The impact of smart and non-smart sanctions on government health expenditures: evidence from developing resource-based countries

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The impact of smart and non-smart sanctions on government health expenditures: evidence from developing resource-based countries[1]

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Abstract

This study aims to investigate the impact of economic sanctions on government health expenditures in developing resource export-based countries, using the dynamic panel data method over the period of 2000-2016. The results show that while the impact of non-smart sanctions on public health expenditures is negative and statistically significant, the impact of smart sanctions on public health expenditures is positive. These findings are evidence of widespread human rights violations by non-smart sanctions and their adverse effects on health among the innocent citizens. Moreover, the results confirm that smart sanctions are humane considering their positive impact on health expenditures. These results remain robust to different specifications of health expenditures and alternative definitions of weights of smart and non-smart sanctions.

JEL Classifications: I31, F51, I15

Key words: smart Sanctions, non-smart sanctions, Public Health, Resource Exporting Countries, Dynamic Panel Data

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1. Introduction

Since the twentieth century, economic sanctions have been considered as a common foreign policy tool. They act as an alternative or a complement to military action to change the political behavior of a target country (Garfield, 1999). Economic sanctions have been frequently used by different countries and intergovernmental organizations (IGOs) for self-interested or humanitarian concerns to deal with issues such as human rights violations, democratization, nuclear proliferation, armed aggression, state-sponsored terrorism, and drug trafficking. The previous studies have mostly focused on the questions of whether and under which economic and political conditions sanctions are successful (Bergeijk and Marrewijk, 1995, Peksen and Drury 2010, Dizaji and Bergeijk 2013, Dizaji 2019 a). Scholars estimate that sanctions fail 65% (Hufbauer et al. 1990; Hufbauer et al. 2007) to 95% of the time (Pape 1997) in achieving their goals.

Human rights advocates argue that traditional trade sanctions do the most damage to innocent populations, while not hurting political and economic elites. Case studies of sanctions against Cuba (Barry, 2000), Haiti (Farmer, Fawzi & Nevil, 2003; Gibbons & Garfield, 1999), Iraq (Daponte & Garfield, 2000; Ali & Shah, 2000), and Yugoslavia (Garfield, 2001) have all revealed that sanctions demolish the public health. Given the weaknesses of sanctions in achieving their foreign policy ambitions, many ask whether the humanitarian costs of sanctions are worth the consequences. Nowadays, it is widely accepted that the design and implementation of sanctions need to be improved, and their humanitarian costs to ordinary citizens minimized as far as possible.

Following these concerns, policy makers have tried to design “targeted sanctions”—often referred to as “smart sanctions”—in order to reduce the humanitarian damages for the public, while maximizing the impact on political leaders and segments of society believed responsible for objectionable behavior. The targeted sanctions include arms embargoes, financial sanctions on the assets of individuals and companies, travel restrictions on the leaders of a sanctioned state, and trade sanctions on particular goods. Despite the abundance of country-specific evidence and policy debate on the humanitarian effects of sanctions, there has not been any cross-national empirical research that directly compares smart against traditional sanctions with respect to health impact. Therefore, it is necessary to examine if smart sanctions comply with human rights. This study offers a quantitative analysis of the effect that smart and non-smart sanctions have on public health expenditures in developing resource-based countries. We use time-series cross-nation data for 46 developing resource-rich countries over the period of 2000-2016.

The effects of sanctions on health sector are often indirect and usually appear after a shortage of resources. Indeed, sanctions directly affect the available resources and allocation decisions that are taken as a result of economic constraints; consequently, health spending can be expected to decrease. The extent to which the income sources of a country are affected by sanctions generally depends on the situation of export and import of that country. The dependence on export earnings of one or more easily monitorable products is a disadvantage for targeted countries that make them more vulnerable towards sanctions (Garfield 1999, Dizaji and Bergeijk 2013, Dizaji 2019b). Under these conditions, the country's revenue can be easily identified and blocked, and this will make the sanctions more effective. The unique role of resource revenues in the structure of government budgets and expenditures is a special characteristic of the developing resource export economies. Resource revenues are the main source of financing government expenditures and imports of products. Therefore, considering the single-product features of these economies, it is expected that they face more revenue restrictions and budget deficit after wielding sanctions (Dizaji 2014). This could lead to negative effects on education, culture and health sectors (Ross 2001, Dizaji 2019b). The economic costs of the sanctions are usually distributed unequally: Since sanctions represent an economic shock to target countries, they affect target governments' decision-making environment, forcing them to adjust strategically by reallocating government spending. The unequal distribution of costs suggests that governments may seek to protect some spending categories (such as national defense) from budget cuts, often at the expense of decreases in spending for low-priority policy areas (for example health) (see, Allen and Lektzian 2013; Drury and Peksen 2014; Peksen 2011). When resources decrease, disease prevention services (including vaccination) also are decreased and emergency needs will be prioritized. The lack of resources also leads to neglect of the health sector infrastructures (Alen & Lektzian, 2013). Sanctions reduce imports and, as a result, limit access to health products, which most of all affect the vulnerable population including women, children and elderly (Garfield, Devin & Fausey, 1995; Cheraghali, 2013). Even if sanctions include specific exemptions for food and medicine, they may lead to disturbances in the health system for citizens by imposing economic pressure on the targeted countries (Shahabi et al.2015).

This study is the first research to analysis the difference between the impact of general sanctions versus the impact of smart targeted sanctions on health expenditures in developing resource-rich countries. Statistical analyses in this study test the following hypotheses:

Hypothesis 1: Comprehensive non-smart sanctions decrease government health expenditures.

Hypothesis 2: Smart sanctions do not have detrimental impact on government health expenditures.

Section 2 provides a brief stylized fact on the health impact of sanctions by reviewing the cases of Iran and Iraq. Section 3 investigates relevant literature on economic sanctions and their health impact with health sector. Section 4 describes data, variables and applied methodology. Section 5 presents the empirical results and related implications. Finally, section 6 concludes.

2. Experience of sanctions against Iraq and Iran

Iraq is an example of a country that was sanctioned comprehensively by the UN when it occupied Kuwait in 1990. The comprehensive trade embargo was truly crippling in its economic and humanitarian effects (Hoskins 1997; Alnasrawi 2001). The sanctions commenced with prohibiting of all imported goods, except for medicine. They were extended by the Security Council in January and February 1991 after the Gulf War. In April 3, Iraq was given permission to import food beside medicine. From 1991 to 1993, humanitarian organizations could help the import of only 5% of the urgent medicine and food. This was because those countries which were enemies of Iraq did not dedicate adequate budget to this country. In August 1991, the Security Council issued the resolution 706, after which selling oil was allowed for importing humanitarian goods. In 1996, Iraq accepted the 'oil for food' program and the first humanitarian package was sent in 1997 (Dastafkan et al., 2020). After the implementation of this program, regime manipulated the program to its own benefit and impeded equitable distribution of food and medicine to ordinary people, while the members of the government, regime supporters, and the army were received these necessary goods (Karsno et al, 2003).

O'Sullivan (2003) estimated that Iraq lost between $175 billion and $250 billion in possible oil revenues due to the sanctions. The price for a family's food supply for a month increased 250-fold over the first five years of the sanctions regime (Hoskins 1997:112). Garfield (1999) approximated that the sanctions caused a minimum of 100,000 and up to 227,000 excess deaths among young children from August 1991 to March 1998. Although the sanctions were quite effective in denying Saddam Hussein the ability to develop weapons of mass destruction, the Iraqi government made one obstruction after another to make life difficult for UN weapons instructors (Drezner 2011). The humanitarian and political costs resulted from the Iraq sanctions caused considerable consternation in political circles. Humanitarian groups ranging from the Red Cross to Human Rights Watch questioned the ethics of comprehensive trade sanctions (Weiss 1999:500). Multiple UN agencies revealed their concerns about the Security Council's implementation of comprehensive sanctions (Reinisch 2001).

