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The Impact of Economic Sanctions on Income
Inequality of Target States

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Abstract

In this paper, we draw on established theoretical work to analyze empirically which segments of the population in the target states bear the most cost when economic sanctions are imposed. Using a cross-country analysis of 68 target states from 1960 to 2008, we find robust empirical evidence that the imposition of sanctions has a deleterious effect on income inequality. Focusing on various sanction instruments, financial and trade sanctions were found to have different impacts on income inequality. Lastly, the adverse effect of the sanctions is more severe when sanctions span longer durations.

Keywords

Economic sanctions, Income inequality, Target states.

JEL Codes: D31, F51, O15

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1. Introduction

Economic sanctions remain a ubiquitous foreign policy tool used by many countries to demand a change in the action of a target state. A current example of the use of economic sanctions is the imposition of various instruments of sanctions by the United States (US) and the European Union (EU) on Russia over the annexation of Crimea region of Ukraine. According to the sanctions literature, the cost of sanctions against a target country is supposed to result in maximum economic damage in order to coerce the target state to alter its policies in favor of the sender states (Kaempfer and Lowenberg 1988; Hufbauer *et al.* 2007; Dizaji and van Bergeijk 2013). Many empirical studies such as van Bergeijk (1989), Pape (1997), Hufbauer *et al.* (2007) and Bapat and Morgan (2009) have focused on the effectiveness of economic sanctions in terms of their successes and failures while Kirshner (1997) and Marinov (2005) conclude that the use of economic sanctions to pressure target states is of limited relevance.

Others such as Peksen and Son (2015), Neuenkirch and Neumeier (2015a, 2015b), Dizaji and van Bergeijk (2013), Yang *et al.* (2009), Kaempfer and Lowenberg (2007a) and Caruso (2003) have analyzed how these episodes of sanctions have instead adverse economic outcomes on national currency, poverty, GDP, trade, government consumption and employment. Our study contributes to this strand of the literature by empirically examining for the first time the impact of economic sanctions on the re-distribution of income within the segments of the target states. This is an important research question, given that widening income inequality has dire consequences on long-term sustainable economic growth as it goes against the principle of inclusive growth, in relation to the lower income groups, which may well lead to civil unrest and political upheaval (Solt, 2015). Income inequality remains a global problem and evidence shows that global wealth is increasingly being concentrated in the hands of a few rich elites (OECD, 2015). In fact, Alvaredo and Gasparini (2015) explain that income inequality in developing countries is more unequal now than it was three decades ago. Relating economic sanctions to income inequality is theoretically possible as sanctions are similar to a prohibitive tariff that has major re-distributional inclinations within the framework of the Stolper-Samuelson theorem (Cooper, 1989). The theoretical underpinnings of several studies in this related literature are detailed in the next section.

Although economic sanctions may not involve the destruction of human capital and infrastructure as in the case of military wars, they may have similar consequences on the welfare of the people in the target economy (Allen and Lektzian, 2013). For instance, Kaempfer and Lowenberg (2007b) explain that sanctions are unfair as they not only burden firms that would otherwise freely engage in international commerce, but they also often impose suffering on innocent civilians. Hufbauer *et al.* (2007), on the other hand, estimated the impact of economic sanctions in the form of a reduction in foreign aid on the target states to be a possible welfare loss of 100% of the value of the aid. Thus some groups of people are directly worse off than the leaders of the target nations.

There has however been a small batch of studies whose focus has been on the impact of sanctions on specific segments of the target state population. For instance, Wood (2008) provides empirical evidence that the imposition of sanctions increases state-sponsored repression and suggests that these sanctions contribute to worsening the humanitarian conditions of the civilian population. Peksen and Drury (2009, 2010) find that the imposition of economic sanctions curtails the political and civil rights of citizens, thereby resulting in deteriorating democratic freedom while Drury and Peksen (2014) highlight the economic vulnerability of women as a result of economic sanctions. Ali and Shah (2000) find that the United Nations (UN) sanctions on Iraq resulted in more than doubling the effect on infant and under-five mortality rates. Garfield and Santana (1997) on the other hand, find that the US sanctions against Cuba contributed to a fall in nutritional value, rising infectious diseases, and violent deaths for the adult and aged population. As a result of these various impacts, different segments of the population may suffer varying degrees of income loss under economic sanctions.

Basically, sanctions involve several actions such as tariffs, export controls, import restrictions, travel bans, freezing assets, reduction or removal of foreign aid and severing of diplomatic relationships. If a combination of these economic embargoes does not induce a change in the behavior

of the political leadership of the target state, then could it be that these political leaders are somehow immune to the negative effects of the economic embargoes? Marinov (2005) argues there are two unequaled costs that the target state must incur – the political costs incurred by the political leaders and the economic costs incurred by the population. However, the distribution of costs associated with sanctions affects the political elites and the ordinary voters or citizens differently. Thus, economic sanctions may have a heterogeneous effect on the income distribution depending on political affiliations and connections of the people. By virtue of political or international connections, the income-reducing effects of the sanction damage can be minimized (Kaempfer and Lowenberg 2007a). Hence, sanctions can affect income distribution in a disproportionate manner from the perspective of the target states. In fact, Neuenkirch and Neumeier (2015b) find that US economic sanctions affect the poor people in the target countries that use the measure of poverty gap, and this can be expected to affect income distribution.

In this paper, we contribute to the existing literature in three ways. First, we draw on established theoretical work to analyze empirically which segments of the population bear the most costs when sanctions are imposed and whether this leads to a more skewed income distribution. Second, we quantify the effects of two main types of sanctions (trade and financial). For trade sanctions, we distinguish between export and import sanctions and various combinations of these sanction types when imposed. Sanctioning states employ different instruments of sanctions against the target states and Hufbauer *et al.* (2007) explain that the economic and political effects of the impact of sanction types differ in several ways. Third, we take into account the duration of the economic sanctions to distinguish their impact (if any) on income inequality.

