Geopolitical Shocks and Supply Chain Resilience: Evidence from the Russo-Ukrainian War*

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This Version: April 2025

Abstract

This paper examines how the Russo-Ukrainian War disrupted global supply chains and triggered firm-level strategic responses to geopolitical shocks. Using firm-level supplier-customer data from FactSet Revere and a global sample of 18,058 firms, we show that firms with supplier exposure to Russia or Ukraine experienced significant stock price declines following the outbreak of the conflict, with sharper losses for firms linked to Russian suppliers. Firms with conflict-zone suppliers actively restructured their supply chains post-invasion by acquiring new, especially international, suppliers, and these responses are stronger among firms headquartered in countries opposing Russia or facing higher geopolitical risks. Moreover, pre-existing geopolitical misalignments between customers and suppliers significantly predict post-conflict relationship terminations. Our findings highlight the cascading effects of geopolitical conflicts through global production networks and underscore the strategic importance of supply chain resilience in an increasingly uncertain world.

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1. Introduction

Global supply chains, once heralded as engines of efficiency and growth, are now increasingly viewed through the lens of vulnerability. In an era marked by escalating geopolitical tensions, rising protectionism, and localized conflicts, the interconnectedness of the global economy has become a double-edged sword. While geographic diversification has enabled firms to optimize costs and access new markets, it has also exposed them to systemic risks emanating from political shocks far beyond their home regions. Recent events, from the U.S.-China trade war to the COVID-19 pandemic and the ongoing Red Sea shipping disruptions, highlight the fragility of international production networks. Yet among these events, the Russo-Ukrainian War stands out as a particularly stark reminder that armed conflict—even in seemingly peripheral regions—can trigger widespread disruption across global supply chains. In this study, we exploit the sudden onset of the Russo-Ukrainian War and detailed firm-level supply chain data to address three interrelated questions: (i) How do materialized geopolitical conflicts transmit through supplier-customer linkages? (ii) How do exposed firms adjust their supply chains to mitigate operational risks? (iii) How do financial markets react to firms' geopolitical exposure and strategic adaptations?

Despite growing interest in geopolitical risk and firm behavior, we have limited empirical evidence on how materialized geopolitical conflicts transmit through supply chains and how firms adjust their strategies in response. While prior research has documented how natural disasters (Barrot & Sauvagnat, 2016; Boehm, Flaaen, & Pandalai-Nayar, 2019) and financial shocks (Costello, 2020; Agca et al., 2022) propagate through supplier-customer linkages, the unique characteristics of geopolitical conflicts—longer-lasting, politically charged, and reputationally sensitive—may engender fundamentally different firm responses. Understanding these dynamics is increasingly urgent, not only for corporate managers and

investors but also for policymakers seeking to safeguard economic resilience amid intensifying global uncertainties.

This study fills the gap by exploiting the Russo-Ukrainian War as a quasi-natural experiment to investigate the propagation of geopolitical shocks through global supply chains and the corresponding firm-level responses. Using detailed firm-to-firm supply chain data, we identify publicly listed firms that had suppliers located in Russia or Ukraine prior to the war. We then examine how financial markets react to firms' supply chain exposure to conflict zones, (ii) how affected firms restructure their supply chains after the outbreak, and (iii) how national geopolitical alignments shape firms' relationship management decisions in the post-conflict environment. By focusing on direct supplier linkages and leveraging the exogenous timing of the invasion, we isolate the transmission of geopolitical disruptions through production networks from confounding macroeconomic shocks.

Our analysis yields several key findings. First, we find that firms with suppliers in Russia or Ukraine experienced a significant and immediate stock market devaluation of approximately 3% relative to unaffected firms following the outbreak of the war. This negative reaction persists even after controlling for firm characteristics, country- and industry-level fixed effects, and varies little with the intensity of supply chain exposure, suggesting that even marginal linkages to conflict zones can carry substantial perceived risks. The magnitude of the valuation effect highlights that geopolitical supply chain vulnerabilities are not seen as idiosyncratic risks but as material threats to firm operations and financial performance.

Second, we document that affected firms responded to the disruption by proactively restructuring their supply chains. Specifically, firms with conflict-zone suppliers significantly increased their acquisition of new suppliers, particularly new international suppliers located outside Russia and Ukraine. On average, affected firms expanded their international supplier bases by around 27%, reflecting a deliberate strategy to diversify geopolitical exposure and

restore supply chain resilience. This strategic reconfiguration highlights that firms are not passive victims of political shocks; instead, they actively manage their networks to mitigate future risks.

Third, we show that geopolitical misalignments between customer and supplier countries significantly predict relationship terminations after the conflict. Firms headquartered in countries that opposed Russia's actions at the United Nations were substantially more likely to sever existing supplier ties with Russian firms. This finding reveals that firms' supply chain decisions are not purely based on operational considerations but are also shaped by political pressures, reputational risks, and broader national alignments during periods of geopolitical instability.

Our study contributes to the literature in the following ways. First, we contribute to the literature on shock propagation in production networks (Acemoglu, Akcigit, & Kerr, 2016; Carvalho et al., 2021) by introducing geopolitical conflict as a distinct and potent source of supply chain disruption. While earlier work has focused on natural disasters and credit shocks, we show that armed political conflicts have similarly powerful transmission effects across supplier-customer linkages, with implications not only for direct counterparties but also for firms embedded deeper within production networks.

Second, we extend the research on firm resilience and strategic supply chain management (Cortes, Silva, & van Doornik, 2019; Hendricks, Jacobs, & Singhal, 2020; Qiu et al., 2024) by providing novel evidence that firms respond to geopolitical shocks by reconfiguring their supplier bases toward more politically stable partners. Our findings suggest that the ability to flexibly adapt supplier networks is a critical component of operational resilience in the face of rising geopolitical risks.

Third, we advance the emerging literature on geopolitical risk and financial markets (Hassan et al., 2019; Caldara & Iacoviello, 2022) by connecting macro-level political conflicts

to micro-level financial outcomes and supply chain decisions. We demonstrate that geopolitical risk exposure is rapidly priced by financial markets and that firms' responses to such exposure are conditioned by the geopolitical alignment between their home countries and their suppliers' locations.

Finally, by highlighting the role of political alignment in post-conflict supply chain restructuring, we add a political economy perspective to the study of global production networks. Our findings suggest that firms' supply chain strategies during international crises are not purely economic but are deeply intertwined with national political positions, reputational concerns, and geopolitical signaling.

Thus, this study offers timely insights into how geopolitical disruptions propagate through global supply chains and how firms adapt their operations in response. As the frequency and severity of geopolitical conflicts continue to rise, understanding these dynamics is crucial for building more resilient and politically robust global production systems.

The rest of the paper is organized as follows. Section 2 reviews the related literature and develops testable hypotheses. Section 3 describes the data sources, sample construction, and empirical methodology. Section 4 presents the main empirical results, including analyses of stock market reactions, supply chain reconfiguration, and the role of geopolitical alignment in supply chain terminations. Section 5 offers concluding remarks.

2. Literature Review and Hypotheses Development

2.1. Shock Propagation Along Supply Chains

A large and growing body of research examines how shocks propagate through supply chain networks, amplifying the effects of localized disruptions across interconnected firms. Acemoglu, Akcigit, and Kerr (2015) demonstrate that firm-level productivity shocks transmit through production networks, with supply-side shocks propagating more strongly

downstream—from suppliers to customers—than upstream. Their findings further show that small, idiosyncratic shocks can escalate into significant aggregate fluctuations depending on the network's topology, highlighting the systemic vulnerabilities embedded within modern supply chains.

Subsequent empirical studies have reinforced the idea that various types of shocks are transmitted through supply chain linkages. Natural disasters (Barrot & Sauvagnat, 2016; Boehm, Flaaen, & Pandalai-Nayar, 2019), environmental incidents (Lo, Ramos, & Rogo, 2018), emission scandals (Jacobs & Singhal, 2020), corruption practices (Wang et al., 2024), and trade sanctions (Jacobs et al., 2022) have all been shown to generate significant ripple effects across production networks. Qiu et al. (2024) extend this view to financial market channels and show that stock price crash risks can propagate from major customers to suppliers, emphasizing the role of information opacity and supplier importance in amplifying financial contagion along supply chains.

Financial frictions also propagate through production networks. Costello (2020) and Alfaro et al. (2021) find that financing constraints faced by suppliers can transmit liquidity shocks downstream to customer firms. Cortes, Silva, and van Doornik (2019) further show that firms with access to stable financing sources, such as government banks, can better shield both upstream and downstream partners during periods of financial distress.

Together, these studies establish that supply chains serve as critical transmission channels for a wide array of adverse shocks, whether operational, financial, or informational. Building on these insights, our study examines how a major geopolitical event—the Russo-Ukrainian War—propagates through global supply chains. Consistent with the theory of supply-side downstream propagation (Acemoglu et al., 2015), we expect that firms with suppliers located in Russia or Ukraine will experience larger adverse stock market reactions than firms with customer relationships in the conflict zones.

2.2. Firm Strategic Responses to Supply Chain Disruptions

Beyond the initial transmission of shocks, firms' strategic responses to supply chain disruptions have received growing attention. Evidence suggests that firms actively manage their supplier networks to enhance resilience following adverse events. Hendricks, Jacobs, and Singhal (2020) document that firms reorganize their supply chains after natural disasters, while Cortes, Silva, & van Doornik (2019) and Costello (2020) find that financial shocks prompt strategic adjustments in supplier relationships to mitigate liquidity risks.

However, much of the existing research focuses on firm responses to environmental or financial disruptions, with less attention paid to adaptations following geopolitical conflicts. Recent work by Crosignani, Macchiavelli, and Rodrigues (2023) shows that cyber-attacks against Ukrainian suppliers led to liquidity shocks and trade network disruptions among international customers, illustrating how shocks emanating from politically unstable regions can propagate through supply chains.

In this study, we extend the literature by investigating how firms with suppliers in Russia or Ukraine respond to the Russo-Ukrainian War. We examine whether affected firms actively rebuild their supply networks, particularly through acquiring new international suppliers, and whether firms' supply chain adaptations vary based on their home country's geopolitical alignment.

2.3. Geopolitical Risk, Trade Disruptions, and Firm Behavior

The broader economics literature has long recognized that wars and geopolitical tensions impose substantial costs on international trade, extending beyond the directly belligerent parties. Blomberg and Hess (2006) and Martin, Mayer, and Thoenig (2008) show that wars and military conflicts reduce trade flows not only between combatants but also with

neutral third parties. Glick and Taylor (2010) further demonstrate that wars generate negative externalities for international trade networks, affecting neutral economies through indirect channels.

In parallel, recent research in finance emphasizes the role of geopolitical risk in shaping firm behavior and financial outcomes. Caldara and Iacoviello (2022) construct a geopolitical risk index and show that increases in geopolitical tensions predict higher stock market volatility and lower investment. Hassan et al. (2019) find that firms facing higher political risks are more likely to engage in political lobbying and campaign donations to mitigate regulatory exposure. However, the intersection between geopolitical risk, supply chain disruptions, and firm responses remains underexplored. While Orhan (2022) highlights that the Russo-Ukrainian War has disrupted global supply chains and affected the world economy, and Ganesan & Mallapragada (2025) document consumer goodwill associated with corporate withdrawals from Russia, little is known about the fate of firms indirectly exposed through supplier or customer ties in conflict regions.

