



WHO BEARS THE COST OF ECONOMIC SANCTIONS? EVIDENCE ON POVERTY IN TARGETED COUNTRIES

Malika Ali¹, Dr. Muhammad Ayaz², Dr. Shoukat Ali³ & Muhammad Asghar⁴

¹University of Palermo Italy & Sardar Bahadur Khan Women's University Quetta.

Email: malika.ali0108@gmail.com

²Head of Department, Department of Economics, University of Balochistan Quetta. Email: ayaznasar@gmail.com

³Lecturer, Department of Political Science University of Balochistan, Quetta. Email: Shoukattareen@gmail.com

⁴Assistant Professor, Department of Economics and Business Administration, University of Layyah.

Email: masghar@ul.edu.pk

KEYWORDS	ABSTRACT
Economic Sanctions, Poverty, Fixed effect, Natural Resource, Bilateral trade	Economic sanctions are commonly used as tool of foreign policy to exert pressure on targeted governments and amend their political behaviour. However, concerns persist regarding their unintended socioeconomic consequences, particularly for vulnerable populations. This study examines the nexus between U.S. economic sanctions and poverty in targeted states, while exploring whether this association varies according to countries' natural resource endowment and bilateral trade dependence on the United States. Using an unbalanced panel of 51 targeted states over the period 1975–2012, the study employs fixed-effects model to evaluate the impact of economic sanctions on both the incidence and depth of poverty. Our findings are threefold: first, economic sanctions affect poor class by greater extent as compared to that of rich, resulting in a greater rise of poverty in the sanctioned states. Second, sanctioned states' natural resource endowment plays a moderating role that allays the impact of economic sanctions on the depth and incidence of poverty in the sanctioned states. Third, in contrast, stronger bilateral trade linkages with the US intensify the adverse effects of sanctions, reflecting greater economic vulnerability to interruptions in established trade affairs. These findings suggest that the consequences of US economic sanctions outspread beyond their intended political targets and may disproportionately affect economically vulnerable populations. The study underscores the importance of considering country-specific economic structures when designing sanctions and calls for greater attention to their potential poverty consequences.
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Corresponding Author	
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Introduction

Economic sanctions have long been adopted as an instrument of foreign policy by states. Its history can be traced back the 432 BC, when Athens imposed ban on travel and trade with Megara. In the recent period, especially after the end of Second World War in 1945, sanctions have been frequently used as part of state policy with a purpose to change the behavior of other states without confronting them militarily. Sanctions normally comprise of restrictions on trade, investment, foreign aid, financial restrictions and diplomatic relations which one or a group of states impose on a target state. They are generally defended as responses to actions perceived as threats to peace and security of the world including terrorism, human rights violations, political repression and violations of state sovereignty (Neuenkirch & Neumeier, 2014).

Sanctions are imposed unilaterally by one state or through international organizations like the UN. In modern era the United States of America has appeared to be the single most active user of economic sanctions. Pape (1998) terms economic sanctions as the “American way of war,” and highlights their role as a substitute to direct military confrontation. Sanctions can be categorized as mild, moderate, and comprehensive, depending on their scope. Mild sanctions mostly comprise of restrictions on aid, loans, and selected goods, while moderate sanctions are intended to target trade and investment. Comprehensive sanctions involve broad restrictions on economic activities and are usually associated with the most blatant penalties (Wood, 2008).

Although economic sanctions are repeatedly presented as a compassionate substitute to armed conflicts, their usefulness and humanitarian implications continue to be highly questioned. Research shows that sanctions generally do not get their intended objectives and impose significant costs on civilian populations. Hufbauer and Schott (1985) witnessed that despite the growing use of sanctions since 1950, their success rate remained relatively low, with less than one-third of cases accomplishing their indicated aims after 1973. Likewise, Pape (1998) maintained that sanctions applied on Iraq after 1990 produced more humanitarian losses than those caused by the Gulf War itself, which indicate damaging social costs inflicted by economic oppression.

An increasing body of literature indicates that sanctions excessively affect ordinary citizens rather than the political elites, the real target. Restrictions on trade, financial flows and investment decrease opportunities of employment, give rise to inflation, weaken public services and lower life standards. As a result, poverty increases due to the economic burden on the vulnerable groups of society. However, the impact of economic sanctions is not alike across all cases. Some states have exhibited resilience to the perils of external restrictions. For example, Cuba, avoided the effects of sanctions imposed by the US by building cooperative economic and political relations with the Soviet Union and introducing economic reforms at home (Coleman, 2001). Similarly, Iran avoided the negative impacts of US sanctions imposed during 2006 and 2011 period by diverting a significant share of its exports toward markets of other countries, which is described as “sanction-busting” phenomenon (Haidar, 2017). These examples suggest that the impacts of economic sanctions are linked with domestic capacities, foreign partnerships, and economic structures of each country.

Specifically, wealth of natural resource and international trade connections are important in this regard. Resource-rich countries may be in a better position to resist external economic pressure caused by sanctions because revenues generated from natural resources can compensate for losses incurred by these sanctions. Likewise, trade relationships of a state influence the degree of its vulnerability to sanctions. Those states which are mainly dependent for trade on the sanctioning state may feel more severe economic distractions when sanctions are imposed on them. The effects of sanctions have extensively been examined in the literature on economic growth, public health, political stability and human rights. Nevertheless, the relationship between economic sanctions and poverty has been less systematically studied. The findings of existing studies indicate that sanctions negatively affect poor segment of society due to less employment opportunities, falling incomes, high inflation rate, and deteriorated public services. However, the degree to which these effects vary according to availability of natural resource wealth and dependency on trade with sanctioning state remains inadequately comprehended.

This study contributes to the literature in three ways. First, it provides cross-country evidence on the relationship between U.S. economic sanctions and two dimensions of poverty: incidence and depth. Second, it moves beyond estimating an average sanctions effect by examining whether natural resource endowments condition the vulnerability of target economies. Third, it investigates whether pre-existing bilateral trade dependence on the United States amplifies the poverty consequences of sanctions.

Literature Review

Economic sanctions is a widely investigated instruments of international political and economic oppression. The increasing use of economic sanctions in international relations by the major states and international organizations has produced huge literature investigating their economic costs, humanitarian consequences, effectiveness and political consequences. The intentions behind imposing sanctions are generally meant to change the behavior of target governments, but studies show that their effects are being felt by the ordinary citizens more than the political elites and the men in authority. The literature related to this scholarship can be roughly categorized into five themes: their effectiveness, humanitarian and economic consequences, impact on poverty, the role of natural resources, and the significance of trade linkages in forming the outcomes of these sanctions.

