

Ahn, Daniel P.; Ludema, Rodney D.

Working Paper

The sword and the shield: the economics of targeted sanctions

CESifo Working Paper, No. 7620

Provided in Cooperation with:

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Ahn, Daniel P.; Ludema, Rodney D. (2019) : The sword and the shield: the economics of targeted sanctions, CESifo Working Paper, No. 7620, Center for Economic Studies and Ifo Institute (CESifo), Munich

This Version is available at:

<http://hdl.handle.net/10419/198980>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

The sword and the shield: the economics of targeted sanctions

Daniel P. Ahn, Rodney D. Ludema

Impressum:

CESifo Working Papers

ISSN 2364-1428 (electronic version)

Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH

The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute

Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de

Editor: Clemens Fuest

www.cesifo-group.org/wp

An electronic version of the paper may be downloaded

- from the SSRN website: www.SSRN.com
- from the RePEc website: www.RePEc.org
- from the CESifo website: www.CESifo-group.org/wp

The sword and the shield: the economics of targeted sanctions

Abstract

How effective are “smart” sanctions in imposing costs on an adversary? We consider this question in a model where a targeted regime may choose to “shield” strategically important firms from harm. Using detailed firm and individual data, we estimate the impact on firm performance from smart sanctions deployed by the U.S. and EU against Russia beginning in 2014. We find significant losses in operating revenue, asset values, and employees for sanctioned firms relative to their non-sanctioned peers, which are greater in sectors dependent upon Western service inputs. Strategic firms systemically outperform non-strategic firms under sanctions, implying a cost of shielding to the regime that adds substantially to the total cost of sanctions.

JEL-Codes: F510.

Daniel P. Ahn
School of Foreign Service,
Georgetown University &
U.S. Department of State
daniel.ahn@georgetown.edu
& AhnDP@state.gov

Rodney D. Ludema
Department of Economics and
School of Foreign Service
Georgetown University
Washington D.C. / USA
ludemar@georgetown.edu

March 2019

We are grateful for the research assistance of Adam Deutche, Shruti Patel, Engda Wubneh, and Joshua Park. We thank Martin Feldstein, Juan Zarate, Nathan Sheets, Rory MacFarquhar, Eric Lorber and Keith Maskus for invaluable advice and seminar participants at the NBER Summer Institute, the U.S. Department of State, the U.S. Department of Treasury, the Peterson Institute of International Economics, and the American Enterprise Institute for many insightful comments. We also would like to give special thanks to Beau Richardson of Bureau van Dijk for his support. The views and opinions expressed are those of the author(s) and do not necessarily represent the official positions or policy of the U.S. Department of State or the U.S. Government.

1 Introduction

The relevant question is whether my adversary should buy a bullet knowing that I can nullify his investment with a bullet-proof vest. He has wasted his money if the vest is cheap, made a splendid investment if my vest is expensive, and if asked what he accomplished by buying his bullet should have the good sense to say that he imposed a cost on me, not that he hoped to kill me and was frustrated. – Thomas Schelling (1967)

Countries have long used economic sanctions to impose costs on their adversaries. One of the earliest recorded examples is the Megarian Decree in 432 BC when Athens banned Megarians from the harbors and marketplaces of the Athenian Empire.¹ More modern examples include the UN embargo against Iraq in 1990 and North Korea since 2006, and the U.S. embargoes against Cuba in 1960 and Iran in 1979. A common feature of these earlier episodes is use of broad or comprehensive trade embargoes aimed at excluding the target country from access to markets. In the last two decades, however, sanctions policy has shifted toward a more targeted approach aimed at specific individuals, companies and transactions. The United States has been at the forefront of this shift, naming over 6,500 targets across 60 distinct sanctions programs against at least 19 countries as of this writing.² Supporters of targeted sanctions trumpet their value in concentrating economic harm on the key actors involved in a conflict while minimizing “collateral damage” to innocent bystanders, often referring to them “smart” sanctions.³ Critics charge that smart sanctions are principally symbolic gestures, with little economic or political impact, due to their limited scope and easy circumvention, including measures taken by governments to shield the targeted actors from economic harm.⁴

In addressing this debate, the literature has paid surprisingly little attention to actually estimating the economic costs that targeted sanctions impose, much less whether the costs are concentrated on the intended targets. Most of the literature focuses on impact of sanctions on the politics of the target country, with the economic impact sometimes included as an

¹According to Thucydides, the Megarian Decree was a significant trigger (though not the underlying cause) that sparked the Peloponnesian War between Athens and Sparta.

²This list does not include states which happen to host sanctioned individuals for non-state reasons, such as terrorism, narcotics trafficking, etc. More information about U.S. sanctions programs can be found at the websites of the U.S. Department of Treasury’s Office of Foreign Asset Control (OFAC) and the U.S. Department of State’s Office of Sanctions Policy and Implementation (SPI). For a readable insider’s account of this policy shift, see Zarate (2013).

³This terminology appears to derive from an analogy to precision-guided munitions, which are known as “smart” bombs. For a recent overview of policy developments regarding the usage of targeted sanctions, see Rosenberg, Goldman, Drezner, and Solomon-Strauss (2016).

⁴For example, see Ashford (2016) or Bershidsky (2018).

explanatory variable. The most commonly-used measure of economic impact is by Hufbauer, et. al. (2009), which is an aggregate measure based on the authors' judgement of the welfare impact of the total trade or financial flows under sanction.⁵ Aggregate measures like this are problematic for two reasons: first, they are difficult to estimate in the presence of simultaneous macroeconomic shocks that might be at work in a target country; and second, they are uninformative about the smartness of a sanctions program.

The approach taken by this paper is to combine the details of a targeted sanctions program with firm and individual-level networked data to estimate differences in economic performance between targets and non-targets within the same country, and even within a sector, before and after sanctions are imposed. We obtain more precise and credible estimates of economic impact than before, which allows us to address several questions in the smart sanctions debate. How smart are targeted sanctions in practice? Do they actually cause economic harm to the specific targets? If so, by what channel? And is the harm confined or does it spill over to non-targets? Can the government of the target country successfully shield individual targets from the sanctions, and if so, at what cost?

This paper addresses these questions in the context of the sanctions programs undertaken by the United States, the European Union (EU), and others against primarily Russian targets in response to Russia's annexation of Crimea and its support of the separatist insurgency in Ukraine since 2014.

Importantly, we also investigate the endogenous response of the target regime in response to sanctions. In particular, we consider the possibility of government "shielding," where the government may ex post transfer resources to certain sanctioned firms over others. As Schelling (1967) suggests, this endogenous shielding must be properly understood and accounted for to deliver accurate estimates of the impact of sanctions.

We therefore begin by presenting a model of how firm performance is affected by sanctions and the interaction between the target firm and the target government. A sanction is modeled as a limit on a targeted firm's access to foreign intermediate inputs, which raises the firm's cost of supplying both private consumers and the government. Government procurement (which could also be interpreted as "crony services") is determined by Nash bargaining between the firm and government, with the outside option being either zero procurement or a takeover of the firm by the government, depending on the "strategic" value of the firm's output in the government's objective function. If the firm's strategic value is low, the firm can credibly threaten the zero procurement option, but the value of this outside option to

⁵See Pape (1997) for a criticism of the Hufbauer, et. al. (2009)'s measure.

the firm is lowered by sanctions. Thus, the firm’s profit is directly exposed to the impact of sanctions both on its market sales and its procurement terms. If the firm’s strategic value is high, however, the government would rather take over the firm than allow zero procurement. In this case, sanctions lowers the value of the takeover to the *government*, and thus the government, as a residual claimant, must absorb the impact of sanctions. This is relected in an improvement in procurement terms for the firm (a “bailout”) that shields the target firm from the effect of the sanctions.

Then, drawing from detailed firm and individual-level data, which allows us to match official lists of sanctioned entities (consisting of individuals and companies) to nearly 3,000 unique firms throughout the world, we use a difference-in-difference approach to compare the financial performance of the targeted firms to their non-targeted peers before and after sanctions were imposed. Country-sector-time fixed effects are used to control for time-varying, sector-level shocks, which is crucial because the sanctions regime coincided with a period of macroeconomic turbulence, notably a dramatic decline in the price of oil, Russia’s main export.

We find that targeted companies are indeed harmed by sanctions relative to their non-targeted peers. On average, a targeted company loses roughly one-quarter of its operating revenue, over one-half of its asset value, and about one-third of its employees after being added to a targeted sanctions list compared to non-targeted peer companies. These estimates, which are large, statistically significant and robust, suggest targeted sanctions do have a powerful impact on the targets themselves.

We also find that the magnitude of losses from sanctions depends on the sector of the firm, with sectors more reliant on imported services from the West being hardest hit. We further find some evidence of spillover onto non-targets. For example, we find that minority-owned subsidiaries of sanctioned companies (which technically are not themselves sanctioned) suffer similar losses as majority-owned subsidiaries (which technically are).

Finally, to address shielding empirically, we consider the impact of sanctions on a set of firms publicly designated as “strategic” by the Russian government. We find that strategic firms are largely spared the effects of sanctions, which is consistent with the model. Using our point estimates, we infer that the total cost to the Russian government from sanctions-related bailouts during the 2014-2016 period was a significant share (about 45 percent) of the overall cost of sanctions to the country.

Together our findings indicate that smart sanctions do impose considerable economic costs on targeted firms. They do not appear to be systematically circumvented by the firms

themselves. However, the government may engage in shielding which shifts the burden of the sanctions from the target firms to the target government. Whether this should be regarded as an unintended consequence – because it ultimately produces collateral damage to taxpayers – or as a desirable feature – because it places the onus on the target government to allocate harm between firms and the taxpayer thus exposing its cronyism – should be a subject for future research.

The outline of the remainder of this paper is as follows: Section 2 reviews the literature. Section 3 presents our model and derives the theoretical results. Section 4 presents the data. Section 5 presents the estimation of the model, robustness checks, and quantification. Section 6 concludes.

2 Literature Review

The literature, both theoretical and empirical, on economic sanctions is vast. However, most empirical studies cover the period when policymakers invoked comprehensive sanctions. Their primary focus has been on the effectiveness of sanctions in achieving the political objectives of the sanctioning, or “sender,” countries. Following the first (1985) edition of Hufbauer, et al. (2009), which put the success rate at about one-third, a large literature emerged devoted to the conceptual, measurement and identification problems associated with estimating effectiveness (e.g., Pape (1997), Baldwin (1999), Nooruddin (2002)). Meanwhile, several studies highlighted the unintended secondary consequences of sanctions on corruption and humanitarian welfare (Hoskins (1997), Alnasrawi (2001), Petrescu (2016)), which in turn led to calls for “smart” or targeted sanctions designed to concentrate harm against decision-making elites rather than the wider populace (e.g. see Weiss (1999), Cortright and Lopez (2002), and O’Sullivan (2003), with more retrospective discussions on smart sanctions provided by Lowenberg and Kaempfer (2007) and Drezner (2011)).