Fisman, Marcolongo, and Wu (2025) show that sanctions can be undermined through entrepôt trade, illustrating the challenges of sustaining economic pressure during conflicts. Similarly, Chakrabarti et al. (2024) reveal that Indian exporters redirected trade flows during the Russo-Ukrainian conflict to maintain market access while avoiding major disruptions with key trading partners.

Our study extends this line of inquiry by focusing specifically on firms whose suppliers are based in Russia or Ukraine. We examine whether stock markets devalue such firms following the outbreak of the war, whether firms adjust their supply chains to mitigate ongoing risks, and whether geopolitical alignment influences the termination of supplier relationships.

2.4. Hypotheses Development

Drawing on the literature reviewed above, we develop the following hypotheses. First, consistent with the theory of shock propagation in supply chains (Acemoglu et al., 2016; Barrot & Sauvagnat, 2016), we expect that firms with suppliers in conflict zones will experience adverse stock price reactions following the outbreak of the Russo-Ukrainian War:

Hypothesis 1: *Firms with supplier linkages to Russia or Ukraine experience significant stock price declines following the war's outbreak*.

Second, building on the literature on firm resilience and supply chain management (Hendricks et al., 2020; Cortes, Silva, & van Doornik, 2019), we posit that affected firms will respond by diversifying their supplier base:

Hypothesis 2: *Firms with supplier linkages to Russia or Ukraine are more likely to acquire new, especially international, suppliers following the war*.

Third, informed by insights from the geopolitical risk literature (Caldara & Iacoviello, 2022; Glick & Taylor, 2010), we hypothesize that geopolitical alignment will influence the likelihood of severing supplier relationships:

Hypothesis 3: *Firms headquartered in countries geopolitically opposed to Russia are more likely to terminate supplier relationships with Russian firms post-conflict*.

3. Data and Sample Construction

We obtain data on supplier-customer relationships from the FactSet Revere database, which records both ongoing and discontinued trade relations between firms from 2003 to the present. Following Gofman et al. (2020), if multiple relations exist between the same firm pair, we establish a continuous relationship by consolidating the earliest reported start date and the most recent reported end date across all entries. Each trade relation record in FactSet Revere

includes information on the relation type (customer or supplier), the start and end dates, and the identities of the source and target firms.

When the relation type is reported as "customer," the target firm is considered the customer and the source firm is the supplier. Conversely, when the relation type is reported as "supplier," the target firm is treated as the supplier and the source firm as the customer. This standardization ensures consistent directionality in supplier-customer linkages across the sample. Then, we obtain the consolidated relations for each identical supplier and customer from 2003 till 2023.

To identify treated and control firms before the escalation of the Russo-Ukrainian conflict, we first exclude supply chain relationships initiated after February 24, 2022, the date of the invasion. We then classify firms as treated if they had at least one supplier located in Russia or Ukraine prior to the invasion, and as control firms otherwise. Then qualifying treated firms must initiate the relation with Russian or Ukrainian suppliers before February 24, 2022. Treated firms even starting relation before invasion show no evidence of activities with Russian or Ukrainian suppliers within five years preceding the invasion are excluded as inactive. Using International Securities Identification Numbers (ISIN) and Committee on Uniform Security Identification Procedures (CUSIP) codes, we identify 438 global firms headquartered outside of Russia or Ukraine with supplier linkages to firms located in Russia or Ukraine.

We complement the supply chain data with daily stock price information and annual accounting data obtained from the Compustat database, covering both North American and global firms. To construct the final sample, we exclude observations with missing control variables.

To further examine firm supply chain responses post-conflict, we consolidate an indicator variable capturing the formation of new supplier-customer relationships starting after February 24, 2022. This variable identifies firms that initiated new trade relationships

following the outbreak of the Russo-Ukrainian War, allowing us to analyze supply chain reconfiguration dynamics. Our final sample consists of 18,058 publicly listed global firms for which we can reliably identify the location of their headquarters and consolidate relevant financial variables for empirical analyses.

4. Empirical Analysis

This section presents our empirical analyses. We begin by reporting the baseline event study results on the stock market impacts of the Russo-Ukrainian War. We then explore heterogeneity in the magnitude of market reactions based on supplier concentration and geopolitical alignment, and investigate firms' supply chain restructuring behaviors. We separately analyze market reactions to key pre-invasion events to assess anticipation effects, and finally examine post-invasion supplier acquisition patterns and customer-supplier relationship terminations.

4.1. Main Event Study Results

We first focus on how the outbreak of the Russo-Ukrainian War affected firm performance through global supply chains. Our goal is twofold: (i) to document whether financial markets devalued firms with supplier exposure to conflict zones, and (ii) to explore whether firms actively restructured their supplier networks post-conflict, consistent with our hypotheses.

Before presenting our pre-event anticipation analyses (discussed separately in Section 4.2 and reported in Table 3), we focus here on firms' stock market reactions to the actual outbreak of the Russo-Ukrainian War and their subsequent supply chain restructuring behaviors. Given that financial markets did not fully anticipate the invasion (as discussed in

Section 4.2), the war serves as a clean exogenous shock for identifying the economic consequences of geopolitical supply chain disruptions.

We estimate baseline event study regressions where cumulative abnormal returns (*CAR*) around February 24, 2022, are regressed on an indicator for firms with supplier relationships in Russia or Ukraine, controlling for firm characteristics, and country and industry fixed effects. As robustness, we also compute market-adjusted cumulative abnormal returns (*MCAR*) over the same [-3, +3] event window.

4.1.1. Immediate Stock Market Reactions to Supply Chain Exposure

We first explore how financial markets responded to firms' exposure to conflict zones. Figure 1 provides a visual overview of market-adjusted abnormal returns (*MCAR*) from February 15 to March 15, 2022. Control firms, without suppliers in Russia or Ukraine, display relatively stable *MCAR* around the invasion. In contrast, treated firms experience sharp, immediate valuation losses, with little evidence of recovery during the observation window.

Descriptive statistics reported in Table 1 provide context. Our sample of 18,058 firms shows a mean *CAR* of 0.819%, and a slightly higher mean *MCAR*. Treated firms differ significantly from controls in firm size, leverage, and profitability, as shown in Panel B.

The core event study results, shown in Table 2, reveal that firms with suppliers in Russia or Ukraine suffered a 3.253% decrease in *CAR* compared to control firms, highly significant at the 1% level. When decomposing by supplier location, firms with Russian suppliers experienced a 3.183% decline, while Ukrainian supplier exposure also produced significant losses.

These findings provide strong support for Hypothesis 1, confirming that financial markets penalized supply chain exposure to geopolitical conflict zones.

4.1.2. Amplification Effects of Supplier Concentration

Is the magnitude of financial losses shaped by the intensity of supplier exposure? Table 4 addresses this question. Columns (1) and (3) use the number of suppliers located in conflict zones as a continuous measure, while columns (2) and (4) define high versus low concentration indicators.

Results show that firms with more concentrated exposure suffered substantially larger valuation declines. Firms with a high number of suppliers in Russia or Ukraine experienced approximately 5% greater drops in *CAR* and *MCAR*, compared to a 2% drop for firms with lower supplier concentration, both significant at the 1% level.

These patterns suggest a powerful amplification mechanism: firms more heavily reliant on conflict-zone suppliers faced disproportionate financial penalties, reinforcing Hypothesis 1.

4.1.3. Geopolitical Alignment and Market Penalties

Next, we investigate whether firms' home country geopolitical alignment influenced market reactions. Table 5, Panel A interacts supplier exposure with an indicator for whether the firm's home country voted "Yes" on the UN resolution condemning Russia's militarization of Crimea. Firms headquartered in countries opposing Russia and with conflict-zone suppliers suffered an additional 3% valuation loss, compared to firms from non-aligned countries. Panel B uses the Caldara et al. (2023) Geopolitical Risk Index. Firms located in higher-risk countries faced an additional 0.4% decline in *CAR* and *MCAR* when exposed to conflict-zone suppliers.

These findings strongly support Hypothesis 3, highlighting how the intersection of geopolitical alignment and operational exposure magnifies market penalties in times of international conflict.

4.1.4. Strategic Supply Chain Restructuring after the Invasion

Finally, we examine whether firms adapted their supply chains post-conflict. Using Poisson pseudo-maximum likelihood regressions, Table 6 shows that treated firms increased their number of new suppliers by 26.1% and new international suppliers by 39.6%, compared to control firms. This reflects a deliberate strategic shift to diversify away from geopolitical risk concentrations.

Further decomposition reveals that firms with Ukrainian suppliers exhibited particularly strong restructuring behaviors—consistent with greater disruption of Ukrainian production networks.

Supplementary analyses using OLS regressions (Appendix 6) show that firms with conflict zone suppliers were 3.8% more likely to acquire new international suppliers. Firms with Ukrainian supplier exposure displayed up to 30.2% higher probability of restructuring internationally.

Robustness checks using Cox hazard models (Appendix 7) confirm that firms with pre-existing ties to Russia or Ukraine were significantly more likely to form new supplier relationships after the conflict.

Collectively, these results provide robust evidence for Hypothesis 2, demonstrating that firms actively reconfigure supply chains in response to sudden geopolitical disruptions.

4.2. Pre-Event Analyses: Did Markets Anticipate the Invasion?

Before the outbreak of the Russo-Ukrainian War, tensions between Russia, Ukraine, and Western powers steadily escalated. In this section, we explore whether financial markets anticipated the impending conflict by analyzing stock market reactions to two key pre-invasion events: the NATO-Russia diplomatic meeting and Russia's subsequent military drills. This analysis provides important validation for our identification strategy by assessing the degree of surprise associated with the actual invasion event.

4.2.1. Early Signs of Optimism: The NATO-Russia Meeting

On January 12, 2022, NATO and Russia convened for a high-level diplomatic meeting aimed at de-escalating tensions. If markets interpreted this dialogue as a credible path toward conflict resolution, firms with supplier exposure to Russia or Ukraine might have exhibited positive abnormal returns.

Table 3, Panel A reports the event study results. Firms with suppliers located in Russia or Ukraine experienced a 0.711% increase in *CAR* around the NATO meeting relative to control firms, although the effect is only marginally significant. The market-adjusted *CAR* (*MCAR*) shows a similar 0.838% increase. Importantly, when decomposing by supplier country, we find no significant differences between firms exposed to Russian versus Ukrainian suppliers.

These results suggest that, at this early stage, markets held a cautiously optimistic view that diplomatic channels could prevent escalation. There was little evidence of widespread pricing of imminent conflict risk at this point.

4.2.2. Shifting Expectations: The Russian Military Drills

Market sentiment changed markedly following Russia's large-scale military drills conducted near Ukraine's border on February 11, 2022. As reported in Table 3, Panel B, firms with supplier linkages to Russia or Ukraine experienced a 0.673% decline in *CAR* around the announcement of the military drills, significant at the 10% level. Firms specifically exposed to Russian suppliers experienced a larger 0.981% decline in *CAR*, highly significant. The market-adjusted *CAR* (*MCAR*) confirm these patterns, showing similar or slightly larger negative effects.

These findings indicate that as military preparations intensified, markets began to revise their expectations, pricing in a greater probability of conflict. Firms connected to Russian

suppliers were particularly penalized, consistent with heightened fears of supply chain disruptions originating from Russia.

