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*“The Impact of Economic and Political Sanctions on Economic Growth.
A panel Data Analysis”*



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ABSTRACT

Despite their increased popularity, economic sanctions are under heavy criticism for their low success rate. We address the above issue by introducing a framework that capitalizes on sanction diversity. This study has two main purposes: At first, to investigate the impact of sanctions to the target economy. Secondly to demonstrate that the estimated effect depends on a series of factors which characterize each sanction episode. Those factors are distinguished between the ones determining the prevailing political and economic conditions of the sanctioned state and those focusing on specific characteristics of the sanctions. Using extensive data for 717 sanction episodes from 1970 till 2012, we examine the conditional impact of sanctions. The results of the dynamic panel model reveal that the application of sanctions significantly decreases economic growth. However this effect depends on the political and economic institutional environment of the sanctioned country. Developing countries are more sensitive to sanctions than developed ones, autocracies are more severely affected than democracies and trade open economies suffer greater hardships as opposed to relatively autarkic ones. In addition, specific sanction features, such as the type of measures employed or the presence of a threat also determine their effectiveness. On the basis of the results it is concluded that the successful application of sanctions as a foreign policy instrument, requires a detailed investigation that accounts for the specific aspects of each episode.

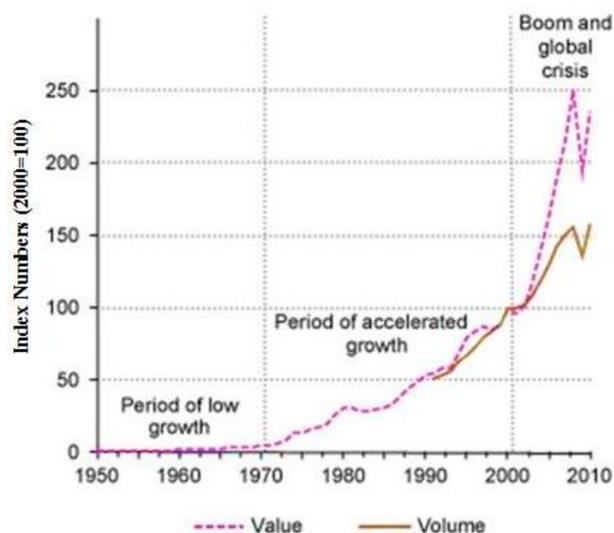
SECTION I : INTRODUCTION - THEORETICAL FRAMEWORK

1. Introduction

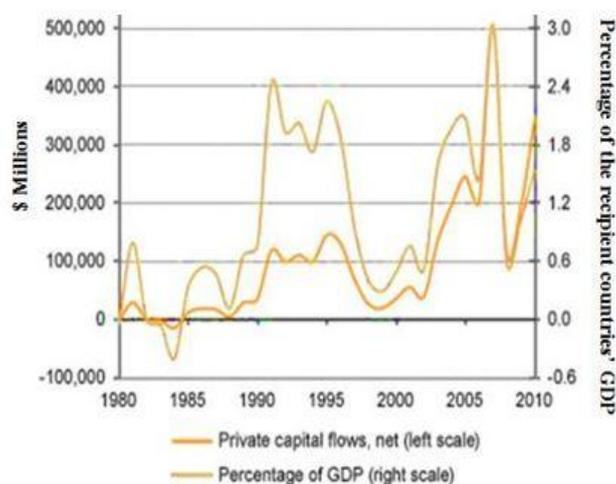
A considerable part of the international economics literature (Redding and Schott, 2003; Fujita et al., 1999) focuses on the importance of strong economic and political bonds between different countries. Such interrelations increase their adaptive capacity, facilitating them in overcoming challenges like recession or unemployment. As a result, they promote economic growth. Extensive multinational cooperation is a vital characteristic of the modern global environment. This is clearly manifested in the unprecedented increase in the value and volume of traded goods and services in the last four decades (Graph 1¹). Similarly, the dynamics of international capital mobility towards transition and developing economies (Graph 2²) exhibit an upward trend for the last 30 years.

Further evidence of the constantly growing interdependence of modern economies is provided by the KOF Globalization Index (Graph 3). This is a composite measure intended to capture the degree of political, economic and social integration. The clear upward trend of the overall indicator in the last 28 years is mainly attributed to its economic dimension. At the same time, social integration (the dissemination of information and ideas) is more time – demanding and results in slowing down the globalization process.

The complementarities between economic growth and globalization are extensive and bilateral (Samimi et al., 2014). However the highly integrated international environment increases the exposure of domestic economies to adverse macroeconomic policies, such as the contraction in foreign direct investment (FDI) or lower-than-committed aid. The above is particularly accurate for the developing world. The vulnerability of less developed countries is increasing with the integration



Graph 1– Long – Term Trends in Value and Volume of Merchandise Exports, 1950-2010

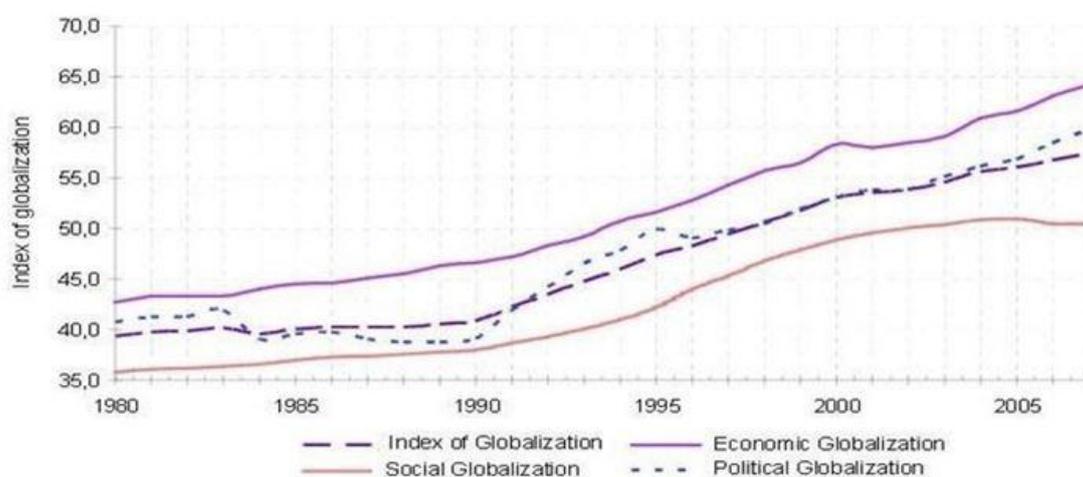


Graph 2 – Net Private Capital Inflows Towards Developing and Transition Economies, 1980-2010

¹Source: UNCTAD secretariat calculations, based on *UNCTADstat* and CPB Netherlands Bureau of Economic Policy Analysis, *World trade database*

²Source: UNCTAD secretariat calculations, based on IMF, WEO October 2011

of global economy. Such vulnerability is mainly attributed to their greater dependency on FDI, remittances and trade inflows or their inadequate financial reserves (IMF, 2009a; 2009b). Similarly, developed economies can exploit the dependency of developing ones on their financial and trade agreements to pursue their own political and economic interests. Recent examples document cases in which developed countries threatened developing ones with aid withdrawal if certain demands concerning domestic or international policies were not met³. Consequently, the complex network of current international interdependencies contributes to the utilization of a rather flexible means of dispute settlement: the application of sanctions. Its' flexibility rests on the fact that sanctions are stricter than verbal negotiations but simultaneously more liberal than military conflict, thus facilitating peaceful conflict resolution.



Graph 3– The Dynamics of the KOF Globalization Index

Albeit sanctions enjoy notable appreciation in the international negotiations context, serious concerns have been raised as to their effectiveness. Prominent place in the respective empirical literature is held by Hufbauer et al. (1990). Their study provides some rather pessimistic results on sanctions' ability to incur the favorable policy changes, thus enhancing the ongoing debate. This thesis directly examines the potential of economic and political disincentives to induce compliance by imposing significant economic hardships to the target state. However instead of assessing the general impact to the target economy, a differentiated approach is adopted: We attribute special attention to *sanction heterogeneity*, a characteristic not sufficiently addressed till now. The main argument is that the imposition of sanctions is a rather complicated process, with the final outcome of each individual episode determined by its' unique conditions and aspects.

Sanctions are triggered by a wide variety of economic, political and environmental policies or serve multiple purposes (proactive, punitive or demonstrative).

³ Recent (03/12/2014) example is the one of Japan threatening Solomon Islands with aid suspension if rights to a lucrative nickel deposit were not assigned to a Japan state-linked corporation. Literature also documents numerous examples of the global donor community issuing aid programs to the Palestinians in the West Bank and Gaza Strip conditional on their participation in the international peace process. (The Guardian 3rd of December 2014 and Wikipedia)

Furthermore they are also instigated unilaterally or multilaterally and implemented by different instruments, like asset freeze, travel bans, partial or total embargoes. In addition, they target countries at various levels of political or economic status (developed or developing, democratic or autocratic). All the above contribute to their increased heterogeneity. We contend that each sanction episode is unique by means of its' characteristics and no two sanction episodes in the literature can be considered perfectly identical. In turn, this is mainly responsible for the vigorous debate among scholars as to the identification of "hard rules" determining their effectiveness (Hufbauer et al., 1990).

Empirical literature so far focused on the general impact of sanctions to the target state (Pape, 1997; Peksen, 2009). However, analyzing their general effect conceals the differences between differentiated sanction episodes. Even in cases that the quantitative effect of economic disincentives is assessed (Peksen and Drury, 2010; Caruso, 2003; Neuenkirch and Neumeier, 2014) the fundamental issue of sanction heterogeneity is not sufficiently considered. This is the exact gap in the literature this study aspires to fill. The identifying assumption of our approach is based on a more systematic recognition that different types of sanctions affect the target economy through different channels. Furthermore, it is argued that the impact of sanctions differs across sanctioned states, dependent on their economic and political institutional environment. In this thesis, we identify the determinants of sanction effectiveness among the political and economic conditions of the target state and the features of the imposed measures (such as the identity of the sender or the type of measures). In such a way, we investigate the *conditional impact* of sanctions.

This study is conceptually and methodologically related to the one by Neuenkirch and Neumeier (2014). However, our main contribution is that we capitalize on sanction diversity by constructing a rather detailed classification of sanctions (based on extensive data for 717 sanction episodes for 153 countries). This allows the investigation of the conditional impact of each sanction category to the target state. To address sanction complexity adequately, the analysis is conducted in a rather detailed way. Such an approach is necessary to identify the exact prerequisites that render a sanction episode effective. It is argued that retaining the specificity of each episode will generate more targeted results and consequently rather significant policy implications.

The results verify our argumentation towards the conditional impact of sanctions. As far as the characteristics of the target state are concerned, we conclude that sanctions' effect heavily depends on the economic status of the target country. Our model outcomes reveal that developing countries are affected more severely (Lam, 1990; Jing et al., 2003). Additionally, we find greater vulnerability of economies largely exposed to international trade (van Bergeijk, 1994). Investigating the impact of sanctions conditioned by the institutional arrangement of the target state, we conclude that autocracies are more sensitive than democracies to the adverse effects from the imposed measures (Lektzian and Souva, 2003).

A sanction characteristic of increased importance is the incorporation of a threat to issue economic or political measures before the actual sanction imposition (Smith, 1996; Dashti-Gibson et al., 1997). Towards this, our models show that credible threats for sanctions exert a significant negative effect to the target economy. Consequently threats are found to be critical parts of sanction episodes, able to induce compliance. Such an outcome alters the international negotiations framework by providing a new and highly liberal tool in the hands of policy makers. Adding to the debate about the conditional impact of threats, we came across significant adverse effects of those against trade and aid agreements. In contrast, threats against the economic structure of the target state were not found able to impose significant disutility. Therefore the conducted analysis verifies the conditional impact of threats. Moreover it contributes to the dominance of threats against trade and aid agreements in inducing the favorable policy change.

The remainder of the thesis is organized as follows: In Section 2 we present the framework of the analysis and provide a review of the literature on sanction effectiveness. Section 3 constitutes the data and methodology part. On this part we provide the necessary details of the dataset employed. In the same section, we also introduce the applied methodology. The results from the corresponding analysis are presented in Section 4. Finally Section 5 consists of the conclusions and the policy implications as well as some suggestions for future work.

2. Theoretical Framework

2.1 *Theoretical Background*

In this thesis, the following definition of sanctions is utilized:

Sanctions constitute a rather specific method of intervention based on coercive measures imposed by one country, an international organization or a coalition of countries against another country – the government or any group within the country – with the aim of bringing about a change in a specific policy or behaviour. (Folch, 2010: p.2)

Economic diplomacy plays an increasingly important role in the post - Cold war era. Many great powers in the world, such as the US or Russia appear disinclined to use extensive military force to resolve disputes. Instead they often adopt more liberal alternatives, like the application of economic sanctions. In such a way, they promote their international interests without incurring the adverse humanitarian costs of a large-scale military conflict. The attractiveness of economic sanctions is extensively documented in the respective literature. Van Bergeijk (1995) summarizes the main reasons contributing to the increased utilization of sanctions: Constantly expanding trade relationships and trade policy considerations, the process of globalization, the proliferation of weapons of mass destruction or the related technology and finally scale economies in the implementation of sanctions.

Despite the increased application of sanctions, the debate on their success rate is vigorous. As to an appropriate indicator of their success, prominent place is held by the index devised by Hufbauer et al. (1990). The overall index takes into consideration both the policy change on behalf of the sanctioned state and the sanction contribution to the above outcome. At least partial compliance due to the imposition of sanctions denotes a successful sanction episode⁴. Voluminous empirical research reporting low success rate of the imposed measures⁵ (Hufbauer et al., 1990; Pape, 1997; Morgan and Schenbach, 1997; Elliott, 1998) intensifies the involved skepticism. Similarly, prominent examples of unsuccessful sanction episodes (UN sanctions against Haiti in 1991⁶) raise additional concerns regarding their successful application.

However the disappointing results reported in the literature are mainly attributed to measurement issues. Earlier studies on sanction effectiveness lack comprehensive data on threatened but not imposed sanctions. Empirical analysis verifies the conventional wisdom that those are the most successful cases. Drezner (2003)

⁴ Hufbauer et al. (1990) construct an index system as follows: The first constituent uses an index scaled from 1 to 4 to measure the policy outcome (failure, unclear, partial success and complete success), The second part identifies the contribution of sanctions (negative, no contribution, substantial and decisive). Their multiplication leads to an index measuring the “success score” from 1 to 16. A score above 9 denotes a successful sanction episode.

⁵ Hufbauer et al. (1990) employ a bivariate analysis with a dataset from 1970 till 1990, finding a success rate of 34% (41 in 115 cases). Pape (1997) reconsiders the above dataset and argues that only 5 out of 115 cases can be considered successful. Finally, Morgan and Schenbach (1997) model 175 cases of dispute settlement only to find that the application of sanctions did not significantly influence the dispute outcome towards the party attempting to change the questionable policy. Elliott (1998) reports that only 13% of US sanctions from 1970 till 1989 were successful

⁶ UN Security Council Resolution 841 placed various sanctions on Haiti (arms and petroleum embargo, traffic bans, asset freezes). The above measures resulted in severe effects for the rural poor but left the entrenched elite relatively unaffected.

suggests that if targets expect to comply they will do so in the threat stage, avoiding the economic and humanitarian costs of the imposed measures. Due to the exclusion of such cases, the reported studies suffer from selection bias (Ang and Peksen, 2007). Furthermore, there is absence of objective measures for sanction success in the literature. Therefore the ambiguity on the criteria that determine a successful episode is reinforced, thus questioning the reliability of model outcomes (McGillivray and Stam, 2004).

To reduce the ambiguity on sanction effectiveness⁷, we construct our framework (Graph 4) based on earlier theoretical insights (Dashti-Gibson et al., 1997; Drury, 1998; Hart, 2000). The above studies identify some of the characteristics of the involved states and the imposed measures that affect the success rate of sanctions. This study complements the aforementioned literature through a relatively more detailed approach. The applied framework consists of three theoretical concepts and two connecting relationships. In brief, the analysis is materialized in two separate steps. At first, we investigate whether sanctions are able to impose economic disutility to the target state. Thus, we evaluate sanction effectiveness. Once the significant impact is established, we argue in favor of a positive relationship between the severity of the imposed costs and the decision to comply. In the sanctions literature (Jentlesson, 2000; Lopez, 1999), there is no easily discernible mechanism that can translate social suffering into policy change. As a result, we attribute the target governments' decision to alter the debatable policy to the severity of the effects on the intermediate targets within the sanctioned country.



Graph 4– Theoretical Framework

The first theoretical concept of the proposed framework refers to the application of sanctions. Our scope at this stage is twofold. Firstly, to investigate whether the imposed (and/or threatened) measures incur significant disutility to the sanctioned economy. Such significant effects constitute the foundation of the analysis. To maintain their central role, we formulate the first research hypothesis:

H₁: Economic and political sanctions impose significant negative effects to the target economy.

