relate the GPRC in March 2022 (left) and the change in tail risk pricing as reflected in exchange-rate options (right) to distance from Ukraine, respectively.

countries.[13]

Second, we show that geographic distance explains a substantial fraction of the equity returns even when controlling for "economic distance". For this purpose, we use a term which—in the spirit of gravity—scales the geographic distance between two countries with the product of their GDPs. We then re-estimate our main country-level specification using economic distance rather than geographic distance. We find that economic distance, as geographical distance before, enters positively and but loses its statistical significance once we include bilateral trade variables in the regressions, see Table B9 in the online appendix. However, when we include geographic distance in addition to economic distance, the significance of economic distance vanishes across all specifications. Remarkably, point estimates and significance levels of geographic distance remain nearly unchanged when compared to our baseline model in Table 2, see Table B10 in the online appendix. In sum, we corroborate that distance matters for the stock market response to the war beyond its impact via trade—consistent with the notion that markets also price military spillover risk.

Third, we present direct evidence that the reaction of financial markets to the war in Ukraine is—at least partially—driven by a perceived increase in tail or disaster risk. To this end, we

[13]We exclude the U.S. from the figure because a) the military strength of the United States is so central that direct comparisons of its GPRC against other countries may not reflect the true relative risk accurately and b) GPRC indexes are constructed using mainly U.S. newspapers, limiting the scope for meaningful comparisons of the U.S. and non-U.S. countries.

rely on the fact that the proximity penalty is not only reflected in stock prices but also in exchange rates. As illustrated in Figure 4 above, greater proximity to Ukraine is associated with weaker exchange rates. And just like with stock prices, exchange-rate movements may be driven by expectations of rare economic disasters.

To measure these, we focus on tail risk premia apparent from currency option pricing. Specifically, the right panel in Figure 5 visualizes the difference between each currency's average "risk reversal" from February 24, 2022 to March 10, 2022 and their average risk reversal value during 2021. The risk reversal is defined as the difference between the price of an out-of-the-money put option on the currency and the price of an out-of-the-money call option. Intuitively, if markets become more worried about disasters, put options that provide insurance against such outcomes become relatively more valuable than call options, which would pay out in the event of large appreciation. Thus, a rising risk reversal reflects greater market concern over the risk of sharp exchange rate weakness. As the right panel of Figure 5 shows, this metric is clearly and inversely related to distance from Ukraine, once again suggesting the importance of geographic proximity for economic risk reflected in asset prices.

A higher perceived tail risk for neighboring countries aligns with our hypothesis that the proximity penalty partly captures military spillover risk: the direct involvement of neighboring countries in the conflict may have low ex ante probability, but implies high ex post costs if the disaster materializes. This type of risk should have *some* impact on basic asset prices like equity prices or exchange rates but become more clearly apparent from option prices that directly reflect tail assessments. In the present case, the increased disaster risk premium apparent from currency options suggests that financial markets did indeed become more concerned about such "unlikely but highly impactful" events occurring in countries closer to Ukraine. One instructive special case is the Taiwan Dollar. Although Taiwan is far away from Ukraine, the apparent rise in Taiwan Dollar tail risk is particularly large in our sample. Proximity to Ukraine clearly is not the reason. And yet, a direct link to the war in Ukraine is very plausible insofar as markets became more attuned, in the wake of Russia's attack on Ukraine, to the possibility of future hostilities between China and Taiwan.[14]

Lastly, we examine whether countries located close to Ukraine were more likely to provide financial, humanitarian, or military support to Ukraine. We obtain data on country-level aid from the Ukraine Support Tracker compiled by Antezza et al. (2022). The database contains the total aid by category provided by 31 Western governments. For each category, we test

[14]See "Investors in Taiwan seek to hedge against risk of conflict with China," Financial Times, March 15, 2022.

whether the amount spent on helping Ukraine, normalized by the respective countries' GDP, varies with their distance from Ukraine. We find that countries' distance from Ukraine is not associated with the amount of humanitarian and financial help in a statistically significant way. By contrast, there is a statistically significant negative association with military aid. In other words, the countries closest to Ukraine tend to provide distinctly more military help to Ukraine than those which are further away. In fact, the five countries which provided the largest military support to Ukraine, scaled by their own GDP, are all first- or second-degree neighbors of Ukraine.[15] In total, the extra military help provided quickly by first- and second-degree neighbors amounted to USD 9.0 billion.[16] These results underscore the prominence of the military dimension and support the notion that military risks are central to the residual proximity penalty (i.e., once trade-related effects are controlled for). A detailed outline of the data and results is provided in Section D in the online appendix.

To sum up, supplementary evidence from a geopolitical risk variable, additional regressions which account for "economic distance," the currency options market, and military aid flows to Ukraine all support the notion that the "proximity penalty" is at least partly related to disaster risk. This risk may not be particularly high but would generate a large impact if the war were to escalate beyond Ukraine's borders.

4 Conclusion

During times of war, a country's proximity to the conflict zone is a key determinant for the economic spillovers it is exposed to. Focusing on the specific case of the war in Ukraine, we show that the behavior of stock markets around the start of the war shows a strong sensitivity to changes in perceived disaster risk. Geography turns out to be key in this regard. In countries geographically close to the war, markets suffered a sizeable proximity penalty, in the form of sharply negative returns, during the first couple of weeks of the war. Countries farther away fared much better in comparison. About one-half to two-thirds of this effect can be attributed to trade links, which, all else equal, tend to be closer among neighbors. The remainder is likely to reflect military spillover risk. Indeed, Ukraine's neighbors generally experienced a greater rise in independent measures of geopolitical risk, provided greater levels of military support to Ukraine, saw their domestic defense companies outperform the

[15]These are Estonia, Latvia, Lithuania, Poland and the Slovak Republic. Related, we find that first- and second-degree neighbors, on average, spent 0.15 percentage points of their GDP more on military help for Ukraine than other countries—an association that is significant at the 5% level.

[16]Here we consider the period from January 24 through April 23, 2022.

general stock market more significantly, and suffered higher perceptions of disaster risk as reflected in currency options. In conclusion, geography matters for the economic spillovers of war. These spillovers, in turn, are likely to feed back into geopolitics and perhaps influence the course of the war itself.

References

Abadie, A., A. Diamond, and J. Hainmueller (2010). Synthetic control methods for comparative case studies: estimating the effect of California's tobacco control program. *Journal of the American Statistical Association 105*(490), 493–505.

Abadie, A., A. Diamond, and J. Hainmueller (2015, April). Comparative politics and the synthetic control method. *American Journal of Political Science 59*(2), 495–510.

Abadie, A. and J. Gardeazabal (2003, March). The economic costs of conflict: A case study of the Basque country. *American Economic Review 93*(1), 113–132.

Antezza, A., A. Frank, P. Frank, L. Franz, E. Rebinskaya, and C. Trebesch (2022). The ukraine support tracker: Which countries help ukraine and how? Kiel Working Paper No. 2218.

Baker, S. R., N. Bloom, and S. J. Davis (2016, 07). Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics 131*(4), 1593–1636.

Barro, R. J. (2006). Rare Disasters and Asset Markets in the Twentieth Century. *The Quarterly Journal of Economics 121*(3), 823–866.

Berkman, H., B. Jacobsen, and J. B. Lee (2011). Time-varying rare disaster risk and stock returns. *Journal of Financial Economics 101*(2), 313–332.

Born, B., G. J. Müller, M. Schularick, and P. Sedláček (2019). The Costs of Economic Nationalism: Evidence from the Brexit Experiment. *The Economic Journal 129*(623), 2722–2744.

Boungou, W. and A. Yatié (2022). The impact of the ukraine–russia war on world stock market returns. *Economics Letters*, 110516.

Caldara, D. and M. Iacoviello (2022). Measuring Geopolitical Risk. *American Economic Review 112*(4), 1194–1225.

Couttenier, Mathieu, N. M. and L. Piemontese (2022). The economic costs of conflict: A production network approach. *CEPR Discussion Papers 16984*.

Deng, M., M. Leippold, A. F. Wagner, and Q. Wang (2022). Stock Prices and the Russia-Ukraine War: Sanctions, Energy and ESG. *Swiss Finance Institute Research Paper No. 22-29*.

Farhi, E. and X. Gabaix (2016). Rare disasters and exchange rates. *The Quarterly Journal of Economics 131*(1), 1–52.

Fuchs-Schündeln, N. and T. Hassan (2016). Natural experiments in macroeconomics. In *The Handbook of Macroeconomics*, Volume 2, pp. 923–1012. Elsevier.

Glick, R. and A. M. Taylor (2010). Collateral damage: Trade disruption and the economic impact of war. *The Review of Economics and Statistics 92*(1), 102–127.