Overall, the pre-event analyses reveal a dynamic shift in market expectations during the lead-up to the invasion. While early diplomatic efforts generated cautious optimism, markets reacted negatively to more concrete signals of military escalation. Nonetheless, even on the eve of the invasion, there is no evidence that financial markets had fully incorporated the likelihood of a full-scale war. These findings reinforce the exogeneity of the invasion event in our main analyses, supporting a causal interpretation of the stock price declines and firm responses documented in Section 4.1.

4.3. Supply Chain Reconfiguration and Geopolitical Attitudes

In this section, we investigate how firms' supply chain reconfiguration decisions following the Russo-Ukrainian War vary based on the geopolitical attitudes of their home countries. Specifically, we study whether firms headquartered in countries with stronger opposition to Russia were more proactive in acquiring new suppliers and severing supplier relationships after the conflict escalation. This analysis further probes the mechanisms underlying Hypotheses 2 and 3.

4.3.1. Supplier Acquisition and UN Voting-Based Geopolitical Stance

We first use United Nations (UN) General Assembly voting records to construct a proxy for countries' geopolitical attitudes toward Russia prior to February 24, 2022. Voeten (2013) emphasizes the importance of considering the content of specific UN agendas when measuring common interests among states. Accordingly, we focus on the December 9, 2021, UN General

Assembly vote addressing the militarization of the Autonomous Republic of Crimea, the city of Sevastopol, and parts of the Black Sea and Sea of Azov.[1]

In this vote, 62 countries voted "Yes" (supporting the agenda to prevent Russian militarization), 22 voted "No," 55 abstained, and 54 did not vote. Based on this, we define an indicator variable, Against the Invasion, which equals one if a firm's home country either voted "No," abstained, or did not vote, and zero if the country voted "Yes."

Table 7, Panel A, presents the results. We divide the sample into firms headquartered in countries explicitly against the invasion (columns (1) and (2)) and those not explicitly against the invasion (columns (3) and (4)). Among firms located in countries that voted "Yes" (against the invasion), having suppliers in Russia or Ukraine is associated with a 31.3% increase in the number of new suppliers acquired post-invasion, relative to control firms (column (1)). Firms with Russian suppliers increased new supplier acquisition by 29.6%, while firms with Ukrainian suppliers increased acquisition by 89.6% (column (2)).

In contrast, for firms headquartered in countries not explicitly against the invasion, we observe no significant differences overall (column (3)). However, within this group, firms with Ukrainian suppliers increased new supplier acquisition by 128.6% relative to firms without such suppliers (column (4)).

These findings suggest that firms located in countries with stronger opposition to Russia were more proactive in restructuring their supply chains after the conflict, consistent with Hypotheses 2 and 3.

4.3.2. Supplier Acquisition and Country-Level Geopolitical Risk

Next, we explore how pre-existing geopolitical risk conditions affected firms' supplier acquisition behavior. Using the Caldara et al. (2023) country-specific Geopolitical Risk Index

[1] Please see the United Nations digital library: https://digitallibrary.un.org/record/3950789?ln=en.

(GPR), we classify firms into high-GPR and low-GPR groups based on whether their home country's GPR is above or below the sample mean prior to February 24, 2022.

Table 7, Panel B, presents the results. Among firms headquartered in countries with high geopolitical risk (columns (1) and (2)), having suppliers in Russia or Ukraine is associated with a 26.5% increase in new supplier acquisition after the war outbreak. Firms with Russian suppliers increased new supplier acquisition by 24.7%, and those with Ukrainian suppliers by 110.4%.

For firms headquartered in low-GPR countries (columns (3) and (4)), the general association between conflict-zone supplier exposure and new supplier acquisition is weaker. Only firms with Ukrainian suppliers show a significant 57.0% increase in new supplier acquisition, while no significant effects are observed for firms with Russian suppliers.

Together, these results reinforce the role of geopolitical risk in shaping firms' post-conflict supply chain adjustments, providing additional support for Hypotheses 2 and 3.

4.3.3. Customer-Supplier Relationship Termination and Geopolitical Attitudes

Finally, we analyze the likelihood of customer-supplier relationship terminations after the conflict escalation, focusing on the influence of pre-existing geopolitical attitudes.

Table 8 presents the results at the customer-supplier pair-year level from 2019 to 2023. The explanatory variable is the indicator for a given year, whether the relation is terminated next year. We divide the sample based on the *Against the Invasion* indicator. Columns (1) and (2) cover the full sample, columns (3) and (4) cover firms not explicitly against the invasion, and columns (5) and (6) cover firms explicitly against the invasion.

In the full sample, we find that customer relationships with Ukrainian suppliers were significantly more likely to be terminated in 2022 (relative to 2021), at the 5% level. Among firms headquartered in countries explicitly against the invasion, we observe that customer

relationships with Russian suppliers were also significantly more likely to be severed in 2022 relative to 2021.

No significant effects are observed among firms headquartered in countries not explicitly opposed to the invasion, suggesting that political alignment plays a central role in post-conflict supply chain restructuring.

These findings further substantiate Hypothesis 3, highlighting that ex-ante geopolitical attitudes strongly predict firms' selective termination of supplier relationships after geopolitical shocks.

5. Conclusion

This study investigates how the Russo-Ukrainian War disrupted global supply chains and how firms strategically responded to geopolitical shocks transmitted through their supplier networks. Using a novel combination of firm-level supplier-customer data from FactSet Revere, stock market reactions, and financial information, we construct a comprehensive sample of 18,058 firms spanning diverse industries and regions.

Our empirical analyses yield three main findings. First, we find that firms with supplier linkages to Russia or Ukraine experienced significant negative stock market reactions following the outbreak of the Russo-Ukrainian War. The adverse effects were more pronounced for firms connected to Russian suppliers, highlighting the financial markets' sensitivity to geopolitical supply chain vulnerabilities.

Second, firms with pre-existing supplier exposure in conflict zones actively restructured their supply chains post-invasion. Firms headquartered in countries explicitly opposing the invasion, or those operating in high geopolitical risk environments, were more likely to establish new supplier relationships—particularly with international partners outside

of conflict zones. This highlights proactive adaptation efforts aimed at enhancing operational resilience.

Third, ex-ante geopolitical misalignments between customers and suppliers significantly predicted post-war relationship terminations. Firms were more likely to sever ties with suppliers from belligerent countries when pre-existing political tensions existed, illustrating the deep entanglement of geopolitical alignment and supply chain decisions.

These findings have implications for both theory and practice. From a managerial perspective, our results emphasize the need for firms to incorporate geopolitical risk assessments into their supply chain management strategies. Geopolitical considerations are no longer peripheral concerns but have become central determinants of supply chain resilience and corporate risk management. Firms embedded in globally dispersed networks must proactively monitor political developments, diversify supplier bases, and design supply chain architectures that are robust to geopolitical shocks.

For policymakers, our evidence highlights the broader economic consequences of geopolitical conflicts. Geopolitical tensions not only affect diplomatic relations but also reconfigure global production networks, with ripple effects across industries and regions. Understanding how private-sector actors respond to geopolitical disruptions can inform public policy strategies aimed at mitigating economic fallout and ensuring supply chain continuity during periods of instability.

Finally, our study contributes to the emerging literature at the intersection of geopolitical risk, supply chain management, and corporate strategy. By providing large-scale, firm-level evidence on how geopolitical shocks propagate through supplier networks and trigger strategic responses, we offer new insights into the dynamics of global business resilience in an increasingly fragmented world.

Taken together, our findings highlight that in an era of rising geopolitical uncertainty, the ability to rapidly reconfigure global supply chains is a critical source of competitive advantage. Future research can build on our study by exploring the long-term operational and financial consequences of these supply chain adaptations and by examining how firms' geopolitical exposure shapes broader strategic decisions beyond the supply network.

References

Acemoglu, D., Akcigit, U., & Kerr, W. (2016). Networks and the macroeconomy: An empirical exploration. *Nber Macroeconomics Annual*, 30(1), 273-335.

Agca, S., Babich, V., Birge, J. R., & Wu, J. (2022). Credit shock propagation along supply chains: Evidence from the CDS market. *Management Science*, *68*(9), 6506-6538.

Alfaro, L., García-Santana, M., & Moral-Benito, E. (2021). On the direct and indirect real effects of credit supply shocks. *Journal of Financial Economics*, *139*(3), 895-921.

Barrot, J.-N., & Sauvagnat, J. (2016). Input Specificity and the Propagation of Idiosyncratic Shocks in Production Networks *. *The Quarterly Journal of Economics*, *131*(3), 1543-1592.

Blomberg, S. B., & Hess, G. D. (2006). How much does violence tax trade? *The Review of Economics and Statistics*, *88*(4), 599-612.

Boehm, C. E., Flaaen, A., & Pandalai-Nayar, N. (2019). Input linkages and the transmission of shocks: Firm-level evidence from the 2011 Tōhoku earthquake. *Review of Economics and Statistics*, *101*(1), 60-75.

Caldara, D., Conlisk, S., Iacoviello, M., & Penn, M. (2023). Do geopolitical risks raise or lower inflation. *Tech. rep., Federal Reserve Board*, 1-32.

Caldara, D., & Iacoviello, M. (2022). Measuring geopolitical risk. *American Economic Review*, *112*(4), 1194-1225.

Carvalho, V. M., Nirei, M., Saito, Y. U., & Tahbaz-Salehi, A. (2021). Supply chain disruptions: Evidence from the great east japan earthquake. *The Quarterly Journal of Economics*, *136*(2), 1255-1321.

Chakrabarti, A. S., Chakraborty, P., & Dutt, A. (2024). War and transnational reshoring. Indian Institute of Management, Working paper.

Cohn, J. B., Liu, Z., & Wardlaw, M. I. (2022). Count (and count-like) data in finance. *Journal of Financial Economics*, *146*(2), 529-551.

Cortes, G. S., Silva, T. C., & van Doornik, B. F. N. (2019). Credit shock propagation in firm networks: Evidence from government bank credit expansions. Working Papers Series 507, Central Bank of Brazil.

Costello, A. M. (2020). Credit market disruptions and liquidity spillover effects in the supply chain. *Journal of Political Economy*, *128*(9), 3434-3468.

Crosignani, M., Macchiavelli, M., & Silva, A. F. (2023). Pirates without borders: The propagation of cyberattacks through firms' supply chains. *Journal of Financial Economics*, *147*(2), 432-448.

Di Giovanni, J., & Hale, G. (2022). Stock market spillovers via the global production network: Transmission of US monetary policy. *The Journal of Finance*, *77*(6), 3373-3421.

Engle, R. F., & Campos-Martins, S. (2023). What are the events that shake our world? Measuring and hedging global COVOL. *Journal of Financial Economics*, *147*(1), 221-242.

Fisman, R., Marcolongo, G., & Wu, M. (2025). The Undoing of Economic Sanctions: Evidence from the Russia-Ukraine conflict. Boston University, Working paper.

Ganesan, S., & Mallapragada, G. (2025). Navigating Geopolitical Turmoil: Corporate Responses to the War in Ukraine and Its Impact on Consumer Mindset. *Journal of Public Policy & Marketing*, *44*(1), 122-139.

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

Gofman, M., Segal, G., & Wu, Y. (2020). Production networks and stock returns: The role of vertical creative destruction. *The Review of Financial Studies*, *33*(12), 5856-5905.

Hassan, T. A., Hollander, S., Van Lent, L., & Tahoun, A. (2019). Firm-level political risk: Measurement and effects. *The Quarterly Journal of Economics*, *134*(4), 2135-2202.