Secondly, we capitalize on sanction diversity. Specifically we emphasize on the argument that different types of sanctions affect the leaders and the population in various political systems, in different ways (Brooks, 2002). Such an approach

⁷ At this point it is informative to make a distinction between a *successful* and an *effective* sanction. As far as this study is concerned, a successful sanction is one that induces compliance, while effective is the one that accomplishes the intermediate targets of the sender nation (such as imposing adverse effects to the target economy).

highlights the conditional impact of sanctions, which constitutes the cornerstone of our analysis. According to the underlying assumption, sanction imposition is a highly diversified tool. Its' impact is affected by a series of factors. Those are closely associated with the social and economic conditions of the states involved as well as the characteristics of the episodes themselves.

In particular, sanctions can be administered for a wide range of questionable policies, including cases of territorial dispute, domestic oppression, or environmental protection. Hence, the purpose of sanctions designates the type of measures applied. In turn, different types of measures are expected to impact the target state in a different way. To elaborate, smart⁸ sanctions are anticipated to impose disutility on the ruling elite, leaving the general population relatively unharmed. On the contrary, forms of trade sanctions such as total embargoes impact the general population. Similarly, the effect of sanctions is also influenced by the economic conditions of the target state. Economic weakness of the receiving country is considered to greatly affect the impact of sanctions (Hufbauer et al., 1990; Lam, 1990). Likewise, the type of political institutions in the receiving state is a major determinant of sanction effectiveness. To illustrate this, Cortright and Lopez (2000) as well as Nooruddin (2002) find that democracies are more likely to comply than autocracies.

Consequently we propose that the impact of sanctions is a multi-dimensional issue which depends on the specific situation of dispute settlement. The above idea was acknowledged by conventional studies (Brooks, 2002). However it was not sufficiently modelled. Instead, studies on sanctions so far focused on their overall effect. The proposed framework is differentiated in the sense that we investigate the quantitative effects of the unique factors that define each sanction episode. Such factors are potential determinants of sanctions' effectiveness. Focusing on individual impact rather than their overall effect can be a critical explanation for the low rate of sanction success reported in the literature. In Section 2.2 we review the existing literature to provide a more refined presentation of various sanction characteristics that are expected to influence the effect of sanctions.

We investigate the effect of each sanction category to the various social groups within the target country by applying separate model specifications. This approach leads to accurate policy implications. Such policy suggestions would bridge the gap between theory and practice of sanction effectiveness. To formally examine the conditional impact of sanctions, we specify the following research hypothesis:

H₂: The individual characteristics of sanctions and the involved states determine the impact of the imposed measures.

On the whole, the rather crucial element in the first part of the framework is to assess the overall as well as the specific effect of each sanction category to the target state. In

⁸ Drezner (2003) defines smart sanctions as: "...measures that are tailored to maximize the target regime's costs while minimizing the target populations' suffering". Examples are: travel bans or international asset freeze.

terms of the graph presented (Graph 4) we investigate the strength of the relationship connecting the sanctions with the intermediate target.

In the second building block of the framework, we assess the impact of sanctions to the target country. To this end, choosing the most relevant intermediate target within the sanctioned economy is highly important. The appropriateness of the intermediate target is tightly associated with the sanctions' objective. Specifically, we argue that the aim of the sanctions defines at first the type of measures applied. In turn, the type of measures imposed determines the suitability of the intermediate target. For instance, trade sanctions are employed to incur extensive economic hardships. Accordingly, an appropriate intermediate target for such measures is the decrease in the volume of trade between the sender and the target states (Hufbauer et al., 2009).

A variety of sanction types is employed in our analysis, such as trade or financial ones. This results in considerable ambiguity as to the choice of a single instrument to evaluate their effectiveness. To reduce the involved ambiguity, we employ the growth rate of the GDP per capita in the target state. We utilize the above intermediate target to investigate the severity of the imposed hardships on the general economic environment.

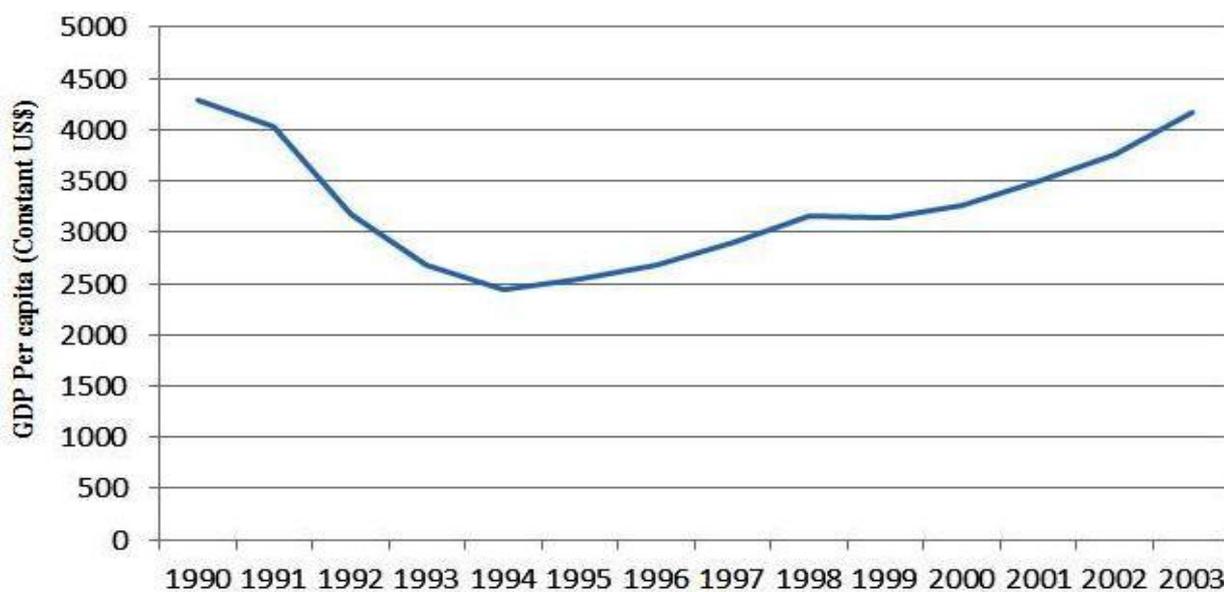
In the final pillar of our framework we refer to sanctions' ability to induce compliance. In terms of Graph 4 this is depicted by the arrow connecting the intermediate targets with the achievement of the ultimate goal. Prominent empirical studies (Doxey, 1980; Crawford, 1999) conclude on the absence of an unambiguous mechanism that forces the target government to comply with the senders' demands. The complexity and heterogeneity of sanction goals contribute to the absence of such a process. However the conventional wisdom that substantial economic costs compel leaders of sanctioned states to acquiesce to the senders' demands is verified in the literature (Galtung, 1967; Lindsay, 1986; Nossal, 1989). The root assumption of the above argument is that the economic hardships imposed to the target population result in pressure exerted to their leaders to change the policy under dispute. Additionally, the pressure to the target government increases with the severity of the imposed disutility. To summarize, the rate of sanction effectiveness is a strong determinant of their potential for success.

However the economic costs of sanctions are not the only determinants of the decision to comply. The underlying explanation is twofold: At first, there is no easily distinguishable path that associates the economic issue of severe costs with the political one of policy change. As is often the case (mainly in autocratic regimes), the ruling elite can secure themselves against anti-governmental activity and continue applying the questionable policy. Therefore, to induce compliance, sanctions must also impose political costs, apart from the economic ones (Morgan and Schenbach, 1997). However, investigating the political costs of the imposed sanctions as well as their effect is outside the scope of this analysis.

The discussion so far clarified the importance but also the insufficiency of severe economic costs for a successful sanction episode. To further illustrate this, we resort to two examples from the literature. The episodes presented below are considered rather effective in terms of imposing considerable hardships. At the same time they proved unsuccessful in inducing compliance. The first one refers to sanctions levied by Russia against Lithuania in 1990, while the second refers to the disincentives imposed to Iran from USA in 1979.

Considering the Russian sanctions against Lithuania, we follow E. Hillebrand and J. Bervoets (2013). They regard economic disincentives as indicative of the general policies with which the former Russian Federation attempted to reap economic and political benefits from its former constituent republics. We specifically refer to sanctions enforced following Lithuania's declaration of independence. Russia imposed economic embargo accompanied by reduced energy subsidies and supplies.

The eastern superpower demanded that Lithuania would revoke all declaration claims and grant the ownership of key industries to Russian interests. Moreover the Russian

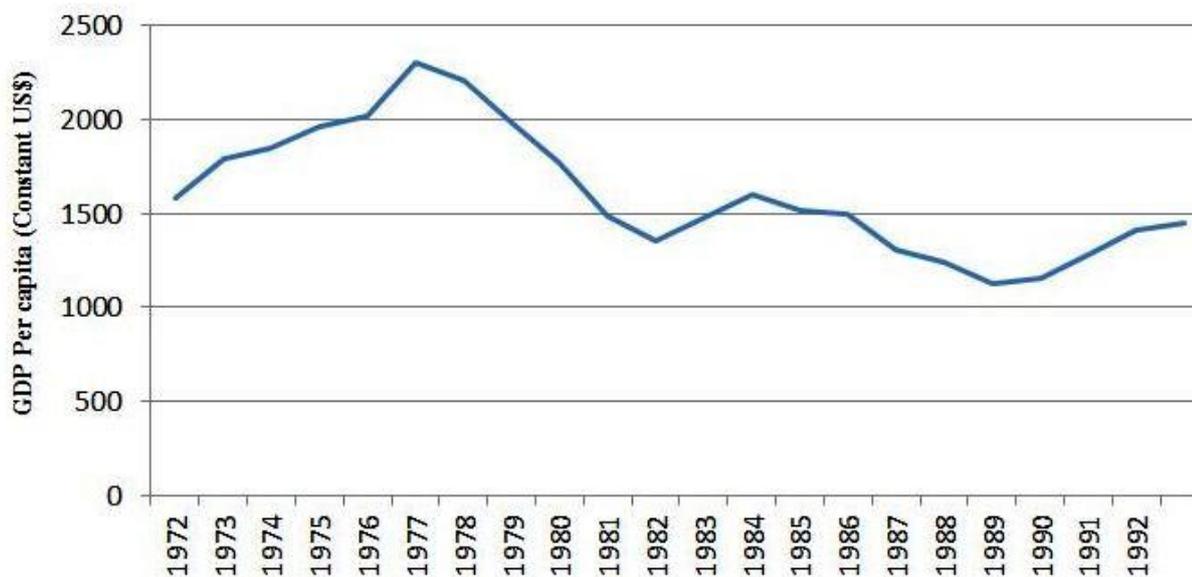


Graph 5– GDP Per Capita of Lithuania, 1990-2003

government called for a secure military transit route for Russian forces. Since Lithuania relied heavily on Russian trade support especially in the first years after independence, the above sanctions were expected to be quite effective. Consequently, fast compliance was rather anticipated (Hufbauer et al., 1990; Miyagawa, 1992), thus proving quite successful. Graph 5 depicts Lithuanian GDP Per Capita in the first 14 years after independence. Judging from the information provided, the disincentives proved to be significantly effective. The sanctions imposed by the Gorbatsjov regime

caused a drop in the Lithuanian per capita income of almost 40p.p. in a period of 5 years⁹.

Although severe economic costs are established as a important determinant of sanctions' success (Drury, 1998; Morgan and Schenbach, 1997), Russian sanctions can hardly be characterized as successful. Neither independence claims were retracted nor was a military transit route provided. The low rate of concession can be attributed only to the ownership of key Lithuanian industries being handed to Russian stakeholders. The above example illustrates that the specific reasons for sanction implementation constitute one major criterion determining a sanction episodes' success (Drury, 1998; Dashti-Gibson et al., 1997). However those reasons do not only vary significantly but also include issues like national sovereignty. Such issues are so fundamental that it is the intention of the target nation not to comply, irrespective of sanctions' severity.



Graph 6– GDP Per Capita of Iran, 1972-1992

The second sanction episode utilized, occurred in Iran shortly after the Iranian Revolution of 1979. The recently established Iranian regime cancelled the coalition between the US and the Shah, leading the former to the adoption of –mostly economic- measures against the Persian economy. These measures were initially considered “smart” since they were targeted towards the entrenched elite. Hardships were directed to policy-makers, by means of freezing their international assets or limiting their access to innovative technology. However they were quickly intensified and supplemented by a series of more general bans and disincentives such as the suspension of foreign aid agreements or abolishment from the international pharmaceutical supply system. Those measures had serious adverse implications for

⁹The above numbers are the product of own calculations according to the per capita GDP of Lithuania for the years 1990 to 1995. (World Bank dataset). In 1990, Lithuanian GDP Per Capita was almost 4300 USD, while in 1994 fell below 2500 USD. It should be noted though that the sanctions were accompanied by military invasion of Russian forces towards the Lithuanian capital (Vilnius), something that could destabilize the Lithuanian economic and political environment.

the general population. The economic impact is illustrated by the heavy drop¹⁰ in the GDP per capita (Graph 6) during the first years after sanction imposition. Mainly due to international sanctions, the GDP per capita of Iran fell from almost 2300 US\$ in 1978 to 1300 US\$ in 1982, a 44p.p. drop in relative numbers.

Although Graph 6 together with the accompanying data clarifies the effectiveness of economic sanctions, their imposition created a heated debate. Not only was the political reward limited (van Bergeijk, 1995), but their humanitarian impact (considerable shortages in food and life - saving medicine) was also rather harsh (Fayazmanesh, 2002). A direct consequence was also the heating up of an already unstable political and economic environment between Iran and its' neighbouring countries. At the same time, sanctions did not induce any significant changes to the Iranian questionable policies. In addition, the actual measures imposed great hardships to several US corporations tightly connected with the oil extracting industry of Iran. This side effect of the sanctions resulted in lobbying pressures towards sanction cancellation. Indicative of the measures' very low success rate are the words of the former US Secretary of State, Madeline Albright, who considered them as: "regrettably short-sighted policies¹¹".

The examples presented indicate the importance but also the relative insufficiency of economic costs in inducing compliance. The decision to alter a questionable policy is based on various political and economic factors. Incorporating such political factors in an objective index determining the success rate of sanctions proves to be a rather complicated task. However academics were able to identify a number of variables and conditions that play a major role in the adverse effects imposed to the sanctioned country and potentially induce compliance. In the following section we conduct an overview of the existing literature on sanction effectiveness and the factors expected to impact the decision to comply or not.

2.2 Literature Review

Earlier studies on sanctions' success (Hufbauer et al., 1990; Pape, 1997; Morgan and Schenbach, 1997) provided some rather disappointing results, questioning the utility of sanctions as a means of dispute settlement. The reported low rates of success triggered extensive research on the factors that induce compliance thus determining a successful sanctions episode. We divide the existing literature on sanction effectiveness between the studies focusing on the prevailing economic and political institutional environment of the target state and those attributing special attention to the characteristics of sanction episodes. Table A1.1 (Appendix A1) presents the determinants of sanction success according to the studies modelling them.

¹⁰ According to Hufbauer et al. *Economic Sanctions Reconsidered*, 2nd edition, Vol: 1, Table 4.4, the GDP of Iran fell by almost 3.8 p.p. But our own calculations depending on the GDP data provided by the World Bank Indicators show a drop of about 23p.p. from 1979 to 1983. However the exact part of this drop that can be attributed to the sanctions themselves is by far less, since on that period the Iranian economy was experiencing a negative trend.

¹¹ March 17, 2000, during a speech delivered before the American Iranian Council (AIC) (Fayazmanesh, 2002).

Regarding the first strand of the economic sanctions literature, there is increasing consensus on the importance of the domestic institutional environment in the success rate of sanctions. To this end, Lektzian and Souva (2003) provide further evidence for the argument presented by Galtung (1967) and Hufbauer et al. (1990) that democratic leaders are less likely to adopt the sender's demands. The greater resilience of democratic target states is mainly attributed to the greater legitimacy they enjoy. This provides better chances for a democratic government to unite their citizens against the senders' requests and in defense of the domestic policy choices (rally-around-the-flag effect¹²; Stein, 2003).

However the above argumentation is met with criticism. Noorundin (2002) proposes that for public accountability reasons democratic governments are more likely to comply. Fear of political costs also leads democracies to easier concession to the sanctioners' demands (Bolks and Al-Sowayel, 2000). The same conclusion is also shared by Pape (1997) as well as Cortright and Lopez (2000). They attribute their conclusion to the better chances authoritarian governments have in securing themselves from public resistance and using repressive mechanisms to create a rally-around-the-flag effect. In a similar respect, several authors have investigated the association between domestic economic status and political stability and the decision to meet the sender's demands. Lam (1990), van Bergeijk (1994) and Drury (1998) corroborate the results earlier presented by Hufbauer et al. (1990) according to which domestic economic and political hardships lead more often to compliance. Empirical evidence of the above is also reported by Jing et al. (2003) and Dashti-Gibson et al. (1997).

