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You're Banned!
The Effect of Sanctions on Cross-Border Financial Flows*

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Abstract

This paper examines the effect of financial sanctions on cross-border capital flows. While sanctions can be expected to hinder international transactions, thereby putting political and economic pressure on a target country, we study the patterns of adjustment in bilateral relationships after the imposition of a sanction along various dimensions. For instance, in addition to aggregate effects, we explore variations in capital flows after a strengthening and an easing of restrictive measures. Our analysis is based on highly disaggregated, monthly data from the German balance of payments statistics for the period from 2005 through 2014. During this time, financial sanctions were imposed by Germany (or, more precisely, the European Union) on 20 countries; two of these sanctions have been lifted. Applying a differences-in-differences approach, we find that financial sanctions have a strong and immediate negative effect on cross-border financial flows.

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1. Introduction

Sanctions are widely considered to be a powerful instrument of international diplomacy. Sanctions imply an action. Since direct (practical) measures are taken, they go beyond threats, negotiations and agreements in achieving a foreign policy goal. Sanctions are also costly. Imposing restrictions on external interactions puts political and economic pressure on the sanctioned (or target) country; likewise, limits and regulations of business activities may also adversely affect the sanctioning (or sender) country. Overall, sanctions convey a strong signal of the imposing country's interest in a particular policy outcome.

The effectiveness of sanctions, however, is still a matter of dispute. Reviewing a broad sample of historical case studies, Hufbauer, Schott, Elliott, and Oegg (2007, p. 7) conclude that “[s]anctions often do not succeed in changing the behavior of foreign countries.” Reasons for the failure of sanction policies are manifold, including elusive goals, inappropriate means and incomplete implementation. In contrast, sanctions are in frequent and ongoing use in practice. If anything, the number of sanctions episodes seems to have increased in recent years. Most prominently, the European Union imposed sanctions on Russia in March 2014, responding to the conflict between the Ukraine and Russia.

In this paper, we examine empirically the effect of financial sanctions on cross-border capital flows. Sanctions, embargos, asset freezes and other forms of legally-imposed restrictions can be, in principle, expected to reduce cross-border transactions of the sanctioning country with the sanctioned country. However, since many of these restrictive measures have become increasingly targeted at specific sectors or listed individuals, mainly to limit the humanitarian consequences of such actions, the overall effect of sanctions on bilateral capital flows may be negligible.

Therefore, we specifically aim to understand the channels and mechanisms of how sanctions work. For instance, sanctions may not only limit directly a sender country's capital outflows (e.g., by prohibiting the granting of a financial loan or credit); capital outflows could also decline in formally unrestricted business areas due to an increase in market uncertainty abroad (possibly related to fears that the target country may take retaliatory action on the sender country) or a greater administrative effort. Another potential mechanism for the effect of sanction policies on capital flows is a decline in capital inflows to the sender country due to a freezing of the target country's operating accounts.

To analyze these issues, we use data from the German balance of payments statistics. Our data set contains detailed information on individual balance of payments transactions that allows us to explore differences in the effects of sanctions along various dimensions (including possible diversion effects to non-sanctioned countries). A typical data entry provides the name of the German reporter of the transaction (typically an individual, a firm or a financial institution), the date and type of transaction, the partner country, the asset class and the transaction value. Our sample spans the period from 2005 through 2014. During this time, the European Union has imposed financial sanctions on 20 countries. Almost all of these sanctions, with the exception of two episodes, are still in place. A differences-in-differences approach then allows us to identify the effects of sanctions on capital flows.

Previewing our main results, we find that financial activities between Germany and the targeted country decline significantly after the imposition of financial sanctions. Responding to the restrictive capital measures, German investors tend to sell their assets held in sanctioned countries. Similarly, investors from targeted countries engage less in the German financial market. Consequently, our results indicate that sanctions do have immediate effects, irrespective of whether they achieve their ultimate goal, forcing the target country to change its behavior, a question that is outside the scope of this paper.

The remainder of the paper is structured as follows. In Section 2, we review the relevant literature. Section 3 briefly describes the operations of financial sanctions, followed by a detailed description of the data source in Section 4. Section 5 motivates our empirical methodology and presents the baseline results. We then extend our analysis along two lines. In Section 6, we examine variations in the intensity of sanctions since restrictive measures take, in practice, various forms. Section 7 explores evidence on the redirection of capital flows, possibly in an effort to evade the effects of sanctions. Finally, Section 8 briefly concludes.

2. Literature

An already sizable literature, both in economics and political science, analyzes a broad range of issues related to economic sanctions. Hufbauer, Schott, Elliott, and Oegg (2007) compile, in a landmark study, an extensive and repeatedly updated database of sanctions episodes and examine various features of sanctions and sanctions policies. Kaempfer and

Lowenberg (2007) provide an excellent and comprehensive overview of the broader literature; see also Davis and Engerman (2003) for an introduction.

For our purposes, three strands of the (empirical) literature are of particular relevance. A first set of papers examines the success of sanctions policies; that is, these papers ask: Do target countries respond to sanctions such that the intended policy outcome of the sender country is in fact achieved? As Hufbauer, Schott, Elliott, and Oegg (2007) note, the analysis of this question is a challenging task; both the definition of success as well as the contribution to success made by sanctions depends to a significant degree on a subjective evaluation.¹ Using an index ranging from 1 to 16 to assess more than 200 sanctions episodes, they classify about one in three cases as successful.² Biersteker, Eckert, Tourinho, and Hudáková (2013, p. 21) argue that UN targeted sanctions achieve their purposes 22 percent of the time.

In view of the frequent ineffectiveness of sanctions, another set of papers aims to identify the determinants of the success of sanctions. Early studies apply a variety of approaches to analyze case studies. Porter (1979), for instance, constructs a linear programming model to simulate the pressure of sanctions on the South African economy; Brandsma and Hughes Hallett (1984) use a macroeconomic model to analyze the impact of Western sanctions on the Soviet Union. More recent studies, making use of the Hufbauer, Schott, Elliott, and Oegg (2007) database, often apply a panel framework to test the effects of various sanctions-specific features on measures of sanctions outcomes. In this literature, many findings turn out to be sensitive to the exact model specification that is used.³ However, reasonably robust results include that sanctions work best when the goals of the sanction are modest and limited, when the target country is politically instable and economically weak, and when there are close economic ties between the sender and the target country; see, among others, van Bergeijk (1989), Lam (1990), and Jing, Kaempfer, and Lowenberg (2003).

Finally, and most closely related to our analysis, a number of papers examines the direct economic impact of sanctions. In contrast to work interested in the overall (mainly political) consequences of sanctions, these studies typically have a narrower focus, aiming to

¹ Levy (2007) convincingly illustrates this point by discussing different views about the role of trade sanctions in ending the apartheid regime in South Africa.

² For the 204 sanctions episodes listed at <http://www.piie.com/research/topics/sanctions/sanctions-timeline.cfm>, the average success score is 6.9; see also Table 6.1 in Hufbauer, Schott, Elliott, and Oegg (2007).

³ For instance, conflicting results are reported for the effects of the duration of sanctions and of the size of coalitions on sanctions success.

identify economic effects of sanctions. Some studies analyze developments in the target country. In medical science, for instance, there is an extensive discussion about the effects of sanctions and embargoes on health, well-being and mortality; see, among others, Garfield, Devin, and Fausey (1995) and Daponte and Garfield (2000). Neuenkirch and Neumeier (2014) estimate that the imposition of sanctions has a sizable and significant negative effect on the target country's economic performance. Other papers assess the costs of sanctions to the sender country, such as Hufbauer, Elliott, Cyrus, and Winston's (1997) analysis of the effects of US economic sanctions for the US economy.

Generally, however, proper identification of damages from sanctions at the country level seems difficult. Therefore, using a more direct approach, a set of studies also aims to quantify the effect of sanctions on the extent of bilateral interactions, with a specific (and, in fact, almost exclusive) focus on trade. In these studies, a gravity model is typically applied to identify sanctions-related distortions in patterns of trade. Evenett (2002) and Haidar (2015), for example, analyze shifts in the export patterns of a single target country, examining evidence from South Africa and Iran, respectively. Caruso (2003) and Hufbauer, Schott, Elliott, and Oegg (2007) use large cross-country and panel data sets to analyze the trade effects of sanctions imposed by a single sender country, the United States; they find that US sanctions, in addition to imposing restrictions on US trade with the target country, also adversely affect a target country's trade with other countries. Slavov (2007) and Yang, Askari, Forrer, and Zhu (2009) focus explicitly on third country effects.

In our analysis, we extend previous work on the direct effects of sanctions along various lines. Since many restrictive measures are targeted at the financial sector, we analyze cross-border financial flows rather than trade. While financial sanctions are expected to also make the exchange of goods and services more difficult, thereby reducing trade, financial restrictions, such as the prohibition of buying and selling financial instruments issued by a targeted entity, should directly affect capital flows. Moreover, in addition to the aggregate effect on capital flows, we also explore the extensive and the intensive margin of cross-border financial activities. Allowing for differences in the intensity of sanctions, we analyze whether measurable effects are identifiable for the size of the coalition imposing sanctions and a tightening or easing of sanctions.

3. Financial Sanctions in Practice

In the European Union, within the framework of the common foreign and security policy, sanctions are (typically) imposed by the Council of the European Union.⁴ The (Foreign Affairs) Council is responsible for the implementation of binding resolutions of the Security Council of the United Nations; this procedure requires the adoption of a legal instrument and an implementing Council Regulation. The Council may also decide to adopt restrictive measures autonomously, where, at the initiative of the Presidency, one of the member states or the European Commission, and after extensive political consultations, a Common Position is adopted which may foresee the implementation of restrictive measures.⁵ Once the Regulation is in force, it automatically applies to all countries within the European Union. Thus, no further action (such as, for instance, ratification by national parliaments) is necessary.