The 1990 sanctions against Iraq also highlight the spending choices target governments have to make under sanctions. Gordon (2010, 135) discusses the destroying impact of the sanctions on Iraqi government resources: 'One of the central goals of the sanctions was to deprive the Iraqi state of income by restricting oil exports. Because Iraq's social services and infrastructure were operated by the state, the reduction in oil revenues affected all of Iraq's economy and public services'. Yet, the government did not decrease all spending equally. The Iraqi government clearly prioritized some spending categories (such as the military) over others (such as public services), and sought to protect resources allocated for the former at the expense of the latter.

Iran has also been under economic sanctions for about four decades. Despite these sanctions, healthcare condition improved after the Islamic Revolution and such improvement was a result of healthcare programs taken by the state (WHO, 1996). Before tightening of the sanctions and in 2005, life expectancy was 70.4 for men and 73.5 for women. In 2018, this index increased to 75.4 and 77.6 for men and women respectively. In 2018, mortality rate was 12.4 per 1000 for infants, which was almost half of that in 2003, which was 24.2 per 1000. However, the current situation in Iran regarding medicine is indicative of unfavorable effects of sanctions on the general public and public health. Economic sanctions have reduced the ability of buying foreign medicine and raw materials by reducing the country income and the value of the national currency. Although it seems that medicine is not included in the list of sanctions, Iranian medical companies need to pay in advance for importation and this is due to limitations on the banking and insurance related transactions (Dastafkan et al 2020).

3. Literature review

The academic literature on the comprehensive sanctions does not support the effectiveness of sanctions. Galtung (1967) initially criticized the central logic of sanctions—that the higher the cost to the target the greater is the probability of success. Other studies indicate that sanctions are not consistently effective (e.g., Nincic and Wallensteen 1983; Wallensteen 1968). A considerable part of literature has concentrated on economic and political outcome of sanctions (Marinov 2005, Hufbauer et al 2007, Peksen and Drury 2010, Dizaji and Bergeijk 2013) and neglected their humanitarian impact.

Peksen (2007), apply a panel gravity model for the period 1975-2000. He finds that US sanctions hurt the trade between target and third party countries. Moreover, he finds that the negative impact of these sanctions on non-OECD countries is much higher than OECD countries. This is because OECD countries recover from trade disruption with target countries by finding new destinations for their trading products, whereas non-OECD developing countries do not have that much strong position in global markets to immediately change their trading partners and alleviate the negative impact of trade disruption. He shows that extensive unilateral sanctions damage trade more severe than limited sanctions.

Dizaji (2019a) examines the impact of lifting sanctions on political system and military expenditures in Iran. Using vector autoregressive (VAR) method and impulse response functions, he finds that the response of military expenditures to sanctions removal is positive and significant, whereas the response of political institutions is negative and significant.

Dizaji and Farzanegan (2021) investigate the short and long-term military impacts of sanctions in Iran over the period 1960-2017. They find that the United States unilateral sanctions do not decrease Iran's military expenditures significantly while multilateral sanctions, where the other countries also cooperate with the United States, decrease the military spending of Iran.

According to Hufbauer et al (2007) comprehensive sanctions are blunt instruments; although, they are designed to force the authorities of the targeted regime to change their behavior, but the economic impact of sanctions often hurts the innocent people. Whatever their effectiveness, critics of economic sanctions argue that the main impact is upon the civilian population in the target country who are incapable to protect themselves and often have little or no influence on the policies which sanctions are designed to change (Doxey 1999, Gordon, 2002; Al-Samarrai, 1995; Damrosch, 1993).
Garfield (1999) and Mueller & Mueller (1999) go further and explain that populations at war may be better off than those under sanctions because the Geneva Conventions control behavior in war but do not take care of sanctions. Since sanctions do not clearly discriminate between civilians and culprit authorities, they are viewed as unfairly punishing targeted publics.

Offering the concept of smart sanctions, proponents believe that targeted sanctions produce several important advantages including; the protection of innocent groups, exclusive targeting of political elites who have the capacity to adjust or change government policy and, therefore, greater overall effectiveness (Tostensen and Bull 2002). Von Soest and Wahman (2015) find that democracy sanctions imposing to facilitate popular participation in politics increase the level of democracy in sanctioned autocratic countries. Shagabutdinova and Berejikian (2007) also find smart financial sanctions to be more effective in their aim of altering targeted state's policy while having no hurtful effect on the human rights. Conversely, Gordon (2011) indicates that smart sanctions like arms embargoes suffer from poor coordination among the senders that makes them ineffective.

3.1 Sanctions and public health

Economic sanctions can deteriorate the public health by restricting access to food and medicine, as well as damaging economic prosperity and declining health care services (Gibbons and Garfield, 1999; Barry, 2000). Garfield (1999) mentions three key ways that leads to a reduction in health system in targeted countries; affecting the quality and quantity of available food and clean water, reducing the capacity of the public health system, and tightening of available resources that can reduce the capacity of curative medical services. Economic sanctions on agricultural products and inputs such as fertilizers and seeds lead to food shortage and food price inflation (Peksen, 2011). As noted by Grafield (1999), almost all sanctions legislation in recent decades has observed humanitarian exemptions, however, other sanctions limitations like disruption in commercial arrangements, complications in transportation, lack of capital to purchase and import goods, and also lack of ironclad assurances about the exemption of these goods from sanctions may cause a shortage of medicine, medical equipment and food in the targeted countries. Therefore, economic sanctions imposed on non-medical goods and spare parts may decline the efficiency of health system. For instance, trade limitations imposed on the products related to the distribution system of water and electricity led to disruption in health services in Cuba, Haiti and Iraq (Garfield 1999; Gibbons & Garfield 1999; Barry 2000), as the use of medical equipment include ambulances, X-ray facilities, and so on, depends on water and electricity system. Daponte & Garfield (2000) discuss that humanitarian exemptions may only have a limited supporting effect on the health of citizens and they just make sanctions to be politically more acceptable.

Economic sanctions reduce the government financial resources through affecting export and tax revenues in target countries; economic sanctions directly reduce the export revenues, and decrease government tax revenues from domestic economic agents, international trade, and financial transactions. The reduction in government revenue forces the state to cut healthcare services. As a result, the sanctioned country may spend less on medical infrastructure such as hospitals, health centers and health professionals (Peksen, 2011). Decisions made by leaders of sanctioned countries to allocate resources are important in affecting the health sector. When financial resources are reduced, leaders must make difficult decisions regarding the provision of public goods and services (Allen, 2005, 2008). The unequal distribution of resources in sanctioned country is potentially harmful effect of sanctions. The political elites allocate public resources to their own selves and goals in order to cope with economic pressures and as a result, social groups that are outside of the government's support will probably have less access to health services. This inappropriately affects the physical quality of the weakest elements of society and increases the human suffering imposed by the sanctions (Peksen, 2011).

In other words, when the overall budget falls as a result of sanctions, the government can only maintain high-priority security spending and has to implement significant reductions in other spending categories. Target leaders may try to maintain military spending to strengthen their position in the international dispute that led to the imposition of sanctions, since losing the dispute could mean the loss of office. In addition, governments can expand military spending as a way of providing benefits to their domestic supporters (Escribà-Folch 2012; Whitten and Williams 2011). To maintain military funding, target governments look for savings in low-priority policy areas, including education and health.

In addition, economic sanctions can reduce income of citizens and thus affect the amount of household expenditure on health care[4]. Economic sanctions exacerbate inflation and economic recession leading to unemployment and poverty. Thus, on the one hand, sanctions reduce people's ability to pay for health services and to maintain standards of living (Peksen, 2011) and on the other hand, deteriorating economic conditions and rising inflation can lead to a deviation in the allocation of household resources. In this situation, citizens will spend more to buy their essential goods (such as food, clothing, and housing) and

[4] - Hufbauer et al (2007), report that economic sanctions averagely reduce the country's GDP by 3%.

consequently less funding will remain for other spending such as healthcare and medicine (Daponte & Garfield 2000).