The link between the structure of the target economy and the decision to comply is also extensively addressed. The degree of trade openness of the target state is of particular interest, however with ambiguous implications. A considerable part of sanctions' literature argues that extensive trade linkages between the sender and the target contribute positively to sanctions' success (Hufbauer et al., 1990; Miyagawa, 1992; van Bergeijk, 1994). The underlying assumption is that the greater the initial trade volume, the greater the disutility imposed when trade agreements are suspended due to sanctions. In contrast, trade openness indicates a more integrated economy. Consequently, greater international integration facilitates sanctioned economies in substituting for any income losses due to the imposed measures. Such an effect substantially reduces the chances of compliance and thus the chances of a successful sanctions episode.

An extensive part of the economic literature focuses on the characteristics of sanctions as determinants of their success rate. The number of sender states has been in the center of attention, with controversial results. Prominent is the conclusion that multilateral sanctions impose greater hardships and at the same time provide less

¹² "Rally-around-the-flag" is a concept used in international relations to describe increased short-run support to the domestic regime, during periods of international crises. (Source: http://en.wikipedia.org/wiki/Rally_%27round_the_flag_effect)

alternative economic sources for the target state (Bapat and Morgan, 2009; Drury, 1998). Therefore they are expected to induce compliance more often. In contrast, sanctions scholars also place emphasis on the collective action problem¹³ in maintaining a stable coalition to conclude that multilateral episodes are less effective (Kaempfer and Lowenberg, 1999; Miers and Morgan, 2002). The issue of coalition maintenance is also highlighted by Drezner (2001). He argues that multilateral sanctions under the auspices of an international organization exhibit greater stability among its members. This way their potential to incur the favorable policy change is increased.

The type of measures involved is also identified as an important determinant of success. Dashti-Gibson et al. (1997) find that financial sanctions (such as asset freeze for the entrenched elite) are more successful in inducing a policy change. In a conceptually similar way, measures designed to inflict the maximum disutility to the ruling coalition are expected to be rather successful (Morgan and Schenbach, 1996).

Several studies have investigated the role of costs incurred to the target state, with unanimous results (Hufbauer et al., 1990; Dehejia and Wood, 1992; Drury, 1998; Hart, 2000). Those studies verify the strong positive relationship between the severity of the incurred disutility and the success rate of sanctions. Finally, the duration of the episodes as a factor of success has raised considerable controversy among sanctions' scholars. Van Bergeijk and van Marrewijk (1995) distinguish between *learning* and *adjustment* effect. They determine that long-term sanctions can prove successful only when permanent sanction damage (learning effect) exceeds the benefit of the offending behaviour (adjustment effect). Bolks and Al Sowayel (2000) also recommend patience in the application of economic sanctions, since they rarely work instantly. In contrast, Miyagawa (1992) proposes that if a sanction episode is going to work, this will happen instantly. The main explanation is that nowadays sanctioned states have the means and the necessary information to accurately discount the long term effects of the incurred measures. A comparison with the benefits of misconduct can immediately determine whether it is to their own best interest to comply or not.

This study falls into the broad category of empirical research on the determinants of sanction effectiveness. The respective strand in the sanctions' literature is divided between qualitative and quantitative assessments of their effectiveness. As far as quantitative research is concerned, we come across studies investigating the effect of sanctions on life expectancy and infant mortality (Ali Mohamed and Shah, 2000; Daponte and Garfield, 2000), the availability of food and drinking water (Cortright and Lopez, 2000; Weiss et al., 1997) or access to health care and medicine (Gibbons and Garfield, 1999; Garfield, 2002). However research on the macroeconomic consequences of economic sanctions is still modestly represented. Peksen and Drury

¹³ The Collective Action Problem refers to the stability and cohesion of a multinational organization. According to Mancur Olson (*The logic of collective action*, Harvard Economic Studies, Volume CXXIV) "...unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests"

(2010) measure the impact of sanctions on human rights and democracy levels, while Caruso (2003) investigates the effect of sanctions on bilateral trade flows. The present study contributes to the macroeconomic assessment of sanctions effectiveness. Following Neuenkirch and Neumeier (2014), to reduce ambiguity in assessing the impact of sanctions, we employ the growth rate of the target state's per capita income as a measure of the disutility imposed to the receiving population.

Although the above study can be treated as the building block upon which we construct our contribution, the differences exceed the similarities considerably. We address the conditional impact of sanctions in detail, distinguishing between different categories of sanctioned states and types of measures. Conventional wisdom and sanctions theory (*economic peace theory*¹⁴) dictate that sanctions are more often imposed against developing and autocratic targets (Kaempfer and Lowenberg, 2007). Furthermore the reduction in the volume of international trade is well established as the most important intermediate effect of sanctions in the target states (Vidal, 2010). To adequately investigate the above issues we separate our sample of receiving countries according to the economic status, the regime type and the degree of trade openness.

Investigating the effectiveness of different types of sanction episodes is also an important aspect of our research. Acknowledging the significance of credible threats as part of the sanctioning process (Smith, 1996; Dashti-Gibson et al., 1997), we address their importance in two ways: At first, we test their immediate quantitative effect as a separate part of a sanction episode. Secondly, in the conditional analysis we investigate the effect of different types of threats in our dependent variable (*conditional impact of threats*). In addition, standard procedure in sanctions literature is to incorporate the costs to the target as one of the main determinants of success (Hufbauer et al., 1990; Doxey, 1996; Hart, 2000). The same is also followed in our analysis however we also incorporate the anticipated costs apart from the actual ones.

The debate considering the effectiveness of unilateral or multilateral episodes motivated the separate modelling of such episodes in our analysis. As far as the unilateral ones are concerned, we distinguish between the most frequent sender (USA) and a less frequent one (Russia). In such a way, we investigate the hypothesis that frequent sanction imposition undermines their effectiveness, due to loss in the credibility of the sender (Dashti-Gibson et al., 1997). In the case of multilateral episodes we focus on the contribution of an international organization in stabilizing the levying coalition. Specifically we model the sanctions imposed by three multinational organizations (EU, UN and WTO) to determine the most successful sanction sender.

¹⁴ Kaempfer and Lowenberg (2007) define *economic peace theory* as the relatively low possibility that democratic states will levy sanctions against other democratic states.

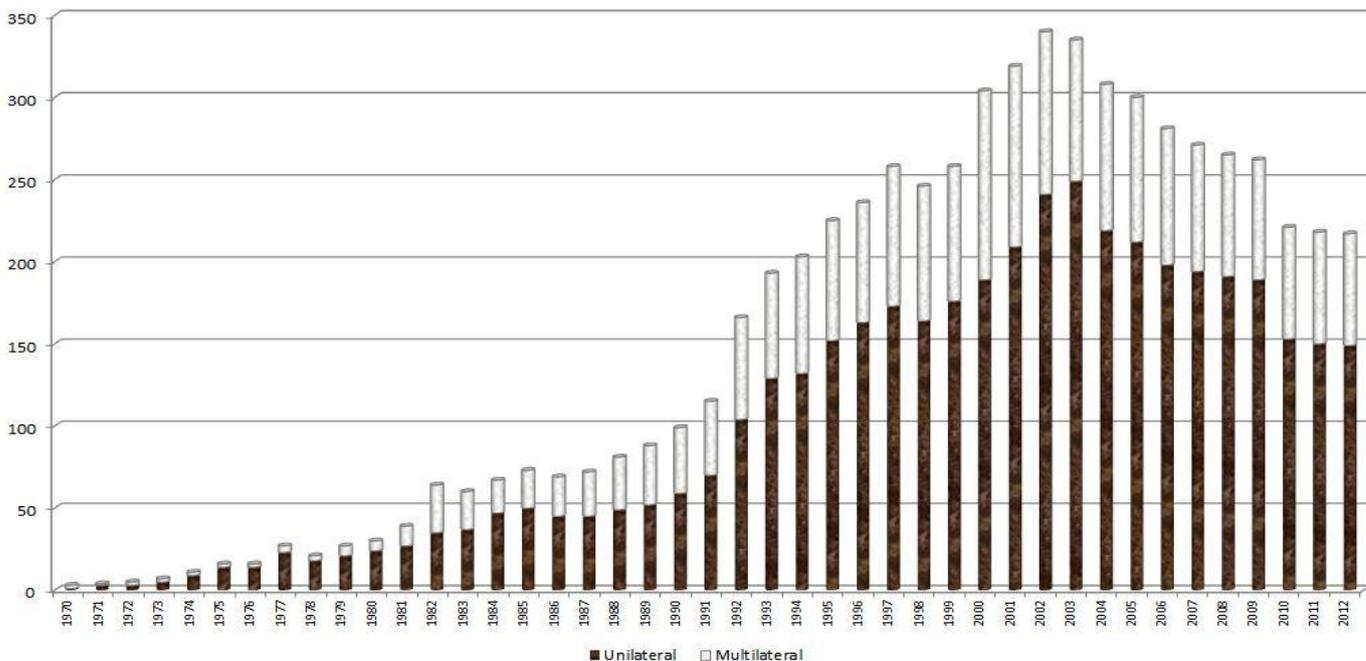
Finally, in close connection with the sanctions' duration debate, we employ an extensive time frame for our analysis, spreading over a period of 5 years. In this way, the interaction between the sender and the target state(s) is modelled over time. Such an approach allows us to gain important insight as to the effect of time in the success rate of sanction episodes (van Bergeijk and van Marrewijk, 1995; Miyagawa, 1992).

SECTION II : DATA AND METHODOLOGY

3. Data and Methodology:

3.1 Data

Data on sanctions were gathered from the 4th version of the Threat and Imposition of Economic Sanctions (TIES) dataset¹⁵, which covers a period of 42 years (1970-2012). A relatively large - T timespan enables us to investigate the existence of a causal relationship between the variables of interest rather than just correlation. Causality implies that in a chain of events, every link is the foundation on which the next one is based. Similarly, we can apply the intended time order in the dependency among the different groups of variables (dependent, control and sanction variables). In this way we maintain the sequence of events discussed in our framework. TIES dataset compiles extensive information on cases of dispute settlement that either resulted in sanction imposition or ended at the threat stage. Therefore the incorporated cases exhibit the required variation to evaluate our theoretical hypotheses.



Graph 7 – Sanction Episodes in Effect Since 1970

In our analysis, we employ 717 sanction episodes targeted against 153 countries (Map: 1-countries in red). The average duration of a sanction is 7.4 years. Table A2.1 (Appendix A2) presents the countries in our dataset and Table A2.2 reports their continental distribution. Graph 7 depicts the distribution of the sanction episodes in effect over time. The white part of each column represents those instigated under the auspices of an international organization (EU, UN or WTO). In contrast, the grey part

¹⁵ A full version of the dataset as well as coding manual is available online at: <http://www.unc.edu/~bapat/TIES.htm>. The principal investigator of this project is: Cliff Morgan, while the co-investigators are: Navin Bapat, Valentin Krustev and Yoshiharu Kobayashi.

represents those initiated unilaterally (US or Russia). The clear upward trend becomes more apparent after the early 1990's denoting a more extensive application of sanctions. The explanation for this rests in the significant political, social and economic changes in Europe that marked the 1990's decade (fall of the world of Berlin in November 1989, the declaration of independency by 15 states from the former USSR in 1991 or the breakup of Czechoslovakia in 1993). During those years the world leaders made a choice to avoid an extensive military conflict. As a result they promoted their political and economic interests through more liberal practices, such as the imposition of sanctions.

However the sanction episodes in our analysis are far from being homogeneous. Our complete sample consists of cases where the episode ends at the threat stage (317 cases), episodes where sanctions are imposed without any previous threat (129 cases) and finally episodes where both threat and measure implementation is present (271 cases).



Map 1 – Countries Represented in the Analysis

In the analysis, we capitalize on the extensive detail level of TIES dataset, which constitutes its' main advantage. It incorporates a series of variables to integrally describe each sanction episode (such as the existence of threat, type of sanctions involved, or the sender state's commitment level). This allows the investigation of the most recent arguments expressed in the literature (Morgan et al., 2009). Specifically we refer to the dependence of sanction effectiveness on a number of conditions uniquely characterizing each episode (sanctions' conditional impact). To adequately investigate this, we employ two different sets of criteria: the first one refers to the economic and political institutions in the target country (economic and regime status, trade openness). The second set is associated with various types of sanctions, according to specific characteristics of the episodes themselves. The involved characteristics are determined by the sender state (incorporation of a threat or not, issue at stake, type of measures implemented, commitment level of the sender).

Table 1 - Sanction Categorization According to the Target State's Characteristics

Target Country Categorization		
Criterion	Categories	Frequency
Economic Status of the Target Country	1. Developing Target Economies	378
	2. Developed Target Economies	339
Degree of Trade Openness	1. More Open Economies	225
	2. Less Open Economies	492
Democracy Level	1. Democratic Target Countries	388
	2. Autocratic Target Countries	329

Table 1 presents the categories of the first set, together with the number of episodes on each one. (Table A3.1 presents the criteria that divide among the respective categories). Initially we propose that the economic status of the target country is an important determinant of sanctions effectiveness (Hufbauer et al., 1990; Drury, 1998). To investigate that, we split the sample among episodes targeted against developing economies and against already developed ones (378 and 339 respectively). Developing countries are expected to rely considerably on their trade and financial aid flows. Moreover, their ability to find alternative ways to mediate the adverse effects of sanctions is considered limited. As such, developing countries exhibit greater economic weakness. Consequently they are more inclined to accomplish the senders' requests in order not to jeopardize their growth prospects (van Bergeijk, 1994; Jing et al., 2003). Furthermore, already developed countries are usually major players in the highly integrated international context. Therefore it is relatively easier to substitute any income losses due to sanction imposition. To isolate the impact of sanctions on the degree of trade openness, we employ two different specifications. The first one models 225 sanctions against more internationally oriented economies and the second 492 episodes against economies with lower degree of trade openness.

The domestic institutional environment of the target state is also considered an important determinant of sanctions' effectiveness in the respective literature (Pape, 1997; Nooruddin, 2002). To sufficiently address this, we separately model 388 sanctions against democratic states and 329 episodes against non-democratic ones. Autocratic regimes are infamous for giving the chance to the ruling elite to secure themselves against the adverse effects of economic disincentives. The disutility from sanction imposition is transferred to the general population. In such cases, conditions of internal conflict that can lead to rebellion may be triggered (*deprivation hypothesis*¹⁶ – Allen, 2008). Under such circumstances, the favourable change in policy that will determine a successful sanction episode is more possible.

However, sanctions against a stable autocracy can limit access to scarce resources for domestic resistance groups. Then sanctions have the perverse effect of strengthening

¹⁶ Allen (2008) defines deprivation hypothesis as “the significant increase in anti-government activity under sanctions, as the public experiences [increasing] economic hardships”.

the entrenched elite (Woodward, 1995; Gibbons, 1999; Cortright and Lopez, 2000). On the other hand, when target country is a democratic one state officials enjoy greater legitimacy from the general population. Subsequently there is greater possibility that the imposition of economic hardships might cause a rally around the flag effect (Drezner, 1999). According to this, the leaders of the target country may find increased short-run popular support by domestic groups. Such domestic forces line up behind their leaders when an outside threat is imminent. This support strengthens the domestic governments' position during the international negotiations, making compliance less possible.

Table 2 - Sanction Categorization According to Individual Sanction Characteristics

Sanction Classification According to Unique Sanction Characteristics		
Criterion	Categories	Frequency
Existence of a threat	1. Sanctions including both a threat and a measure imposition part	271
	2. Sanctions without threat part	129
	3. Only threats for sanctions	317
The sender state (unilateral):	1. US sanctions	515
	2. Russian Federation sanctions	19
The sender state (multilateral – An international organization is involved)	1. United Nations sanction	34
	2. European Union sanctions	128
	3. World Trade Organization sanctions	15
The specific issue involved in the threat / imposition of sanctions	1. Economic ones	436
	2. Political ones	185
Target of Threat	1. Economic	42
	2. Trade	339
	3. Agreement Suspension	198
The particular group within the government that sanctions are designed to affect	1. Political	129
	2. Business	309
Sender commitment	1. Weak	53
	2. Moderate	243
	3. Strong	244
Anticipated Target Costs	1. Minor	415
	2. Major	65
	3. Severe	13
Actual Costs	1. Minor	332
	2. Major	29
	3. Severe	12

Sanction categorisation according to unique characteristics of the respective episodes, together with the number of episodes for each specific category is presented in Table

2. Table A4.1 (Appendix A4) offers a more detailed description of the variables used and their sources.

The first criterion refers to the existence of a threat before the actual measure implementation. Specifically, each sanction episode is divided between the threat and the actual implementation parts. According to the respective theoretical argument, the episodes most likely to succeed will involve no measure implementation. That is because a credible threat is sufficient to induce compliance (Smith, 1996; Dashti-Gibson et al., 1997). Following Morgan and Miers (1999) as well as Drezner (2003), we anticipate a target country to identify a credible threat and alter its questionable policy before the actual sanction is enforced. In such a way, any adverse humanitarian effects of sanctions (such as food or first aid shortage) are avoided. We investigate whether credible threats can have a significant economic impact on the target state by separately modelling 271 cases of threat and sanction imposition, 132 episodes without threat part and 317 episodes where the sanction episode ended at the threat stage, without the imposition of measures.