The imposition of sanctions rarely implies that a country is cut off completely from the rest of the world. Instead, in order to prevent unwanted collateral damage, sanctions are often very specific, targeted measures (frequently labeled ‘smart sanctions’). For instance, an export embargo may be limited to specific goods and services (such as dual use goods, which can be used for both civil and military purposes); visa bans may be even more selective, applying to designated individuals only. As a general rule, from the wide range of possible restrictive measures which could be imposed by the European Union, the measures which are considered to be most appropriate in order to achieve the desired outcome are implemented.⁶ In recent years, the most frequently taken measures have been arms embargoes, economic and financial restrictions and restrictions on admission (that is, entry into a country).

In practice, financial sanctions can take many forms. Restrictive measures with strong financial content include, among others, limiting access to financial markets and restricting loans and credits, prohibiting the provision of financial services (e.g., brokering), restricting

⁴ For a detailed description, see http://eeas.europa.eu/cfsp/sanctions/index_en.htm.

⁵ In view of this specific implementation procedure, and given that it is sometimes necessary to adopt measures, such as an asset freeze, as quickly as possible, EU member states are also allowed to take interim measures with regard to financial measures. In recent years, such exceptional measures have only rarely been taken, two-three weeks before the implementation of European Union sanctions, by the German Federal Ministry for Economic Affairs and Energy.

⁶ Possible restrictive measures include diplomatic sanctions, suspension of cooperation, boycotts of events, trade sanctions (including arms embargoes), financial sanctions, flight and travel bans, and restrictions on admission; see http://eeas.europa.eu/cfsp/sanctions/docs/index_en.pdf.

international transfer payments, and restricting the sale and trade of property abroad.⁷ However, the probably most prominent tool of financial sanctions, often targeted at specifically designated individuals, companies, or governments, is the freezing of foreign funds and assets. An asset freeze typically applies to all financial and economic resources of a targeted entity, including cash, checks, monetary claims, deposits with financial institutions, private and public securities and debt instruments, interest income, dividends and loans.

4. Data

Our main source of data is the Deutsche Bundesbank's balance of payments statistics. This register, which is compiled according to the International Monetary Fund's Balance of Payments Manual 5 (BPM5), regularly collects information on financial transactions between Germany and the rest of the world. The data set is complete; all individuals, firms and financial institutions located in Germany are required to report cross-border payments above a certain threshold to the Deutsche Bundesbank, allowing the central bank to establish the monthly balance of payments statistics.⁸ The micro data are confidential; they are only accessible, often in anonymized form, at the headquarters of the Bundesbank in Frankfurt, Germany.

In its current version, the German balance of payments data base contains information on cross-border transactions in excess of 12,500 euro. For each single declaration, the value and the partner country of the transaction is provided, along with the name and address of the reporting unit (bank or corporation) as well as detailed information on the type of asset that is transferred (bonds, commercial paper, stocks, investment certificate, equity capital, credit and other capital).⁹ For a few types of transactions, exemptions exist such that there is no

⁷ For an early detailed assessment of financial sanctions, see Swiss Federal Office for Foreign Economic Affairs (1998).

⁸ See Section 67 of the Foreign Trade and Payments Ordinance (*Außenwirtschaftsverordnung*), available at <http://www.bmwi.de/BMWi/Redaktion/PDF/A/awv-englisch,property=pdf,bereich=bmwi2012,sprache=de,rwb=true.pdf>. As balance of payments entries on the activities of individuals are often based on estimations, we exclude transactions of individuals from our data set.

⁹ In addition to the type of asset, further information on the traded assets is available such as, for instance, the issuer (private/public) and the currency (domestic/foreign) of bonds. With this fine disaggregation at the product level, the monthly data gets close to transaction-level data.

declaration necessary; these exemptions are: payments below the threshold of 12,500 euro¹⁰, 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. The frequency of the data is monthly, with information provided at the end of the month. Our sample covers the period from January 2005 to December 2014.

Information on financial sanctions is obtained from the service center ‘Financial Sanctions’ of the Deutsche Bundesbank.¹¹ This unit, which is responsible for the implementation of European Union Regulations on financial sanctions in Germany, has collected detailed data on executive orders. Table 1 provides a list of sanctions by the European Union along with a brief description of the measures that are taken.¹² Sanctions are applied instantaneously, such that there is no time lag between the date of 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 Comoros, the sanctions have also been lifted again completely during our sample period. Along with information on the removal of restrictive measures which were imposed before 2004, these episodes provide additional variation for the identification of the effects of sanctions.

Almost all target countries are of tiny importance for Germany’s international financial relationships. Often, the countries are economically small and/or poorly developed. Figure 1 shows that, with the exception of Russia, none of the target countries accounts for more than 0.03 percent of German cross-border capital flows.

Table 2 describes our financial data in more detail. As noted above, the raw data is highly disaggregated; with separate statistical entries on monthly capital flows by declarant,

¹⁰ However, there are observations below this threshold in our data set, for three possible reasons: the information is provided voluntarily; there are some exceptions of this threshold for banks (e.g., income from securities, purchase/sale of currencies); the unit reports a single transaction instead of the total amount.

¹¹ See

http://www.bundesbank.de/Navigation/EN/Service/Financial_sanctions/financial_sanctions.html.

¹² For episodes in which sanction measures are mainly composed of export restrictions (such as Uzbekistan), these restrictions also often affect financial transactions (including, for instance, the prohibition of financing or financial assistance related to military activities, including in particular grants, loans and export credit insurance).

partner country and asset class, it effectively comes close to transaction-level data. In order to partly reduce the complexity of the data, Table 2 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, there are, on average, about 128 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 reporting unit (or declarant). Overall, there is broad trading activity, especially by foreign investors, which is particularly concentrated in bonds and stocks.

More interestingly, and perhaps not surprisingly, given the irrelevance of many sanction targets as a financial partner noted above, bilateral interactions with sanctioned countries are rare; sanction episodes account for only 7 percent of our sample. Also, capital flows under sanction are, on average, of smaller, although still sizable, magnitude. There are fewer balance of payments ‘transactions’, reported by a smaller number of declarants and involving fewer asset classes. While these findings potentially reflect greater (sanction-related) administrative hurdles, cross-border capital flows could have also been affected by other factors unrelated to financial sanctions. Therefore, we next apply a regression analysis to tackle this issue empirically.

5. The Effects of Imposing Sanctions on Capital Flows

5.1 Benchmark Results

We begin our empirical analysis by exploring the (permanent) effect of financial sanctions on cross-border capital flows. In particular, we estimate variants of the following differences-in-differences (or, more generally, fixed effects) model:

$$(1) \quad \text{Log}(\text{Flow}_{ct}) = \alpha + \beta \text{Sanctions}_{ct} \{ + \gamma X_{ct} \} + \eta_c + \phi_t + \varepsilon_{ct}$$

where Flow_{ct} is a measure of German financial activity with country c at time t , Sanctions_{ct} is an indicator variable that takes the value of one when sanctions are imposed (and is zero otherwise), X is a vector of auxiliary control variables, and we include full sets of country-specific (η_c) and time specific (ϕ_t) fixed effects. The coefficient of interest to us is β , the ‘treatment effect’ of sanctions on cross-border financial activities. Throughout the analysis, we estimate regressions with OLS and apply heteroskedastic robust Huber-White standard errors.

Our default measures of the intensity of bilateral financial interactions between Germany and countries (or, more precisely, territories) in the rest of the world are (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 (4) the net value of bilateral capital flows (defined as outflows minus inflows). In the empirical literature on capital flows, many studies focus on net flows in order to identify and analyze extreme capital flow movements. Prasad (2011), however, notes that while net flows tended to decrease over time, gross inflows and outflows have increased sizably in recent years. Along similar lines, Forbes and Warnock (2012) highlight the importance of the analysis of gross capital flows.

In a preliminary check, we examine the time-series properties of our capital flow measures. Fortunately, the Im-Pesaran-Shin unit-root test consistently rejects the null hypothesis of unit roots, allowing us to analyze (log) levels rather than differences.¹³ Moreover, since the cross-section dimension sizably exceeds the time-series dimension in our data set, with 219 country identifiers and 120 months, we use panel estimation techniques (instead of time series econometrics).

Benchmark estimation results are reported in Table 3. Columns 1 to 4 tabulate the results for the most parsimonious specification of equation (1) which includes, in addition to the sanctions dummy, a vector of country dummies that control for mean differences in German capital flows across partner countries, and time dummies that control for monthly variations in capital flows common to all partners. As shown, our estimates of β are consistently negative, economically sizable, statistically highly significant and stable in magnitude across the four measures financial flows. The point estimate of about -0.7 implies that after the imposition of financial sanctions, German capital flows with the target country decrease, on average, by about 50 percent ($\approx \exp(-0.7)-1$). Moreover, in line with intuition, the

¹³ Pesaran’s panel unit root test in presence of cross section dependence yields similar results.

effect turns out to be larger for capital outflows than for capital inflows; many sanction measures (such as the freezing of assets) specifically aim to restrict a target country's access to international capital markets.¹⁴ Interestingly, the β coefficient also takes a significantly negative value for net flows, indicating that the imposition of sanctions also tends to reduce imbalances in bilateral capital flows.