Gourio, F. (2012, May). Disaster risk and business cycles. *American Economic Review 102*(6), 2734–2766.

Guidolin, M. and E. La Ferrara (2007). Diamonds are forever, wars are not: Is conflict bad for private firms? *Economica 97*(5), 1978–1993.

Head, K. and T. Mayer (2014). Chapter 3 - Gravity Equations: Workhorse, Toolkit, and Cookbook. In *Handbook of International Economics*, Volume 4, pp. 131–195. Elsevier.

Huang, L. and F. Lu (2022). The cost of russian sanctions on the global equity markets. *Available at SSRN*.

Korovkin, V. and A. Makarin (2023). Conflict and Intergroup Trade: Evidence from the 2014 Russia-Ukraine Crisis. *American Economic Review 113*(1).

Leigh, A., J. Wolfers, and E. Zitzewitz (2003). What Do Financial Markets Think of War in Iraq? *NBER Working Paper 9587*.

Mueller, H., D. Rohner, and D. Schönholzer (2022, 06). Ethnic Violence Across Space. *The Economic Journal 132*(642), 709–740.

Murdoch, J. C. and T. Sandler (2002). Economic growth, civil wars, and spatial spillovers. *The Journal of Conflict Resolution 46*(1), 91–110.

Murdoch, J. C. and T. Sandler (2004). Civil wars and economic growth: Spatial dispersion. *American Journal of Political Science 48*(1), 138–151.

Nakamura, E. and J. Steinsson (2018). Identification in macroeconomics. *Journal of Economic Perspectives 32*(3), 59–86.

Phillips, B. J. (2015). Civil war, spillover and neighbors' military spending. *Conflict Management and Peace Science 32*(4), 425–442.

Rietz, T. A. (1988). The equity risk premium a solution. *Journal of Monetary Economics 22*(1), 117–131.

Sarkees, M. R. and F. Wayman (2010). *Resort to war: 1816-2007.* Cq Press.

Verdickt, G. (2020). The Effect of War Risk on Managerial and Investor Behavior: Evidence from the Brussels Stock Exchange in the Pre-1914 Era. *The Journal of Economic History 80*(3), 629–669.

Veronesi, P. (2004). The peso problem hypothesis and stock market returns. *Journal of Economic Dynamics and Control 28*(4), 707–725.

Zussman, Asaf, N. Z. and M. Ørregaard Nielsen (2008). Asset market perspectives on the israeli–palestinian conflict. *Economica 75*(297), 84–115.

Online Appendix

A Data Sources and Variable Construction

We retrieve the daily price MSCI indices of all countries available on Thomson Reuters Eikon. Our sample comprises 69 countries from around the world. As we observe significant data anomalies in the MSCI price index of Lebanon, we drop the country from our analyses. We further exclude Ukraine and Russia to focus on the externalities of the war for other countries. Accordingly, our primary analysis comprises 66 countries.[17] We also obtain price levels of the MSCI World, MSCI Russia, and MSCI Ukraine from Thomson Reuters Datastream for our beta estimations. Throughout this section, all price levels are obtained in US dollars.

For our country-level analysis, we estimate the "alphas" and "betas" of all country stock markets in our sample. We use the returns of the MSCI World as a measure of global equity market performance. Considering weekly returns for the year leading up to the start of our event window, we compute the country-specific alpha and beta as the coefficients from a regression of a country's stock market return on the global return and a constant.

To capture trade linkages, we consider a set of variables which we expect to matter for the economic spillover effects of the war. Specifically, we use $ImportsFromRussia_i$ to denote imports from Russia by country i and $ExportsToRussia_i$ to denote exports of country i to Russia. Similarly, the variables $ImportsFromUkraine_i$ and $ExportsToUkraine_i$ denote the imports of country i from Ukraine and the exports of country i to Ukraine, respectively. The import and export variables pertain to 2019 (thus avoiding distortions related to Covid-19) and are all scaled by the country's respective GDP. We obtain the country-level trade statistics from the International Monetary Fund. The data on countries' GDP is provided by the World Bank.[18] A detailed outline of the variables is provided in Section B of this appendix.

Russian and Ukrainian trade restrictions may increase the prices and limit the availability of their top export goods on the global market. Countries with a higher import rate for such goods may therefore be negatively affected even if they do not directly import goods from Russia or Ukraine. To control for these indirect trade spillover effects, we compute each country's total import value, across all trading partners, of the top-10 Russian and Ukrainian export goods as depicted in Table 1, scaled by GDP and denoted $SensitiveCommodities_i$. We calculate each country's aggregate import value accounted for by items on this list. We retrieve data on commodity-specific trade flows from the Harvard University Atlas of Economic Complexity database. As before we use 2019 values and scale by GDP for the same year.

For our firm-level analysis, we retrieve daily pricing data and the headquarters' domicile

[17] See Section B for a detailed overview.

[18] Due to incomplete data coverage, we need to drop Jamaica and Taiwan when including the trade statistics, reducing our sample to 64 countries.

countries and postal codes of all equities available on Thomson Reuters Eikon. We restrict our sample to active, exchange-traded equities. The sample is further restricted to primary quotes with a linked Reuters Instrument Code and major securities as defined by Datastream. The resulting sample comprises 48,403 different firms around the globe. We drop firms with missing postal codes and those we could not match with the Geonames database. We further drop all firms for which we did not obtain valid pricing data on at least 90% of all days as measured by the stock for which we have the most valid day-firm observations. We linearly interpolate the remaining missing values. As the Aerospace & Defense sector likely profits from proximity to Ukraine, we exclude those firms from our analyses. Furthermore, we exclude firms from Ukraine and Russia to only capture the externalities of the war on third-party countries. Moreover, we only include firms in our analysis for which we obtained the market value of equity from Thomson Reuters Eikon on at least one day. Lastly, we drop firms with a market value of equity which is lower than $10 millions as they likely exhibit a deficient liquidity.[19] After applying those filters, our sample size is reduced to 16,929 firms across 54 different countries and 8,954 postal codes. A detailed outline of how many firms are dropped in each step as well as a country-firm overview is provided in Section C of this appendix.

Within our sample there is a total of 1,568 firms headquartered in first- or second-degree neighboring countries of Ukraine. Similarly, a total of 4,414 firms in our sample is located in Europe.[20]

The betas included in the firm-level regression are estimated on weekly-aggregated observations within the year preceding the event-window. The MSCI World was used as a proxy for the global equity return and we assumed a flat risk-free interest rate of 0%. The MSCI Ukraine and MSCI Russia were used to account for the firms' sensitivity to the respective countries' economies. Summarizing, for each firm separately, we estimated their respective alphas and betas using the following ordinary least squares regression:

$$\begin{aligned} LogRet_{n,t} = \alpha_n + \hat{\beta}_{n,world} * MSCILogRet_{t,world} + \hat{\beta}_{n,russia} * MSCILogRet_{t,russia} \\ + \hat{\beta}_{n,ukraine} * MSCILogRet_{t,ukraine} + \varepsilon_{n,t} \,, \end{aligned} \tag{3}$$

where $LogRet_{t,n}$ denotes the log return of firm n on day t and $MSCILogRet_{t,world}$, $MSCILogRet_{t,russia}$, and $MSCILogRet_{t,ukraine}$ denote the log returns of the MSCI World, MSCI Russia, and MSCI Ukraine on day t, respectively. The resulting coefficients of the regression resemble our firm-level control alphas and betas.

We obtain both the currency spot returns and the data on FX risk reversals (the difference between out-of-the-money call and put option premia) from Bloomberg Finance L.P.

For the purpose of external validation, we retrieve the most recent Geopolitical Risk Index

[19] Throughout our analyses we consistently used the first non-missing market value of equity of firm n provided by Thomson Reuters Eikon within our sample period.

[20] We classified the firms' countries as European according to the United Nations geoscheme for Europe.

(GPRC) from Caldara and Iacoviello (2022). The GPRC measures country-specific geopolitical risk as of March 1, 2022, using an automated textual analysis of newspaper articles. It is updated on a monthly basis and available for 39 countries in our analysis.

Regarding the country-level support of Ukraine, we use the Ukraine Support Tracker compiled by Antezza et al. (2022). Specifically, our analysis relies on the latest version of the database which was updated on May 02, 2022.

Lastly, we obtain daily market prices for all active equities operating in the Aerospace and Defense sector from Thomson Reuters Datastream. In total, we retrieved data for 650 Aerospace and Defense equities across 29 different countries. After dropping all stocks for which we did not obtain complete data on market prices and the respective company's domicile country for 2020-22, we are left with 480 equities.