The rest of the paper proceeds as follows. Section 2 summarizes the theoretical perspective on economic sanctions and income inequality and sets out the hypotheses to be tested. Section 3 details the data and empirical methodology used. Section 4 discusses the results and finally, section 5 concludes.

2. Theoretical Perspectives and Hypotheses Formulation

The potential effect of economic sanctions on income inequality has been discussed in the literature using the Stolper-Samuelson theorem in the trade framework by Cooper (1989), the Harris-Todaro model by Wang (1991), the public choice approach by Kaempfer and Lowenberg (1988), and the micro-foundations approach by Kirshner (1997). Thus, we draw on these studies and other related studies to provide the theoretical underpinning for the empirical analysis in this paper. Cooper (1989) was the first to directly link the impact of sanctions on income inequality within a theoretical trade model, although earlier studies such as Metzler (1949) and Bhagwati (1964) have explained how international trade in general affects division of income within each country by relating it to the rents earned by various factors of production. The explanation of the earlier studies was drawn upon by Cooper (1989) on the basis that sanctions are similar to prohibitive tariffs.

Cooper (1989) argues that in contrast to popular belief, economic theory predicts that the position of capital is likely to be strengthened and not weakened by the imposition of sanctions against target states. According to the Stolper-Samuelson theorem, when sanctions are imposed on imports, it favors the factor used intensively in the import-competing sector as the domestic demand for domestic production of importables increases. Using the Edgeworth box representing capital and labor inputs versus imports and exports, together with the related production possibility curve of imports and exports, Cooper (1989) illustrates this particular case which leads to an increase in the return to capital thereby favoring capitalists; and if politicians are manipulated by capitalists, the effect of sanctions will be to slow down the pace of political change, while making the income distribution more unequal.

More specifically, while an import embargo (restricting imports to target state) allows domestic producers of import-competing goods in target countries to gain compared to producers of exports, the consumers of imports in the target state are, however, adversely affected. But Black and Cooper (1988) highlight the fact that the losses suffered by producers of exports may be partly offset by benefits derived in their role as consumers of exports. At the same time, labor may spend a larger

part of its income on exports and capital owners may operate in both export- and import-competing industries in the target countries, thereby making the final effect on the income of the various groups of people unclear (ibid). Wang (1991), on the other hand, uses the Harris-Todaro model comprising a two-sector model with the production functions and factor-price frontiers of the agricultural and manufacturing sectors to show that export and import embargoes have asymmetrical effects on national income (through the impact of demand affecting wages and employment) and income distribution. All these analyses point to the fact that the impact of sanctions could differ depending on a targeted state's level of trade openness and also on the intensity of labor or capital in the economy. For instance, Black and Cooper (1988) analyze that if domestic exporters use more labor-intensive relative to capital-intensive production process, then labor is expected to suffer more from sanctions compared to the owners of capital.

The public choice approach of Kaempfer and Lowenberg (1988) examines economic sanctions from a different angle, whereby sanctions may be imposed to serve the interest of certain pressure groups within the sender state. These interest groups have different motives as they may enjoy some pecuniary benefits from the imposition of the sanctions, which are essentially specific instruments of protection that regulate goods or factor flows. For example, an embargo on exports of a target country would benefit producers of import-competing goods in the sanctioning country but harm producers of the sanctioning state that use imports from the target state as intermediate inputs. This predicates that sanctions may affect domestic constituents in the target (and sender states) differently in terms of varying degrees of income loss or gain. This may skew the income distribution favorably or unfavorably towards one segment of the target population.

Lastly, the micro-foundations approach argues that sanctions work because they weaken the government directly as well as motivate the most influential groups (such as the military, the middle class, agricultural laborers, big business etc.) to pressurize the government into protecting their own interests (Kirshner, 1997). The governments of target states will need to respond domestically because this pressure may destabilize their rule by creating political costs. In so doing, Escribe-Folch (2012) explains that if the rulers' budget is not strictly constrained, they tend to increase spending towards the core of their political support groups. Thus, sanctions can have dramatic differential effects on various groups within the society (Kirshner, 1997). Hence, our main hypothesis is:

Hypothesis 1. The imposition of economic sanctions exacerbates income inequality in the sanctioned or target states.

The sanctions literature has also discussed the dynamics of adjustment of the effect of longer lasting sanctions when political leaders do not comply in the early phase. The theoretical analysis by Dizaji and van Bergeijk (2013) show that sanctions might be more harmful in the early rather than later phases, as the targets find ways to adjust their economies and thus mitigate the impact of the sanctions over time. However, their assertion is at odds with the notion that sanction damage increases with time as argued by Kaempfer and Lowenberg (2007b). Thus our next hypothesis tests whether there is a linear and monotonic, or non-linear relationship between the duration of sanctions and income inequality.

Hypothesis 2. The detrimental effect of economic sanctions on income inequality diminishes over time or is more severe in the early phase of the sanctions.

Senders of sanctions employ different instruments of sanctions and Hufbauer *et al.* (2007) explain that different types of sanctions would have different effects in several ways. For instance, they state that financial sanctions are more likely to hit the personal pocket of the political elites. However, this could also hit hard at the poor, especially if financial sanctions disrupt financial flows such as remittances (see Adams and Page, 2005). Trade sanctions may produce limited damage compared to financial sanctions since the disruption of financial flows may also disrupt international trade even without an

explicit trade sanction (Hufbauer *et al.*, 2007). In addition, trade controls may be applied to selective products because the Geneva Convention prohibits the ban of essential goods such as food and medicine. Unlike financial sanctions, trade sanctions may be difficult to enforce and thus enable target states to circumvent the ban (*ibid*). Thus, the normative assumption here is that financial sanctions would have a more adverse impact on economic outcomes such as poverty or income inequality relative to trade sanctions (Wood, 2008). Financial sanctions include the interruption of commercial finance, transfer of remittances, access to SWIFT, foreign aid, and other official financial flows while export (import) sanctions refer to the interruption of exports (imports) from (by) the sender to (from) the target. On the basis of these different sanction types, we test the hypothesis of whether any differential effects on income inequality exist when different instruments are employed. Thus, our last hypothesis is:

Hypothesis 3. The impact of financial sanctions on income inequality is more severe than trade sanctions.

