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Abstract

In this paper, we empirically assess how economic sanctions imposed by the UN and the US affect the target states' GDP growth. Our sample includes 68 countries and covers the period 1976–2012. We find, first, that sanctions imposed by the UN have a statistically and economically significant influence on economic growth. On average, the imposition of UN sanctions decreases the target state's real per capita GDP growth rate by 2.3–3.5 percentage points (pp). These adverse effects last for a period of 10 years. Comprehensive UN economic sanctions, that is, embargoes affecting nearly all economic activity, trigger a reduction in GDP growth by more than 5 pp. Second, the effect of US sanctions is much smaller and less distinct. The imposition of US sanctions decreases GDP growth in the target state over a period of 7 years and, on average, by 0.5–0.9 pp.

JEL: F43, F51, F52, F53.
Keywords: Economic growth, economic sanctions, United Nations, United States.

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The Impact of UN and US Economic Sanctions on GDP Growth

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In this paper, we empirically assess how economic sanctions imposed by the UN and the US affect the target states' GDP growth. Our sample includes 68 countries and covers the period 1976–2012. We find, first, that sanctions imposed by the UN have a statistically and economically significant influence on economic growth. On average, the imposition of UN sanctions decreases the target state's real per capita GDP growth rate by 2.3–3.5 percentage points (pp). These adverse effects last for a period of 10 years. Comprehensive UN economic sanctions, that is, embargoes affecting nearly all economic activity, trigger a reduction in GDP growth by more than 5 pp. Second, the effect of US sanctions is much smaller and less distinct. The imposition of US sanctions decreases GDP growth in the target state over a period of 7 years and, on average, by 0.5–0.9 pp.

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1. Introduction

Economic sanctions have become one of the most important tools of statecraft in international politics (Cortright and Lopez, 2000). Designed as a means of compelling governments to comply with the imposing state's interests, these measures aim at changing the target nation's policies by inflicting economic damage. They are viewed as a nonviolent, more humane alternative to military intervention. However, the imposition of economic sanctions is often met with harsh criticism, which is based in the unpleasant reality that even though these measures are directed against governments, more often than not, it is the target state's public that bears the costs. This result can be particularly unfair when the regime against which sanctions are directed lacks democratic legitimation.

There is a huge and vibrant literature on the adverse effects of economic sanctions on the target states' humanitarian situation. Sanctions are argued to have devastating consequences for the civilian population as they can negatively affect the availability of food and clean water (Cortright and Lopez, 2000; Weiss et al., 1997) and access to medicine and health-care services (e.g., Garfield, 2002; Gibbons and Garfield, 1999), as well as have a detrimental impact on life expectancy and infant mortality (e.g., Ali Mohamed and Shah, 2000; Daponte and Garfield, 2000). Most of this research is qualitative, however, and based on single-country case studies. Quantitative assessments of sanction effects typically focus on their impact on various measures of the human rights situation (e.g., Peksen, 2009; Wood, 2008), political stability within the target state (Allen, 2008; Marinov, 2005), level of democracy (Peksen and Drury, 2010), and their success in terms of meeting the desired objectives (e.g., Hufbauer et al., 2009; Drury, 1998; Dashti-Gibson et al., 1997).[1] The findings are dispiriting. For example, Peksen (2009) reports that economic sanctions worsen the targeted government's respect for human rights; Peksen and Drury (2010) find that economic sanctions have a detrimental impact on the level of democracy. Moreover, economic sanctions fail to achieve their aims in 65–95% of the cases in which they are imposed (e.g., Hufbauer et al., 2009; Pape, 1997, 1998).

Empirical research on the *economic* consequences of economic sanctions is scarce. Evenett (2002) estimates the impact of eight industrialized countries' sanctions against

[1] There are also theoretical public choice and game-theoretical analyses on conditions under which economic sanctions may trigger policy changes. Examples are Kaempfer et al. (2004), Kaempfer and Lowenberg (1988, 1999), and Eaton and Engers (1992).

the South African Apartheid regime on these countries' bilateral trade relations with South Africa between 1978 and 1999. His findings suggest that the US Anti-Apartheid Act had the strongest influence on South African exports. Hufbauer et al. (2009) rely on a large sample of bi- and multilateral economic sanction episodes and estimate gravity models. They find that the imposition of economic sanctions significantly reduces the volume of bilateral trade between the imposing and the target state.

This paper is the first econometric assessment of the impact economic sanctions have on the target's overall economic development.[2] More precisely, we analyze the effect economic sanctions have on the target countries' GDP growth rate, thereby focusing on (i) multilateral sanctions imposed by the United Nations as well as (ii) unilateral sanctions imposed by the United States. The UN Security Council (UNSC) can call on its member states to partially or completely interrupt economic relations with a state that threatens or breaches international peace and security. First employed in 1965 against Rhodesia, the use of this measure has become increasingly popular during the past two decades (see also Figure 1a in Section 3.2). All UN member states are obliged to adopt the sanction measures determined by the UNSC, which is why these are expected to be particularly effective. With regard to the US, no other country in the world has imposed economic sanctions more often (Hufbauer, 1998; Hufbauer et al., 2009). Although unilateral, the importance of the United States to the global economy may make them an influential policy instrument.

We compiled a unique dataset comprised of UN and US sanction episodes between 1976 and 2012. Our results suggest, first, that sanctions imposed by the UN have a significant influence on economic growth. On average, the imposition of UN sanctions decreases the target state's real per capita GDP growth rate by 2.3–3.5 percentage points (pp). An investigation of the dynamics of the sanction effects reveals that the detrimental influence decreases over time and becomes insignificant after 10 years. Differentiating between categories of economic sanctions, we find that comprehensive UN economic sanctions—that is, embargoes on nearly all economic activity between UN

[2] Hufbauer et al. (2009: 211ff) provide rough approximations of the effect of economic sanctions on the target countries' gross national product. However, the authors themselves admit that their assessment is rather rudimentary. They simply consider the initial reduction in net exports and foreign grants associated with the imposition of economic sanctions, weigh this figure with a "sanction multiplier," which is based on the authors' subjective judgment of the substitution elasticities of domestic demand and international supply of the embargoed goods, and put this measure in relation to the target state's gross national product. However, economic sanctions may affect the target country's GNP in several ways, as outlined in more detail in Section 2 of this paper.

member states and the sanctioned country—exert the strongest influence; they trigger a reduction in real GDP growth of more than 5 pp. Our findings are robust to modifications of the empirical specification that control for potential changes in a country's institutional, political, and social environment. Moreover, when comparing the effect of UN economic sanctions which were actually imposed to those which were blocked by a veto in the UNSC we find that only the former ones exert an adverse impact on economic growth, indicating that our results are not driven by omitted factors that coincide with sanction periods. Second, the adverse effect of US sanctions on real GDP growth is much smaller and less lasting than that of UN sanctions. The imposition of US sanctions decreases GDP growth in the target state over a period of 7 years and, on average, by 0.5–0.9 pp.

The remainder of this paper is organized as follows. Section 2 provides some theoretical arguments for why sanctions may have adverse growth effects in the target countries and outlines the research hypotheses. Section 3 introduces the empirical methodology and the dataset. Section 4 presents the results. Section 5 explores the robustness of our findings with respect to changes in the control sample. Section 6 examines the impact of sanctions on GDP growth over time. Section 7 concludes.

2. Theoretical Considerations and Hypotheses

Economic sanctions are intended to be coercive measures that fall between mere diplomatic pressure and the extreme action of military intervention. According to former UN Secretary-General Kofi Annan, sanctions "represent more than just verbal condemnation and less than the use of armed force."[3] Or, as the former US President Woodrow Wilson put it: "A nation boycotted is a nation that is in sight of surrender. Apply this economic, peaceful, silent, deadly remedy and there will be no need for force" (quoted in Heine-Ellison, 2001: 83). Theoretically, economic sanctions are powerful due to their potential to inflict economic damage. Thus, one should expect UN and US economic sanction episodes to have a detrimental impact on the target nation's economic development. Yet, there is hardly any empirical assessment of the economic costs incurred by sanctions.