An important discussion in the literature relates to the effectiveness of economic sanctions in accomplishing their intended objectives. Economic sanctions are commonly employed to produce policy change, alter objectionable behavior, promote democratic principles, or comply with the provisions of international law. Nevertheless, empirical evidence concerning their effectiveness continues to be diverse. Tsebelis (1990), establishes that only sanctions cannot get the required results rather the outcomes are dependent on the interactions between the imposer countries and the target countries. Therefore, it cannot establish the assumption that severe sanctions can produce stronger political pressure.

Likewise, Cordesman and Hashim (1997), while examining effects of sanctions imposed by the US against Iraq, observed that there exist significant variances at international level concerning the effectiveness of sanctions on Iraq. Some countries were of the view that sanctions are needed so as to bring change in Iraq's behavior, while others considered sanctions as a cause of damage to the common citizens instead of a pressure on the political leadership. Skepticism regarding sanctions as a tool of foreign policy increased due to such disagreements. It was also observed by Oechslin (2014) that sanctions normally fail to create a greater impact due to the reason that governments and ruling class transfer the burden of the sanctions on the common people and protect the elites and the political leadership from the worst effects of these sanctions. Consequently, sanctions fail to achieve the desired results of political change and instead create problems for the common citizens and lower class of society.

The existing literature hints that the usefulness of sanctions tends to go away over time. Dizaji and Van Bergeijk (2013) found that sanctions are more likely to yield required results during their early years, whereas prolonged sanctions often do not retain effectiveness as target state improve adjustment devices. Their study also determined that sanctions significantly affect key economic variables such as investment, imports, political participation and government expenditure. These economic interferences often intensify the sufferings faced by ordinary citizens while offering limited motivations for political leaders to submit to demands from outside. Heinrich et al. (2017) handled the issue from a distinctive viewpoint and argued that sanctions may be more effective as defensive mechanisms than as devices of immediate policy change. Their findings suggest that sanctions may be effective in preventing future violations even if they fail to change existing behavior. However, the wider literature indicates that sanctions are partially successful in promoting democracy, avoiding armed conflicts and pressing governments to implement considerable policy reforms. Another aspect of sanctions that has been focused on the literature is their humanitarian consequences. Economic sanctions are severely criticized for causing significant suffering on common citizens in the target countries. Cortright and Lopez (2000) have observed that sanctions frequently cause food shortages, access to basic needs of the people. Similarly, Garfield (2002) and Gibbons and Garfield (1999) established that sanctions weaken healthcare systems by limiting access to medicines, healthcare funding and medical equipment.

Example related to Sanctioned-induced humanitarian distress is being made available in the experience from Iraq. Mohamed and Shah (2000), Daponte and Garfield (2000), and Alnasrawi (2001) found a huge decline in nutritional standards of people, public health indicators and life expectancy following the imposition of sanctions. Their results indicate that despite the inclusion of humanitarian exemption, sanctions weaken the welfare of poor population. Similar results are produced by research on Myanmar. Rarick (2006) suggest that sanctions from the U.S. failed to promote democracy and protect human rights there. Instead, they contributed to economic hardships, deteriorating healthcare system and higher inflation. The study also shows that sanctions affected ordinary citizens more than the political elites, thus undermining the ethical justification used in support of economic sanctions.

There has been considerable scholarly works on the relationship between sanctions and human rights. Peksen (2009) scrutinized the sanctions imposed on ninety-five target states and found that economic compulsion often reduces governments respect for physical reliability rights. Sanctions often create such an environment for the governments discourage them for implementing reforms, instead, they intensify coercive measures on the general public. Allen and Lektzian (2013) also concluded that sanctions decrease expenditures of healthcare and immunization rates, and as a result contribute to the negative consequences for public health in the target countries. Although humanitarian exemption may lessen some effects on food accessibility, overall health outcomes seem to deteriorate considerably.

Sanctions have economic consequences too, which also matter significantly. Economic sanctions are specially designed so as to disrupt economic activity and generate pressure on the economic life of the country. Various studies have investigated their impact on economic growth and development. Kaempfer and Lowenberg (2007) found that sanctions shrink foreign investment and limit entry into international capital markets. Though, domestic capital utilization may increase at the beginning, the long-term drop in investment flows eventually limits economic growth. Neuenkirch and Neumeier (2014) provided some of the amplest evidence regarding the economic costs of sanctions. Their analysis of sixty-eight countries between 1976 and 2012 found that United Nations sanctions condense GDP growth by around 2.3 to 3.5 percentage points, while U.S. sanctions reduce GDP per capita growth by 0.5 to 0.9 percentage points. Their later study (Neuenkirch & Neumeier, 2015) showed that these negative effects can persist for many years and become especially stern in cases involving full sanctions. Such findings indicate that sanctions generate long-term economic loss that ranges well beyond their primary political objectives.

Literature regularly links these economic distractions to rising poverty. Poverty characterizes one of the most significant and enduring results of sanctions because economic contraction candidly affects income, employment, and access to basic services. Alnasrawi (2001) validated those sanctions imposed on Iraq contributed to widespread poverty due to GDP contraction, living standard decline and the deteriorating social conditions in the country. His study underscored how sanctions can translate economic hardships into a wider humanitarian crisis.

Choi and Luo (2013) studied the connection between economic sanctions and social instability. They explored that sanctions deepen economic injustices among poor segments of society and may add to more violence and terrorism. Economic deprivation produced by sanctions can generate perfect conditions for social unrest, especially when political leaders take advantage of public discontent for strategic purposes. Neuenkirch and Neumeier (2016) found that US sanctions significantly rise poverty levels and broaden poverty gaps within target countries. Their study is empirical evidence regarding economic sanctions and poverty. They established that sanctions disproportionately affect low-skilled workers employed in import and export dependent industries due to the fact that these sectors provide opportunities for the less privileged class of society. Thus, it can be said that sanctions increase vulnerability among groups already confronting economic uncertainty.