The above-mentioned theoretical economic models have all been discussed with various restrictions and assumptions such as only two commodities; two factors of production; under perfect competition, constant cost or technology scenario etc. While these models enable some analyses and predictions, they do not represent the realistic conditions of the world, which are far more complex with changing dynamics over time. Thus, the empirical examination of the hypotheses in this paper lends itself towards a better understanding than pure economic models on these issues. Figure 1 illustrates the sanctioned states and differentiates them in relation to the duration of sanctions.

Figure 1 about here

3. Data and Empirical Strategy

To our knowledge, only two studies have considered the impact of sanctions on incomes of different groups. The first is Porter (1979) who uses the static input-output relationships of eight sectors in a linear programming model on South Africa to estimate the impact of trade and investment sanctions on the incomes of whites and nonwhites, GDP, and employment in various sectors. Not only is the white and nonwhite grouping somewhat narrow and not relevant to the economies of today, but there are also several major concerns¹ about the model noted by Porter (1979) himself. The second study is that of Khan (1988), also on South Africa, who uses multipliers from the Social Accounting Matrix (SAM). His analysis showed that inequality among whites widened more than among blacks. First, the SAM approach can only be used for a single country and results cannot be generalized for other economies. Second, the SAM is a static analytical tool and being a snapshot of the economy, it needs to be continuously updated to be relevant.

The approach considered in this paper is a departure from Porter (1979) and Khan (1988) but is more in line with the models used by several studies on economic sanctions. But first, we discuss the latest edition of the widely-used Economic Sanctions Reconsidered data set by Hufbauer *et al.* (2007) of the Peterson Institute for International Economics. The available data restricts the time period from 1960 to 2008, based on the chosen variables for the empirical model. This data set spans 116 cases of economic sanctions with varied durations imposed by seven principal senders on 68 target states.² We define the main variable of interest, sanctions, as an indicator variable, which takes a

¹These models are only stylized abstractions of the economy they try to represent: sectoral optimization models may not generate explicit outcomes; the structure of the economy may dramatically alter under the pressure of the sanction and this cannot be considered in the model; and that there is a lot of guess work in the estimates.

²The principal senders are the EU, France, the Netherlands, Russia, the United Kingdom, the USA, and the UN. The list of sanctioned states is provided in Appendix 1. Apart from the principal senders, there were also other supporting senders in the sanctions cases, all of which have been included in the analysis. However, we do not differentiate amongst the

value one for the years when any of the principal senders imposed sanctions on the target states, and zero otherwise. As the sanction variable is a dummy, the categories of sanctions are mutually exclusive and in cases where sanctions have been imposed by more than one principal sender at the same time, we combine and classify such cases as multiple senders. Thus, the sanction cases are fully separable and not partially overlapping.

To examine whether the duration of sanctions matters, we define the duration of the economic sanctions by the number of years. To test for an inverted U-shaped impact of sanctions on income inequality in hypothesis 2, we include the square term of the duration of sanctions variable. A natural extension in the sanctions literature is to differentiate between the different degrees of sanctions (see Hufbauer *et al.* (2007)). This is done by including the cost of sanctions as a percentage of GDP and in so doing, we also control for the severity of the sanctions, whether it be mild, moderate, or severe as identified by Wood (2008).

The dependent variable of income inequality is measured using the Gini coefficient from two different data sets for robustness. Although the Gini index is a widely-used measure of income distribution, there are challenges in its computation based on the available data. For instance, should an income- or a consumption-based definition be used for a more accurate measure of welfare? What is the extent of coverage of these measures and which consumption or income types are to be used? To circumvent some of these concerns and as a robustness measure, we use measures of Gini coefficients obtained from the Standardized World Income Inequality Data (SWIID) version 5.1 of Solt (2014), and the United Nation University's World Institute for Development Economics Research (UNU-WIDER 2014). However, SWIID is the preferred source of income inequality measure as a large set of conversion factors for the Gini coefficients based on different income or consumption concepts was used to obtain comparable estimates of Gini coefficients based on gross income and net income. The WIDER data is used to cross-check the results. This database is less preferred as the reported Gini coefficient was based on consumption/expenditure or income/earnings and thus makes it less comparable, unlike the SWIID.³ We use the Gini coefficients based on net income from the SWIID, which has a high correlation of 0.8 with the WIDER data. Nevertheless, an advantage of the WIDER data is that it provides information on the income shares of populations belonging to various income quintiles. If economic sanctions do affect income inequality, it would be interesting to identify which segments of the population benefit, lose, or are not affected. Thus, we consider five income quintiles as the dependent variables.

In order to examine the effect of sanctions on income inequality, we control for political factors identified in the literature that might affect income inequality. One such factor is democracy, where at a simple theoretical level, democracy is supposed to maximize voters' joint interests and ensure that the political elite and leaders are accountable to the people. We rely on the dichotomous Democracy and Dictatorship database developed by Cheibub *et al.* (2010) who employed a minimalist approach to classify political regimes either as a democracy or a dictatorship. Studies on the effect of democracy on income distribution are however mixed (see Timmons, 2010; Chong *et al.*, 2009). As a number of target states had experienced some form of conflict, we use data from Marshall and Marshall (2014) on the counts of coup d'état as a related measure for internal conflict. In addition, we control for interstate conflict using a dummy variable, sourced from the Correlates of Wars data. Lastly, we include a measure of political repression and human rights practices by Fariss (2014), who developed a latent score that measures the level of repression and respect for physical integrity rights.

A set of economic factors are also controlled for. These include GDP per capita and its squared term which underlies the Kuznets hypothesis that GDP and income inequality have an inverted U-shaped relationship. We use national accounts data from the Penn World Tables version 8.0 (Feenstra *et al.* 2013) to obtain data on GDP per capita as well as government consumption as a

(Contd.) _____

sanctioning entities as the main focus of the paper is on whether the imposition of sanctions affects income inequality irrespective of who the sanctioning entities are.