[3] UN Press Release SG/SM/7360. http://www.un.org/News/Press/docs/2000/20000417.sgsm7360.doc.html (accessed in March 2014).

There are several channels through which sanctions may adversely affect the economic performance of the target state. The most obvious of these include a slump in exports and imports, the related loss of bargaining power on international markets, and the contraction of international capital flows, that is, withdrawal of foreign direct investment, foreign aid, and financial grants (Hufbauer et al., 2009; Evenett, 2002). However, such adverse effects may occur even when trade embargoes or suspensions of international aid and capital flows are not explicitly imposed. Economic sanctions are often used as a symbolic instrument to stigmatize political regimes (Whang, 2011). The associated loss of reputation may very well isolate the target state within the international community and deter donors from further providing aid and investments.

Economic sanctions aim at triggering political reforms or even overthrowing the target's political regime. Moreover, economic agents may view sanctions as a sort of early-warning signal that political or societal conflicts in the target state have the potential to escalate. Sanctions thus represent or indicate a serious threat to the target state's political stability and can invoke a great deal of uncertainty about the future of the political and legal system. This ought to have a harmful impact on the target state's trade and financial relations as well as on its domestic and foreign direct investment. Indeed, empirical evidence suggests that sanction episodes are associated with political turmoil and transition (Peksen and Drury, 2010; Allen, 2008; Marinov, 2005). Political instability, in turn, is found to have detrimental effects on investment and savings as well as on economic growth (Alesina et al., 1996; Alesina and Perotti, 1996; Aizenman and Marion, 1993). In a similar vein, sanctions may affect the target's access to international credit markets as investors might be concerned about the sanctioned state's solvency or the payment practices of a successor regime.

Finally, the imposition of economic sanctions often results in an expansion of the shadow economy as economic agents try to evade sanction measures, involving a marginalization of licit commerce as well as public acceptance of illegal economic activity (e.g., Andreas, 2005; Heine-Ellison, 2001; Crawford and Klotz, 1999). Moreover, governments against which sanctions are directed often fail to foster compliance with laws as economic sanctions undermine their authority and legitimacy. What is more, target governments may even promote illegal economic activities in order to generate funds, secure supplies, and strengthen their power. Also, the decline in government authority as well as the rise of political instability frequently involve an increase in

corruption. As a consequence, transaction costs increase and more resources tend to be used unproductively.

The strength of the effect economic sanctions have on the target state's economy may be related to various factors. For example, it could be that the impact of economic sanctions depends on their severity. Previous sanctions employed by the UN and the US range from freezing private and public funds and assets to banning grants and credits to imposing embargoes on certain or all economic activities (for an overview, see Table 1 in Section 3.2). Multilateral UN sanctions ought to have a stronger adverse effect on the target country's GDP growth than unilateral US sanctions simply because of the larger number of countries involved in the imposition of the former. Accordingly, we formulate three hypotheses that we put to an empirical test in this paper.

H1: UN and US economic sanctions have a negative effect on the target country's real GDP per capita growth.
H2: The negative effect increases with increasing severity of the sanctions.
H3: The negative effect is stronger for UN sanctions than for US sanctions.

3. Empirical Methodology and Data

3.1 Empirical Methodology

To assess the impact of UN and US economic sanctions on the sanctioned state's economic performance, we estimate different versions of the following model:

$$\text{(Eq. 1)}\ y_{i,t} = \alpha_i + \beta' sanctions_{i,t} + \gamma' X_{i,t} + \delta_t + \varepsilon_{i,t}$$

The dependent variable $y_{i,t}$ represents the growth rate of country *i*'s real GDP per capita in 2005 US dollars compared to the previous year. α_i is a country-specific effect that accounts for individual heterogeneity due to unobserved time-invariant factors. δ_t is a time-fixed effect and $\varepsilon_{i,t}$ an error term. Our sample includes all 68 countries against which UN and US economic sanctions were imposed (see Table A1 in the Appendix) during our sample period of 1976 to 2012.[4]

We first test H1 and evaluate the effect of UN and US economic sanctions by including dummy variables that take the value 1 during years in which UN or US sanctions,

[4] In a panel fixed-effects approach, estimates are based on the variables' variation *within* the sample countries over time. Countries which were never exposed to either UN or US sanctions are thus omitted from our analysis.

respectively, were imposed. In a second step, we test H2 and discriminate between three categories of sanctions (see Section 3.2) that differ with respect to their severity. To this end, we employ separate dummy variables for each sanction category.

To date, the UN and the US have imposed economic sanctions for primarily three reasons: (i) to coerce states (or militant groups within states) to terminate acts that threaten or infringe the sovereignty of another state, i.e., by resorting to violence against another state or destabilizing the incumbent government; (ii) to foster democratic change in a country, protect democracy, or destabilize an autocratic regime; (iii) to protect the citizens of a state from political repression and enforce human rights.[5]

All three reasons for imposing economic sanctions—engagement in interstate conflict, autocratic tendencies, and political repression—might in themselves affect a country's economic development. To disentangle their effects on GDP growth from the effect of economic sanctions and thus circumvent an omitted variable bias, it is crucial to include appropriate control variables in our empirical specification.

The vector $X_{i,t}$ includes, first, the Political Terror Scale indicator, which measures physical integrity rights violations on a five-point scale (1: lowest degree of violation; 5: highest degree of violation). Second, we control for the degree of democracy or autocracy in a country using a policy variable that is scaled from +10 (strongly democratic) to –10 (strongly autocratic). Third, we take into account (i) interstate armed conflicts, (ii) internal armed conflicts without intervention from other states, and (iii) internationalized internal armed conflicts with intervention from other states. For all three types of conflict we include separate dummy variables for minor conflicts and wars, respectively.

Finally, we consider control variables that are standard in economic growth equations: the log of real per capita GDP in 2005 US dollars,[6] trade openness (imports plus exports divided by GDP), and the log of population. We employ the first lag of these variables to circumvent problems of reverse causality. A list of the control variables along with their definitions and sources can be found in Table A2 in the Appendix.

[5] Information on the objectives of UN and US economic sanctions is obtained from Hufbauer et al. (2009) as well as from the websites of the UN and the US Congress.

[6] Note that this variable also serves as proxy for a country's capital stock since reliable data for the latter are difficult to collect for the countries and period under investigation.

3.2 Data on UN and US Sanctions

We compiled a unique dataset comprised of all UN and US sanction episodes that occurred between 1976 and 2012. UN sanctions were collected from the UN website and cross-checked with Wood's (2008) dataset, which, unfortunately, ends in 2001. For US sanctions, we relied on Hufbauer et al.'s (2009) dataset and augmented it with information from the US Congress websites. Each sanction was categorized as either "mild," "moderate," or "severe," based on the definitions found in Wood (2008) (see Table 1).

Table 1: Definition of sanction categories

Level	**UN sanctions**	**US sanctions**
1: Mild	Restrictions on arms and other military hardware; typically include travel restrictions on a nation's leadership or other diplomatic sanctions as well	Retractions of foreign aid, bans on grants, loans, or credits, or restrictions on the sale of specific products or technologies; not including primary commodities embargoes
2: Moderate	Moderate sanctions such as fuel embargoes, restrictions on trade in primary commodities, or the freezing of public and/or private assets	Import or export restrictions, bans on US investment, and other moderate restrictions on trade, finance, and investment between the US and target nation
3: Severe	Comprehensive economic sanctions such as embargoes on all or most economic activity between UN member states and the target	Comprehensive economic sanctions such as embargoes on all or most economic activity between the US and the target nation

Source: Wood (2008: 500).

Figures 1a and 1b illustrate the frequency of sanctions and their severity over time. The overall number of country/year observations in which UN sanctions are in place (200; 9.3% of the observations) is much lower than that for US sanctions (618; 28.6%). Similarly, UN sanctions have been imposed against only 23 countries, whereas a total of 64 countries have at least one non-zero observation for US sanctions. In addition, the US sanctions are on average harsher than those of the UN as 21.8% of US sanctions fall into category 3 (compared to 12% for the UN). These findings are not surprising, of course, since UN sanctions have to be enacted by the UNSC, which consists of five veto powers, whereas US sanctions only have to pass the US legislative. Also interesting is the huge increase in the frequency of UN sanctions after the end of the Cold War. The frequency of

sanctions is highest during the 1990s due to the First Gulf War, the Yugoslav Wars, and several civil wars in Africa.