B Country Level Analysis

Table B1: Geoprahical and Geopolitical Properties of Sample Countries

	Distance from Ukraine (in km)	First-Degree Neighbor	Second-Degree Neighbor	EU Member	GPRC
Argentina	11,272	No	No	No	0.06
Australia	10,723	No	No	No	0.39
Austria	390	No	Yes	Yes	-
Bahrain	2,496	No	No	No	-
Bangladesh	4,925	No	No	No	-
Belgium	1,175	No	No	Yes	0.78
Bosnia and Herzegovina	464	No	No	No	-
Botswana	6,979	No	No	No	-
Brazil	8,161	No	No	No	0.08
Bulgaria	184	No	Yes	Yes	-
Canada	5,155	No	No	No	1.14
Chile	11,715	No	No	No	0.03
China	3,034	No	No	No	2.05
Colombia	9,360	No	No	No	0.03
Croatia	409	No	Yes	Yes	-
Czech Republic	277	No	Yes	Yes	-
Denmark	881	No	No	Yes	0.13
Estonia	669	No	Yes	Yes	-
Finland	909	No	Yes	Yes	0.23
France	1,045	No	No	Yes	1.90
Germany	589	No	Yes	Yes	2.40
Ghana	4,646	No	No	No	-
Hong Kong	7,045	No	No	No	0.14
Hungary	24	Yes	No	Yes	-
India	3,233	No	No	No	0.42
Indonesia	7,025	No	No	No	0.09

Ireland	2,032	No	No	Yes	-
Israel	1,249	No	No	No	0.65
Italy	704	No	No	Yes	0.67
Jamaica	9,122	No	No	No	-
Japan	7,086	No	No	No	0.61
Jordan	1,321	No	No	No	-
Kazakhstan	527	No	No	No	-
Kenya	4,568	No	No	No	-
Lithuania	266	No	Yes	Yes	-
Malaysia	7,316	No	No	No	0.04
Mauritius	7,551	No	No	No	-
Mexico	9,507	No	No	No	0.13
Morocco	2,494	No	No	No	-
Netherlands	1,151	No	No	Yes	0.33
New Zealand	15,960	No	No	No	-
Nigeria	3,983	No	No	No	-
Norway	1,154	No	Yes	No	0.40
Pakistan	2,955	No	No	No	-
Peru	10,505	No	No	No	0.06
Philippines	7,759	No	No	No	0.03
Poland	27	Yes	No	Yes	-
Portugal	2,352	No	No	Yes	0.04
Romania	3	Yes	No	Yes	-
Russia	14	Yes	No	No	7.84
Serbia	303	No	Yes	No	-
Singapore	8,012	No	No	No	-
Slovenia	474	No	Yes	Yes	-
South Africa	7,436	No	No	No	0.10
South Korea	6,751	No	No	No	0.60
Spain	1,631	No	No	Yes	0.24
Sri Lanka	5,692	No	No	No	-
Sweden	753	No	No	Yes	0.24
Switzerland	941	No	No	No	0.15
Taiwan	7,162	No	No	No	0.32
Thailand	6,086	No	No	No	0.04
Trinidad and Tobago	8,560	No	No	No	-
Tunisia	1,572	No	No	No	-
Turkey	279	No	No	No	0.83
Ukraine	0	No	No	No	7.74
United Kingdom	1,506	No	No	No	3.72
United States	6,245	No	No	No	6.43
Vietnam	6,244	No	No	No	-
N	68				

Notes: Table provides an overview of the properties of the countries included in our country-level analysis.

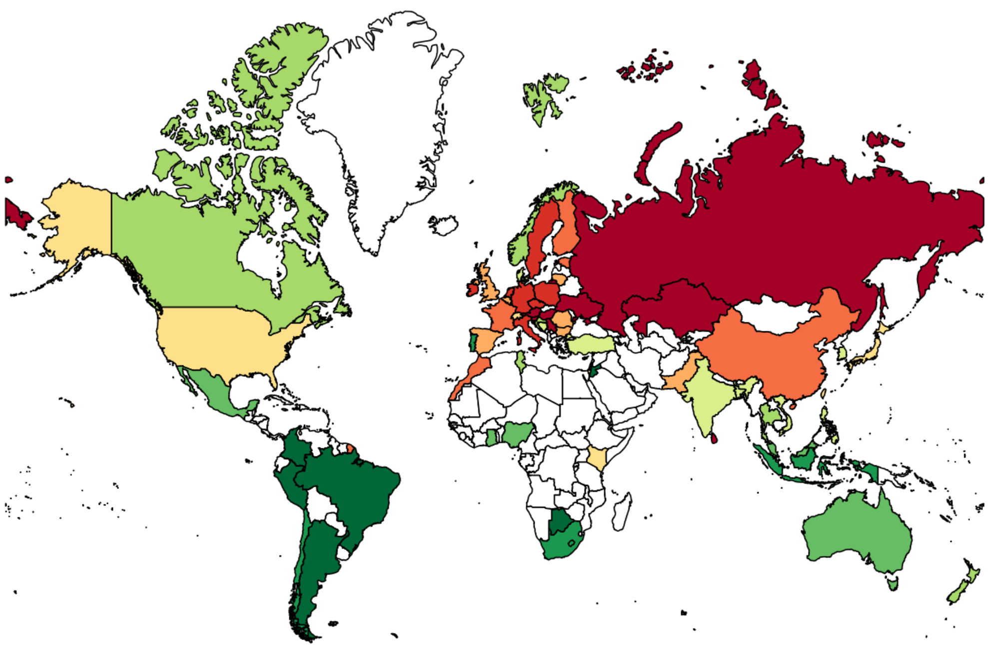
Table B2: Trade Statistics of Sample Countries (Scaled by GDP)

	$ExportsToRussia_i$	$ImportsFromRussia_i$	$ExportsToUkraine_i$	$ImportsFromUkraine_i$	$SensitiveCommodities_i$
Argentina	0.18%	0.07%	0.01%	0.00%	1.36%
Australia	0.05%	0.01%	0.01%	0.00%	2.10%
Austria	0.59%	0.79%	0.15%	0.13%	3.39%
Bahrain	0.03%	0.09%	0.00%	0.03%	4.83%
Bangladesh	0.32%	0.37%	0.03%	0.15%	3.18%
Belgium	0.45%	1.26%	0.10%	0.13%	6.77%
Bosnia and Herzegovina	0.49%	0.19%	0.07%	0.10%	5.45%
Botswana	0.05%	0.15%	0.01%	0.01%	5.54%
Brazil	0.11%	0.13%	0.01%	0.00%	1.33%
Bulgaria	0.84%	3.93%	0.67%	0.70%	7.01%
Canada	0.05%	0.05%	0.01%	0.00%	2.46%
Chile	0.33%	0.03%	0.02%	0.00%	4.24%
China	0.38%	0.38%	0.06%	0.03%	3.02%
Colombia	0.04%	0.05%	0.03%	0.01%	2.11%
Croatia	0.31%	2.39%	0.08%	0.06%	6.66%
Czech Republic	1.46%	1.87%	0.46%	0.36%	4.61%
Denmark	0.34%	0.92%	0.08%	0.07%	2.29%
Estonia	1.56%	7.88%	0.47%	0.45%	5.92%
Finland	1.30%	3.74%	0.10%	0.02%	3.70%
France	0.31%	0.24%	0.06%	0.02%	2.47%
Germany	0.65%	0.72%	0.15%	0.06%	3.38%
Ghana	0.13%	0.18%	0.29%	0.12%	1.32%
Hong Kong	0.13%	0.22%	0.02%	0.02%	10.14%
Hungary	1.39%	2.45%	0.76%	0.96%	5.87%
India	0.14%	0.25%	0.03%	0.07%	5.47%
Indonesia	0.15%	0.07%	0.03%	0.07%	2.57%
Ireland	0.40%	0.11%	0.04%	0.04%	1.60%
Israel	0.21%	0.36%	0.05%	0.16%	2.82%
Italy	0.54%	0.71%	0.10%	0.12%	3.54%
Jamaica	0.56%	0.01%	-	-	9.05%
Japan	0.17%	0.22%	0.02%	0.00%	2.94%
Jordan	0.06%	0.82%	0.04%	0.38%	8.53%
Kazakhstan	2.94%	7.53%	0.25%	0.20%	1.23%
Kenya	0.09%	0.16%	0.01%	0.07%	3.84%
Lithuania	1.05%	6.37%	2.09%	0.75%	8.10%
Malaysia	0.48%	0.31%	0.06%	0.05%	9.84%
Mauritius	0.07%	0.01%	0.01%	0.01%	6.88%
Mexico	0.09%	0.12%	0.01%	0.01%	4.05%
Morocco	0.42%	0.64%	0.08%	0.25%	7.15%
Netherlands	0.44%	4.93%	0.08%	0.20%	10.50%
New Zealand	0.10%	0.09%	0.01%	0.00%	1.92%