Further insights into the mechanisms through which sanctions increase poverty are offered by Oechslin (2014) and Peksen (2016). It is argued in these studies that governments facing sanctions frequently transfer the cost of these sanctions to the common citizens through reduction in public services, faded property rights and limitations on economic rights. As a result, opportunities are decreased and institutional arrangements that support economic security and social welfare are weakened by sanctions. Sanctions literature also points to another important theme of political consequences. Wood (2008) established that sanctions often contribute to political repression within target countries. When governments are faced with economic difficulties and declining public support, they often respond with coercion and control political freedom. Such steps are being taken so as to prevent opposition in the country from exploiting economic grievances. Similarly, Allen (2008) found that sanctions can increase antigovernment activities, although the magnitude of such effects depends on economic domestic political institutions. In authoritarian political systems, governments may be able to suppress opposition despite worsening economic conditions. Peksen and Drury (2010) further established that sanctions can weaken democratic institutions by allowing governments to validate greater control over political and economic life. Sanctions instead of promoting democratization may unconsciously reinforce authoritarian movements.

Another important dimension of this study is related to the role of natural resources in moderating the effects of sanctions. Literature on natural resources gives contesting perceptions. Classical economists usually regarded natural resources as a device of economic growth capable of generating employment, higher incomes and investment. On contrary, supporters of the resource curse thesis claim that abundance of natural resources often contributes to weak institutions, corruption and poor economic performance (Auty, 1994; 2001). Gylfason (2000) proposed that economies greatly dependent on natural resources often experience slower long-term growth due to the reason that resources wealth crowds out investment in human capital. Stevens (2003) also says that resource-rich economies often confront development challenges. However, later studies have questioned the universality of the resource curse hypothesis.

Stijns (2005) stressed that the relationship between natural resources and development is largely dependent on different contexts. Frankel (2010) identified different factors that determine whether natural resources are a blessing or a curse. These factors include institutional effectiveness, governance quality and fiscal management. As a result, it can be said that natural resources have both positive and negative outcomes which depends on the effective management of these resources.

There are multiple studies that support the argument that natural resources can add to decline in poverty and economic development. Lay et al. (2008) established that gas boom in Bolivia declined poverty through growth-enhancing effects. Segal (2009) also claimed that poverty could be reduced significantly when resource dividends are directly shared with citizens. These findings are especially relevant to the sanctions literature because governments may be provided with additional financial resources which can compensate for the economic losses affected by sanctions. Therefore, resource-rich states may have greater capability to support public expenditures, maintain domestic industries and resist external economic pressure. Another important theme

related to this study is the relationship between sanctions, trade, and poverty. Trade plays a critical role in economic development by promoting growth, employment and income generation. Rodrik (1998) found that trade openness contributes significantly to long-term economic growth. Tupy (2005) declared trade restrictions as a major cause of poverty in Africa.

Nordström et al. (1999) conducted a study for World Trade Organization (WTO) observed that trade liberalization normally helps income convergence and poverty reduction. Similarly, Dollar and Kraay (2004) and Winters et al. (2004) established that trade expansion results in economic growth and rising incomes, especially over the long-term. Nguyen and Ezaki (2005) determined that increasing integration of Vietnam into regional and global markets hugely reduced poverty among families in the rural areas. The sanctions literature indicates that trade distraction forms one of the main channels through which sanctions employ their effects. Hufbauer et al. (1997; 2003) established that due to sanctions bilateral trade between the target states and the imposing state declines significantly. Caruso (2003) demonstrated more that comprehensive sanctions result in severe bilateral trade reduction, particularly in cases where the target states are highly dependent on the imposing state. This argument is being supported by the data from Iran. Torbant (2005) found that U.S. sanctions considerably condensed non-oil exports and imports of capital goods. Though, Iran's oil exports continued relatively resilient because alternative markets for oil export were available to Iran. Likewise, Haider (2017) observed that Iranian exports readressed trade toward new markets, which shows that how trade divergence can reduce the effectiveness of sanctions.

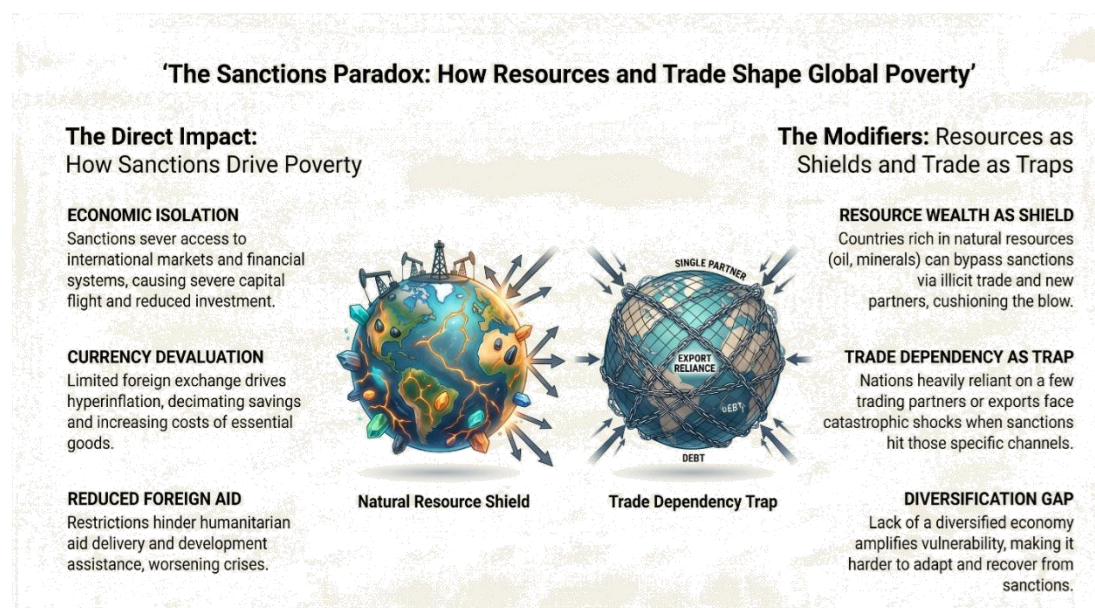
McCaig (2011) further illustrates the importance of bilateral trade in his study on Vietnam. After trade normalization with the U.S., provinces which had better access to U.S. markets saw faster decline in poverty, higher wages for the workers and increased employment prospects. These conclusions validate the significant developmental benefits connected with trade integration and indicate that interruptions in such relationships may have similar negative consequences. Generally, sanctions literature increasingly shows that sanctions have both direct and indirect effects on poverty through reductions in trade (Koehler, 2024), investment (Aloui et al., 2024), economic growth, and employment (kelishomi & Nisticò, 2024). At the same time, natural resource benefactions and trade divergence may help the target states avoid and weaken these effects. There are many studies on economic sanctions but despite that relatively a few studies have examined together the impact of U.S. sanctions on poverty along with considering the moderating influence of natural resources and bilateral trade dependence. This is gap which the present study will fill, which seeks to contribute to a more thorough insight of the socio-economic effects of economic sanctions.

