

Can Sanctions Deter Wars? The Russia-Ukraine Case[†]

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Economic sanctions have become a central instrument of international relations. Since the early 1990s, the number of active sanction regimes has increased sharply, affecting a growing share of global trade. Historically, sanctions have been deployed in response to a wide range of geopolitical concerns, from South Africa's apartheid regime, Iran's nuclear program, and Cuba's political regime to Russia's annexation of Crimea. While the economics literature documents the costs of sanctions, highlighting trade fragmentation and welfare losses, much less is known about their effectiveness as a geopolitical tool. Sanctions (or the threat of) aim at inducing changes in the behavior of foreign governments by harming their economies. They are designed to exchange economic losses for diplomatic leverage. Evaluating their success thus requires a framework that explicitly quantifies this economic-geopolitical trade-off.

In this paper, we build on the quantitative framework of Mayer, Mejean, and Thoenig (2025), which embeds a diplomatic bargaining game into a standard quantitative trade model. Two countries are involved in a geopolitical dispute that can either be resolved diplomatically via a negotiated transfer, or escalate into an armed conflict if bargaining fails. In equilibrium, the endogenous probability of conflict is a decreasing function of the countries' opportunity costs of war, defined as their expected real consumption losses incurred in war. In this setting, *ex ante* credible threats by third countries to impose sanctions on the potential belligerents in the event of war increase their opportunity costs of war, thereby reducing the probability of conflict.

We apply this framework to the geopolitical relationship between Russia and Ukraine by combining historical data from the 1995–2021 period with different sanction scenarios. The exercise is conducted from a pre-invasion perspective—prior to February 2022—and simulates the counterfactual geopolitical and deterrence effects that threats of sanctions would have produced.¹ These effects are measured in terms of welfare-relevant shifts in bargaining power and changes in the likelihood of preserving peace. Our simulation results suggest that, if credibly announced in 2021, the threat of the 2024 sanction package would have been sufficient to deter a full-blown conflict, restoring the pre-2014 probability of peace.

I. A Model of Trade and Diplomacy

The first block of the quantitative framework consists in a diplomatic game involving two countries integrated into the global economy that face a geopolitical dispute. The second block models the trade equilibrium in a multicountry setting. The sequence of the game is as follows. At the beginning of the period, a geopolitical dispute arises between countries n and m . The dispute can be settled through diplomacy, and the countries are unconstrained in their choice of diplomatic protocol. The outcome of the diplomatic game is either a peaceful resolution of the dispute, in which case the countries agree

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¹ Additional analysis is provided in the companion paper (Mayer, Mejean, and Thoenig 2026).

on a transfer (expressed in consumption-equivalent), $\tilde{T}_{nm} \geq 0$, with $\tilde{T}_{nm} = -\tilde{T}_{mn}$; or the outside option: a failure of diplomacy that leads to war. At the end of the game, production and trade happen, markets clear, and each country receives its state-contingent utility:

$$(1) \quad \tilde{U}_n(\text{peace}) = C_n(\text{peace}) - \tilde{T}_{nm} \quad \text{and} \quad \tilde{U}_n(\text{war}) = C_n(\text{war}) - \tilde{u}_n,$$

where $C_n(\text{state})$ is the equilibrium state-contingent real consumption and $\tilde{u}_n$ represents a privately observed random shock to wartime consumption. This informational asymmetry may lead to bargaining failure, resulting in war along the equilibrium path. Specifically, under parametric assumptions on $\tilde{u}_n$ and $\tilde{u}_m$ detailed in Mayer, Mejean, and Thoenig (2025), the endogenous probability of defusing tensions and avoiding war is

$$(2) \quad \Pr(\text{appeasement})_{nm} = \min\left(\frac{(\text{ocw}_n + \text{ocw}_m)^2}{\eta^2}, 1\right),$$

where η measures the informational noise—that is, the support of the underlying random war shocks ($\tilde{u}_n$ and $\tilde{u}_m$)—and ocw_n is the deterministic opportunity cost of war defined as

$$(3) \quad \text{ocw}_n = C_n(\text{peace}) - C_n(\text{war}).$$

This opportunity cost of war can be quantified using standard quantitative trade methods, given a counterfactual war scenario. The next section details the approach.