Depending on the number of sender states, we distinguish among unilateral and multilateral episodes. To ensure comparability of the respective model outcomes, in the unilateral category only the sanctions levied by each one of the two major powers of the world (USA and Russia) were retained. In the employed categories, there is an overrepresentation of US sanctions in our dataset (515 against only 19 from Russia). This constitutes a clear indication of the popularity sanctions enjoyed as a means of dispute settlement in every US government. Similarly, in the multilateral category we incorporated sanctions instigated under the auspices of the following international organizations: EU, UN or WTO. The main multilateral sender is the European Union (128 episodes). According to the nature of the specific issue that triggered the episode, we divide sanctions into economic and political. The greater occurrence of economic measures in the dataset (436 economic sanctions with respect to 185 political) reveals that economic disputes are more likely to put a country under a sanction microscope.

Seeking also to address the conditional impact of threats, we divide them into economic ones, those targeting trade contracts and the ones directed towards already signed foreign aid agreements. These categories are incorporated to identify the specific types of threats that are able to cause adverse effects to the target economy. Target countries are more often developing ones. Such countries are less willing to jeopardize their growth prospects which are often based on such international agreements. Therefore we expect greater frequency of threats on trade and aid agreements in our dataset. More importantly, we contend that any threats against trade and foreign aid agreements of developing countries are more credible.

Additionally, we investigate the relationship between the sender states' commitment level and sanction effectiveness. Three different levels of commitment are employed: weak, moderate and strong. The main objective is to test whether greater determination on behalf of the sender results in greater hardships to the target

economy. The mechanism connecting the sender's determination with the costs incurred is not easily discernible. However we contend that sanctions with greater commitment level are often associated with more severe measures. As a consequence, economic sanctions with strong commitment level are expected to be more effective.

Concluding with the second set of sanction categories, we consider sanction effectiveness to be conditional on the costs incurred to the target state. The relationship between the costs imposed and compliance is a major element of our framework (Graph 4). Thus two different categories with respect to the economic costs of sanctions are incorporated. Both of them are treated as proxies for the strength of the proposed or implemented measures. The first one includes three stages of anticipated costs: minor, major and severe. The above categories measure the anticipated impact of sanction imposition. Anticipated costs are associated with the potential of sanction episodes to impose hardships according to the expectations of the sender. The second category refers to the actual costs imposed to the target economy. Once again, sanctions are divided into minor, major and severe. However the categorization is based on an ex post measurement of the sanctions' impact. The difference between the above categories is subtle yet important. Anticipated costs capture the potential costs of proposed sanctions, while the actual costs measure the impact on the receiving country after the sanctions are imposed. As such, the actual costs variable is an updated analysis of the anticipated costs.

Table 3 – Interaction Terms

Interaction Terms			
Category I	Category II	Final Term Applied	Frequency
Sender State (Unilateral)	Type of Sanction	1. USA / Political 2. USA / Economic 3. Russia / Political 4. Russia/Economic	136 286 11 08
Sender State (Unilateral) ¹⁷	Commitment Level	1. USA / Weak 2. USA / Moderate 3. USA / Strong	24 173 182

The above categories are not the only ones investigated in the analysis. Following Miers and Morgan (2002), interaction terms are formed by modelling together key independent variables. An interaction term of high importance is the one combining the type of sender (unilateral or multilateral) with various levels of commitment level. Table 3 includes the interaction terms that we apply in our analysis. In addition, the categories constituting them and the number of episodes on each one are presented as well. Such terms have the potential to disclose important information regarding the impact of certain sanction categories on intermediate targets. Therefore interaction terms constitute another building block in the investigation of sanction effectiveness through their conditional impact. However, interaction terms are highly case specific. In turn, the more specific a term is the more individually – specific and less

¹⁷ Data limitations prevented us from using also Russia as the second unilateral sender, together with commitment level.

generalizable the outcome will be. As a result, we need to be very cautious in the interpretation of these terms and the policy implications derived from them.

The analysis is also differentiated between *start* and *period*¹⁸ sanction variables. The former count the number of sanctions initiated against a specific country in a certain year. In contrast, the latter represent the cumulative impact of multiple sanctions being continuously in effect towards a single country. Such a distinction serves two purposes: At first we examine whether the effects of multiple sanctions being simultaneously in effect impose greater hardships to the target country. Secondly, in the intermediate analysis, we investigate the interrelation between the cumulative sanction effect and the evasive movements by the target country to mitigate any adverse effects.

Additionally, we investigate a criterion that has raised significant controversy among sanction academics. We specifically refer to the effect of time on sanction ability to induce compliance. Daoudi and Dajani (1983) emphasize on the cumulative effect of the imposed measures. In the same respect, van Bergeijk and van Marrewijk (1995: p. 77) conclude that “sanctions resemble a slow poison, whose consequences are revealed only in the course of time”. Their common argument is that for a sanction episode to induce compliance it needs to be in effect for a considerable number of consecutive periods. However, empirical evidence is rich in profound cases indicating imminent sanction effect. Sanctions against S. Korea¹⁹ in 1975 and El Salvador²⁰ in 1987 reveal that if a sanction has the potential to work, this will happen instantly. The theoretical foundation behind those examples lies in the fact that nowadays target countries have both the information and the means to estimate in advance the adverse quantitative effects of compliance. Consequently they can decide on the course of action that is best to follow. To provide an indication regarding the above debate, we expand the analysis over a period of 5 years. In such a way we determine whether the impact of a sanction is instant or persistent. Accordingly we derive important policy implications considering the effectiveness of many cases of long – lasting sanction episodes (such as the US total embargo against Cuba initiated in 1962).

3.2 Model²¹

Following Garza et al. (2011), to estimate the causality between sanctions and economic growth, Dynamic Panel Data (DPD) analysis is employed. This allows us to

¹⁸ It is already stated that each sanction episode is divided between the threat and the sanction part, without any overlapping between them. Consequently, for each of these parts, as well as for the whole sanction episode we have constructed a start and a period variable.

¹⁹ In 1975, US government threatened to impose sanctions (withdraw all US forces guarding the borders with N. Korea) against S. Korea if the latter did not stop their nuclear weapons research project. S. Korean President Park Chun Hee ordered the immediate cancellation of the research project (Engelhardt, M.J., 1996. Rewarding Non-Proliferation: The South and North Korean Cases. The Non-Proliferation Review)

²⁰ In 1988, US threatened El Salvador with economic sanctions if the latter released those accused of killing US citizens. Sanctions were successful, since the announced release was cancelled. Thirteen Times that Economic Sanctions Really Worked , The Washington Post, April 28, 2014

²¹ Appendix A6 provides a more detailed presentation of the methodology employed.

investigate the dynamic interaction between the different sets of variables (sanction, control and dependent one). The initial model is given below (eq. 1).

$$\Delta \ln y_{it} = \alpha_i + (\gamma - 1) \ln y_{it-k} + \delta' \text{sanctions}_{it-1} + \beta x'_{it-1} + \varepsilon_{it} \quad (1)$$

where: $\ln y_{it}$ is the logarithm of the per capita income for target country i in period t , α_i is the country specific fixed effects term, sanctions_{it-1} refers to the applied sanction categories, x_{it-k} is the vector of control variables and ε_{it} is the error term. Parameter k specifies the number of lags. However the dynamic nature of the model results in endogeneity problems for specification (1). Specifically the lagged dependent variable is correlated with the fixed effects term $E(\alpha_i | y_{it-k}) \neq 0$ (Bun and Sarafidis, 2003).

Endogeneity poses the main problem to consistency (Antonakis et. al., 2014). Inconsistent estimates do not adequately reflect the causal relationship between the sets of variables. As such, they are purely uninterpretable. In the sanctions variable, endogeneity occurs when the sanctioned countries are not randomly selected. Specific characteristics of the target countries can lead to their repeated presence in the dataset. For instance, the empowerment of a severe autocratic regime can lead to the continuous sanctioning of a country. Similarly, the continuous violation of human rights and environmental or trade agreements are additional reasons for the application of sanctions. However such conditions can create a pattern in the selection of target countries (selection effect). In cases such patterns exist, the estimated model captures the wrong causation between the sets of variables.

To solve endogeneity problems, Arellano and Bond (1991) develop a Generalized Method of Moments (GMM) estimator, performing a first difference transformation in model (1). As a result the fixed effects term is removed. Applying the first differenced model, results in the following specification:

$$\Delta^2 \ln y_{it} = (\gamma - 1) \Delta \ln y_{it-k} + \delta' \Delta \text{sanctions}_{it-1} + \beta \Delta x'_{it-1} + (\varepsilon_{it} - \varepsilon_{it-1}) \quad (2)$$

The GMM estimator based on eq. (2) is called *Difference GMM* estimator. It dominates the initial OLS in terms of less bias and smaller variance. However, to estimate eq. (2), an instrumental variable approach is necessary. The sets of instruments consist of second or higher order lagged values of the endogenous and dependent variables, together with the already first differenced exogenous variable. Alternatively, Blundell and Bond (1998) develop a GMM estimator based on both the equation in levels (eq. 1) and the first-differenced one (eq. 2) (*System GMM*). They show that it is preferable to the Difference GMM one when the dependent variable or the regressors exhibit little variance over time (time – invariant variables).

System GMM estimators employ a large set of instruments. Therefore they are expected to be more efficient. However in this approach it is essential to verify the validity of the assumptions underlying both types of estimators. At first, second order

residual autocorrelation is tested through the AR(2) test. Next, to ensure the orthogonality between the instruments and the residuals, Sargan test of over-identifying restrictions is applied.

Acknowledging that economic growth is also affected by a series of social, economic as well as political factors, a vector of control variables is included in the analysis. The set of control variables incorporates the most frequently used ones in the literature. To succeed in isolating the effect of sanctions on economic growth, we need to account for a number of the most well - known economic, political or social growth determinants. Similarly expressed, to ensure that the final outcome can be attributed to the sanction independent variables, we need to decrease the *omitted variable bias*. However we also need to be parsimonious on the number of control variables we employ. A large number of them will confine the available dataset, excluding some important observations and resulting in what is known as *sample selection bias*. Table A5.1 (Appendix A5) offers a detailed description of the control variables, together with their sources.

The vector of control variables is divided into three sub-sets: the *economic*, the *political* and the *demographic* one. The factors included in the economic, are associated with structural characteristics of the target economy (inflation, government spending, domestic credit, capital formation, oil rents). Besides, key determinants of the interaction between the sanctioned state and global economy (terms of trade, current account balance) are also incorporated.

Inflation accounts for macroeconomic stabilization. High inflation is associated with inefficient macroeconomic policies which result in improper market functioning. In a similar manner, Fischer (1993) argues that price volatility decreases growth by reducing the level of investment and the efficiency of production factors. Capital formation implies capacity to save and invest into productive uses. Therefore, the undertaking of investment plans is anticipated to affect growth positively (Uneze; 2013). The assumption underlying the incorporation of domestic credit is not always unanimous. Gozgor (2014) concludes on a positive causality between credit and economic growth in developing countries. On the contrary, Kraft (2005) argues that in order for such a relationship to promote growth, the institutional quality needs to be high enough. Institutions that facilitate the proper channeling of funds into investment projects increase the investors' confidence. The resulting investment process impacts growth positively.

Government spending is a proxy for the size of the government burden (Mitchell, 2005). Low levels of government consumption promote economic growth, through the provision of valuable public goods, such as education or infrastructure. Conversely, high government consumption often results in large and inefficient public sectors, which undermine economic growth. The relationship of government spending and economic growth is conditional on the quality of institutions. High institutional quality can secure the efficient allocation of sources, maintaining a positive economic

effect of government consumption. Next, to investigate the resource curse hypothesis (Sachs and Warner, 2001), an oil rents variable is included in our set of control ones. According to this hypothesis, orienting economic activity towards the exploitation of natural resources, leads to an appreciation of the exchange rate. In turn this harms the productivity of export oriented sectors. In the long run such conditions are detrimental to the economy and the income growth rates.

In addition, we incorporate terms of trade as the ratio of the value of exports and imports. Jawaid and Waheed (2011) point towards a significant positive effect of terms of trade in growth. Such a relation is attributed to the more efficient resource allocation and increased productive efficiency. Nevertheless, Fosu and Gyapong (2010) conclude that the above relationship is conditional on the institutional quality of the respective country. Finally, current account balance is the last economic variable incorporated in our set of control ones. A surplus indicates an export orientation of the economy. In the highly integrated international environment this is indicative of a relative advantage in the production of certain goods and services. Consequently, we argue that a current account surplus, rather than a deficit, is conducive to economic growth.

The next element in the vector of control variables is population growth, which constitutes the demographic category by itself. The main argument points towards a negative impact on growth rates. Enhanced Solow model (Solow, 1999) argues that population growth rates decrease the amount of capital available per worker. This results in a negative effect on capital accumulation which in turn is the driving force of economic growth. To stress the importance of institutional environment, an indicator for the regime type in the target state is also included in the control variables. *Polity2* variable controls for the degree of democracy in the target state. It ranges from -10 (strong autocracy) to +10 (strong democracy). Considering the relationship between democracy and economic growth, empirical evidence is inconclusive. Specifically, Baum and Lake (2003) as well as Lake and Baum (2001) argue that democracies can promote growth by limiting state interventions in the economy. In addition, democracies are more responsive to public demands on goods such as education, justice or health. Opponents of this hypothesis contend that democracies promote immediate consumption at the expense of profitable investment plans, undermining economic growth (Huntington, 1968). Finally there are those (Bhagwati, 1995) who propose that markets matter more for growth than the regime type.

Finally the regression equation includes the level of income per capita at the start of the corresponding period, to catch initial conditions. However it also allows us to test the conditional convergence hypothesis²². The essence of the above hypothesis is that the greater the distance between the initial and the steady state level of income, the

²² According to the *conditional convergence hypothesis*, countries with similar economic characteristics ultimately reach the same steady state of income per capita.

greater the speed of convergence (Levine and Renelt, 1992; Barro, 1991). Nevertheless this is valid only for countries with similar economic structural characteristics. Intuitively, a less developed country will experience faster growth till it reaches the same level of income per capita with the developed ones. In terms of our regression, corroboration of the conditional convergence hypothesis would entail a negative sign in the coefficient of lagged value of income per capita.

SECTION III : RESULTS AND CONCLUDING REMARKS

4. Estimated Results

4.1 *Main Results*

In this section, we present our results considering the impact of sanction episodes on the target country's growth rate of GDP per capita. To ensure the consistency of the estimators, two specification tests are necessary. At first, Sargan test of over-identifying restrictions tests the validity of the instruments used by analyzing the sample analog of the moment conditions used in the analysis. Secondly the Arellano – Bond autocorrelation test (AR(2)) examines whether the error term is serially correlated. However, due to the first difference transformation we performed, we test for second order autocorrelation. The p-values for both the Sargan and the AR test provide no signs of misspecification, verifying the consistency of the GMM estimators.

Table 4 reports our baseline estimation results. This consists of the control variables incorporated in our analysis. The optimum set of control variables is extensive enough to include the major factors reported in the literature as significant determinants of economic growth. In that way, we decrease the *omitted variable bias*. Therefore we are confident that the final outcome can be attributed to the sanction independent variables. However parsimony is necessary in our variable selection. A large number of control variables will considerably decrease the available observations included in the analysis, omitting important ones (*sample selection bias*). To avoid such misspecifications, we employ a general to specific approach. This entails starting with a relatively extensive number of factors and consecutively dropping the ones that enter the regression insignificantly. In our final

Table 4 – Control Variables Results

Explanatory Variables	Expected Sign	
Initial GDP Per Capita	-	0.0035 [0.796]
Inflation Rate	-	-0.0122 [0.005]***
Capital Formation	+	0.0553 [0.038]**
Domestic Credit	-/+	-0.0346 [0.000]***
Government Consumption	-/+	-0.0490 [0.054]*
Oil Rents	-	-0.0090 [0.058]*
Polity 2 Index	+	-0.0058 [0.004]***
Current Account Balance	+	-0.0023 [0.090]*
Terms of Trade	+	0.1267 [0.017]**
Population Growth	-	-0.0322 [0.046]**
Number of Countries		104
Number of Observations		2965
Arrelano - Bond test AR(1)		0.000
Arrelano - Bond test AR(2)		0.199
Sargan test (p-value)		0.120

Numbers in brackets are the corresponding p-values
 ***/**/* Indicate significance in the 1%/5%/10% level.

specification all control variables are significant at least in the 10% level. To investigate the conditional convergence hypothesis we also incorporate a lagged value of the per capita income. Table A5.1 (Appendix A5) presents a detailed list of the control variables together with their sources. Table A5.2 reports their descriptive statistics.