Theoretical Framework

The current study ascribed in the Theory of Economic Sanctions within the broader framework of International Political Economy, which advances that economic sanctions are coercive policy device intended to change the behavior of target states by restricting their access to international financial systems, international markets and trade and foreign capital. While sanctions are designed to put political pressure, in reality, they often generate unintended socioeconomic costs that excessively affect common people. This perspective argues that sanctions disrupt

macroeconomic stability by reducing foreign direct investment, constraining trade, accelerating capital flight and limiting access to international credit. These disruptions often cause depreciation of currency, high inflation, reduced government revenue, declining productive capacity and ultimately fading public service delivery and growing household vulnerability. The aggregate effect is a worsening in living standards which is well illustrated by greater unemployment, reduction in real incomes, increased multidirectional poverty and food insecurity. As a result, the theory provides a causal description for how economic sanctions imposed by other states result in adverse welfare outcomes through connected macroeconomic and organizational channels.

This study also takes Resource Dependence Theory and the concept of Economic resilience to illuminate the diverse effects of economic sanctions across states. Resource Dependence Theory advocates that countries gifted with vast natural resources provide other mechanisms for producing foreign exchange and upholding economic activity notwithstanding the external restrictions. Revenue from natural resources such as oil, gas or critical strategic mineral resources can partly avoid the paradoxical effects of economic sanctions by enabling alternative trade engagements or supporting fiscal capacity. In contrast, states categorized by high trade concentration, reliance on a limited number of export markets, and less economic diversification demonstrate greater structural weaknesses to economic sanctions. Their narrow adaptive capacity augments external shocks which result in declining production capacity, employment and domestic welfare for the public. From this theoretical perspective, the connection between economic sanctions and poverty is not deterministic but contingent upon a state's structural characteristics of its economy, especially availability of natural resources, trade reliance and the capacity for economic divergence. These theoretical standpoints together offer the basis for studying both the direct and indirect pathways through which economic sanctions affect poverty outcomes across different state frameworks.



Data and Methodology

Variables and Data Sources

This analysis is based on unbalanced panel data from 51 nations (targeted countries) collected over 38 years (1975–2012). Since data collection on poverty started in the late 1990s, therefore, poverty data are mostly unavailable in many developing and undeveloped countries (Odhiambo, 2009a). Since the poverty measures are not collected on an annual basis, but rather at a few-year intervals. Therefore, this is one of the reasons for adopting imbalanced panel data. Since our main variable of interest, US economic sanctions, is based on the Hufbauer et al. (2007; 2009) data set, which is a widely used comprehensive and accurate data source for US economic sanctions. Hufbauer et al. (2007; 2009) data set is updated till 2012. Therefore, the time period of our analysis is 1975 to 2012.

For the variable of outcome, the poverty metrics, two variables namely poverty head count ratio and poverty gap are used. The two measures are used to examine the changes in poverty incidence (P0) and the actual livelihood of people living below the poverty line (P1) as a result of economic sanctions, the variable of interest. Two channels, namely natural resource endowment and bilateral trade linkages between the US and the sanctioned states, are examined to moderate the impact of US sanctions of poverty metrics. All other relevant control variables are included in the model to account for the omitted variable bias. Key variables used in this study are described in more detail as follows.

U.S. economic sanctions data

Data on U.S. economic sanctions, denoted by USCN, are obtained from Hufbauer et al. (2007, 2009, 2012). It is a comprehensive dataset that provides detailed information on countries' sanctions, including the timing of sanctions, and the primary reasons for their imposition. To ensure consistency and reliability, we cross-check the sanctions information with Neuenkirch and Neumeier (2016), who also draw on the Hufbauer et al. (2009) dataset and supplement it with data acquired from U.S. Congressional sources.

Following the existing literature (e.g., Neuenkirch and Neumeier, 2014, 2015, 2016), U.S. economic sanctions are measured using a binary indicator USCN. The variable USCN takes the value of 1 for particular year if a country is subject to U.S. economic sanctions and 0 otherwise.

Poverty Data

Poverty is a multidimensional phenomenon that can be measured using various poverty metrics have been used in literature to measure poverty. The commonly used poverty metrics in the literature is the Headcount Ratio (P0) at various absolute or relative income thresholds (Kpodar & Jeanneney et al, 2008; Perera & Lee, 2013). The headcount ratio accounts for the percentage of the population living below a stated poverty line and, therefore, provides an indication of the incidence of poverty. However, it does not capture the intensity or depth of poverty, as it treats all persons below the poverty line alike irrespective of the extent to which their income or consumption falls below that threshold.

To provide a complete assessment of poverty, this study employs both the poverty headcount ratio (P0) and the poverty gap index (P1). While P0 captures the prevalence of poverty, the poverty gap index (P1) computes the average shortfall of poor individuals' income or consumption from the poverty line, thereby providing an indication of the depth or severity of poverty. Different international poverty thresholds have been used in the literature, including US\$1.90, US\$3.25, and US\$5.50 per person per day at purchasing power parity (PPP). Consistent with the historical poverty data used in this study, poverty is measured using the World Bank poverty threshold of US\$1.90 per person per day at 2011 PPP prices.

Nonetheless, head count ratio does not truly describe the state of poor population in a country since it only accounts for the percentage of population having income/consumption lower than the given poverty line, it fails to describe the severity and livelihood of poor living below the poverty line. Therefore, we will use another metric of poverty i.e., the Poverty Gap (P1) along with poverty head count to measure the comprehensive nature of poverty. Poverty Gap (P1) measures the average income gap of poor individuals from a certain poverty line. Various poverty lines have been used in the literature to measure poverty head count, such as \$1.90, \$3.25 and \$5.5 PPP. We used Poverty line at \$1.90 a day (at 2011 PPP basis).

