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Tibor Besedeš, Stefan Goldbach, Volker Nitsch

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Cheap Talk?
Financial Sanctions and Non-Financial Firms*

Tibor Besedeš
Georgia Institute of Technology

Stefan Goldbach
Deutsche Bundesbank

Volker Nitsch
Technische Universität Darmstadt and CESifo

Abstract
Sanctions restrict cross-border interactions and therefore, not only put political and economic pressure on the target country, but also adversely affect the sender country. This paper examines the effect of financial sanctions on the country imposing them. We analyze the business responses of German non-financial entities to the imposition of sanctions on 23 countries over the period from 1999 through 2014. Examining highly disaggregated, monthly data from the German balance of payments statistics, we find four main results. First, German financial activities with sanctioned countries are reduced after the imposition of sanctions. Second, firms doing business with sanctioned countries tend to be disproportionately large, often having alternative business opportunities. Third, firms affected by sanctions expand their activities with non-sanctioned countries, some of which display close trade ties to the sanctioned country. Fourth, we find no effect of sanctions on broader measures of firm performance such as employment or total sales. Overall, we conclude that the economic costs of financial sanctions to the sender country are limited.

JEL Code: F20; F36; F38; F51

Keywords: sanction; restriction; cross-border transaction

E-mail: besedes@gatech.edu; stefan.goldbach@bundesbank.de; nitsch@vwl.tu-darmstadt.de

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1. Introduction

Sanctions vary in scale and scope. The European Union, for instance, currently imposes restrictions on 33 countries,[1] with measures often being specifically designed, from an arsenal of legal instruments, which includes travel bans, financial restrictions, arms embargoes and trade restrictions, "to bring about a change in policy or activity by the target country, entities or individuals."[2]

However, while sanctions aim to exert pressure on a target, they also imply costs for the sender country. The reduction of bilateral relations not only restricts sanctioned entities and their ability to interact, but also limits the business opportunities of the sanctioning country. Consequently, business groups in the sanctions-imposing country typically oppose such measures. When the U.S. government, for instance, considered a tightening of sanctions against Russia in June 2014, the U.S. Chamber of Commerce and the National Association of Manufacturers issued a newspaper advertisement stating that "[w]e are concerned about actions that would harm American manufacturers and cost American jobs. [...] The only effect of such sanctions is to bar U.S. companies from foreign markets and cede business opportunities to firms from other countries." [3] German corporate executives are reported to have warned, in a similar fashion, against escalating the measures.[4]

In practice, sanctions affect the sender's economy in many ways, making quantification of their overall domestic burden difficult. Apart from the immediate reduction in foreign market access, possible costs include the general increase in uncertainty associated with conflict escalation, the risk of countermeasures by the sanctioned country and a long-term loss of the foreign market due to greater competition from non-sanctioning countries. At the other extreme, sender countries may also benefit from the imposition of restrictive measures. Cutting aid or official credits, for instance, implies an immediate reduction in budgetary expenditures, as noted by Hufbauer, Schott, Elliott, and Oegg (2007, p. 108).

In view of these difficulties in identifying the domestic costs of sanctions, empirical studies typically follow, to the extent they address this issue at all, a two-step approach to

[1] For a list of restrictive measures in force, see https://www.sanctionsmap.eu.
[2] See https://eeas.europa.eu/headquarters/headquarters-homepage/423/sanctions-policy_en. Masters (2015) even notes that "because the EU lacks a joint military force, many European leaders consider sanctions the bloc's most powerful foreign policy tool".
[3] A copy of the ad is available on the association's website at http://www.nam.org/Issues/Trade/NAM-Chamber-Ad.pdf.
[4] "German Businesses Urge Halt on Sanctions Against Russia," The Wall Street Journal, May 1, 2014.

examine the impact of sanctions on the sender's economy. In a first step, the effect of sanctions on the targeted economic activity is analyzed. Specifically, since sanctions aim to restrict cross-border interactions, the decline in business with the sanctioned country is quantified, often with a strong focus on bilateral trade. In a second step, based on this estimate, the economic loss to the sanctioning country is calculated. Hufbauer, Elliott, Cyrus, and Winston (1997), for example, examine the costs of unilateral economic sanctions by the United States and estimate that the sanctions may have reduced the country's exports to 26 target countries by about 15-19 billion US dollars in 1995. Assuming, then, that 1 billion U.S. dollars of exports supported about 13,800 jobs and that there was no offsetting increase in exports to other markets, they argue that this drop translated into a reduction of about 200,000-260,000 jobs. Moreover, since jobs in the export sector pay relatively high wages, they estimate that workers probably lost about 0.8-1.0 billion U.S. dollars in export sector wage premiums.

In this paper, we assess the costs of financial sanctions on the imposing country in more detail. In particular, we examine the effects of financial sanctions on German non-financial entities over the period from 1999 through 2014.[5] During this time, Germany newly imposed restrictive financial measures on 23 countries, most of which are still in place. More notably, using highly disaggregated, monthly data from the German balance of payments statistics, we are able to identify business units that declared financial transactions with sanctioned countries and, therefore, can be assumed to have been directly affected by the measures. As we are interested in identifying the costs of sanctions beyond the reduction in bilateral financial flows, we focus our analysis on German non-financial declarants, i.e., declarants which are not classified in section K, financial and insurance activities, according to the NACE Rev. 2 classification. To the extent that financial restrictions have any measurable effect on the economic performance of individual declarants, these effects should be particularly observable for non-financial business entities. For German banks and insurance companies, in contrast, with their large-scale financial operations in major national and international markets, the reduction in business opportunities due to sanctions policies is expected to have generally limited consequences on their overall activities.[6]

[5] Ahn and Ludema (2019) use firm-level data to examine the impact of sanctions on the financial health of the targeted firms.

[6] Buch and Lipponer (2004) provide a detailed empirical assessment of the international activities of German banks. According to their findings, German banks operating abroad typically expand their business either to realize economies of scale, with particularly strong engagements in OECD countries and major international financial centers, or to reap diversification benefits, reporting payments to (or from) a large portfolio of

We examine the impact of financial sanctions on domestic businesses along various lines. We begin with an analysis of the direct costs of sanctions in terms of cross-border business that is lost. More specifically, we apply a differences-in-differences approach to study changes in German bilateral capital flows with the sanctioned country after the imposition of sanctions. Besedeš, Goldbach, and Nitsch (2017) find a strong and immediate decline in cross-border activities with the target country at both the extensive and intensive margins; they estimate, for instance, that after the imposition of financial sanctions German capital flows with the sanctioned country decrease by about 50 percent. For the subset of non-financial declarants analyzed in this paper, however, the reduction in cross-border business with sanctioned countries is, if anything, driven by a decline in the scope of activities (i.e., the extensive margin) while the results for total financial flows (i.e., the intensive margin) turn out to be less robust. The decline in financial flows in the wake of financial sanctions, therefore, seems to be mainly due to the reduction in activities of German financial institutions.

Next, we characterize non-financial firms affected by sanctions in more detail. With only a few exceptions (e.g., Russia), restrictive financial measures have been primarily imposed on countries of small, even tiny, importance for Germany as counterparts in financial transactions. Consequently, it is perhaps not surprising that German firms that declared financial transactions with sanctioned countries turn out to be disproportionately large and generally very active in (many) international markets – a finding that is in line with the literature on firm-level exports.[7] As a result, firms affected by sanctions are expected to have various outside options in response to newly-imposed restrictions.

Our micro data also enable us to explore the response of sanctions-affected declarants directly. In particular, we aim to identify possible sanctions evasion behavior by non-financial reporting units. We find that German firms which declared activities with sanctioned countries in the 12 months before restrictive measures were imposed sizably expand their activities with other countries, some of which display close trade ties to the sanctioned country, potentially indicating sanctions evasion behavior.

Finally, we examine the impact of sanctions on firm-level variables such as total sales and the number of employees. If financial sanctions have any severe consequences for the

countries. In either case, business with sanctioned countries is of minor importance for a bank's overall performance.

[7] See, for instance, Bernard, Jensen, Redding, and Schott (2018), Table 5.

sanctioning country's economy, as argued, for instance, by national business associations, the costs of sanctions should be observable in these measures. However, the business performance of firms affected by sanctions is not measurably different from that of firms doing business only with non-sanctioned countries. Overall, we find consistent evidence that the costs of financial sanctions on the German economy are, if anything, moderate.

The impact of sanctions on the sender country has, until recently, rarely been analyzed in the literature. Kaempfer and Lowenberg (2007), for instance, in their extensive review of empirical studies on sanctions, bypass this issue and discuss the costs of sanctions to the sender only as a potential determinant of the success of sanctions. Studies in this line of work, such as Lam (1990) and Hufbauer, Schott, Elliott, and Oegg (2007) , typically provide a crude ad hoc assessment of the consequences of sanctions for the sender (e.g., by using a scale from 1 [net gain] to 4 [major loss]) and then use this measure as explanatory variable. Over the last few years, however, interest in how sanctions affect the sanctioning country has increased, especially after the imposition of sanctions on Russia. Crozet and Hinz (2020) quantify the loss in exports due to sanctions on Russia and Russian countersanctions for 37 countries and estimate modest effects, most of which are concentrated in non-embargoed products. In a related study, Gullstrand (2020) examines the impact of the sanctions on and by Russia on Swedish firms. Although the aggregate loss is, again, negligible, the effect is heterogeneous, and some firms faced substantial costs. Most recently, Crozet, Hinz, Stammann, and Wanner (2020) find that sanctions lower the probability of French firms to export to sanctioned markets.