II. A War Scenario for Russia and Ukraine

Using the quantitative setup of Mayer, Mejean, and Thoenig (2025), we estimate the opportunity cost of war as the difference in real consumption between a baseline peacetime equilibrium and a counterfactual wartime equilibrium. The approach relies on standard hat-algebra techniques developed in the quantitative trade literature. The underlying trade model features nested CES structures in both consumption and production, leading to a rich pattern of input-output linkages. The baseline equilibrium is simulated using trade flows and final demand data from the OECD Trade in Value-Added (TiVA) database for the years 1995–2021, given a set of calibrated elasticities. The counterfactual equilibrium is obtained by simulating a war scenario that aims to replicate the asymmetric features of the Russo-Ukrainian war: Russia and Ukraine differ markedly in economic size, and the battlefields are entirely located on Ukrainian territory, implying significantly higher economic costs for Ukraine relative to Russia. The simulated scenario involves a combination of human losses, economic losses, and trade disruptions:

- (i) Human losses are calibrated using data from the Center for Strategic and International Studies (CSIS). Scaled by the size of the labor force (source: World Bank), casualties reported by CSIS represent -1.95 percent and -1.38 percent of Ukrainian and Russian labor forces, respectively.
- (ii) We calibrate TFP losses, drawing on the estimates of GDP loss provided in Federle et al. (2024). They estimate the economic cost of the war to be equivalent to 31.02 percent of GDP for Ukraine and just 0.16 percent for Russia.
- (iii) The magnitude of trade disruptions is calibrated using the estimates from Glick and Taylor (2010), who document that, over the 1870–1997 period, bilateral trade between belligerents falls on average by 85 percent during wartime. Trade with third countries is also negatively affected, though to a lesser extent, with an average contraction of 15 percent.

We use the specific institutional context to inform the calibration of the noise parameter η . In 1994, Ukraine, Russia, the United Kingdom, and the United States signed the *Budapest Memorandum*, under

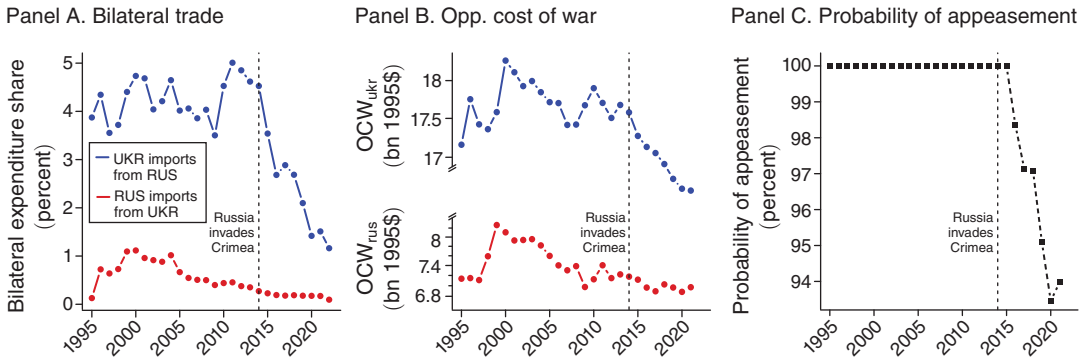


FIGURE 1. THE HISTORICAL EVOLUTION OF TRADE AND CONFLICTUALITY

which the latter three countries committed to providing security assurances to Ukraine in exchange for its accession to the Treaty on the Non-Proliferation of Nuclear Weapons as a non-nuclear-weapon state. While these commitments were eventually violated starting in 2014, we assume that, at the time of signing, all parties regarded them as credible. On this basis, using (2), we calibrate η such that the probability of appeasement in 1995 is exactly one.