Natural Resources Data

Variable Name	Acronym	Definition	Data Source
Natural Resource	NRE	Natural resource rents as percentage of GDP	WDI, World Bank
Bilateral Trade	BLTR	Bilateral (US & targeted country) volume of trade in terms of growth rate.	Correlates of War Project's Trade Data Set, Version 3.0 by Barbieri and Keshk (2012)
Per Capita GDP	PC-GDP	GDP per capita growth rate at constant 2010 US dollars	WDI, World Bank
Inflation	INFL	GDP deflator in terms of percentage change	WDI, World Bank
Polity score	POLS	The value ranges from +10 to -10, from strongly democratic to strongly autocratic.	Polity-IV Dataset version 2017 by Marshall et al. (2014)
Minor conflicts	MINCLT	Takes value 1 if 25-999 battle related deaths, 0 otherwise	Uppsala Conflict Data Program (UCDP) version 4
Major conflicts	MAJCLT	Takes value 1 if at least 1000 battle related deaths, 0 otherwise	Uppsala Conflict Data Program (UCDP) version 4
FDI	FDI	FDI as a percent of GDP	WDI, World Bank
Internal conflict	INTCFT	Conflict within the country between the government and opposition groups. It takes value 1 with conflict year, 0 otherwise.	Uppsala Conflict Data Program (UCDP) version 4 (Gleditsch et al., 2002)

Interstate conflict	INSCFT	Conflict that involves at least two states. It takes value 1 with conflict year, 0 otherwise.	Uppsala Conflict Data Program (UCDP) version 4 (Gleditsch et al., 2002)
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Methodology

Model specification

To measure the actual impact of US economic sanctions on poverty in the sanctioned states, we use the following generalized regression function:

$$\text{Poverty} = f(\text{USCN}, \text{USCN} * \text{NRE}, \text{USCN} * \text{BLTR}) \dots (1)$$

Here, poverty is the dependent variable whereas USCN symbolizes US economic sanctions, which is binary in nature. NRE denotes natural resources endowment and BLTR denotes bilateral trade between US and the sanctioned countries. Besides others, two main factors, targeted country's natural resource endowment (NRE) and bilateral trade linkages between US and sanctioned country (BLTR), play a crucial moderating role in transmitting the impact of economic sanctions on the poverty in the targeted states.

First, natural resources can contribute effectively to economic growth and alleviate the adverse effects of economic sanctions. It facilitates development of industrial sectors, boost investment, and promotes sustainable economic growth (Rostow, 1961). To account for the moderating role of natural resources endowment, we include an interaction effect of US sanctions with that of natural resources (USCN * NRE). Second, trade linkages between US and the sanctioned states also play a crucial role in moderating the impact of US sanctions on poverty and other socio-economic indicators in the sanctioned states. Bilateral trade moderates the effects of sanctions on poverty through a variety of channels, including consumption, production, and the labour market. Trade benefits unskilled and semi-skilled labour in emerging countries, resulting in poverty reduction. Economic sanctions disproportionately affect sectors that rely heavily on bilateral trade. These sectors employ a sizable proportion of the low-wage labour force. Therefore, due to imposition of sanctions underprivileged groups in society are badly affected through trade channel (Gibbons & Garfield, 1999; Winters et al., 2004; Mitra, 2016). Consequently, to examine the role of bilateral trade linkages with the US on poverty in the presence of US economic sanctions, we introduced an interaction effect between these two variables (USCN * BLTR) in the model. The equation-1 can be expressed in the form of regression model as follows:

$$\text{poverty}_{it} = \alpha_i + \beta_1 \text{USCN}_{it} + \beta_2 (\text{USCN} * \text{NRE})_{it} + \beta_3 (\text{USCN} * \text{BLTR})_{it} + \sum_{j=1}^k \gamma_j X_{jit} + \theta_{it} \dots (2)$$

In the above equation, α_i is the intercept term while β are the slope coefficients. Whereas X_j denotes the vector of control variables, with γ_j as its parameter and θ_{it} is the error term. Here, t represents the time series observation while i represents cross-sectional unit or country, and j denotes the id for control variables.

Panel OLS Model

We used panel fixed effect model in our analysis. For this, we can pool data from 51 countries ($N=51$) over a 38-year period. The study uses an unbalanced panel or pooled data because the poverty data is gathered after a few years gap and is not uniformly available across counties. By default, Panel OLS assumes that the intercept term is identical across all cross-sectional units (sanctioned states). To address the issue and include a country-specific defining traits, we must consider the unique features of each targeted states in the model. This is possible by using the Fixed vs Random Effects technique.

Fixed vs Random Effect Model

In this study, the characteristics of targeted countries vary greatly in terms of their geographical, social, and cultural situations, making each one distinct from the other targeted states. This obviously indicates that the idiosyncratic systematic impact appears to exist in the data. Therefore, the Fixed Effect Model (FEM) model is preferable in the situation of cross-section idiosyncratic effect, because it is more effective in perceiving the individual features of cross-sectional units (Afesorgbor & Mahadevan, 2016). The cross section fixed effect Model assumes that the intercept can vary only across entity while the time fixed effect model assumes it to vary only across time. Thus, based on FEM, the equation-2 can be written as follows:

$$\text{poverty}_{FE} = \sum_{i=1}^n \rho_i + \sum_{t=1}^n \sigma_t + \beta_1 \text{USCN}_{1it} + \beta_2 (\text{USCN} * \text{NRE})_{2it} + \beta_3 (\text{USCN} * \text{BLTR})_{3it} + \sum_{j=1}^k \gamma_j X_{jit} + \theta_{it} \dots\dots\dots \text{Eq. (3)}$$

ρ_i is countries fixed effect and σ_t is time fixed effect.

In contrast to the Fixed Effect model, the Random Effect model claims that differences between individual observation is random. This is modelled by describing those effects using the error term rather than including specific dummies and compromising degree of freedom. In REM, it is assumed that the intercept term is a random variable having mean value of a_1 and a latent random component $\varepsilon_i \sim N(0, \sigma_\varepsilon^2)$ as follows:

$$a_{1i} = a_1 + \varepsilon_i \dots\dots\dots \text{Eq. (4)}$$

Even there exists a significant difference across sanction states, which supports the use of FEM, but we are still unsure which model can best describe the data in our case. To decide between the FEM vs REM models, we apply the Hausman Test, which is commonly used in literature in this regard. The null hypothesis of the Hausman test can be stated as “difference in coefficients is not systematic” which means that there is no individual specific characteristics exist in countries under study (Random effect Model). The Hausman test results support fixed effect approach as the probability value is significant at less than 1% for poverty head count and less than 5% for poverty gap equation. Hence, we reject the null hypothesis favouring the use of REM and employ the Fixed Effect Approach.

Results and Discussion

The descriptive statistics are presented in Table 1. The data shows that the average poverty incidence (P0) and poverty gap (P1) in the sanctioned states are 18.3 and 7.6 percent, respectively. Moreover, these states were under US economic sanctions for more than 23 percent of the total sample time (1975 to 2012). These states are predominantly characterized by lower democratic rights, high inflation rate, lower GDP per capita, and greater internal conflicts.