In the remaining four columns of Table 3, we extend our specification of equation (1) by including a set of additional (time-varying) country variables; these controls are intended to capture determinants of capital flows beyond plain country fixed effects. Following Forbes and Warnock (2012), we use a country's stock market capitalization in percent of GDP, the Chinn-Ito index of capital account openness, the public debt to GDP ratio, real GDP growth, and log real GDP per capita.¹⁵ For these macroeconomic control variables, data are available at yearly frequency only and matched accordingly.

Reviewing the results, the extension seems to work well. The coefficients on the additional country controls take the expected signs and are precisely estimated, except for per capita income (for which the estimated coefficient is often statistically indistinguishable from zero). For instance, capital market size, financial openness and macroeconomic performance are all positively associated with capital flows. Similarly, the results indicate that capital flows tend to decrease for greater partner country indebtedness. However, the increase in the number of regressors also comes at a cost: limited data availability implies that the number of observations falls sizably for this specification; sample size is reduced by more than two-thirds. For some variables, data are available only for a limited set of countries; also, data for the period after 2012 are often missing. More notably, with this extension, our core results remain quantitatively and qualitatively unchanged. Our estimates of β turn out to be remarkably robust, indicating a notable decline in cross-border financial activity after restrictive measures have been adopted.

In similar fashion, the estimation results remain basically unaffected when country-month pairs with no recorded capital flows are dropped from our analysis. Since our

¹⁴ The observed decline in capital outflows implies a decline in financial transfers to the target country either because German residents buy fewer foreign assets or because foreigners sell fewer German assets.

¹⁵ All data have been obtained from the World Bank's World Development Indicators, except for the Chinn-Ito index, which has been downloaded from http://web.pdx.edu/~ito/Chinn-Ito_website.htm. Following Forbes and Warnock (2012), real GDP growth measures the growth shock defined as the deviation between actual growth and trend growth.

dependent variable is the logarithm of a capital flow (which is not defined for the value of zero), we follow standard practice and add a small value (of one) to the recorded values of a capital flow. Dropping these observations instead may bias the results, especially when financial sanctions are strictly enforced such that no transactions are reported in the official balance of payments statistics. As Table 2 shows, however, we lose only about 4,500 observations (~17% of the sample) due to zeros. Still, for comparison, the results with observations of zero flows dropped are tabulated in Appendix Table 1.

Next, we examine the contribution of intensive and extensive margins to the aggregate effect of sanctions on capital flows. Following standard practice in the empirical trade literature (and making use of the disaggregate structure of our balance of payments data set), we decompose the aggregate value of German capital flows with a partner country into various factors, including the unique number of reporting units that declare financial transactions with that country, the unique number of asset classes in which business has taken place, and the average value of capital flows by declarant-asset pair.

Table 4 reports the results of two decomposition exercises. Each of the rows in the table presents the estimation results for a different dependent variable; the regressand is tabulated in the first column on the left of the table. The remaining eight columns correspond to the specifications of equation (1) in Table 3 (including additional country controls for columns 5-8), but, in contrast to Table 3, we only report estimates for the coefficient of interest, β .

In our first decomposition, we analyze the effects of sanctions on the number of entries in the German balance of payments statistics per country-month pair and the average value of capital flows per statistical entry. Confirming our earlier descriptive findings, the imposition of sanctions is associated with a sizable decline in cross-border financial activities; the number of entries decreases sharply during sanction episodes, with the point estimates implying a decline, depending on specification, by between 25 and 28 percent. Interestingly, the estimate of β also takes significantly negative values for the average flow per entry as regressand. Contrary to the assumption of greater administrative hurdles for transactions under sanction, which would imply that only large-scale activities may still be profitable once restrictive measures have been imposed, the value of the average transaction falls sizably, by between 24 and 36 percent.

Another decomposition provides an even more detailed assessment of cross-border capital flows, distinguishing balance of payments entries by declarant and by asset category. For both extensive margins, we obtain consistently negative β coefficients, implying that the observed decline in the number of statistical entries under sanction is due to both a drop in the number of reporting units and a reduction in the number of asset classes in which activities are declared. According to our estimates, the number of declarants decreases by some 25 percent, while the number of asset classes decreases by between 5 and 8 percent. Similarly, for the intensive margin, which is now defined as the average value of a capital flow with a partner country in a specific asset category by a given declarant, we again observe a decrease during sanctions, on the order of a 33 percent reduction. We consider this result reassuring.

5.2 Robustness

We check the robustness of our results extensively. For instance, we split the sample along various lines and explore the effect of sanctions on financial flows for different subsamples.

Table 5 presents the results of one particularly interesting experiment in which we analyze the responsiveness of investors to the introduction of restrictive measures by their geographic origin. Specifically, we ask whether investors in the sender country and the target country of sanctions reduce their cross-border activities alike after sanctions have been imposed.¹⁶ While we observe a significant decline in capital flows for both groups of investors, the results are, unfortunately, not terribly conclusive with respect to possible differences in sensitivity. As before, columns 1 to 4 of the table contain the results for our parsimonious specification of equation (1). For this set of regressions, the estimated sanctions effect is considerably larger in magnitude for foreign investors than for German residents. However, this finding is not robust to the inclusion of additional country controls, possibly also as a result of the reduction in sample size.

In another robustness check, we investigate the sanctions effect by asset category. The results are tabulated in Appendix Table 2. Again, our main results turn out to be reasonably robust. Of the 36 estimated coefficients, 23 (19) take a negative sign (and are different from

¹⁶ In the balance of payments statistics, there is information on who initiated a transaction. As a result, a capital inflow (outflow) may be either due to German investors selling (buying) foreign assets or foreign investors buying (selling) German assets.

zero at conventional levels of statistical significance). Especially for asset categories with large-scale transaction values (such as bonds, commercial paper and stocks), the estimation results are of comparable magnitude to our aggregate estimates.

5.3 Adjustment

Financial funds can move quickly. Therefore, for some types of restrictive measures, such as a freeze of assets, quick implementation is an essential feature. As a result, sanctions are expected to have an immediate impact on capital flows. However, measures are also often targeted at designated persons and organizations, such that their effect on total capital flows may be limited; bilateral financial relationships may only gradually deteriorate over time. Likewise, capital flows may already respond in anticipation of the imposition of sanctions. Overall, the speed of adjustment of capital flows to newly imposed sanctions is an interesting empirical issue to which we turn next.

To analyze the time pattern of the sanctions effect, we replace our financial sanctions dummy variable in equation (1) with leads and lags of the imposition of restrictive measures. Specifically, we estimate equations of the form:

$$(2) \quad \text{Log}(\text{Flow}_{ct}) = \alpha + \sum_k \beta_k \text{Imposition}_{ct-k} \{ + \gamma X_{ct} \} + \eta_c + \phi_t + \varepsilon_{ct}$$

where Imposition_{ct-k} is a binary dummy variable which takes the value of one if sanctions were imposed on country c at time $t-k$ (and is zero otherwise). Again, we use different measures of bilateral financial interactions. We also experiment with different numbers of leads and lags and several variants of our specification (with and without additional country controls), without much effect.

Figure 2 displays two sets of results for our four measures of cross-border capital flows. The upper panel shows the point estimates of β , with k running from -6 to $+12$, along with the corresponding ± 2 standard error band. As before, and reassuringly, we observe a substantial negative effect of sanctions on financial activity; the estimated monthly indicator variables take values of sizable economic magnitude, although they occasionally lack statistical precision. More notably, cross-border interactions already decline before the

imposition of restrictive measures; bilateral capital flows tend to be already disproportionately low in the three months before restrictive measures are in place.¹⁷ With sanctions, there is a further notable deterioration in financial activity, but after six months the effect seems to gradually peter out.

In the lower panel of Figure 2, we basically replicate this analysis. However, instead of using separate leads and lags for individual months, we estimate quarterly coefficients (again covering the period from half a year before the imposition of the sanctions to one year after). With this modification, our basic results remain unchanged. Still, we estimate the coefficients with greater precision.

6. Varying the Strength of Sanctions

6.1 Breadth

Restrictive measures often come with different intensities: sanctions may be limited to specific areas; they may be targeted at specific entities; they may be imposed by different groups of countries. We next investigate the impact of various features of sanctions on cross-border financial flows.

We begin our analysis by examining the difference between sanctions imposed by the United Nations (and subsequently also adopted by the European Union) and measures autonomously imposed by the European Union. Interestingly, in the literature on the success of sanctions, there is some notable debate about the effect of the size of the sanctioning coalition. In fact, contrary to intuition (and insights from theory), many empirical studies find that multilateral cooperation among sanctioners lowers the probability of sanctions success; see, for instance, Kaempfer and Lowenberg (2007) for a summary.

In order to identify possible differences in the effect of UN and EU sanctions on cross-border capital flows, we augment equation (1) with an additional dummy variable which takes the value of one when sanctions are imposed by the United Nations (and is zero otherwise). Consequently, the estimated coefficient on this variable captures the extent to which financial

¹⁷ In addition to a possible anticipation effect, the decline may also reflect a deterioration in local political and economic conditions in the target country, which may have contributed to the imposition of sanctions.

activities respond differently to restrictions imposed by the two differently-sized groups of sanctioners.

The results in Table 6 indicate that there is no measurable difference in the impact of UN and EU sanctions on financial flows. Although the coefficient on UN sanctions varies in sign across specifications, the coefficient is typically statistically indistinguishable from zero at any conventional level of confidence.

We also examine different types of sanctions, distinguishing between financial sanctions only and a broader set of restrictive measures (including, for instance, export restrictions and travel bans).¹⁸ As shown in Table 7, a more encompassing set of restrictive measures has stronger effects on capital flows, showing a significantly larger decline in cross-border activities.