Ghobarah et al (2004) introduce four possible channels of the impact of political, economic, and military factors on health sector: level of resources available for allocation to public health, resources actually allocated to public health, productivity-efficiency of health system at utilizing allocated resources, exposure of population to risk factors. According to Allen & Lektzian (2013), sanctions directly affect the level of available resources and resource allocation, which weaken the health sector. After deteriorating the health sector, sanctions indirectly intensify the risk of death and disability. The outcome of these health impacts can be reflected in the important health indicators such as child mortality rate. Gupta et al (2003) find that a one percent increase in government health spending causes a double reduction in child mortality. Peksen (2011) examines the impact of sanctions on the child mortality rate as an indicator for the health sector. He finds that the negative impact of economic sanctions on public health depends on the scope of sanctions. In addition, when the United States is the sender of sanctions, this negative effect will increase. Allen and Lektzian (2013), compare the public health impact of sanctions to those associated with both civil and interstate conflicts. They find that when sanctions have a strong economic effect on the target country they create considerable negative impacts on public health. These impacts can be similar to those associated with major military conflicts. However, sanctions with negligible economic impact on the target do not cause severe impact on public health.

In a nutshell, economic sanctions can deteriorate the infrastructure of the health sector by reducing access to food and medicine, reducing government and household incomes, and consequently reducing allocated budget to health sector. The immediate direct effect of sanctions is not to increase the risk of disease and disability but rather to alter the calculations that leaders must make about the allocation of resources. To investigate the impact of economic sanctions on health sector, in this study, we consider public health expenditure as representatives of health system situation. Moreover, we divide the sanctions into two categories; smart and non-smart sanctions. Since the impact of sanctions on health sector is often indirect and through the income channel of targeted countries, it is expected that non-smart comprehensive sanctions have an extreme impact on health situation. On the contrary, the smart sanctions (e.g. arms embargo, travel bans, asset freezes), due to their weaker economic impacts, are most likely to not affect the health sector.

4. Research design

4.1 Data description

To empirically analyze the impact of economic sanctions on health expenditures, we utilize time-series cross-section data for 46 developing resource-based countries over the period of 2000-2016. As discussed earlier, the sanctions are more likely to influence the government spending behavior of the resource-based countries through affecting their resource revenues. Our calculations reveal that the global average of natural resources rents (as a percentage of GDP), during the period of this study is equal to 7.71%. Therefore, our sample comprises those developing countries, which their average natural resources rents (as a percentage of GDP) are above 7.71%.

Dependent Variable

In this study, government health expenditure is considered as dependent variable. The selection of appropriate health indicators requires a comprehensive assessment of different health indices. Health status measurements are divided in two categories: Objective (observed) health status, and Subjective (perceived) health status (Murray et al., 1994), so that each category has its own particularity. Cevik & Tasar (2013) argue that subjective health indicators that are based on health feeling self-assessment and self-reported are intensely affected by emotional experiences and cognitive biases arising from distinction between experiencing-self and remembering-self that introduced by Kahneman & Riis (2005). On the other hand, the objective health indicators are most likely to be affected by economic and political factors outside the health sector and they are more appropriate to capture the health impact of sanctions in relatively short periods. Therefore, we use the objective health index of government health expenditures in this study. Economic sanctions reduce available resources and subsequently decline allocated resources to public health sector that can lead to a decline in health system.

We apply three different forms of government health expenditures in our estimations, which allow checking the robustness of the findings to data specifications:

- (*ghexGDP*): Domestic general government health expenditure as a percentage of GDP
- (*ghexG*): Domestic general government health expenditure as a percentage of general government expenditures

- (*ghexPC*): Domestic general government health expenditure per capita, PPP

Independent Variables

To examine the impact of sanctions on government health expenditure, we use two types of sanctions, i.e. smart and non-smart sanctions. It is noteworthy that we consider smart and non-smart sanctions imposed by three different types of senders including the European Union (EU), the United States (US), and other member countries of the United Nations (other-UN), against the governments of the target countries (All sanctions episodes that are considered in this study are governmental sanctions).[5]

The smart sanctions include arms embargoes, travel bans and asset freezes.[6] We grade it on 0-3 scale for smart sanctions imposed by each of the three senders; where 0 represents the absence of smart sanctions by a particular sender (US, EU or UN) and 3 shows the most severe smart sanctions. The non-smart sanctions include comprehensive trade restrictions (exports and imports sanctions) and financial sanctions. We grade it on 0-3 scale for non-smart sanctions imposed by each of the three senders; where 0 represents the absence of non-smart sanctions and 3 shows the most severe non-smart sanctions imposed by each sender[7].

The relative economic size of the sender can be important in determining the effectiveness and outcome of the sanctions (Hufbauer et al 2007). Therefore, we have calculated the weighted averages for smart as well as non-smart sanctions imposed by three senders i.e., the European Union (EU), the United States (US), and other member countries of the United Nations (excluding the US and EU; *otherUN*). Where the weights are the ratio of the sender's GDP to the total GDP of all member states of the UN. Considering the type of the sanctions (i.e., smart and non-smart) and with respect to our definition of the weights (fixed or variable), we apply the following sanctions variables in our regression models:

- (*smartV*): weighted average of smart sanctions with variable weights
- (*nonsmartV*): weighted average of non-smart sanctions with variable weights
- (*smartF*): weighted average of smart sanctions with fixed weights

[5]- The detailed descriptions are in appendix.

[6]- It should be noted that when asset freeze imposes on the Central Bank of a country, due to its widespread impact on the target's monetary system, we consider it as a financial non-smart sanction.

[7] - Sanctions must be imposed for at least about 4 months within a particular year in order to be considered in our calculation of sanctions variable for that year.

- (*nonsmartF*): weighted average of non-smart sanctions with fixed weights

In order to calculate the weights related to the US sanctions, EU sanctions, and other member states of the UN sanctions, we suggest two different approaches, namely variable weights and fixed weights. We calculate the weighted averages of smart sanctions (*smartV*) and non-smart sanctions (*nonsmartV*) with variable weights as following:

$$smartV = (\mathrm{US}_t^{\text{variable weight}} \times \mathrm{US}_{it}^{\mathrm{SMART}}) + \left(\mathrm{EU}_t^{\text{variable weight}} \times \mathrm{EU}_{it}^{\mathrm{SMART}}\right) + (\mathrm{otherUN}_t^{\text{variable weight}} \times \mathrm{otherUN}_{it}^{\mathrm{SMART}}) \quad (1)$$

$$nonsmartV = \left(\mathrm{US}_t^{\text{variable weight}} \times \mathrm{US}_{it}^{\mathrm{nonSMART}}\right) + \left(\mathrm{EU}_t^{\text{variable weight}} \times \mathrm{EU}_{it}^{\mathrm{nonSMART}}\right) + (\mathrm{otherUN}_t^{\text{variable weight}} \times \mathrm{otherUN}_{it}^{\mathrm{nonSMART}}) \quad (2)$$

Where US_{it}^{SMART}, EU_{it}^{SMART} and $otherUN_{it}^{SMART}$ represent the smart sanctions imposed against country *i* and at time *t* by US, EU and other member states of the UN respectively. Similarly, $US_{it}^{nonSMART}$, $EU_{it}^{nonSMART}$ and $otherUN_{it}^{nonSMART}$ represent the non-smart sanctions imposed against country *i* and at time *t* by US, EU and other member states of the UN respectively. The variable weights enable us to have different weights for each sender in a particular year. They are represented as following:

$$\mathrm{US}_t^{\text{variable weight}} = \frac{\text{GDP of the US at time t}}{\text{total GDP of the UN contries at time t}} \quad (3)$$

$$\mathrm{EU}_t^{\text{variable weight}} = \frac{\text{total GDP of the EU countries at time t}}{\text{total GDP of the UN contries at time t}} \quad (4)$$

$$\mathrm{otherUN}_t^{\text{variable weight}} = \frac{\text{total GDP of the other UN contries (excluding the US and the EU) at time t}}{\text{total GDP of the UN contries at time t}} \quad (5)$$

As an alternative definition for capturing the impact of economic power of the sender, we calculate the ratio of its average GDP to the average GDP of the world (i.e., average GDP of the UN countries). This provides fixed weights for the smart and non-smart sanctions imposed by each sender over the period 2000-2016. Therefore, fixed weights avoid the immediate annual fluctuations related to the relative economic sizes of the senders.