Figure 1a: UN sanctions and their severity over time

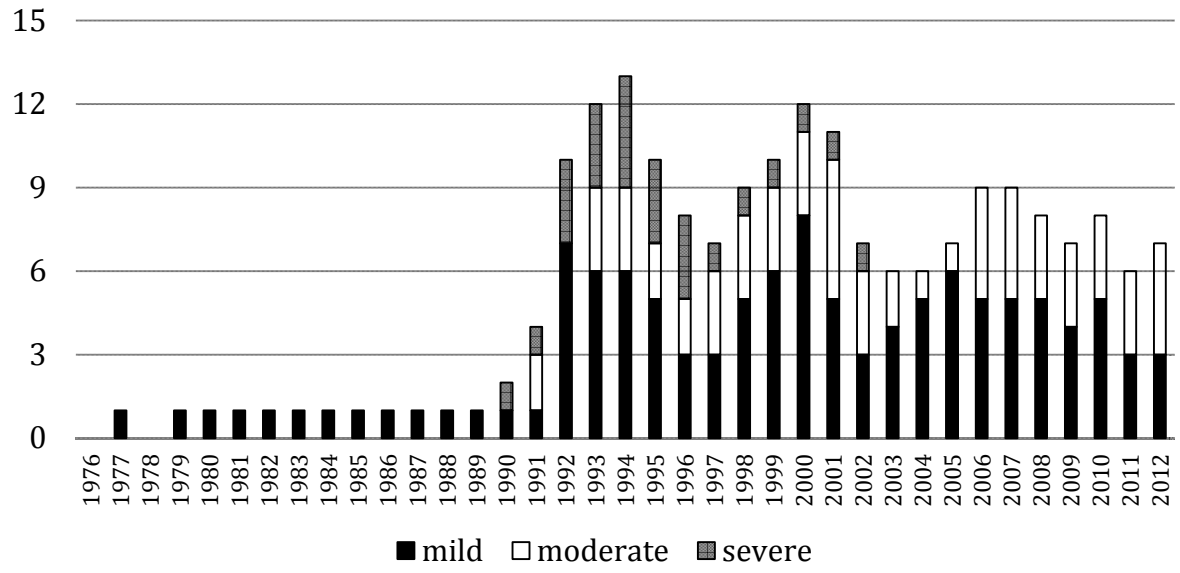
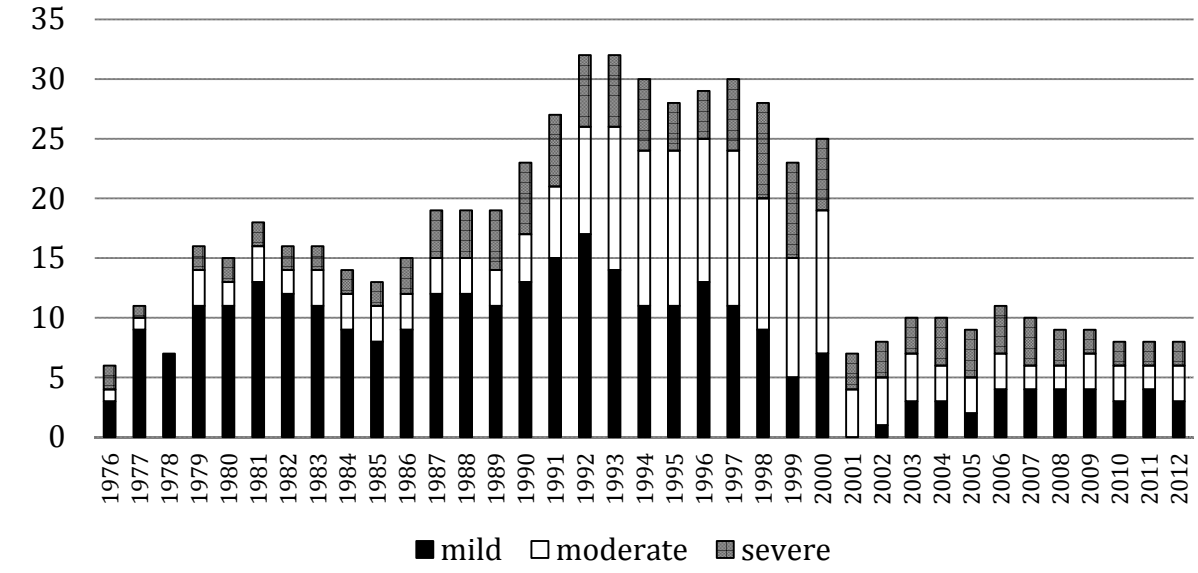


Figure 1b: US sanctions and their severity over time



4. Empirical Results

4.1 Binary Sanction Variable

First, we put H1 to the test. The results are shown in Table 2. We estimate three different specifications of Equation (1): one including a dummy for UN sanctions only

(Column (1) of Table 2); one with a dummy for US sanctions only (Column (2)); and one with separate dummies for both UN and US sanctions (Column (3)).[7]

Table 2: The impact of sanctions on GDP growth: binary sanction variable

	(1)		(2)		(3)	
log(real GDP/capita)$_{t-1}$	–0.19	***	–0.07	***	–0.08	***
openness$_{t-1}$	0.03	**	0.02	***	0.02	***
log(population)$_{t-1}$	0.05		–0.06	***	–0.06	***
political terror$_t$	–2.20	***	–0.72	***	–0.68	***
polity score$_t$	–0.23	*	–0.11	**	–0.11	***
interstate conflict$_t$						
minor	–13.98	*	–2.03	*	–2.22	**
war	–10.34	***	–7.18	***	–7.70	***
internal conflict w/o intervention$_t$						
minor	1.12		–0.56		–0.48	
war	–3.85	*	–4.00	***	–3.90	***
internal conflict w/ intervention$_t$						
minor	–2.18		0.79		–1.32	
war	–5.05	**	–4.99	***	–5.93	***
UN sanctions (yes/no)$_t$	–2.77	**	–––		–2.30	***
US sanctions (yes/no)$_t$	–––		–1.07	**	–0.85	*
R^2	0.29		0.17		0.18	
observations	616		2079		2160	
countries	23		64		68	

Notes: Dependent variable is the annual growth rate of GDP per capita in 2005 US dollars. Model includes country-fixed effects and time-fixed effects. ***/**/* indicates significance at the 1%/5%/10% level.

In confirmation of H1, both UN and US economic sanctions reveal a negative and significant influence on the target country's real GDP growth. The adverse effect is –2.77 pp when only UN sanctions are considered and –1.07 pp when only US sanctions are considered. This harmful impact is slightly smaller when employing both indicators in one specification, indicating collinearity between the variables. Statistical testing rejects the null hypothesis that the adverse effect of UN sanctions (–2.30 pp) and US sanctions (–0.85 pp) is equal at the 10% level ($F(1,2043) = 2.73^*$). Therefore, we can affirm H3 as well since the adverse effect of economic sanctions on real GDP growth is stronger for UN sanctions than for US sanctions.

[7] Note that we rely on restricted samples in the case of (1) and (2) since not all sample countries were subject to UN sanctions or to US sanctions.

4.2 Different Levels of Sanctions

The results for the test of H2 are shown in Table 3. We estimate three versions of our empirical model: the first includes three indicator variables for UN sanctions only (Column (4)); the second includes the same set of variables for US sanctions only (Column (5)); and the third includes a total of six sanction indicators for both the UN and US (Column (6)).