6.2 Strength

In another exercise, we make use of information on the detailed timeline of sanctions measures. With this data, we are able to identify, in addition to the impact of the imposition of sanctions, the effects of taking additional restrictive measures (and, thereby, strengthening sanctions) or lifting some previously imposed measures (and, thereby, easing sanctions). Again, we isolate these effects by including additional dummy variables in equation (1), our baseline regression model. For simplicity, we limit our attention to episodes of a first adjustment in sanctions measures. Moreover, since we focus exclusively on timing (and ignore information on actual measures that were taken), we consider this a particularly demanding exercise.

Results are shown in Table 8a. Overall, we find some moderate support for the hypothesis that the strength of sanctions has an effect on outcomes. To the extent that our augmented variables take statistically significant coefficients, these coefficients are sensible and have the expected sign.

We also experiment with replacing our plain binary sanctions dummy with a sanctions index. This index is defined to take the value of one once there has been no further

¹⁸ On the following target countries only financial sanctions were imposed: Congo (Dem. Rep.), Lebanon, Tunisia, Egypt, Afghanistan, Guinea-Bissau, Central African Republic, and Sudan.

strengthening of financial sanctions and otherwise proportionally incorporates moments of adjustment in restrictive measures. As shown in Table 8b, the β coefficients are more precisely estimated and increase in magnitude for this modification. As before, this result indicates that the intensity of sanctions measures matters.

6.3 Lifting

Our sample also covers a few episodes in which previously imposed European Union regulations have been repealed, lifting sanction measures completely. These episodes include the lifting of measures imposed on Uzbekistan and the Comoros during our sample period as well as the lifting of sanctions (in November 2011) which were imposed on the former Yugoslavia in the 1990s.¹⁹ As a result, we can replicate our differences-in-differences analysis for the removal (instead of the imposition) of sanctions.

Table 9 reports the results of this exercise. The estimates of β take a consistently positive sign and are always statistically highly significant, indicating a considerable increase in cross-border financial flows after the elimination of restrictions. The point estimate of about 0.85 imply that after the lifting of financial sanctions, German capital flows with the (former) target countries increase, on average, by about 130 percent.

7. Evading Sanctions

7.1 Redirection

A policy question of notable interest is: How do firms in the sender country respond to sanctions? This question is of considerable relevance for the success of sanctions. If individuals and firms find ways to circumvent or avoid restrictive measures and, thereby, are able to continue their business operations, sanctions policies may be ineffective. The question is also of importance for an assessment of the costs of sanctions to the sender country. If restrictions are binding (and/or retaliatory measures are taken by the target country), the imposition of sanctions may also have notable negative effects on the sanctioned sectors in the sender country.

¹⁹ In our actual implementation, we classify Serbia (as one of the successor states of the former Yugoslavia) as the country for which sanctions have been lifted.

In our empirical strategy to analyze this issue, we make use of the highly disaggregated structure of our data which allows us to observe activities by individual declarant. As a result, we are able to identify German reporting units which declared activities with sanctioned countries in the 12 months before restrictive measures were imposed. Examining firm activities with non-sanctioned countries, we analyze differences in the activities between declarants affected (or ‘treated’) by sanctions and declarants without any business operations with target countries. Specifically, we estimate equations of the form:

$$(3) \quad \text{Log}(\text{Flow}_{ct}^d) = \alpha + \beta \text{ Affected Declarant}_{ct}^d \{ + \gamma X_{ct} \} + \eta_c^d + \phi_t + \varepsilon_{ct}$$

where Flow_{ct}^d is a measure of German financial activity of declarant d with country c at time t , $\text{Affected Declarant}_{ct}^d$ 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 is a vector of auxiliary control variables, and we include full sets of declarant-country-specific (η_c^d) and time specific (ϕ_t) fixed effects. Again, it should be noted that direct effects of sanctions are ignored (or, more precisely, ruled out) in our analysis by our exclusive focus on a sample of non-sanctioned countries. Accordingly, the estimate of β indicates the extent to which financial activities of treated reporting units with a given country deviate from the activities of 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 10 presents the results. The table contains eight columns. Analogously to our benchmark analysis, we tabulate estimates for our four measures of bilateral capital flows, using a highly parsimonious specification of equation (3); we also replicate the analysis with additional control variables included. As before, however, for this extended specification, sample size is reduced considerably. More notably, while the variables take sensible and significant coefficients, the effect of this modification on the main results is negligible.

Turning to the variable of interest, the estimates of β are consistently positive and economically and statistically significant. The estimates indicate that investors affected by sanctions policies tend to sizably expand their activities with other countries, by 6 to 12 percent. One plausible explanation for this finding is that ‘treated’ declarants are highly

flexible, exploring alternative business opportunities. Another possible explanation, however, is that declarants continue business operations with target countries, via extended transactions with third countries, such that sanctions would be largely ineffective. Unfortunately, we are unable to distinguish between these different explanations. Generally, however, our results suggest that the costs of sanctions to the sender country are manageable.

7.2 Evasion

In an attempt to identify possible sanction-evading behavior by individuals and firms more directly, we make our analysis of German capital flows with non-sanctioned (third) countries more specific. In particular, we identify a target country's five largest trading partners in the 12 months before the imposition of sanctions.²⁰ In our analysis of financial activities of sanctions-affected reporting units, we then distinguish, based on this measure, between different groups of countries. Specifically, we argue that a relative increase in the financial relationships of 'treated' units with countries which are major trading partners of sanctioned countries can be interpreted as evidence of sanction evasion. In addition, we distinguish between UN and EU sanctions, arguing that the effects should be smaller, if any, for UN sanctions as the (geographic) evasion of sanctions seems to be generally more difficult when every UN member country imposes sanctions.

Estimation results are tabulated in Table 11. Instead of using a single measure to quantify cross-border financial activities of reporting units affected by the imposition of sanctions, we now use six measures, differentiating between the type of sanctions (EU, UN) and the destination of third-country capital flows (top 5 trading partner of the target country, rest of the world). As shown, the results are indicative of evasion behavior. For sanctions which have been imposed only by the European Union, the estimated coefficients on the interaction terms take positive (and significant) values, indicating an increase in financial activities. Furthermore, the increase is larger, in both a statistical and an economic sense, for transactions with countries with close economic ties with sanctioned countries, indicating that those countries may serve as an intermediary in evasion of sanctions. Depending on the flow,

²⁰ Monthly data on bilateral values of trade between countries is 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.

financial transactions with largest trading partners of sanctioned countries increase from 40 percent to almost 100 percent more relative to transactions with all other countries.

While these findings do not necessarily imply direct evidence on the evasion of sanctions, our evasion hypothesis is reinforced by the estimation results for sanctions imposed by the United Nations. For UN sanctions, transactions of ‘treated’ firms with non-sanctioned countries decrease for both major trading partners and all other trading partners of the target countries. These results likely indicate that one plausible alternative explanation for our estimation results on EU sanctions does not hold. Specifically, the increase in transactions with other countries that we observe for firms affected by EU sanctions could be due to firms seeking to diversify their international portfolio. However, there is no reason not to expect such behavior in the case of sanctions levied by the entire UN. The fact that we see no such increase in the case of UN sanctions, increases our confidence that at least some part of the observed increase in transactions with largest trading partners of sanctioned countries in the case of EU levied sanctions is due to evasion.

7.3 Net Errors and Omissions

In a final exercise, we examine another potential channel of evading sanctions, the misreporting of financial transactions. To the extent that these transactions are recorded in the balance of payments statistics at all (and do not go completely underground), they may possibly show up in the residual category of the balance of payments, net errors and omissions; this category ensures that the balance of payments accounts sum to zero. However, this information is only available at the aggregate level for all partner countries, implying one entry per month.

Figure 3 plots the net errors and omissions category in the German balance of payments for the sample period. The upper panel shows the balance (which may take positive or negative values); the lower panel graphs the change in the balance against the previous month. Marking the months in which sanctions were imposed by vertical lines, no clear pattern is visually observable.

To empirically identify potential irregularities at the time of the imposition of sanctions, we next estimate equations of the form:

$$(4) \quad \text{Balance}_t = \alpha + \beta \text{Sanction}_t + \lambda_m + \zeta_y + \varepsilon_{ct}$$

where Balance_t is the value of net errors and omissions at time t , Sanction is a dummy variable which takes the value of one when sanctions have been imposed in t (and zero otherwise), and we include comprehensive sets of month and year fixed effects.

Table 12 tabulates the results. Again, we experiment with different measures for the dependent variable. For instance, in addition to the nominal value, we also examine monthly changes and absolute values, without much effect. None of the estimated coefficients is statistically distinguishable from zero, indicating that no pattern in the net errors and omissions category of the German balance of payments is identifiable for months in which sanctions were imposed.

8. Conclusions

This paper examines the effect of financial sanctions on cross-border capital flows. While sanctions can be expected to hinder international transactions, thereby putting pressure on a target country, we study the patterns of adjustment in bilateral relationships after the imposition of a sanction along various dimensions. Our analysis is based on transactions-level data from the German balance of payments statistics for the period from 2005 through 2014. During this time, financial sanctions were imposed on 20 countries and have not been lifted, except for two countries. Applying a differences-in-differences approach, we find that sanctions have a strong and immediate negative effect on cross-border financial flows.