Hence, we obtain *smartF* and *nonsmartF* by replacing the variable weights with fixed weights in equations (1) and (2).

The fixed weights for the senders are calculated as following:

$$US^{fixed\ weight} = \frac{\text{average GDP of the US over 2000}-\text{2016}}{\text{average GDP of the UN countries over 2000}-\text{2016}} \quad (6)$$

$$EU^{fixed\ weight} = \frac{\text{average GDP of the EU countries over 2000}-\text{2016}}{\text{average GDP of the UN contries over 2000}-\text{2016}} \quad (7)$$

$$otherUN^{fixed\ weight} = \frac{\text{average GDP of the other UN contries (excluding the US and the EU) over2000}-\text{2016}}{\text{average GDP of the UN contries over 2000}-\text{2016}} \quad (8)$$

Control Variables

Our empirical models also include several regressors that control for various socioeconomic and political characteristics of countries and their international environment that may affect governments' capacity levels and, consequently, their spending on Public health.

Lagged value of government health expenditures: We use one-year lag of government health expenditure to correct for the autoregressive process in the dependent variable. Government health expenditure is most likely to remain almost constant after one year. This can be due to the lack of dramatic fluctuations in the number of health workers in the country, the high stability of costs associated with maintenance of infrastructures in this sector and so on. We expect the lagged values of health expenditures used in the econometric simulations to be associated with higher contemporaneous levels of health expenditures. Moreover, inclusion of the lagged values of health expenditures helps to control for some excluded but potentially important variables in the model (Dizaji, 2016).

Democracy: We include Democracy to capture varying levels of political pressure on governments to deliver effective public policy. Human development and public health receive more attention in the countries with higher levels of democracy (Przeworski et al. 2000; Lake and Baum 2001). This is because democratic leaders have more incentives to channel the state revenues and resources to the service of the populace through the provision of public goods and services to get re-elected and remain in power. On the other hand, the autocratic leaders do not deal with electoral restrictions to remain in power. Hence, they do not need to spend greatly on public services to satisfy their ordinary people. The autocratic governments spend more on the military in order to save their political power (Prezeworsky et al 2000; Lake & Baum 2001; Buenodemesquita et al 2003; Peksen 2011; Dizaji et al 2016). We use *Polity2* indicator as the measure of political system (Marshall et al 2017). According to this data set the score of each country's democracy range from -10 to +10, so that the score +10 indicates the highest level of democracy. This index is based on three major characteristics of a political regime that include: the regulation, competitiveness, and openness of executive recruitment; executive constraints; and regulation and competitiveness of political participation.

Political violence: Involving in the armed conflicts can be associated with deteriorating of health status. At the first stage, they lead to death and disability as well as undermining of health service delivery mechanisms through damaging health infrastructures such as hospitals and health-care centers. In the next stage, these conflicts can affect the country resources and lead to a decrease of allocated budget on healthcare programs (Alen & Lektzian, 2013). In addition to international armed conflict, the civil wars raise some expenditure in order to stop conflicts so a lower amount of budget remains for welfare programs (Peksen, 2011). Political inequalities caused by ethnic issues can also lead to limited health budget that benefit minorities and transferring expenditures to other programs in favor of dominant ethnic group. It is evident that reducing the health system's efficiency during the war due to destruction of the health system, lack of physicians, and demographic population is likely to continue even after the war (Ghobarah et al 2004). In previous studies, different variables have been used for considering the health impact of military conflicts (such as civil war, international war, etc.). In order to take into account all these effects including civil, international, and ethnic conflicts, we use the comprehensive major episodes of political violence (*ACTOTAL*). This index is defined as the total summed magnitude scores of all societal and interstate major episodes of political violence in a state.

In addition to *ACTOTAL* variable and for further robustness test, we utilize other measurements capturing internal and external conflicts provided by International Country Risk Guide (ICRG) in separate models. Internal conflict (*intconf*) variable's value ranges from 0 to 12, in which minimum score is given to a country embroiled in an on-going civil war and maximum score is given to a country where there is no political violence and civil conflicts between government and its own people. External conflict (*extconf*) variable reflects both non-violent external pressure and violent external pressure. This variable also ranges from 0 to 12, where the maximum amount reflects low risk of external conflict and the minimum amount reflects high risk of conflict.

Economic wealth: the effect of economic wealth on development of health expenditure has been discussed in the literature (Alen & Lektzian 2013; Cockx & Franken 2014). Economic wealth can provide financial support for both state and private health actors to overcome public health problems by investing in hospitals and health technologies and improving the pool of human resources (doctors and health-care specialists) to provide health services (Pritchett & summer 1996; Lake and Baum 2001; Peksen 2011). In this study, we use GDP per capita (*gdpPC)* as an index of economic wealth and development. Using per capita form of GDP is helpful in order to control the effect of population size on health sector. More affluent and rapidly growing economies have a higher capacity to fund various spending programs; more populous countries, however, may have a lower capacity because they need to deliver public goods to more people.

Natural resource rents: Cockx & Franken (2014) indicate that dependency on natural resources have a significant negative effect on public health expenditure (as a percentage of GDP). The natural resource rents increase the unearned income of government and its autonomy (Moore, 2001). The autocratic rentier regimes are not relied on citizen's support to remain in power. Therefore, they have less incentive to engage in public expenditures and provide public goods such as health care. In this study, we utilize total natural resource rents[8] per capita (*rentPC*) and alternatively natural resource rents ratio to general government expenditure (*rentG*) in different models.

Corruption: Corruption may destroy state efficiency by preventing budget equilibrium, reducing expenditure efficiency and also skewing its allocation between different sectors. In fact, corruption can affect the allocated proportions of spending between economic sectors. This allocation effect is usually in favor of fuel, energy, cultural and defense sectors and at the expense of health, education and social sectors (Delavallade 2006). The control of corruption index has a range of -2.5 to 2.5 so that its maximum amount presents the lowest level of

[8] This indicator based on world bank definition is the sum of oil rents, natural gas rents, coal rents (hard and soft), and mineral rents.

corruption. According to Delavallade (2006) we modify this index to illustrate the level of corruption directly:

Corruption=2.5-control of corruption

This new variable's value ranges from 0 to 5, where the maximum amount presents the highest level of corruption.

Considering the advantages of the logarithmic model (including simple interpretations of coefficients as elasticities, modification of outliers, and etc.), we use the logarithmic form of government health expenditures, GDP per capita, resource rents per capita, internal and external conflicts in our estimations. Table 1 provides summary statistics for all of the variables utilized in the empirical analysis.