Table 3: The impact of sanctions on GDP growth: different sanction levels

	(4)		(5)		(6)	
log(real GDP/capita)$_{t-1}$	–0.19	***	–0.07	***	–0.08	***
openness$_{t-1}$	0.03	*	0.02	***	0.02	***
log(population)$_{t-1}$	0.06		–0.06	***	–0.05	***
political terror$_t$	–2.20	***	–0.74	***	–0.70	***
polity score$_t$	–0.28	**	–0.11	**	–0.12	***
interstate conflict$_t$						
minor	–13.85	*	–2.02	*	–2.21	**
war	–10.62	***	–7.14	***	–7.97	***
internal conflict w/o intervention$_t$						
minor	0.90		–0.54		–0.49	
war	–3.96	*	–3.96	***	–3.85	***
internal conflict w/ intervention$_t$						
minor	–2.46		0.79		–1.36	
war	–5.21	**	–4.95	***	–5.93	***
UN sanctions$_t$						
mild	–1.69		–––		–1.68	*
moderate	–3.89	**	–––		–3.43	***
severe	–6.03	*	–––		–5.30	***
US sanctions$_t$						
mild	–––		–1.25	**	–1.34	***
moderate	–––		–0.74		–0.05	
severe	–––		–0.72		0.04	
R^2	0.30		0.17		0.18	
observations	616		2079		2160	
countries	23		64		68	

Notes: Dependent variable is the annual growth rate of GDP per capita in 2005 US dollars. Model includes country-fixed effects and time-fixed effects. ***/**/* indicates significance at the 1%/5%/10% level.

Again, we find some degree of collinearity since most of the coefficients for the sanction variables are slightly smaller in Column (6) compared to the results for UN sanctions only or US sanctions only. To conserve space, the following discussion focuses on the results in Column (6).

In short, the empirical evidence concerning H2 is mixed. The adverse effect of UN sanctions clearly increases over the three categories. Mild sanctions, which include restrictions on arms or travel, lead to a decline in the target country's real GDP growth rate of 1.68 pp. Moderate sanctions, such as fuel embargoes, trade restrictions, or the freezing of assets, have a larger adverse effect of –3.43 pp. Severe sanctions, such as embargoes on most or all economic activity, are the most harmful to growth (–5.30 pp).

In contrast, we find no evidence that the adverse effect of US sanctions increases with their severity. The only significant coefficient is found for mild sanctions (–1.34 pp), which include retractions of foreign aid. Moderate or severe sanctions, such as trade restrictions or complete embargoes, do not have a significantly negative impact on growth. One possible explanation is that retraction of foreign aid might actually hurt a country, whereas unilateral trade restrictions can possibly be circumvented by the target state. That is, the target is still able to trade with other countries, perhaps even with some of the other veto powers on the UNSC—those not agreeing to the sanctions—or might not even have had a strong trade relationship with the US in the first place.[8]

We have at least some evidence in support of H3. The adverse effect of economic sanctions on the target country's real GDP growth is stronger for moderate and severe UN sanctions than for US sanctions of the same type. Statistical testing rejects the null hypothesis at the 5% level (moderate sanctions: $F(1,2039) = 6.19^{**}$; severe sanctions: $F(1,2039) = 5.67^{**}$). In case of mild sanctions, however, we cannot reject the null hypothesis ($F(1,2039) = 0.11$).

To put our findings into perspective, we compare the adverse effects of sanctions with the negative consequences some of the control variables in Column (6) of Table 3 have on economic growth. The effect of severe UN sanctions (–5.30 pp) is statistically indistinguishable from the consequences of (i) intrastate wars (–3.85 pp; $F(1,2039) = 0.50$), (ii) internationalized intrastate wars (–5.93 pp; $F(1,2039) = 0.08$), and even (iii) interstate wars (–7.97 pp; $F(1,2039) = 1.46$).

[8] To confirm this impression, we estimate a modification of (6): we replace the per capita real GDP growth rate as left-hand side variable by the trade openness indicator (i.e., imports plus exports divided by GDP). The results confirm that severe UN sanctions lead to a much stronger decline in a country's openness (–13.28 pp) than severe US sanctions (–3.39 pp) ($F(1,2039) = 8.17^{***}$). None of the other sanction variables are significant. Results are available on request.

5. Robustness Tests

5.1 Narrowing the Control Window

Thus far, our estimates are—roughly speaking—based on a comparison of conditional means of growth in periods during which sanctions are in places compared to times when they are not. It could be argued, however, that the institutional, political, and social environment is not comparable during these periods. Furthermore, the imposition of sanctions might be a consequence of an environment that is considered bad by the UN and/or the US. To address this potential endogeneity problem we reduce the control sample and, first, consider a window of five (three) years around the sanction period instead of the full sample period. A comparison of conditional means of growth during the sanction period and this small window of time around it should provide a more robust estimate of the adverse effects of sanctions since the (typically slowly changing) institutional, political, and social environment is more likely to be stable over a narrow window of time.

The decision to lift sanctions, however, might be driven by having achieved the desired changes in the environment. As a consequence, the years immediately following a sanction period might be characterized by a different institutional, political, and social regime as well. Thus, an obvious robustness test is a further reduction of the control sample by leaving out *all* observations after a period of UN and US sanctions. The remaining sample comprises the five (three) years before sanctions were imposed and the sanction period itself.

In total, we explore the robustness of our findings with four modifications to the sample period. In addition to the sanction period, we consider (i) a window of five years around, (ii) a window of three years around, (iii) the five years before, and (iv) the three years before. Table A3 in the Appendix presents the results for the binary sanction variables and Table A4 for the version in which we take account of the severity of the sanctions.

In general, the results for UN sanctions in the restricted samples are similar to those for the full sample in terms of size and significance. In the case of the binary sanction indicator, the adverse effect is even slightly larger, ranging from –2.65 pp to –3.54 pp (Table A3) compared to –2.30 pp (Table 2). The coefficients for mild sanctions are also larger in absolute terms throughout all modifications compared to the unrestricted sample. In the case of moderate and severe sanctions, the estimates for the unrestricted

sample are in between those of the truncated samples. The maximum adverse effect is found for severe sanctions when only considering the three years before the sanction period (–7.80 pp).

The results for US sanctions, however, are not robust to modifications in the sample period. The binary sanction indicator is insignificant, irrespective of which sample restriction is imposed. When including different variables for the degree of severity, the finding for mild sanctions is replicated only when the sample is restricted to five (three) years before the sanction period.

Therefore, multilateral UN sanctions have a (much) stronger adverse effect on the target country's GDP growth compared to unilateral US sanctions. As mentioned, the reason for this could be as simple as that there is a larger number of countries involved in the imposition of UN sanctions. To summarize, the imposition of UN sanctions decreases the target state's annual real per capita GDP growth rate by 2.3–3.5 pp and the imposition of comprehensive UN economic sanctions triggers a reduction in real GDP growth of more than 5 pp.

One explanation for the non-robust results for US sanctions might be that their impact is more heterogeneous across target countries than that of UN sanctions. As discussed above, countries might circumvent US sanctions by increasing their trade with other countries or they may not even have had a relevant trade relationship with the US in the first place. Therefore, as part of our robustness tests, we extend Equation (1) by interacting the US sanction variables with the distance of the target country's capital to Washington, DC. That is, we test whether greater distance from the US—capturing the bilateral trade potential—leads to a mitigation of the adverse consequences of US sanctions. However, this idea finds no support in the data: the interaction effects are insignificant when employing either the binary sanction variable or indicator variables for different levels of sanctions.[9]

Another explanation might be that the impact of US sanctions is less lasting than that of UN sanctions. That is, the effect of US sanctions on the target country's GDP is too short-lived to be significant in our empirical setup as we compare average conditional GDP growth rates across the sanction period and the non-sanction period. We will return to this issue in Section 6 where we explore the impact of sanctions over time.

[9] Results are available on request.

5.2 Counterfactual Analysis for UN Sanctions

Next, we apply a control group approach and compare the growth effect of UN economic sanctions which were actually imposed and sanctions which did not become effective. In this regard, we take advantage of a peculiarity of the UN decision-making process: before the UN may call upon its member states to impose economic sanctions, the UNSC has to adopt a resolution in which its members declare that the designated target state either threatens international peace and security or violates human rights. The adoption of such a resolution and, thus, the imposition of economic sanctions can be prevented by any of the five permanent members of the UNSC—i.e., China, France, Russia, the United Kingdom, and the United States—since they are endowed with a veto right. Fortunately, the drafts of all vetoed resolutions are accessible at the UN website. We focus on countries against which resolutions were directed but failed due to the veto of either one or two permanent members of the UNSC.[10] Arguably, the pre-sanction political and social environment in countries which were actually exposed to UN sanctions should be comparable to that in countries which were almost sanctioned (at least on average), in particular, since a majority of UNSC members supported the imposition of sanction measures against countries within the latter group. Thus, countries against which failed resolutions were directed can be considered as counterfactuals and utilized to examine whether the adverse growth effect of UN sanctions is driven by omitted factors that coincide with sanction periods.