Recent literature has focused on the determinants of sanctions effectiveness. A robust finding is that sanctions are more effective if they involve greater aggregate economic cost on target country (Bapat, et. al., 2012). This lead Hufbauer, et al. (2009) to dismiss smart sanctions as symbolic gestures and advocate in favor of comprehensive sanctions (p. 168). The measures of economic cost used in such studies, however, are generally informed guesses based on the description of the sanctions and the magnitude of the trade or financial flows involved, rather than ex post estimates.⁶ Moreover, because they are aggregates, they do not

⁶The Threat and Imposition of Sanctions (TIES) database by Morgan, Bapat, and Kobayashi (2014) also

account for the distribution of costs across the relevant actors in the target country, which is the point of smart sanctions. They also cannot determine whether costs are shifted via countermeasures, such as shielding.

To be clear, our paper does not directly address the political effectiveness of sanctions. With only a single case, that of U.S.-EU sanctions against Russia, our paper is not suited to this purpose. Rather it speaks to the prior question of whether the economic costs are concentrated on the intended targets.⁷

Previous empirical studies of targeted sanctions are relatively few, due to the relatively short history of targeted sanctions programs and the paucity of examples involving purely targeted sanctions instead of becoming part of a broader comprehensive sanctions program. Indeed, the U.S.-EU targeted sanctions program against Russia in the wake of the 2014 annexation of Crimea represents a rare example of a purely targeted sanctions program against an economy reasonably well integrated into the global economic and financial system, and in related fashion, has relatively higher quality data.

Yet economists attempting to empirically estimate the impact of sanctions on Russia still face the challenge of disentangling the impact of sanctions from the confounding effects of the broader political uncertainty stemming from the Ukraine crisis and macroeconomic shocks such as the dramatic drop in oil prices mentioned above.

Most studies conclude that oil prices were far more important in explaining Russia's post-2014 macroeconomic weakness, with a relatively small effect ascribed to sanctions. An IMF (2015) study, using a generic macroeconomic model, forecasted that sanctions could reduce Russia's real output by about 1 to 1.5 percent of GDP via weaker investment and consumption. A World Bank (2015) study similarly argues that sanctions against Russia and Russian counter-sanctions may have affected investment and consumption but does not provide any specific numbers. Neither of these studies attempts to directly measure the economic impact of sanctions *ex post*. Dreger et al. (2015) used a VAR model featuring oil prices, the ruble exchange rate, and a sanctions news index to argue that the oil price drop was the primary driver of the ruble depreciation but that sanctions news surprises may have had some impact on the ruble's conditional volatility. Tuzova and Qayub (2016) presents another reduced-form VAR model featuring a variety of Russian macroeconomic variables including GDP, the real exchange rate, inflation, fiscal and consumption expenditures, and external trade to argue that oil prices were the main cause of Russia's poor macroeconomic

has the same feature of using *ex ante* subjective estimates of costs.

⁷See Kaempfer, Lowenberg, and Mertens (2004) and Beladi and Oladi (2015) for theoretical explorations of the political economy of targeted sanctions.

performance. Moret et al. (2016) also looked at country-level trade data and compared trading volumes between Russia and the EU pre- and post-crisis to conclude that the Baltic states suffered the greatest relative losses, similar to the findings of Ahn and Ludema (2019). Crozet and Hinz (2016) use monthly trade data at both the country level and firm level for France. They find large impacts on trade between Russia and many EU economies, arguing that this is 'collateral damage.' However, the authors acknowledge that most of this effect is due to oil prices, Russian economic underperformance, and political uncertainty. Haider (2017) uses export customs data to track the impact of sanctions and export deflection of Iranian non-oil exports after the imposition of United Nations non-oil export sanctions in 2008, and finds significant evidence of export deflection. However, the data studied goes up to 2011 and does not cover the oil-related or targeted financial sanctions from 2012 onwards.

However, the studies above still generally use macroeconomic or trade data to assess the economic impact of sanctions. Studies that use firm, individual, or transactions-level data are much fewer. Draca et al. (2017) uses an event study methodology on the evolution of nuclear-related sanctions relief for Iran during the P5+1 negotiations in Geneva leading up to the Joint Comprehensive Plan of Action (JCPOA) agreement to study the asset prices of firms listed on the Tehran Stock Exchange, finding firms linked to sanctioned entities saw a significant positive return during the window of the diplomatic breakthrough. Similarly, and perhaps the closest to our paper, is Stone (2016), which uses a similar event study methodology to study the impact of Russia sanctions news events on the asset prices of the 11 largest energy firms and banks in Russia. The paper finds a negative impact on the asset prices of targeted sectors compared to non-targeted sectors but no significant difference between targeted and non-targeted firms within a sector.

Compared to this literature, our empirical approach is unique in several respects. First, we use detailed firm and individual-level networked data to assess the impact on the real economic performance (such as operating revenue, assets, and employment) of the target firms themselves. Second, we consider a comprehensive sample of all targeted firms, including privately held firms and those firms linked to sanctioned individuals, and not only the small number of publicly traded firms. Third, we investigate the source of the impact, namely Western tradeable inputs. Fourth, we account for possible shielding by the target regime onto sanctioned firms.

Thus, this paper also follows an increasing trend in the broader conflict literature that uses large-scale sub-national micro-data, including Berman and Laitin (2008), Berman, Shapiro, and Felter (2011), Berman, Callen, Felter, and Shapiro (2011), Dube and Vargas (2013),

Berman, Felter, Shapiro, and Troland (2013), Crost, Felter, and Johnson (2014), and Dell (2015).

3 The Model

Sanctions can harm targeted firms by limiting their ability to supply foreign markets or by limiting their access to foreign inputs. For simplicity, our model focuses on the latter channel.⁸

We consider a model of two countries, the sanctioning country (S) and the target country (T). The focus is on firms in country T , which are assumed to combine inputs – domestic and imported – to produce final goods for sale to both private consumers in T and the government of T . The model unfolds in four stages. First, the government of S imposes sanctions on select downstream firms in T . We treat this choice as exogenous, as it depends on range of political and legal factors outside of the model. A firm under sanction loses access to certain imported inputs, thus forcing it to rely more on domestic inputs. Second, the government of T offers a contract to each firm to procure final goods for government consumption. In the event the firm rejects the offer, the government has the option to nationalize the firm at some cost. Third, each firm learns its market demand. Fourth, all firms produce and sell as permitted under the sanctions regime, the agreed procurement terms and realized market demand.

The possibility that the firm may be nationalized if rejects the government’s offer is a key element of our model. Indeed, we shall show that the credibility of this threat determines whether a firm is shielded or not from the impact of sanctions, even though no firm is actually nationalized in equilibrium. That nationalization of firms owned by uncooperative cronies is a realistic assumption in the present context is motivated by case of Putin critic Mikhail Khodorkovsky, whose Yukos oil company was seized and transferred for a fraction of its value to state-owned oil companies. This seizure was widely seen as politically motivated and designed to set an example for other oligarchs.⁹

⁸This channel best represents the situation present in our data. With the exception of energy products, the exports of which are not directly limited by sanctions, Russia exports very little to the U.S. or the EU. Its imports are primarily capital goods. A notable exception is food imports, but these were blocked by Russia’s own counter-sanctions, which we do not consider here.

⁹See Bershidsky (2014).

3.1 Markets

Consumer demand for final good j in country T is given by

$$q_j = \theta_j p_j^{-\sigma} \quad (1)$$

where q_j is quantity demanded, p_j is the price charged by firm j , $\sigma > 1$ is the demand elasticity and $\theta_j > 0$ is a firm-specific demand shifter. We assume θ_j is an i.i.d. random variable drawn from the distribution $H_j(\theta)$, with density $h_j(\theta)$, on \mathbb{R}^+ .

The government's valuation of good j is given by

$$G_j(g_j) = \gamma_j^{\frac{1}{\sigma}} g_j^{\frac{\sigma-1}{\sigma}} \quad (2)$$

where g_j is the quantity procured. The term γ_j measures the importance of final good j in government consumption. This specification allows for a wide array of interpretations: g_j could be interpreted as a public good or more narrowly as a private good, such as “crony services,” of value only to the leader. It may be that the government values final good j for its usefulness in the sanctioned policy (e.g., forcibly annexing a neighbor), or for unrelated reasons. For simplicity we assume the government and consumers share the same demand elasticity, but none of our conclusions depend on this assumption.

Each final producer incurs a fixed cost of production F , after which final good j is produced from a continuum of intermediate inputs on the interval $[0, n_j]$, according to a CES production function

$$y_j = \left[\int_0^{n_j} x_j(\omega)^{\frac{\xi-1}{\xi}} d\omega \right]^{\frac{\xi}{\xi-1}} \quad (3)$$

where y_j is output, $x_j(\omega)$ is the firm's chosen level of input ω , and $\xi > 1$ is the elasticity of substitution between inputs.

Supply of each input is infinitely elastic, and we normalize the price of each input to 1. This implies that each final producer has a constant marginal cost that depends only on the measure of its set of available inputs

$$c_j = n_j^{1/(1-\xi)} \quad (4)$$

Let $z < 1$ be measure domestic inputs, and let $1 - z$ be the measure of inputs available in S . If firm j is not subject to sanction, then $n_j = 1$, whereas a complete blocking sanction would imply $n_j = z$. Any partial sanction would be represented by $n_j \in [z, 1)$. Given the one-to-one relationship between marginal cost and the number of available inputs, a sanction can be represented as a choice of marginal cost in the range $c_j \in [1, z^{1/(1-\xi)})$.

If the downstream firm chooses to sell to the private sector, then based on (1) it charges a price $p_j = \frac{\sigma}{\sigma-1}c_j$, and earns an operating profit from market sales equal to

$$\pi_j^m = A\theta_j c_j^{1-\sigma} \quad (5)$$

where $A = \sigma^{-\sigma}(\sigma - 1)^{\sigma-1}$. Note that market revenue is proportional to operating profit, i.e., $r_j^m = \sigma A\theta_j c_j^{1-\sigma}$.

Although the firm sells to the government in addition to the market, it is useful as a point of reference to define the break-even market demand for a firm that sells only to the private sector:

$$\theta_j^m = FA^{-1}c_j^{\sigma-1}$$

3.2 The Bargaining Game

The government of T makes a take-it-or-leave-it offer to each final producer. As the offer is made prior to the realization of market demand, we allow the government to offer a state-contingent contract $(g(\theta), t(\theta))$, where $g(\theta)$ is the quantity of government consumption and $t(\theta)$ is the transfer payment from the government to the firm, conditional on realized market demand θ (note that we drop the subscripts for the remainder of this section). Let $\Gamma(\theta) = G(g(\theta)) - t(\theta)$ and $\Pi(\theta) = \pi^m(\theta) + t(\theta) - cg(\theta) - F$ denote the realized payoffs of the government and firm, respectively. The optimal contract must satisfy,

$$\max_{g(\theta), t(\theta)} E[\Gamma] \quad s.t. \quad E[\Pi] \geq E[\bar{\Pi}] \quad (6)$$

where $E[\bar{\Pi}]$ is the firm's expected profit from rejecting the offer. Solving (6) produces,

$$\begin{aligned} g^* &= (\sigma - 1) A\gamma c^{-\sigma} \\ G^* &= \sigma A\gamma c^{1-\sigma} \\ t^*(\theta) &= E[\bar{\Pi}] - \pi^m(\theta) + F + cg^* \end{aligned} \quad (7)$$

for all $\theta \geq \underline{\theta}$, where $\underline{\theta} = \max[0, \sup\{\theta \mid \Gamma(\theta) + \Pi(\theta) < 0\}]$. Note that the optimal contract always chooses the efficient level of government procurement. The transfer is chosen to hold the *ex post* profit of the firm equal to its expected value from rejecting the offer. For all $\theta < \underline{\theta}$, the good cannot be profitably supplied, and the optimal contract is to simply shut down the firm. Using (7), we can solve for the demand cut-off $\underline{\theta}$ as:

$$\underline{\theta} = \max[0, \theta^m - \gamma] \quad (8)$$

The firm's expected profit from rejecting the offer depends on whether or not it is credible for the government to nationalize the firm. We assume that under nationalization the resulting government-run entity would continue to supply both the government and the market (provided doing so is *ex post* efficient) but incurs an *ex ante* nationalization cost $\beta > 0$. Thus, the government would choose to nationalize if $\int_{\underline{\theta}}^{\infty} [\Gamma(\theta) + \Pi(\theta)] dH(\theta) > \beta$. Note that the lefthand side of this condition is monotonically increasing in γ .¹⁰ Thus, provided $\int_{\theta^m}^{\infty} [\pi(\theta) - F] dH(\theta) < \beta$ (i.e., the government would not nationalize a market-only firm), there exists a $\gamma^n > 0$ such that for all $\gamma > \gamma^n$, it is credible for the government to nationalize the firm; otherwise, nationalization is not credible. Figure 1 shows the possible outcomes in θ and γ space.