Hendricks, K. B., Jacobs, B. W., & Singhal, V. R. (2020). Stock market reaction to supply chain disruptions from the 2011 Great East Japan Earthquake. *Manufacturing & Service Operations Management*, *22*(4), 683-699.

Huang, Y., Lin, C., Liu, S., & Tang, H. (2023). Trade networks and firm value: Evidence from the US-China trade war. *Journal of International Economics*, *145*, 103811.

Jacobs, B. W., & Singhal, V. R. (2020). Shareholder value effects of the Volkswagen emissions scandal on the automotive ecosystem. *Production and Operations Management*, *29*(10), 2230-2251.

Jacobs, B. W., Singhal, V. R., & Zhan, X. (2022). Stock market reaction to global supply chain disruptions from the 2018 US government ban on ZTE. *Journal of Operations Management*, *68*(8), 903-927.

Lo, C. K., Tang, C. S., Zhou, Y., Yeung, A. C., & Fan, D. (2018). Environmental incidents and the market value of firms: An empirical investigation in the Chinese context. *Manufacturing & Service Operations Management*, *20*(3), 422-439.

Martin, P., Mayer, T., & Thoenig, M. (2008). Make trade not war? *The Review of Economic Studies*, *75*(3), 865-900.

Orhan, E. (2022). The effects of the Russia-Ukraine war on global trade. *Journal of International Trade, Logistics and Law*, *8*(1), 141-146.

Qiu, B., Xu, F., Yeung, A., & Zeng, C. (2024). Contagious stock price crashes along the supply chain. *Production and Operations Management*, 33(8), 1679-1699.

Voeten, E. (2013). Data and analyses of voting in the United Nations: General Assembly. *Routledge handbook of international organization*, 54-66.

Wang, G., Xiong, Y., Cheng, Y., & Lam, H. K. (2024). The spillover effects of supply chain corruption practices on stock returns. *International Journal of Operations & Production Management*, *44*(5), 934-951.

TABLE 1: Summary Statistics

This table Panel A presents the summary statistics for the variables used in baseline analyses. Panel B presents the means and medians of each control variable for treated and control groups, as well as the differences in means and medians between the two groups. Treated group represents firms with suppliers in either Russia or Ukraine. Control group represents firms without suppliers in Russia or Ukraine. Panel C shows the industry and geographic distribution of the sample. Definitions of variables are included in Appendix I.

Panel A	Obs.	Mean	SD	P25	P50	P75
CAR	18058	0.819%	8.987%	-3.341%	0.438%	4.218%
MCAR	18058	1.111%	9.112%	-3.106%	0.631%	4.414%
Firm_w_Russia_Supplier	18058	0.019	0.138	0.000	0.000	0.000
Firm_w_Ukraine_Supplier	18058	0.001	0.035	0.000	0.000	0.000
Firm_w_Conflict_Zone_Supplier	18058	0.021	0.144	0.000	0.000	0.000
Only_Russia_Customer	18058	0.043	0.203	0.000	0.000	0.000
Only_Ukrain_Customer	18058	0.003	0.057	0.000	0.000	0.000
Both_Country_Customer	18058	0.003	0.053	0.000	0.000	0.000
Affected_Customer	18058	0.049	0.216	0.000	0.000	0.000
Size	18058	22.483	2.883	20.619	22.376	24.266
MTB	18058	4.471	12.498	0.907	1.801	3.538
Leverage	18058	0.227	0.197	0.060	0.190	0.342
ROA	18058	0.058	0.154	0.028	0.077	0.128
Momentum	18058	20.773%	71.363%	-16.600%	5.030%	34.757%
CAPX	18058	18.433	3.353	16.280	18.576	20.608
Cash_Holdings	18058	0.169	0.167	0.054	0.120	0.226
Number of New Supplier	18058	7.594	25.288	0.000	2.000	6.000
Number of New International Supplier	18058	4.512	18.671	0.000	1.000	3.000
Number of Total Supplier	18058	15.794	46.096	1.000	4.000	13.000
Number of Total International Supplier	18058	9.605	33.719	0.000	2.000	7.000
New Supplier	18058	0.712	0.453	0.000	1.000	1.000
New International Supplier	18058	0.524	0.499	0.000	1.000	1.000

Panel B	Treated		Control		Test of difference	
Variables	Mean (1)	Median (2)	Mean (3)	Median (4)	*t*-test (1)-(3)	Wilcoxon (2)-(4)
CAR	-1.967%	-0.303%	0.880%	0.449%	-2.846%***	-0.752%***
MCAR	-1.777%	-0.283%	1.174%	0.653%	-2.951%***	-0.936%***
Size	24.253	24.329	22.445	22.339	1.808***	1.990***
MTB	5.656	1.274	4.445	1.815	1.211*	-0.541***
Leverage	0.294	0.260	0.225	0.188	0.069***	0.072***
ROA	0.097	0.093	0.057	0.077	0.040***	0.016***
Momentum	19.292	11.348	20.805	4.872	-1.513	6.476***
CAPX	20.364	20.686	18.391	18.538	1.974***	2.148***
Cash_Holdings	0.114	0.089	0.171	0.121	-0.057***	-0.032***

Panel C

Industry Category	**No.**	**%**	**Regions**	**No.**	**%**
Industrial Applications and Services	2,109	11.7%	Africa	103	0.6%

Energy & Transportation	2,276	12.6%
Finance	289	1.6%
Life Sciences	1,273	7.0%
Manufacturing	5,719	31.7%
Real Estate and Construction	711	3.9%
Technology	3,383	18.7%
Trade and Services	2,298	12.7%
Total	18,058	100.0%

Asia	10,805	59.8%
Europe	2,819	15.6%
North America	3,496	19.4%
Oceania	576	3.2%
South America	259	1.4%
Total	18,058	100.0%

TABLE 2: The Propagation of Russo-Ukrainian War along the Supply Chain

This table presents the baseline results examining the Russo-Ukrainian War adverse impact on firms with suppliers in either Russia or Ukraine. The dependent variable in column (1) and (2) is [-3, +3] CAR on Feb 24, 2022. The dependent variable in column (3) and (4) is [-3, +3] CAR in market-adjusted model on Feb 24, 2022. Definitions of variables are included in Appendix I. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *standard errors* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	[-3, +3] CAR		[-3, +3] MCAR	
	(1)	(2)	(3)	(4)
Firm_w_Conflict_Zone_Supplier	-3.253***		-3.177***	
	(0.687)		(0.684)	
Firm_w_Russia_Supplier		-3.183***		-3.105***
		(0.647)		(0.645)
Firm_w_Ukraine_Supplier		-4.337		-4.273
		(2.922)		(2.876)
Size	-0.075	-0.076	-0.104	-0.104
	(0.085)	(0.085)	(0.088)	(0.088)
Leverage	-0.440	-0.440	-0.436	-0.437
	(0.438)	(0.438)	(0.423)	(0.423)
ROA	3.012***	3.019***	3.361***	3.367***
	(0.855)	(0.857)	(0.840)	(0.842)
MTB	0.025***	0.025***	0.024***	0.024***
	(0.008)	(0.008)	(0.008)	(0.008)
Momentum	-0.007***	-0.007***	0.015***	0.015***
	(0.002)	(0.002)	(0.002)	(0.002)
CAPX	0.077	0.077	0.056	0.056
	(0.064)	(0.064)	(0.066)	(0.066)
Cash_Holdings	1.635***	1.633***	1.587***	1.585***
	(0.509)	(0.509)	(0.504)	(0.503)
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	18058	18058	18058	18058
Adj. R^2	0.080	0.080	0.102	0.102

TABLE 3: The Pre-Event Analyses on NATO-Russia Meeting and Russia Military Drills

This table Panel A presents the results of regressions with fixed effects validating no significant negative effect of NATO-Russia meeting on firms with supplier relations in Russia or Ukraine, which happened on Jan 12, 2022. And Panel B presents the results of regressions with fixed effects Russia military drills on firms with supplier relations in Russia or Ukraine, which happened on Feb 11, 2022. For both panels, the dependent variable in column (1) and (2) is [-3, +3] cumulative abnormal returns in market model. The dependent variable in column (3) and (4) is [-3, +3] cumulative abnormal returns calculating in market-adjusted model. The firm level control variables are included for confounding differences across firms. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *standard errors* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

Panel A	[-3,+3] CAR		[-3,+3] MCAR	
	(1)	(2)	(3)	(4)
Firm_w_Conflict_Zone_Supplier	0.711*		0.838**	
	(0.420)		(0.426)	
Firm_w_Russia_Supplier		0.534		0.657
		(0.418)		(0.416)
Firm_w_Ukraine_Supplier		1.562		1.658
		(1.604)		(1.818)
Firm-level control variables	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	17,517	17,517	17,517	17,517
Adj. R^2	0.087	0.087	0.046	0.046
Panel B	(1)	(2)	(3)	(4)
Firm_w_Conflict_Zone_Supplier	-0.673*		-1.153*	
	(0.371)		(0.625)	
Firm_w_Russia_Supplier		-0.981***		-1.544**
		(0.346)		(0.646)
Firm_w_Ukraine_Supplier		1.711		2.051
		(1.455)		(1.939)
Firm-level control variables	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	17,519	17,519	17,519	17,519
Adj. R^2	0.111	0.111	-0.013	-0.013

TABLE 4: Russo-Ukrainian War and Supplier Reliance

This table also presents subsample analyses examining the Russo-Ukrainian War adverse impact on firms with supplier reliance in either Russia or Ukraine. In column (1) and (3), the proxies for measuring supplier reliance are constructed by counting number of suppliers in Russia or Ukraine. High conflict zone supplier concentration is an indicator variable equal to one when affected firm has above the mean number of Russian or Ukrainian suppliers, and zero otherwise. Low conflict zone supplier concentration is an indicator variable equal to one when affected firm has below the mean number of Russian or Ukrainian suppliers, and zero otherwise. The dependent variable is [-3, +3] CAR and MCAR centering on Feb 24, 2022. Definitions of variables are included in Appendix I. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *standard errors* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	[-3,+3] CAR		[-3,+3] MCAR	
	(1)	(2)	(3)	(4)
Number_Russia_Supplier	-1.078**		-1.078**	
	(0.536)		(0.529)	
Number_Ukraine_Supplier	-4.030*		-4.000*	
	(2.364)		(2.351)	
High_Conflict_Zone_Supplier_Conc		-5.154***		-5.141***
		(1.469)		(1.456)
Low_Conflict_Zone_Supplier_Conc		-2.482***		-2.380***
		(0.682)		(0.677)
Size	-0.050	-0.074	-0.082	-0.103
	(0.085)	(0.085)	(0.088)	(0.088)
Leverage	-0.445	-0.437	-0.441	-0.434
	(0.439)	(0.437)	(0.425)	(0.423)
ROA	3.007***	3.027***	3.358***	3.375***
	(0.858)	(0.856)	(0.843)	(0.842)
MTB	0.028***	0.026***	0.026***	0.024***
	(0.008)	(0.008)	(0.008)	(0.008)
Momentum	-0.007***	-0.007***	0.015***	0.015***
	(0.002)	(0.002)	(0.002)	(0.002)
CAPX	0.075	0.075	0.054	0.054
	(0.063)	(0.064)	(0.066)	(0.066)
Cash_Holdings	1.616***	1.635***	1.569***	1.587***
	(0.509)	(0.508)	(0.502)	(0.502)
Total Number of Suppliers	-0.005**		-0.004**	
	(0.002)		(0.002)	
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	18,058	18,058	18,058	18,058
Adj. R^2	0.080	0.081	0.102	0.103