For this purpose, we extend our sample and include—in addition to the countries which were actually exposed to UN sanctions—also countries which were *almost* (i.e., the adoption of a corresponding resolution failed due to a veto in the UNSC) subject to UN sanctions. We then compare the GDP growth effects of realized sanctions and unsuccessful resolutions. To do so, we consecutively add three indicator variables for failed resolutions to our baseline empirical model. Our binary indicator variables take on the value 1 (i) in the veto year, (ii) in the veto year plus the two following years, (iii) in the veto year plus the four following years. If UN economic sanctions have a causal influence on economic growth then the effect of the sanctions should be more pronounced than that of failed resolutions.

[10] Failed resolutions were directed against 13 countries: Argentina, Bosnia and Herzegovina, China, Cyprus, France, Guatemala, Israel, Macedonia, Myanmar, Syria, UK, Vietnam, and Zimbabwe.

Table A5 in the Appendix presents the results for the binary sanction variable and Table A6 for the version in which we take account of the severity of the sanctions. The findings suggest that failed resolutions do not affect the designated target country's GDP growth. In each of the six specifications, the indicator variable for vetoed resolutions is not statistically different from zero. What is more, the adverse effect of economic sanctions—regardless of their severity—is notably larger than that of vetoed resolutions. Thus, our previous results are unlikely affected by omitted factors that coincide with sanction periods.

6. Impact of Sanctions over Time

So far, we implicitly assumed that the effects of UN and US economic sanctions are time-invariant. However, there is some reason to believe that the detrimental impact economic sanctions exert on GDP growth is decreasing over time. First, the length of a sanction period may indicate the strength of the incumbent political regime. Arguably, the longer the target state's government can withstand the economic and political pressure associated with economic sanctions, the lower are the expectations that the sanction measures actually trigger desired changes in the political and social environment. This may restore investors' confidence in the stability of the target state's political and legal system. Second, after some time has passed, the target government as well as the economic agents within the target country may adapt to the new situation and learn how to successfully evade sanction measures, reducing the economic costs they incur. Finally, sanctions which are particularly harmful may also be particularly effective and will thus be lifted sooner.

To examine the development of the sanction effects over time, we extend Equation (1) by interacting the sanction indicators with a variable that measures the years elapsed since the respective sanction has been imposed.[11] The results are shown in Table 4. Column (7) provides the estimates for the binary sanction variables, whereas Column (8) offers insight into the dynamics when distinguishing between different sanction categories.

[11] Note that we also considered interactions of the sanction variables with the squared number of years elapsed since the respective sanction has been imposed to capture non-linearities in the impact of sanctions over time. However, the resulting estimates yield implausible dynamics and, therefore, are not shown but available on request.

Table 4: The impact of sanctions on GDP growth over time: binary sanction variable and different sanction levels

	(7)		(8)	
log(real GDP/capita)$_{t-1}$	−0.08	***	−0.08	***
openness$_{t-1}$	0.02	***	0.02	***
log(population)$_{t-1}$	−0.06	***	−0.06	***
political terror$_t$	−0.55	**	−0.65	***
polity score$_t$	−0.12	***	−0.13	***
interstate conflict$_t$				
minor	−2.24	**	−2.32	**
war	−6.76	***	−6.57	***
internal conflict w/o intervention$_t$				
minor	−0.30		−0.09	
war	−3.68	***	−3.47	***
internal conflict w/ intervention$_t$				
minor	−1.37		−1.33	
war	−6.67	***	−6.57	***
UN sanctions (yes/no)$_t$	−4.88	***	---	
… * years	0.32	***	---	
US sanctions (yes/no)$_t$	−1.89	***	---	
… * years	0.17	***	---	
UN sanctions$_t$				
mild	---		−3.50	***
mild * years	---		0.25	*
moderate	---		−4.57	***
moderate * years	---		0.11	
severe	---		−13.10	***
severe * years	---		1.64	***
US sanctions$_t$				
mild	---		−2.19	***
mild * years	---		0.19	*
moderate	---		−2.73	**
moderate * years	---		0.34	***
severe	---		0.34	
severe * years	---		−0.01	
R^2	0.18		0.19	
Observations	2160		2160	
Countries	68		68	

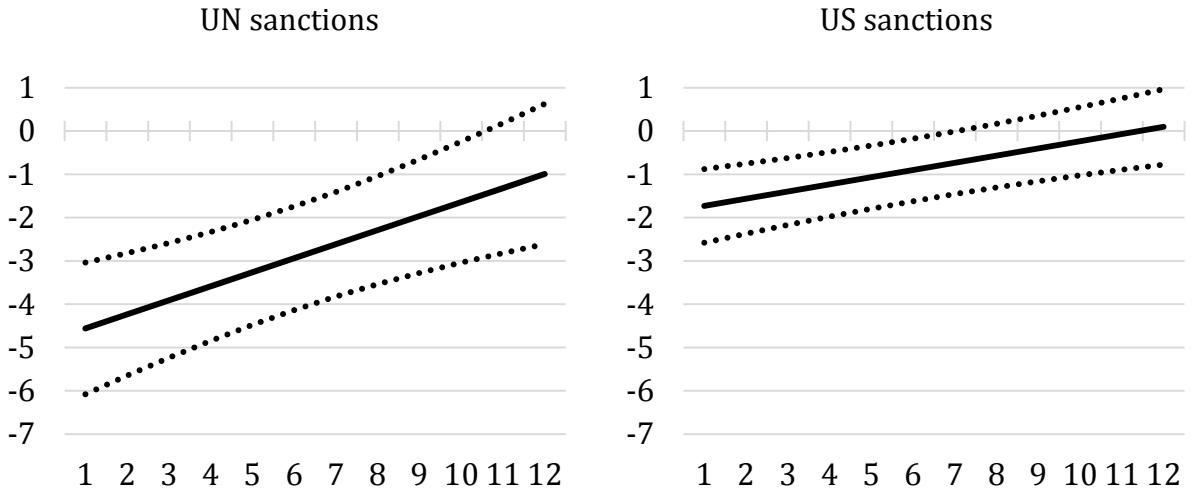
Notes: Dependent variable is the annual growth rate of GDP per capita in 2005 US dollars. Model includes country-fixed effects and time-fixed effects. ***/**/* indicates significance at the 1%/5%/10% level.

Our findings for the binary sanction indicators suggest that the effects of UN and US economic sanctions vary considerably over time as both the linear and the interaction

terms are of notable size and statistically significant. The initial negative influence of UN sanctions on GDP growth is –4.88 pp, which is notably larger (in absolute terms) than the corresponding estimate in our baseline specification (–2.30 pp; see Column (3) of Table 2). However, this detrimental effect becomes smaller over time. With every year that passes after the imposition of a UN sanction the adverse growth effect decreases by 0.32 pp. We obtain a very similar picture for US sanctions. In the year in which a US sanction is adopted, the target state's GDP growth rate decreases by –1.89 pp. As in the case of UN sanctions, this effect diminishes by 0.17 pp with every year that passes after the imposition of US sanction measures. Strikingly, both, the initial and the time-varying effect of US sanctions are significant at the 1% level, whereas the estimate for the US sanction indicator in a specification without an interaction term is only significant at the 10% level (see Column (3) of Table 2).

To facilitate interpretation of the interaction terms and to glean further insights into the development of the sanction effects over time we graphically illustrate time-dependent marginal effects along with 90% confidence bands for the binary UN and US sanction indicators.

Figure 2: The impact of sanctions on GDP growth over time: binary sanction indicator



Notes: Figure shows impact of sanctions on GDP growth over time for the binary sanction indicator. Estimates are based on the results from Column (7) in Table 4. The dotted lines represent 90% confidence intervals.