Thus, we have two possible cases, depending the government's valuation of the firm's output. Case 1 occurs if γ exceeds the threshold γ^n , in which case nationalization is a credible threat and $E[\bar{\Pi}] = 0$. Expected negotiated payoffs are,

$$\begin{aligned} E[\Gamma] &= \int_{\underline{\theta}}^{\infty} [Ac^{1-\sigma}(\gamma + \theta) - F] dH(\theta) \\ E[\Pi] &= 0 \end{aligned} \quad (9)$$

Because the firm can obtain no profits outside of its relationship with the government, the government extracts all profits in negotiations. Not only does the firm earn zero expected profits, it also earns zero profits *ex post*, as the negotiated transfer schedule in (7) vacuums up all profits in every state. However, this also implies that the firm is entirely *shielded* from shocks, including the shock of being sanctioned. As the residual claimant, government absorbs all of the losses from sanctions. In particular, the marginal impact of a sanction on the expected government payoff is equal to total expected output of the firm, i.e., $\partial E[\Gamma] / \partial c = -E[q + g]$.

Case 2 occurs if $\gamma < \gamma^n$, in which case nationalization is not a credible threat. In this case,

¹⁰If $\underline{\theta} = 0$, then $\frac{d}{d\gamma} \int_0^{\infty} [\Gamma(\theta) + \Pi(\theta)] dH(\theta) = Ac^{1-\sigma} > 0$, whereas if $\underline{\theta} = \theta^m - \gamma$, then $\frac{d}{d\gamma} \int_{\underline{\theta}}^{\infty} [\Gamma(\theta) + \Pi(\theta)] dH(\theta) = Ac^{1-\sigma} [1 - H(\theta^m - \gamma)] > 0$.

the firm retains ownership but supplies the private market only, provided this is profitable. Private-only profitability requires $\theta \geq \theta^m$, thus $E[\bar{\Pi}] = \int_{\theta^m}^{\infty} [\pi(\theta) - F] dH(\theta)$. Expected negotiated payoffs work out to be,

$$\begin{aligned} E[\Gamma] &= Ac^{1-\sigma}\gamma[1 - H(\underline{\theta})] + \int_{\underline{\theta}}^{\theta^m} [Ac^{1-\sigma}\theta - F] dH(\theta) \\ E[\Pi] &= \int_{\theta^m}^{\infty} [Ac^{1-\sigma}\theta - F] dH(\theta) \end{aligned} \tag{10}$$

As the firm now can earn profits outside of its relationship with the government, it's negotiated payoffs will be affected by sanctions. In particular, the marginal effect of a sanction on expected payoffs are $\partial E[\Pi]/\partial c = -E[q]$ and $\partial E[\Gamma]/\partial c = -E[g]$. That is, expected firm profits decline by the amount of expected market sales, while the government loses by the amount of expected government sales.

Comparing the two cases, it is clear that that sanctions have a larger effect on the government when the government is sufficiently dependent on the firm's output as to make nationalization credible (Case 1). This is because the government absorbs the firm's profits, which implies that the government also absorbs the impact of sanctions as it shields the firm. Thus, shielding does not eliminate the sanctions impact. Rather it redirects the impact from the firm to the government. Note that we have assumed government cares about the firm only to the extent that the firm supplies the government with output. Were we to assume instead that the profits of the firm enter directly into the government's objective function, then impact of sanctions on the government would be the same in each case.

3.3 Effects of Sanctions on Observable Measures of Firm Performance

In this section, we dig deeper into the marginal effects of a sanction on the performance of a targeted firm. Our data allow us study firm survival rates and as well changes in various firm performance measures, conditional on survival.

Survival. As long as $\gamma < \theta^m$, the firm's probability of survival is $1 - H(\underline{\theta})$. A marginal tightening the sanction lowers the survival probability according to,

$$-(\sigma - 1)h(\underline{\theta})(\theta^m/c) < 0 \tag{11}$$

For $\gamma > \theta^m$, the survival probability is equal to 1. Thus, for sufficiently high γ , sanctions have no effect on the firm's survival probability.

Log Output. Conditional on survival, the elasticity of *ex post* output with respect to

marginal cost is $-d\ln(q + g)/d\ln(c) = \sigma$. This impact on output is the same whether the firm enjoys high demand or low demand with a shielding government contract. The reason is that in both cases, output is chosen to maximize the surplus, and the optimal quantity declines as the cost of production increases. Shielding therefore occurs entirely through the transfer the government makes to the firm, not in the quantity the government procures. In the data, we proxy quantity with employment.

Log Revenue. We observe operating revenue in our data, which theoretically is the sum of market revenue and the transfer, $R = r^m + t$. Thus, conditional on survival, *ex post* revenue is equal to

$$R = (\sigma - 1)Ac^{1-\sigma}(\gamma + \theta) + E[\bar{\Pi}] + F \quad (12)$$

and the elasticity of revenue with respect to marginal cost is

$$-d\ln(R)/d\ln(c) = (\sigma - 1) \left[\frac{1}{1 + \Phi} \right] \quad (13)$$

where $\Phi = \frac{F}{(\sigma-1)A(\theta^L+\gamma)c^{1-\sigma}+E[\bar{\Pi}]} > 0$. The term Φ is strictly decreasing in $E[\bar{\Pi}]$, and thus the elasticity of revenue is greater if $\gamma < \gamma^n$ (i.e., $E[\bar{\Pi}] > 0$) than if $\gamma > \gamma^n$ (i.e., $E[\bar{\Pi}] = 0$). In other words, if the firm is sufficiently important to the government as to be shielded from loss under sanctions, then the elasticity of its revenue with respect to sanctions is smaller than that of a non-shielded firm.

Finally, note that as operating profit is proportional to revenue, similar expressions apply.

To summarize the predictions of the model, sanctions lower the survival rate of targeted firms on average but have no effect on survival if the government's valuation of the good γ is sufficiently high. Conditional on survival, log revenue and log operating profit and log output all decline with sanctions; however, the declines in log revenue and profit (but not log output) are mitigated for firms with high γ . This mitigation occurs because the government wishes to maintain its access to the firm's product at all times, and thus assumes the firm's potential losses from sanctions in the optimal contract.

Of course, this model does not provide an exhaustive picture of the all the ways sanctions affect firms or all the reasons the government might wish to bail out firms under sanction. It is, however, a workable model, with plausible assumptions and sharp predictions.

4 Data

4.1 Overview of the Targeted Sanctions Program

Beginning in March 2014, the governments of the United States and the European Union began targeted sanctions programs against mainly Russian and Ukrainian entities in response to Russia’s annexation of Crimea and the conflict in Ukraine.¹¹ The explicitly sanctioned targets could be divided into two categories. The first category are those sanctioned targets who face blocking or restrictive sanctions. On top of travel bans and asset freezes, individuals and entities under a blocking sanction also face a complete prohibition on all trade, financial transactions, and other activities with U.S. and/or EU persons.¹² The second category of targets are those facing sectoral sanctions. Unlike blocking sanctions, targets facing sectoral sanctions are only prohibited from engaging in certain kinds of transactions, such as longer-term financing transactions or the transfer of certain kinds of specialized technologies and services. Despite the rather misleading name, sectoral sanctions do not refer to the sanctioning of an entire industry sector. Rather, sectoral sanctions were still targeted toward specific firms that happened to be in specific sectors of the Russian economy, such as finance, energy and resources, engineering, and the defense sector.¹³

In selecting which individuals and entities ultimately get sanctioned, policymakers in the United States and the European Union must demonstrate that the targets in question pass certain foreign policy-related criteria. The earliest U.S. criterion was to show the sanctioned targets was responsible for or complicit in, or to have engaged in, directly or indirectly, any of the following: (A) actions or policies that undermine democratic processes or institutions in Ukraine; (B) actions or policies that threaten the peace, security, stability, sovereignty, or territorial integrity of Ukraine; (C) misappropriation of state assets of Ukraine or of an economically significant entity in Ukraine; or (D) asserted governmental authority over any region of Ukraine without the authorization of the Government of Ukraine. The EU Council Regulations are similar, targeting persons “responsible for actions undermining or

¹¹For the United States, the original sanctions authorities were provided by four Executive Orders: E.O. 13660 (March 6, 2014), E.O. 13661 (March 16, 2014), E.O. 13662 (March 20, 2014), and E.O. 13685 (December 19, 2014). Meanwhile, the European Union’s sanctions authorities were provided by EU Council Regulations No. 269/2014, 284/2014, 433/2014, 833/2014, and 960/2014.

¹²The U.S. Specially Designated Nationals (SDN) list contains all individuals and entities facing U.S. blocking sanctions while the European counterpart would be its Restrictive Measures list.

¹³The U.S. and EU also imposed comprehensive restrictions on economic investment and trade with the Crimea region, and this is only considered in so far as individuals or entities engaged in Crimea also face explicit or implicit sanctions.

threatening the territorial integrity, sovereignty and independence of Ukraine.”

Later, the criterion was expanded to include targets that “operate in such sectors of the Russian Federation economy... such as financial services, energy, metals and mining, engineering, and defense and related materiel,” and “to have materially assisted, sponsored, or provided financial, material, or technological support for, or goods or services to or in support of the Government of the Russian Federation or blocked targets.” Targets under these later criteria generally faced sectoral rather than blocking sanctions.

On top of those entities that explicitly face either blocking or sectoral sanctions by the U.S. or the EU, many entities also implicitly face similar restrictions via various channels of indirect association.¹⁴ The first channel was to be a company or other entity that facilitates a “significant [economic or financial] transaction” for or on behalf of an explicitly sanctioned target. Policymakers were given significant leeway in broadly interpreting what constituted a “significant transaction,” and in practice, this meant that any entity that held a major economic relationship with a sanctioned individual (such as being a major shareholder or a corporate officer) was to be avoided, regardless of whether that entity was explicitly sanctioned or not.¹⁵ Second, both the United States and the European Union adopted the so-called “50% Rule” where transactions with a subsidiary that is 50 percent or more owned, whether individually or in the aggregate, directly or indirectly, by an explicitly designated entity or individual, are also implicitly prohibited, regardless of whether the entity itself is explicitly listed. Again, in practice, given the difficulty in precisely determining the level of ownership, subsidiaries that may have technically fallen below the 50 percent threshold could also have been affected.