Table 1. Summary Statistics

Variables	Obs	Mean	Min	Max	Std. Dev
Log (Domestic general government health expenditure (% of GDP))	781	0.397222	-2.774800	1.592696	0.675202
Log (Domestic general government health expenditure (% of general government expenditure))	781	1.821694	0.036937	3.132714	0.517516
Log (Domestic general government health expenditure per capita)	781	4.388525	-1.261421	8.132979	1.762938
Smart sanction (fixed weight)	782	0.142388	0.0000	3.0000	0.523744
Smart sanction (variable weight)	782	0.143748	0.0000	3.0000	0.525157
Non-smart sanction (fixed weight)	782	0.067167	0.0000	1.948433	0.263535
Non-smart sanction (variable weight)	782	0.068574	0.0000	1.865199	0.265028
Log (internal conflict)	782	2.131799	1.386294	2.484907	0.177548
Log (external conflict)	782	2.252862	1.376244	2.484907	0.154571
ACTOTAL	782	0.643223	0.0000	7.0000	1.509449
Log (GDP per capita)	774	8.546935	6.075521	11.85393	1.380515
Log (Rent per capita)	774	6.751916	3.511154	10.94477	1.715167
Log (Rent (% general government expenditure))	776	4.229531	1.280534	6.101658	0.645413
Corruption	782	3.091535	0.9100	4.1700	0.650806

Polity2	782	0.832481	-10.0000	10.0000	5.937905

4.2 Methodology

In this study, we use the methodology of Generalized Method of Moments (GMM) to investigate the impact of smart and non-sanctions on health expenditures in developing countries. The GMM is helpful in order to control for endogeneity in panel data analyses (Arellano and Bond (1991), and Blundell and Bond (1998)).[9] This model is presented as following:

$$Z_{it} = \gamma_1 EX_{it} + \gamma_2 EW_{it} + v_i + \eta_{it}\ , \qquad i = 1, \dots, N; \quad t = 1, \dots, T \qquad (9)$$

where *Z* is a given dependent variable, *EX* denotes a vector of strictly exogenous covariates; *EW* represents a vector of predetermined covariates and endogenous covariates (we assume that the predetermined variables are correlated with past errors, while endogenous ones are correlated with past and present errors); v_i shows the unobserved group-level effect, and η_{it} denotes the error term, assuming that v_i and η_{it} are independent for each i over all t, and that there is no autocorrelation in the η_{it}.

The differenced form of Equation (1) is used to omit the unobservable group-specific effects:

$$Z_{i,t} - Z_{i,t-1} = \gamma_1\left(EX_{i,t} - EX_{i,t-1}\right) + \gamma_2\left(EW_{i,t} - EW_{i,t-1}\right) + (\eta_{i,t} - \eta_{i,t-1}) \qquad (10)$$

In order to solve the endogeneity problem of explanatory variables in Equation (10), the instrumental-variable approaches are used. To do this, the predetermined and endogenous variables in first differences are instrumented with suitable lags of the specified variables in levels, while strictly exogenous regressors are first-differenced for use as instruments in the first-differenced equation. Considering the fact that the lagged levels are often poor instruments for first differences, the efficiency of this instrumental approach can be relatively weak. The System-GMM approach, proposed by Blundell and Bond (1998), combine the first-differenced estimator (i.e., Equation (10)) with the estimator in levels (i.e., Equation (9)) to form a more efficient "system estimator": for the first-differenced equation, the instruments are the same as

[9] - Some further discussion on GMM estimation can be found in Green (2000, Chapter 11) and Wooldridge (2002, Chapter 8 and Chapter 14).

that mentioned above; for the levels equation, predetermined and endogenous variables in levels are instrumented with appropriate lags of their own first differences, while the strictly exogenous regressors can directly enter the instrument matrix for use in the levels equation.

The GMM panel estimator is useful in exploiting the time-series variation in the data, accounting for unobserved individual specific effects, and therefore providing better control for endogeneity of all the explanatory variables (Beck *et al*. (2000)).

5. Empirical findings

To avoid spurious regression estimations, we need to test the stationarity of the variables before estimating our GMM models. Thus, we apply Phillips-Perron (1998); Im, Pesaran, and Shin (1997); Levin, Lin, and chu (1993) unit root tests to test the existence of unit roots for the variables. The tests revealed that each of the variables is stationary at least based on one of the mentioned unit root tests[10]. In order to ensure our results in what follows, we estimate our regression models by using three government health expenditure indices and also to do further robustness check, we consider two types of weights for the averages of smart and non-smart sanctions, two different data bases for political violence, and two different definitions for natural resource rents proxies. We correct for the autoregressive process in the dependent variable using a one-year lag of the dependent variable in the models.

5.1.Impacts of sanctions on general government health expenditure (% of GDP)

Table 2 shows the effects of smart and non-smart sanctions on the ratio of domestic general government health expenditures to GDP in four different models. Models (1) and (2) apply the average of smart and non-smart sanctions with variable weights over time, while models (3) and (4) apply the average of these sanctions with fixed weights. In models (1) and (3), we use conflict (both internal and external) indexes while in models (2) and (4), we use *ACTOTAL* index of political violence alternatively.

The results of table 2 indicate that smart sanctions have a positive and statistically significant effect on domestic general government health expenditure (% of GDP) at 1% level in all models using averages of smart sanctions with both variable and fixed weights. On the other hand, non-

[10] The table of stationarity test (and also for more reassurance cointegration test) is included in appendix.

smart sanctions show a negative and statistically significant effect on domestic general government health expenditure (% of GDP) at 5% and 1% level in the models using variable weights and fixed weights for the average of non-smart sanctions respectively. The negative impact of non-smart sanctions confirms our expectation about its restricting impact on government financial sources and subsequently reducing government health expenditure. The comprehensive sanctions without targeting particular sectors may encourage the target regime to spend more on defense sectors by reducing the allocation of its restricted resources to social programs such as health issues.

The positive effect of smart sanctions is probably because restricting arms purchase of the target country or even foreign travels spending of authorities, intentionally or unintentionally, may create opportunity for the sanctioned regime to allocate its resources to social welfare program and health issues rather than arms imports and defense sector (Dizaji and Murshed, 2020). This will increase the government health expenditures as a share of GDP.

The coefficients for political violence index of *ACTOTAL* in models (2) and (4) indicate that an increase in violence has decreased the governmental health expenditure (% of GDP). This is probably because the international violence and civil war motivates the governments to shift the financial sources from health sector towards defense and security sectors in order to remove and counteract the violence. Focusing on obtained coefficients of non-smart sanctions and *ACTOTAL* (which both are in non-logarithmic form), it is evident that destructive impact of imposing export, import, and financial sanctions is far worse than political violence and war. This suggests that sanctions are not necessarily a humane alternative to armed warfare.

The coefficient of internal and external conflict variables in models (1) and (3) support the coefficients of *ACTOTAL* index in models (2) and (4). This indicates that when there are no political conflicts between government and society and also in the lack of external pressure, the composition of government expenditure will become in favor of health sector (as aforementioned, higher scores of internal and external conflicts represent the lower risks of internal and external violence). The results show that increase in wealth and per capita income has positive impact on domestic general government health expenditure as a percentage of GDP although we could only find the statistically significant coefficients in models (1) and (3).

As expected, the obtained coefficients for the natural resources rents per capita in all models indicate that increases in the natural resources rents per capita decrease the government health expenditure (% of GDP).This indicates that more dependency on natural resource rents has reverse impact on government spending on health. Contrary to our expectation, corruption variable has a positive effect on government health expenditure (% of GDP) in the models, however its coefficient is not statistically significant in most of the cases. This could be because the existence of corruption imposes extra costs on any contract in every sector.

The coefficient for *Polity II* reflects a positive and significant effect of democracy on health sector in all models. In a country with a high degree of democracy, the social and health status of citizens is important for national authorities to maintain people's votes (Besley and Kudamatsu 2006, Dizaji et al 2016).

In addition to the above variables, the positive and significant coefficients for the one-year lag of domestic general government health expenditure (% of GDP) in all models provide a strong support for a dynamic effect of government health expenditure in the models. Health expenditure has a certain degree of inertia, which does not allow for a fast and dramatic change. In other words, higher levels of health expenditure in the past are associated with higher levels of health expenditure in the present. Lagged levels of general government health expenditure (% of GDP) are significant at 1 percent in the models.