Considering the economic control variables, in line with Andres and Hernando (1999) as well as Fischer (1993) we find a negative coefficient for inflation rate. The baseline specification captures the harmful consequences of macroeconomic price instability in the target economy. Furthermore we confirm the positive association between capital formation and growth, (Uneze, 2013). Our model also predicts that government spending undermines economic growth. In such a way, we support the argumentation towards the negative effect of a large fiscal burden (Mitchell, 2005) and its' contribution to a bureaucratic public sector with relatively low productivity. Due to the overrepresentation of developing countries in our sample, the model fails to verify that domestic credit availability can be an engine of economic growth (Gozgor, 2014). In developing economies, it is common to observe inefficiencies in the allocation of credit (i.e. financial instability, less investment confidence). Such inefficiencies are attributed to the mediocre institutional quality of developing countries. This mitigates the beneficial effects of investment. In turn it is mainly responsible for the negative effect of domestic credit on GDP growth rate that our model comes up with.

In accordance with Sachs and Warner (2001), the negative sign of oil rents variable verifies the resource curse hypothesis. Our model concludes that relative abundance in natural resources imposes adverse effects on domestic economic growth. The above is referred to as *Dutch disease*. According to this, an increase in resource exports results in an appreciation of the exchange rate (value of domestic currency increases). However this causes detrimental effects to the competitiveness of export-dependent sectors, such as manufacturing. Those adverse effects have the potential to slow down the economy as a whole.

As to the terms of trade effect, the positive outcome verifies that more favorable terms of trade tend to improve economic growth performance (Jawaid and Waheed, 2011). The main argument is that a larger relative volume of exports results in capital accumulation with beneficial effect for the economy. The final economic control variable is current account balance, however with ambiguous implications. Although the reasons for the surplus matter considerably, economic theory associates surpluses due to higher demand with an expansion in the production of the export sector. This impacts the domestic economy positively. In contrast, surpluses can be also attributed to severe drops in demand which is indicative of a general environment of recession. Our data is influenced by the latter cases therefore we find a negative sign in the estimation results.

Consistent with the Solow model, the baseline specification also predicts that a population increase exerts negative influence to the target economy. Furthermore,

Polity2 index enters the regression negatively indicating adverse effects of democracy on growth. One explanation for this lies in the proposition of a non-linear relationship between democracy and growth. Barro (1996) proposed that democracy depresses growth when at least moderate levels of political freedom have been achieved. An inspection of our dataset verifies that the majority of countries included are above a benchmark level of political freedom. This explains the negative sign in our baseline model. Finally we consider a limitation of our specification the fact that the lagged value of income per capita is insignificant, failing to provide evidence of the conditional convergence hypothesis. The above hypothesis is a product of the

Table 5 – Main Estimation Results

	Dependent Variable: GDP Per Capita Growth Rate							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Start Variables								
Complete Sanction Episode	-0.031 [0.015]**							
Threat and Sanction Episode		-0.044 [0.074]*						
Threat, with no Sanction Imposition			-0.045 [0.048]**					
Sanction Imposition without a Threat				0.049 [0.111]				
2. Period Variables								
Complete Sanction Episode					-0.020 [0.039]**			
Threat and Sanction Episode						-0.030 [0.007]***		
Threat, with no Sanction Imposition							-0.215 [0.450]	
Sanction Imposition without a Threat								-0.038 [0.063]*
No of Observations	2965	2942	2998	3013	2965	2750	2750	2641
No of Countries	104	104	104	104	104	103	103	103
AR(1) Test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) Test	0.118	0.134	0.164	0.184	0.112	0.241	0.271	0.281
Sargan Test	0.418	0.118	0.335	0.556	0.202	0.677	0.886	0.140

Numbers in brackets are the corresponding p-values

***/**/* Indicate significance in the 1%/5%/10% level.

neoclassical growth models. It dictates that countries at low level of wealth are expected to grow faster than their richer –but similar in economic characteristics– counterparts, following a path that will lead them to their own steady – state level of capital per worker. However, recent growth analyses (Prasad et al., 2007) report that the conditional convergence effect weakens and even disappears when data after 2000

are included. This can partly explain the insignificant coefficient in the baseline specification.

Next, the sanction variables were applied to the control variables specification, providing the main estimation results (Table 5). In the first column we employ our complete sample of sanctions²³. This includes episodes that consist of either a threat, a measure imposition part or in some cases both. In line with Neuenkirch and Neumeier (2014), we find that the initiation of such an episode imposes significant negative effects to the target economy. The result verifies the first research hypothesis that sanctions impose considerable disutility to the target state. Specifically, the absolute value (0.031) predicts a decline in the per capita income growth rate of 3 percentage points (p.p.), due to the initiation of a sanction episode.

In column 2 we model the effect of sanctions consisting of both a threat and a measure implementation part. Such episodes start with a threat and finish with sanctions being imposed. The result reveals that they impose significant negative effects to the target economy. Specifically the respective coefficient indicates that the above category of sanctions causes a decrease in the gdp per capita growth rate equal to 4.4p.p. This effect is greater than the one estimated for our whole sample (3.1p.p. decline in the per capita income growth rate). Therefore the first two specifications of the main results indicate the importance of both a threat and an actual measure imposition part as constituents of a rather effective sanction episode.

In columns 3 and 4 we isolate the impact of threats and the imposed measures respectively. The specification in column 3 investigates the effect of threat initiation to the target economy. The result suggests that the initial effect of threats is negative and significant. To elaborate, issuing a threat for sanctions causes a decrease to the target states' gdp per capita growth rate, equal to a 4.5 p.p. This result is consistent with earlier studies which considered credible threats as important factors of the conditional impact of sanction episodes (Dashti-Gibson et al., 1997).

However our model in column 4 fails to capture any significant effects of the actual measure implementation part in the absence of threats. The respective coefficient enters the regression insignificantly, indicating rather weak effects of measures applied directly. Consequently it provides further evidence for the necessity of threats. Specifically it verifies the hypothesis that a credible threat is often enough to induce compliance (Drezner, 2003). Therefore, it is highly advisable for sender states to start a sanction episode from the threat stage, since immediate measure implementation proves inefficient in causing significant disutility to the target economy.

The results so far offer a couple of crucial implications considering the importance of threats. At first, due to their significant economic impact, we determine that threats

²³ It is important to clarify the difference between the results in columns 1 and 2 and respectively columns 5 and 6 of Table 5. A "Complete Sanction Episode" refers to the complete sample of sanctions, which incorporates episodes consisting of either only threats, or measure imposition or even both. A "Threat and Sanction Episode" refers to the subsample of episodes necessarily consisting of both a threat and a measure part.

have the potential to modify the international negotiations framework. They accomplish that by providing an additional tool at the negotiator's disposal. Recent historical examples (the Montreal Protocol²⁴, US experience with the OTCA²⁵) indicate that threats constitute a rather liberal alternative to actual sanction imposition. An effective threat can bring about the favorable change in policy, signifying the end of a sanctions episode. In such a way, the adverse humanitarian effects of the imposed measures are avoided. Furthermore, it also accounts for the disappointingly low rate of sanction effectiveness in the literature (Hufbauer et al., 1990; Pape, 1997; Morgan and Schenbach, 1997). The outcome verifies the assumption that the dispiriting results on sanctions' effectiveness can be partially attributed to measurement issues. Following Drezner (2003), we conclude that threats are able to impose hardships to the target state. In case the imposed disutility induces compliance then a considerable number of sanctions are bound to end at the negotiations part. However the extensively used Hufbauer dataset overlooks the possibility of a credible threat before the measure implementation. We contend that those are the most successful cases, since nowadays target economies have the means to discount the adverse effects of threatened measures and decide upon compliance during the threat stage. Consequently, the Hufbauer dataset fails to incorporate the most successful sanction episodes, raising concerns of sample selection bias.

In addition, disentangling the modelled impact of column 2 into its constituent parts (columns 3 and 4) provides further evidence towards the importance of threats. Firstly, threats are the only significant constituent of a threat and sanction episode. Secondly, the impact of threats to impose sanctions is almost the same with the impact of episodes consisting of both a threat and a sanction (4.5p.p. decline in the per capita income growth rate, compared to 4.4p.p. for a threat and sanction episode). As a result, the negative effect of an episode including both threat and sanctions can be mainly attributed to the partial impact of threats.

In the second part of Table 5 (columns 5-8), we utilize the period variables of our analysis. Column 5 examines the effect of each one of the multiple sanction episodes targeted against a specific state. The estimated outcome shows significant negative impact to the target economy. To elaborate, an economy which is the target of multiple threats, sanctions or both at the same time is expected to experience a 2p.p. decline in the per capita income growth rate from each episode.

In column 6 we investigate the cumulative effect of sanction episodes necessarily consisting of both a threat and a measure imposition part. The result reveals a negative impact to the target economy due to such episodes. Specifically, when multiple

²⁴ The Montreal Protocol (1987) is an international treaty designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. It specifically called for sanctions against non-signatories that failed to control their use of CFC's. Those threats for sanctions exerted decisive influence in many countries which cut down the amount of CFC's production and ultimately signed the protocol.

²⁵ The *Omnibus Foreign Trade and Competitive Act* was signed in 1988 as an act to promote the competitiveness of the American Industry. It threatened countries that retained large trade surpluses with the US with a bilateral surplus reduction requirement by 10%. (Further information available at http://en.wikipedia.org/wiki/Omnibus_Foreign_Trade_and_Competitiveness_Act)

episodes consisting of both threats and sanction measures are imposed against a single country, each one causes a 3p.p. decline in the gdp per capita growth rate of the respective economy. As was the case in the start variables specifications, the adverse effects to the sanctioned state are greater when both threats and sanctions are present in the modelled episodes. The estimated outcome for such sanctions (3p.p. decline in the per capita income growth rate) exceeds the one found when we apply the sanction period variable to the complete sample (2p.p. decrease in the gdp per capita growth rate of the target state). Therefore the period variables verify the significance of both constituent parts for an effective sanction, also indicated by the start variable specifications.

Decomposing the effect of a threat and sanction episode into its constituent parts (columns 7-8), reveals some intriguing implications. At first, our model fails to capture any significant effects of multiple threats targeting a single country. This is attributed to the nature of our period variables. To elaborate, the respective specifications examine the duration effect of the imposed episodes. Our model (column 7) predicts that in a longer time perspective, multiple threats are ineffective. To explain this result, we argue that the extended time frame of the period variables provides the target state with the necessary time to evaluate the credibility of threats. However, the credibility of ongoing threats is undermined by their longer existence (Miyagawa, 1992). As such, the threatened state considers them less credible and continues with the debatable policy. Therefore we find insignificant impact of multiple threats to the target economy.

As to the measure imposition part, we come across significant negative effects to the target state. The outcome in column 8 predicts that when multiple sanctions are implemented against a single country, each case of measure implementation results in a drop in the growth rate of the per capita income equal to 3.8p.p. The above result, in conjunction with the model outcomes in columns 6 and 7 provides some interesting implications. At first, sanction imposition is the only constituent part of multiple threat and sanction episodes with a significant effect. Furthermore, this effect is greater in magnitude than the one estimated in column 6 (3.8p.p. decrease in the gdp growth rate of the targeted country, in contrast to a 3p.p. decline when a threat is also present). As such, we conclude on the importance of measure implementation when the duration effect of sanction episodes is modelled. In contrast with the start variable models, period specifications indicate that in order to increase sanction effectiveness, threats need to be converted into measures.

Before finalizing this section, it is informative to make a comparison between the effects of the start and period variables. The assumptions underlying the construction of each variable are different therefore the estimated coefficients are not directly comparable. However, our specifications predict greater initial adverse effects of sanctions, rather than the cumulative effects of already implemented episodes (3.1p.p. drop in the per capita income growth rate in comparison to 2p.p.). The same result is verified when we investigate the effect of episodes necessarily including both a threat

and a sanction imposition stage (4.4p.p. drop in the per capita income growth rate for the start variables in comparison to 3p.p. decrease in the period model). From the above comparisons we conclude that the immediate impact from the imposition of sanctions is greater. Consequently the sanctioned economy faces greater risks at the point sanctions are imposed. After imposition, the adverse effects are persistent, but their effectiveness is weaker.

Furthermore, as to the constituent parts of threat and sanction episodes, the respective models provide some opposing results. Considering the threat part, we find that the initiation of a threat imposes significant adverse effects to the target economy. In contrast, the impact of each one of multiple threats targeting a single state is found to be insignificant. However the situation changes when the effects of actual measure implementation are investigated. In that case, the initial effects of sanction imposition are found to be insignificant. On the other hand, multiple sanctions targeting a single country are found to negatively impact the target economy.

To summarize, our findings so far confirmed the first research hypothesis. Specifically we concluded on a significant impact of sanctions to the target economy. The negative effects appear not only at the time a sanction is initiated, but also when multiple episodes are in effect over a specific target. In addition, such adverse effects hold, irrespective of the presence of both constituent parts of a sanction episode, however the impact is greater when both threats and measures are present. Finally, as to the conditional impact of sanctions, when modelling the initial effects, we confirmed the significant economic impact due to threats for sanctions. However our period models failed to verify the adverse effects of multiple threats against a single economy. Therefore, on the basis of the start variable results, we argue towards the contribution of threats for sanction effectiveness.

4.2 Conditional Results

In this part, we thoroughly investigate the second research hypothesis. Specifically we test the conditional impact of sanctions. To effectively address that, we employ two sets of criteria: The first one controls for the political and economic institutional environment of the sanctioned country. The second one involves individual characteristics of the imposed sanctions. Sanction effects are captured by the start variables of our analysis, an element highly important for the interpretation of the results.

4.2.1 Conditional Results Based on the Characteristics of the Target Country

Table 6 reports the results as to the criteria which differentiate sanction episodes based on the social and economic conditions of the target state (Table 1). The baseline specification is the same as in the main results (Table 5). In addition, the p-values for the AR(2) and the Sargan test verify the absence of second order autocorrelation as well as the validity of the instruments used.

In the first two columns we investigate the role of domestic political institutions in the effectiveness of the imposed sanctions. Column 1 reports the sanctions' impact on democratic states and column 2 on autocratic ones²⁶. In line with Nooruddin (2002), our model reveals that the regime type of the target state is an important determinant of sanctions' effectiveness. Specifically we conclude on a significant negative impact against autocratic countries. On the contrary, our model fails to capture a significant impact on democracies.

Table 6 – Sanctions Conditional Results Based on the Target States' Characteristics

	Dependent Variable : Per Capita Income Growth Rate					
	(1)	(2)	(3)	(4)	(5)	(6)
1. Democracy Level						
Democratic Countries	0.024					
	[0.156]					
Autocratic Countries		-0.026				
		[0.022]**				
2. Income Level						
Low Income Countries			-0.050			
			[0.013]**			
High Income Countries				-0.201		
				[0.665]		
3. Trade Openness						
Less Open Countries					-0.010	
					[0.261]	
More Open Countries						-0.028
						[0.044]**
No of Observations	1598	1380	1655	1007	1828	1151
No of Countries	72	73	72	42	85	76
AR(1) Test	0.000	0.008	0.000	0.548	0.000	0.002
AR(2) Test	0.101	0.313	0.209	0.482	0.105	0.454
Sargan Test	0.735	0.359	0.463	0.632	0.317	0.153

Numbers in brackets are the corresponding p-values

***/**/* Indicate significance in the 1%/5%/10% level.

As to the sanction outcome on democracies, the insignificant coefficient is explained by a twofold argument. At first, following the economic peace²⁷ theory (Kaempfer and Lowenberg, 2007; Lektzian and Souva, 2003) we expect disputes between democratic states to be resolved in the negotiations stage. However, even in cases that measures are actually implemented, they are rather targeted and aim at small policy changes. Therefore their economic impact is expected to be rather weak. Secondly, democratic states often exhibit a higher degree of global integration (Pelanda, 2007).

²⁶ More information on the exact criteria that differentiate among the various sanction categories reported in this part are presented on Appendix A3.

²⁷ For more information, the reader should Consult footnote 14

This is often manifested by participating in multinational economic unions or signing international trade and aid agreements. Consequently, it is relatively easier for democratic leaders to find alternative income sources and mitigate the adverse impact of the imposed measures.