In our analysis, we substantially deviate from this work. Instead of focusing on a single conflict episode, we pool across sanctions which have been newly imposed on a number of countries over a period of more than a decade. More importantly, we concentrate on sanction measures targeted at financial activities (and, therefore, go beyond restrictions on cross-border trade which typically also include constraints on financial transactions). In earlier work (Besedeš, Goldbach, and Nitsch, 2017), we analyze, in a comparable setting, how financial sanctions affect financial flows. Using the full set of entries in the German balance of payments, we find a strong and immediate decline in direct financial flows with the sanctioned country after the imposition of sanctions. We also document other sanctions-related patterns in bilateral financial relationships, including non-anticipation, evasion, and sensitivity to sanctions intensity. In this study, in contrast, we focus exclusively on non-financial actors and characterize declarants affected by sanctions (rather than flows), using a

range of firm-level economic indicators beyond cross-border financial transactions. Limiting our attention to declarants outside finance allows us to assess more directly the extent to which financial sanctions are 'smart'. Our results indicate that, by and large, the financial sanctions in force in Germany are indeed 'smart': while reducing the financial activities of German non-financial entities with target countries, they do not affect firm performance.

The remainder of the paper is organized as follows. Section 2 reviews some relevant aspects of sanctions and sanction policies, followed by a description of our data. In Section 4, we follow standard practices and examine, at the country-month level, the effect of financial sanctions on cross-border activities. We then make explicit use of the firm-level dimension of our data set and characterize German non-financial declarants that report business with sanctioned countries in Section 5. In Section 6, we explore firm-level responses to the imposition of sanctions, while Section 7 focuses on the effects of sanctions on aggregate measures of firm performance. Finally, Section 8 provides some concluding comments.

2. Financial Sanctions in the European Union

In the European Union (EU), where member states have committed themselves to a Common Foreign and Security Policy, foreign policy instruments are (typically) imposed by the Council of the EU. Among the instruments for external action, financial sanctions became available to EU authorities in 1994. At this time, the Treaty of Maastricht entered into force, which introduced the free movement of capital as a Treaty freedom. Today, Article 63 of the Treaty of the Functioning of the European Union (TFEU) prohibits all restrictions on payments and the movement of capital between member states and between member states and third countries, while Article 215 of the TFEU allows for the interruption or reduction, in part or completely, of economic and financial relations with one or more third countries.

For our purposes, two features of sanction policies in the European Union are particularly noteworthy. First, while the Council acts by qualified majority, making it difficult, if not impossible, for a single country to veto proposed legislation, regulations are directly applicable in all EU member states and binding in their entirety. As a result, there is only limited scope for potential concerns of endogeneity, where the decision to impose restrictive measures is affected by their expected domestic costs. Still, as the EU implements sanctions either autonomously, at the EU level, or because of resolutions of the Security

Council of the United Nations (UN), we check for robustness by examining UN sanctions only.[8]

Second, the EU adopts, in practice, a wide range of restrictive measures. These measures often target specific activities; they also include, for instance, restrictions on non-financial activities such as trade embargoes and travel bans. The overwhelming majority of such measures, however, directly and/or indirectly affect cross-border financial relations and are, therefore, also officially recorded as financial sanctions (which is the policy instrument of our interest). Embargoes on exports of specific types of goods, for instance, typically involve restrictions on technical assistance, training and financing; travel bans on named individuals are often accompanied by other restrictive measures, such as the freezing of funds and financial assets. The measures are also regularly reviewed and frequently adjusted. Besedeš, Goldbach, and Nitsch (2017), for instance, use this information to also examine the effects of the strength, and changes in the strength (i.e., tightening and loosening), of sanctions on cross-border capital flows; they also discuss the types of financial sanctions in more detail. In this paper, to save space, we generally limit our attention to the distinction whether a country is financially sanctioned or not. By using a single financial sanctions indicator variable, we do not differentiate, for instance, by the sanctioning coalition (EU, UN) or by the type and scope of sanctions (finance, trade, travel), but only report average effects.

In practice, sanctions is the EU's policy "to intervene when necessary to prevent conflict or respond to emerging or actual crises."[9] Consequently, it may be difficult to disentangle the impact of sanctions from other political and economic issues faced by the target country, including an increase in uncertainty. In our analysis of German capital flows, we partly deal with this issue by adding controls for economic conditions in the partner country.[10]

3. Data

[8] Occasionally, the European Union imposes measures that go beyond UN sanctions; see Biersteker and Portela (2015) for a more detailed discussion. In our analysis, we classify these episodes as UN sanctions.
[9] See https://ec.europa.eu/info/business-economy-euro/banking-and-finance/international-relations/sanctions_en.
[10] We note in passing that macroeconomic controls themselves may be affected by sanctions or by events that resulted in the imposition of sanctions. As a consequence, these results may be biased. We consider the extended specification as a robustness check without a clear preference for the baseline or extended specification.

Our analysis is based on two confidential micro data sets from the Deutsche Bundesbank. Given the sensitivity of the business information involved, the data are only accessible, often in anonymized form, at the headquarters of the Bundesbank in Frankfurt, Germany.

We use the Deutsche Bundesbank's balance of payments statistics as our main source of data. This register contains detailed information on financial transactions between Germany and the rest of the world and has, for our purposes, at least two notable advantages. First, the data set is complete; all individuals, firms and financial institutions located in Germany are required to report cross-border payments in excess of 12,500 euros to the Deutsche Bundesbank, allowing the central bank to compile the monthly balance of payments statistics.[11] Second, the register collects information on various transaction features, including the name and the address of the reporting unit, thereby allowing us to identify cross-border financial activities of non-financial declarants.[12] In addition, for each single declaration, the value and the partner country of the transaction are provided as well as information on the type of asset that is transferred (bonds, commercial paper, stocks, investment certificate, equity capital, credit and other capital).[13] Hence, although the frequency of the data is monthly, with information provided at the end of the month, the data are effectively close to the level of the individual transaction.

In contrast to Besedeš, Goldbach, and Nitsch (2017), however, we do not use the full sample of balance of payments entries available to us, but, aiming to assess the domestic (economic) costs of sanctions, focus our attention exclusively on transactions of non-financial declarants. Consequently, we exclude cross-border financial flows reported by financial institutions, many of them of considerable magnitude, which implies a loss of 4,364 declarants out of a total of 47,674 reporting units.[14] We also deviate from Besedeš, Goldbach,

[11] See Section 67 of the Foreign Trade and Payments Ordinance (*Außenwirtschaftsverordnung*), available at http://www.bmwi.de/Redaktion/DE/Downloads/A/awv-englisch.html.
[12] Cross-border transactions by households and individuals are typically declared by the financial institution that handles the transfer.
[13] For a few types of transactions, exemptions exist such that there is no declaration necessary; these exemptions are: payments below the threshold of 12,500 euro, payments related to the export and import of goods, (re-)payments related to short-term (duration of less than 12 months) loans, paid short-term deposits to foreign monetary institutions and payments which are forwarded to other foreigners.
[14] In the practical implementation, we exclude all balance of payments entries for which the German declarant is classified in Section K ("financial and insurance activities") according to the NACE Rev. 2 classification. Outside finance, most of the German cross-border financial activities are concentrated in Sections M ("professional, scientific and technical activities") and C ("manufacturing").

and Nitsch (2017) in analyzing more years of data. Our sample covers the period from January 1999 to December 2014.

The second source of information that we use is the corporate balance sheets database of the Bundesbank, Ustan. The Bundesbank has collected, for various purposes, extensive data on individual firms. The data are often taken from financial statements but may also have been obtained from a mandatory questionnaire that covers the firms' balance sheet and profit and loss accounts data. Most notably for our purposes, the database contains information on firm characteristics that are not included in the balance of payments data (such as firm employment or sales).[15]

The corporate balance sheets data are available on an annual basis. We merge the data with our information from the balance of payments data by the corresponding year (such that annual firm data are matched with the monthly transactions data in each of the twelve months in a given year). As the firm identifiers are not identical for the two data sets, we apply a propensity score string matching algorithm, based on the name of the firm, its address, and its legal form, to link the two data sets. Schild, Schultz, and Wieser (2017) provide a detailed discussion of the matching methodology and the quality of the match; see also the Appendix.

Our matched sample covers more than 5,000 non-financial declarants. For these declarants, the average monthly transaction value is only marginally larger than the cross-border financial activities of unmatched reporting units. Overall, it is comforting to note that the matched data set does not differ significantly from the balance of payments data.[16]

Information on financial sanctions is mainly obtained from the service center 'Financial Sanctions' of the Deutsche Bundesbank.[17] This unit, which is responsible for the implementation of European Union Regulations on financial sanctions in Germany, provides a compilation of executive orders and disseminates relevant information to interested parties and the wider public. We augment this data with additional information from official European Union sources.[18]

[15] For a more detailed description, see https://www.bundesbank.de/Redaktion/EN/Standardartikel/Bundesbank/Research_Centre/research_data_micro_data_ustan.html.
[16] See Table A1 in the appendix. While most of the results in this paper are derived from the full universe of non-financial declarants in the German balance of payments, we make use of the matched (sub-)sample whenever we examine additional firm-level characteristics.
[17] See http://www.bundesbank.de/Navigation/EN/Service/Financial_sanctions/financial_sanctions.html.
[18] Common Foreign and Security Policy Decisions and European Union Regulations are published in the Official Journal of the EU; see http://eur-lex.europa.eu/homepage.html.