Nigeria	0.01%	0.08%	0.00%	0.04%	2.05%
Norway	0.12%	0.70%	0.07%	0.01%	1.73%
Pakistan	0.13%	0.06%	0.03%	0.02%	4.68%
Peru	0.12%	0.12%	0.01%	0.01%	3.14%
Philippines	0.11%	0.18%	0.01%	0.05%	4.73%
Poland	0.85%	2.07%	0.69%	0.55%	3.98%
Portugal	0.23%	0.30%	0.03%	0.12%	4.28%
Romania	0.58%	1.28%	0.26%	0.40%	3.57%
Russia	-	-	0.41%	0.19%	0.32%
Serbia	2.03%	2.96%	0.34%	0.50%	5.08%
Singapore	0.16%	0.61%	0.01%	0.05%	21.06%
Slovenia	1.89%	0.90%	0.45%	0.07%	7.50%
South Africa	0.21%	0.07%	0.02%	0.01%	3.55%
South Korea	0.48%	0.99%	0.02%	0.02%	7.34%
Spain	0.24%	0.18%	0.06%	0.11%	3.97%
Sri Lanka	0.34%	0.13%	0.05%	0.07%	4.56%
Sweden	0.42%	0.44%	0.09%	0.01%	3.14%
Switzerland	0.39%	0.53%	0.22%	0.02%	8.69%
Taiwan	-	-	-	-	-
Thailand	0.32%	0.11%	0.04%	0.06%	7.21%
Trinidad and Tobago	0.00%	0.18%	0.02%	0.00%	5.60%
Tunisia	0.34%	1.23%	0.05%	0.87%	12.47%
Turkey	0.65%	2.78%	0.31%	0.34%	4.85%
Ukraine	3.12%	4.78%	-	-	6.89%
United Kingdom	0.14%	0.46%	0.03%	0.02%	4.68%
United States	0.06%	0.06%	0.01%	0.00%	1.11%
Vietnam	1.44%	0.43%	0.16%	0.04%	8.46%
N	68				

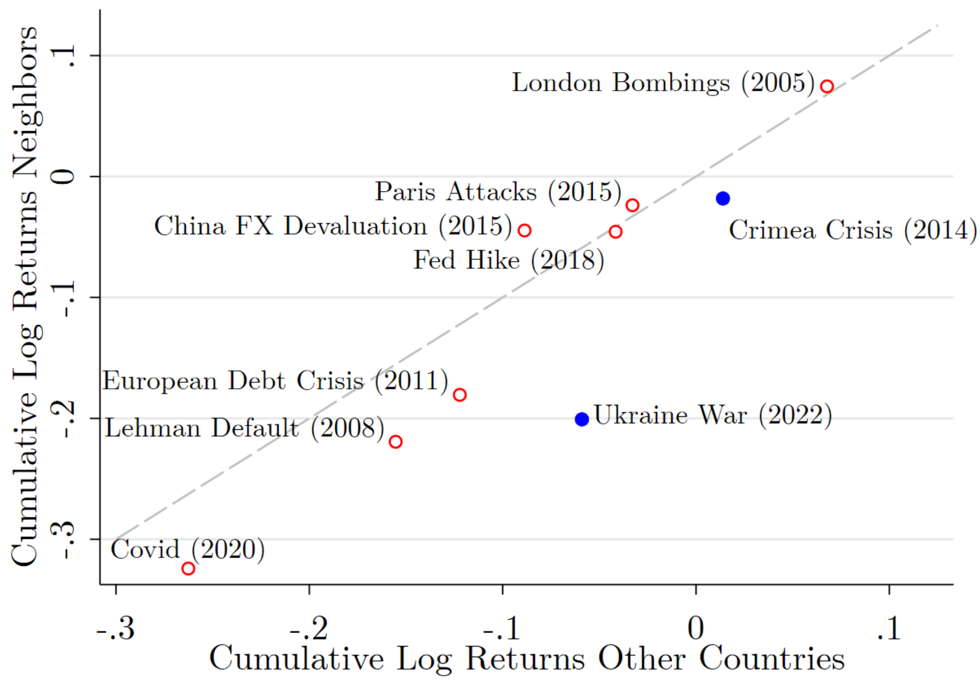
Notes: Table provides an overview of countries' trade relationships with Russia and Ukraine as well as their dependence on commodities which rank among the top-10 import and export goods from Russia or Ukraine, respectively. All variables are scaled by the countries' GDP.

Figure B1: Geographic Variation of Stock Market Returns



Notes: Map illustrates geographical distribution of cumulative log returns, measured in 4-week event window around February 24, 2022. Dark green (red) countries exhibited the highest (lowest) returns within period. Countries for which we did not obtain any data are white.

Figure B2: Stock Market Returns Around Major Events



Notes: "Neighbors" is unweighted average of 15 European first- and second-degree neighbors of Ukraine; "Other Countries" is average of remaining 51 countries in our sample. Russia and Ukraine are excluded from both groups. Returns are computed based on Morgan Stanley Capital International (MSCI) country indices. Figure measures cumulative log returns over four weeks around major geopolitical or financial events for Neighbors (vertical axis) and Other Countries (horizontal axis).

Table B3: Synthetic Control Weights

Country	Weight	Country	Weight
Argentina	0.038	Malaysia	0.000
Australia	0.000	Mauritius	0.000
Bahrain	0.000	Mexico	0.090
Bangladesh	0.000	Morocco	0.059
Belgium	0.000	Netherlands	0.000
Bosnia and Herzegovina	0.000	New Zealand	0.046
Botswana	0.000	Nigeria	0.000
Brazil	0.000	Pakistan	0.000
Canada	0.000	Peru	0.000
Chile	0.000	Philippines	0.000
China	0.000	Portugal	0.000
Colombia	0.000	Singapore	0.185
Denmark	0.000	South Africa	0.016
France	0.000	South Korea	0.000
Ghana	0.000	Spain	0.000
Hong Kong	0.000	Sri Lanka	0.000
India	0.124	Sweden	0.000
Indonesia	0.000	Switzerland	0.000
Ireland	0.018	Taiwan	0.000
Israel	0.000	Thailand	0.000
Italy	0.121	Trinidad and Tobago	0.000
Jamaica	0.000	Tunisia	0.000
Japan	0.000	Turkey	0.000
Jordan	0.000	United Kingdom	0.293
Kazakhstan	0.000	United States	0.000
Kenya	0.008	Vietnam	0.000
N	52		

Notes: Table depicts country weights within synthetic control group.

Table B4: Country-Level Responses to the Ukraine War (Disaggregated Commodities)

	(1) $CumRet_i^\tau$	(2) $CumRet_i^\tau$	(3) $CumRet_i^\tau$	(4) $CumRet_i^\tau$
$DistanceUkraine_i$	0.0257	0.0248	0.0250	0.0205
	(0.00458)	(0.00508)	(0.00531)	(0.00587)
	{0.000}	{0.000}	{0.000}	{0.001}
Historical Alpha	8.213	8.716	4.956	-4.603
	(34.88)	(36.70)	(37.02)	(39.61)
	{0.815}	{0.813}	{0.894}	{0.908}
Historical Beta	-0.0565	-0.0587	-0.00217	-0.00217
	(0.0558)	(0.0595)	(0.0727)	(0.0744)
	{0.314}	{0.328}	{0.976}	{0.977}
Coal, Coke and Briquettes		-0.0167	-0.0245	-0.00908
		(0.0132)	(0.0134)	(0.0206)
		{0.212}	{0.073}	{0.662}
Fertilizers		0.00815	0.0197	0.0300
		(0.0301)	(0.0316)	(0.0269)
		{0.788}	{0.535}	{0.271}
Cork and Wood		-0.0146	-0.0352	-0.0281
		(0.0356)	(0.0358)	(0.0359)
		{0.684}	{0.331}	{0.436}
Fixed Vegetable Fats and Oils			0.0111	0.00383
			(0.0171)	(0.0177)
			{0.517}	{0.830}
Cereals and Cereal Preparations			0.0429	0.0672
			(0.0185)	(0.0217)
			{0.024}	{0.003}
Petroleum, petroleum products...				0.0179
				(0.0280)
				{0.526}
Gas, natural and manufactured				-0.0253
				(0.0232)
				{0.281}
Iron and Steel				-0.0219
				(0.0344)
				{0.526}
Nonferrous Metals				-0.00803
				(0.0362)
				{0.825}
Inorganic Chemicals				-0.0206
				(0.0226)
				{0.366}
Constant	-0.196	-0.190	-0.226	-0.209
	(0.0450)	(0.0459)	(0.0529)	(0.0569)
	{0.000}	{0.000}	{0.000}	{0.001}
Adj. R^2	0.33	0.31	0.34	0.34
N	66	65	65	65

Notes: Table presents country-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) with disaggregated controls for commodity dependencies. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets. The event window is $\tau = [-14, 14]$.

