On the Relationships Between Democracy, Development, and Domestic Conflict

- Theory and Evidence -

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Chapter 1

Background

Modern states are based on a multitude of political institutions, such as elections, constitutions, parliaments, and courts. In their entirety, those institutions constitute the political regime. It is widely recognized that countries differ substantially in many aspects of their institutional structures. Consequently, the literature has offered various conceptualizations of regime types (see, e.g., Alvarez et al., 1996; Boix et al., 2013; Freedom House, 2016; Marshall and Gurr, 2016). This thesis follows the approach of the Polity IV Project (Marshall and Gurr, 2016), which locates autocracy and democracy at opposite ends of the regime spectrum. Democracies rely on competitive elections, procedures for open political participation, and a system of checks and balances. These characteristics are absent in autocratic regimes, whose chief executives are usually chosen within the political elite and face few institutional constraints. In contrast to binary democracy indicators as coded by Alvarez et al. (1996) or Boix et al. (2013), the Polity IV Project takes the different degrees to which political regimes fulfill these criteria into account. The level of democracy is measured by the Polity scores, which range from -10 (full autocracy) to 10 (full democracy). While some countries can unambiguously be identified as autocracies or democracies, others show a mixture of democratic and autocratic institutions. Those "hybrid" regimes are referred to as anocracies.

Currently, democracies account for a large share of countries in the international system. However, the spread of democracy is a relatively new phenomenon from a historical point of view. Based on the Polity IV data, this is illustrated by Figure 1.1, which depicts the number of democratic, anocratic, and autocratic political regimes over the period from 1800 to 2017.[1] A country is classified as an autocracy in a certain year if its Polity score is between -10 and -6, as an anocracy if the Polity score is between -5 and 5, and as a democracy if the Polity score is between 6 and 10. The first half of the 19th century was characterized by the dominance of non-democratic political regimes. In addition to a relatively stable number of autocracies, these decades have seen an increasing number of anocracies. In the mid-19th century, the number of democracies started to increase slowly but steadily, whereas the number of autocratic countries declined. In this period, anocracies became

[1] Note that the Polity IV Project considers countries with more than 500,000 inhabitants only.

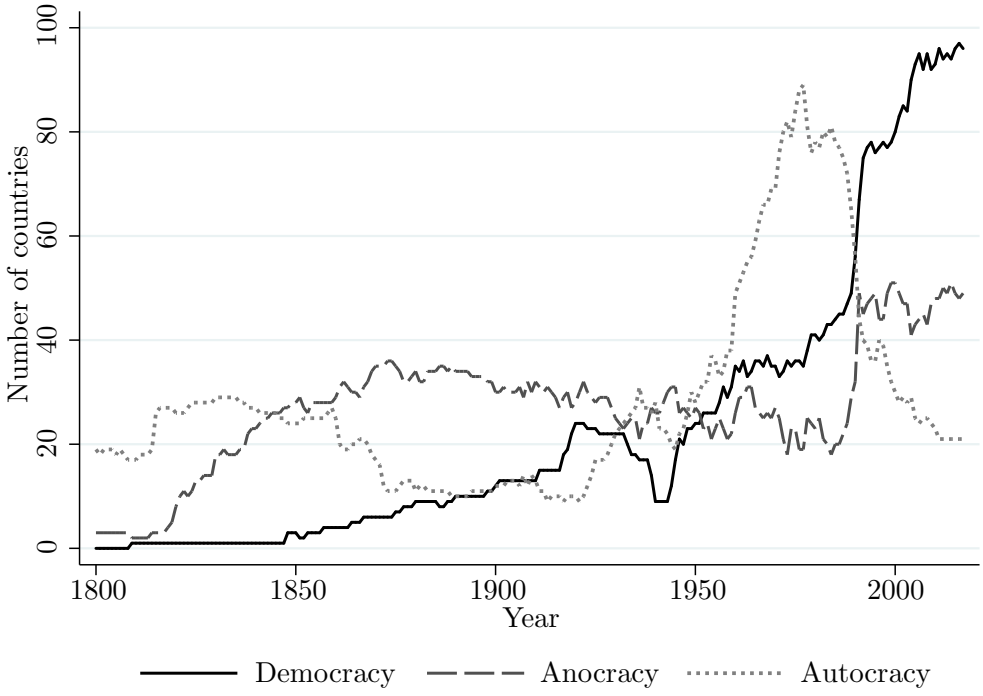

Figure 1.1: Political regimes, 1800-2017

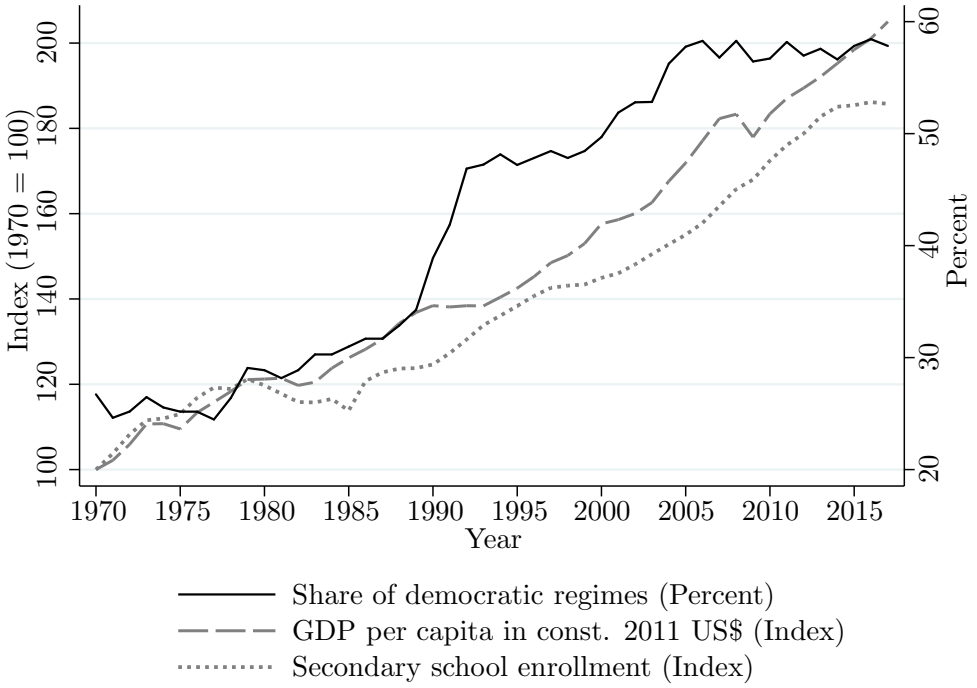

Figure 1.2: Democracy and economic development from a global perspective, 1970-2017

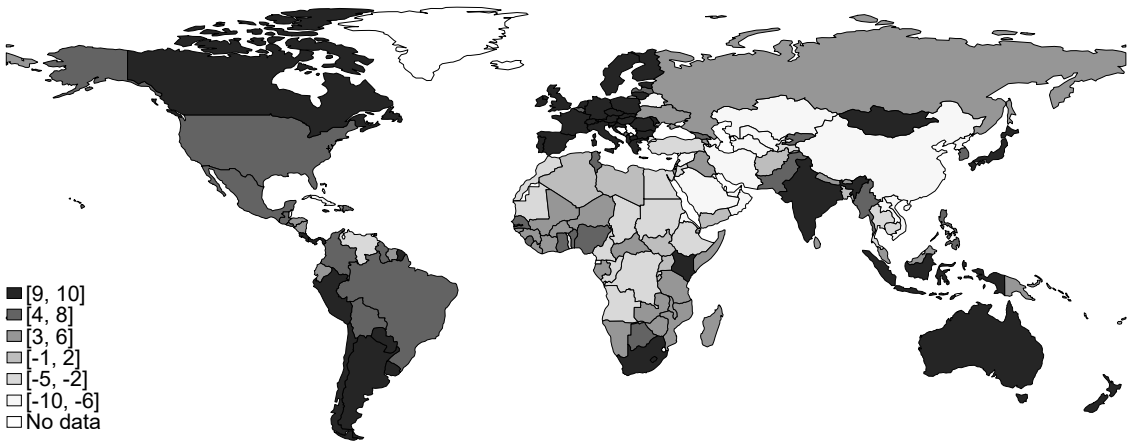

Figure 1.3: Spatial distribution of the Polity scores, 2017

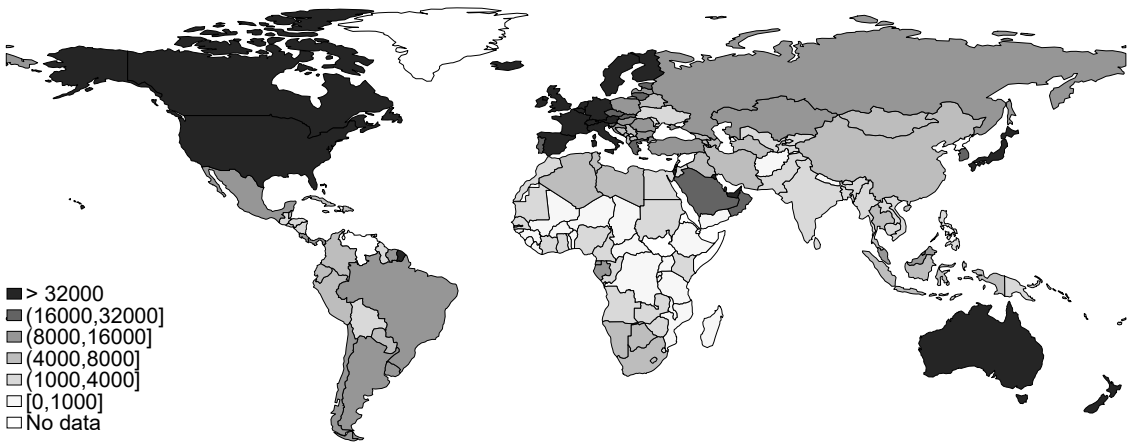

Figure 1.4: Spatial distribution of GDP per capita (in constant 2011 US$), 2017

the predominant regime type. Due to the autocratizations and the occupation of formerly democratic states during World War II, the composition of regimes changed considerably over the 1930s and the 1940s, with the number of democratically governed countries falling from 22 in 1932 to 9 in 1943. After the end of World War II, many new states came into existence, which was reflected in increases in the numbers of both democracies and autocracies. The latter formed the largest group throughout the Cold War. The breakdown of the Soviet Union marked the beginning of rapid political changes. In the early 1990s, the emergence of many new states was associated with a sharp decline in the number of autocracies and increases in the numbers of anocratic and democratic countries. In 1991, the number of democracies exceeded the numbers of both anocracies and autocracies for the first time in history. These trends continued for more than one decade. According to the data, there were 96 democracies, 49 anocracies, and 21 autocracies in 2017.