As Figure 2 shows, UN sanctions exert a significant negative influence on the target country's GDP growth for 10 years, whereas the adverse effect of US sanctions lasts for 7 years. In addition, the detrimental impact of UN sanctions is significantly larger (in

absolute terms) than that of US sanctions throughout the first eight years.[12] Thus, the economic costs UN sanctions inflict on the target state are notably larger than those of US sanctions as UN sanctions exert a stronger negative influence on GDP growth and are also longer lasting.

We obtain similar results when distinguishing between different levels of sanctions (Column (8) of Table 4). Initially, mild (–3.50 pp), moderate (–4.57 pp), and severe (–13.10 pp) UN sanctions have a huge negative influence on the target country's GDP growth. These adverse effects are mitigated over time by 0.25 pp (mild), 0.11 pp (moderate), and 1.64 pp (severe) with every year that passes after the imposition of the respective sanction measures. Turning to US sanctions, the picture from our baseline specification changes a bit: in addition to mild sanctions (–2.19 pp), also moderate sanctions (–2.73 pp) initially exert a significant negative influence on GDP growth; the effect of the latter sanction category was insignificant when computing an average effect over the whole sanction period (see Column (6) in Table 3). For both, mild and moderate US sanctions, we observe a significant decrease of the detrimental effect over time (mild: 0.19 pp; moderate 0.34 pp). The impact of severe sanctions, however, remains insignificant.

Figure A1 in the Appendix graphically illustrates the corresponding time-dependent marginal effects for different levels of sanctions. The results are qualitatively the same as for the binary sanction indicators. The influence of UN sanctions is longer lasting than that of US sanctions. Mild, moderate, and severe UN sanctions exert a statistically significant influence on GDP growth for 7, 14, and 6 years, respectively, whereas mild, moderate, and severe US sanctions have a detrimental effect for 6, 4, and 0 years, respectively.

Finally, as in Section 5.1, we explore the robustness of our findings with four modifications to the sample period. In addition to the sanction period, we consider (i) a window of five years around, (ii) a window of three years around, (iii) the five years before, and (iv) the three years before. Table A7 in the Appendix presents the results for the binary sanction variables and Table A8 for the specifications in which we take account of the severity of the sanctions.

The most important finding from these robustness tests is that, in contrast to the specifications without an interaction term (see Tables A3 and A4 in the Appendix), the

[12] The difference is –1.72 pp after 8 years (t = –1.83*) and –1.56 pp after 9 years (t = –1.58).

results for the US binary sanction indicator as well as for mild US sanctions are robust with respect to modifications to the control sample. The results for moderate US sanctions, however, become insignificant in both specifications in which the control window ends after the sanction period (Columns (A21) and (A22) in Table A8). Turning to UN sanctions, the results remain qualitatively unchanged.[13] To summarize, the robustness tests confirm that it is crucial to account for time-variation when estimating the effects of US sanctions on the target country's GDP growth.

7. Conclusions

In this paper, we empirically assess how (i) multilateral economic sanctions imposed by the United Nations and (ii) unilateral sanctions imposed by the United States affect the target states' real GDP growth. We augment a standard growth model by indicator variables for UN and US sanctions, also taking into account that the reasons economic sanctions are imposed—that is, engagement in interstate conflicts, autocratic tendencies, and political repression—might in themselves affect a country's economic development. Our sample includes 68 countries and covers the period from 1976 to 2012.

Our results suggest, first, that sanctions imposed by the UN have a significant influence on economic growth. On average, the imposition of UN sanctions decreases the target state's real per capita GDP growth rate by 2.3–3.5 pp. An investigation of the dynamics of the sanction effects reveals that the detrimental influence decreases over time and becomes insignificant after 10 years. We find that comprehensive UN economic sanctions—embargoes on almost all economic activity between UN member states and the sanctioned country—have the strongest influence; they trigger a reduction in real GDP growth by more than 5 pp. Our findings are robust to modifications of our empirical specification that control for potential changes in a country's institutional, political, and social environment. Moreover, we compare annual real GDP growth rates during actual UN sanction periods and the years after an unsuccessful attempt by the UN Security Council to impose sanctions (i.e., when the imposition of sanctions was prevented by a veto of a permanent member of the UNSC). Our findings suggest that real GDP growth

[13] Note that the interaction term for the binary indicator becomes insignificant in Columns (A15)–(A18) of Table A7 which implies that sanctions exert a negative influence on the target country's GDP growth for 11–15 years, depending on the specification. The same holds for the interaction terms of mild and moderate sanctions in in Columns (A19)–(A22) of Table A8.

declines only when economic sanctions are actually imposed, indicating that our results are not driven by omitted factors that coincide with UN sanction episodes. Second, the effect of US sanctions is much smaller and robust only when allowing for time-variation in the effect of sanctions on growth. The imposition of US sanctions decreases GDP growth in the target state over a period of 7 years and, on average, by 0.5–0.9 pp.

Our results suggest that multilateral UN sanctions are indeed harmful to the target country's economy and have a (much) stronger adverse effect than unilateral US sanctions. Whether these sanctions are an appropriate (irrespective of their effectiveness) tool for compelling governments to comply with the UN's interests remains unclear, especially in light of the frequent criticism that they often cause more damage to the poor than to the political elite. An interesting and useful extension of this work would be to discover the consequences of economic sanctions for poverty in the target country.[14]

[14] At the time of this writing, such an analysis is virtually impossible, chiefly due to the large number of missing country/year observations. World Bank poverty data are based on primary household survey data obtained from government statistical agencies and World Bank country departments and rarely available during periods of sanctions.

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Appendix

Table A1: List of sample countries

Africa (22). Angola, Cameroon, Central African Republic, Democratic Republic Congo, Eritrea, Ethiopia, Gambia, Guinea-Bissau, Kenya, Liberia, Libya, Malawi, Niger, Nigeria, Rwanda, Sierra Leone, Somalia, South Africa, Sudan, Uganda, Zambia, Zimbabwe.

America (16). Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama, Paraguay, Peru, Uruguay.

Asia (19). Afghanistan, Cambodia, China, India, Indonesia, Iran, Iraq, Israel, Jordan, Lebanon, Myanmar, North Korea, Pakistan, South Korea, Syria, Thailand, Uzbekistan, Vietnam, Yemen.

Europe (10). Azerbaijan, Belarus, Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Poland, Romania, Serbia, Turkey.

Oceania (1). Fiji.

Table A2: Variable description and data sources

g(real GDP/capita). $100(y_t/y_{t-1}-1)$, in 2005 US dollars.

log(real GDP/capita). $100log\ y_t$, in 2005 US dollars.

openness. $100(ex_t + im_t)/y_t$.

log(population). $100\log pop_t$.

Source: UN.

political terror. Terror scale measuring physical integrity rights violations based on US State Department ratings; ranges from 1 (lowest value) to 5 (highest value).

Source: Political Terror Scale.

polity score. Polity scale variable; ranges from strongly democratic (+10) to strongly autocratic (–10).

Source: Polity IV Database.

interstate conflict. Interstate armed conflict between two or more states; indicator variables for minor conflicts (between 25 and 999 battle-related deaths in a given year) and wars (at least 1,000 battle-related deaths in a given year).

internal conflict w/o intervention. Internal armed conflict between the government of a state and one or more internal opposition group(s) without intervention from other states; indicator variables for minor conflicts and wars.

internal conflict w/ intervention. Internationalized internal armed conflict between the government of a state and one or more internal opposition group(s) with intervention from other states on one or both sides; indicator variables for minor conflicts and wars.

Source: UCDP/PRIO Armed Conflict Dataset.

UN sanctions. As defined in Table 1.

Source: Own collection and Wood (2008).

US sanctions. As defined in Table 1.

Source: Hufbauer et al. (2009), Wood (2008), and own collection.