Table 1: Descriptive Statistics

Variable	Mean	Std.Dev.	Min	Max
Pov-head count	18.3	20.6	0	91.6
Pov-Gap	7.6	9.6	0	61.9
USCN	.236	.425	0	1
USCN-1lag-year	.236	.425	0	1
USCN*NRE	1.7	5.2	0	63.5
USCN*BLTR	39.1	1241.5	-100	52518.2
Per c. real GDP	1.65	5.1	-37.0	33.0
Inflation	65.2	531.3	-26.3	13611.6
Polity score	.93	6.68	-10	10
Minor conflict	.188	.391	0	1
Major conflict	.083	.275	0	1
FDI	2.3	4.1	-25.8	55.1
Internal conflict	.234	.423	0	1
Interstate conflict	.022	.147	0	1

Fixed Effect Regression Results

The fixed effect results of poverty headcount and poverty gap are presented in table 2. Model 1 in table-2 shows the impact of US economic sanctions on poverty headcount and poverty gap without control. Whereas model 2 includes the moderating variables into the model while model-3 includes all relevant controls along with the moderating variables. Since poverty is not an indicator that changes abruptly as a result of any shock or sanctions, rather takes time. Second, the impact of economic sanctions also takes time to the grass root level. Third, poverty data is not available every year in each country, rather after some time interval as discussed in the data section. As a result, we have included the lag year proxy, denoted by USCN-1(lag year), alongside the current year to assess the effects of US economic sanctions in both the years, the year they are imposed and one year after. In both models, each poverty measure is regressed on the variable of interest (US sanctions), with the key the interaction terms NRE*USCN and BLTR*USCN previously defined as a moderating variable.

In all regression models, the positive sign of US sanctions shows that imposing economic sanctions of any type has a disastrous effect on poverty. These deteriorating effects of US sanctions are insignificant in the present year, but they become more significant after one year of sanctions

imposition, denoted by the $US-1$ (lag year). This indicates that the adverse effect of US economic sanctions on poverty in target countries worsens over time as compared to the year of imposition. According to the FEM results, US sanction rises poverty incidence by 4.9 percentage points while increasing poverty gap by 2.328 pp one year after the sanction impositions. The results uphold the validity of H_{01} hypothesis that US economic sanctions worsen poverty conditions in the target states. These findings are consistent with the results of Mathias and Neuenkirch (2016).

Furthermore, the negative coefficients for the interaction term $USCN*NRE$ in both models are compatible with economic theory. This value is significant at 5% in terms of the poverty headcount ratio, implying that natural resources mitigate the negative effects of US economic sanctions on the lower middle-income group. In other words, natural resources of a sanctioned state reduce the impact of sanctions on lower- and middle-income populations that are just above the poverty line, preventing them from falling into poverty. However, the natural resource interaction term with US sanctions has no meaningful effect on the poverty gap. It means that, while natural resources can help to alleviate poverty, they cannot protect individuals who are already poor from the negative effects of sanctions. Therefore, the hypothesis H_{02} of this study is partially accepted.

Furthermore, the interaction term between bilateral trade connections (lag year, year before the sanction) and $USCN$ demonstrates the expected positive relationship with both poverty indicators. The positive association between them suggests that when formerly stronger bilateral trade between the United States and sanctioned countries is reduced or halted as a result of US sanctions, the poverty condition in target countries worsens. More openly, the significant positive association of the interaction term $USCN*BLTR-1$ for both measures of poverty implies that unskilled workers, particularly those in the middle- and lower-income classes, are disproportionately affected by bilateral trade disruptions between the US and sanctioned countries as a result of US economic sanctions. Hence, reduced bilateral trade activity as a result of sanctions disproportionately harm the low-income and impoverished classes. This finding lends support to the H_{03} hypothesis, which says that trade barriers imposed by a major trading partner such as the United States exacerbate the severity of the effects of US sanctions on poverty.

Similarly, all of the control variables in the regression models are significant at various levels of significance, with coefficient signs that correspond to economic theories. For example, in all models, per capita real GDP has a substantial negative correlation with poverty metrics. Polity-score also demonstrates the proper negative theoretical link with poverty indicators, implying that a better democratic condition in the country is associated with lower poverty rates; provided that, this is insignificant in both models. On the contrary, inflation and conflict both major and minor show significant positive relationship with poverty measures. It means that increase in factors, such as inflation, major and minor conflicts increase poverty incidence as well as poverty-gap. All these coefficients are significant at less than 1% level of significance.

Table 2. Fixed Effect Results of Poverty Head count and Poverty gap

	(Model-1) P0-1	(Model-1) P1-1	(Model-2) P0-2	(Model-2) P1-2	(Model-3) P0-3	(Model-3) P1-3
USCN	2.31 (2.13)	.274 (.113)	4.032* (2.28)	.92 (.114)	2.103 (2.87)	-.144 (.137)
USCN-1 (lag year)	5.2** (2.021)	2.4** (.959)	5.6*** (2.006)	2.56*** (.938)	4.91** (1.846)	2.29** (.904)
USCN*NRE			-.34** (.139)	-.132* (.07)	-.335*** (.12)	-.127** (.058)
USCN*BLTR (lag year)			.065 (.041)	.029* (.016)	.077* (.039)	.037** (.016)
Per c. real GDP					-.234*** (.083)	-.147*** (.054)
Inflation					.005*** (.001)	.002*** (0)
Polity score					-.446 (.474)	-.229 (.193)
Minor conflict					6.4*** (1.684)	3.1*** (.852)
Major conflict					6.4*** (1.579)	2.7*** (.771)
Constant	17.1*** (.43)	7.2*** (.199)	17.14*** (.423)	7.16*** (.193)	18.5*** (2.21)	7.9*** (.946)
Observations	497	518	493	514	492	507
R-squared	.063	.032	.088	.048	.187	.133
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Heteroscedasticity and Autocorrelation robust standard errors in parentheses

*** p<.01, ** p<.05, * p<.1

In all regressions, the variables of outcome are the two poverty measures: poverty headcount ratio and poverty gap, while the variables of interest are US sanctions binary and two separate interactive terms of natural resource rents and bilateral trade growth rate with the US sanction binary variable.