In addition to political changes, the last decades have been characterized by remarkable economic development. From a global perspective, the spread of democracy was associated

with rising standards of living. For illustration, Figure 1.2 shows the evolution of the share of democratic political regimes, global GDP per capita (in constant 2011 US$), and global secondary school enrollment (% gross) between 1970 and 2017 (data on GDP per capita and secondary school enrollment are from World Bank, 2018). Over this period, the share of democratic countries has increased from 26.7% to 57.8%. Simultaneously, GDP per capita has roughly doubled. A similar upward trend is observed for secondary school enrollment, which has increased by more than 80% relative to its initial value. The positive correlation between democracy and indicators of economic development is also observed at the country level. Drawing on data from 2017, Figures 1.3 and 1.4 depict the spatial distributions of the Polity scores and GDP per capita, respectively. Glancing at these figures reveals that more developed states generally tend to be more democratic.

The observed association between democracy and development has fueled discussions about the underlying mechanisms. One of the most influential explanations for this empirical relationship has been proposed by Lipset (1959). His "modernization theory" postulates that economic development in terms of income, education, and urbanization promotes the emergence and consolidation of democracy. Other authors have casted doubt on this view (Acemoglu et al., 2005, 2008) and have argued that causality runs in the opposite direction. From this perspective, higher levels of democracy induce higher average growth rates (Acemoglu et al., 2019). In this regard, one channel through which democracy may affect economic development concerns the public provision of goods like education, healthcare, and infrastructure. Although previous theoretical work broadly suggests that democracy promotes the provision of such goods, empirical evidence is inconclusive. Given these contradictory findings, the first essay of this thesis re-examines the link between democracy and publicly provided goods.

Essay 1: Political regimes and publicly provided goods: why democracy needs development

Previous theoretical studies generally indicate that democracy promotes public investment. In this regard, one of the main arguments is based on the idea that governments provide goods to their citizens in exchange for public support. Given this assumption, democratic governments are expected to choose higher public investment relative to non-democratic governments because of a stronger dependence on the loyalty of the population. However, empirical evidence is inconclusive, as several studies do not find a positive relationship between democracy and the level of publicly provided goods. Against that background, this paper argues that democracy does not necessarily increase but may also reduce goods provision. Drawing on a formal model it is shown that the higher public investment a democratic government must provide in order to stay in power reduces the officials' gains from holding office and, thus, increases their incentives for kleptocratic behavior. According to the model, this adverse effect is particularly

likely to dominate in poor countries, where the budget available to the government is small. Hence, the model implicates that democracy increases goods provision in relatively rich countries, whereas it reduces goods provision in poor countries. Using panel data on 154 countries over the period from 1960 to 2014, these hypotheses are tested empirically for 11 indicators of education, health, infrastructure, and governance. The results of the GMM instrumental variables regressions confirm the proposed interaction between democracy and economic development. Furthermore, the paper demonstrates that neglecting this interaction may lead to insignificant estimates of the effect of democracy on the level of publicly provided goods. Thus, the paper contributes to the literature by providing a novel perspective on the interactions between political regimes and economic development and by proposing an explanation for the inconclusive evidence found in previous studies.

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Although goods provision is an essential tool of governments, it is not the only available instrument to secure office. In addition to buying off opposition, political leaders may use the police, the military, or secret services to combat their opponents. Those practices of state repression are usually attributed to autocratic political regimes. By increasing the accountability of leaders, democratic institutions may reduce incentives and limit possibilities to use repression. However, the empirical relationship between government violations of human rights and democracy is not monotonous. Figure 1.5 shows the distribution of the Political Terror Scale scores (Gibney et al., 2017), which measure repression on a scale ranging from 1 (lowest level of repression) to 5 (highest level of repression) by Polity score for 170 countries over the period from 1976 to 2017.[2] The figure reveals considerable heterogeneity between and within democracy levels. Importantly, higher Polity scores are not generally associated with lower Political Terror Scale scores. On the contrary, the highest median repression levels are observed in countries with an intermediate Polity score of 0. Substantially lower repression levels are found for countries with the highest democracy levels only. These descriptive insights are also reflected in the results of econometric studies. While there is debate on whether anocracies tend to be more repressive than autocracies, there is consensus that full democracies are less repressive than other regime types (see, e.g., Davenport, 2007a). However, the second essay of this thesis highlights that the relationship between government violations of human rights and full democracy is less clear-cut when examining the evolution of repression in the course of democratizations.

[2]The data are described in more detail below.

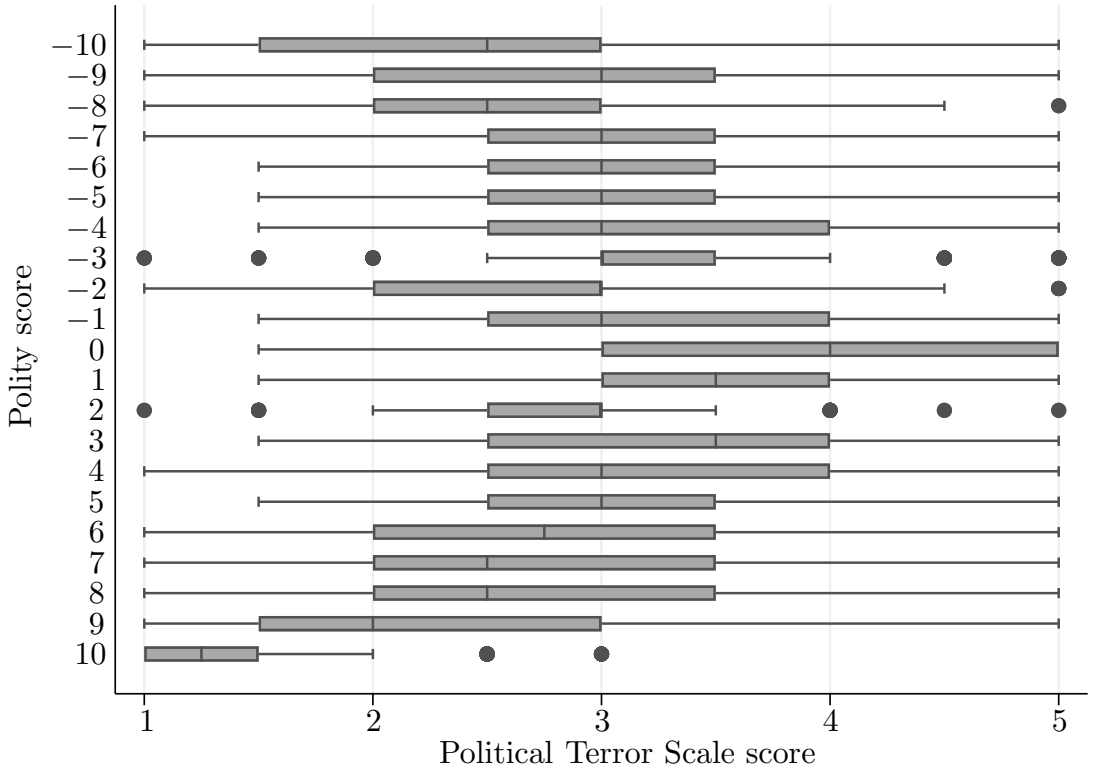

Figure 1.5: Boxplots of the Political Terror Scale scores by Polity score, 1976-2017

Furthermore, it is argued that economic factors play an important role in determining the effect of democracy on repression.

Essay 2: (When) Does democratization reduce state repression?
Based on the observation that the patterns of state repression differ substantially between democratizing countries, this paper investigates heterogeneous relationships between political regimes and government violations of human rights. Drawing on arguments from the civil war literature, a formal model that highlights opposing effects of democracy on state repression is developed. While the model shows a pacifying effect of democracy because of a better representation of the citizens' policy preferences, it also highlights an adverse effect resulting from improved opportunities of insurgents to coordinate with each other. The main implication of the model is that the effect of democracy on state repression is moderated by the level of income. Democracy is found to be more likely to reduce (increase) repression in relatively rich (poor) countries. The implications of the model are tested empirically using different methodological approaches including panel regressions, event studies, and a generalization of the synthetic control method. The empirical results consistently support the implications of the theoretical model.

The paper contributes to the literature by highlighting heterogeneity in the effects of democracy on state repression and by providing theoretical and empirical insights into the moderating role of income.

The paper was co-authored by Jonathan David Old and Patrick Zwerschke. The author of this thesis is responsible for the idea of the paper and the formulation of the research question. The literature review was co-authored by Patrick Zwerschke. The theoretical model was fully developed and described by the author of this thesis. The conceptualization of the empirical part was joint work of all authors. Patrick Zwerschke and the author of this thesis were mainly responsible for the choice of the econometric methods. Data preparation and calculations were conducted by Jonathan David Old.

By arguing that the relationship between government violations of human rights and democracy depends on domestic economic factors, the paper described above follows the majority of studies on state repression in taking a "closed-polity" perspective. However, domestic violence may also be affected or even driven by violence in neighboring countries. In the civil war literature, it is well established that conflicts tend to be contagious (see, e.g., Gleditsch, 2007). Given that governments may anticipate the threat of conflict spillovers, it is likely that they respond to neighboring civil wars with repression (Danneman and Ritter, 2014). Against that background, the third essay of this thesis aims to shed more light on interactions between domestic and international determinants of domestic conflict and violence. Special emphasis is placed on low-level conflict and state repression. By exploiting variations in the spatial distribution of democracy, as highlighted in Figure 1.3, the paper provides evidence that the effect of democracy on low-level conflict and repression depends on the composition of political regimes in a country's neighborhood.

Essay 3: Democracy and the transnational dimensions of low-level conflict and state repression

This paper presents a simple model building on the assumption that people form their attitudes towards the government by evaluating their living conditions relative to those in neighboring countries. By highlighting this channel, the model reveals that democracy may have opposing effects on low-level conflict and state repression. On the one hand, democracy provides opportunities for political participation and thus reduces domestic conflict potential. On the other hand, domestic democracy may spur dissatisfaction and conflict abroad, which, in turn, may induce conflict spillovers. The net effect of democracy on domestic conflict and state repression is therefore found to be ambiguous. Furthermore, the model implicates that domestic democracy is more (less) likely to be pacifying when the country's neighborhood is more (less) democratic. Likewise, more democratic

environments decrease (increase) the intensity of conflict in democratic (autocratic) countries. These theoretical implications are supported by the results of panel data analyses based on linear, logistic, and negative binomial models. The paper contributes to the literature on transnational determinants of conflict and state repression by highlighting interactions between domestic and neighboring political institutions within the framework of a simple formal model. The paper also contributes to the empirical literature by providing evidence for these interaction effects.