While the selection criteria discussed above are not purely random, we note that the sanctioned targets appear to be primarily chosen due to their political activities in Ukraine rather than any economic criteria. In particular, it is difficult to argue that those targets only indirectly facing sanctions (such as entities only associated with sanctioned individuals involved in undermining Ukraine politically or subsidiaries of sanctioned firms) systematically respond differently than would their non-sanctioned peers, conditional on observables such as sector, country, and government shielding. This quasi-random nature of the selection

¹⁴In sanctions parlance, an entity can refer to a firm or other organization but not an individual, while a person can be either an individual or an entity.

¹⁵To put a finer point to this, according to FAQ 400 [08-13-2014], U.S. sanctions generally prohibit transactions involving, directly or indirectly, a blocked person, absent authorization, even if the blocked person is acting on behalf of a non-blocked entity. Therefore, "U.S. persons should be careful when conducting business with non-blocked entities in which blocked individuals are involved. U.S. persons may not, for example, enter into contracts that are signed by a blocked individual."

process orthogonal to the target’s economic performance provides some comfort that this is a useful “natural experiment.”

4.2 Data on Targets

Our empirical approach first requires an examination of the sanctions lists of the U.S. and the EU for potential overlap to identify all unique targets. Our micro-level firm and individual networked data come from business intelligence provider Bureau van Dijk (BvD) Orbis and the LexisNexis Risk Solutions WorldCompliance databases.¹⁶

We first create a list of entities and individuals explicitly targeted by the U.S. and the EU via its Russia/Ukraine-related sanction authorities from March 17, 2014 to December 1, 2016. All sanctioned individuals face blocking or restrictive sanctions, while some firms face blocking sanctions and others face sectoral sanctions.

For the sanctioned individuals, we classify them into two categories: business figures or political figures. We classify a sanctioned individual as a business figure if the named individual appears in the WorldCompliance standardized positions database as having a significant economic relationship with at least one or more firms. These relationships include being a major shareholder, being part of corporate management, and/or being on the board of directors for the firm. Even individuals who work in public service would be classified as a business figure if that individual has a major economic relationship with at least one firm. Those firms that are then effectively sanctioned by association with sanctioned individuals we call ‘associated firms.’

Meanwhile, we classify those sanctioned individuals who do not appear to have significant business associations as being purely political individuals, as their primary occupation appears to be political rather than commercial in nature (e.g. a legislator, a political party official, or a militia commander). Given the selection process, the vast majority of sanctioned individuals proved to be political figures, which we do not consider, with only 13 percent of sanctioned individuals being classified as business figures.

Lastly, given the list of firms that are explicitly sanctioned (whether by direct blocking sanctions, sanctions by association with a blocked individual, or sectoral sanctions), we consider all subsidiaries of those explicitly sanctioned firms according to BvD’s cor-

¹⁶Bureau van Dijk’s Orbis database compiles and standardizes financial data on over 200 million firms around the world, both publically traded and private, from a variety of regulatory and other sources. Similarly, LexisNexis Risk Solutions’ WorldCompliance tracks roughly 140 million high-risk individuals. More information about the databases can be found on Bureau van Dijk’s homepage at www.bvdinfo.com and at LexisNexis Risk Solutions’ homeage at risk.lexisnexis.com.

porate ownership database. By the 50% Rule, those subsidiaries that are 50 percent or more majority-owned by explicitly sanctioned firms implicitly face the same type of sanction (blocking or sectoral). Furthermore, we also consider those subsidiaries that are minority-owned by explicitly sanctioned firms, i.e. those whose ownership threshold falls below 50 percent.¹⁷ These minority-owned subsidiaries technically do not face sanctions but in practice, given difficulties in determining where they stand relative to the 50 percent threshold, many banks and other counterparties disconnected legitimate economic relationships anyway, a phenomena called “de-risking” by practitioners.¹⁸

Table 1: Sanctioned Firms by Year

	2014	2015	2016
Blocked	45	70	89
Sectoral	26	137	230
Associated	219	267	267
Majority-Owned Subsidiary	598	1,035	1,193
Minority-Owned Subsidiary	626	944	1,094
Total	1,487	2,411	2,832
Of which, Strategic	34	38	39

Table 1 provides a summary of sanctioned firms categorized by type. The first three rows show the list of firms which have been explicitly sanctioned by blocking sanctions, sectoral sanctions, or by association with an explicitly named individual. The remaining two rows show the list of subsidiaries, both majority and minority-owned, of the aforementioned explicitly sanctioned firms. Since no firm or individual was de-listed from the sanctions blacklist in our sample, the number of sanctioned firms increase by year as more firms or individuals (and their associated firms) are added from 2014 to 2015 and 2016. The union of all of these sanctioned entities form the total number of sanctioned firms in our database.¹⁹ Lastly, we show the number of those sanctioned firms which are also strategic, to be defined below.

¹⁷Those firms that were listed as subsidiaries but for whom the exact ownership amount (or whether it was above or below the 50 percent threshold) was unknown, we classified as simply being minority-held subsidiaries.

¹⁸We discuss “de-risking” further in Section 5.

¹⁹The sums of the columns do not exactly add up to the total number of sanctioned firms due to some overlap in these categories.

4.3 Strategic Firms

As discussed in the preceding modeling section, we predict strategic firms providing high-priority goods or services to the government may be endogeneously shielded by the regime from the full effect of sanctions. Indeed, we found numerous anecdotes and other qualitative intelligence documenting how the target government (i.e. the Government of the Russian Federation) may be providing various forms of state largess to some of these targeted firms via a variety of mechanisms. These include the granting of government contracts and monopolies, state-backed loan guarantees, capital injections by the state, and tax breaks.

For example, in April 2014, about one month after the imposition of sanctions, the Russian government gave sanctioned Bank Rossiya the sole contract to service the \$36 billion dollar domestic wholesale electricity market, promising rich revenues estimated to be at least \$112 million to the target.²⁰ Sanctioned VTB Bank also asked for \$5.4 billion in state capital aid to offset losses from sanctions. Often these shielded firms appear to be providing high-priority services to the government, such as managing Russia’s sovereign bond issuances, providing bank services to the annexed territories of Crimea, or helping build the Kerch bridge connecting Crimea to the Russian mainland.²¹

We construct a list of 374 strategic firms which the Government of the Russian Federation may value as providing strategic high-priority services by taking the union of three official lists. The first is a list of 165 ‘national security’ firms the Russian government deems of “strategic importance for national defense and state security, protection of morality, health, rights, and the lawful interest of Russian citizens.”²² The second is a list of 201 ‘backbone’ or ‘systemic’ firms which have a “significant effect on the formation of GDP, employment, and social stability.”²³ The last is a list of 35 systemically important financial institutions required to have improved capitalization measures.²⁴

While the motivations for the target government shielding a particular firm may be opaque and context-specific and the form of shielding diverse, the strategic firms that appear on these lists appear to be more likely candidates for receiving state aid. Many (though not

²⁰In a sign of how suboptimal this might be from a general welfare perspective, Bank Rossiya reported that it had to hire the previous holder of the contract, Alfa Bank, as a contractor to actually implement operations.

²¹Newspaper reporting from The Moscow Times in 2014, some of which are cited in the references, document some of these cozy state-firm relationships.

²²The original list was made by a Presidential Decree on August 4, 2004 and we used the version of the list updated on March 28, 2015.

²³This list was made by the Commission on Economic Development, February 5, 2015, No. 1.

²⁴As established by the Deposit Insurance Agency on February 2, 2015 and the Central Bank of Russia, Ordinance No. 3737 dated July 22, 2015.

all) of the firms that are anecdotally reported to have been shielded by the state appear on one or more of these strategic lists. Figure 3 shows the overlap between the overall strategic list and the list of explicitly sanctioned targets. We see that of the 374 strategic firms, 40 face targeted sanctions (of which we only have data for 39).

4.4 Description of the Data

As mentioned above, our firm/individual data come from the Bureau Van Dijk (BvD) Orbis and LexisNexis WorldCompliance databases, which tracks over 200 million firms and 140 million individuals worldwide, including over 18 million firms in Russia.²⁵ From this larger database, we isolate 80,827 firms, including 542 of the 584 firms identified as being explicitly sanctioned above that are also present in the BvD database.²⁶ Also included are 2,290 firms that BvD identified as being subsidiaries of the 542 explicitly sanctioned firms. The remainder is a control group of 77,995 peer companies, constructed by collecting all companies that share the same home country and sector of business operation as the sanctioned companies in the global BvD database as well as as the 334 non-sanctioned strategic firms described above.²⁷ For each company, we track its home country location, sector of business operation (according to the 4-digit NACE Rev. 2 code specification), and its total Operating Revenue, Total Assets, and Number of Employees for the years 2012 to 2016. We also track the status of the firm, whether it remains active or whether it has become bankrupt, liquidated or dissolved, or changed to some other non-active status.

Table 2 shows the summary statistics for the sanctioned, non-sanctioned, and strategic firms for Operating Revenue (*OpRev*) in thousands of dollars, Total Assets (*Asset*) in thousands of dollars, Number of Employees (*Emp*), as well as a status variable (*d_Active*) which is equal to 1 when the firm is active and 0 when it is inactive. As we shall discuss further in the robustness section, sanctioned firms tend to be larger in every measure of financial health than non-sanctioned firms, and strategic firms are even larger.

²⁵We paste together the data using the Ruslana historical data discs provided by BvD to get as comprehensive and nationally representative a dataset as possibly, as recommended by Kalemli-Ozcan et al. (2015).

²⁶We use fuzzy logic and NLP (natural language processing) machine-learning tools to match firm and individual names identified as being sanctions to the BvD database due to the possibility of multiple ways in which Cyrillic names could be Romanized. Those explicitly sanctioned firms that could not be found in the BvD database appear to be mainly Ukrainian rather than Russian entities.

²⁷Bureau van Dijk assigns a unique identification number that tracks a company through potential name and ownership changes.

Table 2: Summary Statistics for Sanctioned, Non-Sanctioned, and Strategic Firms

Variable	Obs	Mean	Std. Dev.	Min	Max
Sanctioned					
d_Active	14,160	.911	.285	0	1
OpRev	6,995	695,624	6,009,979	0	1.61e+08
Asset	7,078	1,341,157	1.42e+07	0	5.56e+08
Emp	6,738	1,349	13,428	0	450,000
Non-Sanctioned					
d_Active	389,975	.982	.132	0	1
OpRev	146,056	10,708	258,043	0	3.43e+07
Asset	155,054	35,638	1,280,498	0	2.68e+08
Emp	144,105	48	2,012	0	330,447
Strategic					
d_Active	1,835	.958	.201	0	1
OpRev	1,224	2,871,849	1.25e+07	0	1.61e+08
Asset	1,220	7,307,084	3.51e+07	9.515	5.56e+08
Emp	937	8,720	42,119	1	450,000

4.5 Input-Output Data

To explore the trade channels by which sanctions may impact the target, we require data on value-added provided by Western intermediate inputs into Russia’s production function. We use data provided by the Japan External Trade Organization (JETRO)’s Institute of Developing Economies on Input-Output Tables for BRICs (Brazil, Russia, India, and China) for 2005. It provides data for 25 sectors, although the data is much more granular for manufactured sector while reserving just a single sector for private sector services.