³ Deininger and Squire (1996, 1998) note that Gini coefficients are generally about six or seven points larger when based on income compared to consumption data.

share of GDP. From this same source, we obtain data on trade openness measured by the sum of exports and imports as a share of GDP, the price of capital goods relative to overall price level as a proxy for investment price, and average years of education to proxy the human capital. Table 1 provides the summary statistics of the variables in the model.

Table 1 about here

In terms of the empirical strategy, the baseline equation (1) is estimated using the fixed effect estimator combined with Newey-West heteroskedasticity- and autocorrelation-consistent standard errors. The inclusion of country fixed effects (α_i) accounts for unobserved time-invariant heterogeneity in countries, such as social and cultural values, which if excluded can lead to the breakdown of the exogeneity condition necessary for obtaining consistent and unbiased estimates. A full set of time period dummies (α_t) is included to account for any global trends and economic events. We also include the GDP per capita (GDPpc) and its square term to test Kuznets relationship while X_{it} captures the vector of controlling variables outlined above and ϵ_{it} is the error term.

$$Gini_{it} = \alpha_0 + \alpha_i + \alpha_t + \beta \ln(GDP_pc_{it}) + \gamma (\ln GDPpc_{it})^2 + \delta Sanction_{it} + \rho X_{it} + \epsilon_{it} \quad (1)$$

In terms of econometric issues, first, there are no serious concerns about omitted variable bias after the inclusion of the fixed effects and an exhaustive set of time-varying political and economic control variables. Second, in relation to reverse causality from income inequality to economic sanctions, there is no theoretical explanation for such a relationship to exist.⁴ It may however be argued that more unequal societies are likely to have more incidences of human rights violations (which is assumed to be one of the main reasons for the imposition of sanctions). But the empirical data does not support this assumption as we find a low positive correlation between income inequality and the human rights violations score. Nevertheless, we conduct three robustness checks for possible endogeneity. First, by lagging all the variables on the right-hand side of equation (1) and second, by employing a restricted window for the control sample and lastly, by using the generalized method of moments (GMM) to deal with any possible endogeneity similar to the approach used by Acemoglu *et al.* (2013). This method uses the lagged values of the possible endogenous variables as instruments and also corrects for mean-reverting dynamics or path dependence that often characterizes income inequality regressions (ibid).

4. Results and Discussion

Table 2 reports the main empirical results testing the first hypothesis that economic sanctions may exacerbate income distribution within the target states. We find a strong positive significant effect of economic sanctions on income inequality, where on average income inequality is greater by 1.5 to 1.7 points in countries and years in which economic sanctions were imposed. The result that imposing economic sanctions worsens and widens the income distribution gap within a targeted country is robust to two different sources of data on Gini coefficient.

Taking into account that sanction episodes vary in terms of duration, we found that income distribution increases by a point of 0.26 if the duration of the sanction increases by one year. However, we fail to find a diminishing impact of sanctions on income inequality as the coefficient for the square terms although negative, is not statistically significant. Alternatively, when we differentiate the duration by the use of dummy variables, we find that sanctions have a more adverse effect on income inequality in target states in which the duration of sanctions spans a longer period. This confirms Kaempfer and Lowenberg's (2007b) theoretical analysis that the adverse impact of economic sanctions on target states would increase over time.

⁴ Neither is this supported from the empirical point of view because some countries with the highest Gini coefficient such as Namibia, Seychelles and Comoros have never sanctions imposed on them according to the PIIE database.

Table 2 about here

Turning to the control variables, the results show an inverted U-shape relationship between inequality and GDP per capita, indicating the presence of the Kuznets relationship. This is confirmed by the significance of a joint F-test (on the coefficient of GDP per capita and its squared term) in the last row of all the reported tables. Among the control variables, human capital measured by years of education has the most dramatic impact in reducing income inequality obtained from SWIID but not from WIDER. The negative and strongly significant effect of education on the Gini coefficient from SWIID is in line with the conventional income inequality literature. In that, all things being equal, a higher level of education would be expected to reduce income inequality as a greater proportion of the population who acquire better and more skills become more productive and earn higher wages.

With the relative price of investment, this has a positive effect on income inequality. Although this may not be consistent with the Stolper-Samuelson theorem, it could be a probable occurrence due to wage repression in an economy. It is possible that the use of low-skilled labor to replace capital may not guarantee better wages for labor when there is a high level of unemployment, or when there are instances of labor exploitation in the target states. In fact, Wood (2008) confirms the existence of such labor exploitation when he found that the imposition of sanctions increased state-led repression and human right abuses in sanctioned states. Specifically, Acemoglu *et al.* (2013) highlight how the ruling elites in sanctioned South Africa enacted government policies to repress the wages of the poor and black Africans.

The coefficient of democracy is negative and significant using SWIID, which is consistent with the theoretical expectation of increased re-distributional tendencies and reduced income inequality. In that, a poor voter is expected to vote in favor of government policies on redistribution. Similarly, we only find a significant effect of human rights condition on the SWIID income inequality measure. For the remaining control variables of conflict, trade openness, and government consumption, there exists no significant relationship between them and income inequality measures.

In Table 3, we show the heterogeneous effect of sanctions on different segments of the population.⁵ Sanctions have a negative effect on three of the lowest income groups by reducing their income shares between 0.3% to 0.5% points but there is a positive effect of 1.6% point increase in the income share of the population in the highest income group. A noticeable effect is that the imposition of sanctions increases the share of the income favorably towards the highest income quintile and unfavorably towards those in the lowest income quintiles. The heterogeneous effect of sanctions on income inequality can thus be said to lead to a more skewed distribution within the targeted states.