Robustness checks

We check for the robustness of the results three ways: first, checking for the omitted variable bias and reverse causality. Second, inclusion of country fixed effect. Third, we test for the model specification check and diagnostic tests for the autocorrelation, heteroskedasticity, and multicollinearity. First, we check for the omitted variable bias and reverse causality. Ramsey-reset test is used to check for the functional form and omitted variable bias of the main models. The

Ramsey–reset test yields insignificant probability values of 0.1529 for headcount ratio and 0.3698 for poverty gap, which do not reject the null hypothesis that the models have no omitted variable bias (Table A1, Appendix A). Furthermore, there is no reverse causation linking the dependent variables to economic sanctions. As no theoretical rationale exists for this association (Afeesorgbor & Mahadevan, 2016). Besides, there is no logical link that establishes relationships from poverty to US-sanctions. Therefore, we can avoid concerns of reverse causality. Furthermore, we tried an ample set of time and country varying most pertinent control variables (such as FDI, internal conflict and interstate conflict) have also been included in the model to check for sensitivity or robustness of results. The results show that despite inclusion of other variables affecting both poverty measures, the results remain intact and robust. FDI, internal conflict, and interstate conflict have a correct coefficient sign with both measurements of the dependent variable, although they are insignificant (table 3).

Second, to check the heterogeneity in results across countries, we included the entity fixed effect in the model. The results remain robust even with inclusion of country fixed effect. Third, we perform various diagnostic tests including heteroskedasticity, autocorrelation, and multicollinearity. Further, the econometric issues such as heteroscedasticity, autocorrelation and multicollinearity have also been examined. After applying the Breusch-Pagan/Cook-Weisberg test to examine the heteroskedasticity issue in the model. In baseline models, the null hypothesis of homoscedasticity is rejected (Table A2, appendix-A). However, we account for this issue using robust standard errors in accordance with Hoechle, D. (2007). Additionally, the Woolridge test for autocorrelation has also identified the issue of autocorrelation in the model because the null hypothesis that there is no first-order autocorrelation is rejected (Table A3, appendix-A). This issue has also been addressed by grouping the cross-sectional units, in accordance with Hoechle, D. (2007). To put it simple, all regressions have robust standard errors for heteroscedasticity and autocorrelation.

The issue of multicollinearity has also been tested separately for the base line models by applying Variance Inflation Factor (VIF) and first order correlation test. The mean VIF values; 1.425 for headcount ratio and 1.449 for poverty gap regressions are very low which means there is no multicollinearity issues in both models (Table A4, appendix-A). Besides, we check for multicollinearity using the first order correlation matrix between the covariates, which is presented in table A5 in appendix-A. The results suggest that, aside from variables in the same genre, such as USCN and USCN-1 (lag year) or poverty gap and headcount ratio, the highest correlation values are 0.408 and 0.342 between polity score and US sanctions binary variable and its lag, respectively. These correlation coefficient values are modest, indicating that multicollinearity is unlikely to be an issue.

Lastly, we used Link test envisioned by Tukey (1949) and Pregibon (1980) to test for model specification. The results show that the base line models are correctly specified (Table A6, appendix-A). The results of hatsq P values (0.629 for headcount ratio and 0.573 for poverty gap) are insignificant compared to the significant hat p values (0.021 for headcount ratio and 0.011 for poverty gap). This means that the models are correctly specified.

Table 3. Robustness checks Results

	(1) P0	(2) P1	(3) P0	(4) P1	(5) P0	(6) P1
USCN	1.135 (2.779)	-.718 (1.296)	2.039 (2.962)	-.18 (1.397)	1.992 (2.921)	-.232 (1.384)
USCN-1 lag-year	5.24*** (1.82)	2.47*** (.858)	4.96** (1.859)	2.31** (.908)	4.90** (1.857)	2.27** (.906)
USCN*NRE	-.329** (.117)	-.126** (.059)	-.331*** (.123)	-.124** (.06)	-.326** (.125)	-.12** (.059)
USCN*BLTR-1 lag-year	.078** (.038)	.042*** (.015)	.077* (.039)	.036** (.016)	.078* (.04)	.038** (.017)
Per c. real GDP	-.215** (.083)	-.137** (.053)	-.236*** (.081)	-.148*** (.053)	-.229*** (.083)	-.143** (.054)
Inflation	.004*** (.001)	.002*** (0)	.005*** (.001)	.002*** (0)	.005*** (.001)	.002*** (0)
Polity score	-.444 (.475)	-.224 (.194)	-.436 (.459)	-.223 (.188)	-.449 (.474)	-.231 (.193)
Minor conflict	6.48*** (1.667)	3.18*** (.835)	5.07* (2.668)	2.37** (1.11)	6.28*** (1.702)	3.01*** (.846)
Major conflict	6.14*** (1.611)	2.52*** (.779)	4.88* (2.894)	1.84 (1.232)	6.25*** (1.613)	2.54*** (.769)
FDI	-.182 (.137)	-.11 (.092)				
Internal conflict			1.892 (3.019)	1.044 (1.176)		
Interstate conflict					2.396 (4.392)	1.949 (2.473)
Constant	19.10*** (2.262)	8.26*** (1.025)	18.36*** (2.078)	7.88*** (.916)	18.53*** (2.208)	7.98*** (.941)
Observations	491	505	492	507	492	507
R-squared	.194	.151	.188	.135	.187	.134
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: Heteroscedasticity and Autocorrelation robust standard errors in parentheses, *** p<.01, ** p<.05, * p<.1

Conclusion and Policy Recommendation

This study examines the effects of US economic sanctions on poverty in the targeted states using a panel fixed effect technique on data from 51 countries spanning from 1975 to 2012. Second, two

effect modifier factors namely, the sanctioned country's natural resource endowments and bilateral trade links between the sanctioning and sanctioned states, were employed to assess the impact and severity of US sanctions on socioeconomic outcomes in the targeted countries. Although, the primary objectives of the sanctions are: (i) to coerce governments to stop hostile engagement against another state or threatening its legitimate government; (ii) to promote and guard democracy or wane an autocratic regime; and (iii) to shelter a country's citizens from political repression and administer human rights (Hufbauer et al., 2009). This study does not evaluate the political effectiveness of sanctions, the findings demonstrate that sanctions are associated with significant adverse consequences for poverty outcomes in target countries. Besides, the findings reveal that US sanctions disproportionately hurt the poor class by increasing poverty, rather than their intended targets. The low class with little authority bears the actual cost of sanctions, not the target government, individuals in power, or elite class that are the true root cause of the sanctions.