5 Empirical Analysis

5.1 Estimation Strategy

Our benchmark econometric specification is a standard difference-in-differences ordinary least-squares (OLS) approach as follows:

$$\ln(y_{isct}) = \alpha_i + \lambda_{cst} + \beta d_{it} + \epsilon_{isct}$$

where the subscript i denotes the unique company identification, s denotes the sector, c denotes the home country, and t denotes the year. The left-hand side dependent variable y_{isct}

tracks the particular firm i 's financial metrics. We consider four metrics: Total Operating Revenue, Total Asset value, and Number of Employees, and an “active” dummy variable, which equals 1 if the firm is active in that year versus 0 if the firm loses its active status due to a bankruptcy, liquidation, etc.

The variables α_i capture firm fixed-effects, λ_{cst} capture country-sector-time fixed effects, d_{it} are the sanction treatment dummies and ϵ_{isct} is the error term. Our sanctions dummies d_{it} switch from 0 to 1 when firm i faces any of our three categories of targeted sanctions by either U.S. or EU authorities (or both).

A negative β would indicate a decline in a targeted firm’s performance after being sanctioned compared to non-targeted firms in the same sector and country. To interpret this as causal requires ruling out that targeted companies would have grown more slowly than their non-targeted peers even if they had not been sanctioned, or, in other words, ruling out bias for slow-growing firms in the sender government’s choice of targets. For now, we note only that the selection process for being sanctioned appears to be “quasi-random” in nature. Targeting is not based on a firm’s economic characteristics per se, except in the case of sectoral sanctions, but we control for sector. Nevertheless, even with these legal criteria followed strictly, targeted firms could coincidentally be slow-growers. Sections 5.3 and 5.4 present robustness checks and extensions to address this possibility.

5.2 Benchmark Results

5.2.1 Primary Regression

Columns 1 through 4 in Table 3 displays our primary results, which shows the coefficients from regressing our dummy indicating firm active status, log Operating Revenue, log Assets, and log Employee Count on the simplest sanctions dummy `d_Sanc`, which turns on in the time period when it faces any type of sanction from either the U.S. or the EU. Here, we do not impose any controls and the number of observations can vary across the various regressions due to missing or non-reported data for many companies.

Our headline results suggest that targeted sanctions have a statistically significant negative impact on firm-level financial health relative to non-sanctioned peer companies. Converting from logs back into levels, we find that a targeted firm on average faces a 3 percent increased likelihood of losing its active status relative to non-sanctioned peers (compared to an average firm exit rate of 0.8 percent per annum in the control group). Also, its operating revenue falls by about one-quarter, total assets by about one-half, and employee count by

Table 3: Primary Regression Results on Sanctions Impact without Controls

VARIABLES	(1)	(2)	(3)	(4)
	d_Active	lOpRev	lAsset	lEmp
d_Sanc	-0.0283*** (0.005)	-0.2989*** (0.059)	-0.6955*** (0.104)	-0.4211*** (0.042)
Observations	401,120	93,999	147,190	136,859
R-squared	0.675	0.900	0.887	0.863

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *d_Active* and *d_Sanc* are dummies capturing when firms are active and sanctioned respectively. *lOpRev* stands for log Operating Revenue, *Assets log Total Asset Holdings*, and *Emp log Total Number of Employees*.

about one-third compared to non-sanctioned peers. These results are highly statistically significant at the 1% confidence level for all of our financial metrics.

Note that our results arise after controlling for both firm-specific fixed effects and country-sector-time fixed effects, which should eliminate oil price fluctuations and other factors that may apply to companies in particular combinations of sectors and countries. In particular, the sectors are determined by the 4-digit NACE Rev. 2 core codes, providing a high degree of granular control.

Although the magnitudes of the estimated losses are large, these results should be interpreted with some caution. First, these are the average effect but it does not necessarily apply uniformly to all targeted companies. The effect on each particular target may vary according to firm-specific characteristics and also the type of the sanction it faces. Many of the largest Russian companies tended to face only sectoral sanctions which are deliberately designed not to have a large immediate impact but affect their long-term health via their access to credit and technology. This is one reason why the concentrated impact at the firm level does not necessarily translate into a large macroeconomic impact, despite the target list containing some of the largest state-owned enterprises that comprise a large share of overall Russian national output.

On the other hand, the results capture the differential impact of sanctions on the performance of targeted or associated companies compared to non-targeted companies. They do not measure factors that might affect all firms equally in a sector or a country. For example, there has been anecdotal reports of “de-risking” by international banks and other companies, whereby they disconnect business and correspondent banking relationships with even legitimate counterparties in certain sectors and regions out of an abundance of caution

in managing the regulatory burden of sanctions compliance.²⁸

If targeted sanctions deter counter-parties from engaging in trade with any firm in a suspect sector (e.g. firms may “de-risk” and stop trade with the entire Russian arms manufacturing sector) and not just the targeted firms, then this impact of sanctions would not be reflected in the performance differential exploited by the regression. This possibility would bias our estimates of the sanctions impact toward zero.

5.2.2 Sector Input Dependence

Next, we assess the sanctions impact while controlling for how dependent the business sector the target is operating in is dependent on Western (U.S. and EU) intermediate inputs. Columns 1 through 4 of Table 4 shows the our primary regressions repeated after introducing two interaction terms: one between the sanctions dummy and the ratio of Western private sector services inputs into the gross value added of the sector in which the target is operating, and the second between the sanctions dummy and the ratio of all Western non-services inputs into the sector.

We see statistically significant negative impacts on Operating Revenue and on Assets on the services interaction term but no significance for the non-services interaction term. This suggests that rather than gross inputs, it is specifically Western service inputs, which may be difficult to find substitutes for, is the channel by which targeted sanctions transmit the economic harm. In particular, our estimates suggests a one percent increase in the share of Western private services inputs into gross value added of the target’s sector decreases the target’s Operating Revenue by an additional four percent and the target’s Assets by about six percent under sanctions.

5.2.3 Strategic Firms and State Shielding

Columns 1 through 4 of Table 5 shows our primary regressions repeated after controlling for state shielding by having an interaction term between the sanctions treatment and whether the firm is strategic according to our lists. We find that the direct sanctions impact remains negative and highly statistically significant, but that the interaction term is also positive and statistically significant.

We find that if a firm is strategic, the estimated negative impact on both the probability of bankruptcy and Operating Revenue is entirely negated. Meanwhile, the impact on

²⁸See Erbenova et al. (2016) for a recent review of de-risking and the withdrawal of correspondent banking relationships.

Table 4: Sanctions controlling for Western intermediate inputs

VARIABLES	(1) d_Active	(2) lOpRev	(3) lAsset	(4) lEmp
d_Sanc	-0.0182** (0.008)	-0.1199* (0.073)	-0.4132*** (0.157)	-0.3922*** (0.073)
d_Sanc_Services	-0.1908 (0.182)	-4.2328*** (0.813)	-6.6109** (3.187)	-0.5813 (1.315)
d_Sanc_NonServices	-0.0003 (0.000)	0.0009 (0.003)	0.0069 (0.005)	-0.0004 (0.005)
Observations	401,120	93,999	147,190	136,859
R-squared	0.675	0.900	0.887	0.863

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *d_Active* and *d_Sanc* are dummies capturing when firms are active and sanctioned respectively. *d_Sanc_Services* is an interaction term by multiplying *d_Sanc* with the ratio of all Western Services intermediate inputs with the gross value added of Russian output. Similarly, *d_Sanc_NonServices* is an interaction term by multiplying *d_Sanc* with the ratio of all Western intermediate inputs other than services with the gross value added of Russian output. *lOpRev* stands for log Operating Revenue, *Assets* log Total Asset Holdings, and *Emp* log Total Number of Employees.

Table 5: Sanctions on Strategic and Non-Strategic Firms

VARIABLES	(1) d_Active	(2) lOpRev	(3) lAsset	(4) lEmp
d_Sanc	-0.0288*** (0.005)	-0.3067*** (0.060)	-0.7025*** (0.105)	-0.4233*** (0.042)
d_Sanc_Strat	0.0337*** (0.012)	0.2939** (0.149)	0.3191*** (0.134)	0.2020* (0.106)
Observations	401,120	93,999	147,190	136,859
R-squared	0.675	0.900	0.887	0.863

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *d_Active* and *d_Sanc* are dummies capturing when firms are active and sanctioned respectively. *d_Sanc_Strat* is an interaction term capturing when a firm is both sanctioned and strategic. *lOpRev* stands for log Operating Revenue, *Assets* log Total Asset Holdings, and *Emp* log Total Number of Employees.

Assets and on Employment is reduced by about one-half, although the mitigating impact on Employment is only statistically significant at the 10 percent level. This is consistent with the theoretical predictions of our model whereby the target regime may have an incentive to make transfers to sanctioned entities in order to “shield” them from bankruptcy and maintain the continued flow of goods and services to the government. Recall that our model sharply predicted that the impact on firm exit and revenue should be completely nullified if the firm is strategic. Furthermore, the weaker impact on employment is consistent with our theoretical model above if employment can proxy for output. This is also consistent with anecdotal evidence of government shielding of firms deemed sensitive for economic, political, or national security reasons.

Finally, it is worth mentioning that measurement error in terms of mislabeling which firms are strategic and which are not may bias both the coefficient on the sanctions dummy and the coefficient on the interaction term. If a strategic firm received a bailout but is mislabeled as non-strategic since it does not appear on one of the lists above, this would bias the results in Table 5 toward zero.²⁹ Similarly, incidences of firms that is labeled as strategic but did not receive a government bailout (of which again, there appear to be many) would attenuate the results in Table 5. That the results remain highly significant is reassuring.

5.2.4 The Cost of Shielding

Schelling (1967) argues that, if the goal is to inflict costs on an adversary, the success of one’s action should be measured not only by the direct costs that the action inflicts but also the indirect cost of the adversary’s defensive response. If we assume that the sole reason the strategic firms in our sample perform better under sanctions than their non-strategic peers is because of government subsidies, then we can estimate this indirect cost in our case.

We begin with our model prediction of log revenue for each firm, $\ln \hat{R}_i = \beta_1 I_S(i) + \beta_2 I_S(i) I_{ST}(i) + \Gamma_i$, where Γ_i captures estimated log revenue unrelated to sanctions, and $I_S(i)$ and $I_{ST}(i)$ are indicators of whether $i \in S$ (the set of sanctioned firms) and $i \in ST$ (the set of strategic firms), respectively. We use the model prediction for the year in which the firm was first sanctioned.