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The three essays summarized above highlight heterogeneous impacts of democracy on economic outcomes and violent intrastate conflict. All of these analyses indicate that differences between democracies and non-democracies are moderated by contextual factors. While the results may help to explain some of the observed heterogeneity *between* regime types, they may not capture relevant differences *within* groups of regimes. In particular, non-democratic states differ not only in terms of economic development but, as indicated by Figure 1.5, also with respect to their institutional structures and repressive practices. Explaining these differences between non-democratic countries may require a different perspective on the role of political institutions. Some authors emphasize that non-democratic leaders may use democratic institutions as instruments for securing office (Gandhi and Przeworski, 2006, 2007). Hence, institutional characteristics of non-democratic regimes should not be considered as exogenous but are likely to be shaped by the ruling elite. Against that background, the fourth essay of this thesis examines the relationships between economic development, repression, and democratic institutions in non-democratic regimes.

Essay 4: Democratic institutions, repression, and economic development in non-democratic regimes: theory and evidence
This paper examines the use of repression and the implementation of democratic institutions by a non-democratic government. Based on a simple model, it is argued that economic development may have opposing effects, depending on whether it appears in the form of increasing income or education. While a more educated population is related to more democracy and more repression, higher income levels are found to dismantle democratic structures. These theoretical implications are supported by dynamic panel data regressions based on data covering 458 non-democratic leaders of 101 countries between 1962 and 2010. The paper contributes to the literature by providing a rationale for the simultaneous use of both democratic institutions and repression by non-democratic governments. Furthermore, it proposes a more differentiated perspective on the role of economic development for democracy and government violations of human rights.

The paper was co-authored by Alexander Kemnitz. The basic idea and the empirical part of the paper were developed by the author of this thesis. Alexander Kemnitz is mainly responsible for the structure, the conceptualization, and the theoretical part of the paper.

Chapter 2

Political regimes and publicly provided goods: why democracy needs development

Author: Martin Roessler

Abstract[3] While most of the theoretical literature suggests that democracy promotes the provision of public goods, the findings of empirical studies are inconclusive. Drawing on a simple model, this paper aims at reconciling theory and evidence. We argue that the stronger dependence of more democratic governments upon public support has two opposing effects: on the one hand, it encourages these governments to increase goods provision in order to generate more loyalty. On the other hand, it raises the leaders' incentives for kleptocratic behavior. The model predicts that the latter effect may dominate in poor countries. In countries with higher income levels, democracy is expected to increase public goods provision. Utilizing 11 indicators of education, health, infrastructure and governance both hypotheses are confirmed by panel regressions including 154 countries over the period from 1960 to 2014. We also show that the omission of per capita income as a moderator variable of democracy may result in small and insignificant empirical estimates.

Keywords: Publicly Provided Goods, Public Goods, Democracy, Political Regimes
JEL classification: H11, H40, H52, H54

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2.1 Introduction

From a global perspective, the last decades have seen both remarkable economic development and a considerable increase in the share of democratic political regimes (Marshall and Cole, 2014). The positive association between economic development and democracy has fueled more than 50 years of research on the underlying mechanisms. Some authors, most prominently Lipset (1959), consider economic development to be a requisite for democracy. Other scholars argue that causality runs from democracy to development (see, e.g., Acemoglu et al., 2008, 2019). In that regard, one strand of the literature emphasizes the link between political regimes and the provision of goods like education, healthcare and infrastructure.[4] Theoretical studies agree widely that democracy induces higher levels of those publicly provided goods (see, e.g., Bueno De Mesquita et al., 2003; Deacon, 2009; Lake and Baum, 2001; McGuire and Olson, 1996). However, the purported positive relationship between democracy and goods provision appears to be less clear-cut empirically as several contradictory findings challenge the hypothesis of a "democratic advantage" (see, e.g., Lott, 1999; Mulligan et al., 2004; Ross, 2006; Truex, 2017).

The contribution of this paper is twofold: 1) Emphasizing the interactions between economic development and political regimes, we re-consider the link between democracy and goods provision from a theoretical and an empirical perspective. On the one hand, and in line with previous studies, our theoretical model shows that democracy promotes goods provision by increasing the dependence of the government upon public support. On the other hand, the model highlights that democracy also increases the government's incentives for kleptocratic behavior by reducing the gains from holding public office. We show that the adverse effect is particularly likely to dominate in countries with low income levels. Goods provision is positively related to democracy in countries with sufficiently high income levels only. 2) Showing that the omission of the interaction between democracy and income levels may result in small and insignificant empirical estimates, we propose an explanation for contradictory previous evidence on the link between democracy and publicly provided goods.

Building on the work of Deacon and Saha (2006), theoretical arguments for a positive relationship between democracy and goods provision can be characterized by two lines of reasoning: the first one postulates that autocratic governments enjoy more monopoly power than democratic governments. For that reason, autocratic regimes foster the exploitation of the general population in favor of small elites. The second argument states that democratic leaders have to generate the loyalty of a larger group of people in order to survive in office. From that perspective, goods such as education, healthcare, or infrastructure are provided in exchange for political support.

Drawing on the first argument, McGuire and Olson (1996) point out that democratic as well as autocratic governments have an incentive to provide certain goods because

[4] In the following, we will refer to such goods as "publicly provided goods". In the literature, those goods often are called "public goods". They do, however, usually not satisfy the criteria of non-excludability and non-rivalry fully.

they increase the economy's productivity, which, in turn, increases the rents that can be generated by the redistribution of income in favor of the ruling elite. As the democratic elite's "stake" in the society is relatively strong, democratic governments will tend to reduce the deadweight loss associated with the generation of rents and to raise the level of publicly provided goods. Assuming that democratic governments maximize the utility of the median voter, whereas autocratic rulers maximize the amount of rents they can extract from the economy, Niskanen (1997) arrives at a similar conclusion with regard to goods provision.

Bueno De Mesquita et al. (2003) build on the assumption that all political leaders are striving for gains from office, irrespective of the type of the political regime in which they operate. Within the framework of their "selectorate theory", the level of goods provision is driven fundamentally by the size of that group, i.e., the number of people eligible to select the ruler, and the size of the winning coalition, i.e., the number of supporters a leader needs to remain in power. In order to stay in office, a political leader can provide private goods to the members of the winning coalition and public goods to the whole population. To minimize costs, the leader relies on the provision of private goods if the winning coalition is small. As the size of the winning coalition grows, public good provision becomes more attractive. Since democracies usually are characterized by relatively large winning coalitions, "selectorate theory" predicts that democratic regimes will be associated with high levels of public good provision.

Lake and Baum (2001) draw a parallel between economic and political markets by emphasizing that not the state's monopoly position, but its openness to political contest determines the supply of public services. Less contestability corresponds to more monopoly power, which enables political leaders to extract more rents at the cost of public investment. Relative to autocracies, the political markets of democratic political regimes are characterized by vigorous contestability and, therefore, are expected to foster goods provision. Deacon (2009) identifies the relative political influence of different societal groups - in the simplest case, that of an elite and that of the rest of the population - as a crucial factor. The more even distribution of political power under democracy compared to dictatorship is shown to result in larger amounts of nonexclusive publicly provided goods.

From an empirical viewpoint, several studies find evidence in favor of the hypothesis that democracy promotes goods provision. More democratic countries are, for instance, found to perform better in terms of public education, population health, safe water and physical infrastructure (see, e.g., Baum and Lake, 2003; Besley and Kudamatsu, 2006; Deacon, 2009; Justesen, 2012; Kotera and Okada, 2017; Kudamatsu, 2012; Lake and Baum, 2001; Stasavage, 2005; Wigley and Akkoyunlu-Wigley, 2011). In many countries, those goods are not provided exclusively by the public sector. Democracy also may foster private sector production of goods like education, healthcare, and infrastructure owing to the provision of a favorable institutional and regulatory environment. In that regard, multiple studies point to the crucial role of economic institutions and "good governance", including the establishment of the rule of law and freedom from corruption (see, e.g., Acemoglu et al.,

2001; Brunetti et al., 1998; Jain, 2001; Nguyen and Van Dijk, 2012). Governance, in turn, is found to be closely related to the type of political regime, with democracies generally showing "better" performance (see, e.g., Rigobon and Rodrik, 2005; Rivera-Batiz, 2002).

However, those results have not gone unchallenged. Lott (1999) analyses education expenditures and does not find a positive association with democracy. Totalitarian governments instead are shown to invest heavily in public education.[5] By investigating educational and social spending, Mulligan et al. (2004) also obtain the result that democracy does not have a systematic impact on those public policies. While the analysis of Ross (2006) indicates that democracies indeed do spend more on education and health, little evidence is found for democracy's impacts on infant and child mortality rates. Ross concludes that the corresponding benefits of democracy accrue to middle- and upper-income groups, whereas the situation of the poor does not improve substantially. Dahlum and Knutsen (2017) raise more subtle doubts by distinguishing between the quantity and the quality of education. Their results show that democracies on average provide more, but not systematically better education than autocracies. Clague et al. (1996) find that democracies in general provide greater security of property and contract rights. However, short-lasting democracies are shown to perform worse than autocracies, particularly compared to situations wherein the autocratic leader has a long time horizon. The positive association between democracy and property and contract rights thus is driven by long-lasting democracies. In that regard, the authors argue that both the durability of democracy and the provision of property rights rely on adherence to individual freedoms and the rule of law. By focusing on a lower level of aggregation, Justesen (2015) highlights that political institutions that make governments accountable to larger groups in the society induce better protection of property rights, whereas the existence of veto players can have ambiguous effects. With respect to economic development, Justesen and Kurrild-Klitgaard (2013) emphasize interactions between property rights protection and political institutions. They argue that the "mere promise" of property rights protection is not sufficient for fostering economic development if the promise lacks credibility. Credibility, in turn, may be ensured by a political system with separation of powers, which implies the presence of veto players. In line with such reasoning, the authors provide evidence that the positive growth effects of property rights protection are explained, in particular, by legislative checks on the executive branch. Furthermore, the growth-promoting effects of institutions are found to be weaker in countries with smaller stocks of democratic capital, i.e., in young democracies and countries having limited historical experience with democratic forms of government. Truex (2017) notes that empirical studies usually rely on only a few model specifications, apply different methods, and use different sets of control variables and lag structures. Moreover, he suspects that the literature on democracy and goods provision could be subject to publication bias. Within the framework of global sensitivity analysis, Truex estimates various model specifications and finds little evidence of a "democratic advantage".