Table B5: Country-Level Responses to the Ukraine War (With Affiliation Dummies)

	(1)	(2)	(3)	(4)
	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$
$NATO_i$	-0.105	-0.0899	0.0190	0.0593
	(0.0402)	(0.0428)	(0.0476)	(0.0538)
	{0.011}	{0.039}	{0.691}	{0.276}
$Soviet_i$		-0.219	-0.159	-0.0693
		(0.143)	(0.114)	(0.145)
		{0.132}	{0.166}	{0.636}
$DistanceUkraine_i$			0.0257	0.0138
			(0.00603)	(0.00488)
			{0.000}	{0.007}
Historical Alpha				35.86
				(28.16)
				{0.209}
Historical Beta				-0.0139
				(0.0594)
				{0.816}
$z(ImportsFromRussia_i)$				-0.00229
				(0.0702)
				{0.974}
$z(ExportsToRussia_i)$				-0.0742
				(0.0435)
				{0.094}
$z(ImportsFromUkraine_i)$				-0.0104
				(0.0323)
				{0.748}
$z(ExportsToUkraine_i)$				0.00684
				(0.0195)
				{0.727}
$z(SensitiveCommodities_i)$				0.00986
				(0.0278)
				{0.725}
EU_i				-0.102
				(0.0516)
				{0.053}
$EU_i * z(ImportsFromRussia_i)$				0.0484
				(0.0676)
				{0.477}
$EU_i * z(ExportsToRussia_i)$				-0.0405
				(0.0493)
				{0.415}
Constant	-0.0881	-0.0831	-0.228	-0.156
	(0.0268)	(0.0246)	(0.0448)	(0.0441)
	{0.002}	{0.001}	{0.000}	{0.001}
Adj. R^2	0.07	0.13	0.34	0.52
N	66	66	66	64

Notes: Table presents country-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) with additional controls for NATO and former Soviet Union membership. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets. The event window is $\tau = [-14, 14]$.

Table B6: Country-Level Responses to the Ukraine War (Non-Linear)

	(1) $CumRet_i^{\tau}$	(2) $CumRet_i^{\tau}$	(3) $CumRet_i^{\tau}$	(4) $CumRet_i^{\tau}$	(5) $CumRet_i^{\tau}$
$DistanceUkraine_i$	0.0474	0.0424	0.0187	0.0175	0.00187
	(0.0119)	(0.0120)	(0.0142)	(0.0136)	(0.0151)
	{0.000}	{0.001}	{0.191}	{0.204}	{0.902}
$DistanceUkraine_i^2$	-0.00189	-0.00149	-0.000140	-0.0000493	0.000730
	(0.000802)	(0.000820)	(0.000990)	(0.000966)	(0.00110)
	{0.022}	{0.074}	{0.888}	{0.959}	{0.509}
Historical Alpha		4.911	31.68	30.54	36.41
		(34.57)	(28.53)	(28.48)	(29.01)
		{0.887}	{0.272}	{0.288}	{0.215}
Historical Beta		-0.0397	-0.0318	-0.0266	-0.00648
		(0.0571)	(0.0504)	(0.0545)	(0.0550)
		{0.489}	{0.531}	{0.628}	{0.907}
$z(ImportsFromRussia_i)$			0.0312	0.0282	-0.0172
			(0.0243)	(0.0243)	(0.0611)
			{0.204}	{0.251}	{0.780}
$z(ExportsToRussia_i)$			-0.105	-0.106	-0.0813
			(0.0225)	(0.0215)	(0.0433)
			{0.000}	{0.000}	{0.066}
$z(ImportsFromUkraine_i)$			-0.00235	-0.00576	-0.00821
			(0.0295)	(0.0296)	(0.0284)
			{0.937}	{0.846}	{0.774}
$z(ExportsToUkraine_i)$			-0.00196	-0.00103	0.00441
			(0.0130)	(0.0125)	(0.0139)
			{0.881}	{0.935}	{0.751}
$z(SensitiveCommodities_i)$				0.0107	0.0106
				(0.0250)	(0.0270)
				{0.671}	{0.696}
EU_i					-0.0805
					(0.0468)
					{0.092}
$EU_i * z(ImportsFromRussia_i)$					0.0536
					(0.0698)
					{0.446}
$EU_i * z(ExportsToRussia_i)$					-0.0359
					(0.0515)
					{0.489}
Constant	-0.259	-0.228	-0.175	-0.176	-0.126
	(0.0347)	(0.0524)	(0.0473)	(0.0479)	(0.0515)
	{0.000}	{0.000}	{0.001}	{0.001}	{0.018}
Adj. R^2	0.34	0.33	0.52	0.51	0.52
N	66	66	64	64	64

Notes: Table presents country-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^{\tau}$) to distance from Ukraine ($DistanceUkraine_i$) and a corresponding higher-order term to capture non-linear effects. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets. The event window is $\tau = [-14, 14]$. With very high variance inflation factors in Columns (3) - (5), the models suffer from substantial multicollinearity.

Table B7: Country-Level Responses with Event Window Variations (Baseline)

	$\tau=[-1,7]$	$\tau=[-7,7]$	$\tau=[-1,14]$	$\tau=[-1,28]$	$\tau=[-28,28]$
	(1)	(2)	(3)	(4)	(5)
	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$
$DistanceUkraine_i$	0.0155	0.0208	0.0169	0.0147	0.0236
	(0.00337)	(0.00412)	(0.00317)	(0.00379)	(0.00531)
	{0.000}	{0.000}	{0.000}	{0.000}	{0.000}
Constant	-0.123	-0.180	-0.154	-0.101	-0.156
	(0.0239)	(0.0295)	(0.0219)	(0.0238)	(0.0283)
	{0.000}	{0.000}	{0.000}	{0.000}	{0.000}
Adj. R^2	0.24	0.27	0.26	0.15	0.22
N	66	66	66	66	66

Notes: Table presents country-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) replicating Column (1) of Table 2 for different event window specifications. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets.

Table B8: Country-Level Responses with Event Window Variations (Expanded)

	$\tau = [-1, 7]$	$\tau = [-7, 7]$	$\tau = [-1, 14]$	$\tau = [-1, 28]$	$\tau = [-28, 28]$
	(1)	(2)	(3)	(4)	(5)
	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$
$DistanceUkraine_i$	0.00246	0.00393	0.00674	0.00714	0.0139
	(0.00445)	(0.00498)	(0.00353)	(0.00532)	(0.00616)
	{0.584}	{0.433}	{0.062}	{0.185}	{0.029}
Historical Alpha	-25.26	-11.15	6.681	12.85	52.06
	(18.53)	(27.66)	(15.35)	(20.33)	(28.15)
	{0.179}	{0.689}	{0.665}	{0.530}	{0.070}
Historical Beta	-0.00134	-0.00226	0.0211	0.0914	0.118
	(0.0206)	(0.0289)	(0.0376)	(0.0578)	(0.0816)
	{0.948}	{0.938}	{0.577}	{0.120}	{0.154}
$z(ImportsFromRussia_i)$	-0.0547	-0.0636	-0.0103	0.00209	-0.0105
	(0.0558)	(0.0706)	(0.0499)	(0.0540)	(0.0610)
	{0.332}	{0.372}	{0.837}	{0.969}	{0.864}
$z(ExportsToRussia_i)$	-0.0495	-0.0628	-0.0649	-0.0897	-0.0970
	(0.0369)	(0.0471)	(0.0378)	(0.0409)	(0.0466)
	{0.186}	{0.188}	{0.092}	{0.033}	{0.042}
$z(ImportsFromUkraine_i)$	-0.00723	-0.0108	0.000965	0.00125	0.00776
	(0.0215)	(0.0284)	(0.0172)	(0.0187)	(0.0249)
	{0.738}	{0.706}	{0.955}	{0.947}	{0.757}
$z(ExportsToUkraine_i)$	-0.00220	0.00716	-0.00750	-0.00986	-0.00196
	(0.00769)	(0.0102)	(0.00984)	(0.00911)	(0.0135)
	{0.776}	{0.485}	{0.450}	{0.284}	{0.885}
$z(SensitiveCommodities_i)$	0.00415	0.00974	0.00449	0.00849	0.0113
	(0.0164)	(0.0209)	(0.0191)	(0.0176)	(0.0222)
	{0.801}	{0.642}	{0.815}	{0.632}	{0.614}
EU_i	-0.0303	-0.0606	-0.0303	-0.0178	-0.0620
	(0.0335)	(0.0394)	(0.0367)	(0.0386)	(0.0430)
	{0.369}	{0.130}	{0.413}	{0.647}	{0.155}
$EU_i * z(ImportsFromRussia_i)$	0.0808	0.0929	0.0414	0.0196	0.0337
	(0.0584)	(0.0741)	(0.0553)	(0.0581)	(0.0702)
	{0.172}	{0.216}	{0.458}	{0.737}	{0.634}
$EU_i * z(ExportsToRussia_i)$	-0.0000818	-0.0150	-0.0130	0.0455	0.0265
	(0.0451)	(0.0576)	(0.0431)	(0.0468)	(0.0585)
	{0.999}	{0.796}	{0.765}	{0.336}	{0.652}
Constant	-0.0738	-0.105	-0.118	-0.122	-0.165
	(0.0281)	(0.0327)	(0.0289)	(0.0437)	(0.0587)
	{0.011}	{0.002}	{0.000}	{0.007}	{0.007}
Adj. R^2	0.58	0.57	0.47	0.34	0.35
N	64	64	64	64	64

Notes: Table presents country-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) and controls replicating Column (5) of Table 2 for different event window specifications. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets.