Tables 3 and 4 about here

There are plausible explanations as to why different segments of the population may suffer varying income loss or gain during the period of sanctions. First, the sanctioned states may become isolated and this may enable them to veil their economic and repressive policies from the international community. Second, without any international watchdog, the isolation pushes the government to be responsible and to cater to the needs of the ‘selectorate’ instead of the population at large. The political/economic elites may use the period of isolation to extract a substantial amount of sanction rents. Kaempfer and Lowenberg (2007a) cite the case of Slobodan Milošević of Serbia, whose regime took advantage of the isolation that was the result of sanctions to appropriate large sanctions rents by creating state-run monopolies and centralizing the distribution of goods. Third, international organizations’ endeavors to reach out to the oppressed and poor in sanctioned states are sometimes

⁵ As indicated in Bjørnskov (2010), since the income quintiles add up to 100, the error terms of the five equations would be correlated. In such a case, the use of seemingly unrelated regression (SUR) is more efficient. However, Wooldridge (2010) explains that the SUR estimates would not differ algebraically when the same regressors are used. Thus SUR was not undertaken as the same regressors were used in all the columns in Table 3.

constrained because the political elites may see them as appendages of the sanctioning states who may engage in espionage activities. Additionally, the activities of the aid agencies to support the poor and relatives of political prisoners are fraught with rent-seeking and corruption.⁶

In Table 4, we test the third hypothesis and find that the results confirm that the use of different types of sanction instruments produce statistically significant differential impacts on income distribution.⁷ Financial sanctions have a positive impact and skew the income distribution to make it more uneven. With financial sanctions, the most common instrument is the interruption of official development assistance and financial flows (Hufbauer *et al.* 2007). The cut in financial flows would have a direct consequence on the poor if most target states are developing countries that rely heavily on official development assistance or personal remittances for those in the lowest income group.

Unlike financial sanctions, trade sanctions have a negative impact by reducing income inequality when they are used alone. Although trade sanctions are effective in reducing the income share of the population in the highest income segment, only import sanctions are significant in reducing income inequality. This is consistent with Cooper's (1989) argument that the impact of import sanctions would fall heavily on owners of capital in the sanctioned states (who control and benefit substantially from the exportable sector and are in the highest income groups) as the share of income in the highest quintile reduces significantly. Similarly, the import bans do not have any impact on the share of income in the lowest quintile. This shows that the overall income inequality-reducing effect may be a result of the deteriorating effect on the income share of the richest quintile.

For export sanctions, Cooper (1989) explains that this would mean a cut in investment capital from the advanced sanctioning states and the resort to the use of low-skilled labor in the production process in the sanctioned states. In terms of its effect, although the income share of the highest quintile reduces, the income share of those in the lowest income quintiles does not increase significantly and thus, low-skilled labor does not benefit. This, however, does not translate into a more even income distribution because, although the effect is negative on income inequality, it is not statistically significant. Combining trade sanctions with financial sanctions induces the most adverse effect on income distribution. Since financial sanctions involve the stop of financial flows (such as remittances or bank transfers), combining this with trade embargoes produces the most adverse effect. Although this economic cost may affect a good majority of the population, the political/economic elites may find ways to insulate themselves from the negative consequences of the sanctions. Thus, the ordinary and innocent citizens may be left to face the suffering caused by the sanctions without any social protection measures.⁸

Tables 5 and 6 about here

A check on the robustness of the impact of economic sanctions on income inequality was undertaken by using the lagged covariates, restricted window of control sample and GMM. We employed a restricted window of three years around the sanction periods. This is because, the imposition of sanctions might be a consequence of an environment that is considered adverse by the sender. In other words, the effect captured by the sanctions dummy might be the direct negative effect of the sanctioned government's own policies rather than the true effect of the sanctions. To minimize this potential endogeneity problem, instead of the full sample period the control sample is reduced to consider a window of three years around the sanction period where factors related to the institutional, political, and social environment are likely to be similar and hence comparable (cf. Neuenkirch and

⁶ For instance, the US Government Accountability Office (GAO) reports on vast corruption in administering assistance to the poor and the relatives of political prisoners in Cuba (GAO, 2006).

⁷ Different instruments used in the sanction cases do not overlap as each type or a combination of them is separately identified with a different dummy variable. The differences in the impact of different instruments of sanctions on income inequality are statistically significant.

⁸ Phimister and Raftopoulos (2007) highlight the opulence of President Mugabe of Zimbabwe, even in the face of sanctions, spending extravagantly on his birthdays while the civilian population is burdened with an exorbitant cost of living.

Neumeier, 2015a).⁹ The results for this are seen in column 3 of Table 5. For the GMM method, we follow the approach of Acemoglu *et al.* (2013) where the maximum number of lags is set to five to restrict the number of moments. The estimations in Table 5 were done with sanctions treated as exogenous in column 1 and endogenous in column 2. The GMM coefficient for the economic sanction variable is reported with the tests of over-identification (Hansen J test) and autocorrelation showing no sign of misspecification. The results emphasized the adverse effect of sanctions on income distribution. Although the coefficients become less pronounced, they remain positive and statistically significant when we specify the sanction variable as either exogenous or endogenous.

To further check on the robustness of the results obtained, we use different sub-samples in Table 6 to account for low and high trade-opened economies, low and high labor-abundant economies, as well as autocratic and democratic countries. Countries are classified in different years as low (high) when its trade openness measure or the share of employed labor in the population is less (greater) than the 50th percentile for all countries in each year. Columns 1 and 2 in Table 6 indicate that the impact of economic sanctions is more pronounced in low trade-exposed sanctioned states compared to high trade-exposed ones. Thus, it appears that the impact on income inequality is less severe for sanctioned states that are more integrated into the world trading system. This is possibly because more trade exposure enables an economy to source from other non-sanctioning states and circumvents some of the negative effects. In addition, the impact of sanctions is more harmful in sanctioned states with a high share of employed labor in the population. This implies that developing countries are more adversely affected than developed countries as the former are often characterized by a high labor-capital ratio compared to the latter. Lastly, from the perspective of the political regime, the effect of sanctions on income inequality is more debilitating for autocratic regimes compared to democracies as the autocratic leaders have the incentives to allocate the scarce resources to their core supporters. These results on the robustness measure are useful in providing a nuance to the underlying mechanisms through which the effect of the sanctions could exacerbate income distribution.