The applied instrumental variables used in GMM estimations should meet the following two conditions— being correlated with the suspected explanatory variables and uncorrelated with the error term in the regression models. The validity of the applied instrumental variables is examined by using an over-identifying restriction test such as that of Sargan (1958). The null hypothesis under the Sargan test is that the instruments are uncorrelated with the error term (Gundlach and Paldam, 2009). The amounts of (J-statistic) and their probability in the table 2 show validity of the instrumental variables used in the models.

Table 2. Sanctions impacts on general government health expenditures (% of GDP)

Dependent variable: ***ghexGDP***				
Independent variables	(1)	(2)	(3)	(4)
ghexGDP (-1)	0.548347*** (18.55484)	0.607659*** (28.80230)	0.615553*** (28.27995)	0.609921*** (27.20899)
SmartV	0.229065*** (3.712695)	0.206996*** (2.883506)		
nonsmartV	-0.258845** (-2.192584)	-0.239171** (-2.151565)		
smartF			0.266410*** (4.535923)	0.199096*** (3.075043)
nonsmartF			-0.281307*** (-3.207391)	-0.312288*** (-3.521592)
intconf	0.290506* (1.860221)		0.267657** (2.285646)	
extconf	0.393280*** (2.766260)		0.418737*** (4.087196)	
ACTOTAL		-0.060471*** (-5.260558)		-0.018394* (-1.767497)
gdpPC	0.259969*** (2.730115)	0.001386 (0.028266)	0.152518* (1.880442)	0.039693 (0.774479)
rentPC	-0.207148*** (-5.463148)	-0.069952** (-2.126778)	-0.147562*** (-4.881206)	-0.133290*** (-5.296283)
corruption	0.145188** (2.062678)	0.136736 (1.547479)	0.049239 (0.758470)	0.032778 (0.516966)
polity2	0.060001*** (5.974581)	0.054788*** (6.771312)	0.013087** (2.552772)	0.015709*** (3.186915)
J-Statistic	41.96583	43.46918	42.73728	42.43581
Prob(J-Statistic)	0.264328	0.249758	0.238252	0.285655

(Note: t-statistic in parentheses: coefficient*** are significant at the 1% level, ** at the 5% level and * at 10%).

5.2.Impacts of sanctions on general government health expenditure (% of general government expenditures)

In order to test the robustness of our results, we will estimate other models using domestic general government health expenditures (% of general government expenditure) as the dependent variable in table 3. The weighted averages of smart sanctions and non-smart sanctions with variable weights have been applied in models (1), (2) and (5) and their weighted averages with fixed weights are used in models (3), (4) and (6).

In models (2) and (4), we use *ACTOTAL* index to capture impact of political violence on the ratio of general government health expenditures to total government expenditure whereas we use alternatively internal and external conflicts indexes of ICRG in other models. To capture the impacts of natural resource rents, we apply two different forms of these variables in Table 3: per capita form of natural resources rents in models (1), (2), (3) and (4), and the ratio of natural resource rents to general government expenditure in models (5) and (6).

As previous regressions, the results of table 3 show that smart sanctions have raised domestic general government health expenditure (% of general government expenditure) in all models. In contrast, the impact of non-smart sanctions on domestic general government health expenditure (% of general government expenditure) are negative although these negative impacts are only significant for the calculated average of non-smart sanctions using variable weights represented in models (1), (2) and (5).

The negative and statistically significant coefficients of *ACTOTAL* in model (4) indicate that an increase in political international violence or civil war decreases the governmental health expenditure (% of general government expenditure). This is probably because the violence motivates the governments to shift the financial sources from health towards defense and security sectors in order to eliminate and counteract the violence. The negative impact of natural resource rents on government health expenditure (% of general government expenditure) are confirmed through models (1)-(6) while we have used this variable in both per capita form and as the ratio of total government expenditure.

By increasing wealth and per capita income, we will see a significant decrease in the government health expenditure (% of general government expenditure) through models (2), (4), (5) and (6). These results can suggest that by increasing GDP per capita in resource-based countries, the governments increase their non-health expenditures (e.g. defense expenditures) more than their health expenditures and this decreases the ratio of government health expenditures to its total expenditures. The results for corruption indicate that the coefficients of these variables are negative but not significant in all models. Polity variable has a positive and significant effect on government health expenditure (% of general government expenditure) in all models. This indicates that the countries with higher levels of democracy are more responsive and accountable to the voters to preserve their votes and probably offer more public goods and welfare programs, so it is expected that a larger share of government expenditure will be allocated to health sectors. As expected, we find a strong positive correlation between past and present values of the domestic general government health expenditure (% of general government expenditure). This shows the adhesion of government expenditure in this sector. The amounts of (J-statistic) and their probability in the table 3 confirm validity of the instrument variables used in the models.

Table 3. Sanctions impacts on general government health expenditures (% of general government health expenditures)

Dependent variable: *ghexG*						
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
ghexG(-1)	0.396530*** (13.19274)	0.387239*** (11.99312)	0.388371*** (12.31503)	0.383919*** (10.98592)	0.414649*** (11.49841)	0.405695*** (12.92476)
smartV	0.197489*** (3.307010)	0.195183*** (3.635364)			0.217066*** (3.669971)	
nonsmartV	-0.236144*** (-3.202943)	-0.248799*** (-2.638886)			-0.200327** (-2.021973)	
smartF			0.198011*** (3.111276)	0.175395*** (3.170722)		0.208874*** (3.823162)
nonsmartF			-0.078216 (-0.896977)	-0.042980 (-0.422338)		-0.42416 (-0.490794)
intconf	0.073632 (0.587341)		0.017261 (0.133453)		0.085814 (0.764572)	0.056194 (0.507969)
extconf	0.085232 (1.111431)		0.244821*** (2.983031)		0.048348 (0.474248)	0.207949** (2.479271)
ACTOTAL		-0.009513 (-1.430312)		-0.055152*** (-9.40000)		
gdpPC	-0.057495 (-1.274163)	-0.086236 ** (-2.045655)	-0.055878 (-1.206961)	-0.109975** (-2.439028)	-0.238060*** (-5.014231)	-0.224650*** (-4.861822)
rentPC	-0.122912*** (-6.488346)	-0.119431*** (-7.636153)	-0.116059*** (-5.769400)	-0.128243*** (-7.644547)		
rentG					-0.094879*** (-6.923739)	-0.092410*** (-7.015612)
corruption	-0.030666 (-0.891586)	-0.045714 (-1.162253)	-0.048663 (-1.213892)	-0.054485 (-1.127685)	-0.020410 (-0.527471)	-0.034243 (-1.006176)
polity2	0.030782*** (4.964574)	0.029355*** (4.361284)	0.033055*** (5.650131)	0.033136*** (4.109380)	0.027932*** (3.744484)	0.030405*** (4.423640)
J-Statistic	42.57130	42.23918	42.23872	42.16031	41.86206	41.78610
Prob(J-Statistic)	0.243715	0.292822	0.254905	0.295726	0.267968	0.270652

(Note: t-statistic in parentheses: coefficient*** are significant at the 1% level, ** at the 5% level and * at 10%).

5.3.Impacts of sanctions on general government health expenditure per capita

Table 4 examines the impact of smart and non-smart sanctions on government health expenditures per capita controlling for the other determinants of health expenditures through models 1-4. In models (1) and (2), we apply averages of smart and non-smart sanctions with variable weights while models (3) and (4) use averages of smart and non- smart sanctions with fixed weights definition. Models (1) and (3) apply the ICRG’s internal conflict and external conflict indicators to capture the impact of political violence. Alternatively, we use *ACTOTAL* index in models (2) and (4). Based on our expectations and consistent with previous results, smart sanctions have a positive and significant effect on general government health expenditure per capita in all models using both variable and fixed definitions of related weights. The down side is that, non-smart sanctions have an adverse effect on general government health expenditure per capita in all models.