Table B9: Country-Level Responses with Gravity Distance

	(1)	(2)	(3)	(4)	(5)
	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$
$DistanceUkraine_i^{Economic}$	66.67	63.74	32.37	30.94	18.30
	(22.07)	(29.64)	(30.07)	(30.87)	(27.88)
	{0.004}	{0.036}	{0.286}	{0.321}	{0.515}
Historical Alpha		-39.12	7.817	7.077	21.93
		(36.26)	(31.73)	(31.78)	(30.47)
		{0.285}	{0.806}	{0.825}	{0.475}
Historical Beta		-0.0685	-0.0437	-0.0377	0.0116
		(0.0669)	(0.0571)	(0.0601)	(0.0607)
		{0.310}	{0.447}	{0.533}	{0.850}
$z(ImportsFromRussia_i)$			0.0242	0.0213	-0.0474
			(0.0258)	(0.0264)	(0.0584)
			{0.351}	{0.423}	{0.421}
$z(ExportsToRussia_i)$			-0.112	-0.112	-0.0702
			(0.0225)	(0.0220)	(0.0418)
			{0.000}	{0.000}	{0.099}
$z(ImportsFromUkraine_i)$			-0.0231	-0.0260	-0.0119
			(0.0257)	(0.0261)	(0.0261)
			{0.374}	{0.324}	{0.651}
$z(ExportsToUkraine_i)$			-0.00238	-0.00135	0.00258
			(0.0143)	(0.0138)	(0.0134)
			{0.868}	{0.923}	{0.848}
$z(SensitiveCommodities_i)$				0.0104	0.00610
				(0.0230)	(0.0244)
				{0.654}	{0.804}
EU_i					-0.114
					(0.0415)
					{0.008}
$EU_i * z(ImportsFromRussia_i)$					0.0860
					(0.0646)
					{0.189}
$EU_i * z(ExportsToRussia_i)$					-0.0369
					(0.0487)
					{0.452}
Constant	-0.142	-0.103	-0.104	-0.107	-0.107
	(0.0224)	(0.0446)	(0.0375)	(0.0385)	(0.0409)
	{0.000}	{0.025}	{0.008}	{0.007}	{0.012}
Adj. R^2	0.07	0.08	0.44	0.43	0.49
N	65	65	64	64	64

Notes: Table presents country-level estimations of equation (1) but relates cumulative returns around war onset ($CumRet_i^\tau$) to a gravity distance measurement from Ukraine instead of to the geographical distance. The gravity distance is calculated as $\frac{DistanceUkraine_i}{GDP_{Ukraine} * GDP_i}$. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets. The event window is $\tau = [-14, 14]$.

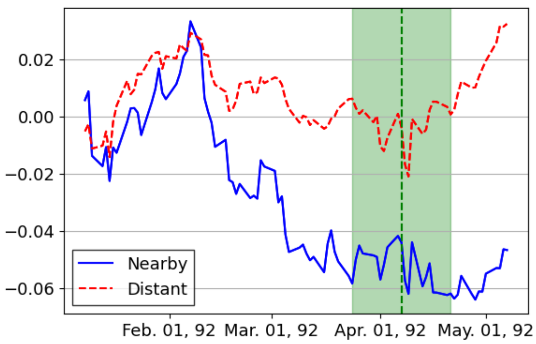
Table B10: Country-Level Responses with Gravity and Geographical Distance

	(1)	(2)	(3)	(4)	(5)
	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$
$DistanceUkraine_i$	0.0249	0.0248	0.0169	0.0169	0.0115
	(0.00496)	(0.00462)	(0.00469)	(0.00479)	(0.00518)
	{0.000}	{0.000}	{0.001}	{0.001}	{0.032}
$DistanceUkraine_i^{Economic}$	23.66	13.44	2.457	0.936	2.117
	(20.98)	(21.02)	(25.72)	(27.49)	(28.47)
	{0.264}	{0.525}	{0.924}	{0.973}	{0.941}
Historical Alpha		4.099	31.00	30.26	33.72
		(33.32)	(30.41)	(30.35)	(30.82)
		{0.902}	{0.313}	{0.323}	{0.279}
Historical Beta		-0.0510	-0.0334	-0.0271	-0.000496
		(0.0586)	(0.0511)	(0.0550)	(0.0560)
		{0.387}	{0.516}	{0.624}	{0.993}
$z(ImportsFromRussia_i)$			0.0312	0.0282	-0.0152
			(0.0240)	(0.0239)	(0.0638)
			{0.198}	{0.244}	{0.813}
$z(ExportsToRussia_i)$			-0.105	-0.106	-0.0802
			(0.0215)	(0.0207)	(0.0452)
			{0.000}	{0.000}	{0.082}
$z(ImportsFromUkraine_i)$			-0.00303	-0.00602	-0.00404
			(0.0289)	(0.0291)	(0.0282)
			{0.917}	{0.837}	{0.887}
$z(ExportsToUkraine_i)$			-0.00216	-0.00109	0.00397
			(0.0131)	(0.0126)	(0.0142)
			{0.870}	{0.931}	{0.781}
$z(SensitiveCommodities_i)$				0.0107	0.00892
				(0.0256)	(0.0283)
				{0.677}	{0.754}
EU_i					-0.0709
					(0.0448)
					{0.120}
$EU_i * z(ImportsFromRussia_i)$					0.0507
					(0.0733)
					{0.492}
$EU_i * z(ExportsToRussia_i)$					-0.0334
					(0.0522)
					{0.526}
Constant	-0.231	-0.199	-0.171	-0.175	-0.150
	(0.0298)	(0.0465)	(0.0400)	(0.0415)	(0.0435)
	{0.000}	{0.000}	{0.000}	{0.000}	{0.001}
Adj. R^2	0.32	0.32	0.52	0.51	0.51
N	65	65	64	64	64

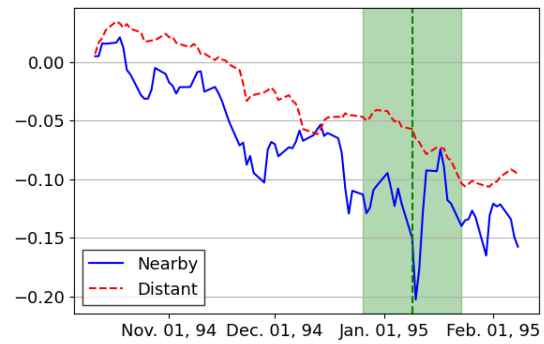
Notes: Table presents country-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) and a corresponding gravity distance measure. The gravity distance is calculated as $\frac{DistanceUkraine_i}{GDP_{Ukraine} * GDP_i}$. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets. The event window is $\tau = [-14, 14]$.