5. Conclusion

The theoretical relationship expressed by the literature in relation to the impact of economic sanctions on income inequality is addressed for the first time by the empirical research in this paper. This is an important issue on two fronts. First, economic sanctions are a frequently used instrument to bring about change in the target states and there is an ongoing research interest in the different impacts on the economy. Second, time and again there has been a global call to even up an economy's income inequality, as seen in the reports of various international organizations. The established link between income inequality and economic sanctions, in particular, the adversarial effect of sanctions on income distribution, sheds light on the effects of sanctions against target economies going beyond the intended political goal and setting the target states backwards more than is intended. Even if the affected economies return to their trajectory of intended economic growth once sanctions are lifted, addressing the widened income inequality becomes an additional burden, which may slow down efforts towards recovery or result in less success.

Apart from highlighting that recovery from the economic costs of imposed sanctions has been underestimated, this paper provides strong empirical evidence that the imposition of sanctions has unintended consequences for the civilian population and may affect the ordinary people more than the sanctioned country's leaders. Thus, senders need to be made aware of their actions having an impact that is unintended or unfairly harmful. The target states, on the other hand, should be cautioned about ignoring the effects on income distribution that are a result of the imposition of sanctions, should they take too long to comply with the demands of the sanctioning states. Our empirical results suggest that not only does the imposition of sanctions skew income distribution in an uneven manner but that the effects of various types of instruments employed by the sanctioning states have varying consequences for the target states. While we find evidence that financial sanctions and a combination of financial and trade sanctions produce the greatest harm in widening income inequality,

⁹ We thank the referee for raising this point and suggesting the use of a three year window.

using trade sanctions (especially import bans) alone and not in combination with other sanction types can significantly reduce the income share of the population in the richest quintile of the target states. Lastly, our results also show that the impact of sanctions is more severe on income equality when sanctions span a longer duration.

In light of these results, future research identifying the channels through which the imposition of sanctions could affect the civilian population adversely would be important; this could help to devise mechanisms to avoid or minimize the unintended consequences. Based on the results of the adverse impact of financial sanctions on income inequality, further research looking at the differential impact (if any) of various types of financial sanctions related to financial aid, capital flows, bank lending, access to SWIFT, etc. would produce a better understanding. The lack of data on the type of financial sanctions imposed has prevented the examination of this issue. It thus remains to be seen if different financial instruments will affect different segments of the society in a myriad of diverse ways.

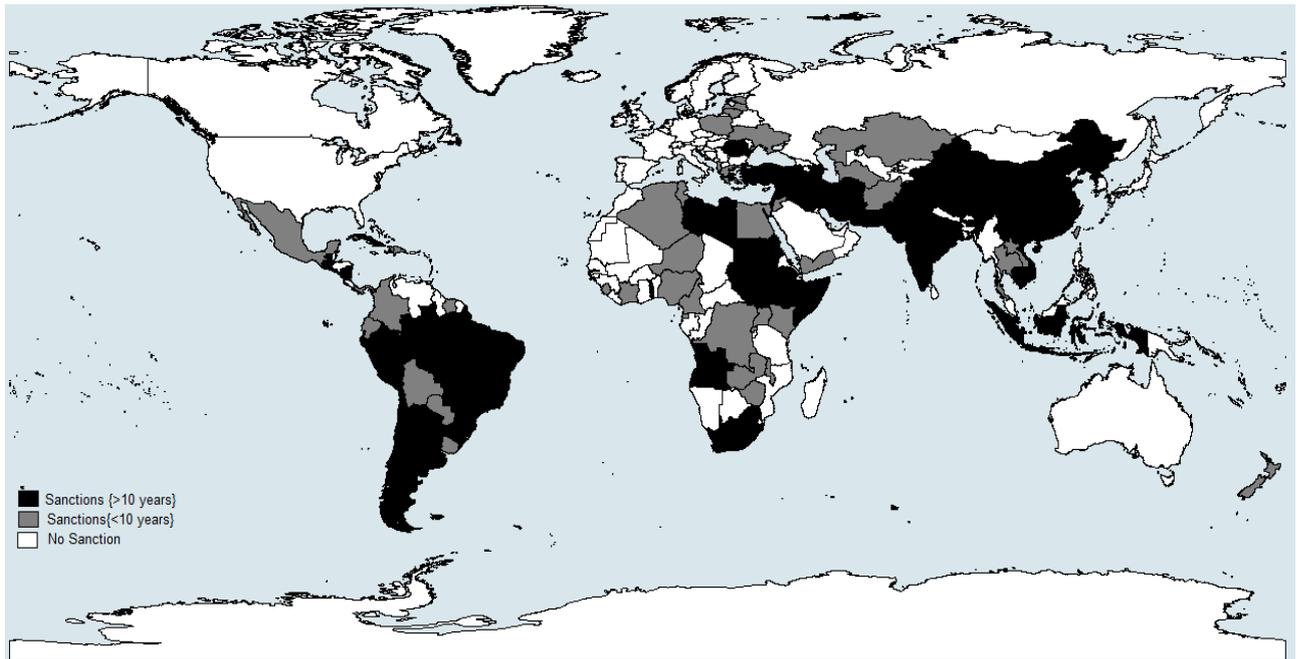
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Figure 1: Map showing the targeted states with respect to the duration of sanctions



Note: The legends differentiate the duration of sanction, the darker the color, the longer the duration

Table 1: Descriptive statistics

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
Economic sanctions	883	0.217	0.413	0	1
Financial sanctions	183	0.311	0.464	0	1
Export sanctions	183	0.033	0.179	0	1
Import sanctions	183	0.005	0.074	0	1
Duration of sanction (years)	183	6.557	5.508	1	24
Gini index (WIDER)	883	42.286	9.897	20.100	72.450
Gini index (SWIID)	883	40.644	9.248	20.306	67.822
1st Income quintile (Q1)	706	5.596	2.135	1.070	11.010
2nd Income quintile (Q2)	706	9.919	2.483	2.030	15.530
3rd Income quintile (Q3)	706	14.314	2.372	6.351	19.700
4th Income quintile (Q4)	706	21.075	2.112	12.499	31.250
5th Income quintile (Q5)	706	49.149	8.378	32.460	76.688
Log GDP per capita	863	8.398	0.972	5.094	10.223
Trade openness ratio	863	0.450	1.075	5.02X 10 ⁻⁶	20.775
Government consumption as % of GDP	863	0.195	0.108	0.020	1.559
Sanction cost as % of GDP	830	1.311	2.628	-6.303	19.801
Human capital (years of education)	832	2.268	0.566	1.052	3.495
Democracy index	883	0.583	0.493	0	1
Internal conflict (number of coups)	883	0.043	0.224	0	2
Interstate conflict	883	0.023	0.149	0	1
Human rights score	883	-0.106	1.284	-2.894	3.836
Relative price of investment	863	0.552	0.568	0.035	5.442