During our sample period, financial sanctions have been newly imposed on 23 countries. Table 1 provides a list of countries along with a brief description of the measures taken.[19] As shown, almost all target countries are economically small and/or poorly developed. More importantly, they are often of tiny importance for the international financial business relationships of German non-financial companies. As shown in Figure 1, to the extent any (direct) financial activities are reported, the target countries typically account, with few exceptions, for less than 0.01 percent of cross-border capital flows by German non-financials.

Sanctions are applied instantaneously, with no lag between the date of the announcement of a sanction and its enforcement. In our empirical analysis, with balance of payments data at monthly frequency, we code sanctions imposed after the middle of the month as being effective from the beginning of the following month. For two target countries, Uzbekistan and the Comoros, the sanctions have also been lifted completely during our sample period. However, as German non-financial entities do not declare any financial business with the Comoros, these episodes of a (reverse) switch in sanction status are ignored.[20]

In Table 2, we describe our financial data in more detail. As noted above, the raw data are highly disaggregated, with separate statistical entries in each month for each feature of a transaction. Therefore, to partly reduce the complexity of the data, the table reviews data at the country-month level, our main unit of analysis. Descriptive statistics are presented for both the full sample of available observations, and for transactions under sanction, along with a p-value for a t-test of equality of means.

Table 2 illustrates the various features and dimensions of our (raw) balance of payments data. For each country-month pair in our sample, there are, on average, about 33 separate entries of cross-border financial activities; each entry refers to a capital flow activity (inflow or outflow) in one of nine asset categories by a single German non-financial reporting unit (or declarant). Overall, there is broad trading activity which is particularly concentrated in credit, equity capital, and direct investment credit.[21]

[19] The table has been updated and extended from Besedeš, Goldbach and Nitsch (2017).
[20] Besedeš, Goldbach, and Nitsch (2017) use these episodes to replicate their analysis for the removal (instead of the imposition) of sanctions, without new insights.
[21] Once the sample is expanded to also include financial institutions and insurance companies, financial flows are dominated by trading activities in bonds and stocks; see Besedeš, Goldbach, and Nitsch (2017).

More interestingly, and perhaps not surprisingly, given the irrelevance of many sanction targets as a financial partner noted above, bilateral financial interactions with sanctioned countries are rare; sanction episodes account for only 4 percent of our sample (of country-month pairs). Also, capital flows under sanctions are, on average, of smaller, although still sizable, magnitude.[22] There are fewer balance of payments 'transactions', reported by a smaller number of declarants and involving fewer asset classes, potentially already reflecting greater administrative hurdles due to the imposition of financial sanctions.

4. Business with Sanctioned Countries

We begin our empirical analysis of the domestic costs of sanctions by examining the effect of sanctions on the targeted economic activity. Since financial sanctions typically put restrictions on cross-border financial interactions, we estimate a gravity equation to analyze how financial flows declared by German non-financial entities to/from sanctioned countries have changed after the imposition of sanctions.

Our empirical framework builds on the model of Okawa and van Wincoop (2012), who provide a theoretical underpinning for the use of gravity models in international finance. Okawa and van Wincoop (2012) develop a model of asset flows between countries with assets broadly defined and encompassing equity as well as other risky assets such as corporate bonds, long-term bonds, or bank holdings. Their formal theoretical model gives rise to a gravity equation for asset trade capturing the relationship between asset flows, $Flow_{cj}$, between two countries *c* (destination) and *j* (source) and variables identifying financial frictions, z_{cj}^{m}, where *m* identifies each friction

$$\log(\text{Flow}_{cj}) = -\sum_{m=1}^{M} \beta_m z_{cj}^{m} + \eta_c + \xi_j + \epsilon_{cj}. \quad (1)$$

Estimates of β_m identify the effect of frictions between countries, while η_i and ξ_j are destination and source country fixed effects.

[22] As noted above, restrictive measures are typically tailored in order to promote the desired outcome; they do not prohibit automatically all business dealings with a sanctioned country. For the EU's description of best practices for the effective implementation of restrictive measures, see http://eeas.europa.eu/archives/docs/cfsp/sanctions/docs/index_en.pdf.

Since our data set covers financial flows between Germany and the rest of the world, we estimate a simpler form of this gravity equation

$$\log(\text{Flow}_c) = -\sum_{m=1}^{M} \beta_m z_c^m + \eta_c + \epsilon_c, \quad (2)$$

where we have omitted the source country subscript *j* and source country fixed effects since we only have one source country in our data, Germany. An obvious issue with the above specification is that the destination fixed effects also absorb the effects of frictions. In our application we avoid this complication by using a panel data set and the resulting addition of a time subscript to every variable as well as year fixed effects, ϕ_t. Lastly, since the destination country fixed effects η_c absorb all time-invariant frictions, we can only estimate the effect of a time-varying friction, z_{ct}^m, which in our case is the presence of financial sanctions that Germany imposes on a destination or target country *c*, and is the only time-varying friction we use. Thus, the basic form of the gravity equation we estimate is given by

$$\log(\text{Flow}_{ct}) = \alpha + \beta \text{Sanctions}_{ct} + \eta_c + \phi_t + \epsilon_{ct}, \quad (3)$$

where α is a constant term. The coefficient of interest to us is β, which measures the effect of sanctions on cross-border financial activities; a negative and significant coefficient indicates that the adoption of sanctions is associated with fewer financial interactions between German non-financial declarants and their foreign counterparts, ceteris paribus. In line with Okawa and van Wincoop (2012), we estimate regressions with least squares, using the least squares with dummy variables (LSDV) technique of Head and Mayer (2014). However, following the more recent literature, we also employ a Poisson pseudo-maximum likelihood (PPML) estimator. Also, we analyze the data at the country-month level to reduce the amount of noise, and especially the number of zero observations (i.e., observations of no flows), in the raw data.[23]

We use four different variables to measure the intensity of bilateral financial interactions between Germany and countries (or, more precisely, territories) in the rest of the world: (1) the total value of bilateral capital flows (defined as the sum of inflows and outflows), (2) the value of gross capital inflows, (3) the value of gross capital outflows, and

[23] As we examine a balanced sample, the analysis of more disaggregated data inflates the size of the panel dramatically.

(4) the net value of bilateral capital flows (defined as outflows minus inflows). For us, none of the measures is obviously superior to any other, although we put perhaps somewhat less emphasis on the estimation results for net financial flows. We also experiment with adding further control variables to the baseline fixed effects differences-in-differences specification, at the costs of a (much) smaller sample size.

Table 3 reports the results. The table contains two panels. In the upper panel, we tabulate the results from LSDV estimation, similar to Besedeš, Goldbach, and Nitsch (2017); in the lower panel, we provide analogous results using the now more conventional PPML estimation. We begin by discussing the results from least squares estimation. Columns (1) to (4) of the table present the estimates from the parsimonious specification of equation (3) which only includes, in addition to our variable of interest, the sanctions dummy, two sets of fixed effects. In this specification, all time-invariant influences on German financial flows with a country (such as, for instance, the partner's geographic distance from Germany) are accounted for by country fixed effects, while a comprehensive set of time fixed effects captures monthly variations in capital flows common to all partners. As shown, the point estimates of β are consistently negative and, with a value of about -0.8, of about the same magnitude as found in Besedeš, Goldbach, and Nitsch (2017) who analyze a shorter but more comprehensive sample of German cross-border financial flows (covering, in addition, declarations by German financial institutions and insurance companies). Taken at face value, the point estimates of β imply that capital flows by German non-financial businesses with target countries of sanctions decrease, on average, by about 55 percent ($\approx e^{-0.8} - 1$) after the imposition of financial sanctions which seems economically plausible. In comparison to Besedeš, Goldbach, and Nitsch (2017), however, the statistical precision of the estimated effects is considerably lower. Only one of the four coefficients is estimated at the 5 percent level of statistical significance, while the remaining three coefficients are marginally significant at the 10 percent level. As a result, the activities of German non-financial entities seem to be less clearly affected by financial sanctions than the business activities of financial declarants.

This finding is confirmed when we additionally control for standard determinants of bilateral financial flows (such as the partner country's level of public debt).[24] Columns (5) to (8) of Table 3 tabulate the results from the augmented model of equation (3). With this

[24] See Forbes and Warnock (2012). We do not control for stock market capitalization due to limited data availability.

extension, our estimates of β, although slightly larger in magnitude, are basically unchanged in statistical significance.