TABLE 5: Russo-Ukrainian War and Geopolitical Attitudes

This table also presents heterogenous analyses examining the Russo-Ukrainian War adverse impact on firms with suppliers in either Russia or Ukraine regarding geopolitical attitudes of firm locations. The indicator of against the invasion is proxied through UN general assembly voting results regarding agenda of militarization of the Autonomous Republic of Crimea and the city of Sevastopol, Ukraine, as well as parts of the Black Sea and the Sea of Azov. If the country votes Yes for the agenda, it is considered to be against the Russian invasion on Ukraine. And countries which vote No, Abstention, and Non-voting are considered to be not explicitly against the Russian invasion on Ukraine.The indicator variable for against the invasion equals to one if the firm is located in countries which voted Yes in above mentioned agenda, and zero otherwise. The independent variable in Panel B is country-specific monthly Geopolitical Risk index which measures the country geopolitical risk at the beginning of January 2022 (GPR_Index)[3]. The dependent variable is [-3, +3] CAR and MCAR centering on Feb 24, 2022. Definitions of variables are included in Appendix I. The firm level control variables are included for confounding differences across firms. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *standard errors* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

Panel A	[-3, +3] CAR		[-3, +3] MCAR	
	(1)	(2)	(3)	(4)
Against the Invasion× Firm_w_Conflict_Zone_Supplier	-3.228***		-3.230***	
	(1.054)		(1.036)	
Against the Invasion× Firm_w_Russia_Supplier		-3.202***		-3.201***
		(1.035)		(1.019)
Against the Invasion× Firm_w_Ukraine_Supplier		-3.298		-3.379
		(3.685)		(3.627)
Firm_w_Conflict_Zone_Supplier	-1.213**		-1.135**	
	(0.520)		(0.510)	
Firm_w_Russia_Supplier		-1.204**		-1.128**
		(0.530)		(0.520)
Firm_w_Ukraine_Supplier		-1.529		-1.396
		(1.559)		(1.515)
Firm-level control variables	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	18,058	18,058	18,058	18,058
Adj. R^2	0.081	0.081	0.103	0.103
Panel B	(1)	(2)	(3)	(4)
GPR_Index×Firm_w_Conflict_Zone_Supplier	-0.448*		-0.424	
	(0.264)		(0.263)	
GPR_Index×Firm_w_Russia_Supplier		-0.518*		-0.491*
		(0.278)		(0.278)
GPR_Index×Firm_w_Ukraine_Supplier		0.606		0.587
		(1.204)		(1.225)
Firm_w_Conflict_Zone_Supplier	-2.141**		-2.122**	
	(0.864)		(0.861)	

[3] Data downloaded from https://www.matteoiacoviello.com/gpr.htm on Jan 2025.

Firm_w_Russia_Supplier		-1.993**		-1.990**
		(0.833)		(0.832)
Firm_w_Ukraine_Supplier		-4.455		-4.174
		(4.576)		(4.566)
Firm-level control variables	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	17,424	17,424	17,424	17,424
Adj. R^2	0.077	0.077	0.101	0.101

TABLE 6: Post-Russo-Ukrainian War and Number of New Suppliers

This table presents Poisson regression results for post-event analyses examining how firms with suppliers in either Russia or Ukraine would react to the Russo-Ukrainian War regarding the number of new suppliers acquired after the Russo-Ukrainian War. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *standard errors* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively, based on two-tailed *t*-test.

	Number_New_Supplier		Number_New_International_Supplier	
	(1)	(2)	(3)	(4)
Firm_w_Conflict_Zone_Supplier	0.232***		0.334***	
	(0.071)		(0.085)	
Firm_w_Russia_Supplier		0.219***		0.332***
		(0.072)		(0.086)
Firm_w_Ukraine_Supplier		0.670***		0.423*
		(0.187)		(0.255)
Size	0.390***	0.391***	0.399***	0.399***
	(0.025)	(0.025)	(0.027)	(0.027)
Leverage	-0.348**	-0.347**	-0.422**	-0.422**
	(0.166)	(0.166)	(0.179)	(0.179)
ROA	-0.315*	-0.315*	-0.190	-0.190
	(0.180)	(0.180)	(0.230)	(0.230)
MTB	0.019***	0.019***	0.021***	0.021***
	(0.001)	(0.001)	(0.002)	(0.002)
Momentum	-0.001***	-0.001***	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
CAPX	0.047***	0.046***	0.057***	0.057***
	(0.015)	(0.015)	(0.020)	(0.020)
Cash_Holdings	0.024	0.029	0.012	0.013
	(0.112)	(0.111)	(0.185)	(0.186)
Total Number of Suppliers	0.002***	0.002***		
	(0.000)	(0.000)		
Total Number of International Suppliers			0.003***	0.003***
			(0.001)	(0.001)
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	18,046	18,046	18,017	18,017

TABLE 7: Geopolitical Attitudes and New Supplier Relation Formation

This table presents Poisson regression results on subsample analysis of new supplier acquisition regarding geopolitical attitudes. In both panels, the dependent variable is number of new suppliers acquired after Feb 24, 2022. For Panel A, in the sample of against the Russian invasion on Ukraine, there are 7,338 firms headquartered in countries which geopolitical positions are explicitly against the invasion. The indicator of against the invasion is proxied through UN general assembly voting results regarding agenda of militarization of the Autonomous Republic of Crimea and the city of Sevastopol, Ukraine, as well as parts of the Black Sea and the Sea of Azov. If the country votes Yes for the agenda, it is considered to be against the Russian invasion on Ukraine. And countries which vote No, Abstention, and Non-voting are considered to be not explicitly against the Russian invasion on Ukraine. For Panel B, the indicator of high GPR index is constructed using country specific GPR Index. If the firm is located in a country with GPR Index above the sample mean, the firm is classified in High GPR subsample; otherwise, the firm is classified in Low GPR subsample if located in a country with GPR Index below the sample mean. The firm level control variables are included for confounding differences across firms. Standard errors are clustered at either the industry level or country level with controlling the country and industry fixed effects. And *standard errors* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively, based on two-tailed *t*-test.

Panel A	Number of New Supplier			
	Against the Invasion		Not Against the Invasion	
	(1)	(2)	(3)	(4)
Firm_w_Conflict_Zone_Supplier	0.272***		-0.026	
	(0.087)		(0.125)	
Firm_w_Russia_Supplier		0.259***		-0.036
		(0.091)		(0.126)
Firm_w_Ukraine_Supplier		0.640***		0.827***
		(0.190)		(0.097)
Total Number of Suppliers	0.002***	0.002***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)
Firm-level control variables	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	7,327	7,327	10,649	10,649
Panel B	High_GPR		Low_GPR	
	(1)	(2)	(3)	(4)
Firm_w_Conflict_Zone_Supplier	0.235***		0.098	
	(0.091)		(0.102)	
Firm_w_Russia_Supplier		0.221***		0.087
		(0.093)		(0.105)
Firm_w_Ukraine_Supplier		0.744***		0.451***
		(0.203)		(0.207)
Total Number of Suppliers	0.002***	0.002***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Firm-level control variables	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Obs.	11,061	11,061	6,918	6,918

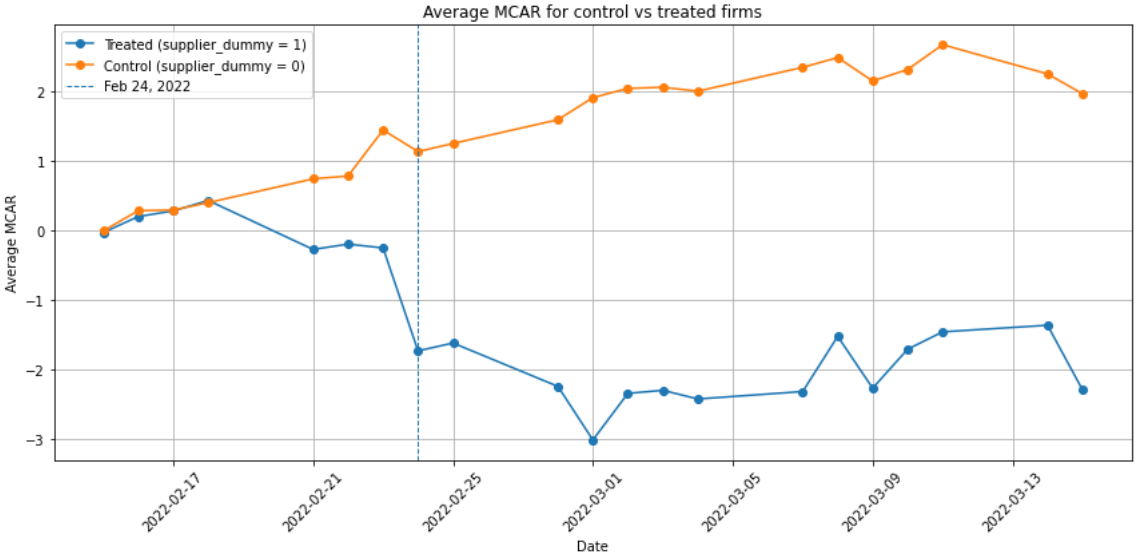
TABLE 8: Geopolitical Frictions, Geopolitical Attitudes, and Customer-Supplier Termination