Although our empirical findings are derived from data of only one (sender) country, Germany, they provide a number of interesting policy implications. First, sanctions reduce capital flows, both inflows and outflows. Sanctions also work across the board; they do not only lower the value of financial flows, but also lessen the number of transactions and the number of asset categories. Overall, sanctions imply costs for both the target and the sender country. Second, capital flows already decline before the imposition of sanctions, indicating anticipation effects. As a result, whenever the imposition of sanctions is seriously considered as a policy tool, they should be implemented immediately. Third, the easing or strengthening of sanctions does not seem to matter much. What matters is the sheer act of imposing sanctions. Thus, changing the intensity of sanctions may only serve as a political signal, but

not an economic one. Forth, if only a subset of countries imposes sanctions, there seems to be rampant evasion through third countries. In other words, UN sanctions seem far more effective in cutting off capital flows than EU only sanctions, indicating that the effect of EU only sanctions may be more in the political area than the economic area.

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Figure 1: The Relevance of Target Countries for German Cross-Border Capital Flows

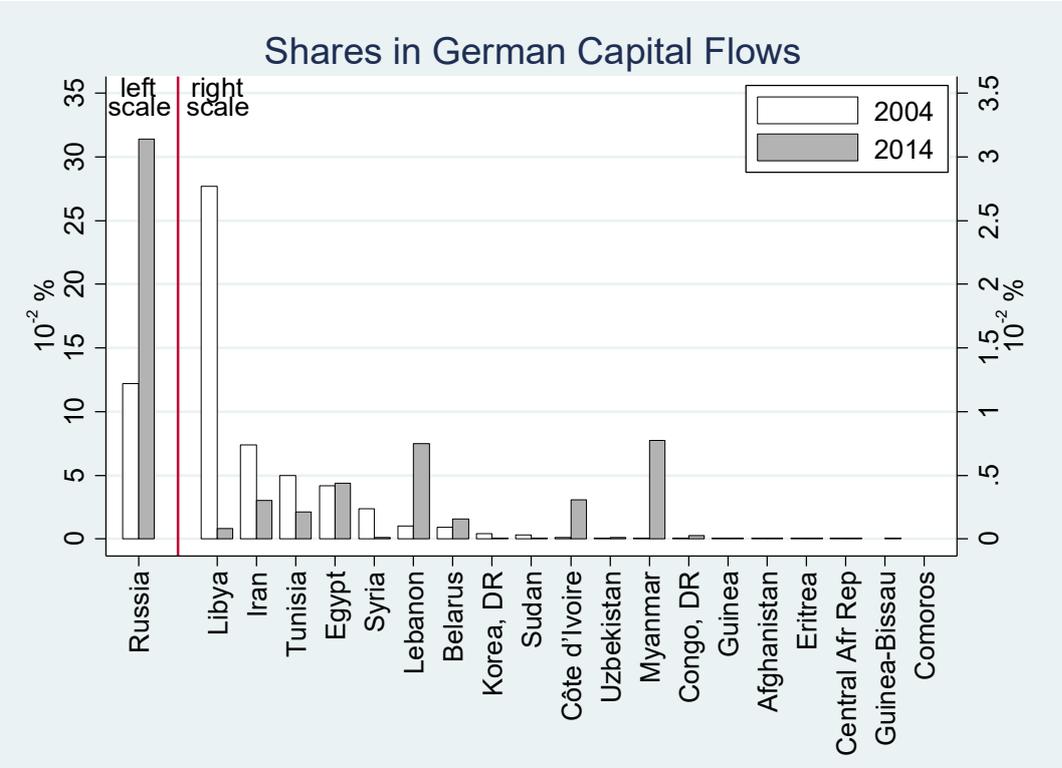


Figure 2: The Effects of Sanctions on Cross-Border Capital Flows

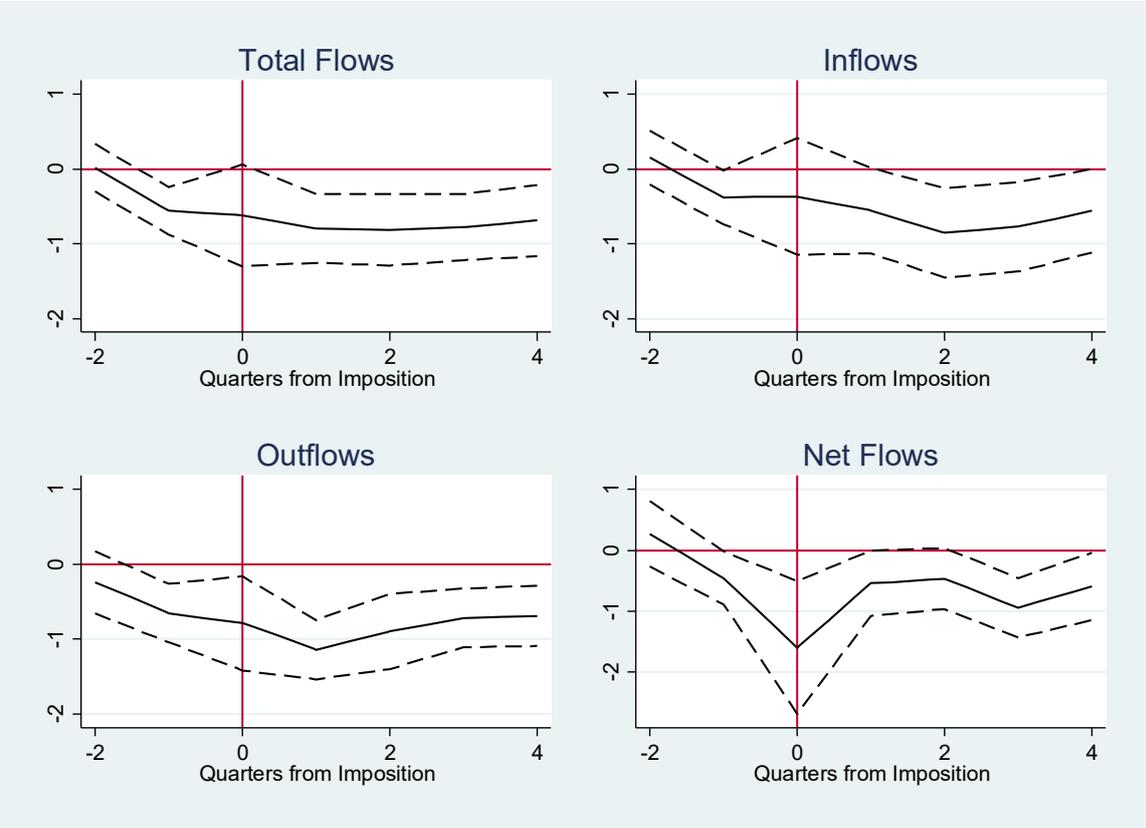
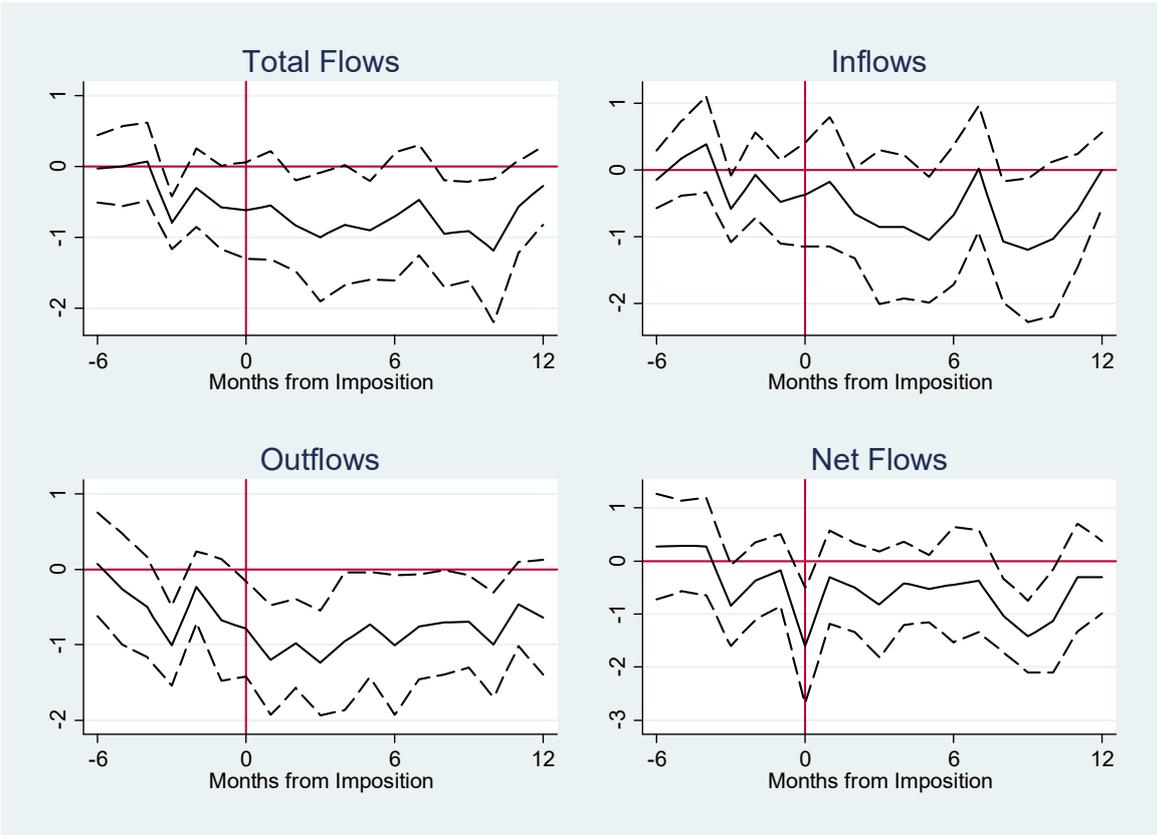
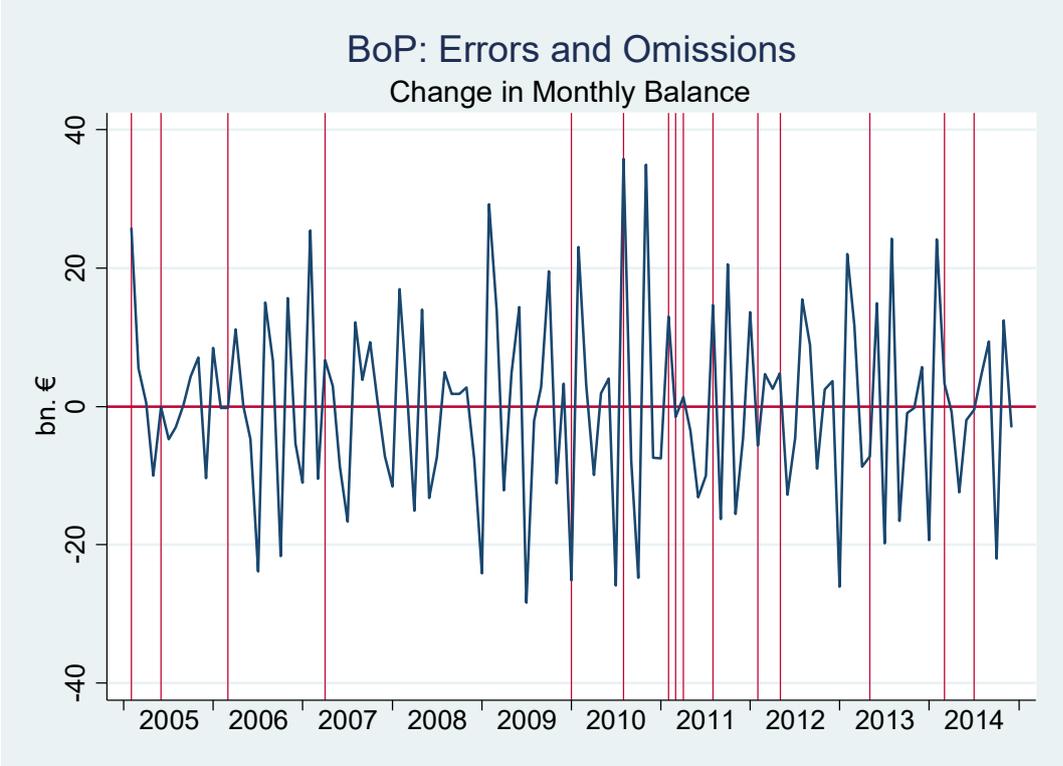
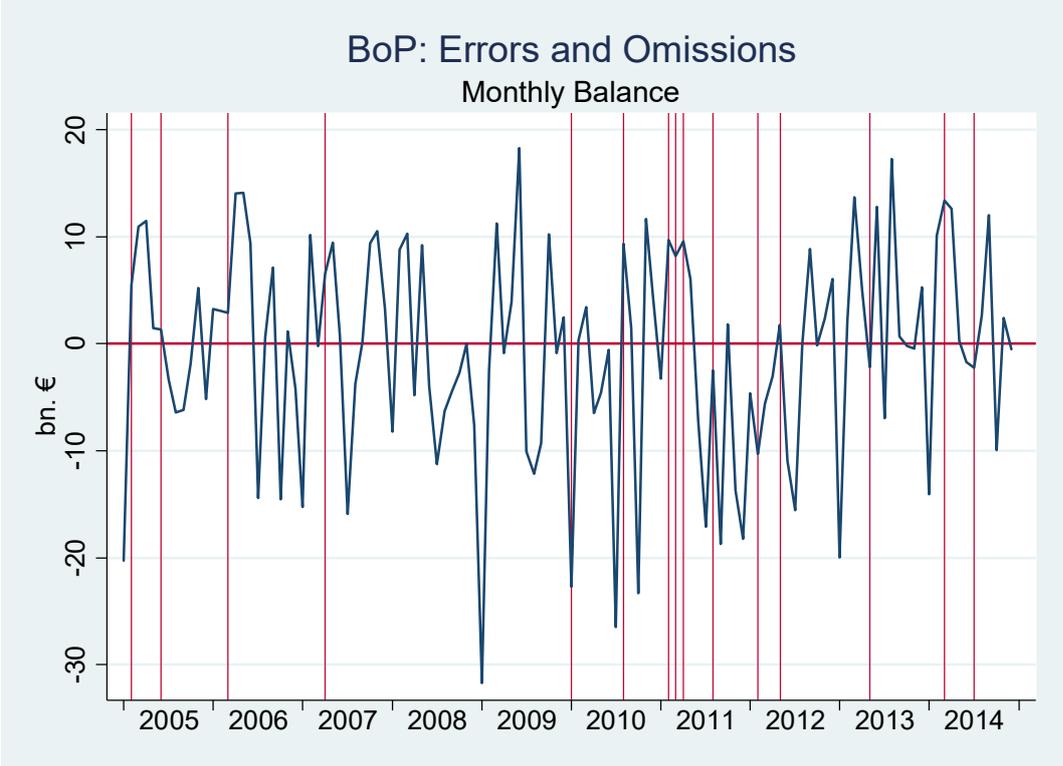