Reassuringly, the results also turn out to be largely robust across different estimation techniques. As shown in the lower panel of Table 3, the PPML estimates for the default specification are very similar to our LSDV estimates. With additional controls, however, our estimates of β decrease in magnitude by about one-third and become statistically indifferent from zero at any conventional level of confidence. Part of the decline in the estimated sanctions effect is explained by time-varying country-specific features which tend to enter the regressions significantly with PPML. A country's overall financial openness, for instance, turns out to be, as expected, positively associated with German capital flows and is likely to decline under sanctions. The results are also affected, however, by the considerably reduced sample size. As some control variables are only available for a limited number of countries, our sample is effectively reduced to cover only thirteen (of 23) sanctions episodes. For these episodes, then, which contain the economically more relevant markets from the list of sanctioned countries, there is, with PPML, hardly any measurable effect of sanctions on the cross-border capital flows of German non-financial declarants identifiable.[25,26]

In Table 4, we expand our analysis to cover not only the value of financial flows but also other quantitative features of Germany's bilateral financial relationship with a country. Again, we present results of both LSDV and PPML estimation. In particular, we decompose aggregate financial flows with a partner into various (contributing) factors (such as the number of German reporting units that actually declare financial transactions with the country) and estimate the sanctions effect for these factors separately. The results of these decomposition exercises are reported in Table 4. As before, we experiment with various specifications of equation (3). However, to save space, we only report estimates for the coefficient of interest, β; that is, each cell in the table contains the results of a separate regression. The regressand is tabulated in the first column on the left of the table; the remaining eight columns correspond to the specifications of equation (3) in Table 3 (including

[25] When we reestimate, for the restricted sample, the parsimonious specification of equation (3), the estimated β coefficient is of (borderline) statistical significance for only one measure of cross-border financial activity (net flows). Results are available on request.

[26] Instead of controlling for determinants of cross-border financial flows, it may also be reasonable to restrict the analysis to a homogeneous group of countries. When we analyze a sample that only includes countries with a per capita income below that of the sanctioned country with the highest per capita income (Russia), our baseline results remain qualitatively unchanged.

additional country controls for columns (5)-(8)). For comparison, the first row of Table 4 replicates the results for the value of financial flows shown in the first row of Table 3.

Reviewing the results, the sanctions effect varies sizably by type of margin. Specifically, for measures of the extensive margin of a bilateral financial relationship (such as, for instance, the number of German reporting units that declare financial activities with a country in a given month), the estimated β coefficients take consistently negative and statistically significant values. In particular, our point estimates imply a decline in the number of declarants of about 27 percent irrespective of the type of flow, while marginally smaller effects are observed for the number of statistical entries in the balance of payments of about 26 percent irrespective of the type of flow. More notably, this finding is largely unaffected when we extend our specification to include additional control variables. As shown in columns (5) to (8), the coefficients even tend to increase in magnitude with this extension. The number of declarants decreases by between 26 and 32 percent depending on the flow, while the number of statistical entries decreases by between 20 and 41 percent. In contrast to our findings for the intensive margin, these results indicate a measurable decline in financial activities, or the extensive margin, with sanctioned countries after the imposition of sanctions.

Financial sanctions reduce another dimension of the extensive margin, namely the number of asset classes traded which decrease by about 12 to 13 percent. However, and similar to our intensive margin results, when we look at another dimension of the intensive margin, the average value of a flow per asset class per declarant, we again find no statistically significant effects. These results again indicate that the effect of financial sanctions on non-financial declarants is concentrated on the extensive margin and does not affect the intensive margin in a significant way.

As shown in the lower panel of Table 4, our findings are much less conclusive for PPML estimation. While virtually all (that is, 45 out of 48) estimated coefficients take a negative sign, indicating a sanctions-related decline in financial activities along the various margins, only five of the coefficients are (weakly) statistically significant. Possible explanations for the differences between our LSDV and PPML estimates include the presence of heteroskedasticity and the different treatment of observations with no financial activities by the two estimators.

5. Firms Facing Sanctions

An implicit assumption in reduced-form assessments of the domestic costs of sanctions is that financial restrictions affect all internationally active firms in similar fashion. Firms reporting business with sanctioned countries, however, may be systematically different from other declarants, potentially affecting their ability to cope with restrictions. For instance, given that countries targeted by sanctions often tend to be small, German entities conducting business with targeted countries could be disproportionately large, allowing them to more easily absorb the higher cost that may accompany operations in small countries with thin markets. Therefore, we next describe German non-financial entities that report cross-border capital flows with a sanctioned country in more detail. To do so, we construct, from the balance of payments, measures of the extent of a firm's monthly cross-border financial activities and estimate regressions of the form:

$$\log\left(\text{FirmActivity}_{it}\right) = \alpha + \beta \text{SanctionedFirm}_{it} + \{\gamma Z_{it}\} + \phi_t + \epsilon_{it}, \tag{4}$$

where FirmActivity_{it} is a measure of declarant i's aggregate cross-border financial activity at time t, $\text{SanctionedFirm}_{it}$ is an indicator variable that takes the value of one when declarant i faces sanctions on (part of) its business at time t (and is zero otherwise), Z_{it} is a vector of auxiliary control variables, and we include a full set of time-specific (ϕ_t) fixed effects. Our unit of observation for this exercise is a firm-month pair; that is, we compute, for each firm in our sample, a measure of the firm's business activities at a given point in time, and compare firms that declare activities with at least one country under sanctions with firms only reporting transactions with non-sanctioned countries, holding constant for other factors. To the extent there is any systematic identifiable difference between the firms, this difference will be captured by β, the estimated coefficient on our variable of interest.

As before, we proceed sequentially. We begin our analysis with a measure of how active a non-financial entity is in cross-border financial business as proxied by the log number of entries in the balance of payments statistics by a declarant in a given month (i.e., the firm-asset-country triplet). The results are reported in the first column in Table 5. The estimated coefficient on the sanctions dummy is positive and statistically significant, indicating that non-financial declarants hit by sanctions tend to report a disproportionately large number of activities with countries worldwide. The point estimate of 1.3 indicates that firms affected by sanctions report, on average, 255 percent more cross-border financial transactions, measured

by the number of country-asset pair entries in the balance of payments, than other declarants. Moreover, columns (2) to (4) show that this result remains qualitatively unchanged when we include additional control variables. In particular, we successively add (1) a comprehensive set of sector fixed effects to control for any industry-specific factors that may affect a firm's cross-border financial activity, (2) the total value of a firm's capital flows to control for firm size, and (3) the number of the firm's international markets that are under sanctions. While sector fixed effects and a firm's total cross-border flows explain part of the difference between entities operating under sanctions and other declarants, sanction-affected entities are still disproportionately more active in international markets, with the effect getting stronger the larger the number of sanctioned markets for which an entity reports business activities. Similarly, the results also hold for a balanced sample, which also includes (previously dropped) observations of zero cross-border activity, as shown in columns (5) to (8).[27]

In Table 6, we experiment with other measures of firm activity, including firm characteristics taken from the corporate balance sheets database (such as employment and sales), without much effect on our main findings.[28] Non-financial entities with activities in sanctioned countries are significantly larger than other declarants, by approximately 50 percent for both employment and sales. They operate in 160 percent more countries and trade 27 percent more asset classes. Firms which are active in sanctioned markets also have more total assets by 57 percent and are more productive by about 19%.

These findings are in line with selection effects highlighted by the Melitz (2003) model applied to financial activities. Countries that are targeted by sanctions display large degrees of political risk, which ultimately results in sanctions. Entry and operations of firms in these countries is more costly, or in terms of Melitz (2003) is characterized by a higher productivity cutoff. As a result, only more productive and larger firms will tend to operate in these countries as they are able to afford the higher costs of market entry.

In sum, we conclude that financial sanctions predominantly affect non-financial declarants with a wide range of domestic and international business activities and, therefore, considerable outside options. For a proper assessment of the domestic costs of sanctions, this

[27] Following standard practice, we add the value of 1 to our measure of firm activity, the number of firm-asset-partner triplets, to allow for log-linearization of this variable.
[28] Note that data used in the first three columns of Table 6 are monthly firm-level data collected for the purpose of compiling balance of payments reports. Data used in the remaining columns are from the annual firm-level data from the Ustan database which provides data on corporate balance sheets.

empirical finding, which is unobservable from the analysis of aggregate data, may be of particular relevance.

6. Responses to Sanctions

In view of outside business opportunities, we next examine how German non-financial declarants respond to the imposition of sanctions. To analyze this issue, we make explicit use of our granular data that allow us to observe cross-border financial activities by individual declarant. We perform a two-step procedure. In a first step, we identify German reporting units which declared financial activities with sanctioned countries in the period of 12 months before restrictive measures were imposed. These declarants are classified as firms affected by sanctions.[29] Then, based on this information, we analyze differences in activities between declarants affected (or 'treated') by sanctions and declarants without any business operations with target countries, examining firm activities with non-sanctioned countries only of both types of declarants. We hypothesize that any systematic variation over time in the size and scope of financial activities with non-sanctioned countries between the two groups of declarants can be interpreted as evidence of business responses related to the imposition of sanctions. Specifically, we estimate equations of the form:

$$\log\left(\text{Flow}_{ct}^{i}\right) = \alpha + \beta \text{AffectedFirm}_{t}^{i} + \{\gamma X_{ct}\} + \eta_{c}^{i} + \phi_{t} + \epsilon_{ct}, \tag{5}$$

where Flow_{ct}^{i} is a measure of German financial activity of declarant i with country c at time t, $\text{AffectedFirm}_{t}^{i}$ is an indicator variable that takes the value of one when a declarant reported business operations with a target country of sanctions in the 12 months before sanctions were imposed (and is zero otherwise), X_{ct} is a vector of auxiliary control variables, and we include declarant-country-specific (η_{c}^{i}) and time-specific (ϕ_{t}) fixed effects. In our empirical setting in which we focus exclusively on a sample of non-sanctioned countries and, therefore, ignore the direct effects of sanctions, the estimate of β indicates the extent to which financial activities of treated reporting units with a given country deviate from activities of

[29] A time window of 12 months before the imposition of sanctions allows us to ignore possible seasonal variation in financial activities. However, when we experiment with other time windows to identify sanctions-affected firms, we obtain very similar results.

other declarants after the treated units have been exposed to the treatment (i.e, they suffer from the imposition of sanctions on a third country).