Expressing revenue in absolute levels and summing over all sanctioned firms, strategic and non-strategic, gives the estimated aggregate revenue of sanctioned firms:

²⁹We have strong anecdotal evidence that some firms, such as the Stroygazmontazh (SGM) group of companies controlled by the Rotenberg brothers Arkady and Boris, were recipients of massive state bailouts but do not appear on any of the strategic lists.

$$\sum_{i \in S} \hat{R}_i = \exp(\beta_1) \sum_{i \in SUNST} \exp(\Gamma_i) + \exp(\beta_1) \exp(\beta_2) \sum_{i \in SUST} \exp(\Gamma_i)$$

This aggregate revenue reflects the combined effects of sanctions and the presumed government bailouts to strategic firms. To get at the government contribution, we calculate the revenue of all sanctioned firms in the absence of bailouts, which is

$$\sum_{i \in S} \hat{R}_i^{NB} = \exp(\beta_1) \sum_{i \in S} \exp(\Gamma_i)$$

The imputed cost to the government is therefore,

$$GovCost = \sum_{i \in S} \hat{R}_i - \sum_{i \in S} \hat{R}_i^{NB} = \exp(\beta_1) [\exp(\beta_2) - 1] \sum_{i \in SUST} \exp(\Gamma_i)$$

Finally, we can calculate the aggregate revenue in the absence of sanctions:

$$\sum_{i \in S} \hat{R}_i^{NS} = \sum_{i \in S} \exp(\Gamma_i)$$

Thus, the cost to the government as a share of the total cost of sanctions is,

$$GovShare = \frac{\sum_{i \in S} \hat{R}_i - \sum_{i \in S} \hat{R}_i^{NB}}{\sum_{i \in S} \hat{R}_i^{NS} - \sum_{i \in S} \hat{R}_i^{NB}} = \frac{\exp(\beta_1) [\exp(\beta_2) - 1] \sum_{i \in SUST} \exp(\Gamma_i)}{1 - \exp(\beta_1) \sum_{i \in S} \exp(\Gamma_i)}$$

We see that the government share depends both on the extent to which bailouts offset the effect of sanctions and on the share of strategic firms' baseline revenue in the baseline revenue of all sanctioned firms. Full offset would imply $\beta_1 = -\beta_2$, in which case $\exp(\beta_1) [\exp(\beta_2) - 1] / [1 - \exp(\beta_1)] = 1$, but according to our estimates from Table 5, Column 2, this value is in fact 0.95 (i.e., slightly less than full offset). Despite being only 14 percent of the sanctioned firms, strategic firms in our sample account for 47 percent of the total baseline revenue. Thus, we conclude that the *GovShare* is approximately 45 percent. In other words, an estimate based solely the cost of sanctions to targeted firms, failing to account for the cost of government shielding, would account for only about half of the true cost of sanctions to the target country.

5.3 Robustness Checks

5.3.1 Parallel Trends and Matching Estimation

Our difference-in-differences methodology relies on the parallel trends assumption, i.e. that sanctioned firms would have experienced the same average change in performance as their non-sanctioned peers in the same sector and country had they not been sanctioned. In the case of non-strategic firms, we might worry that sanctioned firms have a tendency to grow more slowly than their non-sanctioned peers for reasons other than sanctions. In the case of strategic firms, the concern might be that some underlying trend, and not government shielding, causes sanctioned strategic firms to perform as well as their non-sanctioned peers, despite being sanctioned. In either case, while it seems unlikely that sanctioned firms were sanctioned because of such trends, unintentional selection bias cannot be ruled out.³⁰ In this section, we perform two tests to address these concerns.

We first examine whether differential trends in performance between sanctioned and non-sanctioned firms can be found in years prior to sanctions. For this purpose, we define $dlnX_t = lnX_t - lnX_{t-1}$, for each $X = OpRev, Asset, Emp$. For each t , we regress $dlnX_t$ on dummy variables $everSanc * nonStrat$ and $everSanc * Strat$, controlling for country, sector and strategic status. The variable $everSanc * nonStrat$ equals 1 if the firm is not strategic and is sanctioned in any year; otherwise, it equals zero. Its regression coefficient measures the average difference in growth of sanctioned non-strategic firms relative to non-sanctioned non-strategic firms. The $everSanc * Strat$ is the equivalent indicator for strategic firms, and its coefficient is average difference in growth of sanctioned strategic firm relative to a non-sanctioned strategic firm.

Figure 2 shows reports the coefficients for each year. For non-strategic firms (left panel), the 2013 growth differential between sanctioned and non-sanctioned is close to zero. The coefficients for revenue and employment are insignificant, while the coefficient for assets is significant but small. Thus, there is little evidence that sanctioned firms grew more slowly than non-sanctioned firms prior to the sanctions regime. The 2014 performance differential, however, is strongly negative coinciding with the implementation of the bulk of the sanctions. In 2015 and 2016, sanctioned firms return to roughly the same growth path as non-sanctioned firms (though at a lower level) for revenue and assets, while they continue to lag behind non-sanctioned firms in employment growth in 2015. There is no estimate for employment growth

³⁰Recall that most of our sanctioned firms were not explicitly targeted at all but were implicitly sanctioned because of an association with a sanctioned individual or as subsidiaries of sanctioned firms. All of our results are robust to restricting the set of sanctioned firms to these associated firms or subsidiaries.

in 2016, due to lack of data. For strategic firms (right panel), the growth differential between those sanctioned and non-sanctioned is statistically insignificant in all years.

While the finding of no differential in pre-treatment trends is reassuring, we might still be concerned that the 2014 drop in the relative performance on non-strategic sanctioned firms is due to some other coincident shock that hit those firms particularly hard relative to their non-sanctioned peers in the same sector and country. For example, sanctioned firms tend to be larger than their non-sanctioned peers, which suggests that they may be more internationally engaged, both as importers and exporters.³¹ Perhaps the 2014 drop in oil prices and associated devaluation of the ruble differentially affected these firms relative to smaller firms in the same sector and country. To address this concern, we estimate the average treatment effect (ATE) of sanctions on $dlnX_t$ for each cohort of sanctioned firms t (defined by the first year of sanction) using Mahalanobis nearest-neighbor matching. Specifically, for each cohort t , we match sanctioned firms with the never-sanctioned firms in terms of industry, country and size, measured by lagged (log) assets and employment.³² The idea is that if size differences between sanctioned and non-sanctioned firms are driving a spurious correlation between firm growth and our sanctions dummy in the post-sanction period, then looking at matched firms of similar size should uncover this.

Table 6 reports the average (across cohorts) ATE, along with the model-adjusted difference in means and the ratio of variances of the lagged size variables between treated and untreated firms. In most cases, matching reduces the difference in means by an order of magnitude. The ATE indicates that, even between matched pairs, the impact of sanctions is to reduce the relative performance of sanctioned firms. For all three performance measures, the ATEs are statistically significant at the 1 percent level and the magnitudes are in line with our headline results reported in Table 3.

5.3.2 Regression by Type

In this subsection, we split the sanctions treatment into its type: 1) Sanctions via association with a sanctioned individual who is economically associated with the target firm; 2) Blocking or Restrictive sanctions on the firm itself; and 3) Sectoral sanctions that only limit certain transactions in certain sectors. Our results appear in Table 7. The impact of associative sanctions and sectoral sanctions appear to be both negative and statistically significant, while

³¹For evidence on the international engagement of large U.S. firms, see Bernard, Jensen and Schott (2009).

³²As assets and employment are continuous variables, we use the bias-corrected estimator of Abadie and Imbens (2006). We do not match on lagged operating revenue, because doing so results in significant data loss for the asset and employment regressions.

Table 6: Matching Estimates

		(1)	(2)	(3)
VARIABLES		<i>lOpRev</i>	<i>lAsset</i>	<i>lEmp</i>
<i>ATE</i>	<i>d_Sanc</i>	-0.344*** (0.093)	-0.846*** (0.087)	-0.401*** (0.109)
	Observations	6,833	13,532	13,030
Standardized differences				
<i>lAsset</i> _{<i>t</i>-1}	Raw	1.53	1.82	1.87
	Matched	0.29	0.18	0.19
<i>lEmp</i> _{<i>t</i>-1}	Raw	1.28	1.37	1.40
	Matched	0.22	0.11	0.11
Variance Ratio				
<i>lAsset</i> _{<i>t</i>-1}	Raw	0.86	0.74	0.76
	Matched	0.81	1.00	0.98
<i>lEmp</i> _{<i>t</i>-1}	Raw	1.05	2.05	2.08
	Matched	0.86	1.06	1.07

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *ATE* is the average treatment effect over sanction cohorts, using Mahalanobis nearest-neighbor matching on lagged *lAsset*, lagged *lEmp*, country, and industry. The sample is restricted to firms that report some data prior to 2014.

interestingly, the impact of direct blocking/restrictive sanctions do not appear statistically significant (except on the firm's Active Status), possibly due to fewer observations.

As discussed above, it is difficult to argue that the economic performance of those firms only associated with those sanctioned individuals involved in undermining Ukraine politically should be a priori systematically underperforming their non-sanctioned peers, lending confidence that it is indeed sanctions that are causing the underperformance.

5.3.3 Regression by Ownership Level

Using BvD ownership data, we can also split the impact of sanctions between those firms/individuals that are explicitly named vs. on the subsidiaries of those targets that are implicitly sanctioned via the 50% Rule. Also, we consider the impact on any subsidiaries that are minority (less than 50 percent) owned by the sanctioned firm/individual and are therefore in a legal sense technically not sanctioned.

We find in Table 8 that the impact on implicitly sanctioned entities is also negative and statistically significant, with magnitudes comparable to that of explicit sanctions. Also, the impact on minority-owned subsidiaries is also negative and statistically significant, with magnitudes only moderately less than that for explicitly and implicitly sanctioned targets.

Table 7: Impact by Type of Sanction

	(1)	(2)	(3)	(4)
VARIABLES	d_Active	lOpRev	lAsset	lEmp
d_Assoc	-0.0400*** (0.011)	-0.4113*** (0.107)	-0.7637*** (0.139)	-0.3871*** (0.079)
d_Rest	-0.0221** (0.010)	0.1242 (0.118)	0.0777 (0.123)	-0.0188 (0.072)
d_Sect	-0.0202*** (0.004)	-0.3082*** (0.066)	-0.6659*** (0.101)	-0.4330*** (0.042)
Observations	401,120	93,999	147,190	136,859
R-squared	0.675	0.900	0.887	0.863

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *d_Assoc*, *d_Rest*, and *d_Sect* are dummies capturing when a firm faces sanctions via association with a sanctioned individual, blocking/restrictive sanctions, or sectoral sanctions respectively. *lOpRev* stands for log Operating Revenue, *Assets* log Total Asset Holdings, and *Emp* log Total Number of Employees.

Table 8: Impact by Ownership Level

	(1)	(2)	(3)	(4)
VARIABLES	d_Active	lOpRev	lAsset	lEmp
d_Sanc_Exp	-0.0298*** (0.007)	-0.3125*** (0.109)	-0.7259*** (0.156)	-0.3811*** (0.079)
d_Sanc_Imp	-0.0393*** (0.007)	-0.3463*** (0.075)	-0.6982*** (0.111)	-0.4661*** (0.046)
d_Sanc_Min	-0.0146*** (0.005)	-0.2108** (0.082)	-0.6729*** (0.109)	-0.3768*** (0.051)
Observations	401,120	93,999	147,190	136,859
R-squared	0.675	0.900	0.887	0.863

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *d_Active* is a dummy variable capturing if the firm is active or not. *d_Sanc_Exp*, *d_Sanc_Imp*, and *d_Sanc_Min* are dummies that capture if the firm has been explicitly sanctioned, a majority-owned subsidiary that implicitly faces the same sanction according to the 50% Rule, or a minority-owned (or unknown) subsidiary of a sanctioned firm. *lOpRev* stands for log Operating Revenue, *Assets* log Total Asset Holdings, and *Emp* log Total Number of Employees.