Figure 3: The Effects of Sanctions on Errors and Omissions in the Balance of Payments



Source: Deutsche Bundesbank.

Table 1: List of Financial Sanctions, 2005-2014

| Country | First announcement (Lifted) | Measures taken |
|--------------------------|---------------------------------------|--|
| Côte d'Ivoire | 31 January 2005 | Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment |
| Congo, Dem. Rep. | 13 June 2005 | Freezing of assets and economic resources of natural persons and establishments |
| Uzbekistan | 14 November 2005 (27 October 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 |
| 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 | 03 March 2008 (27 May 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 |
| Iran | 12 April 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 |
| Syria | 18 January 2012 | Freezing of assets and economic resources of natural persons and establishments; export restriction on military equipment, chemicals and other resources (gold, silver, ...) |
| Guinea-Bissau | 3 May 2012 | Freezing of assets and economic resources of natural persons |
| Myanmar | 2 May 2013 | Export restriction on military equipment |
| 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 |
| Sudan | 10 July 2014 | Freezing of assets and economic resources of natural persons |

Source: Deutsche Bundesbank, Service center 'Financial Sanctions'.

Table 2: Descriptive Statistics

| | Full Sample | | | Under Sanction | | | t-test (p-value) |
|--|-------------|--------|-----------|----------------|-------|-----------|---------------------|
| | Obs. | Mean | Std. Dev. | Obs. | Mean | Std. Dev. | |
| Total Flows (Bn. €) | 21,891 | 6.03 | 30.20 | 1,518 | 0.04 | 0.32 | 0.00 |
| Entries (Number) | 21,891 | 126.19 | 304.99 | 1,518 | 12.07 | 24.01 | 0.00 |
| Avg. Flow per Entry (Mn. €) | 21,151 | 9.67 | 35.30 | 1,203 | 2.54 | 29.60 | 0.00 |
| Declarants (Number) | 21,891 | 61.90 | 130.53 | 1,518 | 8.13 | 14.79 | 0.00 |
| Avg. Number of Entries per Declarant | 21,891 | 1.53 | 0.49 | 1,518 | 1.31 | 0.40 | 0.06 |
| Asset Classes (Number) | 21,891 | 4.66 | 2.72 | 1,518 | 3.04 | 1.94 | 0.00 |
| Avg. Flow per Asset Class per Declarant (Mn. €) | 21,891 | 3.26 | 26.06 | 1,518 | 1.31 | 25.84 | 0.00 |
| | | | | | | | |
| Inflows (Bn. €) | | | | | | | |
| – By German Investors | 17,028 | 1.73 | 6.08 | 940 | 0.02 | 0.13 | 0.00 |
| – By Foreign Investors | 19,698 | 1.82 | 13.70 | 1,109 | 0.01 | 0.13 | 0.00 |
| Outflows (Bn. €) | | | | | | | |
| – By German Investors | 17,028 | 1.83 | 6.37 | 940 | 0.02 | 0.11 | 0.00 |
| – By Foreign Investors | 19,698 | 1.79 | 11.80 | 1,109 | 0.01 | 0.08 | 0.00 |
| | | | | | | | |
| Assets (Bn. €) | | | | | | | |
| – Bonds | 16,567 | 3.07 | 12.60 | 951 | 0.04 | 0.27 | 0.00 |
| – Commercial Paper | 11,032 | 2.04 | 7.67 | 411 | 0.01 | 0.02 | 0.00 |
| – Stocks | 16,329 | 2.64 | 16.40 | 834 | 0.02 | 0.12 | 0.00 |
| – Investment Certificate | 16,226 | 0.55 | 3.81 | 780 | 0.01 | 0.01 | 0.00 |
| – Equity Capital | 9,572 | 0.25 | 1.41 | 310 | 0.01 | 0.02 | 0.00 |
| – Direct Investment Credit | 9,541 | 0.13 | 0.64 | 289 | 0.01 | 0.02 | 0.00 |
| – Credit | 13,030 | 0.22 | 0.95 | 604 | 0.01 | 0.09 | 0.00 |
| – Other Capital | 7,116 | 0.03 | 0.22 | 105 | 0.01 | 0.02 | 0.20 |
| – Coupon | 1,959 | 0.01 | 0.01 | 11 | 0.01 | 0.01 | 0.58 |