[5] According to Lott, his finding reflects the fact that totalitarian governments use education as an instrument for indoctrination.

Against that background, we present a simple model of goods provision that relies on the assumption that more democratic governments are required to generate the loyalty of a larger group of people to remain in office. We show that that requirement creates a tradeoff for the government: on the one hand, democracy clearly promotes goods provision in exchange for the wider political support required to stay in office. On the other hand, the larger public investment a democratic government must provide to stay in power reduces its gains from holding office. In that way, democracy may affect goods provision negatively. The model indicates that adverse effects are particularly likely if income levels are low and, as a result, the budget available to the government is small. According to that reasoning, democracy needs development in the sense that positive impacts on goods provision arise only in countries with sufficiently high income levels. In less developed countries, more democratic regimes are associated with lower public investment. Utilizing 11 indicators of publicly provided goods, the hypotheses derived from the model are tested empirically. Our instrumental variables regressions confirm that democracy has a positive (negative) effect on goods provision in countries with high (low) income levels. The results are robust against different lag structures, alternative measures of democracy, and additional control variables. We conclude that the inconsistencies in previous evidence on the relationship between democracy and goods provision may be because of the omission of income as a moderator variable.

The rest of the paper is structured as follows. Section 2.2 develops our theoretical model and derives empirically testable hypotheses. Section 2.3 describes the data and our empirical strategy. Section 2.4 discusses the estimation results. Section 2.5 presents some robustness checks. Section 2.6 summarizes and concludes.

2.2 The model

The simple model outlined in this section aims to describe basic mechanisms determining the relationship between publicly provided goods and the type of the political regime. We consider two (groups of) agents: the government and the citizens. More government-goods provision is assumed to result in higher income levels which, in turn, raise the citizens' welfare and broaden the tax base. However, the provision of goods such as education, healthcare, infrastructure, and a favorable institutional environment affects an economy's output and income level only with a time lag. To capture that intertemporal structure, the model has two time periods, t and $t+1$. The timing is as follows: the government enters office at the beginning of period t and decides on the tax rate and the level of publicly provided goods. Based on those policy choices, each citizen evaluates the government's performance and decides whether or not to be loyal. The population's aggregate level of loyalty finally determines whether the government is removed from office at the end of period t or survives until period $t+1$. Accordingly, the government's objective is to maximize utility over both periods while facing the constraint that a threshhold level of loyalty is required in order to stay in office in the next period. In line with core arguments of

the literature, that threshold level is determined by the type of governing political regime.

2.2.1 Model setup

Following Bueno De Mesquita et al. (2003), we assume that political leaders primarily are striving for gains from holding office. Those gains include the use of public resources for private purposes (e.g., palaces, Swiss bank accounts, vanity projects) and the inherent value of holding power. As the latter is not crucial for our analysis, we focus on a government G drawing utility from current private consumption $c_{G,t}$; consumption prospects are captured by the size of the future tax base y_{t+1}. Hence, the utility function of the government is defined as

$$U_G = \log c_{G,t} + \delta \cdot \log y_{t+1}, \tag{2.1}$$

where $\delta \in]0,1[$ reflects time preference. Expression (2.1) describes the government's utility when it survives in office beyond period t since it benefits from the tax base in period $t+1$. As outlined above, survival requires that the population's level of loyalty $L_t \in [0,1]$ is at least as high as a certain threshold level $\bar{L}_t \in [0,1]$. Thus, the government survives until period $t+1$ if $L_t \geq \bar{L}_t$ and is removed from office at the end of t otherwise. In line with the literature, we assume that the level of loyalty a government has to generate in order to stay in office is higher under more democratic regimes.[6] However, although to a lesser extent, non-democratic governments also rely on the population's loyalty as they face the threat of revolution (see, e.g., Bar-El, 2009). Formally, we posit that

$$\bar{L}_t = \bar{L}(D_t), \tag{2.2}$$

with $\bar{L}' > 0$, $\bar{L}(0) > 0$, $\bar{L}(1) < 1$, and $D_t \in [0,1]$ as the level of democracy. Here, $D_t = 0$ and $D_t = 1$ represent fully autocratic and fully democratic political regimes, respectively. The positive derivative of $\bar{L}(\cdot)$ reflects that governments under more democratic regimes must secure higher levels of loyalty in order to stay in office. However, as $\bar{L}_t$ is positive for $D_t = 0$, even governments under fully autocratic regimes have to generate some popular support.

The population consists of a continuum of citizens $i \in [0,1]$ with mass normalized to unity. Generally, the decision of an individual whether or not to support the government is determined by her utility from consumption $c_{i,t}$ and $c_{i,t+1}$ according to

$$U_{i,t} = \log c_{i,t} + \delta \cdot E[\log c_{i,t+1}], \tag{2.3}$$

where $E[\cdot]$ denotes the expectations operator. For simplicity, the citizens' time preference is equal to that of the government. Given proportional tax rates $\tau_t, \tau_{t+1} \in [0,1]$, consumption is given by net income, i.e., $c_{i,t} = (1-\tau_t)y_{i,t}$ and $c_{i,t+1} = (1-\tau_{t+1})y_{i,t+1}$, where $y_{i,t}$ and

[6] This is obvious for full democracies where governmental survival is depends on the electoral support of the citizenry.

$y_{i,t+1}$ denote the individual's gross income in the respective period. While income in period t is treated as exogenous, each citizen's income in period $t+1$ is affected by the level of previously supplied publicly provided goods g_t. Formally, that relationship is expressed by the micro-level production function

$$y_{i,t+1} = \theta_i \cdot g_t^{\alpha}, \tag{2.4}$$

where $\theta_i > 0$ is an individual-specific productivity factor and $\alpha \in]0,1[$ is the elasticity of income in $t+1$ with respect to goods provision in t. Aggregating individual incomes yields the macro-level production function

$$y_{t+1} = \int_0^1 y_{i,t+1}\,\mathrm{d}i = \theta \cdot g_t^{\alpha}, \tag{2.5}$$

where $\theta = \int_0^1 \theta_i\,\mathrm{d}i$ reflects aggregate productivity.[7] Using (2.4), a citizen's consumption in period $t+1$ can be written as $c_{i,t+1} = (1-\tau_{t+1}) \cdot \theta_i \cdot g_t^{\alpha}$. While the level of publicly provided goods is observed by each individual at the end of the first period, the tax rate in the next period is unknown when evaluating governmental performance. Citizens therefore may have different beliefs about τ_{t+1}, which are represented by the individual-specific density functions $b_i(\tau_{t+1})$. Thus, the expected utility from consumption in period $t+1$ is

$$E[\log(c_{i,t+1})] = \int_0^1 \log\{(1-\tau_{t+1}) \cdot \theta_i \cdot g_t^{\alpha}\} \cdot b_i(\tau_{t+1})\,\mathrm{d}\tau_{t+1}. \tag{2.6}$$

Based on (2.3) and (2.6), we can write a citizen's utility as

$$U_{i,t} = \log\{(1-\tau_t) y_{i,t}\} + \delta \int_0^1 \log\{(1-\tau_{t+1}) \cdot \theta_i \cdot g_t^{\alpha}\} \cdot b_i(\tau_{t+1})\,\mathrm{d}\tau_{t+1}. \tag{2.7}$$

Each citizen's utility declines in the tax rate τ_t as it reduces current consumption and increases in goods provision g_t because the latter generates a higher income in the following period. The specification implies a tradeoff between the citizens' current and future consumption as investments in publicly provided goods have to be financed by tax revenue. In deriving the latter, we follow Acemoglu and Robinson (2005) and others by accounting for the distortionary costs of taxation $\varphi(\tau_t) \cdot y_t$, where $\varphi(\cdot)$ is assumed to be convex, differentiable and non-decreasing ($\varphi' > 0, \varphi'' > 0, \varphi(0) = 0$). Tax revenue in period t therefore is $[\tau_t - \varphi(\tau_t)] \cdot y_t$. Thus, from the perspective of an individual, an optimal policy $\{\tau_t^{\mathrm{opt}}, g_t^{\mathrm{opt}}\}$ maximizes (2.7) subject to the constraint $g_t = [\tau_t - \varphi(\tau_t)] \cdot y_t$. Hence, the optimal policy is described by

[7] Note that y denotes both total and per capita income because the size of the population is normalized to unity.

$$\varphi'(\tau_t^{\text{opt}}) = 1 - \frac{\tau_t^{\text{opt}} - \varphi(\tau_t^{\text{opt}})}{\alpha\delta \cdot (1 - \tau_t^{\text{opt}})}, \tag{2.8}$$

$$g_t^{\text{opt}} = \alpha\delta \cdot (1 - \tau_t^{\text{opt}}) \cdot [1 - \varphi'(\tau_t^{\text{opt}})] \cdot y_t. \tag{2.9}$$

As shown by (2.8), the optimal tax rate τ_t^{opt} increases in the income elasticity of goods provision α and the rate of time preference δ. The level of goods provision consequently also increases in both parameters. Moreover, (2.9) reveals that the optimal level of goods provision g_t^{opt} is proportional to the income level y_t.