Although the coefficients of both internal and external conflict variables are positive, only the effect of external conflict is statistically significant. These results show that in the absence of international political tensions, higher amount of budget will allocate to health sector. Moreover, the negative and significant coefficients of *ACTOTAL* index of political violence in models (2) and (4) confirm these findings. Focusing on the coefficients of *ACTOTAL* and non-smart sanctions variables in models 2 and 4, it is evident that non-smart sanctions have a more detrimental impact general government health expenditure per capita compared with political violence.

The noticeable positive effect of GDP per capita on government health expenditure per capita is evident from its significant coefficients in table 4. A one percent increase in per capita wealth leads to 0.63 percent, 0.57 percent, 0.63 percent and 0.59 percent increase in general government health expenditure per capita according to models (1), (2), (3) and (4) respectively. Additionally, a one percent rise in natural resources rents per capita will lead to approximately 0.19 percent, 0.20 percent, 0.19 percent and 0.20 percent drop in general government health expenditure per capita according to models (1), (2), (3) and (4) respectively.

The positive coefficient of corruption may indicate that probably the embezzlement expenses caused by corruption in the health sector increase the per capita government health expenditures in resource-rich countries. The obtained results for *polity2* illustrate positive effect of democracy on dependent variable. Like all previous models, the lag of dependent variable has positive and statistically significant effect in all models. The applied Sargan tests in all models of table 4 confirm the validity of the instrumental variables used in the models.

Table 4. Sanctions impacts on general government health expenditures per capita

Dependent variable: *ghexPC*				
Independent variables	(1)	(2)	(3)	(4)
ghexPC(-1)	0.570179*** (28.49066)	0.548811*** (32.23411)	0.574778*** (29.57265)	0.548460*** (34.06529)
smartV	0.539060*** (4.501375)	0.639966*** (3.545365)		
nonsmartV	-0.688950*** (-3.430021)	-0.907311*** (-4.231097)		
smartF			0.534255*** (4.828315)	0.609882*** (3.605831)
nonsmartF			-0.638093*** (-3.126942)	-0.927786*** (-4.438072)
intconf	0.131716 (0.810416)		0.164508 (1.089364)	
extconf	0.427793** (2.150942)		0.426383** (2.315080)	
ACTOTAL		-0.107548*** (-10.50503)		-0.105104*** (-10.64698)
gdpPC	0.633297*** (6.622771)	0.573188*** (6.734933)	0.634309*** (7.666066)	0.594851*** (7.150309)
rentPC	-0.187453*** (-6.367258)	-0.198597*** (-5.817971)	-0.186564*** (-7.027537)	-0.200123*** (-6.124197)
corruption	0.152917* (1.923657)	0.126063** (2.182791)	0.135549* (1.728050)	0.121092** (2.088388)
Polity2	0.047785*** (6.599745)	0.047824*** (6.405215)	0.047927*** (7.141480)	0.047636*** (6.744590)
J-Statistic	39.89310	38.46366	40.18816	38.54657
Prob(J-Statistic)	0.342725	0.448497	0.330862	0.444775

(Note: t-statistic in parentheses: coefficient*** are significant at the 1% level, ** at the 5% level and * at 10%).

6. Conclusion

Since World War I, economic sanctions have become popular tools for foreign policy. Between World War II and 1990 no one thought much about the humanitarian impact of sanctions. There was little noticeable humanitarian damage as they were not comprehensive. Later on, the comprehensive sanctions were criticized for their ineffectiveness and destroying externalities (Tostensen and Bull, 2002). Consequently, many scholars advocated for smart sanctions. These sanctions focus on specific aspects of the political leadership and/or economy of the targeted states, unlike comprehensive sanctions that tended to have negative consequences on the target's population (Brzoska 2003; Shagabutdinova and Berejikian, 2007; Portela 2016). Humanitarian concerns are often an important component in the calculus for initiating sanctions. Smart sanctions may be less effective but more humane than traditional trade sanctions. The studies that have been done so far are often anecdotal, case studies, and, in some cases, panel data without any distinction between smart and non-smart traditional sanctions. In this study, we expanded our scope and studied the human costs of sanctions in developing resource-based countries where resource revenues play a key role in influencing the government spending on health and non-health sectors. We have examined the impact of smart and non-smart on public health expenditure applying a dynamic Panel data method (GMM) for the period 2000-2016. The results of our empirical analysis indicate that smart sanction has a positive effect and non-smart sanction has a negative impact on domestic general government health expenditure (%GDP), domestic general government health expenditure (% general government health expenditure), and domestic general government health expenditure per capita. These findings imply that smart sanctions are more humane than non-smart sanctions in terms of their impact on public health expenditures.

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Appendix

Table A.1.Data sources

Variables	Data sources
Domestic general government health expenditure (% of GDP)	World bank- world development indicators
Domestic general government health expenditure (% of general government expenditure)	World bank- world development indicators
Domestic general government health expenditure per capita, PPP (current international $)	World bank- world development indicators
smart and non-smart sanctions (Variable and fixed weight)	www.federalregister.gov www.threasury.gov www.state.gov www.un.org www.unscr.com www.sanctionsmap.eu
ACTOTAL (Major episodes of political violence)	www.systemicpeace.org
The international country risk guide (internal conflict)	www.prsgroup.com
The international country risk guide (external conflict)	www.prsgroup.com
Corruption=2/5-control of corruption	World bank-The Worldwide Governance Indicators
Rent per capita, PPP (current international $) = (Total natural resources rents (% of GDP)) * (GDP per capita, PPP (current international $)) /100	World bank- world development indicators
Rent (% general government expenditure) = (rent (% GDP)) *1/ (general government total expenditure(%GDP))	World bank- world development indicators & International monetary fund outlook 2018
PolityII (Autocracy-democracy index)	www.systemicpeace.org
GDP per capita	World bank- world development indicators

Table A.2. unit root tests:

Variables		LLC			IPS		PP		
		None	Intercept & Trend	Intercept	Intercept & Trend	Intercept	None	Intercept & Trend	Intercept
ACTOTAL	Level	-1.36456 (0.0862)	0.09473 (0.5377)	-2.29222 (0.0109) (*)	0.05727 (0.5228)	-0.94495 (0.1723)	98.9739 0.0000 (*)	71.8171 (0.0007) (*)	56.4422 (0.0091) (*)
	1st differences	-10.3661 (0.0000) (*)	-4.41894 (0.0000) (*)	-1.99219 (0.0232) (*)	-6.29427 (0.0000) (*)	-6.86698 (0.0000) (*)	277.017 (0.0000) (*)	215.873 (0.0000) (*)	208.059 (0.0000) (*)
corruption	Level	-0.62245 0.2668	-1.53010 0.0630	-2.60328 0.0046 (*)	0.36250 0.6415	-0.75340 0.2256	91.9956 0.4805	107.351 0.1308	104.980 0.1675
	1st differences	-20.7365 (0.0000) (*)	-12.5972 (0.0000) (*)	-12.5891 (0.0000) (*)	-8.56436 (0.0000) (*)	-10.8061 (0.0000) (*)	673.980 (0.0000) (*)	480.786 (0.0000) (*)	496.935 (0.0000) (*)
gdpPC	Level	7.36906 1.0000	4.15570 1.0000	-5.98304 0.0000 (*)	5.68297 1.0000	1.71383 0.9567	11.6387 1.0000	35.5434 1.0000	91.4222 0.4974
	1st differences	-5.68591 (0.0000) (*)	-7.28133 (0.0000) (*)	-2.60697 (0.0046) (*)	-2.38153 (0.0086) (*)	-2.14384 (0.0160) (*)	252.465 (0.0000) (*)	240.198 (0.0000) (*)	213.133 (0.0000) (*)
ghexGDP	Level	0.73817 0.7698	0.09123 0.5363	0.21373 0.5846	2.18889 0.9857	2.84761 0.9978	104.049 (0.1838)	127.796 0.0081 (*)	89.4955 0.5545
	1st differences	-16.9295 (0.0000) (*)	-6.64876 (0.0000) (*)	-7.75383 (0.0000) (*)	-6.10783 (0.0000) (*)	-8.89444 (0.0000) (*)	752.596 (0.0000) (*)	517.846 (0.0000) (*)	588.222 (0.0000) (*)
ghexG	Level	1.55515 (0.9400)	-0.23834 (0.4058)	-0.23949 (0.4054)	1.29122 (0.9017)	0.40780 (0.6583)	69.2371 (0.9633)	129.078 (0.0065) (*)	144.449 (0.0004) (*)