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

| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
|--|----------------------------|----------------------|-------------------------|----------------------------|----------------------------|----------------------|-------------------------|----------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sanctions | -0.715*** (0.098) | -0.724*** (0.104) | -0.702*** (0.087) | -0.663*** (0.105) | -0.628*** (0.128) | -0.656*** (0.170) | -0.745*** (0.126) | -0.685*** (0.242) |
| Stock Market Capitalization | | | | | 0.004*** (0.001) | 0.004*** (0.001) | 0.005*** (0.001) | 0.004*** (0.001) |
| Capital Account Openness | | | | | 0.855*** (0.203) | 1.083*** (0.258) | 0.781** (0.233) | 0.803*** (0.267) |
| Public Debt | | | | | -0.009*** (0.001) | -0.007*** (0.001) | -0.010*** (0.002) | -0.004** (0.002) |
| Real GDP Growth | | | | | 0.923*** (0.112) | 0.871*** (0.148) | 1.091*** (0.133) | 0.715*** (0.146) |
| Log GDP per Capita | | | | | -0.052 (0.039) | -0.010 (0.047) | -0.119*** (0.038) | 0.079 (0.059) |
| Observations | 26,280 | 26,280 | 26,280 | 26,280 | 7,485 | 7,485 | 7,485 | 7,485 |
| Adj. R² | 0.881 | 0.883 | 0.878 | 0.823 | 0.911 | 0.883 | 0.887 | 0.736 |

Notes: OLS estimation. The dependent variable is specified at the top of each column. The unit of observation is a country-month pair. Data cover the period from January 2005 through December 2014 in monthly frequency. Time fixed effects and country-specific fixed effects are included but not reported. Robust standard errors 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 | | | |
|---|--------------------------------------|----------------------|----------------------|----------------------|-----------------------------------|----------------------|----------------------|----------------------|
| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Log Total Value | -0.715*** (0.098) | -0.724*** (0.104) | -0.702*** (0.087) | -0.663*** (0.105) | -0.628*** (0.128) | -0.656*** (0.170) | -0.745*** (0.126) | -0.685*** (0.242) |
| Log Number of Entries | -0.241*** (0.020) | -0.246*** (0.021) | -0.245*** (0.020) | -0.241*** (0.020) | -0.284*** (0.039) | -0.314*** (0.052) | -0.354*** (0.042) | -0.284*** (0.039) |
| Log Average Value per Entry | -0.474*** (0.090) | -0.474*** (0.095) | -0.467*** (0.078) | -0.422** (0.099) | -0.343*** (0.116) | -0.372** (0.157) | -0.459*** (0.116) | -0.404* (0.241) |
| Log Number of Declarants | -0.233*** (0.019) | -0.227*** (0.019) | -0.227*** (0.019) | -0.233*** (0.019) | -0.261*** (0.038) | -0.282*** (0.053) | -0.282*** (0.053) | -0.261*** (0.038) |
| Log Number of Asset Classes | -0.079*** (0.015) | -0.086*** (0.015) | -0.049*** (0.014) | -0.079*** (0.015) | 0.001 (0.022) | 0.024 (0.028) | 0.039 (0.027) | 0.001 (0.022) |
| Log Avg. Value per Asset Class per Declarant | -0.403*** (0.087) | -0.412*** (0.093) | -0.416*** (0.077) | -0.403*** (0.087) | -0.368*** (0.118) | -0.398*** (0.156) | -0.436*** (0.110) | -0.368*** (0.118) |

Notes: OLS estimation. 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 2005 through December 2014 in monthly frequency. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 5: The Effect of Sanctions on Cross-Border Capital Flows by Type of Investor

| | Without Additional Control Variables | | | | With Additional Control Variables | | | |
|--------------------------|--------------------------------------|----------------------|----------------------|----------------------|-----------------------------------|---------------------|----------------------|----------------------|
| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| German Investors | -0.358*** (0.079) | -0.279*** (0.083) | -0.169** (0.077) | -0.538*** (0.094) | -0.560*** (0.189) | -0.521** (0.223) | -0.180 (0.173) | -1.159*** (0.319) |
| Foreign Investors | -0.741*** (0.142) | -0.865*** (0.152) | -0.822*** (0.126) | -0.496*** (0.136) | -0.478** (0.208) | -0.447 (0.343) | -0.750*** (0.277) | -0.224 (0.229) |

Notes: OLS estimation. 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 specified at the top of each column; the sample is listed in the first column. The unit of observation is a country-month pair. Data cover the period from January 2005 through December 2014 in monthly frequency. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 6: The Effects of EU and UN Sanctions on Cross-Border Capital Flows

| | Without Additional Control Variables | | | | With Additional Control Variables | | | |
|--------------------------|--------------------------------------|----------------------|----------------------|----------------------|-----------------------------------|----------------------|----------------------|----------------------|
| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| All Sanctions | -0.562*** (0.117) | -0.568*** (0.126) | -0.737*** (0.101) | -0.541*** (0.133) | -0.624*** (0.133) | -0.651*** (0.176) | -0.748*** (0.130) | -0.699*** (0.252) |
| UN Sanctions Only | -0.417** (0.203) | -0.424** (0.214) | 0.096 (0.182) | -0.330 (0.210) | -0.100 (0.289) | -0.129 (0.274) | 0.073 (0.359) | 0.354 (0.325) |

Notes: OLS estimation. The regression specification is similar to the corresponding column in Table 3. The dependent variable is specified at the top of each column. The unit of observation is a country-month pair. Data cover the period from January 2005 through December 2014 in monthly frequency. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 7: The Effects of Financial and Economic Sanctions on Cross-Border Capital Flows

| | Without Additional Control Variables | | | | With Additional Control Variables | | | |
|---|--------------------------------------|----------------------|----------------------|----------------------|-----------------------------------|----------------------|----------------------|---------------------|
| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Financial Sanctions Only | -0.345*** (0.097) | -0.215* (0.112) | -0.440*** (0.103) | -0.611*** (0.125) | -0.464*** (0.147) | -0.453** (0.205) | -0.626*** (0.138) | -0.699** (0.277) |
| Financial and Economic Sanctions | -0.931*** (0.142) | -1.020*** (0.149) | -0.854*** (0.121) | -0.693*** (0.148) | -0.983*** (0.225) | -1.099*** (0.274) | -1.002*** (0.243) | -0.655 (0.463) |

Notes: OLS estimation. The regression specification is similar to the corresponding column in Table 3. The dependent variable is specified at the top of each column. The unit of observation is a country-month pair. Data cover the period from January 2005 through December 2014 in monthly frequency. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 8a: The Effects of Imposing, Strengthening, and Easing of Sanctions on Cross-Border Capital Flows

| | Without Additional Control Variables | | | | With Additional Control Variables | | | |
|----------------------|--------------------------------------|----------------------|----------------------|----------------------|-----------------------------------|----------------------|----------------------|----------------------|
| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sanctions | -0.589*** (0.120) | -0.618*** (0.121) | -0.682*** (0.106) | -0.553*** (0.129) | -0.619*** (0.138) | -0.579*** (0.184) | -0.753*** (0.128) | -0.828*** (0.252) |
| Strengthening | -0.416*** (0.149) | -0.536** (0.152) | -0.146 (0.149) | -0.224 (0.157) | -0.231 (0.302) | -0.660 (0.411) | -0.024 (0.333) | 0.502 (0.504) |
| Easing | 0.232** (0.123) | 0.512*** (0.136) | 0.173 (0.133) | -0.030 (0.134) | 0.694* (0.418) | 1.144** (0.464) | 0.215 (0.599) | 0.501 (0.485) |

Table 8b: The Effects of Imposing, Strengthening, and Easing of Sanctions on Cross-Border Capital Flows

| | Without Additional Control Variables | | | | With Additional Control Variables | | | |
|------------------------|--------------------------------------|----------------------|----------------------|----------------------|-----------------------------------|---------------------|----------------------|---------------------|
| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sanctions Index | -0.640*** (0.105) | -0.570*** (0.108) | -0.725*** (0.093) | -0.618*** (0.113) | -0.432*** (0.154) | -0.468** (0.204) | -0.508*** (0.163) | -0.611** (0.263) |

Notes: OLS estimation. The regression specification is similar to the corresponding column in Table 3. The dependent variable is specified at the top of each column. The unit of observation is a country-month pair. Data cover the period from January 2005 through December 2014 in monthly frequency. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 9: The Effects of Lifting Sanctions on Cross-Border Capital Flows

| | Without Additional Control Variables | | | |
|------------------|---|--------------------|---------------------|------------------------|
| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
| | (1) | (2) | (3) | (4) |
| Sanctions | 1.071** (0.345) | 0.835* (0.366) | 0.765* (0.374) | 0.960* (0.402) |

Notes: OLS estimation. The regression specification is similar to the corresponding column in Table 3. The dependent variable is specified at the top of each column. The unit of observation is a country-month pair. Data cover the period from January 2005 through December 2014 in monthly frequency. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 10: The Effects of Sanctions on Third-Country Capital Flows

| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
|--|----------------------------|------------------------|-------------------------|----------------------------|----------------------------|------------------------|-------------------------|----------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Affected Declarant | 0.124*** (0.006) | 0.100*** (0.007) | 0.104*** (0.007) | 0.070*** (0.007) | 0.117*** (0.010) | 0.103*** (0.012) | 0.088*** (0.012) | 0.087*** (0.012) |
| Stock Market Capitalization | | | | | 0.002*** (0.000) | 0.002*** (0.000) | 0.002*** (0.000) | 0.001*** (0.000) |
| Capital Account Openness | | | | | 0.175*** (0.053) | 0.167** (0.065) | 0.188*** (0.064) | 0.147** (0.059) |
| Public Debt | | | | | -0.005*** (0.001) | -0.004*** (0.001) | -0.006*** (0.000) | -0.005*** (0.000) |
| Real GDP Growth | | | | | 0.310*** (0.027) | 0.297*** (0.034) | 0.361*** (0.032) | 0.239*** (0.030) |
| Log GDP per Capita | | | | | -0.117*** (0.014) | -0.086*** (0.018) | -0.097*** (0.016) | -0.082*** (0.015) |
| Observations | 1,316,661 | 890,580 | 960,138 | 1,300,498 | 685,948 | 459,181 | 502,777 | 677,603 |
| Adj. R² | 0.753 | 0.749 | 0.759 | 0.658 | 0.766 | 0.764 | 0.772 | 0.671 |