III. Trade Patterns, Opportunity Costs of War, and Probability of Appeasement

Figure 1, panel A depicts the evolution of Russia and Ukraine's bilateral trade from 1995 to 2021, as a share in overall expenditures. Several salient features emerge. Russia reduces its bilateral dependence on imports from Ukraine since 2000, even more than its broader pattern of international disengagement. Prior to 2014, Ukraine's imports from Russia remain relatively stable. At the same time, Ukraine steadily integrates into the global economy, particularly with the European Union. As a result, the share of domestic products in Ukrainian consumption declines between 2005 and 2014. A sharp regime shift occurs after 2014: Ukrainian imports from Russia collapse, being replaced by a significant increase in imports from the rest of the world—especially from EU countries—indicating a strong substitution away from Russia. Panel B shows the consequences in terms of the evolution of OCW (expressed in billions of 1995 US dollars). Due to the large asymmetry in economic size, Ukraine's opportunity costs of war are substantially higher than Russia's in absolute terms, as reflected by the different scales on the y-axes. While both series trend downward from the early 2000s, a marked break occurs for Ukraine in 2014. The sharp decline in its bilateral import dependence on Russian final and intermediate goods significantly reduces OCW_{ukr} . As a result, the sum $OCW_{ukr} + OCW_{rus}$ falls below its 1995 level, decreasing the incentives for peaceful settlement. This shift is captured in panel C, where the model predicts a rise in the probability of war beginning in 2015. Between 2014 and 2021, this probability increases by more than 5 percentage points, reaching a local peak just prior to the full-scale invasion of Ukraine.

Overall, our model predicts that Ukraine's effective decoupling from Russia following the 2014 annexation of Crimea lowered its opportunity costs of war, thereby raising the likelihood of conflict. During this period, however, Ukraine's security remained formally guaranteed by the Budapest Memorandum, which in principle should have acted as a deterrent.

IV. Trade Sanctions and Conflictuality

We conduct a set of counterfactual experiments to assess whether credible threats of sanctions, had they been announced in 2021, could have deterred Russia from invading Ukraine. We compare two types of sanctions: noncontingent sanctions, such as the ones adopted in 2014 in response to the annexation of Crimea, and state-contingent sanctions, measures that are imposed only in the

event of war.² By restricting Russia's ability to redirect trade in wartime, the latter type of sanctions amplifies the economic costs associated with domestic and bilateral trade disruptions. In contrast to noncontingent sanctions, this raises Russia's opportunity cost of war, thereby enhancing the disciplining effect of diplomacy and increasing the likelihood of a peaceful settlement.

Our counterfactual sanction scenarios rely on the set of countries that effectively imposed sanctions following the 2022 invasion—namely, the European Union, the United Kingdom, Switzerland, the United States, Canada, Australia, Japan, and Korea. The list of targeted Harmonized System six-digit (HS6) product categories, as well as the country-year mapping of implemented sanctions, is taken from Egorov et al. (2025). The trade impact of these sanctions is calibrated using a difference-in-differences strategy that compares trade dynamics before and after sanction imposition, between targeted and nontargeted product categories.

We first estimate trade frictions using the gravity residuals approach by Huang et al. (2025): $u_{ijkt} \equiv s_{ijkt} / \exp(\hat{\eta}_{ikt} + \hat{\mu}_{jkt})$, where s_{ijkt} is the share of country i in country j 's imports of product k in year t , and $\hat{\eta}_{ikt}$ and $\hat{\mu}_{jkt}$ are origin and destination fixed effects recovered from a structural gravity equation. We then estimate the trade impact of sanctions by running a staggered difference-in-difference on targeted versus nontargeted products exported by sanctioning countries to Russia:

$$\ln u_{ijkt} = \text{FE}_{ijt} + \text{FE}_{ijk} + \alpha \times \mathbf{1}(k \in T_i) \times \mathbf{1}(t \geq t_0) + \varepsilon_{ijkt},$$

where $\mathbf{1}(k \in T_i)$ is a dummy equal to one if product k is sanctioned by country i and $\mathbf{1}(t \geq t_0)$ indicates posttreatment periods. The equation is estimated on the sample of sanctioning countries' exports to Russia, using data from 2017 to 2024. The fixed effects FE_{ijt} and FE_{ijk} control for time-varying bilateral factors and time-invariant product-level heterogeneity, respectively. In this equation, the coefficient α captures the percentage change in trade frictions for targeted products relative to nontargeted ones. Our preferred regression yields $\hat{\alpha} = -0.636$.

Given the estimated trade impact of actual sanctions imposed by Western countries since 2022, we calibrate a war scenario augmented with sanctions. First, we map HS6-level products k into TiVA industries s in order to compute shr_{ijst} , the share of a given s -level trade flow from country i to country j that is covered by sanctions in a given year t . Second, the tariff equivalent of trade sanctions is defined as: $\text{SanctionsAVE}_{ijst} = (1 + \hat{\alpha} \times \text{shr}_{ijst})^{\frac{1}{-\theta_s}}$, where θ_s is the sectoral trade elasticity. In practice, $\text{SanctionsAVE}_{ijst}$ is computed under four distinct scenarios, where Western sanctions are applied to exports of: (i) all HS products effectively targeted in 2022; (ii) the same set extended to all HS products targeted in 2024; (iii) all HS products exported to Russia by sanctioning countries; and (iv) the set in (iii), augmented with a ban on oil imports from Russia. Third, we augment trade frictions with $\text{SanctionsAVE}_{ijs}$ in either the war scenario only (contingent sanctions), or in both peace and war equilibria (noncontingent sanctions).