Figure B3: Proximity Penalty in Other Wars

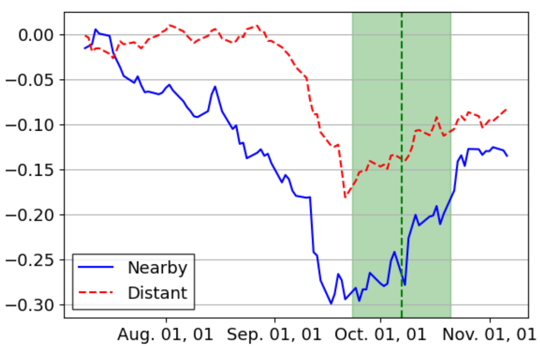
(a) Bosnian Independence



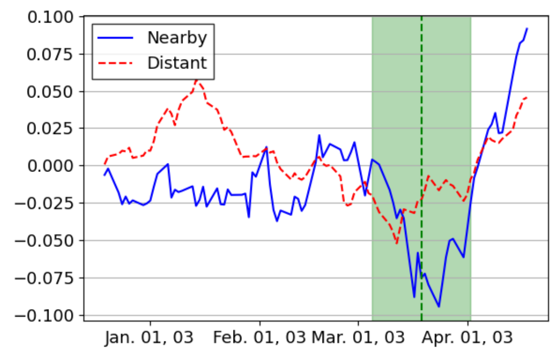
(b) Cenepa Valley



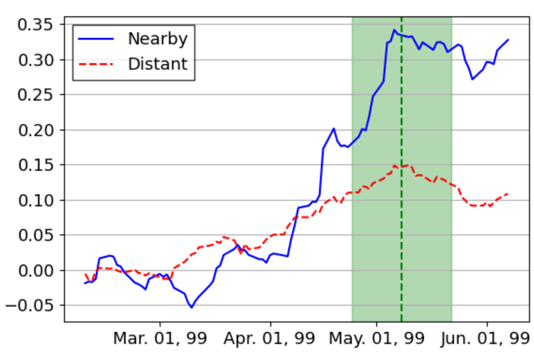
(c) Invasion of Afghanistan



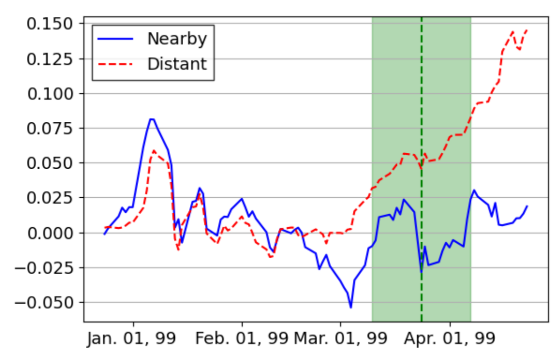
(d) Invasion of Iraq



(e) Kargil War



(f) War for Kosovo



Notes: Figure shows cumulative returns of "Nearby" and "Distant" countries around all wars for which we have daily MSCI coverage of at least three "Nearby" countries. "Nearby" refers to countries located within a 1,000km radius of the war site of the respective wars. "Distant" refers to all other countries.

C Firm-Level Analysis

Table C1: Firm-Level Responses to the Ukraine War (With Higher-Order Distance Term)

	(1)	(2)	(3)
	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$
$DistanceUkraine_i$	0.0279	-0.00558	-0.00680
	(0.000908)	(0.00802)	(0.00845)
	{0.000}	{0.487}	{0.421}
$DistanceUkraine_i^2$	-0.00136	0.000508	0.000566
	(0.0000682)	(0.000417)	(0.000437)
	{0.000}	{0.223}	{0.195}
$DistanceUkraine_i \times Neighbor_i$			-0.0332
			(0.0685)
			{0.627}
$DistanceUkraine_i^2 \times Neighbor_i$			0.0482
			(0.0367)
			{0.189}
Constant	-0.281	-0.0459	-0.0457
	(0.0240)	(0.0606)	(0.0630)
	{0.000}	{0.449}	{0.468}
Country FE	No	Yes	Yes
Industry FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Adj. R^2	0.17	0.19	0.20
N	16,929	16,929	16,929

Notes: Table presents firm-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) and a corresponding higher-order term to capture non-linear effects. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets. The event window is $\tau = [-14, 14]$.

Table C2: Firm Sample Selection

Total Firms	48,403
./ Firms with missing postal codes	9,222
./ Firms with postal codes we could not match with GeoNames	14,425
./ Firms with too many missing prices	6,075
./ Firms without data on market value of equity	10
./ Firms with market value of equity smaller than $10m	1,484
./ Firms in aerospace & defense sector	100
./ Firms from Russia or Ukraine	158
Final sample global	16,929
Final sample Europe	4,414
Final sample first-/second-degree neighboring countries of Ukraine	1,568

Notes: Table outlines the initial firm sample obtained from Thomson Reuters Datastream and the number of firms dropped in each step of the sample selection.

Table C3: Country-Firm Overview

	Average HQ Distance from Ukraine (in km)	Total Firms
Argentina	12,158	8
Australia	13,210	1,065
Austria	501	47
Bangladesh	5,192	131
Belgium	1,311	101
Bermuda	7,158	44
Brazil	10,128	6
Canada	7,602	1,171
Chile	12,915	14
Croatia	602	8
Cyprus	1,104	11
Czech Republic	429	2
Denmark	923	132
Faeroe Islands	2,155	2
Finland	1,178	38
France	1,456	366
Germany	927	899
Hungary	265	22
Iceland	2,946	18
India	4,470	1,619
Ireland	2,037	31
Isle of Man	1,902	15
Italy	1,002	244
Japan	7,615	3,398
Latvia	559	5
Liechtenstein	957	3
Lithuania	315	1
Luxembourg	1,176	6
Macedonia	672	2
Malaysia	7,724	700
Malta	1,522	11
Mexico	10,236	76
Monaco	1,253	6
Netherlands	1,270	98
New Zealand	16,223	102
Norway	1,306	205
Pakistan	3,458	142
Philippines	8,204	124
Poland	284	316
Portugal	2,654	21
Romania	153	16
Serbia	413	1
Singapore	8,009	172
Slovenia	650	8
South Africa	8,178	147
South Korea	6,823	1,260

Spain	2,212	95
Sweden	938	534
Switzerland	1,062	216
Thailand	6,721	564
Turkey	531	284
United Kingdom	1,674	945
United States	8,204	1,476
Uruguay	12,072	1
Observations	54	

Notes: Table provides an overview of firms' origins and their average headquarters' distance from Ukraine.

Table C4: Firm-Level Responses With Event Window Variations (Without Country FE)

	$\tau = [-1, 7]$ (1) $CumRet_i^\tau$	$\tau = [-7, 7]$ (2) $CumRet_i^\tau$	$\tau = [-1, 14]$ (3) $CumRet_i^\tau$	$\tau = [-1, 28]$ (4) $CumRet_i^\tau$	$\tau = [-28, 28]$ (5) $CumRet_i^\tau$
$DistanceUkraine_i$	0.00813	0.0104	0.00799	0.00539	0.00714
	(0.000262)	(0.000300)	(0.000305)	(0.000366)	(0.000465)
	{0.000}	{0.000}	{0.000}	{0.000}	{0.000}
Constant	-0.145	-0.190	-0.193	-0.0187	-0.0137
	(0.0135)	(0.0161)	(0.0174)	(0.138)	(0.134)
	{0.000}	{0.000}	{0.000}	{0.892}	{0.919}
Country FE	No	No	No	No	No
Industry FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.15	0.15	0.14	0.10	0.14
N	16,929	16,929	16,929	16,929	16,929

Notes: Table presents firm-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) replicating column (1) of Table C1 for different event windows. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets.

Table C5: Firm-Level Responses With Event Window Variations

	$\tau = [-1, 7]$	$\tau = [-7, 7]$	$\tau = [-1, 14]$	$\tau = [-1, 28]$	$\tau = [-28, 28]$
	(1)	(2)	(3)	(4)	(5)
	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$
$DistanceUkraine_i$	0.0000846	0.0000902	0.00175	-0.00109	0.00366
	(0.00176)	(0.00203)	(0.00230)	(0.00279)	(0.00353)
	{0.962}	{0.964}	{0.445}	{0.697}	{0.300}
Constant	-0.0313	-0.0459	-0.0882	0.0384	0.0962
	(0.0304)	(0.0421)	(0.0404)	(0.143)	(0.144)
	{0.304}	{0.276}	{0.029}	{0.788}	{0.505}
Country FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.20	0.22	0.19	0.13	0.16
N	16,929	16,929	16,929	16,929	16,929

Notes: Table presents firm-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) replicating column (2) of Table C1 for different event windows. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets.