Notes: OLS estimation. The dependent variable is specified at the top of each column. The unit of observation is a firm-country-month triplet. Data cover the period from January 2005 through December 2014 in monthly frequency. Time fixed effects and firm-country-specific fixed effects are included but not reported. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 11: The Effects of Sanctions on Third-Country Capital Flows Extended

| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
|------------------------------------|------------------------|----------------------|----------------------|------------------------|------------------------|----------------------|----------------------|------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| EU | -0.146*** (0.030) | -0.039 (0.037) | -0.122*** (0.036) | -0.039 (0.032) | -0.316*** (0.053) | -0.174*** (0.067) | -0.279*** (0.062) | -0.238*** (0.055) |
| UN | -0.407*** (0.093) | -0.110 (0.107) | -0.319*** (0.111) | -0.298** (0.098) | 0.185 (0.281) | -0.098 (0.309) | 0.466 (0.322) | 0.315 (0.406) |
| Affected Declarant EU Top5 | 0.233*** (0.010) | 0.206*** (0.011) | 0.201*** (0.011) | 0.163*** (0.011) | 0.225*** (0.014) | 0.222*** (0.016) | 0.162*** (0.016) | 0.184*** (0.016) |
| Affected Declarant EU Rest | 0.151*** (0.009) | 0.113*** (0.010) | 0.144*** (0.010) | 0.084*** (0.010) | 0.117*** (0.015) | 0.084*** (0.017) | 0.119*** (0.016) | 0.074*** (0.016) |
| Affected Declarant UN Top5 | -0.091*** (0.017) | -0.073*** (0.019) | -0.094*** (0.019) | -0.075*** (0.020) | -0.283*** (0.033) | -0.268*** (0.036) | -0.303*** (0.036) | -0.215*** (0.038) |
| Affected Declarant UN Rest | -0.107*** (0.015) | -0.094*** (0.017) | -0.127*** (0.016) | -0.103*** (0.016) | -0.298*** (0.034) | -0.302*** (0.038) | -0.262*** (0.037) | -0.270*** (0.037) |
| Stock Market Capitalization | | | | | 0.002*** (0.000) | 0.002*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) |
| Capital Account Openness | | | | | 0.086* (0.050) | 0.055 (0.061) | 0.118** (0.060) | 0.068 (0.055) |
| Public Debt | | | | | -0.005*** (0.001) | -0.004*** (0.001) | -0.007*** (0.001) | -0.005*** (0.001) |
| Real GDP Growth | | | | | 0.318*** (0.027) | 0.306*** (0.033) | 0.366*** (0.032) | 0.248*** (0.029) |
| Log GDP per Capita | | | | | -0.121*** (0.014) | -0.092*** (0.018) | -0.099*** (0.016) | -0.086*** (0.015) |
| Observations | 1,354,365 | 914,586 | 988,077 | 1,337,479 | 707,261 | 472,459 | 518,909 | 698,617 |
| Adj. R² | 0.752 | 0.749 | 0.758 | 0.657 | 0.766 | 0.764 | 0.771 | 0.670 |

Notes: OLS estimation. The dependent variable is specified at the top of each column. The unit of observation is a firm-country-month triplet. Data cover the period from January 2005 through December 2014 in monthly frequency. Time fixed effects and firm-country-specific fixed effects are included but not reported. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Table 12: The Effects of Sanctions on Net Errors and Omissions in the Balance of Payments

| | Balance | ΔBalance | Balance | Δ Balance |
|---------------------------|------------------|------------------|-------------------|-------------------|
| | (1) | (2) | (3) | (4) |
| Sanctions | 2.115 (2.066) | 1.185 (3.252) | -0.141 (1.465) | 0.896 (2.333) |
| Observations | 120 | 119 | 120 | 119 |
| Adj. R² | 0.449 | 0.393 | 0.236 | 0.200 |

Notes: OLS estimation. The dependent variable is specified at the top of each column. The unit of observation is the monthly entry in the net errors and omissions category in the German balance of payments. Data cover the period from January 2005 through December 2014 in monthly frequency. Month and year fixed effects are included but not reported. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Appendix Table 1: The Effect of Sanctions on Cross-Border Capital Flows

| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
|--|----------------------------|----------------------|-------------------------|----------------------------|----------------------------|----------------------|-------------------------|----------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sanctions | -0.694*** (0.098) | -0.663*** (0.112) | -0.793*** (0.097) | -0.633*** (0.113) | -0.620*** (0.128) | -0.686*** (0.166) | -0.753*** (0.123) | -0.684*** (0.242) |
| Stock Market Capitalization | | | | | 0.004*** (0.001) | 0.003*** (0.001) | 0.004*** (0.001) | 0.004*** (0.001) |
| Capital Account Openness | | | | | 0.849*** (0.203) | 0.802*** (0.208) | 0.705** (0.203) | 0.766*** (0.266) |
| Public Debt | | | | | -0.009*** (0.001) | -0.009*** (0.001) | -0.012*** (0.001) | -0.004** (0.002) |
| Real GDP Growth | | | | | 0.909*** (0.112) | 0.782*** (0.139) | 1.122*** (0.128) | 0.689*** (0.145) |
| Log GDP per Capita | | | | | -0.050 (0.039) | -0.026 (0.046) | -0.130*** (0.037) | 0.081 (0.059) |
| Observations | 21,151 | 19,640 | 19,902 | 21,054 | 7,482 | 7,378 | 7,387 | 7,475 |
| Adj. R² | 0.889 | 0.877 | 0.880 | 0.781 | 0.915 | 0.894 | 0.904 | 0.737 |

Notes: This table is an analogue to Table 3, but drops country-month pairs for which no capital flows are recorded. OLS estimation. The dependent variable is specified at the top of each column. The unit of observation is a country-month pair. Data cover the period from January 2005 through December 2014 in monthly frequency. Time fixed effects and country-specific fixed effects are included but not reported. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.

Appendix Table 2: The Effect of Sanctions on Cross-Border Capital Flows by Asset Class

| | Without Additional Control Variables | | | | With Additional Control Variables | | | |
|---------------------------------|--------------------------------------|----------------------|----------------------|----------------------|-----------------------------------|----------------------|----------------------|--------------------|
| | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows | Log Total Flows | Log Inflows | Log Outflows | Log Net Flows |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Bonds | -0.500*** (0.125) | -0.536*** (0.142) | -0.739*** (0.130) | -0.662*** (0.140) | -0.430** (0.182) | -0.336 (0.218) | -0.723*** (0.207) | -0.455* (0.249) |
| Commercial Paper | -0.616*** (0.168) | -0.962*** (0.196) | -0.093 (0.168) | -0.434** (0.191) | -0.816** (0.335) | -1.130*** (0.407) | 0.243 (0.335) | -0.684* (0.378) |
| Stocks | -0.268*** (0.103) | -0.106 (0.109) | -0.301*** (0.110) | -0.277*** (0.104) | -0.039 (0.184) | -0.111 (0.194) | -0.088 (0.192) | -0.133 (0.193) |
| Investment Certificate | -0.574*** (0.075) | -0.585*** (0.088) | -0.574*** (0.085) | -0.214** (0.094) | -0.360*** (0.123) | -0.401*** (0.154) | -0.473*** (0.141) | -0.088 (0.188) |
| Equity Capital | -0.666*** (0.168) | -0.685* (0.351) | -0.764*** (0.159) | -0.276* (0.163) | -0.242 (0.319) | 0.484 (0.750) | -0.204 (0.296) | -0.300 (0.314) |
| Direct Investment Credit | 0.387** (0.170) | 0.316 (0.242) | 0.141 (0.203) | 0.426** (0.185) | 0.115 (0.321) | 0.304 (0.431) | -0.508 (0.383) | 0.210 (0.332) |
| Credit | 0.524*** (0.166) | -0.001 (0.179) | 0.740*** (0.215) | 0.315* (0.179) | 0.302 (0.238) | -0.373 (0.272) | 0.422 (0.297) | -0.044 (0.301) |
| Other Capital | 0.030 (0.641) | 0.610 (0.827) | 2.035** (0.816) | -0.080 (0.604) | -0.650 (1.011) | -1.683** (0.725) | 1.139 (1.313) | -0.340 (1.070) |
| Coupon | 0.136 (0.669) | 1.561* (0.860) | -1.714*** (0.453) | 0.250 (0.742) | -0.075 (1.024) | 0.000 (0.000) | -1.454 (0.909) | -0.151 (1.024) |

Notes: OLS estimation. 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 specified at the top of each column; the sample is listed in the first column. The unit of observation is a country-month pair. Data cover the period from January 2005 through December 2014 in monthly frequency. Robust standard errors in parentheses. ***, ** and * denote significant at the 1%, 5% and 10% level, respectively.