Table 2: Impact of economic sanctions on the Gini-coefficient

	(1)	(2)	(3)	(4)	(5)
Source of Gini Co-efficient:	WIDER	SWIID	SWIID	SWIID	SWIID
Log GDP per capita	21.79*** (7.672)	10.01* (6.033)	6.945 (5.443)	6.999 (5.453)	6.916 (5.390)
(Log GDP per capita)²	-1.058** (0.427)	-0.368 (0.330)	-0.193 (0.302)	-0.194 (0.303)	-0.192 (0.300)
Trade openness	-0.262 (0.335)	-0.525** (0.243)	-0.504** (0.246)	-0.516** (0.245)	-0.482* (0.245)
Government consumption	3.990 (3.732)	5.765* (2.958)	4.845 (2.998)	4.940* (2.985)	4.590 (2.981)
Human capital	3.038 (2.831)	-7.935*** (1.445)	-8.839*** (1.429)	-8.587*** (1.426)	-8.857*** (1.423)
Investment price	2.558** (1.209)	2.153** (0.896)	2.042** (0.884)	2.049** (0.889)	2.116** (0.877)
Sanction cost as % of GDP	-0.0728 (0.265)	-0.0600 (0.110)	-0.0880 (0.129)	-0.0760 (0.126)	-0.0548 (0.124)
Democracy	-0.237 (0.876)	-1.720*** (0.633)	-1.754*** (0.652)	-1.682** (0.654)	-1.817*** (0.649)
Internal conflict (number of coups)	0.0363 (0.965)	-0.507 (0.584)	-0.424 (0.580)	-0.403 (0.579)	-0.580 (0.572)
Interstate conflict	-1.426 (1.263)	-1.022 (0.815)	-0.263 (0.776)	-0.264 (0.774)	-0.607 (0.778)
Human rights score	0.464 (0.429)	0.689** (0.316)	0.542* (0.317)	0.572* (0.324)	0.640** (0.320)
Sanction	1.504** (0.614)	1.725*** (0.514)			
Duration of sanction			0.261*** (0.0815)	0.376*** (0.140)	
(Duration of sanction)²				-0.00719 (0.0101)	
Duration of sanction (<10 years)					1.126** (0.463)
Duration of sanction (>10 years)					4.670*** (1.302)
Constant	-81.25** (34.90)	-9.866 (28.09)	6.058 (24.65)	5.038 (24.56)	6.335 (24.27)
Observations	779	779	779	779	799
Adjusted R square	0.832	0.881	0.881	0.882	0.880
Kuznets F-test	7.493***	10.81***	11.76***	12.24***	11.91***
Joint F-test (duration of sanction)	-	-	-	9.005***	-

Notes: Heteroskedasticity- and autocorrelation-consistent standard errors in parentheses.

Time and country fixed effects are included.

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Impact of economic sanctions on the income quintiles

	(1)	(2)	(3)	(4)	(5)
Income quintiles:	Q1	Q2	Q3	Q4	Q5
Log GDP per capita	1.348 (2.097)	-2.594 (1.999)	-4.882*** (1.781)	-1.925 (1.953)	11.46* (6.424)
(Log GDP per capita)²	-0.132 (0.119)	0.0972 (0.114)	0.251** (0.102)	0.118 (0.109)	-0.560 (0.362)
Trade openness	0.227** (0.0904)	0.0439 (0.0937)	-0.0458 (0.0840)	-0.0519 (0.0946)	-0.161 (0.301)
Government consumption	-1.687* (0.991)	-0.544 (1.006)	-0.758 (0.931)	-0.153 (0.980)	2.951 (3.276)
Human capital	1.783*** (0.672)	2.467*** (0.629)	2.087*** (0.583)	1.784*** (0.636)	-4.895** (2.008)
Investment price	-0.619** (0.263)	-0.332 (0.298)	-0.0395 (0.266)	-0.126 (0.283)	1.120 (0.952)
Sanction cost as % of GDP	-0.00782 (0.0468)	-0.0214 (0.0496)	-0.0209 (0.0555)	0.0284 (0.0441)	-0.00315 (0.194)
Democracy	-0.0458 (0.203)	-0.0119 (0.205)	0.121 (0.210)	0.342 (0.266)	-0.261 (0.730)
Internal conflict (number of coups)	-0.0690 (0.238)	-0.104 (0.309)	-0.319 (0.343)	-0.763** (0.383)	1.061 (1.098)
Interstate conflict	-0.00187 (0.279)	0.161 (0.314)	0.331 (0.290)	0.576 (0.557)	-1.060 (1.079)
Human rights score	-0.191** (0.0944)	-0.131 (0.0973)	-0.176* (0.0957)	-0.169 (0.127)	0.663** (0.328)
Sanction	-0.481*** (0.151)	-0.439*** (0.159)	-0.341** (0.155)	-0.264 (0.211)	1.594*** (0.543)
Constant	3.387 (9.493)	22.35** (8.928)	35.61*** (7.893)	26.48*** (8.874)	-7.494 (29.18)
Observations	634	634	634	634	634
Adjusted R-square	0.796	0.832	0.821	0.677	0.826
Kuznets F-test	11.33***	9.245***	6.166***	0.799	3.570**

Notes: Heteroskedasticity- and autocorrelation-consistent standard errors in parentheses.

Time and country fixed effects are included.