In contrast, the respective model predicts a significant negative effect of sanctions on autocratic target states. Specifically the per capita income growth rate is expected to decrease by 2.6p.p. due to the imposition of sanctions. A first explanation is traced in the domestic institutional environment of autocracies. To elaborate, sanctions against autocracies mainly aim at their democratization (Soest et al., 2014). As a result, they are rather targeted towards the entrenched elite. However empirical examples (EU sanctions against Belarus²⁸) verify that autocratic leaders often insulate themselves and pass on the adverse effects of sanctions to the civilian population. In addition, autocratic states tend to be in the margin of the international trade and aid network. Such conditions are evident by their relative absence from economic and trade unions. Consequently their chances of finding alternative income sources to mitigate the incurred hardships are considerably impaired. With a low degree of income substitution, the imposed sanctions are expected to exert a significant negative effect.

Columns 3 and 4 report the sanction effects conditioned by the economic status of the target country²⁹. Considering low - income countries, our specification in column 3 reveals a significant negative impact. The absolute value of the coefficient is 0.05, indicating a 5p.p. decrease in the growth rate per capita income in the sanctioned country due to the imposed measures. Such an effect is consistent with a voluminous strand in the respective literature (Hufbauer et al., 1990; Lam, 1990; van Bergeijk, 1994; Dashti-Gibson et al., 1997; Drury, 1998). The above studies conclude that economic weakness of the target state contributes to sanction success. As far as our framework is concerned, the significant economic costs found contribute to a successful sanction episode.

The above model outcome is associated with the characteristics of less developed countries. At first, the economic structure of developing economies is more fragile and less resilient to international economic shocks. Moreover, such economies base their growth prospects mainly in multinational trade agreements, foreign direct investment or international aid programs. However economic sanctions place those ventures at risk. As a result, the impact of sanctions is expected to be severe. In addition, low-income countries are usually less integrated in the global economic context. This decreases their potential for income substitution which renders the effect of the imposed measures more persistent.

²⁸ EU imposed targeted political sanctions against Belarusian regime in October 2010. The imposed measures included asset freeze, travel bans, arms embargo and ban on exports of equipment for internal repression (EU Council Decision 2012/642/CFSP). However the imposed sanctions caused extensive economic damage to vulnerable populations rather than inducing a regime change.

²⁹ In the specification applied, the only valid instruments came from the first-differenced equation, therefore we apply the Difference GMM estimator.

Contrary to the above conditions, high-income countries are characterized by a stronger founded economic structure with greater resilience to imposed hardships. Furthermore, they are major partners in the global economic environment. As such, they can at least partially counterbalance any income losses due to the levied sanctions. Such reasons account for the insignificant effect of sanctions against developed economies reported in column 4.

In the last two columns of Table 6 we investigate the impact of sanctions, conditioned by the target states' degree of trade openness. In column 5 we investigate the effect of sanctions on less open target states. The respective coefficient enters the regression insignificantly. This result reveals that less open states are better insulated against international coercive measures.

Conversely, in column 6 we report a negative and significant impact on trade oriented economies. The estimated coefficient on internationally oriented countries predicts a 2.8p.p. decrease in the per capita income growth rate following the initiation of a sanction episode. Such an effect is in line with a considerable strand in the literature (Miyagawa, 1992; Hufbauer et al., 1990; Drury, 1998). The aforementioned studies argue that trade oriented economies provide a greater spectrum for sanction imposition. Furthermore, international orientation increases the possibilities for extensive trade relationships between the sender and the target states. This is especially the case for multilateral imposition. Since the above factor is considered to affect sanctions' success rate positively, a significant negative effect on such economies is rather expected.

To summarize the findings on the conditional impact of sanctions so far, we conclude that the characteristics of the target state are important determinants of sanction effectiveness. We find that political and economic weakness as well as trade openness contribute to significant adverse effects of sanctions. As a result, we provide evidence towards our second research hypothesis as far as the characteristics of the target state are concerned.

4.2.2 Conditional Results Based on the Characteristics of Sanctions

Table 7 reports the estimated impact of various sanction categories based on individual characteristics of the levied episodes. As was the case in the earlier specifications, here as well the autocorrelation test verifies the absence of second order autocorrelation in the error term of the transformed model. Similarly, Sargan test concludes on the validity of the instruments used.

In column 1 we model unilateral sanctions, differentiating between US and Russian ones. We find a significant impact only for disincentives levied by the US. The absolute value of the coefficient indicates a 0.3p.p. decrease in the growth rate of the

Table 7 – Sanctions' Conditional Results Based on the Episodes' Characteristics

	Dependent Variable: Per Capita Income Growth Rate							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Unilateral Sanctions								
US Sanctions	-0.003							
	[0.050]**							
Russian Sanctions	0.030							
	[0.488]							
2. Multilateral Sanctions								
EU Sanctions		0.003						
		[0.278]						
UN Sanctions		-0.014						
		[0.728]						
WTO Sanctions		0.041						
		[0.000]***						
3. Different Types of Sanctions								
Economic Sanctions			-0.032					
			[0.023]**					
Political Sanctions			-0.011					
			[0.577]					
4. Different Types of Threats								
Economic Threat				-0.008				
				[0.416]				
Trade Threat				-0.004				
				[0.034]**				
Agreement Suspension Threat				-0.023				
				[0.028]**				
5. Different Target Groups								
Political Sanctions					-0.048			
					[0.001]***			
Business Sanctions					-0.002			
					[0.173]			
6. Sender Commitment								
Weak Commitment						0.001		
						[0.946]		
Moderate Commitment						-0.004		
						[0.039]**		
Strong Commitment						-0.015		
						[0.100]*		
7. Anticipated Costs								
Minor Anticipated Costs							-0.003	
							[0.248]	
Major Anticipated Costs							-0.040	
							[0.090]*	
Severe Anticipated Costs							-0.030	
							[0.482]	

8. Actual Costs

Minor Actual Costs									-0.0002 [0.856]
Major Actual Costs									0.012 [0.839]
Severe Actual Costs									-0.142 [0.037]**
No of Observations	2983	2998	2664	2894	2906	2978	2983	2953	
No of Countries	104	104	103	104	104	104	104	104	
AR(1) Test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) Test	0.147	0.113	0.111	0.153	0.102	0.103	0.205	0.154	
Sargan Test	0.365	0.408	0.115	0.114	0.104	0.534	0.447	0.369	

Numbers in brackets are the corresponding p-values

***/**/* Indicate significance in the 1%/5%/10% level.

target states' per capita income, when sanctioned by the US. Our result is in accordance with the one reported by Neuenkirch and Neumeier. However the effect we came across is considerably weaker (0.3p.p. in comparison to 1.34p.p. for the mild US sanctions in the above paper).

The same specification fails to capture a significant impact of Russian sanctions. Thus it reveals a relative inefficiency in sanction implementation on behalf of Russia. One explanation is traced in the sample of Russian sanctions. A closer inspection reveals that it includes only 19 episodes. Moreover a considerable part of them are long - lasting unsuccessful measures against less developed countries (ongoing sanction against Thailand from 1995 and two ongoing episodes against Samoa from 1982 and 1996 respectively).

In addition, the reported results allow us to test a recent hypothesis put forward in the literature. Dashti-Gibson et al. (1997) argue that the repeated application of sanctions from a specific country, undermines their effectiveness, due to a loss of credibility. However the estimated coefficients indicate a different implication. A frequent sanctioner (US) was found able to impose effective sanctions. On the contrary, a less frequent sanctioner (Russia) imposes ineffective sanctions. Such a result indicates scale economies in the imposition of sanctions (van Bergeijk, 1994).

The second column presents the results considering multinational episodes. We model the sanctions levied under the auspices of EU, UN or WTO. Out of the three multinational organizations, only WTO is found able to impose sanctions with significant effects to the target economy. However the respective coefficient (0.041) shows a 4p.p. increase in the per capita income growth rate due to the imposition of sanctions. In order to account for this impact, we resort to the nature of WTO sanctions. As part of the Dispute Settlement Body, the organization seeks to resolve disputes and restore balance between its members. Therefore in many cases disputes

are settled during the negotiations stage. Even in cases sanctions are imposed, their expected impact is not severe, for two main reasons. At first, WTO authorizes trade sanctions of moderate severity³⁰. In such a way, boycotts and embargoes are avoided. Secondly, sanction imposition follows after a period of negotiations. As a result, the target government has adequate time to seek alternative income sources and alleviate the incurred hardships.

In the same specification, the coefficients for EU and UN sanctions enter the regression insignificantly. Concerning UN measures, the result is in contrast with the study by Neuenkirch and Neumeier. They come up with significant adverse effects for all three categories of UN sanctions they apply (1.68p.p. drop in the growth rate of the per capita income for mild sanctions, 3.43p.p. drop for moderate ones and 5.3p.p. drop for severe UN sanctions). Our outcome is explained by an overview of the imposed measures. Specifically, both EU and UN specialize in levying rather targeted sanctions. In an attempt to minimize any adverse humanitarian effects, they aim the imposed measures at the entrenched elite, which is mainly responsible for the debatable policy. Under such an enforcement pattern, the impact of sanctions to the civilian population is expected to be minimal.

Even so, the modelled insignificant effects reinforce the argument in the literature that multilateral sanctions tend to fail (Kaempfer and Lowenberg, 1999; Miers and Morgan, 2002). However, sanctions under the auspices of a multinational organization are expected to be more effective. Drezner (2000) attributes the increased effectiveness of such sanctions to the more efficient monitoring and enforcement of the levying coalition, due to the presence of a multinational organization. Nevertheless, our results conclude towards the ineffectiveness of UN and EU sanctions.

In column 3 we differentiate sanctions according to the specific issue that triggered their imposition³¹. In particular, we model economic and political episodes. Our results indicate that only economic measures impact significantly the target economy. They are found to decrease the per capita income growth rate by 3.2p.p. Such an outcome verifies the conventional wisdom that economic disincentives have greater potential in significantly affecting the sanctioned economy. Besides, they are imposed due to an economic dispute. Therefore significant costs covering the whole economic sector are a pre-requisite for compliance. In contrast, political sanctions often aim at destabilizing the target regime. As such, they consist of rather targeted measures (like asset freeze or travel bans). That reason explains the insignificant effect of political sanctions to the target economy (Soest et al., 2014).

³⁰ WTO Dispute Settlement Body authorizes *retaliatory* sanctions. Such measures result from the logic of restoring balance in the rights and obligations between members, when a country applies a policy that violates WTO rules. However more severe sanctions are not part of the WTO dispute settlement process. (Maarten Smeets. 2000. Sanctions: Efficacy and Morality. Global Dialogue 2(3)).

³¹ In the specification applied, the only valid instruments came from the first-differenced equation, therefore we apply the *Difference GMM* estimator.

Column 4 reports the modelled impact of various threat categories. We investigate the effects of threats against the economic structure of the target country as well as threats against trade and aid agreements. The estimated coefficients reveal that threats against trade and aid agreements impose significant hardships to the sanctioned state. The respective coefficients predict that the target economy will experience a decrease in the per capita income growth rate equal to 0.4p.p. due to threats against already signed trade transactions. Similarly, threats against aid agreements are found to decrease the GDP per capita growth rate by 2.3p.p. The obtained results highlight the significance of trade and aid agreements for target countries. Those are mainly developing ones. As a result, they attribute great importance to their trade and aid protocols. In addition, such agreements are difficult to circumvent (Lindsay, 1986). To this end, such countries are reluctant to jeopardize their international trade and aid prospects.

In column 5 sanctions are differentiated according to the particular group they target within the sanctioned state. The sample is divided between political and business sanctions. Those aiming at the political elite enter the regression significantly, while the impact of business ones is found to be statistically insignificant. The estimated coefficient indicates that political sanctions cause a decline of 4.8p.p. to the per capita income growth rate. As such, they instigate policy changes that adversely impact the general population. In addition, the estimated outcome reveals the close ties between the political and economic environment in modern societies. The entrenched elite is able to pass on the adverse effect of sanctions to the general population. Conversely, sanctions threatening the business environment are not found to adversely impact the target economy.

Column 6 models three different sanction categories, depending on the commitment level of the sender state (weak, moderate and strong). The estimated results indicate that in order for sanctions to exert negative influence to the receiving economy, the sender state(s) need to be at least moderately committed. Sanctions with moderate sender commitment instigate a decline in the target states' per capita income growth rate equal to 0.4p.p. In a similar way, the respective decline for measures with strong commitment level is 1.5p.p. The estimated coefficients verify the positive association between the commitment level of the sender state and the episodes' success, initially suggested by Morgan, Bapat and Krustev (2009). Additionally it is in line with our expectation that the level of sender commitment positively affects the incurred costs. The proposed mechanism associates the senders' determination with the severity of the sanctions. Intuitively, more committed senders impose more severe measures. In turn, more comprehensive measures impose greater hardships to the target economy. The verification for the above expectation is twofold: At first, sanctions with weak commitment are not found to cause significant hardships. Furthermore, the magnitude of the significant costs escalates with the commitment level. Sanctions levied by strongly committed senders impose greater hardships compared to those imposed with moderate commitment level (1.5p.p. decline in the growth rate of per capita income, compared to a decline of 0.4p.p.).

The last two categories employed in this sections (Columns 7 and 8) refer to the costs incurred to the target state. The first specification constitutes of three levels of anticipated costs (minor, major and severe). We find that measures with major anticipated costs adversely impact the target economy. Specifically, our model predicts a 4p.p. decline in the growth rate of GDP per capita due to sanctions of the above category. Not in accordance with the above result, the term measuring the impact of sanctions that are expected to incur a severe effect, enters the regression insignificantly. However, the explanation lies in the dataset employed. It incorporates only 12 such episodes, which explains the model's inability to capture any significant effect.

In the final column, we investigate a well - documented relationship in the literature. Specifically, we capitalize on the studies associating the imposed costs with the success rate of sanctions (Hufbauer et al., 1990; Dehejia and Wood, 1992; Dashti-Gibson et al., 1997; Drury, 1998; Hart, 2000). We model the effects of three different categories of sanctions' costs (minor, major and severe). The estimated outcome indicates significant adverse effects only for sanctions with severe ex-post impact. Our specification predicts that such measures will cause a 14.2p.p. drop in the per capita income growth rate of the target country. The magnitude of the estimated impact strikes as excessive. However, our sample is influenced by highly atypical cases in the empirical literature (US sanctions against Yugoslavia³² in 1991-'92). In such cases sanctions caused exorbitant adverse quantitative effects on target economies, although they were often intensified by military support.

To sum up, throughout this part we verified that the characteristics of sanction episodes are important determinants of their effectiveness. In particular, we concluded that the identity of the sender (unilateral or multilateral), the type of measures threatened or implemented as well as the sanctioned groups within the target state can define the impact of sanctions. In addition, aspects such as the degree of the sender commitment or the anticipated and actual costs decisively influence the effectiveness of the imposed measures.

4.3 Interaction Terms

Table 8 presents the interaction term results. Once again, the necessary tests verify the consistency of the GMM estimators. The p-values of AR(2) test reveal the absence of second order autocorrelation, while Sargan test establishes the validity of the instruments used. Column 1 reports the specification consisting of the two unilateral senders (USA and Russia) combined with the two different types of issues that can trigger a sanction episode (political and economic). Judging by the significance of the estimated coefficients, USA is in position to levy economic measures which impose significant hardships to the target country. The estimated coefficient shows a 0.6p.p. decline in the per capita income growth rate of the sanctioned country, incurred by

³² Due to severe economic and political sanctions (later intensified by military strike), the per capita income of Yugoslavia declined by 60p.p. in 5 years (1989-1993). In absolute terms, per capita income fell from \$3240 in 1989 to \$1390 in 1993.

economic disincentives originating from USA.

In contrast, Russia is found able to negatively affect the target economy by issuing political sanctions. The magnitude of the estimated coefficient (0.24) indicates a severe adverse effect on the target economy. Specifically, our model predicts a 24p.p. decline in the per capita income growth rate of the target state. An explanation lies in the low number of episodes (only 11) incorporated in the above category. The rather high estimated outcome is also accounted for by the fact that most of those sanctions were levied against the former constituent republics of Russia (Lithuania, Latvia, and Estonia). These countries relied considerably on trade agreements with Russia. Consequently, their suspension due to the sanctions imposed caused great hardships to the respective target economies. Moreover, a closer inspection reveals that such measures were often intensified by military force. As such, their impact is expected to be rather severe.

A simple comparison between the significant interaction terms and their constituent categories (Table 7), reveals two interesting conclusions. In accordance with our conditional results, the *USA/Economic* interaction term is based on two significant sanction categories. What can be considered inconsistent though is that the two categories forming the – significant- *Russia/Political* interaction term enter their own regressions insignificantly.