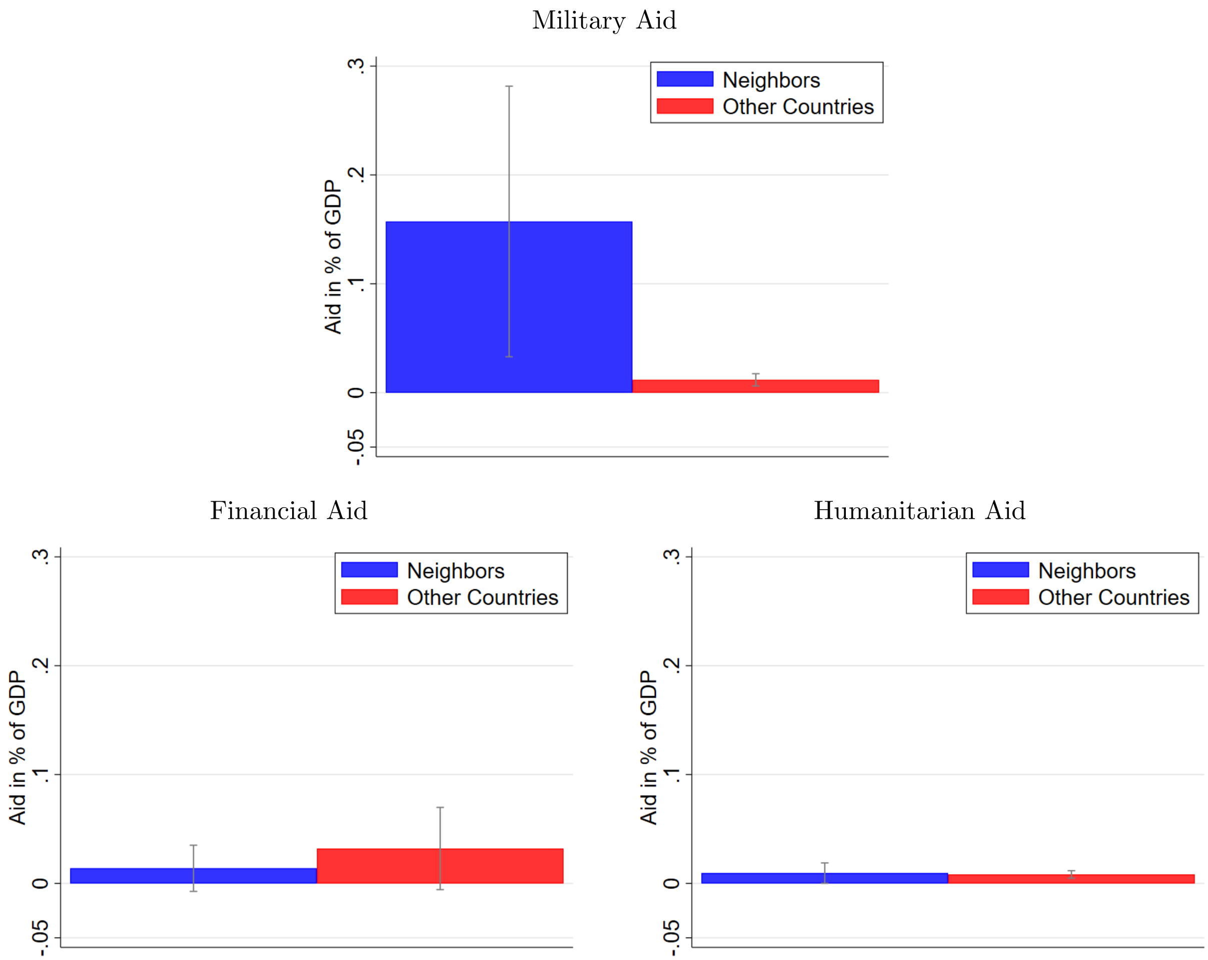
Table C6: Firm-Level Responses With Event Window Variations (Within Neighbors)

	$\tau = [-1, 7]$	$\tau = [-7, 7]$	$\tau = [-1, 14]$	$\tau = [-1, 28]$	$\tau = [-28, 28]$
	(1)	(2)	(3)	(4)	(5)
	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$	$CumRet_i^\tau$
$DistanceUkraine_i$	0.000221	0.000192	0.00184	-0.00120	0.00334
	(0.00178)	(0.00205)	(0.00232)	(0.00281)	(0.00357)
	{0.901}	{0.925}	{0.427}	{0.669}	{0.349}
$DistanceUkraine_i \times Neighbor_i$	0.00350	0.00930	0.0174	0.0249	0.0778
	(0.0163)	(0.0201)	(0.0194)	(0.0226)	(0.0306)
	{0.830}	{0.644}	{0.369}	{0.271}	{0.011}
Constant	-0.0279	-0.0417	-0.0933	0.0533	0.107
	(0.0311)	(0.0430)	(0.0416)	(0.158)	(0.158)
	{0.370}	{0.332}	{0.025}	{0.735}	{0.499}
Country FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.21	0.23	0.20	0.14	0.16
N	16,929	16,929	16,929	16,929	16,929

Notes: Table presents firm-level estimations of equation (1) and relates cumulative returns around war onset ($CumRet_i^\tau$) to distance from Ukraine ($DistanceUkraine_i$) replicating column (3) of Table C1 for different event windows. Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets.

D Interpretation Analysis

Figure D1: Ukraine Aid by Type



Notes: Top panel shows average military aid provided to Ukraine by first- and second degree neighbors and other countries scaled by the respective countries' GDP. Bottom left and bottom right panel shows the same statistic for financial and humanitarian help, respectively. Grey markers indicate the 5% confidence bands in each direction, respectively. The only category exhibiting significant differences between first- and second-degree neighbors and other countries is military aid.

Table D1: Currency Overview

Symbol	Name	Mean Distance from Ukraine (in km)	Countries in MSCI Sample
AUD	Australian Dollar	10,723	Australia
BRL	Brazilian Real	8,161	Brazil
CAD	Canadian Dollar	5,155	Canada
CHF	Swiss Franc	941	Switzerland
CLP	Chilean Peso	11,715	Chile
CNH	Chinese Yuan (Offshore)	3,034	China
COP	Colombian Peso	9,360	Colombia
CZK	Czech Koruna	277	Czech Republic
EUR	Euro	1,095	Austria, Estonia, Finland, France, Germany, Ireland, Italy, Lithuania, Netherlands, Portugal, Slovenia, Spain
GBP	Pound Sterling	1,506	United Kingdom
HUF	Hungarian Forint	24	Hungary
IDR	Indonesian Rupiah	7,025	Indonesia
ILS	Israeli New Shekel	1,249	Israel
INR	Indian Rupee	3,233	India
JPY	Japanese Yen	7,086	Japan
KRW	South Korean Won	6,751	South Korea
MXN	Mexican Peso	9,507	Mexico
MYR	Malaysian Ringgit	7,316	Malaysia
NOK	Norwegian Krone	1,154	Norway
NZD	New Zealand Dollar	15,960	New Zealand
PHP	Philippine Peso	7,759	Philippines
PLN	Polish Zloty	27	Poland
SEK	Swedish Krona	753	Sweden
SGD	Singapore Dollar	8,012	Singapore
THB	Thai Baht	6,086	Thailand
TRY	Turkish Lira	279	Turkey
TWD	New Taiwan Dollar	7,162	Taiwan
ZAR	South African Rand	7,436	South Africa

Notes: Table provides an overview of currencies examined in Figure 4. Each currency was merged with all countries from our MSCI analysis that use the respective currency as main currency. If a currency comprises multiple countries, the mean distance of countries using the currency was taken as the currency distance.

Table D2: Regression of Risk Reversal Change on Distance from Ukraine

	(1)	(2)	(3)	(4)	(5)
	ΔRR_i	ΔRR_i	ΔRR_i	ΔRR_i	ΔRR_i
$DistanceUkraine_i$	-0.129	-0.372	-0.178	-0.178	-0.0393
	(0.0436)	(0.0897)	(0.102)	(0.121)	(0.137)
	{0.007}	{0.000}	{0.093}	{0.156}	{0.778}
$DistanceUkraine_i^2$		0.0197	0.0110	0.0107	0.00336
		(0.00554)	(0.00535)	(0.00628)	(0.00753)
		{0.002}	{0.053}	{0.103}	{0.662}
$z(ImportsFromRussia_i)$			0.759	0.654	0.967
			(0.185)	(0.175)	(0.209)
			{0.000}	{0.001}	{0.000}
$z(ExportsToRussia_i)$			-0.186	-0.281	-0.651
			(0.108)	(0.121)	(0.282)
			{0.100}	{0.031}	{0.035}
$z(ImportsFromUkraine_i)$				0.192	0.243
				(0.423)	(0.256)
				{0.655}	{0.357}
$z(ExportsToUkraine_i)$				0.0200	-0.224
				(0.497)	(0.375)
				{0.968}	{0.558}
$z(SensitiveCommodities_i)$					-0.0939
					(0.136)
					{0.499}
EU_i					1.391
					(0.290)
					{0.000}
$EU_i * z(ImportsFromRussia_i)$					-0.114
					(0.434)
					{0.796}
$EU_i * z(ExportsToRussia_i)$					0.165
					(0.310)
					{0.601}
Constant	1.507	1.907	1.237	1.247	0.576
	(0.315)	(0.333)	(0.353)	(0.411)	(0.419)
	{0.000}	{0.000}	{0.002}	{0.007}	{0.188}
Adj. R^2	0.29	0.44	0.67	0.65	0.74
N	28	28	27	27	27

Notes: Table relates change in risk reversal around war onset (ΔRR_i) to distance from Ukraine ($DistanceUkraine_i$). Standard errors are heteroscedasticity robust and denoted in round brackets. P-values are reported in curly brackets.