Table 7 presents the results. The table is constructed analogously to our benchmark analysis of cross-border financial flows (Table 3); that is, we report estimates for our four measures of bilateral capital flows, using both a highly parsimonious specification of equation (5), with results being tabulated in columns (1)-(4) of the table, as well as a more demanding specification with additional control variables, for which the results are tabulated in columns (5)-(8). As before, the number of observations declines as the number of regressors increases because of missing country data. However, the drop in sample size turns out to be somewhat less pronounced for the analysis of firm-level data. Moreover, to the extent the control variables take significant coefficients, the results are reasonable and intuitive. Most notably, the effect of this modification on the main results is negligible, in contrast to our baseline findings above.

Turning to the variable of interest, the estimates of β are consistently positive and economically and statistically significant. This finding suggests that German declarants affected by sanctions policies indeed turn out to be highly flexible in adjusting their business patterns, successfully exploring alternative business opportunities. According to our point estimates, treated declarants expand their activities with other (non-sanctioned) countries relative to German declarants unaffected by financial sanctions by 35 to 55 percent, depending on specification.

Another possible interpretation that is consistent with our empirical findings, however, is that declarants, instead of opening new markets, simply continue business operations with target countries, via extended transactions with third countries. Consequently, sanctions would be largely ineffective because affected declarants circumvent the restrictions by using third countries as intermediaries.

Unfortunately, our data does not allow us to directly distinguish between these two different interpretations of the observed increase in third-country capital flows by sanctions-affected German declarants.[30] However, we are able to identify possible circumvention behavior. Circumvention of sanctions becomes more difficult the more countries impose them. As sanctions in our sample are imposed either by the European Union or by the entire

[30] The main restriction is our limited access to data, covering detailed balance of payments information from only a single source country, Germany.

United Nations, we expect to find evidence of circumvention, if anything, for sanctions imposed by the European Union alone. Further, it is assumed that countries which are economically close to the target countries are countries which may be more likely to serve as an intermediary.[31] Therefore, we identify a target country's five largest trading partners in the 12 months before the imposition of sanctions.[32] Specifically, we argue that a relative increase in financial relationships of sanction-'treated' units with countries which are major trading partners of sanctioned countries can be interpreted as evidence of circumvention.[33]

Estimation results are contained in Table 8. In contrast to our previous analysis, in which we use a single variable to describe the cross-border financial activities of German non-financial declarants affected by the imposition of sanctions relative to reporting units unaffected by sanctions, we now use six measures; these measures differentiate between the scope of sanctions (EU, UN) and the destination of third-country capital flows (top 5 trading partners of the target country, rest of the world), respectively. In combination, the results are indicative of circumvention behavior. Two findings are particularly noteworthy. First, for sanctions which have been imposed by the European Union alone, the estimated coefficients on the interaction terms (EU sanctions × destination) consistently take positive and significant values. As a result, third-country capital flows of German declarants affected by EU sanctions have, on average, sizably increased in relative terms. More importantly, the coefficients are larger, in both a statistical and an economic sense, for financial transactions with countries with close economic ties with sanctioned countries. Depending on the flow and regression specification, the point estimates imply that business with the largest trading partners of sanctioned countries increased by about 80 to 120 percent whereas business with all other countries expanded by only about 30 to 60 percent. This notable difference in the geographic diversification of financial activities, holding constant for other factors, is suggestive of the possibility of circumvention behavior by sanctions-affected German declarants. Second, for UN sanctions, we obtain very different results. For these sanctions, which are (by definition) broader in geographic scope, transactions of affected firms increase, if anything, only for countries other than the major trading partners of target countries by between 5 and 35 percent

[31] Besedeš, Goldbach and Nitsch (2017) also examine other potential intermediaries for the circumvention of financial sanctions, such as offshore financial centers. However, for this group of countries and territories, the results are much less conclusive.
[32] Monthly data on bilateral values of trade between countries are obtained from the International Monetary Fund's Direction of Trade Statistics. We compute a country's trade shares based on the sum of exports and imports.
[33] Circumvention does not necessarily imply that a sanctions regime is violated. Due to the administrative burden associated with sanctions, for instance, declarants also have a reasonable incentive to reroute legal activities.

according to the more parsimonious specification. Note that results from the richer specification identify similar magnitudes for EU-imposed sanctions while UN-imposed sanctions by and large do not result in increases in flows with third countries. As there is a priori no reason to expect a difference in patterns of geographic readjustment of financial activities by type of sanction, we argue, in line with Besedeš, Goldbach, and Nitsch (2017), that this finding provides further evidence of efforts by affected declarants to circumvent financial sanctions.

In sum, we conclude that, in response to sanctions, affected firms expand their business with non-sanctioned countries. Especially for sanctions imposed by the EU alone, there is indirect evidence that firms manage to continue their business operations with the target countries via non-sanctioned countries which display close trade ties to the sanctioned country and, therefore, serve as intermediaries.

7. Sanctions and Firm Performance

In a final exercise, we examine the overall costs of sanctions on domestic businesses. In view of the frequent and widespread opposition of industry groups and business leaders to sanction policies, emphasizing the loss in foreign business opportunities associated with such policy measures, the restrictions are expected to (also) have measurable negative consequences for the domestic economy, at least at the firm level. Therefore, we ask: Do German non-financial declarants affected by sanctions experience an identifiable decline in firm performance?

We analyze this issue by estimating regressions of the form:

$$\log(\text{FirmPerformance}_{it}) = \alpha + \beta \text{AffectedSanctionedFirm}_{it} + \upsilon_i + \phi_t + \epsilon_{it}, \quad (6)$$

where $\text{FirmPerformance}_{it}$ is a measure of declarant i's overall economic performance at time t, $\text{AffectedSanctionedFirm}_{it}$ is an indicator variable that takes the value of one when declarant i reports business with a sanctioned country within 12 months before the imposition of sanctions or after the imposition of sanctions (and is zero otherwise), and we include a full set of firm-specific (υ_i) and time-specific (ϕ_t) fixed effects. In this differences-in-differences

setting, to the extent that sanctions have any measurable effect on German non-financial entities, we expect the estimate of β to be negative and significant, indicating that firm performance worsens after the imposition of sanctions, holding constant for other (unobserved) firm features. As our data on firm characteristics are of annual frequency, we focus, in our baseline specification, on the contemporaneous association between sanctions and firm performance. Also, we jointly analyze the effects of sanctions on declarants that are affected by sanctions (because they reported business operations with a sanctioned country in the 12 months before sanctions were imposed) and declarants that (continue to) operate under sanctions since a firm's activities may have been reduced or eliminated completely due to the imposition of restrictions.

Table 9 presents the results. We experiment with a wide range of firm characteristics. Each column of the table reports the results of a separate regression, with the regressand tabulated in the first line. We begin, in column (1), with a model specification in which firm performance is proxied by the number of employees. In particular, we argue that the size of the workforce is probably the most comprehensive measure of a firm's economic adjustment costs to a sanctions environment. For firm employment as dependent variable, however, the point estimate of β, although negative, is economically small and statistically indistinguishable from zero. Taken at face value, this finding indicates that there is no measurable association between sanctions and firm performance. According to our estimation result, sanctions-affected firms do not change their labor force in response to sanctions. Still, adjustments in employment may be generally difficult, especially in the short term, due to German labor market regulations. Therefore, we next analyze a potentially more sensitive performance measure, a firm's total sales. As shown in column (2), for this regressand, the point estimate of β slightly increases in magnitude, but we obtain qualitatively similar estimation results. In line with our (weak) findings for the effects of sanctions on cross-border financial activities along the intensive margin, there is no evidence of a sizable drop in overall economic activity after the imposition of sanctions. Reassuringly, we note that this conclusion also holds for all our other measures of firm performance. The estimation results for assets, wages, capital intensity, and productivity are tabulated in the remaining four columns of Table 9.

One possible explanation for why firms' performance indicators are unaffected by sanctions are the results discussed in the previous section. Since firms affected by sanctions

are able to increase their activities in third countries, it is possible that such diversion of activity allows them to experience few if any changes in their performance.

We perform extensive robustness checks to confirm that the results are insensitive to the exact regression specification.[34] For instance, we lag the regressor of interest one year to reduce possible simultaneity problems. We also estimate separate effects for firms affected by sanctions (and discontinuing business with the sanctioned country) and firms that still declare activities under sanctions. In none of these changes, however, the estimate of β takes a value that is statistically different from zero. As there is no observable difference in the business performance of German firms that either currently declare or previously have declared or never have declared transactions with a sanctioned country, we conclude that the domestic costs of financial sanctions at the firm level are negligible.

8. Conclusions

Sanctions are meant to hurt! By restricting a country's access to international markets, they impose costs on the foreign government, with the ultimate aim of inducing a fundamental change in the government's policies. At the same time, however, a reduction in cross-border business also implies costs for the domestic economy. In fact, given the sanctioning country's demonstrated willingness to bear the economic burden associated with such measures, sanctions are widely considered to be a particularly powerful tool of diplomacy.