When deciding whether or not to be loyal to the government, each citizen compares her actual utility to her utility under the optimal policy $U_{i,t}^{\text{opt}}$. We assume that an individual is loyal to the government if $U_{i,t}^{\text{opt}} - U_{i,t} \leq \varepsilon_i$, where $\varepsilon_i \geq 0$ measures the individual's willingness to accept deviations from the optimal utility level. Using (2.7) and (2.9), the condition can be rewritten as

$$\eta_t \cdot (1 - \tau_t) \cdot \left(\frac{g_t}{y_t}\right)^{\alpha\delta} \geq \tilde{\varepsilon}_i, \tag{2.10}$$

where $\eta_t := \{\alpha\delta \cdot (1 - \tau_t^{\text{opt}})^{1+\alpha\delta} \cdot [1 - \varphi'(\tau_t^{\text{opt}})]^{\alpha\delta}\}^{-1}$. $\tilde{\varepsilon}_i := \exp(-\varepsilon_i) \in [0, 1]$ reflects the extent to which the government must approach the optimal utility level in order to win the individual's support. To derive the citizens' aggregate level of loyalty, the distribution of $\tilde{\varepsilon}_i$ in the population is described by the distribution function $L(\tilde{\varepsilon})$. As a general assumption, we impose that $L'(\tilde{\varepsilon}) > 0 \,\forall\, \tilde{\varepsilon} \in [0, 1]$. The population's level of loyalty, defined as the share of the citizens supporting the government, is then given by

$$L_t = l(\tau_t, g_t) = L\left(\eta_t \cdot (1 - \tau_t)\left(\frac{g_t}{y_t}\right)^{\alpha\delta}\right). \tag{2.11}$$

Thus, (2.11) implies that a lower tax rate and a higher level of goods provision broaden the population's support for the government. However, according to its utility function (2.1), the government has an incentive to use at least part of the tax revenue for private consumption $c_{G,t}$. That is obvious from the government's budget constraint

$$[\tau_t - \varphi(\tau_t)] \cdot y_t = g_t + c_{G,t}, \tag{2.12}$$

stating that tax revenue is divided between investments in publicly provided goods and officials' private consumption. Based on those considerations and taking into account that a certain level of loyalty is required to survive in office, the government's utility can be expressed as

$$U_{G,t} = \begin{cases} \log\{[\tau_t - \varphi(\tau_t)] \cdot y_t - g_t\} + \delta \cdot \log\{\theta \cdot g_t^{\alpha}\} & : l(\tau_t, g_t) \geq \bar{L}(D_t) \\ \log\{[\tau_t - \varphi(\tau_t)] \cdot y_t - g_t\} & : l(\tau_t, g_t) < \bar{L}(D_t) \end{cases}. \tag{2.13}$$

The government draws utility from tax revenue not spend on publicly provided goods in period t and the size of the tax base in period $t+1$ if $l(\tau_t, g_t) \geq \bar{L}(D_t)$, i.e., if the population's level of loyalty is at least as high as the regime-specific threshold level. If the level of goods provision is too low to reach that threshold, i.e., if $l(\tau_t, g_t) < \bar{L}(D_t)$, the government is removed from office at the end of period t and benefits from consumption in that period only. In the following, we examine the government's decisions on the tax rate and investments in publicly provided goods when the loyalty constraint is non-binding and when it is binding, respectively.

2.2.2 Non-binding loyalty constraint

Without the loyalty constraint, the government's problem is to choose $\{\tau_t^*, g_t^*\}$ to maximize

$$U_{G,t} = \log\{[\tau_t - \varphi(\tau_t)] \cdot y_t - g_t\} + \delta \cdot \log\{\theta \cdot g_t^{\alpha}\}. \tag{2.14}$$

Hence, the government's preferred policy is given by

$$\varphi'(\tau_t^*) = 1, \tag{2.15}$$

$$g_t^* = \xi \cdot [\tau_t^* - \varphi(\tau_t^*)] \cdot y_t, \tag{2.16}$$

where $\xi := (\alpha\delta)/(1+\alpha\delta)$ is the share of tax revenue spent on goods provision. According to (2.15), the government chooses τ_t^* such that tax revenue is maximized by equating the marginal distortion and the marginal gain associated with a rise in the tax rate. (2.16) states that the government's preferred level of publicly provided goods rises in the level of income as such an increase generates more tax revenue and, ceteris paribus, more private consumption for officials. To maximize utility, the government shifts the share ξ of that gain in tax revenue to goods provision in order to increase future consumption possibilities.

2.2.3 Binding loyalty constraint

If the government's preferred policy does not generate support in the population sufficient to survive in office, i.e., if $l(\tau_t^*, g_t^*) < \bar{L}(D_t)$, the loyalty constraint becomes binding. In that scenario, the government will either (1) choose a policy that fulfills the loyalty constraint or (2) maximize current consumption while accepting loss of office at the end of period t.

In case of choosing option (1), the government's policy maximizes private consumption while securing office in $t+1$. Hence, the government chooses $\{\tau_t^D, g_t^D\}$ such that the loyalty constraint is fulfilled with equality, i.e., $l(\tau_t^D, g_t^D) = \bar{L}(D_t)$. The Lagrangian is

$$\begin{aligned}\mathcal{L}(\tau_t, g_t, \lambda) = \log\{[\tau_t - \varphi(\tau_t)] \cdot y_t - g_t\} + \delta \cdot \log\{\theta \cdot g_t^{\alpha}\} \\ + \lambda \left[L\left(\eta_t \cdot (1-\tau_t) \left(\frac{g_t}{y_t} \right)^{\alpha\delta} \right) - \bar{L}(D_t) \right].\end{aligned} \tag{2.17}$$

Utilizing the first-order conditions resulting from (2.17), the government's policy fulfilling the loyalty constraint is described by

$$\varphi'(\tau_t^D) = \frac{1-\varphi(\tau_t^D)}{1-\tau_t^D} - \frac{1}{\xi \cdot (1-\tau_t^D)} \left(\frac{\Psi(D_t)}{\eta_t \cdot (1-\tau_t^D)} \right)^{\frac{1}{\alpha\delta}}, \tag{2.18}$$

$$g_t^D = \xi \cdot [1 - \varphi(\tau_t^D) - (1-\tau_t^D) \cdot \varphi'(\tau_t^D)] \cdot y_t, \tag{2.19}$$

where $\Psi(D_t) := L^{-1}(\bar{L}(D_t))$. The properties of $L(\cdot)$ and $\bar{L}(\cdot)$ imply that $\Psi(0) > 0$ and $\Psi' > 0$. Hence, the right-hand side of (2.18) declines in the level of democracy. Since $\varphi'' > 0$, the latter implies that $\mathrm{d}\tau_t^D/\mathrm{d}D_t < 0$. A rise in the level of democracy therefore leads to a reduction in the tax rate set by the government. From (2.19) follows

$$\frac{\mathrm{d}g_t^D}{\mathrm{d}y_t} = \xi \cdot [1 - \varphi(\tau_t^D) - (1-\tau_t^D) \cdot \varphi'(\tau_t^D)] > 0, \tag{2.20}$$

$$\frac{\mathrm{d}g_t^D}{\mathrm{d}D_t} = -\xi \cdot \varphi''(\tau_t^D) \cdot y_t \cdot \frac{\mathrm{d}\tau_t^D}{\mathrm{d}D_t} > 0, \tag{2.21}$$

$$\frac{\mathrm{d}^2 g_t^D}{\mathrm{d}D_t \mathrm{d}y_t} = -\xi \cdot \varphi''(\tau_t^D) \cdot \frac{\mathrm{d}\tau_t^D}{\mathrm{d}D_t} > 0. \tag{2.22}$$

While (2.20) shows that higher income levels induce higher levels of goods provision, (2.21) implies that rises in the level of democracy also increase the level of publicly provided goods. Under a binding loyalty constraint, democracy therefore is related to a smaller tax burden and larger goods provision. As such, the government sacrifices private consumption by using both instruments to secure a return to office by generating the required increase in the population's loyalty. Furthermore, (2.22) states that the increase in goods provision triggered by an increase in the level of democracy is larger at higher than at lower income levels. Given the policy $\{\tau_t^D, g_t^D\}$, the government's utility when fulfilling the loyalty constraint is

$$U_{G,t}^D = \log\{[\tau_t^D - \varphi(\tau_t^D)] \cdot y_t - g_t^D\} + \delta \cdot \log\{\theta \cdot (g_t^D)^\alpha\}. \tag{2.23}$$

In case of choosing option (2), the government accepts losing office at the end of period t and therefore sets $\{\tau_t^K = \tau_t^*, g_t^K = 0\}$ to maximize current consumption. Thus, the government maximizes tax revenue by setting the tax rate to τ_t^* and reduces expenditures on publicly provided goods to zero. In the following, case (2) is referred to as kleptocracy. Accordingly, the government's utility under kleptocracy is

$$U_{G,t}^K = \log\{[\tau_t^* - \varphi(\tau_t^*)] \cdot y_t\}. \tag{2.24}$$

As (2.24) shows, in that scenario the government does not draw utility from the tax base in period $t+1$ but consumes the total available budget in period t.

When facing a binding loyalty constraint, the government decides between the two options described above based on their respective utility levels. Define $\Delta(D_t) := U^D_{G,t} - U^K_{G,t}$ as the difference in utility between fulfilling the loyalty constraint by providing g^D_t and opting for kleptocracy. Applying the envelope theorem yields

$$\Delta'(D_t) = \frac{\mathrm{d}U^D_{G,t}}{\mathrm{d}D_t} = -\lambda \cdot \bar{L}'(D_t) < 0. \tag{2.25}$$

The difference in utility between fulfilling the loyalty constraint and opting for kleptocracy therefore declines in the level of democracy. Intuitively, the binding loyalty constraint requires the government to choose a lower tax rate and a higher level of publicly provided goods in order to stay in power than it would provide in line with its preferred policy. Thus, the government's utility is lower in the constrained than in the unconstrained scenario. An increase in the level of democracy further reduces the tax rate and increases the required level of goods provision, leading to an additional reduction in utility. On the contrary, the utility that the government obtains when it maximizes current consumption at the cost of losing office is independent of the regime type. Thus, higher democracy levels strengthen the government's incentives for kleptocratic behavior, ceteris paribus. For that reason, democratization may first lead to an increase of the level of publicly provided goods, but result in a reduction of the latter when a certain democracy level is reached. We will refer to the lowest level of democracy at which the government favors kleptocracy as the critical level of democracy $\tilde{D}_t$. For further investigation, suppose that the government fulfills the loyalty constraint if $\Delta(D_t) > 0$ and opts for kleptocracy otherwise. Utilizing the previous results, $\tilde{D}_t$ thus is given implicitly by

$$\Delta(\tilde{D}_t) = \log\{\omega(\tau^D_t(\tilde{D}_t), \tau^*_t)\} + \alpha\delta \cdot \log y_t = 0, \tag{2.26}$$

where $\omega(\cdot)$ captures the tax rates under the government's preferred policy $\tau^D_t(\tilde{D}_t)$ and under kleptocracy τ^*_t. Implicit differentiation of (2.26) shows that the critical level of democracy increases in the level of income:

$$\frac{\mathrm{d}\tilde{D}_t}{\mathrm{d}y_t} = \frac{1}{-\Delta'(\tilde{D}_t)} \cdot \frac{\alpha\delta}{y_t} > 0. \tag{2.27}$$

A rise in the current income level increases tax revenue and thereby leads to more private consumption of the government irrespective of whether it fulfills the loyalty constraint or opts for kleptocracy. However, a rise in income also induces a higher level of goods provision, which broadens the tax base in the next period and, hence, increases the government's consumption prospects. Since the government benefits from the latter effect only if it stays in office, a rise in the level of income increases the government's incentives to fulfill the loyalty constraint.