In the second column, we combine each of the three commitment levels (weak, moderate and strong) with USA as the sender state. Our specification captures significant adverse effects incurred only by episodes levied under strong commitment level. The estimated coefficient (-0.019) points to an almost 2p.p. drop in the sanctioned states' per capita income growth rate, due to political measures originating from USA. As was the case for economic measures levied by USA, the

Table 8 – Interaction Terms Results

	Dependent Variable: GDP Per Capita Growth Rate	
	(1)	(2)
1. Sender State and Issue Involved		
USA / Political	-0.002 [0.866]	
USA / Economic	-0.006 [0.037]**	
Russia / Political	-0.240 [0.086]*	
Russia / Economic	0.480 [0.249]	
2. Sender State and Commitment Level		
USA / Weak		0.002 [0.780]
USA / Moderate		-0.001 [0.836]
USA / Strong		-0.019 [0.082]*
No of Observations	2910	2806
No of Countries	104	104
AR(1) Test	0.000	0.001
AR(2) Test	0.112	0.385
Sargan Test	0.100	0.122

Numbers in brackets are the corresponding p-values

***/**/* Indicate Significance at the 1%/5%/10% level

significant interaction term in our second model is based on two terms (USA as the sender state and strong commitment level) that enter their own specifications significantly.

4.4 Intermediate Results

Sanction imposition is a dynamic process of counteracting forces. On one hand, the adverse impact of episodes in effect grows over time, increasing the probability of compliance. Conversely, economic adjustment of the target state provides alternative income sources and reduces the incentives to comply (van Bergeijk and van Marrewijk, 1995). To sufficiently model the above strategic interaction we adopt an extended time frame of 5 years in total. From the estimation results (Table 9) it is clear that in many cases the estimated coefficients are rather large. This is considered a limitation of the specific analysis. However the signs of the significant coefficients provide a pattern for the interaction between the involved states. The interpretation of that pattern constitutes the relative significance of the intermediate analysis.

To determine the consistency of the GMM estimators, we rely on two specification tests. Sargan test of over-identifying restrictions verifies the validity of the instruments used. Similarly autocorrelation tests indicate first (in the 10% level) but no second order autocorrelation of the residuals. Hence the assumptions underlying the selection of instruments are established. Furthermore we conduct an F-test to investigate the joint significance of the additional lags in the intermediate analysis. According to this, the more informative intermediate models are preferred in three cases: the period variable specification in our complete sample and the threat and sanction models in both start and period of variables (in the 10% level). In the rest cases, the intermediate analysis models are rejected against the more parsimonious ones. As far as the start variables are concerned, the joint insignificance of the additional lags is attributed to the nature of those variables. The additional lags enter the models insignificantly since start variables are intended to capture the initial effect of sanction episodes. Applying an extended time frame is opposed to the nature of the start variables. Nevertheless, the joint insignificance of the additional lags is still treated as a limitation of the respective specifications.

The specification in column 1 models the initiation of a complete sanction episode, measured by the start variable. The intermediate model fails to capture any significant effects. In the years following the beginning of the episode we mainly come up with negative coefficients. However the respective terms enter the regression insignificantly, in contrast with our main results (Table 5). This inconsistency is attributed in the fact that the intermediate specifications spread the overall variation over a period of 5 years. Therefore it is rather difficult to be captured by a single model.

In column 2 we investigate the economic impact of sanctions consisting of both a threat and a measure part. The results provide us with one negative and significant

Table 9 – Intermediate Analysis Results

		Sanction Variables							
		Start Variables				Period Variables			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Complete Episode	Threat and Sanction	Threat, No Sanction	No Threat, Sanction	Complete Episode	Threat and Sanction	Threat, No Sanction	No Threat, Sanction	
GDP Growth	L 0	0.018 [0.383]	0.011 [0.721]	0.091 [0.051]*	-0.010 [0.868]	0.035 [0.018]**	-0.104 [0.045]**	0.058 [0.165]	0.130 [0.041]**
	L 1	-0.023 [0.242]	-0.040 [0.182]	-0.060 [0.139]	0.031 [0.492]	-0.062 [0.000]***	-0.011 [0.844]	-0.096 [0.093]*	-0.1480 [0.015]**
	L 2	0.011 [0.669]	-0.018 [0.449]	0.045 [0.211]	-0.002 [0.969]	0.038 [0.037]**	-0.017 [0.684]	0.069 [0.108]	0.001 [0.965]
	L 3	-0.021 [0.218]	0.052 [0.161]	-0.066 [0.061]*	-0.062 [0.231]	0.001 [0.971]	0.068 [0.048]**	-0.037 [0.505]	-0.058 [0.113]
	L 4	-0.018 [0.163]	-0.078 [0.006]**	-0.037 [0.229]	0.016 [0.625]	-0.013 [0.345]	0.040 [0.319]	0.060 [0.200]	0.020 [0.472]
No of Observations		2965	2942	2998	3013	2965	2750	2750	2641
No of Countries		104	104	104	104	104	103	103	103
AR(1) Test		0.002	0.000	0.002	0.000	0.001	0.378	0.013	0.002
AR(2) Test		0.911	0.586	0.152	0.157	0.997	0.728	0.207	0.338
Sargan Test		0.768	0.594	0.974	0.604	0.964	0.815	0.997	0.551
F-test (nested vs complete model)		0.459	0.090	0.101	0.485	0.003	0.095	0.342	0.163

Numbers in brackets are the corresponding p-values

***/**/* Indicate Significance at the 1%/5%/10% level

coefficient four years after the initiation of the episode. Specifically, we find that four periods after a threat and sanction episode is issued, the target economy will experience a decrease of 7.8 p.p. in the per capita income growth rate. The overall negative impact verifies the outcome for such episodes found in the main results (Table 5). Furthermore, it confirms the hypothesis that sanctions do not work instantaneously and need time to be effective (Bolks and Al-Sowayel, 2000).

Decomposing the overall impact into a threat and a measures part (columns 3 and 4), reveals some interesting conclusions. At first, verifying the main results (Table 5), threats are the only constituent of a sanction episode with significant effects to the target economy. The estimated outcome indicates positive impact to the target economy in the year the threat is issued and negative impact three years later. To elaborate, the year a country is threatened with sanctions experiences an increase in the per capita income growth rate equal to 9.1p.p. However the coefficient measuring the effect in the year an episode commences has restricted value of interpretation. This is because our dataset does not include information on the exact date the episode starts. It is possible for an episode to be initiated at the end of the year. Therefore we cannot be certain that the modelled effect can be purely attributed only to the sanctions episode. Nevertheless, the inconsistency of the above outcome with the

negative coefficient obtained in the main results is also considered a limitation of the intermediate analysis.

In the same specification, we find negative effect of threats three years after their initiation. The result indicates that three years after a country is threatened with sanctions, the domestic economy's growth rate of gdp per capita will decrease by 6.6p.p. This result verifies the negative initial impact of threats we came up with in our main results (Table 5). Furthermore, it indicates that single threats also need time to work, as is the case for sanctions, according to Hufbauer et al. (1990).

Column 4 investigates the economic impact of direct measure imposition. Similar to our main results, the intermediate analysis provides no significant coefficients. This reveals that sanctions starting directly with measure imposition are less effective. Consequently the threat part is a necessary constituent of an effective sanctions episode.

In the second part of Table 9 (Columns 5 to 8) we employ the period variables of our analysis. Thus we model the cumulative impact of sanction episodes enforced against a single country. Column 5 reports the results of a complete episode. The model predicts no adverse effects in the year the episodes commence. The respective coefficient (0.035) shows that the target economy experiences an increase of 3.5p.p. in the per capita income growth rate from every single sanction episode. Once again, the interpretative value of the first-year coefficient is considered rather limited. However domestic economic conditions change considerably one year later. At that point, the target country suffers a decline in the per capita income growth rate, equal to 6.2p.p.. Yet the adverse effects last only for one period. During the next year the growth rate of the per capita income turns out to be positive again. Furthermore it is almost equal to the one the country experienced at the beginning of the sanction episodes (3.8p.p. compared to 3.5p.p.). Overall, the above specification indicates short-lasting negative effects of the complete sanctions dataset. Alternatively, we suggest that the sanctioned states exhibit high rates of income substitution and therefore are able to counterbalance the adverse impact of sanctions rather quickly and efficiently.

Modelling the economic effects of multiple threat and sanction episodes (column 6) provides some interesting results. When a country is repeatedly sanctioned each of the episodes is found to exert negative impact to the target economy the period it is levied. The model predicts that each episode is expected to cause a decrease the gdp per capita growth rate by 10p.p. This outcome might strike as excessive. However we already accounted for the limitations associated with the magnitude of the coefficients in the intermediate analysis and also the low value of interpretation for the first year effect. Three years later the target economy is able to counterbalance the negative effects of sanctions and experiences an increase in the per capita income growth rate, equal to 6.8p.p. Such a result strongly suggests successful income substitution on behalf of the target state.

In column 7 we isolate the impact of a threat for sanctions, when the target state is already being threatened multiple times. Our outcome predicts that the negative effects in such conditions will appear one period after the threat is issued. To be more specific, any of the multiple threats against a single state is responsible for a 9.6p.p. decrease in the gdp per capita growth rate of the threatened state. We contend that one year is the necessary period for the target state to evaluate the credibility of the threat. Once the threat is deemed credible, the threatened government forsakes its' questionable policy, with immediate adverse economic effects.

Furthermore, our model in column 8 captures significant effects from the imposition of sanctions. During the year a sanction is levied against a country already being sanctioned, our model predicts a positive impact to the target economy. Specifically the domestic growth rate of the per capita income is expected to increase by 13p.p. This is a counter intuitive outcome, which constitutes a limitation of the intermediate analysis. However the economic situation changes one year later. Then, each one of the multiple sanctions targeting a specific country is predicted to impose a decrease of almost 15p.p. to the gdp per capita growth rate. Such an effect is considered rather large, however the significance of our intermediate models lies in the pattern of interaction between the involved states and not the estimated coefficients per se.

As a final part of this section, we compare the start and period variable outcomes in the intermediate context. Considering the effect of complete sanction episodes, the comparison concludes towards the dominance of the period specifications, based on the following: At first, it is the only one that provides significant results. Furthermore, the significant coefficients describe a rather plausible pattern. According to this, the economy of the target state suffers significant disutility one year after the respective episode. However these effects are partially offset by the countermeasures employed by the sanctioned country. One period later the target state manages to transform the domestic economic structure and substitute any income losses. As a result, the target state experiences positive effects on economic growth. In addition, the same result is reached by isolating the episodes that consist of a threat and a measure implementation part. The main difference is that in the latter case, the adverse effects are more imminent and the sanctioned state needs more time to mitigate the imposed disutility.

In case the effect of threats is modelled separately, both start and period variables verify the adverse impact of threats to the target economy. Despite the fact that this effect takes place in different time periods, the two respective specifications indicate almost identical patterns of interaction. Specifically, the negative effects are quite large (6.6p.p. in the start and 9.6p.p. in the period model) and take some time to appear (three years in the start specification and one in the period one). Finally, the period variable specification is considered more informative than the start one when the effect of measure imposition is modelled. Indeed it is the only one to provide significant effect of the imposed measures to the target economy.

To summarize, intermediate analysis examined the effect of time on the impact of sanctions. As such, it provided the necessary evidence for a sufficient answer as to the effect of sanction duration to their effectiveness. In contrast with our main estimation results (Table 5) we concluded that the cumulative impact of multiple sanction episodes is more severe for the target state than the initial one. Regarding the effect of time in sanctions' effectiveness, the literature is divided. There are scholars who argue towards the importance of time in sanctions application (Hufbauer et al. 1990; van Bergeijk and van Marrewijk, 1995) and those who contend that sanctions will work instantly (Miyagawa, 1992). Our significant results on the full sample (column 5) point towards the view of the latter. In particular, they reveal that economic disincentives need some time to weaken the target economy and prove more effective. However when we restrict the sample to episodes including both a threat and a sanction part, the outcome is reversed. The initial effect of such episodes proves more efficient in inducing significant costs than the cumulative one. Such costs can ultimately determine the success rate of the imposed measures. In addition, in both types of specifications threats prove rather effective.

5. Conclusions and Policy Recommendations

In this thesis we examined the potential of sanctions to induce compliance on behalf of the target state. Considerable hardships constitute the motivation mechanisms for compliance. However we distinguish ourselves from previous studies by investigating the conditional impact of sanctions. This involves attributing special importance to the specific conditions of the target countries and characteristics of sanctions themselves. We contend that such aspects determine the effectiveness of the imposed measures. A panel model is employed with extensive data from 717 sanction episodes from 1970 to 2012.

In line with previous studies (Neuenkirch and Neumeier, 2014) the estimated results reveal that sanctions impose significant disutility to the target economy. Adverse effects are found in the complete sample of sanctions as well as the restricted one. The latter consists of episodes necessarily including both a threat and a measure implementation part. Furthermore the above result is valid both for the initiation of a sanction episode and for multiple episodes simultaneously targeting a specific country. In addition, we model the effect of various aspects of sanction imposition on their effectiveness. On the basis of the target country characteristics, the effectiveness of sanctions was found to be conditional on the political and economic status of the sanctioned state. Specifically the analysis revealed that sanctions are more effective against low income rather than high income economies, autocratic states instead of democratic ones and export oriented economies compared to less open ones.

Moreover, the present study showed that the impact of sanctions is also conditional on characteristics of the levied measures. Disaggregating the overall effect into a threat and a measure imposition part revealed that threats impose significant economic hardships to the target country. The estimated outcome indicates the significance of threats as a vital element of a successful sanction episode. Such a result confirms the trade-off between the perceived credibility of a threat and the reallocation of production factors within the sanctioned economy. Our result also verifies prominent sanction episodes in the literature, such as the Montreal Protocol (1989), highlighting the importance of credible threats. We also investigate the impact of different threat categories, only to find that target countries are rather vulnerable to the withdrawal of trade and aid agreements.

Further refinement of the sanction variables reveals the conditional impact of sanctions. We find that the identity of the sender determines their effectiveness. This result stands both for unilateral and multilateral episodes under the auspices of an international organization. Moreover, sanction effectiveness is also influenced by the specific type of measures. Economic measures rather than political ones exert a significant negative impact to the target economy. Similarly, sanctions targeting the political elite impose greater economic hardships compared to the ones against the business environment. Such a result is indicative of the fact that the political elite in

the target country often possess the necessary means to transfer the adverse effects caused by sanctions to the general population.

Additionally the effect of sanctions is associated with the commitment level of the sender state. The impact to the target economy increases with the degree of sender commitment. Sanction episodes were also differentiated according to the costs incurred to the target economy. Such costs were divided between the anticipated and the actual ones. The respective specification showed that when major costs are expected, severe economic disutility is indeed imposed to the target economy. As to actual costs, our results verified the extensive literature documenting the costs of sanctions as a significant determinant of their effectiveness (Hufbauer et al. 1990; Dehejia and Wood, 1992),

Finally, to determine the effect of sanctions' duration on their effectiveness, we expanded the time frame of the analysis to a 5 year period. Investigating the cumulative impact of multiple sanction episodes revealed two main implications. Depending on our complete sample, we find that the adverse effects of each one of multiple episodes are more severe for the target state than the initial ones. In contrast, the sanctioned states prove rather inefficient in mitigating the initial effects of episodes consisting of both a threat and a measure imposition part. As to the effect of threats only, we conclude that their initiation imposes significant disutility to the target economy. This result is valid also for the cumulative impact of multiple threats to the sanctioned state. Finally, the duration effect of measure imposition proves harder to mitigate than the initial one.

On the whole, the analysis provided useful insight regarding a number of issues that raise controversy in the sanctions literature. On the basis of the results, we propose significant policy recommendations for the future imposition of sanctions. Considering forthcoming episodes, it is important for the sender state(s) to follow a backwards induction process of implementation. At first they need to clearly specify the goal of the sanction. In turn, this will define the most appropriate measures to be implemented. Once the type of sanctions and the specific social group targeted are identified, the imposed measures need to be tailored to the political and economic framework of the target country. This process leads to more targeted sanctions, which can be highly effective and with increased potential for success. Furthermore, targeted measures minimize the adverse humanitarian impact, promoting the welfare of the whole society.

However this study exhibits a number of limitations that should be addressed by future research. In the intermediate analysis, the coefficient controlling for the effect at the year of implementation has low value of interpretation. Since we lack data on the exact date within the year the episode started, it is not possible to purely attribute the first-year effect to the sanction variable. In addition, there is notable inconsistency between the intermediate and the short-term results. Considering the complete sanction episode, we failed to replicate the adverse effects of sanction imposition. The

respective specification provided no significant coefficients. Moreover, in the case of multiple threats, we identify an inconsistency between the main and the intermediate results. Intermediate analysis suggested adverse impact of threats, while the main results provided no significant estimates.

Nonetheless our study on sanction effectiveness is far from being complete. It is only a building block on which further research will capitalize upon. Identifying and testing some criteria that are used to distinguish between sanction episodes is only the beginning of the sanctions' conditional impact approach. Further investigation will identify more factors that contribute to the effectiveness of sanctions. The impact of the imposed measures to the receiving economy should also be investigated in a more targeted way. A differentiation of significant importance refers to the impact of sanctions on the different economic sectors of the target country. Indeed, there is no reason to assume that sanctions will impact the three economic sectors similarly. Moreover, the role of external factors in assisting the targeted state, also known as Black Knights (Tolstrup, 2012) was not incorporated in our analysis. Their role is very important in the counterbalancing effects of the target state. Overall, thorough investigation of their conditional impact will refine the operation of sanctions and minimize any detrimental humanitarian impact.