Table A3: The impact of sanctions on GDP growth: robustness test for different time windows and the binary sanction variable

	(A1)		(A2)		(A3)		(A4)	
log(real GDP/capita)$_{t-1}$	−0.11	**	−0.13	**	−0.12	***	−0.13	***
openness$_{t-1}$	0.02	**	0.02	**	0.02	*	0.02	*
log(population)$_{t-1}$	−0.06	*	−0.03		−0.02		−0.01	
political terror$_t$	−1.04	**	−1.30	**	−1.38	***	−1.81	***
polity score$_t$	−0.12	*	−0.13	*	−0.11		−0.15	*
interstate conflict$_t$								
minor	−1.81		−1.65		−1.93		−1.42	
war	−7.19	**	−6.88	**	−7.22	***	−7.24	***
internal conflict w/o intervention$_t$								
minor	−0.83		−1.33		−1.31		−1.25	
war	−5.46	**	−6.20	**	−7.02	***	−6.78	***
internal conflict w/ intervention$_t$								
minor	−0.61		−2.73		−2.41		−2.93	
war	−5.77	**	−5.91	**	−6.26	***	−5.87	***
UN sanctions (yes/no)$_t$	−3.01	**	−3.54	**	−2.65	**	−3.20	***
US sanctions (yes/no)$_t$	−0.52		−0.55		−0.83		−0.81	
time window	[−5;+5]		[−3;+3]		[−5;0]		[−3;0]	
R^2	0.20		0.23		0.22		0.25	
observations	1337		1106		1045		915	
countries	68		68		68		68	

Notes: Dependent variable is the annual growth rate of GDP per capita in 2005 US dollars. In addition to the actual sanction period, Columns (A1) and (A2) include a window of only five and three years around this period, respectively. Columns (A3) and (A4) restrict the sample to five and three years before the sanction period (which is also included), respectively. Model includes country-fixed effects and time-fixed effects. ***/**/* indicates significance at the 1%/5%/10% level.

Table A4: The impact of sanctions on GDP growth: robustness test for different time windows and different sanction levels

	(A5)		(A6)		(A7)		(A8)	
log(real GDP/capita)$_{t-1}$	−0.11	**	−0.13	**	−0.12	***	−0.14	***
openness$_{t-1}$	0.03	**	0.02	**	0.02		0.02	*
log(population)$_{t-1}$	−0.05	*	−0.03		−0.02		0.00	
political terror$_t$	−1.07	**	−1.33	**	−1.42	***	−1.89	***
polity score$_t$	−0.13	**	−0.14	**	−0.12		−0.15	*
interstate conflict$_t$								
minor	−1.82		−1.64		−1.84		−1.28	
war	−7.47	**	−7.32	**	−7.72	***	−7.97	***
internal conflict w/o intervention$_t$								
minor	−0.79		−1.35		−1.30		−1.29	
war	−5.33	**	−6.18	**	−6.90	***	−6.78	***
internal conflict w/ intervention$_t$								
minor	−0.59		−2.81		−2.55		−3.26	
war	−5.68	**	−5.89	**	−6.27	***	−5.93	***
UN sanctions$_t$								
mild	−2.41	**	−3.26	**	−2.97	**	−4.06	***
moderate	−4.06	**	−4.08	**	−2.84	**	−2.95	**
severe	−5.15	**	−6.32	**	−6.65	***	−7.80	***
US sanctions$_t$								
mild	−0.96		−1.02		−1.63	**	−1.80	*
moderate	0.21		0.50		0.94		1.45	
severe	0.27		0.06		0.86		0.99	
time window	[−5;+5]		[−3;+3]		[−5;0]		[−3;0]	
R^2	0.20		0.23		0.23		0.26	
observations	1337		1106		1045		915	
countries	68		68		68		68	

Notes: Dependent variable is the annual growth rate of GDP per capita in 2005 US dollars. In addition to the actual sanction period, Columns (A5) and (A6) include a window of only five and three years around this period, respectively. Columns (A7) and (A8) restrict the sample to five and three years before the sanction period (which is also included), respectively. Model includes country-fixed effects and time-fixed effects. ***/**/* indicates significance at the 1%/5%/10% level.

Table A5: The impact of UN sanctions on GDP growth: robustness test including vetoed UN resolutions and the binary sanction variable

	(A9)		(A10)		(A11)	
log(real GDP/capita)$_{t-1}$	–0.11	***	–0.11	***	–0.11	***
openness$_{t-1}$	0.03	**	0.03	**	0.03	**
log(population)$_{t-1}$	–0.04		–0.04		–0.04	
political terror$_t$	–1.29	***	–1.33	***	–1.34	***
polity score$_t$	–0.28	***	–0.28	***	–0.29	***
interstate conflict$_t$						
minor	–8.69	***	–9.09	***	–9.25	***
war	–8.63	***	–8.78	***	–8.77	***
internal conflict w/o intervention$_t$						
minor	0.65		0.63		0.62	
war	–5.47	***	–5.52	***	–5.46	***
internal conflict w/ intervention$_t$						
minor	–3.70		–3.69		–3.67	
war	–5.22	***	–5.18	***	–5.11	***
UN resolution vetoed (yes/no)$_t$	–0.37		1.46		1.72	
UN sanctions (yes/no)$_t$	–2.93	***	–2.89	***	–2.86	***
time window	[0;+1]		[0;+3]		[0;+5]	
R^2	0.22		0.22		0.22	
observations	982		982		982	
countries	33		33		33	

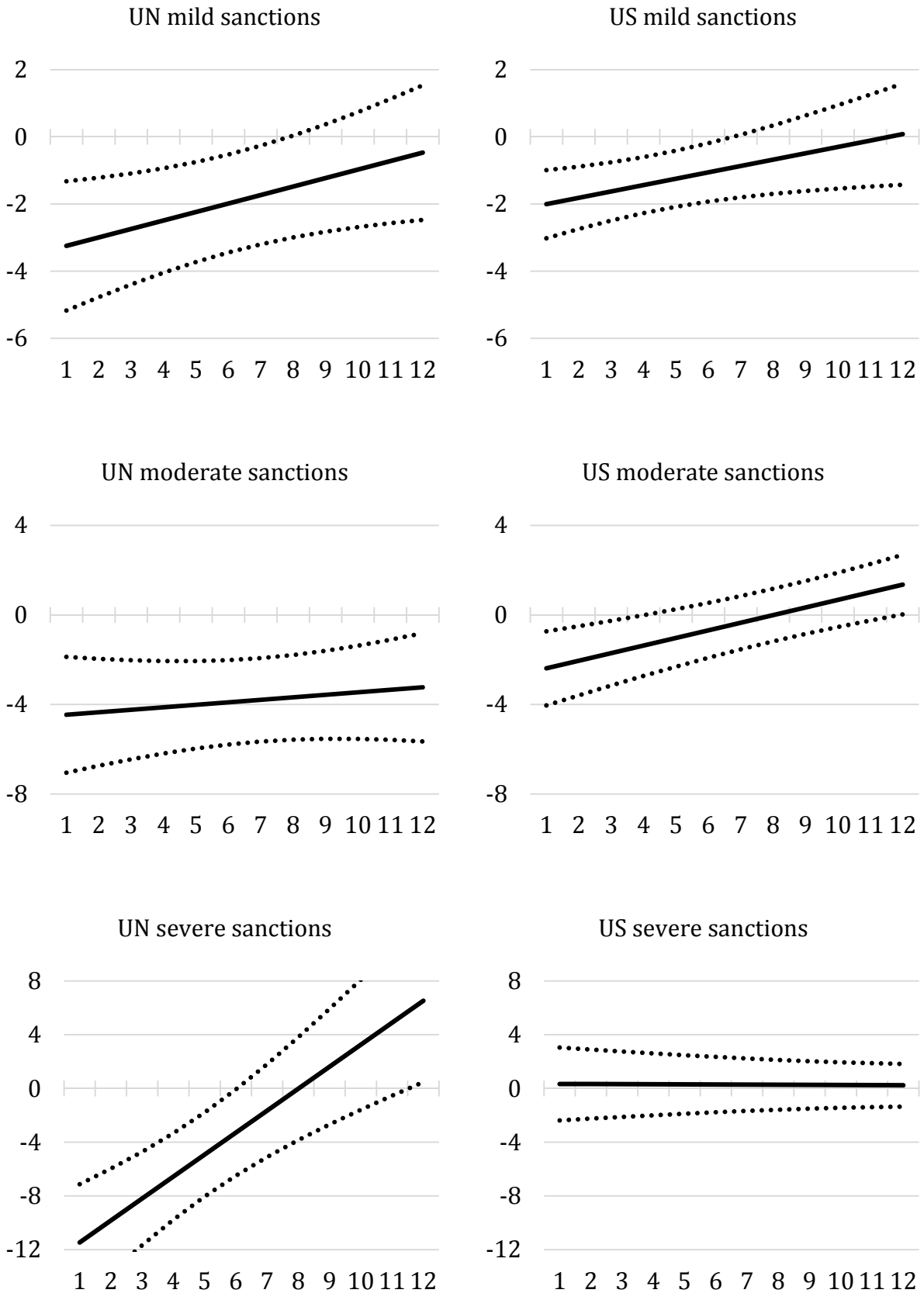
Notes: Dependent variable is the annual growth rate of GDP per capita in 2005 US dollars. The dummy variable 'UN resolution vetoed (yes/no)$_t$' takes the value 1 during the year of the veto in Column (A9), during a three-year window (including the year in which the veto took place) after a veto in Column (A10), and during a five-year window after a veto in Column (A11). Model includes country-fixed effects and time-fixed effects. ***/**/* indicates significance at the 1%/5%/10% level.