	1st differences	-18.3590 (0.0000) (*)	-5.93416 (0.0000) (*)	-8.23597 (0.0000) (*)	-7.17171 (0.0000) (*)	-9.90827 (0.0000) (*)	740.723 (0.0000) (*)	534.640 (0.0000) (*)	585.919 (0.0000) (*)
ghexPC	Level	8.32468 (1.0000)	1.63026 (0.9485)	-0.39723 (0.3456)	3.70134 (0.9999)	4.77916 (1.0000)	20.4408 (1.0000)	91.4460 (0.4967)	84.9480 (0.6859)
	1st differences	-11.8942 (0.0000) (*)	-4.53636 (0.0000) (*)	-5.73600 (0.0000) (*)	-4.62979 (0.0000) (*)	-7.07992 (0.0000) (*)	625.948 (0.0000) (*)	484.802 (0.0000) (*)	531.178 (0.0000) (*)
smartF	Level	-1.23994 (0.1075)	0.36428 (0.6422)	-1.09840 (0.1360)	0.85432 (0.8035)	0.04072 (0.5162)	22.7076 (0.1218)	24.6795 (0.1340)	11.2254 (0.7954)
	1st differences	-5.28959 (0.0000) (*)	-4.15634 (0.0000) (*)	-2.48179 (0.0065) (*)	-2.65447 (0.0040) (*)	-3.23860 (0.0006) (*)	122.311 (0.0000) (*)	94.4777 (0.0000) (*)	84.1524 (0.0000) (*)
nonsmartF	Level	-1.61529 (0.0531)	2.41896 (0.9922)	-0.21148 (0.4163)	1.60448 (0.9457)	-0.33963 (0.3671)	8.33597 (0.4014)	4.56971 (0.8024)	5.33284 (0.7215)
	1st differences	-3.30804 (0.0005) (*)	-1.51557 (0.0648)	1.88910 (0.9706)	-0.96436 (0.1674)	-1.51323 (0.0651)	49.2152 (0.0000) (*)	31.7472 (0.0001) (*)	29.6775 (0.0002) (*)
smartV	Level	-1.14744 (0.1256)	0.21612 (0.5856)	-0.55706 (0.2887)	0.57756 (0.7182)	0.09964 (0.5397)	41.1799 (0.0014) (*)	27.4722 (0.0706)	53.2389 (0.0000) (*)
	1st differences	-6.73097 (0.0000) (*)	-3.97746 (0.0000) (*)	-4.24018 (0.0000) (*)	-3.2E+15 (0.0000) (*)	-5.7E+15 (0.0000) (*)	122.625 (0.0000) (*)	91.3194 (0.0000) (*)	85.3447 (0.0000) (*)

nonsmartV	Level	-1.69395 (0.0451) (*)	-2.78902 (0.9974)	-1.39001 (0.0823)	-2.06449 (0.9805)	-0.57636 (0.2822)	12.1979 (0.2720)	4.79566 (0.9044)	6.63559 (0.7593)
	1st differences	-5.26972 (0.0000) (*)	-2.75078 (0.0030) (*)	-1.44603 (0.0741)	-1.87708 (0.0303) (*)	-1.85840 (0.0316) (*)	58.8290 (0.0000) (*)	47.3686 (0.0000) (*)	35.2397 (0.0001) (*)
intconf	Level	-3.39491 (0.0003) (*)	-6.90862 (0.0000) (*)	-6.77746 (0.0000) (*)	-4.95774 (0.0000) (*)	-5.65188 (0.0000) (*)	92.1426 (0.4762)	317.534 (0.0000) (*)	557.399 (0.0000) (*)
	1st differences	-24.2982 (0.0000) (*)	-13.6175 (0.0000) (*)	-15.0778 (0.0000) (*)	-10.7544 (0.0000) (*)	-14.7389 (0.0000) (*)	765.506 (0.0000) (*)	506.583 (0.0000) (*)	606.350 (0.0000) (*)
extconf	Level	-2.66649 (0.0038) (*)	-12.4176 (0.0000) (*)	-11.4055 (0.0000) (*)	-1.2E+11 (0.0000) (*)	-1.4E+11 (0.0000) (*)	101.331 (0.1947) (*)	199.413 (0.0000) (*)	656.114 (0.0000) (*)
	1st differences	-25.1992 (0.0000) (*)	-2.32398 (0.0101) (*)	-8.21395 (0.0000) (*)	-10.9698 (0.0000) (*)	-14.2885 (0.0000) (*)	606.335 (0.0000) (*)	393.271 (0.0000) (*)	451.826 (0.0000) (*)
Polity2	Level	-0.30914 (0.3786)	-3.25723 (0.0006) (*)	-6.70967 (0.0000) (*)	-6.9E+13 (0.0000) (*)	-8.7E+13 (0.0000) (*)	79.9483 (0.1950)	130.091 (0.0000) (*)	531.504 (0.0000) (*)
	1st differences	-10.8236 (0.0000) (*)	-9.75467 (0.0000) (*)	-6.02758 (0.0000) (*)	-6.08307 (0.0000) (*)	-7.51816 (0.0000) (*)	510.084 (0.0000) (*)	366.734 (0.0000) (*)	374.382 (0.0000) (*)
rentPC	Level	2.75116 (0.9970)	1.97848 (0.9761)	-5.71388 (0.0000) (*)	3.07541 (0.9989)	-1.88010 (0.0300) (*)	38.8121 (1.0000)	80.5985 (0.7963)	79.4910 (0.8207)
	1st differences	-15.2815 (0.0000) (*)	-12.0964 (0.0000) (*)	-8.31323 (0.0000) (*)	-6.22357 (0.0000) (*)	-6.33510 (0.0000) (*)	523.761 (0.0000) (*)	432.927 0.0000 (*)	358.235 (0.0000) (*)

rentG	Level	-2.49907 (0.0062) (*)	-1.34545 (0.0892)	-1.34411 (0.0895)	0.93525 (0.8252)	0.64869 (0.7417)	94.8328 0.3991	69.0333 (0.9647)	65.2044 (0.9845)
	1st differences	-18.5879 (0.0000) (*)	-11.3428 (0.0000) (*)	-9.97129 (0.0000) (*)	-7.14066 (0.0000) (*)	-8.62490 (0.0000) (*)	642.090 (0.0000) (*)	474.746 (0.0000) (*)	433.708 (0.0000) (*)
(*) =Significance at the 5% level									

Table A.3. KAO cointegration test

Models	Sanction variable	t-statistic
Table 2 – first model	Variable weight	-9.971925 ***
Table 2– second model	Variable weight	-9.019702 ***
Table 2 – third model	Fixed weight	-10.05382 ***
Table 2 – fourth model	Fixed weight	-8.996996***
Table 3 – first model	Variable weight	-9.347352 ***
Table 3 – second model	Variable weight	-8.818577 ***
Table 3 – third model	Fixed weight	-9.381013 ***
Table 3– fourth model	Fixed weight	-8.837798 ***
Table 3 – fifth model	Variable weight	-9.789182 ***
Table 3– sixth model	Fixed weight	-9.822772 ***
Table 4– first model	Variable weight	-10.08074 ***
Table 4– second model	Variable weight	-9.653965 ***
Table 4– third model	Fixed weight	-10.14596 ***
Table 4– fourth model	Fixed weight	-9.688169 ***
Note: *** means significance at the 1% level.		