Figure 2 summarizes the results, focusing on the implied probability of appeasement. Absent additional sanctions, the model predicts a 94 percent probability of appeasement in 2021—as in Figure 1, panel C. Augmenting the war scenario with the 2022 sanction package reduces the probability of war by more than half, raising the probability of appeasement to 97.5 percent (second green bar in Figure 2). The 2024 package further increases this probability to nearly 100 percent. As expected, state-contingent sanctions reduce the ex ante probability of war by raising Russia's opportunity cost of conflict. Quantitatively, the 2024 sanction package is sufficient to fully offset the conflict-prone effects of Ukraine's effective decoupling from Russia in the aftermath of the 2014 annexation of Crimea. In contrast, noncontingent sanctions slightly reduce the probability of appeasement (orange bars). By restricting Russia's access to Western products irrespective of the outcome of its diplomatic interactions with Ukraine, such sanctions induce a broader decoupling from the rest of the world and increase Russia's reliance on domestic goods in both peacetime and wartime. In a war scenario where

²These two sets of instruments share similarities with those studied in Becko and O'Connor (2024). They consider a setting in which countries can develop peacetime industrial and trade policies, the equivalent of our noncontingent instruments, as well as credible threats to tax trade in the event of a geopolitical conflict, as in our contingent sanction scenario.

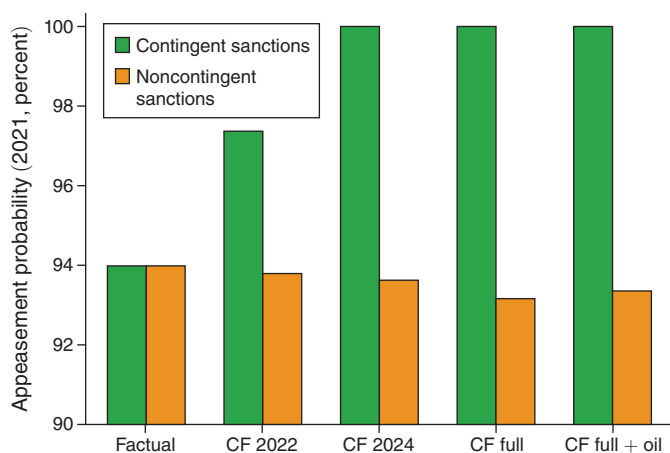


FIGURE 2. COUNTERFACTUAL SANCTIONS IN 2021: IMPACT ON RUSSIA-UKRAINE APPEASEMENT PROBABILITY

Russian TFP is only marginally affected, this sanction-induced decoupling lowers Russia's opportunity cost of war, thereby reducing the probability of appeasement.

V. Conclusion

This paper proposes a framework to assess how trade sanctions shape the likelihood of interstate conflict. Applied to the Russia-Ukraine relationship, our quantitative model shows that Ukraine's post-2014 trade decoupling from Russia both reduced its war-related economic losses and increased the probability of war, highlighting a fundamental trade-off in geoeconomic strategy. We further explore whether this rise in conflict risk could have been mitigated by credible, war-contingent trade sanctions threatened in advance by third countries. Using detailed trade data and the structure of actual sanctions adopted post-2022, we simulate counterfactual sanction packages as if they had been announced in 2021. Our results suggest that a sufficiently strong and targeted set of sanctions—such as the 2024 package—would have increased Russia's opportunity cost of war enough to deter a full-blown conflict, restoring the pre-2014 probability of peace. Crucially, sanctions prove ineffective when imposed unconditionally (or engineered and announced ex post), as they fail to influence expectations at the bargaining stage. Overall, our analysis shows that sanctions can serve as a powerful tool for reducing conflict risk, although their success critically hinges on design: To act as a disciplinary force in diplomatic negotiations, sanctions must be credible, war contingent, and sharply raise the opportunity cost of war for the targeted country.

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