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Impact of different types of economic sanctions on income inequality

	(1)	(2)	(3)	(4)
Income inequality:	SWIID	Q1	Q3	Q5
Log GDP per capita	11.87*	1.178	-5.527***	13.66**
	(6.133)	(2.195)	(1.906)	(6.786)
(Log GDP per capita)²	-0.471	-0.120	0.290***	-0.698*
	(0.336)	(0.124)	(0.108)	(0.382)
Trade openness	-0.430*	0.206**	-0.0743	-0.0461
	(0.244)	(0.0899)	(0.0837)	(0.296)
Government consumption	5.305*	-1.542	-0.609	2.183
	(2.951)	(0.979)	(0.924)	(3.225)
Human capital	-8.717***	1.941***	2.276***	-5.625***
	(1.473)	(0.699)	(0.605)	(2.075)
Investment price	2.152**	-0.561**	-0.0509	1.157
	(0.914)	(0.276)	(0.276)	(1.019)
Sanction cost as % of GDP	-0.0992	-0.00867	-0.0150	-0.0162
	(0.107)	(0.0469)	(0.0554)	(0.191)
Democracy	-1.556**	-0.0699	0.0651	-0.0223
	(0.643)	(0.207)	(0.213)	(0.734)
Internal conflict (number of coups)	-0.587	-0.0311	-0.276	0.870
	(0.599)	(0.246)	(0.351)	(1.126)
Interstate conflict	-1.168	0.0534	0.347	-1.242
	(0.802)	(0.297)	(0.304)	(1.110)
Human rights score	0.650**	-0.183*	-0.159*	0.586*
	(0.313)	(0.0949)	(0.0940)	(0.318)
Financial sanctions	1.780**	-0.344	-0.454	1.902*
	(0.767)	(0.216)	(0.300)	(1.021)
Export sanctions	-0.973	0.216	1.034	-4.992*
	(1.395)	(0.449)	(0.825)	(2.741)
Import sanctions	-2.762***	0.0425	1.096***	-3.270***
	(0.846)	(0.347)	(0.276)	(1.120)
Financial and import sanctions	4.385***	-1.052**	-1.170**	3.946**
	(1.369)	(0.484)	(0.518)	(1.866)
Financial and export sanctions	1.383	-0.717**	-0.408*	2.258**
	(0.870)	(0.286)	(0.239)	(0.875)
Export and import sanctions	-0.203	-0.0598	0.119	-0.0443
	(0.992)	(0.332)	(0.360)	(1.140)
Financial, import and export sanctions	2.908***	-0.564	-0.398	1.760*
	(0.961)	(0.354)	(0.257)	(1.001)
Constant	-16.38	3.608	37.83***	-14.49
	(28.41)	(9.903)	(8.428)	(30.62)
Observations	779	634	634	634
Adjusted R-square	0.877	0.796	0.833	0.823
Kuznets F-test	11.15***	10.28***	5.947***	3.400**

Notes: Heteroskedasticity- and autocorrelation-consistent standard errors in parentheses.

Time and country fixed effects included.

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Robustness analysis using GMM and control sample

Empirical method:	(1)	(2)	(3)	(4)	(5)
	Lagging all covariates		Restricted control	GMM	
Source of Income inequality:	WIDER	SWIID	SWIID	SWIID	SWIID
Economic sanctions	1.351** (0.651)	1.551*** (0.565)	1.214** (0.513)	0.809*** (0.234)	0.558*** (0.08)
Sample size	475	475	160	231	231
P-value for Hansen J test	-	-	-	0.126	0.306
P-value for first-order auto-correlation test	-	-	-	0.003	0.011
P-value for second-order auto-correlation test	-	-	-	0.211	0.187
Covariates treated as an endogenous variable	-	-	-	No	Yes

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

In column (3) we restrict the control sample to a three year window before and after the imposition of the sanctions.

All controls, time and fixed effects are included.

Table 6: Robustness analysis using sub-samples on the basis of trade openness, labor-abundance, and political regimes

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
SWIID Gini index	Low-trade exposed countries	High-trade exposed countries	Low share of labor employment	High share of labor employment	Autocratic political regime	Democratic political regime
Economic sanctions	1.867*** (0.704)	0.396 (0.625)	1.126* (0.594)	2.898*** (0.719)	3.924*** (0.727)	-0.322 (0.774)
Sample size	394	363	382	378	317	462
R-squared	0.848	0.927	0.895	0.883	0.880	0.880
Kuznets F-test statistic	8.847***	1.671*	1.210	4.486**	3.244**	2.543**

Notes: Heteroskedasticity- and autocorrelation-consistent standard errors in parentheses

All controls, time and country fixed effects are included.

*** p<0.01, ** p<0.05, * p<0.1.

Appendix 1 List of Sanctioned States

Count	Sanctioned States	Count	Sanctioned States
1	Afghanistan	35	Latvia
2	Albania	36	Lebanon
3	Algeria	37	Lithuania
4	Angola	38	Malawi
5	Argentina	39	Mexico
6	Azerbaijan	40	New Zealand
7	Bolivia	41	Nicaragua
8	Brazil	42	Niger
9	Cambodia	43	Nigeria
10	Cameroon	44	Pakistan
11	Chile	45	Panama
12	China	46	Paraguay
13	Colombia	47	Peru
14	Cote D'Ivoire	48	Poland
15	Cuba	49	Rwanda
16	DR Congo	50	Sierra Leone
17	Dominican Republic	51	Somalia
18	Ecuador	52	South Africa
19	Egypt	53	Sudan
20	El Salvador	54	Suriname
21	Estonia	55	Syria
22	Ethiopia	56	Taiwan
23	Gambia	57	Thailand
24	Greece	58	Togo
25	Guatemala	59	Tunisia
26	Haiti	60	Turkey
27	India	61	Turkmenistan
28	Indonesia	62	Uganda
29	Iran	63	Ukraine
30	Israel	64	Uruguay
31	Jordan	65	Vietnam
32	Kazakhstan	66	Yemen
33	Kenya	67	Zambia
34	Lao	68	Zimbabwe