Figure 2.1 illustrates the effects of a rise in income y_t on goods provision g_t for different levels of democracy D_t. The gray curve depicts the level of goods provision in the initial

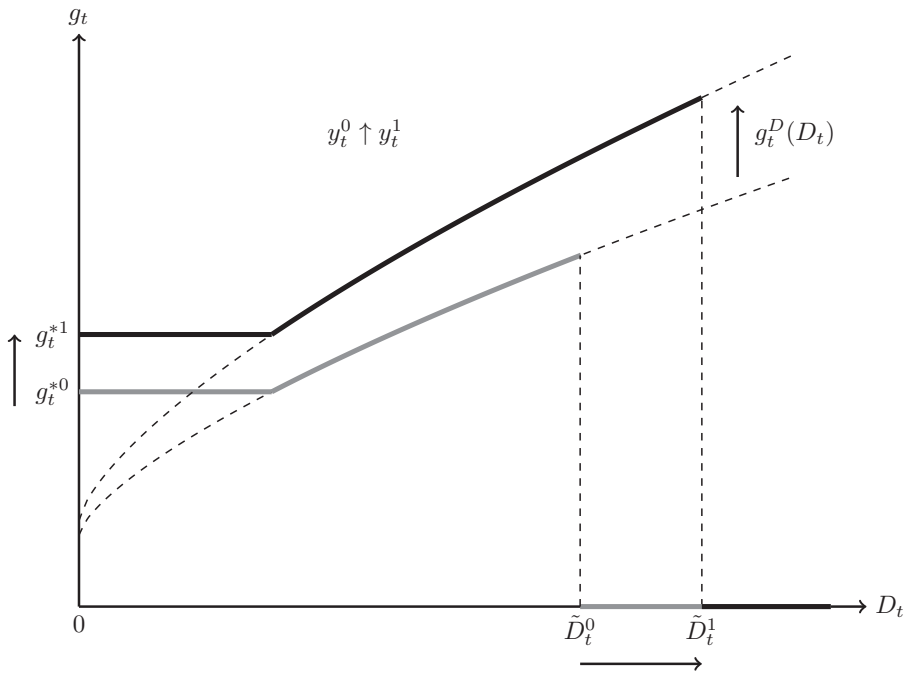


Figure 2.1: Effect of a rise in income y_t on the level of publicly provided goods g_t and the critical level of democracy $\tilde{D}_t$

situation where the population's income is y_t^0 and the government's preferred level of goods provision is g_t^{*0}. At a certain democracy level the loyalty constraint, which is given by the curve $g_t^D(D_t)$, becomes binding. Therefore, the level of goods provision henceforth rises with the level of democracy. However, when reaching the critical democracy level $\tilde{D}_t^0$ the government's utility when fulfilling the loyalty constraint no longer exceeds the utility obtained under kleptocracy. Hence, the level of publicly provided goods drops to zero for $D_t \geq \tilde{D}_t^0$. The black curve depicts the situation after the population's income has increased from y_t^0 to y_t^1. Owing to higher tax revenue, the government's preferred level of goods provision rises to g_t^{*1} (see section 2.2.2). At the same time, the loyalty constraint is shifted upwards as the higher income level increases the citizens' utility-maximizing level of goods provision, thereby forcing the government to provide more publicly provided goods to generate the same level of loyalty as in the initial situation. Furthermore, the critical level of democracy shifts to the right from $\tilde{D}_t^0$ to $\tilde{D}_t^1$. Thus, kleptocracy sets in at later stages of democratization. Evidently, if income exceeds a certain threshold, no critical level of democracy exists as the government never has an incentive for kleptocratic behavior. Hence, the government of a sufficiently rich economy always provides goods in the amount of g_t^D or higher.

Given the foregoing results from comparative static analysis, we formulate the following hypotheses for empirical examination:[8]

[8]Note that we abstain from formulating hypotheses regarding the tax rate. The main reason is that the model presented here focuses on the use of tax revenue for public spending and does not account for the redistribution of income among citizens by transfers. The latter perspective may lead to the result that democracy is associated with higher tax rates (see Acemoglu and Robinson, 2005). However, since this

H_1 : Higher income levels induce higher levels of publicly provided goods.

H_2 : Democracy increases the level of publicly provided goods in countries with high income levels.

H_3 : Democracy reduces the level of publicly provided goods in countries with low income levels.

2.3 Data and method

To test the hypotheses derived above, we draw on multiple indicators of publicly provided goods that frequently are utilized in the literature. The indicators can be classified into the categories education, health, infrastructure and governance quality. With regard to education, we use data on secondary and tertiary gross school enrollment ratios. School enrollment ratios have shortcomings, e.g., as they do not reflect attendance, dropout rates and repeaters. However, we expect them to capture changes induced by government policies relatively quickly. The same is, for instance, not true for indicators measuring the population's average years of schooling, which may respond only with a long time lag.[9] Health indicators include the infant mortality rate, the number of physicians per 1000 people, and measles and DPT (diphtheria, pertussis and tetanus) immunization rates. Infrastructure is represented by the number of telephone subscriptions per 100 people and the number of Internet users per 100 people. All data are retrieved from the World Development Indicators (World Bank, 2018). With regard to governance, we utilize three indicators from the Varieties of Democracy (VDem) Project (Coppedge et al., 2017) measuring rule of law and corruption. The VDem "Rule of law" index ranges from zero to one, with higher values indicating stronger establishment of the rule of law. Corruption is measured by the "Executive corruption" index and the "Public sector corruption" index. While the former focuses directly on members of the executive branch, the latter relates to the behavior of public sector employees. Both indexes capture bribery as well as theft, embezzlement and misappropriation of state resources for private use. All indicators of goods provision capture outcomes of rather than expenditures on goods provision since expenditure data may be distorted, e.g., by corruption, unnecessary spending, or hidden rents (see, e.g., Baum and Lake, 2003; Deacon, 2009; Truex, 2017). To avoid highly skewed distributions, the variables "Physicians", "Telephone", and "Internet" are defined as the logarithms of the respective indicators. As some observations on those indicators are zero, we transform them by adding 1 beforehand. Infant morality rates are inverted before calculating the logarithm, so that higher values of the variable "Mortality" indicate "better" outcomes. A slightly different approach is used regarding the variables "Measles"

paper focuses on publicly provided goods, the redistributional role of taxes is not considered further for the sake of simplicity.

[9] Using data on the population's average years of schooling provided by Barro and Lee (2013) and accounting for the mentioned delay by time lags of democracy and income yields results consistent with the findings presented in this paper.

and "DPT". In addition to skewed distributions, the underlying indicators are characterized by several observations with values of 100%. Therefore, we use the transformation $\log(100/(100 - x + 1))$ to define the variables entering the analysis, where x denotes the respective indicator. Thus, we calculate the logged inverses of the complements of the indicators (e.g., the number of people per person without measles immunization), but add one to the denominators to avoid dividing by zero. While that procedure preserves the interpretation of higher values as indicating "better" outcomes, it also mitigates concerns about skewness. Regarding "Executive corruption" and "Public sector corruption", higher values indicate more corruption on the original scales. Hence, we reverse their signs to measure freedom from corruption as a publicly provided good. Table 2.1 gives an overview of our proxy variables for the level of publicly provided goods and the indicators used for operationalization.

Our main explanatory variables are democracy and income. To measure democracy, we rely on two indicators often used in the empirical literature (see, e.g., Acemoglu et al., 2008; Deacon, 2009; Mulligan et al., 2004). First, we utilize the "Polity scores" from the Polity IV Project (Marshall and Gurr, 2016), which code institutional characteristics of the political regime on a scale ranging from -10 (full autocracy) to 10 (full democracy). Second, we take the "Freedom House Political Rights scores" (FHPR) (Freedom House, 2016), which range from 1 (highest level of political rights) to 7 (lowest level of political rights). To harmonize interpretation, we reverse the signs of the FHPR scores such that higher values denote more political rights. To measure income levels, we use real GDP per capita from the Penn World Table 9.0 (Feenstra et al., 2015). GDP data are expressed in purchasing power parities (PPP), adjusted to 2011 US$ to avoid distortions owing to price and exchange rate fluctuations.

In addition, we control for several popular covariates. These include "Urbanization" (urban population in percent) and "Population" (logged number of inhabitants), both derived from World Bank (2018). Furthermore, we use data on "Resources" (logged oil and gas rents in 2014 US$ per capita) from Ross and Mahdavi (2015), and on "Civil conflict" (magnitude of civil war and violence) provided by the Major Episodes of Political Violence (MEPV) project (Marshall, 2016). Higher levels of "Urbanization" are expected to indicate lower unit costs of goods provision. "Population" is included because the public sector may exhibit economies of scale (Mulligan and Shleifer, 2004; Mulligan et al., 2004). "Resources" captures the potential adverse effects of natural resource endowments highlighted in the "resource curse" literature (see Frankel, 2010, for an overview). "Civil conflict" is employed to control for the likely negative impacts of civil war and violence. Descriptive statistics are provided in the appendix.

To prevent our results from being driven by short-term fluctuations in the variables, we rely on five-year averages. This empirical strategy also to some extent accounts for the fact that outcomes of investments in publicly provided goods may not be fully observable in the same year, but evolve over time. We additionally control for the effects of time by entering different lags of the explanatory variables as described in more detail below. Our

Table 2.1: Dependent variables and indicators of publicly provided goods

Category	Variable	Indicator
Education	Secondary	Ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of secondary education
	Tertiary	Ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of tertiary education
Health	Mortality (inv.)[b]	Number of infants dying before reaching one year of age, per 1,000 live births in a given year
	Physicians[a]	Generalist and specialist medical practitioners per 1000 people
	Measles[c]	Percentage of children ages 12-23 months who received the measles vaccination
	DPT[c]	Percentage of children ages 12-23 months who received DPT vaccinations
Infrastructure	Telephone[a]	Sum of active number of analogue fixed telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivalents and fixed public payphones per 100 people
	Internet[a]	Number of individuals who have used the Internet (from any location) in the last 3 months per 100 people
Governance	Rule of law	Extent to which laws are transparently, independently, predictably, impartially, and equally enforced, and the extent to which the actions of government officials comply with the law
	Executive corruption (rev.)[d]	Extent to which members of the executive or their agents routinely grant favors in exchange for bribes, kickbacks, or other material inducements, and how often they steal, embezzle, or misappropriate public funds or other state resources for personal or family use
	Public sector corruption (rev.)[d]	Extent to which public sector employees grant favors in exchange for bribes, kickbacks, or other material inducements, and how often they steal, embezzle, or misappropriate public funds or other state resources for personal or family use

Indicators and descriptions on education, health, and infrastructure are derived from World Bank (2018). Indicators and descriptions on governance are from Coppedge et al. (2017). If marked, variables are defined by the following transformations: [a] $\log(x+1)$, [b] $\log(1/x)$, [c] $\log(100/(100-x+1))$, [d] $-x$, where x denotes the respective indicator.

final dataset constitutes an unbalanced panel of 154 countries in the period from 1960 to 2014.