Table A6: The impact of UN sanctions on GDP growth: robustness test including vetoed UN resolutions and different sanction levels

	(A12)		(A13)		(A14)	
log(real GDP/capita)$_{t-1}$	–0.11	***	–0.11	***	–0.11	***
openness$_{t-1}$	0.03	**	0.03	**	0.03	**
log(population)$_{t-1}$	–0.03		–0.03		–0.04	
political terror$_t$	–1.29	***	–1.33	***	–1.35	***
polity score$_t$	–0.32	***	–0.33	***	–0.33	***
interstate conflict$_t$						
minor	–8.69	***	–9.11	***	–9.27	***
war	–8.95	***	–9.10	***	–9.10	***
internal conflict w/o intervention$_t$						
minor	0.46		0.43		0.43	
war	–5.60	***	–5.65	***	–5.59	***
internal conflict w/ intervention$_t$						
minor	–3.93	*	–3.91	*	–3.89	*
war	–5.42	***	–5.37	***	–5.30	***
UN resolution vetoed (yes/no)$_t$	–0.28		1.54		1.81	
UN sanctions$_t$						
mild	–1.83		–1.77		–1.73	
moderate	–3.98	***	–3.97	***	–3.95	***
severe	–6.20	**	–6.18	**	–6.19	**
time window	[0;+1]		[0;+3]		[0;+5]	
R^2	0.22		0.22		0.22	
observations	982		982		982	
countries	33		33		33	

Notes: Dependent variable is the annual growth rate of GDP per capita in 2005 US dollars. The dummy variable 'UN resolution vetoed (yes/no)$_t$' takes the value 1 during the year of the veto in Column (A12), during a three-year window (including the year in which the veto took place) after a veto in Column (A13), and during a five-year window after a veto in Column (A14). Model includes country-fixed effects and time-fixed effects. ***/**/* indicates significance at the 1%/5%/10% level.

Figure A1: The impact of sanctions on GDP growth over time: different sanction levels



Notes: Figure shows impact of sanctions on GDP growth over time for different sanction levels. Estimates are takes from Column (8) in Table 4. 90% confidence intervals are represented by dotted lines.

Table A7: The impact of sanctions on GDP growth over time: robustness test for different time windows and the binary sanction variable

	(A15)		(A16)		(A17)		(A18)	
log(real GDP/capita)$_{t-1}$	–0.11	***	–0.13	***	–0.12	***	–0.14	***
openness$_{t-1}$	0.03	**	0.03	**	0.02	*	0.03	**
log(population)$_{t-1}$	–0.06	**	–0.04		–0.03		–0.01	
political terror$_t$	–0.91	***	–1.19	***	–1.24	***	–1.70	***
polity score$_t$	–0.12	**	–0.14	**	–0.10		–0.13	
interstate conflict$_t$								
minor	–1.80		–1.53		–1.88		–1.23	
war	–6.48	***	–6.22	***	–6.46	***	–6.53	***
internal conflict w/o intervention$_t$								
minor	–0.72		–1.29		–1.02		–0.94	
war	–5.17	***	–5.95	***	–6.54	***	–6.20	***
internal conflict w/ intervention$_t$								
minor	–0.80		–2.87		–2.58		–2.89	
war	–6.45	***	–6.57	***	–7.14	***	–6.89	***
UN sanctions (yes/no)$_t$	–4.65	***	–4.86	***	–4.58	***	–4.95	***
… * years	0.18		0.11		0.20		0.18	
US sanctions (yes/no)$_t$	–1.60	**	–1.82	**	–2.04	**	–2.27	**
… * years	0.18	***	0.22	***	0.27	***	0.34	***
time window	[–5;+5]		[–3;+3]		[–5;0]		[–3;0]	
R^2	0.21		0.23		0.23		0.26	
observations	1337		1106		1045		915	
countries	68		68		68		68	

Notes: Dependent variable is the annual growth rate of GDP per capita in 2005 US dollars. In addition to the actual sanction period, Columns (A15) and (A16) include a window of only five and three years around this period, respectively. Columns (A17) and (A18) restrict the sample to five and three years before the sanction period (which is also included), respectively. Model includes country-fixed effects and time-fixed effects. ***/**/* indicates significance at the 1%/5%/10% level.

Table A8: The impact of sanctions on GDP growth over time: robustness test for different time windows and different sanction levels

	(A19)		(A20)		(A21)		(A22)	
log(real GDP/capita)$_{t-1}$	–0.11	***	–0.14	***	–0.12	***	–0.15	***
openness$_{t-1}$	0.03	**	0.03	**	0.02		0.02	
log(population)$_{t-1}$	–0.05	*	–0.02		–0.01		0.01	
political terror$_t$	–1.05	***	–1.30	***	–1.47	***	–1.96	***
polity score$_t$	–0.14	**	–0.15	**	–0.12		–0.16	*
interstate conflict$_t$								
minor	–1.83		–1.44		–1.86		–1.17	
war	–6.15	***	–6.00	***	–6.46	***	–6.63	***
internal conflict w/o intervention$_t$								
minor	–0.39		–0.99		–0.57		–0.46	
war	–4.85	***	–5.76	***	–6.09	***	–5.86	***
internal conflict w/ intervention$_t$								
minor	–0.67		–2.91		–2.43		–2.86	
war	–6.22	***	–6.48	***	–6.79	***	–6.49	***
UN sanctions$_t$								
mild	–3.51	**	–3.83	**	–3.67	**	–4.34	**
mild * years	0.13		0.04		0.10		0.07	
moderate	–3.98	*	–3.85	*	–3.72	*	–3.76	*
moderate * years	–0.08		–0.15		0.04		0.01	
severe	–12.52	***	–13.52	***	–14.53	***	–15.77	***
severe * years	1.51	***	1.43	**	1.55	***	1.57	***
US sanctions$_t$								
mild	–1.71	*	–1.85	*	–2.65	***	–3.09	***
mild * years	0.17		0.19		0.32	**	0.42	**
moderate	–2.64	*	–2.88	*	–1.62		–1.18	
moderate * years	0.37	***	0.43	***	0.41	***	0.45	***
severe	0.17		–1.06		0.88		0.06	
severe * years	0.03		0.11		0.09		0.19	
time window	[–5;+5]		[–3;+3]		[–5;0]		[–3;0]	
R^2	0.22		0.24		0.25		0.28	
observations	1337		1106		1045		915	
countries	68		68		68		68	

Notes: Dependent variable is the annual growth rate of GDP per capita in 2005 US dollars. In addition to the actual sanction period, Columns (A19) and (A20) include a window of only five and three years around this period, respectively. Columns (A21) and (A22) restrict the sample to five and three years before the sanction period (which is also included), respectively. Model includes country-fixed effects and time-fixed effects. ***/**/* indicates significance at the 1%/5%/10% level.