In a different respect, future research should also focus on the factors that translate sanction effectiveness into compliance. Changing a debatable policy is often a political decision. As such, economic costs are important determinants, however not the only ones. Integrating economic and political theory will lead to many significant motivation mechanisms of the decision to comply. On the whole, detailed research will generate significant policy implications that will increase the relative attractiveness of sanctions as a foreign policy tool.

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SECTION IV - APPENDICES

APPENDIX A1 – Literature Review

Table A1.1: Determinants of Sanction Effectiveness

	Democratic Institutions *	Economic and Political Weakness	Trade Linkages Between Target and Sender	Multilateral Levying of Sanctions	Financial Sanctions	Smart Sanctions	Costs to the Target State	Greater Duration
Lektzian and Souva (2003)	+							
Galtung (1967)	+							
Hufbauer et al. (1990)	+	+	+				+	
Noorundin (2002)	-							
Bolks and Al-Sowayel (2000)	-							+
Pape (1997)	-							
Cortright and Lopez (2000)	-							
Lam (1990)		+						
van Bergeijk (1994)		+	+					
Drury (1998)		+		~ +				
Dashti-Gibson et al. (1997)		+			~~ +			
Miyagawa (1992)			+					-
Bapat and Morgan (2009)				+				
Kaempfer and Lowenberg (1999)				-				
Ang and Peksen (1997)				-				
Miers and Morgan (2002)				-				
Drezner (2001)				+				

Table A1.1 (continued)

	Democratic Institutions *	Economic and Political Weakness	Trade Linkages Between Target and Sender	Multilateral Levying of Sanctions	Financial Sanctions	Smart Sanctions	Costs to the Target State	Greater Duration
Morgan and Schenbach (1996)								
Dehejia and Wood (1992)								
Doxey (1990)							+	
Hart (2000)							+	
Van Bergeijk and van Marrewijk (1995)								+

Dependent Variable: Sanctions' Success Score

The * refers to the institutional environment of the target country

+ denotes a statistically significant positive effect of the independent variable to the dependent one. Conversely, – stands for a statistically significant negative effect.

~ only if a multinational organization is involved

^^ denotes that financial sanctions are more effective than trade ones

APPENDIX A2 Countries Included In the Analysis

Table A2.1 - Countries included in the analysis and their distribution:

Afghanistan +	Cyprus @ +	Kuwait +	Samoa * +
Albania *	Czech Republic @ +	Laos *	San Marino
Algeria *	Congo Democratic Republic *	Latvia * +	Saudi Arabia +
Andorra	Djibouti *	Lebanon	Senegal
Angola *	Dominica +	Lesotho * +	Seychelles +
Antigua and Barbuda	Dominican Republic * @	Liberia * +	Sierra Leone *
Argentina @	Ecuador *	Libya	Singapore +
Armenia * +	Egypt *	Liechtenstein	Slovakia @ +
Australia @	El Salvador * @	Lithuania @ +	Slovenia +
Austria @ +	Equatorial Guinea * +	Macedonia, FYR * @ +	South Africa * @
Azerbaijan * +	Eritrea * +	Malawi * @	South Korea
Bahamas +	Estonia @ +	Malaysia * +	South Sudan
Bahrain +	Ethiopia *	Maldives * +	Spain @

APPENDIX A2 (continued)

Bangladesh *	Fiji * +	Mali *	Sri Lanka *
Barbados +	Finland @	Malta +	St. Kitts and Nevis +
Belarus * +	France @	Marshall Islands *	St. Lucia +
Belgium @ +	Gabon +	Mauritius * @ +	St. Martin (French part)
Belize * +	Gambia * +	Mexico	Sudan *
Benin *	Georgia *	Monaco	Sweden @ +
Bhutan * +	Germany @	Mongolia * +	Switzerland @ +
Bolivia * @	Ghana *	Morocco *	Syrian Arab Republic *
Bosnia & Herzegovina * +	Greece @	Myanmar	Tajikistan *
Botswana * @ +	Grenada *	Namibia * +	Tanzania *
Brazil * @	Guatemala *	Netherlands @ +	Thailand * +
Bulgaria * @ +	Guinea *	New Zealand @	Togo * +
Burkina Faso *	Haiti *	Nicaragua *	Tonga * +
Burundi *	Honduras * @ +	Niger *	Trinidad and Tobago @ +
Cambodia * +	Iceland +	Nigeria * +	Turkey * @
Cameroon *	India * @	North Korea	Uganda *
Canada @	Indonesia *	Norway @ +	Ukraine * +
Cape Verde * @ +	Iran, Islamic Rep.	Pakistan *	United Kingdom @
Central African Republic *	Iraq *	Panama * +	United States of America @
Chad *	Ireland @ +	Paraguay *	Uruguay @
Chile * @	Israel @ +	Peru * @	Uzbekistan *
China *	Italy @	Philippines *	Vanuatu *
Colombia * @	Ivory Coast * +	Poland * @	Venezuela, RB @
Comoros *	Japan @	Portugal @	Vietnam *
Costa Rica * @ +	Jordan * +	Romania * @ +	Yugoslavia *
Croatia @ +	Kazakhstan * +	Russia *	Zambia * +
Cuba *	Kenya	Rwanda *	Zimbabwe * +

Considering the results of Table 6 (Conditional Results), * denotes less developed target countries, @ the democratic ones and + stands for the trade oriented economies

Table A2.2 – Distribution of Countries Included in the Analysis

Continent	Number of Countries in the Analysis	Representation Percentage
Asia	22	71 %
Africa	39	70 %
Caribbean	18	82 %
Europe	40	83 %
Middle East	14	67 %
North America	3	75 %
Pacific	8	40 %
South America	9	70 %
Total	153	71 %

APPENDIX A3 – Categorization Due to Target Countries' Characteristics:

Table A3.1: Criteria for Distinguishing Sanctioned Countries

Characteristic	Categories	Criterion	
Economic Status	1. Developed Economies 2. Developing Economies	GDP Per Capita (World Bank Indicators: 2005)	1. Developed Economies $0 < GDP < 4035$ 2. Developed Economies $GDP > 4036$
Political Regime	1. Democratic Countries 2. Autocratic Countries	Polity 2 Index	1. Democratic Countries $Polity\ 2 > 5$ 2. Autocratic Countries $-7 < Polity\ 2 < 5$
Trade Openness	1. Trade Oriented Economic Activity 2. Autarkic Economies	$TrOp = \frac{(M + X)}{GDP}$ $M = Imports$ $X = Exports$	1. Trade Oriented $TrOp > 67$ 2. Autarkic $TrOp < 67$

APPENDIX A4 Sanction Variables

Table A4.1 - Detailed list and sources of the sanction variables:

Variable	Description	Source
Threat	Variable identifying whether a threat was issued in a sanctions case or not	TIES dataset, variable: Threat
US Sanctions	Sanction cases for which the main sender state is US	TIES dataset, variable: Senders, COW ³³ country code: 2
Russian Sanctions	Sanction cases for which the main sender state is Russia	TIES dataset, variable: Senders, COW country code: 365
EU Sanctions	Sanctions imposed under the supervision of the European Union	TIES dataset, variable: Senders, COW country code: 1830
UN Sanctions	Sanctions imposed under the supervision of the United Nations	TIES dataset, variable: Senders, COW country code: 4400
WTO Sanctions	Sanctions imposed under the supervision of the World Trade Organization	TIES dataset, variable: Senders, COW country code: 4580
Political Sanctions (aimed to capture the specific issue involved)	Sanctions aimed towards destabilizing the target government	TIES dataset, variable: Issue, categories included: 01-10
Economic Sanctions (aimed to capture the specific issue involved)	Sanctions aimed at imposing reforms to the economic sector of the target government	TIES dataset, variable: Issue, categories included: 12-14
Economic Threat	The variable identifies whether the issue that instigated the threat was economic or not	TIES dataset, variable: Sanction Type Threatened ³⁴

³³ COW stands for Correlates of War

³⁴ This classification in many cases incorporates several types of sanctions threatened for a single episode

APPENDIX A4 (continued)

Political Threat	The variable identifies whether the issue that instigated the threat was political or not	TIES dataset, variable: Sanction Type Threatened
Agreement Suspension Threat	The variable identifies whether the issue that instigated the threat was the suspension of a foreign aid agreement	TIES dataset, variable: Sanction Type Threatened
Political Sanctions (Intended to capture the interests the sender aims to impose costs upon)	Sanctions aimed to cause hardships on the political / regime leadership	TIES dataset, variable: Threatened Target Interest, categories included: 02,04,05
Business Sanctions (Intended to capture the interests the sender aims to impose costs upon)	Sanctions aimed to cause hardships on particular industries within the target state	TIES dataset, variable: Threatened Target Interest, categories included: 03
Weak Sender Commitment	Variable that controls for weak specificity of the threats made by the sender	TIES dataset, variable: Sender Commitment, category: 01
Moderate Sender Commitment	Variable that controls for moderate specificity of the threats made by the sender	TIES dataset, variable: Sender Commitment, category: 02
Strong Sender Commitment	Variable that controls for strong specificity of the threats made by the sender	TIES dataset, variable: Sender Commitment, category: 03
Minor Anticipated Target Costs	Variable intended to measure the anticipated impact of sanction imposition	TIES dataset, variable: Anticipated Target Economic Costs, category: 01
Major Anticipated Target Costs	Variable intended to measure the anticipated impact of sanction imposition	TIES dataset, variable: Anticipated Target Economic Costs, category: 02
Severe Anticipated Target Costs	Variable intended to measure the anticipated impact of sanction imposition	TIES dataset, variable: Anticipated Target Economic Costs, category: 03
Minor Target Economic Costs	Variable intended to measure the impact of sanction imposition ex post	TIES dataset, variable: Target Economic Costs, category: 01
Major Target Economic Costs	Variable intended to measure the impact of sanction imposition ex post	TIES dataset, variable: Target Economic Costs, category: 02
Severe Target Economic Costs	Variable intended to measure the impact of sanction imposition ex post	TIES dataset, variable: Target Economic Costs, category: 03

APPENDIX A5 - Control Variables

Table A5.1 - List of variables used together with their sources:

Variable	Definition	Source
Polity2	The Polity variable is computed by subtracting the Autocracy score from the Democracy one. Both these scores are computed in a scale from 0 to 10 and as a result the polity score has a scale from -10 to 10.	Polity IV Project
Current Account Balance	It is the sum of net exports of goods and services, net primary income, and net secondary income.	The World Bank Development Indicators
Terms of Trade	Net barter terms of trade index is calculated as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000.	The World Bank Development Indicators

APPENDIX A5*(continued)*

Domestic Credit	It refers to financial resources provided to the private sector by other depository corporations (except central banks) and trade credits and other accounts receivable that establish a claim for repayment.	The World Bank Development Indicators
Population Growth	The yearly rate at which the population changes.	The World Bank Development Indicators
Inflation	The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. It shows the rate at which prices change in the economy as a whole.	The World Bank Development Indicators
Government Consumption	General government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees), as well as expenditure on national defense and security, but excludes government military expenditures that are part of government capital formation.	The World Bank Development Indicators
Capital Formation	Private investment covers gross outlays by the private sector (including private nonprofit agencies) on additions to its fixed domestic assets.	The World Bank Development Indicators
Oil Rents	Oil rents are the difference between the value of production at world prices and total costs of production	The World Bank Development Indicators

Table A5.2 – Descriptive Statistics of the control Variables

Variable	Mean	Standard Deviation
GDP Per Capita (logarithm)	7.65	1.60
Inflation Rate (logarithm)	1.91	1.40
Capital Formation (logarithm)	3.04	0.42
Domestic Credit (logarithm)	3.21	0.96
Government Consumption (logarithm)	2.68	0.43
Oil Rents (logarithm)	0.81	2.20
Polity 2 Index	0.51	7.45
Current Account Balance	-3.61	11.01
Terms Of Trade (logarithm)	-0.20	0.45
Population Growth	1.87	1.67

APPENDIX A6 – Econometric Methodology:

In this thesis, we applied Dynamic Panel Data analysis. The main difference between the dynamic and static analysis is the incorporation of lagged values of the dependent variable in the set of independent one. The above is explained in mathematical terms as (Bun and Sarafidis, 2003):

$$y_{it} = \gamma y_{it-1} + x_{it}'\beta + v_{it} + a_i \quad (1)$$

APPENDIX A6 (continued)

Where y_{it} is the dependent variable in period t , α_i is the country specific fixed effects term, y_{it-1} is the lagged value of the dependent variable, x_{it} is the vector of independent variables and v_{it} is the error term for which we make the assumptions that has zero mean, constant variance and is uncorrelated with the individuals. $v_{it} \approx (0, \sigma^2)$

Writing equation (1) one period earlier in history, we end up with: $y_{it-1} = \gamma y_{it-2} + x_{it-1}'\beta + v_{it-1} + \alpha_i$ (2)

Equation (2) is indicative of the main problem in a dynamic panel data estimation model. By construction, the fixed individual effects (α_i) are correlated with the lagged dependent variable (y_{it-1}). In other words, we have that: $[E(\alpha_i | y_{it-1})] \neq 0$

As a result, the OLS estimators become both biased and inconsistent. A possible way to overcome the above issue is to perform a *first difference* transformation of eq. (1) and thus derive the following model specification: $\Delta y_{it} = \gamma \Delta y_{it-1} + \Delta x_{it}'\beta + \Delta v_{it}$ (3). This transformation allowed us to remove the individual fixed effects, however, once again GLS estimators are not appropriate due to the correlation between the error term (Δv_{it}) and the lagged dependent variable (Δy_{it-1}) which originates from the dynamic structure of equation (3).

The endogeneity problem in a dynamic panel data analysis can also be explained intuitively. As long as the independent covariates do not reflect natural phenomena (which we assume being strictly exogenous) and are closely connected with policy intervention variables, it is legitimate to assume that the regressors are not determined independently, but simultaneously with the dependent variable. Thus the variables are co-defined in a system of equations, causing our model to suffer from endogeneity.

To address the endogeneity problems, Anderson and Hsiao (1982) proposed using lagged values of the dependent variable as instruments. The instruments could be taken from either the equation in levels (eq. (1)) or in first differences (eq. (3)). In a similar respect, Arellano and Bond (1991) applied the Generalized Method of Moments (GMM) so as to use all possible instruments, especially in large-N datasets. By exploiting the orthogonality between the differenced error term and lagged dependent variable in levels, they come up with what they called *Difference GMM* estimators. Monte Carlo simulations between the latter and the initial OLS estimators proved the domination of the GMM ones in terms of smaller bias and less variance. However, Blundell and Bond (1998) proposed a different method, by also using the initial equation and not only the first difference transformation in order to obtain more instruments. Their proposition depended on the error term of the original equation (eq. (1)) being uncorrelated both with the dependent $E(v_{it} | y_{it}) \neq 0$ and the independent variables $E(v_{it} | x_{it}) \neq 0$. This results in a system of two equations (one in levels and one first - differenced) from which we obtain our estimators, which are now called *System GMM* estimators. Since the number of instruments employed in the last case is greater, we can expect the new unbiased estimates to be more efficient. At the same time though, we need to be sure about the validity of the instruments used.

The instruments applied need to be tested for serial correlation of the disturbance term and correlation between the instruments and the residuals.

APPENDIX A6 (*continued*)

As far as serial correlation in the disturbance terms is concerned, it poses a problem for the instruments used, because y_{it-2} becomes endogenous to the difference Δv_{it} . Specifically, autocorrelation of first degree in the error term, implies that: $v_{it} = \rho v_{it-1} + \varepsilon_{it}$ or: $v_{it-1} = \rho v_{it-2} + \varepsilon_{it-1}$ with: $\rho \neq 0$. But we have already transformed the model so as to remove the unwanted individual effects (a_i). As a result, the difference: $\Delta v_{it} = v_{it-2} - v_{it-1}$ is endogenous to: y_{it-2} due to the presence of v_{it-1} in the above difference.

In the two possible tests for autocorrelation, the crucial information is that the model is transformed into first differences. As a result, the assumed absence of autocorrelation of first degree in the original model (in levels) becomes autocorrelation of second degree in the transformed specification. Consequently, the test that is absolutely important to determine absence of autocorrelation is the one referring to second order in the transformed model.

Finally, the validity of the instruments is also judged by the absence of correlation between the instruments and the residuals. The Arellano – Bond solution employs the use of the Sargan – Hansen test, which tests the overall validity of the instruments by analyzing the sample analog of the moment conditions. The null hypothesis is that all *moment conditions* are valid, or –put differently- that the residuals are not correlated with the instruments. When the two above mentioned presumptions are met, a final model can be properly estimated from equation (3).