This may also be evidence that counter-parties find it challenging to distinguish between those subsidiaries that are implicitly sanctioned vs. those that are not, and are 'de-risking' against any subsidiary.

5.3.4 Regression by Primary Sector Group

As mentioned above, counter-parties may choose to 'de-risk' against firms that may not technically or legally face sanctions out of an over-abundance of caution to comply with sanctions and not risk potential multi-billion dollar fines. This 'de-risking' may extend beyond minority-held subsidiaries but also include other firms in the same sector as the sanctioned firm. For example, many firms facing blocking/restrictive sanctions are clustered in the defense and finance subsectors, and anecdotally many Western firms have withdrawn entirely from doing business in those sectors, affecting those peer firms in the same business sector cohort as the target. This in turn would bias the coefficient of our regression towards zero, by affecting not just the targeted firm but also its non-sanctioned neighbors.

One way to explore whether 'de-risking' is causing bias is to use a coarser classification of sectors, creating a broader control group cohort with a reduced impact from sanctions spillover. In other words, instead of comparing the performance of a sanctioned Russian arms manufacturer to a non-sanctioned Russian arms manufacturer (which may face 'de-risking' if Western counter-parties are refusing to do any business in the Russian arms sector), we can compare with all non-sanctioned firms in the Russian manufacturing sector as a whole.

Table 9: Impact using Primary Sector Groups

	(1)	(2)	(3)	(4)
VARIABLES	d_Active	lOpRev	lAsset	lEmp
d_Sanc	-0.0272*** (0.003)	-0.4479*** (0.047)	-1.0118*** (0.040)	-0.6224*** (0.025)
Observations	403,605	94,744	148,022	137,596
R-squared	0.678	0.901	0.888	0.862

*Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. d_Active and d_Sanc are dummies capturing when firms are active and sanctioned respectively. lOpRev stands for log Operating Revenue, Assets log Total Asset Holdings, and Emp log Total Number of Employees.*

We re-run our headline sanctions regression but now using the 12 primary sector groups according to NACE's high-level aggregation instead of the 4-digit NACE Rev. 2 categoriza-

Table 10: Sanctions on Strategic Firms vs. SOEs

	(1)	(2)	(3)	(4)
VARIABLES	d_Active	lOpRev	lAsset	lEmp
d_Sanc	-0.0288*** (0.005)	-0.3068*** (0.060)	-0.7025*** (0.105)	-0.4233*** (0.042)
d_Sanc_Strat	0.0352*** (0.012)	0.3004** (0.155)	0.3118** (0.140)	0.2253* (0.113)
d_Sanc_SOE	-0.0143 (0.013)	-0.1437 (0.163)	0.1679 (0.391)	-0.2440 (0.213)
Observations	401,120	93,999	147,190	136,859
R-squared	0.675	0.900	0.887	0.863

*Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. d_Active and d_Sanc are dummies capturing when firms are active and sanctioned respectively. d_Sanc_Strat is an interaction term capturing when a firm is both sanctioned and strategic. d_Sanc_SOE is an interaction term capturing when a firm is both sanctioned and a state-owned enterprise. lOpRev stands for log Operating Revenue, Assets log Total Asset Holdings, and Emp log Total Number of Employees.*

tions in Table 9. We see that not only do the coefficients remain negative and statistically significant, but their magnitudes appear to have strengthened relative to using the finer sector groupings, which provides indirect evidence that 'de-risking' may be occurring and our headline results are, if anything, conservative and biased to zero.

5.3.5 State-Owned Enterprises

We also explored whether the differences in sanctions impact between strategic and non-strategic firms could be accounted for by the fact that many strategic firms are state-owned enterprises. Presumably, a target state may face different incentives to shield a firm if it was also the ultimate owner of the firm. Hence, using BvD ownership data, we constructed a dummy variable d_SOE which activates when the ultimate beneficial owner of a firm is an arm of the Russian government. Table 10 shows that the interaction of the sanctions treatment with the SOE dummy does not seem to have any significant extra explanatory power beyond the strategic dummy.

6 Conclusions

If the effectiveness sanctions in influencing the political behavior of a target state is dependent on the economic harm the sanctions impose, then measuring the economic harm should be of first order importance. Moreover, in light of the widespread and growing use of smart sanctions, assessing whether the economic harm of such sanctions is concentrated on the intended targets, with minimal collateral damage, is equally important. Our paper speaks to both of these questions.

The U.S.-EU sanctions against Russia surrounding the 2014 Ukraine crisis appear to have been both economic harmful and smart, up to a point. We find that targeted companies are indeed harmed by sanctions relative to their non-targeted peers. On average, a targeted company loses roughly one-quarter of its operating revenue, over one-half of its asset value, and about one-third of its employees after being added to a targeted sanctions list compared to non-targeted peer companies. Moreover, the magnitude of impact depends on the dependence of the firm on Western services. These estimates, which are large, statistically significant and robust, suggest targeted sanctions do indeed have a powerful impact on the targets themselves, in part by cutting off their access to vital inputs.

However, as Schelling (1967) warns, the direct change in the economic performance of targets may be a misleading indicator of the overall costs that sanctions impose on an adversary. Specifically, government efforts to shield certain targets may be costly, and these costs need to be included. Our theoretical model explains why the target government may wish to shield some targeted firms but not others. If the government highly values the goods or services that a targeted firm supplies, it can credibly commit to nationalize the firm if the firm refuses to cooperate. This allows the government to extract all but a modicum of the firm's profit in negotiations over procurement terms. As sanctions raise the firm's input cost, that cost is completely passed on to the government, while firm's profit is unchanged. Empirically, we find that the set of firms publicly designated as "strategic" by the Russian government are largely spared the effects of sanctions, which is consistent with the model. Using our point estimates, we infer that the total cost to the Russian government from sanctions-related bailouts during the 2014-2016 period was a significant share (about 45 percent) of the overall cost of sanctions to the country.

While government shielding is an important source of the overall economic harm of sanctions to the target country, it also presents a problem from the standpoint of smartness. Shielding diverts the economic harm away from strategic and toward non-strategic parts of the economy, such as the average taxpayer. This points to a tradeoff between the "tacti-

cal” and “strategic” objectives of sanctions policy. The former refers to the goal of focusing economic harm on the targets themselves, constraining them from conducting undesirable behavior. But facing a government able to shield sensitive targets at will, the sanctioning policymaker ultimately faces limits on what targeted sanctions can tactically achieve. Indeed, narrowly interpreted in terms of final economic impact, targeted sanctions that are countered by shielding may appear little different from comprehensive sanctions if “innocent bystanders” in the general public ultimately shoulder the burden. However, there is one crucial difference between comprehensive sanctions and smart sanctions under shielding: the former implies collateral damage caused by the sanctioning country, whereas smart sanctions force the target government to choose whom to save. The importance of this distinction should be a subject for future research.

References

- [1] Abadie, A., and G. W. Imbens, 2006. "Large Sample Properties of Matching Estimators for Average Treatment Effects." *Econometrica* 74: 235–267
- [2] Ahn, Daniel P. and Rodney D. Ludema, 2019. "Measuring Smartness: Understanding the Economic Impact of Targeted Sanctions." Chapter in *Disrupted Economic Relationships Disasters, Sanctions, Dissolutions*, Edited by Tibor Besedeš and Volker Nitsch, MIT Press.
- [3] Alnasrawi, Abbas, 2001. "Iraq: Economic Sanctions and Consequences, 1990–2000." *Third World Quarterly* 22 (2): 205–218.
- [4] Ashford, Emma, 2016. "Not-So-Smart Sanctions: The Failure of Western Restrictions against Russia." *Foreign Affairs*, January/February 2016.
- [5] Baldwin, David, A. (1999) "The Sanctions Debate and the Logic of Choice" *International Security* 24 (3): 80-107.
- [6] Bapat, Navin A., Tobias Heinrich, Yoshiharu Kobayashi and T. Clifton Morgan (2012) "Determinants of Sanctions Effectiveness: Sensitivity Analysis Using New Data" *International Interactions* 39 (1): 79-98.
- [7] Beladi, Hamid & Oladi, Reza, 2015. "On smart sanctions," *Economics Letters*, Elsevier, vol. 130(C), pages 24-27.
- [8] Berman, Eli and David D. Laitin, 2008. "Religion, Terrorism, and Public Goods: Testing the Club Model." *Journal of Public Economics*, Vol. 92, Issue 10-11, pages 1942-1967.
- [9] Berman, Eli, Jacob N. Shapiro, and Joseph H. Felter, 2011. "Can Hearts and Minds Be Bought? The Economics of Counterinsurgency in Iraq." *Journal of Political Economy*, vol. 119, no. 4.
- [10] Berman, Eli, Michael Callen, Joseph H. Felter, and Jacob N. Shapiro, 2011. "Do Working Men Rebel? Insurgency and Unemployment in Afghanistan, Iraq, and the Phillipines." *Journal of Conflict Resolution*.
- [11] Berman, Eli, Joseph H. Felter, Jacob N. Shapiro, and Erin Troland, 2013. "Modest, Secure, and Informed: Successful Development in Conflict Zones." *American Economic Review: Papers and Proceedings*, 103(3): 512-517.

- [12] Bershidsky, Leonid, 2014. "A \$50 Billion Bill for Putin's Aggression," Bloomberg Opinion, July 28, 2014.
- [13] Bershidsky, Leonid, 2018. "Some Sanctioned Russian Firms Thrive on Adversity." Bloomberg Opinion, May 8, 2018.
- [14] Bernard, Andrew B., J. Bradford Jensen and Peter K. Schott, 2009. "Importers, Exporters and Multinationals: A Portrait of Firms in the U.S. that Trade Goods," in Timothy Dunne, J. Bradford Jensen, Mark J. Roberts, *Producer Dynamics: New Evidence from Micro Data*, University of Chicago Press, pp. 513-552.
- [15] Cortright, David, and George Lopez, eds., 2002. *Smart Sanctions*. New York: Rowman and Littlefield.
- [16] Crost, Benjamin, Joseph Felter, and Patrick Johnson, 2014. "Aid Under Fire: Development Projects and Civil Conflict." *American Economic Review*, 104(6): 1833-1856.
- [17] Crozet, Mattieu and J. Hinz, 2016. "Collateral Damage: The Impact of Russia Sanctions on Sanctioning Countries' Exports," CEPII Working Paper, June 2016.
- [18] Dell, Melissa, 2015. "Trafficking Networks and the Mexican Drug War." *American Economic Review*, 105(6): 1738-1779.
- [19] Draca, M., J. Garred, N. Warrinnier, and L. Stickland, 2017. "On Target? The Incidence of Sanctions Across Listed Firms in Iran." University of Warwick Working Paper.
- [20] Dreger, C., J. Fidrmuc, K. Kholodilin, and D. Ulbricht, 2015. "The Ruble between the Hammer and the Anvil: Oil Prices and Economic Sanctions", DIW Berlin Discussion Paper No. 1488.
- [21] Drezner, Daniel, 2011. "Sanctions Sometimes Smart: Targeted Sanctions in Theory and Practice," *International Studies Review*, Volume 13, pages 96-108.
- [22] Dube, Oeindrila and Juna F. Vargas, 2013. "Commodity Price Shocks and Civil Conflict: Evidence from Columbia." *Review of Economic Studies*, Vol. 80. 1384-1421.
- [23] Erbenová, Michaela, Yan Liu, Nadim Kyriakos-Saad, Alejandro López-Mejía, Giancarlo Gasha, Emmanuel Mathias, Mohamed Norat, Francisca Fernando, and Yasmin Almeida, 2016, "The Withdrawal of Correspondent Banking Relationships: A Case for Policy Action," IMF Staff Discussion Note 16/06, International Monetary Fund, Washington.