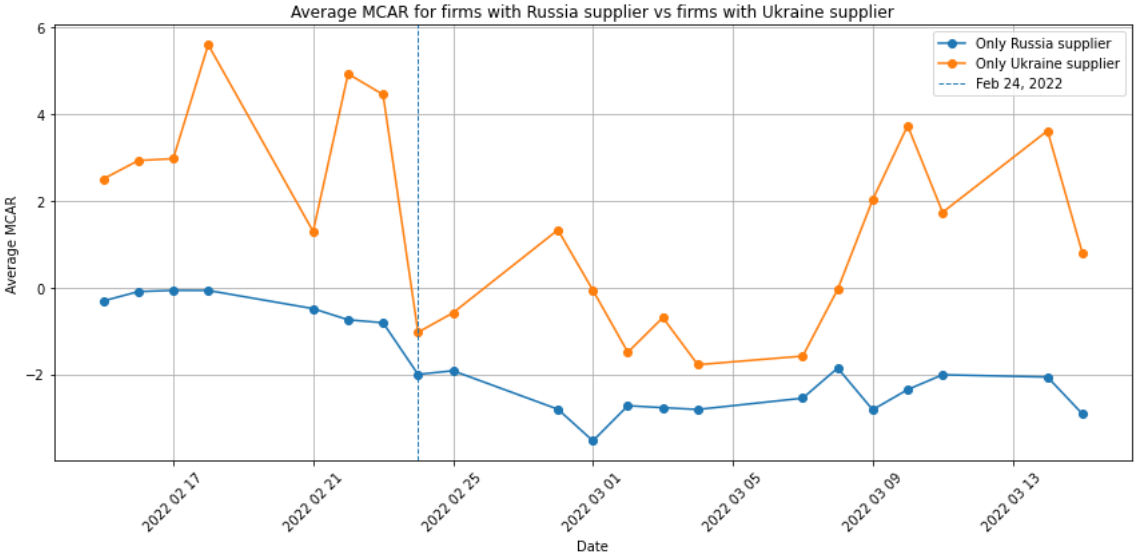
This table presents results of OLS regression on the effect of Russo-Ukrainian War on the likelihood of customer-supplier relation termination. The unit of observation is at the customer-supplier pair-year level from 2019 to 2023. The dependent variable Termination is an indicator variable, equals to one if in a given year pair level data, the given customer and supplier relation is terminated in the following year, and zero otherwise. The Pair with Russia Supplier is an indicator variable, equals to one when in the pair-year level data, the supplier is located in Russia, and zero otherwise. The Pair with Ukraine Supplier is an indicator variable, equals to one when in the pair-year level data, the supplier is located in Ukraine, and zero otherwise. The Year2021 is an indicator variable, equals to one when in the pair-year data, the year is 2021, and zero otherwise. The Year2022 is an indicator variable, equals to one when in the pair-year data, the year is 2022, and zero otherwise. Columns (1) and (2) are full sample, column (1) includes pair-level and year fixed effects and column (2) includes customer firm fixed effects, supplier firm fixed effects, and year fixed effects. In column (3) and (4), the sample represents observations where customer firms are headquartered in countries whose geopolitical attitudes are not explicitly against the Russian invasion over Ukraine. The indicator of against the invasion is proxied through UN general assembly voting results regarding agenda of militarization of the Autonomous Republic of Crimea and the city of Sevastopol, Ukraine, as well as parts of the Black Sea and the Sea of Azov. If the country votes Yes for this agenda, it is considered to be against the Russian invasion on Ukraine and the indicator Against Invasion equals to one. And countries which vote No, Abstention, and Non-voting in this agenda are considered to be not explicitly against the Russian invasion on Ukraine and the indicator Against Invasion equals to zero. Standard errors are clustered at the pair level and year level. And *standard errors* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	Termination					
	Full Sample		Not Against Invasion		Against Invasion	
	(1)	(2)	(3)	(4)	(5)	(6)
Year2021×Pair_w_Russia_Supplier	0.063	0.043	0.005	-0.016	0.089*	0.100**
	(0.028)	(0.020)	(0.044)	(0.029)	(0.036)	(0.024)
Year2021×Pair_w_Ukraine_Supplier	0.389**	0.572**			0.385**	0.558**
	(0.108)	(0.117)			(0.108)	(0.117)
Year2022×Pair_w_Russia_Supplier	0.019	-0.013	0.105	0.101	-0.034	-0.029
	(0.040)	(0.022)	(0.054)	(0.053)	(0.052)	(0.028)
Year2022×Pair_w_Ukraine_Supplier	-0.201	-0.006			-0.229	-0.046
	(0.097)	(0.119)			(0.099)	(0.116)
Firm FE	No	Yes	No	Yes	No	Yes
Pair FE	Yes	No	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	300,386	379,450	123,599	153,376	176,787	222,833

Graph 1: Average Market-Adjusted Cumulative Abnormal Return

This graph presents the average market-adjusted cumulative abnormal return among different supplier type and control group. Firms with suppliers in either Russia or Ukraine experienced significant drop in MCAR. There are 406 firms with suppliers in Russia or Ukraine and 20,848 control firms.





Appendix
Appendix 1: Variable Definitions

Variables	Definitions	Data Sources
Firm w Conflict Zone Supplier	An indicator variable that equals 1 if a firm has suppliers in either Russia or Ukraine and equals 0 otherwise; the relation must start before Feb 24, 2022.	FactSet Revere
Firm w Russia Supplier	An indicator variable that equals 1 if a firm has suppliers in Russia and equals 0 otherwise; the relation must start before Feb 24, 2022. And if firms having suppliers in both Russia and Ukraine, the indicator variable equals 1.	FactSet Revere
Firm w Ukraine Supplier	An indicator variable that equals 1 if a firm has suppliers in Ukraine and equals 0 otherwise; the relation must start before Feb 24, 2022.	FactSet Revere
Firm w Conflict Zone Customer	An indicator variable that equals 1 if a firm has customers in either Russia or Ukraine and equals 0 otherwise, the relation must start before Feb 24, 2022.	FactSet Revere
Only Russia Customer	An indicator variable that equals 1 if a firm has customers in Russia and equals 0 otherwise, the relation must start before Feb 24, 2022.	FactSet Revere
Only Ukraine Customer	An indicator variable that equals 1 if a firm has customers in Ukraine and equals 0 otherwise, the relation must start before Feb 24, 2022.	FactSet Revere
Both Country Customer	An indicator variable that equals 1 if a firm has customers in both Russia and Ukraine and equals 0 otherwise, the relation must start before Feb 24, 2022.	FactSet Revere
CAR	Cumulative abnormal returns (cumulated using daily abnormal returns) over [-3,+3] centering around the event date. The daily abnormal returns are calculated using market model and daily market return in World Indices.	Compustat
MCAR	Market adjusted cumulative abnormal returns (cumulated using daily abnormal returns) over [-3,+3] centering around the event date. The daily abnormal returns are calculated using market adjusted model and daily market return in World Indices.	Compustat
Size	Natural logarithm value of the total assets (at) for each firm in FY 2021.	Compustat
Leverage	Financial leverage ratio in FY 2021 as sum of long-term debt(dltt) and debt in current liabilities (dlc) divided by total assets (at).	Compustat
ROA	Return on Assets ratio in FY 2021 as operating income before depreciation (oibdp) divided by total assets (at).	Compustat
MTB	Market to Book ratio in FY 2021 as market value of total equity (cshoc*prccd scaled down by millions) over book value of total equity (using total assets subtract with total liabilities)	Compustat
Momentum	Annualized stock volatilities using daily return for each firm over [-270, -60] with zero indicating Feb 24, 2022.	Compustat
CAPX	Natural logarithm value of total capital expenditures (capx) for each firm in FY 2021.	Compustat
Cash Holdings	Total cash or cash equivalents (ch/chech) divided by total assets (at) in FY 2021.	Compustat
Number Russia Supplier	Total number of suppliers located in Russia for one affected firm during the customer-supplier relation period covering the day of Feb 24, 2022, as recorded in FactSet Revere.	FactSet Revere

Number Ukraine Supplier	Total number of suppliers located in Ukraine for one affected firm during the customer-supplier relation period covering the day of Feb 24, 2022, as recorded in FactSet Revere.	FactSet Revere
High Conflict Zone Supplier Conc	The variable is high conflict zone supplier concentration. An indicator variable equals 1 if firm has above the mean total number of suppliers located in Russia or Ukraine and the mean is among firms have suppliers in either Russia or Ukraine, and 0 otherwise.	FactSet Revere
Low Conflict Zone Supplier Conc	The variable is low conflict zone supplier concentration. An indicator variable equals 1 if firm has below the mean total number of suppliers located in Russia or Ukraine and the mean is among firms have suppliers in either Russia or Ukraine, and 0 otherwise.	FactSet Revere
New Supplier	An indicator variable equals 1 if firm has supplier relation other than Russia or Ukraine in FactSet Revere when start date is after Feb 24, 2022.	FactSet Revere
New International Supplier	An indicator variable equals 1 if firm has international supplier relation other than home country and Russia or Ukraine in FactSet Revere when start date is after Feb 24, 2022.	FactSet Revere
New Supplier Counts	Total number of new suppliers located other than Russia or Ukraine for each firm after Feb 24, 2022.	FactSet Revere
New International Supplier Counts	Total number of new international suppliers located other than home country and Russia or Ukraine for each firm after Feb 24, 2022.	FactSet Revere
Total Number of Suppliers	Total number of suppliers for each firm and the relation starts before Feb 24, 2022.	FactSet Revere
Total Number of International Suppliers	Total number of international suppliers located other than home country for each firm and the relation starts before Feb 24, 2022.	FactSet Revere
Not Against the Invasion	An indicator variable equals 1 if firm is in the country voted “No” or abstained or did not vote on the agenda of problem of the militarization of the Autonomous Republic of Crimea and the city of Sevastopol, Ukraine, as well as parts of the Black Sea and the Sea of Azov, and zero otherwise.	United Nation Digital Library
Against the Invasion	An indicator variable equals 1 if firm is in the country voted “Yes” on the agenda of problem of the militarization of the Autonomous Republic of Crimea and the city of Sevastopol, Ukraine, as well as parts of the Black Sea and the Sea of Azov, and zero otherwise.	United Nation Digital Library
Geopolitical Risk Index	Country-specific monthly Geopolitical Risk index (GPR Index) which measures 44 countries’ geopolitical risk at the beginning of January 2022.	Caldara et al. (2023)
Year2021	Indicator variable for the supplier-customer relation, equals to one when in the customer-supplier pair-year data from 2019 to 2023, the year is 2021, and zero otherwise.	FactSet Revere
Year2022	Indicator variable for the supplier-customer relation, equals to one when in the customer-supplier pair-year data from 2019 to 2023, the year is 2022, and zero otherwise.	FactSet Revere
Pair w Russia Supplier	Indicator variable for the supplier country, equals to one if the supplier is located in Russia in the customer-supplier pair-year data from 2019 to 2023, and zero otherwise.	FactSet Revere
Pair w Ukraine Supplier	Indicator variable for the supplier country, equals to one if the supplier is located in Ukraine in the customer-supplier pair-year data from 2019 to 2023, and zero otherwise.	FactSet Revere

Termination	Indicator variable for the supplier-customer relation status, equals to one if for the given year, the trade relation is terminated next year in the customer-supplier pair-year data from 2019 to 2022, and zero otherwise.	FactSet Revere

Appendix 2: Summary Statistics for Treated Firms

This table presents the treated firms summary statistics for the variables used in baseline analyses. Definitions of variables are included in Appendix I.

	Obs.	Mean	SD	P25	P50	P75
CAR	383	-1.967%	11.581%	-5.244%	-0.303%	3.683%
MCAR	383	-1.777%	11.659%	-4.955%	-0.283%	3.574%
Firm_w_Russia_Supplier	383	0.919	0.273	1.000	1.000	1.000
Firm_w_Ukraine_Supplier	383	0.057	0.233	0.000	0.000	0.000
Firm_w_Conflict_Zone_Supplier	383	1.000	0.000	1.000	1.000	1.000
Only_Russia_Customer	383	0.253	0.435	0.000	0.000	1.000
Only_Ukrain_Customer	383	0.013	0.114	0.000	0.000	0.000
Both_Country_Customer	383	0.034	0.181	0.000	0.000	0.000
Firm_w_Conflict_Zone_Customer	383	0.300	0.459	0.000	0.000	1.000
Size	383	24.253	3.148	22.300	24.329	26.184
MTB	383	5.656	17.989	0.691	1.274	2.741
Leverage	383	0.294	0.192	0.160	0.260	0.393
ROA	383	0.097	0.112	0.050	0.093	0.137
Momentum	383	19.292%	46.310%	-7.235%	11.348%	31.130%
CAPX	383	20.364	3.546	18.081	20.686	22.613
Cash-Holdings	383	0.114	0.105	0.049	0.089	0.143