In this paper we complement the sizable literature on the effects of sanctions on the target country by examining the economic costs of sanctions for the sanctioning country. We use detailed data from the German balance of payments statistics to analyze the effects of financial sanctions on German non-financial entities over the period from 1999 through 2014. During this time, Germany imposed, due to its international obligations as a member state of the United Nations and the European Union, restrictive financial measures on 23 countries.

We find a measurable decline in Germany's financial activities with the sanctioned country after the imposition of sanctions. For non-financial entities, however, the reduction in cross-border business is mainly along the extensive margin, while the (negative) effect on financial flows, the intensive margin, is less precisely estimated, as one would expect for diplomatic attempts to 'target' sanctions on specific individuals, groups, entities and activities. More notably, our data set allows us to identify entities that declared business with the

[34] In order to save space, we do not report the results.

sanctioned country and, therefore, can be assumed to be directly affected by the restrictive measures. These entities are not only found to be more active in international markets, providing them with numerous outside options to deal with the decline in business with the sanctioned country, there is also consistent evidence that they make use of such options, significantly expanding their business operations with non-sanctioned countries. As a result, it is unsurprising that we find no sanctions effect on aggregate indicators of firm-level activity, such as employment or sales. Overall, we conclude that financial sanctions have, at most, limited economic consequences for non-financial business entities in the sanctioning country and, therefore, can be indeed considered as being 'smart.'

A possible limitation of our analysis is the exclusive focus on evidence from a single country, Germany. Moreover, most countries targeted by financial sanctions are small. Therefore, the economic costs of sanctions may be larger (and alternative business opportunities may be more limited) once sanctions are imposed on a major partner country. Still, it is reassuring to note that our results are generally in line with other studies finding that the macroeconomic impact of sanctions on the sender country are small.

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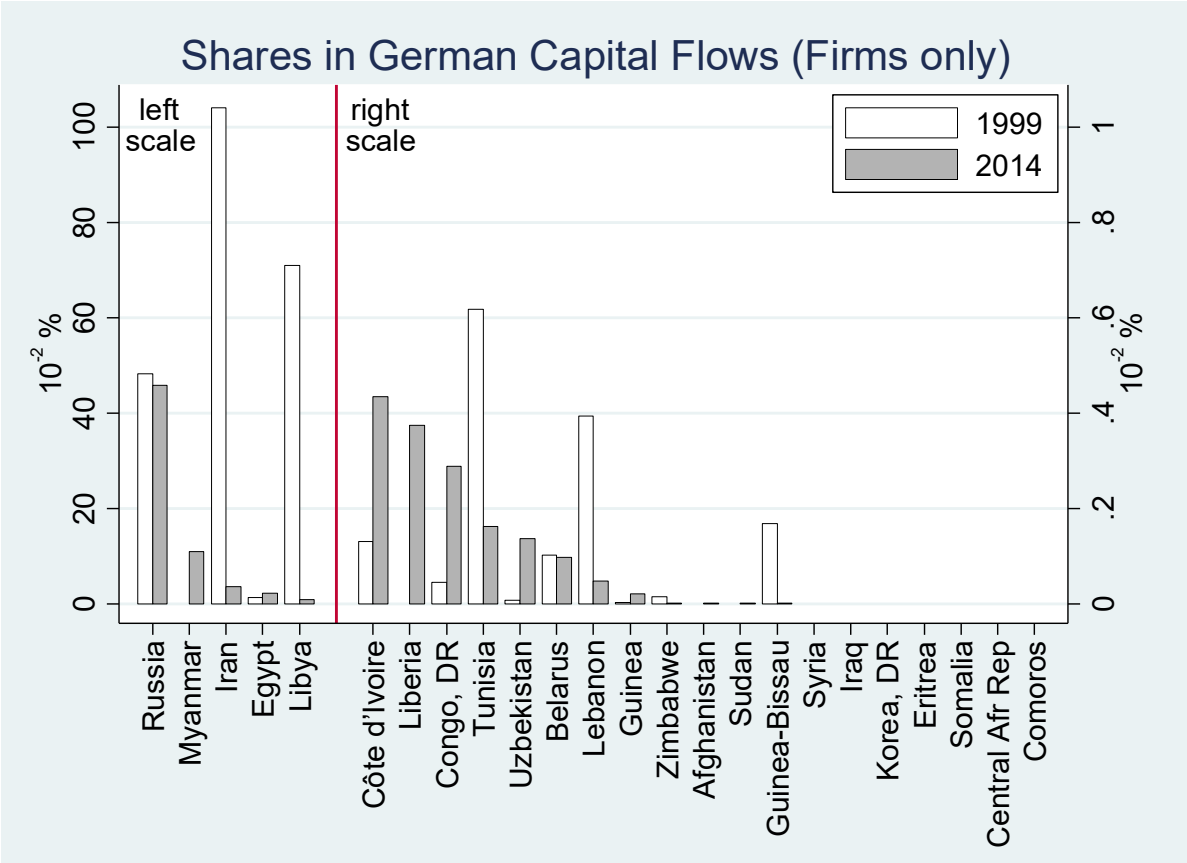
Figure 1: The Relevance of Sanctioned Countries for Cross-Border Capital Flows of German Non-Financial Declarants



Source: Authors' calculations.

Table 1: List of Financial Sanctions, 1999-2014

Country	First announcement (Lifted)	Measures taken
Myanmar	22 May 2000	Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment
Somalia	27 January 2003	Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment
Liberia	4 September 2003	Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment
Congo, Dem. Rep.	29 September 2003	Freezing of assets and economic resources of natural persons and establishments
Sudan	26 January 2004	Freezing of assets and economic resources of natural persons
Zimbabwe	19 February 2004	Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment
Côte d'Ivoire	31 January 2005	Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment
Uzbekistan	14 November 2005 (15 December 2009)	Export restriction on goods related to nuclear technology
Lebanon	21 February 2006	Freezing of assets and economic resources
Belarus	18 May 2006	Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment
Iran	2 February 2007	Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment, chemicals and other resources (gold, silver, …)
Korea, Dem. Rep.	27 March 2007	Freezing of assets and economic resources of natural persons and establishments; export restriction on luxury goods and goods related to nuclear technology
Comoros	17 March 2008 (24 July 2008)	Freezing of assets and economic resources of natural persons
Guinea	22 December 2009	Freezing of assets and economic resources of natural persons; export restriction on military equipment
Eritrea	26 July 2010	Freezing of assets and economic resources; export restriction on military equipment
Tunisia	4 February 2011	Freezing of assets and economic resources of natural persons
Libya	2 March 2011	Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment
Egypt	21 March 2011	Freezing of assets and economic resources of natural persons
Syria	9 May 2011	Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment, chemicals and other resources (gold, silver, …)

Afghanistan	1 August 2011	Freezing of assets and economic resources of natural persons and establishments
Guinea-Bissau	3 May 2012	Freezing of assets and economic resources of natural persons
Russia	5 March 2014	Freezing of assets and economic resources of natural persons and establishments; export restriction on oil drilling machinery, chemicals and other natural resources
Central African Republic	10 March 2014	Freezing of assets and economic resources of natural persons and establishments

Source: Deutsche Bundesbank, Service center ‘Financial Sanctions’.

Table 2: Descriptive Statistics

	Full Sample			Under Sanctions			
	Obs.	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**t-test (p-value)**
Total Flows (Bn. €)	22,381	0.81	4.40	893	0.02	0.88	0.00
Entries (Number)	22,381	32.53	75.30	893	3.74	9.21	0.00
Avg. Flow per Entry (Mn. €)	22,381	8.41	47.58	893	7.13	71.93	0.41
Declarants (Number)	22,381	26.25	56.31	893	3.63	8.80	0.00
Avg. Number of Entries per Declarant	22,381	1.09	0.16	893	1.02	0.10	0.00
Asset Classes (Number)	22,381	3.51	2.38	893	1.88	1.10	0.00
Avg. Flow per Asset Class per Declarant (Mn. €)	22,381	3.37	39.38	893	6.58	71.90	0.01
Inflows (Bn. €)							
– By German Investors	21,408	0.15	0.82	853	0.01	0.01	0.00
– By Foreign Investors	11,625	0.59	3.19	221	0.01	0.01	0.01
Outflows (Bn. €)							
– By German Investors	21,408	0.18	0.91	853	0.01	0.01	0.00
– By Foreign Investors	11,625	0.37	2.25	221	0.01	0.01	0.01
Assets (Bn. €)							
– Bonds	10,708	0.30	1.39	152	0.01	0.01	0.01
– Commercial Paper	2,827	0.11	3.15	0	0.00	0.00	
– Stocks	9,414	0.29	1.64	203	0.01	0.01	0.01
– Investment Certificate	5,071	0.17	0.84	41	0.00	0.00	0.19
– Equity Capital	13,958	0.29	2.73	333	0.01	0.04	0.06
– Direct Investment Credit	12,974	0.15	0.87	315	0.01	0.03	0.01
– Credit	16,365	0.14	0.56	586	0.01	0.09	0.00
– Other Capital	6,959	0.01	0.05	48	0.01	0.02	0.85
– Coupon	291	0.02	0.09	0	0.00	0.00	

Notes: The unit of observation is a country-month pair. If not noted otherwise, values refer to the sum of inflows and outflows.