Given the hypotheses derived in section 2.2, our econometric model has to capture the effect of democracy on goods provision conditional on income. We therefore estimate the following model for each indicator of publicly provided goods g of country i in period t:

$$g_{it} = \beta_1 D_{i,t-l} + \beta_2 y_{i,t-l} + \beta_3 D_{i,t-l} \times y_{i,t-l} + \boldsymbol{X}_{i,t-l}\boldsymbol{\gamma} + v_i + \delta_t + \varepsilon_{it}, \tag{2.28}$$

where D denotes the democracy indicator, y denotes logged GDP per capita, $\boldsymbol{X}$ is the matrix of control variables, and $\beta_0, \beta_1, \beta_2, \beta_3$, and $\boldsymbol{\gamma}$ are the regression coefficients. Since our indicators of goods provision may respond to investments by the government and changes in other influential factors with a time lag of unapparent length, we estimate the model for different five-year period lags $l \in \{0, 1, 2\}$ of the independent variables. The error term in (2.28) is split into an unobserved country fixed effect v_i, an unobserved time fixed effect δ_t and an idiosyncratic error ε_{it}. In the presence of correlation between our explanatory variables and v_i or δ_t, pooled OLS estimates would be subject to omitted variable bias. We therefore remove country fixed effects by a suitable transformation of the data (described below) and include period dummies to control for time fixed effects. Another econometric issue arises with regard to the likely endogeneity of D and y. As the literature and also the theoretical model outlined in section 2.2 indicate that the supply of publicly provided goods increases income levels, we face the threat of simultaneous causality bias when estimating the effect of GDP per capita on goods provision. The latter likewise may affect democracy. Although the evidence is not conclusive (see, e.g., Acemoglu et al., 2005, 2008), higher levels of wealth and education could spur the population's demand for political rights and thereby lead to democratization (see, e.g., Castelló-Climent, 2008; Lipset, 1959). To handle those endogeneity problems, a common approach that also is adopted here is to estimate instrumental variables (IV) regressions. Unfortunately, little guidance is available from the literature regarding suitable external instruments for our setting. However, as our data have a time dimension, we utilize lags of $\bar{D}_{i,t-l}$, $y_{i,t-l}$, and their interactions $\bar{D}_{i,t-l} \times y_{i,t-l}$, where $\bar{D}$ denotes the democracy indicator not used in (2.28). Thus, we use the lag of the Polity index as an instrument for the FHPR scores and vice versa. This strategy is similar to the one pursued by Deacon (2009). The rationale underlying the choice of these instruments is that past levels of income and democracy are strongly correlated with their current levels, but are unaffected by current goods provision. Moreover, as the two democracy indicators are coded by different organizations, measurement errors may not be correlated perfectly. Thus, instrumenting one democracy index with the other is hoped to reduce the impact of measurement error on our results. Both the results obtained when instrumenting the Polity index with the FHPR and vice versa are reported below.

With regard to the choice of the estimation method, we adopt generalized method of moments instrumental variables estimation (GMM IV) based on forward orthogonal deviations. The forward orthogonal transformation removes country fixed effects by "demeaning" the data based on future observations only. Lags of the endogenous variables thus can potentially serve as instruments. However, specific lags are valid instruments only in the absence of autocorrelation of the error term. For that reason, we choose the order of the first lag entered as instrument based on Arellano-Bond autocorrelation tests (see Roodman, 2009a, for a more detailed description of GMM estimations).[10][11] Furthermore,

[10] A specific lag order is chosen if the null hypothesis of no autocorrelation cannot be rejected at the 5% significance level.

[11] As further measures of goods provision, the share of people with access to fresh water sources and

using too many instruments may overfit the instrumented variables and result in biased coefficient estimates (see Roodman, 2009b). To mitigate that concern, we restrict the order of lags used as instruments to a maximum of five. As specification tests, we apply the Hansen J-test and the difference-in-Hansen test. In both cases, low p-values indicate potential validity problems.

To facilitate the interpretation of our regression results, we normalize all dependent and independent variables between zero and one. That procedure has two major advantages. The first one is that a specific regression coefficient now reflects the expected change in the dependent variable relative to its sample range associated with a sample-range increase in the respective independent variable. The second advantage is that the regression coefficients on the democracy indicator and the interaction terms can be interpreted directly in a meaningful way. The marginal effect of democracy on goods provision can be derived from (2.28) as

$$\frac{\partial E[g_{it}|D_{i,t-l}, y_{i,t-l}]}{\partial D_{i,t-l}} = \beta_1 + \beta_3 y_{i,t-l}. \tag{2.29}$$

Hence, the marginal effect of democracy at the lowest income level in the sample ($y_{i,t-l} = 0$)[12] is given directly by β_1:

$$\left.\frac{\partial E[g_{it}|D_{i,t-l}, y_{i,t-l}]}{\partial D_{i,t-l}}\right|_{y_{i,t-l}=0} = \beta_1. \tag{2.30}$$

For the highest sample income level ($y_{i,t-l} = 1$) the marginal effect of democracy is

$$\left.\frac{\partial E[g_{it}|D_{i,t-l}, y_{i,t-l}]}{\partial D_{i,t-l}}\right|_{y_{i,t-l}=1} = \beta_1 + \beta_3. \tag{2.31}$$

Based on our theoretical model, we therefore expect that both $\beta_1 < 0$ and $\beta_1 + \beta_3 > 0$.

2.4 Results

2.4.1 Unmoderated effects of democracy

For comparison, our econometric analysis starts with estimations of the unmoderated effects of democracy on our variables capturing goods provision. Hence, we estimate the model specified in (2.28) without the interaction term between the democracy indicator and logged GDP per capita. We also compare the results obtained from GMM instrumental variables estimations with those obtained from simple fixed-effects regressions without instrumental variables.

sanitation facilities were considered. However, within our econometric framework, valid inferences for those variables were not possible owing to their short time coverage and their high-order residual autocorrelation.

[12] To be precise, $y_{it} = 0$ and $y_{it} = 1$ are the lowest and the highest average per capita incomes of the five-year periods in the sample, respectively. To simplify terminology, we will refer to them as the lowest / highest per capita income.

Table 2.2 reports the estimation outcomes. Except for the governance indicators, the simple fixed effects regressions without instrumental variables yield little evidence of a positive relationship between democracy and the level of publicly provided goods. In some cases, we even find statistically significant negative effects. In general, the coefficient estimates for the democracy indicators are small. The use of GMM instrumental variables regression does not change those findings substantially. Most of the effect estimates obtained by the use of that estimation method are insignificant.

These findings are unsurprising if the predictions of the theoretical model outlined in section 2.2 are correct. While we expect that democracy positively affects the level of

Table 2.2: Results of fixed effects regressions without instrumental variables and GMM instrumental variables regressions both excluding the interaction term between the indicator of democracy and GDP per capita

	Fixed Effects			GMM IV		
Dependent var.	Polity_t	FHPR_t	(N/Ctry.)	Polity_t	FHPR_t	(N/Ctry.)
Secondary_t	-0.01		(1105/152)	-0.07		(953/149)
		-0.03*	(1115/153)		-0.11**	(962/149)
Tertiary_t	-0.05**		(1078/153)	-0.04		(925/149)
		-0.01	(1093/154)		0.07	(939/150)
Mortality_t (inv.)	-0.00		(1337/153)	0.10		(1184/151)
		-0.01	(1222/154)		0.09*	(1068/152)
Physicians_t	-0.02*		(1212/153)	-0.04		(1058/151)
		-0.02*	(1102/154)		0.02	(948/152)
Measles_t	-0.10**		(958/153)	-0.10		(805/151)
		-0.13***	(975/154)		-0.06	(821/152)
DPT_t	-0.08**		(962/153)	-0.12		(809/151)
		-0.12***	(979/154)		-0.07	(825/152)
Telephone_t	0.01		(1296/153)	-0.00		(1142/151)
		-0.02	(1200/154)		-0.08	(1046/152)
Internet_t	-0.16***		(753/153)	-0.58***		(600/151)
		-0.05	(760/154)		-0.32*	(606/152)
Rule of law_t	0.33***		(1359/153)	0.33***		(1205/151)
		0.32***	(1232/154)		0.50***	(1078/152)
Exec. corr._t (rev.)	0.15***		(1359/153)	0.03		(1205/151)
		0.11**	(1232/154)		0.20*	(1078/152)
Pub. sec. corr._t (rev.)	0.10**		(1359/153)	-0.03		(1205/151)
		0.08*	(1232/154)		0.07	(1078/152)

Fixed effects regressions without instrumental variables and GMM instrumental variables regressions. Each row represents an econometric specification with the dependent variable given by the first column. Each regression model is estimated twice by using the Polity IV scores (Polity) and the Freedom House Political Rights scores (FHPR), respectively, as the measure of democracy. The number of observations (N) and countries (Ctry.) included in the estimations are shown in parentheses. (Logged) GDP per capita and control variables are included but not shown in the table. The full regression results are available upon request. Standard error estimators are robust against heteroscedasticity and serial correlation within countries. Significance levels: *10%, **5%, ***1%.

publicly provided goods in rich countries, we hypothesize a negative relationship in poor countries. Therefore, estimating an "average" effect of democracy on goods provision by neglecting the moderating role of income is likely to lead to small and insignificant coefficient estimates.