The targeted government and those in power are immune to economic sanctions and can shift the costs of sanctions onto the impoverished masses. All of this demonstrates that the use of economic sanctions as a tool by the US failed to achieve its genuine objective of ensuring the public rights by an autocratic regime but rather increasing poverty and severely affecting disadvantaged people, making it harder to meet the SDG goals of zero poverty and no hunger by 2030. Next, the results for the heterogenous effect of the country's natural resource endowments and bilateral trade connections between the sanctions sender and the receiver country indicate predicted theoretical signs. First, natural resources have a significant moderating effect on alleviating poverty headcount and the poverty gap in the presence of economic sanctions. As a result, natural resources mitigate the deleterious effects of US sanctions on the marginalised class. Second, the suspension of US bilateral trade with sanctioned states exacerbates poverty impact as a result of the sanctions. The findings suggest that US sanctions constraining countries' economic or international contacts have a suppressive effect on the unauthorised underprivileged class, resulting in increased poverty in sanctioned countries.

It must be noted that the general and poor masses are not the causes of economic sanctions, nor are they authorised to act, respond to, or comply with the motives of sanctioning countries. However, they bear the brunt of the economic penalties. As part of policy recommendations, the sanctions imposers are strongly advised to evaluate the far-reaching negative and harmful repercussions of sanctions that prioritise poor people over their true targets. First and foremost, the United States must avoid generalisation when imposing sanctions; instead, it should arrange its penalties such that they exclusively target the power or person in power who is causing the implementation of sanctions.

This can be accomplished in a variety of ways by restricting and pressuring only the individuals or groups of individuals deemed guilty, rather than the entire institutions that affect the broader population, particularly the impoverished portion of society. Furthermore, international organisations such as the United Nations must act as a check and balance on the United States to prevent it from implementing sanctions that have far-reaching negative consequences for the general public in addition to its intended targets. Furthermore, donations or aid for humanitarian

objectives from international bodies or organisations should not be limited, even in the face of strong or comprehensive sanctions. Because blocking such aids or donations will merely harm the general public while having little effect on the true objectives of economic sanctions.

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Appendices

Appendix A

Table A1: Ramsey RESET results for testing omitted variable bias for P0 and P1

Model	F-value	P-value	Decision
Poverty Head count	$F(3, 477) = 1.77$	0.153	Ho accepted
Poverty Gap	$F(3, 492) = 1.05$	0.369	Ho accepted

Note: the null hypothesis of Ramsey RESET is model has no omitted variables bias

Table A2: Breusch-Pagan/Cook-Weisberg test results for Heteroscedasticity (P0 & P1)

Model	chi2-value	P-value	Decision
Poverty Head count	39.48	0.000	Ho rejected
Poverty Gap	37.55	0.000	Ho rejected

Note: the null hypothesis of Breusch-Pagan/Cook-Weisberg is Ho: Constant variance.

Table A3: Wooldridge test results for autocorrelation (P0 & P1)

Model	F-value	P-value	Decision
Poverty Head count	$F(1, 21) = 33.3$	0.000	Ho accepted
Poverty Gap	$F(1, 23) = 44.2$	0.000	Ho accepted

Note: the null hypothesis of Wooldridge test is Ho: no first-order autocorrelation.

Table A4: Variance inflation factor for Headcount Ratio and Poverty Gap

Variables	Poverty Head Count		Poverty Gap	
	VIF	Tolerance Factor	VIF	Tolerance Factor
USCN	2.710	.370	2.792	.358
USCN1	2.110	.474	2.188	.457
USCN*NRE	1.543	.648	1.589	.630
Polity score	1.225	.816	1.221	.820
USCN*BLTR	1.089	.919	1.093	.915
Conflict minor	1.056	.947	1.057	.946
Per c. real GDP	1.046	.956	1.047	.955
Conflict major	1.036	.965	1.034	.967

Inflation	1.020	.981	1.020	.981
Mean VIF	1.425	.702	1.449	.690

Table A5: Correlation Matrix of Poverty Analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Headcount ratio	1.00										
(2) Poverty Gap	0.95	1.00									
(3) USCN	0.14	0.08	1.00								
(4) USCN1	0.12	0.08	0.72	1.00							
(5) NRE	0.25	0.26	0.08	0.11	1.00						
(6) BLTR	-0.03	-0.05	0.02	0.05	0.08	1.00					
(7) P.c. real GDP	-0.15	-0.20	~	-0.01	0.11	0.31	1.00				
			0.03								
(8) Inflation	0.01	0.01	~	-0.02	-0.03	-0.01	-0.13	1.00			
			0.02								
(9) Polity score	-0.24	-0.19	~	-0.34	-0.29	-0.05	~	0.02	1.00		
			0.40				0.08				
(10) Minor conflict	0.12	0.07	0.18	0.15	0.05	0.01	0.07	-0.05	-0.09	1.00	
(11) Major conflict	0.09	0.08	-0.01	0.05	0.05	-0.07	~	0.02	-0.09	-0.09	1.00
							0.08				

A6: Link Test Results of Model Specification for P0 and P1

Test-statistics	Poverty Head Count Model			Poverty Gap Model		
	Coef.	t-stat	P-value	Coef.	t-stat	P-value
hat	1.256	2.31	0.021	1.272	2.55	0.011
hatsq	-.0061	-0.48	0.629	-.0154	-0.56	0.573
cons	-2.363	-0.43	0.666	-1.025	-0.48	0.628

Appendix B

Table B1: U.S. Sanctioned States' List

ID	Country Name	ID	Country Name
1	Afghanistan	27	Jordan
2	Argentina	28	South Korea
3	Azerbaijan	29	Kenya
4	Belarus	30	Malawi
5	Bolivia	31	Madagascar
6	Brazil	32	Montenegro

7	Burundi	33	Mauritania
8	Cambodia	34	Nicaragua
9	Cameroon	35	Niger
10	Central African Republic	36	Nigeria
11	Chile	37	Pakistan
12	China	38	Panama
13	Colombia	39	Paraguay
14	Cote D'Ivory	40	Peru
15	Ecuador	41	Romania
16	El Salvador	42	South Africa
17	Ethiopia	43	Sri Lanka
18	Gambia	44	Thailand
19	Guatemala	45	Turkey
20	Guinea	46	Russia
21	Guinea Bissau	47	Uganda
22	Honduras	48	Uruguay
23	India	49	Venezuela
24	Indonesia	50	Vietnam
25	Iran	51	Zambia
26	Israel		