Table 3: The Effect of Sanctions on Cross-Border Capital Flows

	Total Flows	Inflows	Outflows	|Net Flows|	Total Flows	Inflows	Outflows	|Net Flows|
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Least Squares Dummy Variables (LSDV) Estimation							
Sanctions	-0.827* (0.435)	-0.962** (0.474)	-0.781* (0.422)	-0.689* (0.350)	-1.063* (0.587)	-0.895 (0.885)	-1.074** (0.527)	-0.896** (0.441)
Capital Account Openness					0.236 (0.623)	-0.157 (0.649)	0.351 (0.556)	0.353 (0.644)
Public Debt					-0.000 (0.001)	0.000 (0.003)	0.001 (0.001)	0.000 (0.001)
Real GDP Growth					0.205 (0.288)	0.318 (0.431)	0.293 (0.241)	0.128 (0.240)
Log GDP per Capita					0.151* (0.084)	0.087 (0.117)	0.133 (0.081)	0.168* (0.090)
Observations	40,512	40,512	40,512	40,512	22,500	22,500	22,500	22,500
Adj. R^2	0.808	0.788	0.806	0.764	0.801	0.791	0.801	0.739
	Poisson Pseudo-Maximum Likelihood (PPML) Estimation							
Sanctions	-0.890* (0.486)	-0.852 (0.535)	-0.904* (0.466)	-0.690*** (0.256)	-0.552 (0.786)	-0.541 (0.788)	-0.527 (0.848)	-0.402 (0.264)
Capital Account Openness					1.090 (0.735)	1.051* (0.631)	1.221 (0.927)	0.755 (0.529)
Public Debt					0.005 (0.005)	0.008** (0.004)	0.001 (0.007)	0.013*** (0.003)
Real GDP Growth					-0.111 (0.374)	-0.292 (0.375)	0.089 (0.398)	-0.350 (0.349)
Log GDP per Capita					-0.916* (0.514)	-0.577 (0.392)	-1.313* (0.734)	-0.007 (0.136)
Observations	40,512	39,360	39,552	40,512	22,488	22,308	22,440	22,488

Pseudo R^2	0.943	0.932	0.918	0.832	0.942	0.935	0.918	0.826

Notes: The dependent variable is the total value for the capital flow specified at the top of each column (in logs for LSDV). The unit of observation is a country-month pair. Data cover the period from January 1999 through December 2014 in monthly frequency. Time fixed effects and country-specific fixed effects are included but not reported. Robust standard errors (clustered by country) in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 4: The Effect of Sanctions on Cross-Border Financial Transactions

	Without Additional Control Variables				With Additional Control Variables			
	Total Flows	**Inflows**	**Outflows**	**|Net Flows|**	**Total Flows**	**Inflows**	**Outflows**	**|Net Flows|**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Least Squares Dummy Variables (LSDV) Estimation							
Log Total Value	-0.827* (0.435)	-0.962** (0.474)	-0.781* (0.422)	-0.689* (0.350)	-1.063* (0.587)	-0.895 (0.885)	-1.074** (0.527)	-0.896** (0.441)
Log Number of Entries	-0.322*** (0.100)	-0.325*** (0.076)	-0.317*** (0.085)	-0.322*** (0.100)	-0.323** (0.130)	-0.245** (0.124)	-0.290*** (0.135)	-0.323** (0.130)
Log Average Value per Entry	-0.505 (0.357)	-0.628 (0.400)	-0.460 (0.342)	-0.368 (0.278)	-0.739 (0.477)	-0.599 (0.770)	-0.749* (0.439)	-0.573 (0.348)
Log Number of Declarants	-0.300*** (0.099)	-0.308*** (0.075)	-0.298*** (0.083)	-0.300*** (0.099)	-0.294** (0.128)	-0.223* (0.121)	-0.223* (0.121)	-0.294** (0.128)
Log Number of Asset Classes	-0.135** (0.057)	-0.139*** (0.042)	-0.125** (0.048)	-0.135** (0.057)	-0.140* (0.075)	-0.080 (0.069)	-0.143* (0.073)	-0.140* (0.075)
Log Avg. Value per Asset Class per Declarant	-0.392 (0.328)	-0.515 (0.408)	-0.357 (0.330)	-0.254 (0.252)	-0.628 (0.425)	-0.591 (0.764)	-0.567 (0.391)	-0.462 (0.291)
	Poisson Pseudo-Maximum Likelihood (PPML) Estimation							
Total Value	-0.890* (0.486)	-0.852 (0.535)	-0.904* (0.466)	-0.690*** (0.256)	-0.552 (0.786)	-0.541 (0.788)	-0.527 (0.848)	-0.402 (0.264)
Number of Entries	-0.129 (0.137)	-0.047 (0.217)	-0.243 (0.149)	-0.129 (0.137)	-0.116 (0.123)	0.080 (0.148)	-0.261* (0.148)	-0.116 (0.123)
Average Value per Entry	-0.336 (0.414)	-0.179 (0.467)	-0.531 (0.394)	-0.000 (0.323)	-0.657 (0.411)	-0.546 (0.485)	-0.732* (0.379)	-0.056 (0.299)

Number of Declarants	-0.072 (0.132)	-0.007 (0.213)	-0.181 (0.147)	-0.072 (0.132)	-0.074 (0.112)	0.105 (0.143)	-0.216 (0.138)	-0.074 (0.112)
Number of Asset Classes	-0.089 (0.123)	-0.044 (0.152)	-0.062 (0.145)	-0.089 (0.123)	-0.181 (0.113)	-0.056 (0.136)	-0.173 (0.130)	-0.181 (0.113)
Avg. Value per Asset Class per Declarant	-0.137 (0.434)	-0.188 (0.418)	-0.437 (0.396)	0.179 (0.377)	-0.498 (0.478)	-0.504 (0.450)	-0.579 (0.438)	0.160 (0.419)

Notes: Each cell contains the coefficient from a separate regression; the regression specification is similar to the corresponding column in Table 3. The dependent variable is listed in the first column; the sample is specified at the top of each column. The unit of observation is a country-month pair. Data cover the period from January 1999 through December 2014 in monthly frequency. Robust standard errors (clustered by country) in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 5: A Characterization of Firms with Capital Flows under Sanctions

	Recorded Capital Flows Only				Capital Flows Including Zeros			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dummy Firm with Capital Flows under Sanctions	1.267*** (0.187)	1.185*** (0.164)	1.037*** (0.134)	0.215*** (0.082)	0.379*** (0.063)	0.372*** (0.062)	0.190*** (0.037)	0.121*** (0.029)
Log Total Value of Firm Capital Flows			0.110*** (0.005)	0.106*** (0.004)			0.127*** (0.001)	0.127*** (0.001)
Log Number of Capital Flows under Sanctions by Firm				1.020*** (0.080)				0.097*** (0.013)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector Fixed Effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Observations	326,957	326,957	326,957	326,957	8,312,832	8,312,832	8,312,832	8,312,832
Firms	43,296	43,296	43,296	43,296	43,296	43,296	43,296	43,296
Adj. R^2	0.032	0.080	0.265	0.305	0.009	0.017	0.794	0.795

Notes: OLS estimation. The dependent variable is the log number of firm capital flow transactions (firm-asset-partner triplet) in the German Balance of Payments statistics. The unit of observation is a firm-month pair. Data cover the period from January 1999 through December 2014 in monthly frequency (192 months). Robust standard errors (clustered by firm) recorded in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 6: A Further Characterization of Firms with Capital Flows under Sanctions

	Log Average Value per Transaction	Log Number Countries	Log Number Asset Classes	Log Firm Employment	Log Firm Sales	Log Firm Total Assets	Log Firm Productivity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dummy Firm with Capital Flows under Sanctions	-1.037*** (0.134)	0.956*** (0.118)	0.238*** (0.044)	0.409*** (0.154)	0.412** (0.162)	0.447*** (0.128)	0.175* (0.099)
Log Total Value of Firm Capital Flows	0.890*** (0.005)	0.090*** (0.004)	0.035*** (0.002)	0.220*** (0.009)	0.268*** (0.011)	0.361*** (0.010)	0.070*** (0.005)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	No	No	No	No
Industry Fixed Effects	No	No	No	Yes	Yes	Yes	Yes
Observations	326,957	326,957	326,957	16,491	16,070	17,929	14,217
Firms	43,296	43,296	43,296	4,819	4,820	5,216	4,386
Frequency	Monthly	Monthly	Monthly	Yearly	Yearly	Yearly	Yearly
Adj. R^2	0.947	0.236	0.150	0.561	0.562	0.539	0.312

Notes: OLS estimation. The dependent variable is listed in the first line; the regression specification is similar to column 4 in Table 4. Data cover the period from January 1999 through December 2014 in monthly frequency. Note that data used in columns (1)-(3) are based on monthly firm-level data from the balance of payments data collected by the Bundesbank, while results in columns (4)-(7) are based on annual data from the Ustan database which reports corporate balance sheet data. The former data set provides a sectoral classification of firms, while the latter one provides information on the industry in which the firm operates. Robust standard errors (clustered by firm) recorded in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 7: The Effects of Sanctions on Third-Country Capital Flows