Appendix: Baseline Robustness Check on All Non-Eurozone Firms

	[-3, +3] CAR		[-3, +3] MCAR	
	(1)	(2)	(3)	(4)
Firm_w_Conflict_Zone_Supplier	-2.435***		-2.347***	
	(0.582)		(0.572)	
Firm_w_Russia_Supplier		-2.473***		-2.402***
		(0.600)		(0.591)
Firm_w_Ukraine_Supplier		-1.825		-1.457
		(1.902)		(1.660)
Size	-0.110	-0.109	-0.133	-0.133
	(0.083)	(0.083)	(0.087)	(0.087)
Leverage	0.196	0.196	0.194	0.194
	(0.477)	(0.477)	(0.463)	(0.463)
ROA	3.055***	3.052***	3.350***	3.346***
	(0.806)	(0.807)	(0.789)	(0.790)
MTB	0.020***	0.020***	0.019**	0.019**
	(0.008)	(0.008)	(0.008)	(0.008)
Momentum	-0.006***	-0.006***	0.016***	0.016***
	(0.002)	(0.002)	(0.002)	(0.002)
CAPX	0.073	0.073	0.049	0.049
	(0.062)	(0.062)	(0.065)	(0.065)
Cash_Holdings	1.763***	1.763***	1.723***	1.724***
	(0.522)	(0.523)	(0.529)	(0.529)
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	15,945	15,945	15,945	15,945
Adj. R^2	0.071	0.071	0.097	0.097

Appendix 3: Market Reactions to Firms with Conflict Zone Customers

This table presents the baseline results examining the Russo-Ukrainian War adverse impact on firms with customers in either Russia or Ukraine. The dependent variable in column (1) and (2) is [-3, +3] CAR on Feb 24, 2022. The dependent variable in column (3) and (4) is [-3, +3] CAR in market-adjusted model on Feb 24, 2022. Definitions of variables are included in Appendix I. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And t-values are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	[-3, +3] CAR		[-3, +3] MCAR	
	(1)	(2)	(3)	(4)
Only_Russia_Customer	-1.005**		-1.071**	
	(0.485)		(0.493)	
Only_Ukraine_Customer	-1.157		-1.086	
	(0.927)		(0.903)	
Both_Country_Customer	-2.185		-1.995	
	(1.966)		(1.972)	
Firm_w_Conflict_Zone_Customer		-1.080**		-1.122**
		(0.444)		(0.451)
Size	-0.095	-0.095	-0.122	-0.122
	(0.085)	(0.085)	(0.088)	(0.088)
Leverage	-0.441	-0.444	-0.439	-0.441
	(0.442)	(0.442)	(0.427)	(0.427)
ROA	3.068***	3.064***	3.414***	3.411***
	(0.852)	(0.850)	(0.839)	(0.837)
MTB	0.024***	0.024***	0.023***	0.023***
	(0.008)	(0.008)	(0.008)	(0.008)
Momentum	-0.007***	-0.007***	0.015***	0.015***
	(0.002)	(0.002)	(0.002)	(0.002)
CAPX	0.073	0.073	0.052	0.052
	(0.064)	(0.064)	(0.066)	(0.066)
Cash_Holdings	1.604***	1.602***	1.555***	1.553***
	(0.515)	(0.515)	(0.508)	(0.508)
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	18058	18058	18058	18058
Adj. R^2	0.0784	0.0785	0.101	0.101

Appendix 4: The Pre-Event Analyses on NATO-Russia meeting on Jan 12, 2022

This table presents the results of regressions with fixed effects validating no significant negative effect of NATO-Russia meeting on firms with customer relations in Russia or Ukraine. The dependent variable in column (1) and (2) is [-3, +3] cumulative abnormal returns. The dependent variable in column (3) and (4) is [-3, +3] cumulative abnormal returns calculating in market-adjusted model. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *t-values* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	[-3,+3] CAR		[-3,+3] MCAR	
	(1)	(2)	(3)	(4)
Only_Russia_Customer	0.265		0.225	
	(0.330)		(0.330)	
Only_Ukraine_Customer	-0.713		-0.541	
	(0.613)		(0.630)	
Both_Country_Customer	-0.233		-0.087	
	(1.075)		(1.094)	
Firm_w_Conflict_Zone_Customer		-0.036		-0.063
		(0.285)		(0.290)
Size	-0.204**	-0.200**	-0.261***	-0.257***
	(0.088)	(0.089)	(0.087)	(0.088)
Leverage	0.579	0.577	0.585	0.584
	(0.640)	(0.641)	(0.640)	(0.641)
ROA	2.699***	2.696***	3.163***	3.161***
	(0.759)	(0.760)	(0.784)	(0.785)
MTB	0.009	0.009	0.007	0.007
	(0.017)	(0.016)	(0.017)	(0.017)
Momentum	-0.032***	-0.032***	-0.010***	-0.010***
	(0.002)	(0.002)	(0.002)	(0.002)
CAPX	0.143**	0.142**	0.143**	0.142**
	(0.063)	(0.063)	(0.062)	(0.062)
Cash_Holdings	-2.474***	-2.476***	-2.650***	-2.652***
	(0.580)	(0.580)	(0.582)	(0.583)
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	17,547	17,547	17,547	17,547
Adj. R^2	0.087	0.087	0.046	0.046

Appendix 5: The Pre-Event Analyses on Russia Military Drills on Feb 11, 2022

This table presents the results of regressions with fixed effects validating no significant negative effect of Russia military drills on firms with customer relations in Russia or Ukraine. The dependent variable in column (1) and (2) is [-3, +3] cumulative abnormal returns. The dependent variable in column (3) and (4) is [-3, +3] cumulative abnormal returns calculating in market-adjusted model. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *t-values* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	[-3, +3] CAR		[-3, +3] MCAR	
	(1)	(2)	(3)	(4)
Only_Russia_Customer	0.279		0.122	
	(0.303)		(0.285)	
Only_Ukraine_Customer	-1.356		-1.245	
	(0.882)		(0.907)	
Both_Country_Customer	-3.242**		-2.958**	
	(1.312)		(1.299)	
Firm_w_Conflict_Zone_Customer		-0.134		-0.358
		(0.301)		(0.301)
Size	0.341***	0.343***	0.151	0.153
	(0.080)	(0.081)	(0.207)	(0.207)
Leverage	-0.115	-0.125	0.047	0.037
	(0.488)	(0.489)	(1.003)	(1.000)
ROA	-0.227	-0.243	-8.057*	-8.069*
	(0.942)	(0.941)	(4.442)	(4.438)
MTB	0.028***	0.028***	0.010	0.010
	(0.005)	(0.005)	(0.013)	(0.013)
Momentum	-0.028***	-0.028***	-0.004**	-0.004**
	(0.002)	(0.002)	(0.002)	(0.002)
CAPX	-0.103	-0.103	-0.032	-0.033
	(0.064)	(0.064)	(0.140)	(0.140)
Cash_Holdings	0.214	0.206	-3.827*	-3.837*
	(0.655)	(0.656)	(2.102)	(2.103)
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	17,549	17,549	17,549	17,549
Adj. R^2	0.111	0.111	-0.013	-0.013

Appendix 6: Post-Event Analyses on New Supplier Relation Formations

This table presents OLS regression results for post-event analyses examining the probabilities of firms with suppliers in either Russia or Ukraine would react to the Russo-Ukrainian War through acquiring new suppliers elsewhere. The dependent variable in column (1) and (2) is an indicator variable, equal to one if after Feb 24, 2022, firms seek out new suppliers located outside of conflict zones, and zero otherwise. The dependent variable in column (3) and (4) is an indicator variable, equal to one if after Feb 24, 2022, firm seeks out new suppliers located outside of conflict zones and also outside of home country of the firm, and zero otherwise. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *p-values* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	New_Supplier		New_International_Supplier	
	(1)	(2)	(3)	(4)
Firm_w_Conflict_Zone_Supplier	-0.020		0.038*	
	(0.207)		(0.079)	
Firm_w_Russia_Supplier		-0.036**		0.018
		(0.024)		(0.405)
Firm_w_Ukraine_Supplier		0.198***		0.302***
		(0.002)		(0.000)
Size	0.081***	0.081***	0.088***	0.088***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.020	-0.020	-0.016	-0.015
	(0.321)	(0.325)	(0.448)	(0.455)
ROA	-0.133***	-0.134***	-0.080***	-0.082***
	(0.000)	(0.000)	(0.003)	(0.002)
MTB	0.004***	0.004***	0.006***	0.006***
	(0.000)	(0.000)	(0.000)	(0.000)
Momentum	0.000	0.000	-0.000***	-0.000***
	(0.409)	(0.407)	(0.000)	(0.000)
CAPX	0.015***	0.015***	0.013***	0.013***
	(0.000)	(0.000)	(0.000)	(0.000)
Cash_Holdings	0.068***	0.069***	0.085***	0.086***
	(0.008)	(0.007)	(0.001)	(0.001)
Total Number of Suppliers	-0.000	-0.000		
	(0.629)	(0.729)		
Total Number of International Suppliers			0.001*	0.001*
			(0.061)	(0.052)
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	18,058	18,058	18,058	18,058
Adj. R^2	0.189	0.189	0.228	0.229

Appendix 7: Hazard Model Analysis of New Supplier Relation Formations Post-Conflict

This table presents Cox hazard model in which the "failure event" is the formation of first new supplier after Feb 24, 2022. The sample consists of 11,537 firms having new suppliers after Feb 24, 2022. The dependent variable is New Supplier Event, which equals to one if customer successfully acquires one supplier after Feb 24, 2022, and zero otherwise. Standard errors are clustered at either the industry level or country level with controlling the country and industry fixed effects. And *p-values* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	New_Supplier_Event	
	(1)	(2)
Firm_w_Conflict_Zone_Supplier	0.303***	
	(0.103)	
Firm_w_Russia_Supplier		0.281***
		(0.106)
Firm_w_Ukraine_Supplier		0.685**
		(0.294)
Size	0.301***	0.301***
	(0.019)	(0.019)
Leverage	-0.168*	-0.167*
	(0.095)	(0.095)
ROA	-0.293**	-0.295**
	(0.146)	(0.146)
MTB	0.012***	0.012***
	(0.002)	(0.002)
Momentum	0.000	0.000
	(0.000)	(0.000)
CAPX	0.045***	0.045***
	(0.013)	(0.013)
Cash_Holdings	0.284***	0.285***
	(0.093)	(0.093)
Country FE	Yes	Yes
Industry FE	Yes	Yes
Obs.	11,537	11,537

Appendix 8: DiD Regression on Firm Trade Credit

This table presents DiD results examining causality between Russo-Ukrainian War and firm trade credit performance. The dependent variable in the first six columns is trade credit measured using Accounts Payable divided by Cost of Goods Sold. The last six columns measure trade credit as Accounts Payable divided by Total Sales. The variable Affected is an indicator, equals to one if a firm has suppliers located in either Russia or Ukraine, and zero otherwise. The variable Post is an indicator, equals to one if it is 6 months after Russo-Ukrainian War and zero otherwise. The Switch variable is an indicator variable, equal to one if treated firms terminated relations with suppliers in Russia or Ukraine and acquired new suppliers elsewhere, and zero otherwise. The Non-Switch variable is an indicator variable, equal to one if treated firms terminated relations with suppliers in Russia or Ukraine but did not acquire new suppliers elsewhere or did not terminate relations and acquired new suppliers elsewhere, and zero otherwise. Definitions of control variables are included in Appendix I. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *standard errors* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	TradeCredit (Accounts Payable/COGS)						TradeCredit(Accounts Payable /Sales)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post×Affected	-0.001	-0.042	-0.022				0.0003	0.011	-0.001			
	(0.042)	(0.044)	(0.041)				(0.014)	(0.029)	(0.015)			
Post×Switch				-0.004	-0.003	-0.001				-0.001	0.013	-0.003
				(0.007)	(0.144)	(0.007)				(0.005)	(0.095)	(0.005)
Post×Non_Switch				-0.001	-0.046	-0.024				0.0004	0.011	-0.001
				(0.047)	(0.046)	(0.045)				(0.016)	(0.031)	(0.016)
Post	-0.017	0.011*	-0.025	-0.017	0.011*	-0.025	-0.018	-0.003	-0.031	-0.018	-0.003	-0.031
	(0.027)	(0.006)	(0.029)	(0.027)	(0.006)	(0.029)	(0.025)	(0.004)	(0.026)	(0.025)	(0.004)	(0.026)
Affected		0.002						-0.013				
		(0.022)						(0.014)				
Switch					-0.071						-0.007	
					(0.072)						(0.047)	
Non_Switchh					0.009						-0.013	
					(0.023)						(0.015)	
Size		0.037***	-0.031*		0.037***	-0.031*		0.023***	-0.015		0.023***	-0.015
		(0.002)	(0.017)		(0.002)	(0.017)		(0.001)	(0.012)		(0.001)	(0.012)
Leverage		0.024	0.025		0.024	0.025		-0.062***	-0.073**		-0.062***	-0.073**
		(0.015)	(0.048)		(0.015)	(0.048)		(0.010)	(0.036)		(0.010)	(0.036)
MTB		0.002***	-0.001		0.002***	-0.001		0.001***	-0.001		0.001***	-0.001