- [24] Harrell, Peter, 2015. Lessons From Russia for the Future of Sanctions, Economic Statecraft Series, Center for a New American Security.
- [25] Hoskins, Eric, 1997. "Humanitarian Impacts of Sanctions and War in Iraq." in *Political Gain and Civilian Pain*, edited by Thomas Weiss, David Cortright, George Lopez, and Larry Minear, eds. New York: Rowman & Littlefield.
- [26] Haider, Jamal, 2017. "Sanctions and Export Deflection: Evidence from Iran." *Economic Policy*, Vol. 32(90), pages 319-355.
- [27] Hufbauer, Gary, C. Jeffrey, J. Schott, K.A. Elliott, and Barbara Oegg, 2009. *Economic Sanctions Reconsidered*, 3rd Edition. Washington, DC: Peterson Institute for International Economics.
- [28] International Monetary Fund, Staff Report for the Article IV Consultation: Russian Federation, July 2015.
- [29] Kaempfer, William H., Anton D. Lowenberg, and William Mertens, 2004. "International Economic Sanctions Against a Dictator," *Economics and Politics*
- [30] Kaempfer, William H., and Anton D. Lowenberg, 2007. "The Political Economy of Economic Sanctions," *The Handbook of Defense Economics*, Vol. 2, Chapter 27.
- [31] Kalemli-Ozcan, K., B. Sorensen, C. Villegas-Sanchez, V. Volosovych, and S. Yesiltas, 2015. "How to Construct Nationally Representative Firm Level Data from the ORBIS Global Database," University of Maryland Working Paper
- [32] Moret, E., T. Biersteker, F. Giumelli, C. Portela, M. Veber, D. Jarosz, C. Bobocea, 2016. "The New Deterrent: International Sanctions against Russia over the Ukraine Crisis," Institute of International and Development Studies in Geneva.
- [33] Morgan, T. Clifton, Navin Bapat, and Yoshi Kobayashi. 2014. "The Threat and Implication of Sanctions: Updating the TIES dataset." *Conflict Management and Peace Science* 31(5): 541-558.
- [34] The Moscow Times, "Russia's VTB Wants \$5.4 Billion in State Aid to Offset Sanctions Losses," November 20, 2014.
- [35] The Moscow Times, "Sanctioned Bank Rossiya Becomes First Major Bank to Expand in Crimea," April 15, 2014.

- [36] The Moscow Times, "Sanctioned Bank Rossiya to Service \$36 Billion Domestic Electricity Market," April 14, 2014.
- [37] Nooruddin, Irfan. 2002. "Modeling Selection Bias in Studies of Sanctions Efficacy." *International Interactions* 28 (1): 59–75.
- [38] O’Sullivan, Meghan, 2003. *Shrewd Sanctions*. Washington, D.C.: Brookings Institution Press.
- [39] Pape, Robert A. (1997). "Why Economic Sanctions Do Not Work." *International Security*, 22(2): 90–136.
- [40] Petrescu, Ioana M. 2016, "The Effects of Economic Sanctions on the Informal Economy," *Management Dynamics in the Knowledge Economy*, Vol. 4 pp. 623-648.
- [41] Rosenberg, Elizabeth, Zachary K. Goldman, Daniel Drezner, and Julia Solomon-Strauss, 2016. "The New Tools of Economic Warfare: Effects and Effectiveness of Contemporary U.S. Financial Sanctions." Center for a New American Security.
- [42] Schelling, Thomas C., 1967. "The Strategy of Inflicting Costs." Chapter in NBER book *Issues in Defense Economics* (1967), Roland N. McKean, editor (p. 105 - 127).
- [43] Stone, Mark, 2016. "The Response of Russian Security Prices to Economic Sanctions: Policy Effectiveness and Transmission." U.S. Department of State Office of the Chief Economist Working Paper.
- [44] Tuzova, Y. and Faryal Qayum, 2016. "Global oil glut and sanctions: The impact on Putin’s Russia", *Energy Policy*, Vol. 90, March 2016, pages 140–151.
- [45] Weiss, Thomas. 1999. "Sanctions as a Foreign Policy Tool." *Journal of Peace Research* 36 (5): 499–509.
- [46] World Bank, *Russia Economic Report No. 33: The Dawn of a New Economic Era?* April 2015.
- [47] Zarate, Juan C. 2013, *Treasury’s War: The Unleashing of a New Era of Financial Warfare*, PublicAffairs, New York, NY.

Figure 1: Firm Outcomes in θ and γ Space

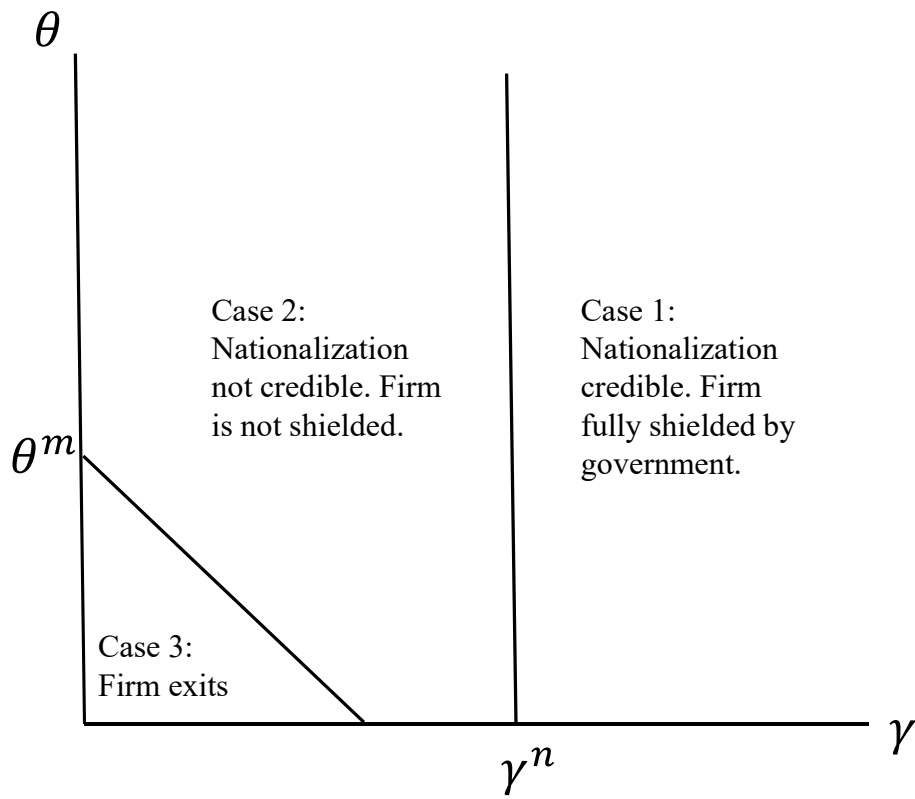
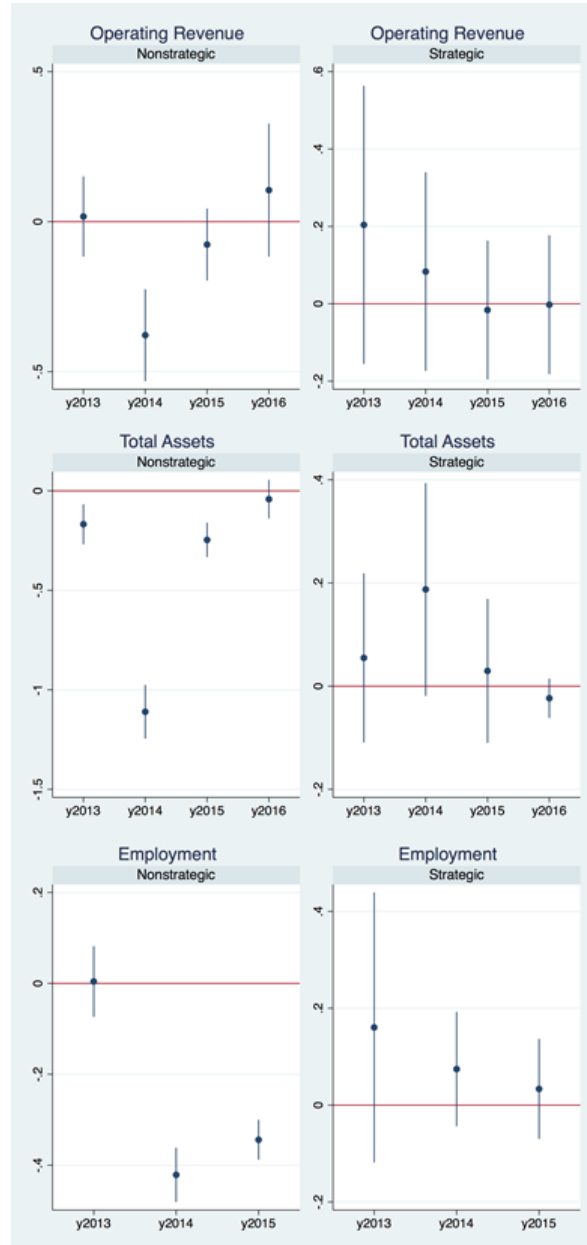
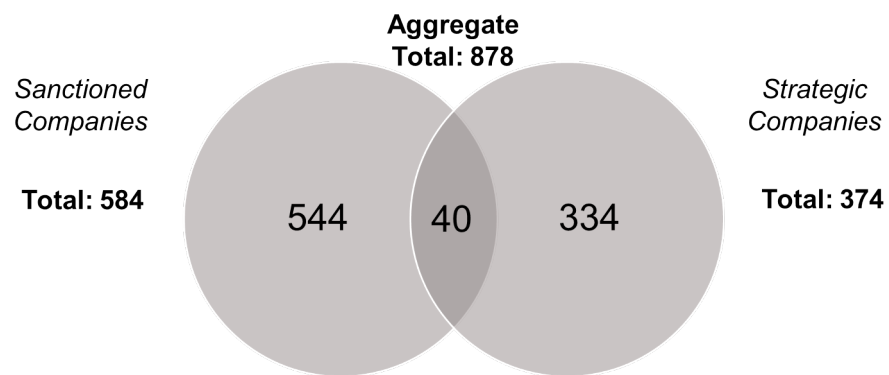


Figure 2: Log Change in Performance of Sanctioned vs. Non-sanctioned Firms by Year



Notes: Figure shows coefficient point estimates and 95% confidence intervals from regressing $\ln X_t$ on $\text{everSanc} * \text{nonStrat}$ and $\text{everSanc} * \text{Strat}$, controlling for country, sector and strategic status, by year.

Figure 3: Sanctioned vs. Strategic Firms



Source: U.S. Treasury OFAC, Council of the European Union, Government of the Russian Federation