	Total Flows	Inflows	Outflows	|Net Flows|	Total Flows	Inflows	Outflows	|Net Flows|
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Least Squares Dummy Variables (LSDV) Estimation							
Affected Declarant	0.437*** (0.041)	0.456*** (0.048)	0.323*** (0.044)	0.307*** (0.035)	0.407*** (0.044)	0.412*** (0.051)	0.318*** (0.047)	0.276*** (0.038)
Capital Account Openness					0.300* (0.157)	0.247 (0.300)	0.418** (0.173)	0.315** (0.139)
Public Debt					-0.001 (0.001)	0.002 (0.002)	-0.001 (0.001)	-0.001 (0.001)
Real GDP Growth					0.007 (0.053)	-0.132* (0.080)	0.053 (0.060)	0.028 (0.050)
Log GDP per Capita					-0.046 (0.034)	-0.051 (0.056)	-0.057 (0.039)	-0.044 (0.030)
Observations	525,794	273,796	376,026	520,040	437,316	225,715	315,355	432,758
Adj. R^2	0.685	0.710	0.686	0.621	0.686	0.711	0.683	0.623
	Poisson Pseudo-Maximum Likelihood (PPML) Estimation							
Affected Declarant	0.430*** (0.140)	0.616*** (0.164)	0.090 (0.174)	0.251 (0.170)	0.368*** (0.143)	0.540*** (0.161)	0.006 (0.186)	0.180 (0.163)
Capital Account Openness					-0.646 (0.495)	0.846 (0.848)	-1.723*** (0.579)	-0.376 (0.454)
Public Debt					-0.003 (0.003)	-0.001 (0.004)	-0.006 (0.004)	-0.005 (0.004)
Real GDP Growth					0.057 (0.309)	0.145 (0.356)	0.030 (0.326)	0.151 (0.258)
Log GDP per Capita					-0.601 (0.403)	-0.405 (0.423)	-0.848* (0.456)	-0.192 (0.174)

Observations	525,794	430,243	501,578	525,689	437,316	353,368	417,520	437,247
Pseudo R^2	0.817	0.789	0.754	0.805	0.825	0.807	0.760	0.817

Notes: The dependent variable is specified at the top of each column (in logs for LSDV). The unit of observation is a firm-country-month triplet. Data cover the period from January 1999 through December 2014 in monthly frequency. Time fixed effects and firm-country-specific fixed effects are included but not reported. Robust standard errors (clustered by country) recorded in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 8: The Effects of Sanctions on Third-Country Capital Flows Extended

	Total Flows	Inflows	Outflows	|Net Flows|	Total Flows	Inflows	Outflows	|Net Flows|
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Least Squares Dummy Variables (LSDV) Estimation							
EU	-0.085	-0.125	-0.030	0.047	-0.108	-0.063	-0.044	0.032
	(0.108)	(0.139)	(0.123)	(0.106)	(0.110)	(0.139)	(0.126)	(0.110)
UN	-0.419	-0.546**	0.111	0.016	-0.600	-0.246	-0.316	-0.102
	(0.650)	(0.261)	(0.955)	(0.524)	(0.575)	(0.301)	(0.811)	(0.434)
Affected Declarant EU Top5	0.783***	0.769***	0.642***	0.593***	0.767***	0.737***	0.652***	0.576***
	(0.185)	(0.174)	(0.180)	(0.155)	(0.184)	(0.173)	(0.179)	(0.155)
Affected Declarant EU Rest	0.425***	0.454***	0.345***	0.259***	0.407***	0.416***	0.347***	0.241***
	(0.049)	(0.054)	(0.053)	(0.041)	(0.053)	(0.059)	(0.057)	(0.045)
Affected Declarant UN Top5	0.457	0.292	0.348	0.552**	0.400	0.207	0.305	0.498**
	(0.316)	(0.384)	(0.315)	(0.235)	(0.307)	(0.366)	(0.302)	(0.229)
Affected Declarant UN Rest	0.242***	0.296***	0.048	0.195**	0.139	0.188*	-0.002	0.093
	(0.081)	(0.107)	(0.088)	(0.070)	(0.085)	(0.113)	(0.191)	(0.073)
Capital Account Openness					0.352**	0.249	0.437***	0.383***
					(0.143)	(0.253)	(0.157)	(0.128)
Public Debt					-0.001	0.002	-0.002	-0.001
					(0.001)	(0.001)	(0.001)	(0.001)
Real GDP Growth					0.008	-0.137*	0.030	0.040
					(0.052)	(0.077)	(0.058)	(0.050)
Log GDP per Capita					-0.005	-0.034	-0.013	-0.010
					(0.036)	(0.053)	(0.042)	(0.033)
Observations	540,279	280,114	386,456	534,382	450,033	231,164	324,559	445,370
Adj. R^2	0.684	0.710	0.685	0.620	0.685	0.710	0.682	0.623
	Poisson Pseudo-Maximum Likelihood (PPML) Estimation							
EU	-0.148	0.023	-0.169	0.057	0.103	0.113	0.051	0.024
	(0.244)	(0.392)	(0.269)	(0.280)	(0.288)	(0.396)	(0.392)	(0.291)
UN	-1.621***	-2.031***	-1.240***	-0.817	-1.541***	-1.704***	-1.359**	-0.530
	(0.383)	(0.346)	(0.467)	(0.504)	(0.463)	(0.403)	(0.611)	(0.370)

Affected Declarant EU Top5	1.005***	1.278***	0.325	0.943***	0.969***	1.241***	0.303	0.849***
	(0.200)	(0.154)	(0.350)	(0.224)	(0.199)	(0.158)	(0.351)	(0.219)
Affected Declarant EU Rest	0.193	0.374***	-0.283	0.038	0.158	0.320**	-0.367	-0.005
	(0.153)	(0.133)	(0.293)	(0.178)	(0.164)	(0.141)	(0.303)	(0.176)
Affected Declarant UN Top5	0.789***	0.961***	0.606***	0.654***	0.622***	0.759***	0.490***	0.427***
	(0.168)	(0.194)	(0.157)	(0.162)	(0.165)	(0.154)	(0.186)	(0.117)
Affected Declarant UN Rest	0.418*	0.724***	0.124	0.191	0.260	0.460	0.048	-0.029
	(0.226)	(0.249)	(0.245)	(0.209)	(0.280)	(0.282)	(0.320)	(0.231)
Capital Account Openness					-0.404	0.716	-1.264***	-0.234
					(0.450)	(0.801)	(0.492)	(0.441)
Public Debt					-0.003	0.001	-0.007*	-0.004
					(0.003)	(0.003)	(0.004)	(0.003)
Real GDP Growth					-0.064	-0.075	0.047	0.014
					(0.280)	(0.302)	(0.298)	(0.215)
Log GDP per Capita					-0.446	-0.241	-0.733*	-0.130
					(0.337)	(0.344)	(0.390)	(0.161)
Observations	540,279	440,901	515,170	540,171	450,033	362,673	429,473	449,961
Pseudo R^2	0.817	0.789	0.755	0.805	0.825	0.807	0.761	0.817

Notes: The dependent variable is specified at the top of each column (in logs for LSDV). The unit of observation is a firm-country-month triplet. Data cover the period from January 1999 through December 2014 in monthly frequency. Time fixed effects and firm-country-specific fixed effects are included but not reported. Robust standard errors (clustered by country) recorded in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 9: The Effects of Sanctions on Firm Performance

	Log Firm Employment	Log Firm Sales	Log Firm Total Assets	Log Firm Wages	Log Firm Capital Intensity	Log Firm Productivity
	(1)	(2)	(3)	(4)	(5)	(6)
Affected Declarant	-0.015 (0.066)	-0.063 (0.087)	0.058 (0.061)	0.026 (0.035)	-0.047 (0.119)	0.120 (0.079)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,492	16,069	17,929	16,305	16,045	14,217
Firms	4,820	4,820	5,216	4,766	4,676	4,386
Frequency	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly
Adj. R^2	0.961	0.946	0.975	0.797	0.899	0.839

Notes: OLS estimation. The dependent variable is listed in the first line. Data cover the period from January 1999 through December 2014 in annual frequency. Robust standard errors (clustered by firm) recorded in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Appendix: Matching Procedure

Most of our estimates are based on data from a single source, the Deutsche Bundesbank's Balance of Payments (BoP) statistics. However, for some analyses, we also link the information from the BoP statistics to firm-level information taken from the Deutsche Bundesbank's corporate balance sheets database (Ustan).

Collected for different purposes and by different departments within Deutsche Bundesbank, the data lack a unique firm identifier. Therefore, following common internal practice, we apply a string matching procedure, where the algorithm takes into account the name of a unit, its address and its legal form, to identify the same real-world entity in the two data sets. Schild, Schultz, and Wieser (2017) provide an extensive documentation of this procedure and a detailed evaluation of the match result.

Table A1 presents a brief overview of the various data samples. As shown, 12.1 percent of the non-financial reporting units in the BoP are matched to data in Ustan, covering about 12.7 percent of the BoP entries. More notably, the matched data set does not differ significantly from the BoP data. While matched units are expected to be relatively large, their cross-border financial flows only marginally exceed the averages in the BoP sample.

Table A1: Descriptive Statistics on the Matched Sample, 1999-2014

	BoP	**Ustan**	**BoP-Ustan**
	(1)	(2)	(3)
Frequency	Monthly	Yearly	Monthly
Observations (Number)	734,441	454,362	93,267
Firms (Number)	43,310	71,816	5,237
Mean Total Flows (1,000 €)	25,029		26,621
Mean Inflows (1,000 €)	13,915		14,211
Mean Outflows (1,000 €)	11,114		12,410
Mean Net Flows (1,000 €)	2,801		1,800
Share of Sanctioned Observations (%)	0.5		0.6

Notes: All data have been obtained from the Deutsche Bundesbank. BoP is the balance of payments; Ustan is the corporate balance sheet statistics.

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