		(0.0004)	(0.001)		(0.0004)	(0.001)		(0.0003)	(0.001)		(0.0003)	(0.001)
ROA		-1.021***	-0.351***		-1.021***	-0.351***		-1.295***	-0.259***		-1.295***	-0.259***
		(0.020)	(0.067)		(0.020)	(0.067)		(0.013)	(0.051)		(0.013)	(0.051)
CAPX		-0.047***	-0.012**		-0.047***	-0.012**		-0.025***	-0.010***		-0.025***	-0.010***
		(0.002)	(0.004)		(0.002)	(0.005)		(0.001)	(0.003)		(0.001)	(0.003)
Cash		-0.131***	0.070		-0.131***	0.070		0.019	-0.006		0.019	-0.006
Holdings		(0.020)	(0.056)		(0.020)	(0.056)		(0.013)	(0.042)		(0.013)	(0.042)
Obs.	140,741	127,758	127,460	140,741	127,758	127,460	141,563	128,457	128,173	141,563	128,457	128,173
R2_a	0.748	0.037	0.592	0.748	0.037	0.592	0.758	0.099	0.604	0.758	0.099	0.604
Year FE	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Firm FE	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes

Appendix 8 Continued: DiD Regression on Firm Trade Credit

This table provides additional tests for DiD results examining causality between Russo-Ukrainian War and firm trade credit performance. The dependent variable is trade credit measured using Accounts Payable divided by Total Assets. The variable Post is an indicator, equal to one if it is 6 months after Russo-Ukrainian War and zero otherwise. The Switch variable is an indicator variable, equal to one if treated firms terminated relations with suppliers in Russia or Ukraine and acquired new suppliers elsewhere, and zero otherwise. The Non-Switch variable is an indicator variable, equal to one if treated firms terminated relations with suppliers in Russia or Ukraine but did not acquire new suppliers elsewhere or did not terminate relations and acquired new suppliers elsewhere, and zero otherwise. Definitions of control variables are included in Appendix I. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *standard errors* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	TradeCredit (Accounts Payable/Total Assets)					
	(1)	(2)	(3)	(4)	(5)	(6)
Post	0.00002	-0.001**	-0.0001	0.00002	-0.001**	-0.0002
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Affected		0.004**				
		(0.002)				
Post×Affected	0.002	0.003	0.001			
	(0.002)	(0.004)	(0.002)			
Switch					0.008	
					(0.007)	
Post×Switch				0.0002	0.003	-0.001
				(0.005)	(0.014)	(0.005)
Non_switchh					0.004*	
					(0.002)	
Post×Non_Switch				0.003	0.003	0.001
				(0.002)	(0.005)	(0.002)
Size		0.003***	-0.006***		0.003***	-0.006***
		(0.0002)	(0.001)		(0.0002)	(0.001)
Leverage		-0.041***	-0.011***		-0.041***	-0.011***
		(0.001)	(0.003)		(0.001)	(0.003)
MTB		0.00002	-0.0001		0.00003	-0.0001
		(0.00003)	(0.0001)		(0.00004)	(0.0001)
ROA		-0.060***	-0.038***		-0.060***	-0.038***
		(0.002)	(0.003)		(0.002)	(0.003)
CAPX		-0.002***	-0.001**		-0.002***	-0.001**
		(0.0001)	(0.0002)		(0.0002)	(0.0002)
Cash Holdings		-0.068***	-0.017***		-0.068***	-0.017***
		(0.002)	(0.003)		(0.002)	(0.003)
Year FE	Yes	No	Yes	Yes	No	Yes
Firm FE	Yes	No	Yes	Yes	No	Yes
Obs.	153,219	130,424	130,174	153,219	130,424	130,174
Adjusted R2	0.838	0.018	0.836	0.838	0.018	0.836

Appendix 9: Country UN Votes Breakdown

This table presents the country breakdown for the UN General Assembly Votes of Agenda regarding the militarization of the Autonomous Republic of Crimea, the city of Sevastopol, and parts of the Black Sea and Sea of Azov. For each country, it presents UN vote results along with number of firms, number of firms with conflict-zone suppliers and number of firms with conflict-zone customers before Feb 24, 2022.

Country	Total number of firms in sample	No. firms with conflict-zone supplier	No. firms with conflict-zone customer	UN Vote
AUSTRALIA	516	1	16	Y
AUSTRIA	37	3	10	Y
BELGIUM	55	1	10	Y
BRAZIL	155	2	4	A
BULGARIA	13	1	1	Y
CANADA	531	11	30	Y
CHILE	83	1	1	A
CHINA	3,213	26	95	N
COLOMBIA	16	0	0	A
CYPRUS	12	2	0	Y
DENMARK	67	2	8	Y
ESTONIA	7	0	3	Y
FINLAND	95	4	19	Y
FRANCE	304	15	44	Y
GERMANY	298	21	38	Y
GREECE	54	4	7	Y
HUNGARY	3	1	0	Y
INDIA	768	15	34	A
INDONESIA	324	3	5	A
IRELAND	50	1	1	Y
ISRAEL	221	5	22	Y
ITALY	171	10	31	Y
JAPAN	2,280	32	33	Non-Voting
KAZAKHSTAN	5	1	2	A
LITHUANIA	14	1	2	Y
LUXEMBOURG	29	1	3	Y
MALAYSIA	271	0	7	A
MALTA	5	0	0	Y
MEXICO	70	1	2	A
MONACO	4	0	0	Y
MONGOLIA	2	0	0	A
NETHERLANDS	73	9	9	Y
NEW ZEALAND	60	1	0	Y
NORWAY	118	3	14	Y
PERU	2	0	0	A

PHILIPPINES	91	0	2	N
POLAND	138	9	19	Y
PORTUGAL	29	0	0	Y
REPUBLIC OF KOREA	1,257	34	47	A
ROMANIA	18	0	4	Y
SERBIA	2	1	1	N
SINGAPORE	209	4	7	Y
SOUTH AFRICA	103	3	3	Non-Voting
SPAIN	85	5	12	Y
SWEDEN	322	12	25	Y
SWITZERLAND	155	5	15	Y
THAILAND	287	3	3	A
TURKEY	143	3	12	Y
UNITED ARAB EMIRATES	7	0	0	A
UNITED KINGDOM	634	22	48	Y
UNITED STATES	2,829	84	157	Y
URUGUAY	3	0	0	A
VIET NAM	109	2	8	A

Appendix 10: Additional Robustness Check Controlling Pre-Invasion Operation in RU

This table presents the baseline robustness checks with controlling for firms with pre-existing operations in Russia. We construct the indicator variable of Pre_RU_Operation, which equals to one if prior to invasion, firms have physical operations in conflict areas and zero otherwise. We identify whether firms have operations in conflict areas using the firm list constructed by Yale Chief Executive Leadership Institute[4]. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *t-values* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	(1)	(2)	(3)	(4)
	CAR	CAR	MCAR	MCAR
Firm_w_Conflict_Zone_Supplier	-2.462***		-2.409***	
	(0.670)		(0.665)	
Firm_w_Russia_Supplier		-2.319***		-2.267***
		(0.620)		(0.616)
Firm_w_Ukraine_Supplier		-4.558		-4.487
		(2.918)		(2.874)
Size	0.043	0.043	0.011	0.011
	(0.085)	(0.085)	(0.088)	(0.088)
Leverage	-0.433	-0.435	-0.430	-0.432
	(0.444)	(0.444)	(0.429)	(0.428)
ROA	2.966***	2.979***	3.316***	3.328***
	(0.851)	(0.854)	(0.838)	(0.840)
MTB	0.034***	0.034***	0.032***	0.032***
	(0.008)	(0.008)	(0.008)	(0.008)
Momentum	-0.007***	-0.007***	0.015***	0.015***
	(0.002)	(0.002)	(0.002)	(0.002)
CAPX	0.068	0.068	0.047	0.047
	(0.062)	(0.063)	(0.065)	(0.065)
Cash_Holdings	1.668***	1.664***	1.619***	1.615***
	(0.509)	(0.508)	(0.504)	(0.503)
Pre_RU_Operation	-3.359***	-3.385***	-3.260***	-3.286***
	(0.388)	(0.389)	(0.387)	(0.387)
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	18,058	18,058	18,058	18,058
Adjusted_R2	0.085	0.085	0.106	0.106

[4] Please visit to see full list of companies: https://www.yalerussianbusinessretreat.com/

Appendix 11: Additional Robustness Check for Non-Eurozone Firms

This table presents baseline regression for non-eurozone firms. We exclude the firms headquartered in Europe and rerun the baseline setting. Standard errors are clustered at the industry level with controlling the country and industry fixed effects. And *t-values* are presented in the parentheses. Statistical significance at the 1%, 5%, and 10% level is presented as ***, **, *, respectively.

	(1)	(2)	(3)	(4)
	CAR	CAR	MCAR	MCAR
Firm_w_Conflict_Zone_Supplier	-2.435***		-2.347***	
	(0.582)		(0.572)	
Firm_w_Russia_Supplier		-2.473***		-2.402***
		(0.600)		(0.591)
Firm_w_Ukraine_Supplier		-1.825		-1.457
		(1.902)		(1.660)
Size	-0.110	-0.109	-0.133	-0.133
	(0.083)	(0.083)	(0.087)	(0.087)
Leverage	0.196	0.196	0.194	0.194
	(0.477)	(0.477)	(0.463)	(0.463)
ROA	3.055***	3.052***	3.350***	3.346***
	(0.806)	(0.807)	(0.789)	(0.790)
MTB	0.020***	0.020***	0.019**	0.019**
	(0.008)	(0.008)	(0.008)	(0.008)
Momentum	-0.006***	-0.006***	0.016***	0.016***
	(0.002)	(0.002)	(0.002)	(0.002)
CAPX	0.073	0.073	0.049	0.049
	(0.062)	(0.062)	(0.065)	(0.065)
Cash_Holdings	1.763***	1.763***	1.723***	1.724***
	(0.522)	(0.523)	(0.529)	(0.529)
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Obs.	15,945	15,945	15,945	15,945
Adjusted_R2	0.071	0.071	0.097	0.097