2.4.2 Estimation of the interaction model

In the following, we investigate whether the predictions of the theoretical model can be supported empirically. Using the Polity IV scores as the democracy index, Table 2.3 reports the results of GMM instrumental variables regressions of the econometric interaction model (2.28). Recall that the coefficient on the Polity scores β_1 represents the estimated effect of a rise in the democracy index from its minimum to its maximum value[13] for a country with the lowest income in the sample. Since the estimates of β_1 are negative and statistically significant for nine out of 11 regressions, the results indicate that higher levels of democracy generally are associated with lower levels of publicly provided goods if GDP per capita is low. The sizes of the effect are quite large in absolute terms. Exceptions are "DPT" and "Rule of law" for which we find negative, but insignificant effects. Turning to the coefficient on the interaction term between the Polity scores and logged GDP per capita β_3, we find evidence for a moderating role of income. All coefficient estimates are positive and, except for "DPT", significant. Hence, strong evidence exists that the effect of democracy on goods provision depends on per capita income. That conclusion is underlined by the estimated marginal effects of democracy on the indicators of goods provision for the highest income in the sample ($\beta_1 + \beta_3$). All of the estimates are positive and, except for "Measles" and "DPT", significant. Again, the effects are quite large. Table 2.4 shows the regressions using the Freedom House Political Rights scores instead of the Polity scores as the measure of democracy. The results are in line with those reported in Table 2.3.

[13]Since our sample includes full autocracies as well full democracies according to both democracy indicators, the estimated effect is that of full-scale democratization.

Table 2.3: Results of GMM instrumental variables regressions using the Polity scores as democracy indicator

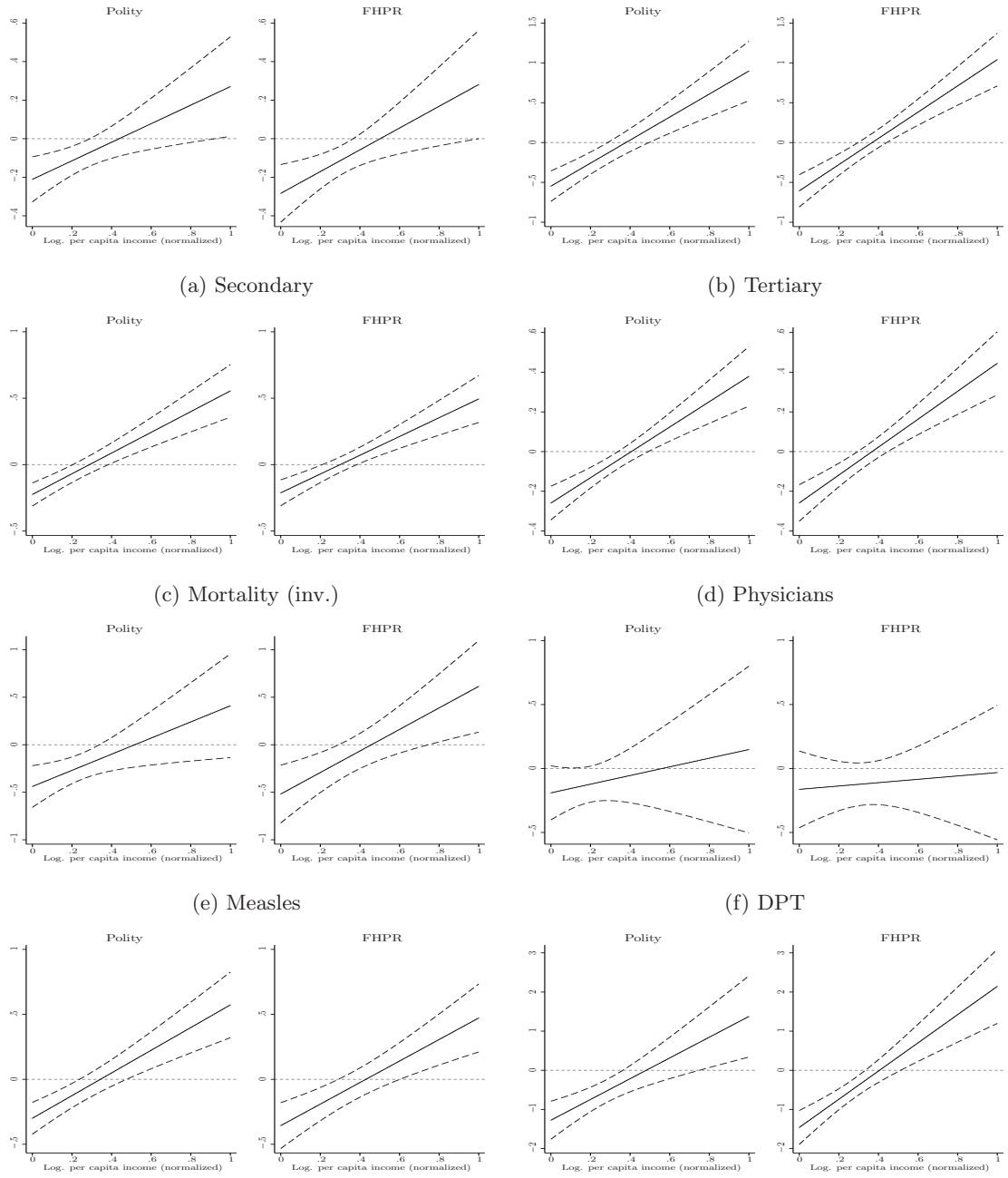
Dependent var.	Polity_t β_1		GDPcap_t β_2		$\text{Polity}_t \times \text{GDPcap}_t$ β_3		$\beta_1 + \beta_3$		N	Ctry.	Instr.	Hansen	Diff.
Secondary_t	-0.21***	(0.07)	0.01	(0.18)	0.48**	(0.21)	0.27*	(0.16)	953	149	67	0.46	0.99
Tertiary_t	-0.55***	(0.12)	-0.06	(0.26)	1.45***	(0.29)	0.90***	(0.23)	925	149	67	0.23	0.24
Mortality_t (inv.)	-0.23***	(0.05)	0.04	(0.12)	0.78***	(0.15)	0.56***	(0.12)	1184	151	99	0.06	0.13
Physicians_t	-0.26***	(0.05)	-0.03	(0.08)	0.64***	(0.13)	0.38***	(0.09)	1058	151	99	0.38	0.39
Measles_t	-0.44***	(0.13)	-0.43	(0.33)	0.85**	(0.42)	0.41	(0.33)	805	151	87	0.25	0.11
DPT_t	-0.19	(0.13)	-0.41	(0.33)	0.34	(0.48)	0.15	(0.40)	809	151	77	0.18	0.93
Telephone_t	-0.30***	(0.07)	-0.05	(0.21)	0.87***	(0.19)	0.57***	(0.15)	1142	151	99	0.13	0.42
Internet_t	-1.28***	(0.29)	0.70	(0.56)	2.65***	(0.84)	1.38**	(0.63)	600	151	69	0.00	0.93
Rule of law_t	-0.11	(0.09)	-0.39**	(0.19)	1.25***	(0.23)	1.14***	(0.17)	1205	151	99	0.52	0.11
$\text{Executive corruption}_t$ (inv.)	-0.40***	(0.12)	-0.37	(0.25)	1.20***	(0.31)	0.80***	(0.22)	1205	151	99	0.20	0.00
$\text{Public sector corruption}_t$ (inv.)	-0.57***	(0.11)	-0.49**	(0.24)	1.55***	(0.27)	0.98***	(0.19)	1205	151	99	0.85	0.50

Each row represents an econometric specification with the dependent variable given by the first column. The table presents the estimates for the Polity IV scores (Polity), logged GDP per capita (GDPcap), and their interaction. The table further shows the number of observations (N) and countries (Ctry.) included in the estimation, the number of instruments (Instr.), and the p-values of the Hansen-J-test (Hansen) and the Difference-in-Hansen test (Diff.). Control variables are included but not shown in the table. The full regression results are available upon request. Standard errors are given in parentheses. Standard error estimators are robust against heteroscedasticity and serial correlation within countries. Significance levels: *10%, **5%, ***1%.

Table 2.4: Results of GMM instrumental variables regressions using the FHPR scores as democracy indicator

	$FHPR_t$		$GDPcap_t$		$FHPR_t \times GDPcap_t$								
Dependent var.	β_1		β_2		β_3		$\beta_1 + \beta_3$		N	Ctry.	Instr.	Hansen	Diff.
$Secondary_t$	-0.28***	(0.09)	0.01	(0.20)	0.56**	(0.24)	0.28*	(0.17)	962	149	87	0.77	0.95
$Tertiary_t$	-0.61***	(0.12)	-0.38*	(0.22)	1.65***	(0.29)	1.04***	(0.20)	939	150	102	0.11	0.85
$Mortality_t$ (inv.)	-0.21***	(0.06)	-0.01	(0.12)	0.71***	(0.15)	0.49***	(0.11)	1068	152	114	0.07	0.23
$Physicians_t$	-0.26***	(0.06)	-0.09	(0.10)	0.70***	(0.14)	0.45***	(0.10)	948	152	114	0.23	0.41
$Measles_t$	-0.52***	(0.18)	-0.41	(0.29)	1.13***	(0.42)	0.62**	(0.29)	821	152	97	0.27	0.15
DPT_t	-0.16	(0.18)	-0.32	(0.31)	0.13	(0.45)	-0.03	(0.32)	825	152	91	0.38	0.74
$Telephone_t$	-0.36***	(0.11)	0.05	(0.19)	0.83***	(0.23)	0.47***	(0.16)	1046	152	114	0.07	0.67
$Internet_t$	-1.46***	(0.26)	0.49	(0.40)	3.60***	(0.77)	2.14***	(0.57)	606	152	81	0.01	0.82
Rule of law_t	0.01	(0.13)	-0.33	(0.20)	1.16***	(0.30)	1.17***	(0.20)	1078	152	114	0.57	0.73
Executive $corruption_t$ (inv.)	-0.37**	(0.18)	-0.42	(0.27)	1.48***	(0.42)	1.12***	(0.28)	1078	152	114	0.40	0.31
Public sector $corruption_t$ (inv.)	-0.57***	(0.18)	-0.42	(0.27)	1.76***	(0.40)	1.19***	(0.27)	1078	152	114	0.57	0.69

Each row represents an econometric specification with the dependent variable given by the first column. The table presents the estimates for the Freedom House Political Rights scores (FHPR), logged GDP per capita (GDPcap), and their interaction. The table further shows the number of observations (N) and countries (Ctry.) included in the estimation, the number of instruments (Instr.), and the p-values of the Hansen-J-test (Hansen) and the Difference-in-Hansen test (Diff.). Control variables are included but not shown in the table. The full regression results are available upon request. Standard errors are given in parentheses. Standard error estimators are robust against heteroscedasticity and serial correlation within countries. Significance levels: *10%, **5%, ***1%.



(a) Secondary

(b) Tertiary

(c) Mortality (inv.)

(d) Physicians

(e) Measles

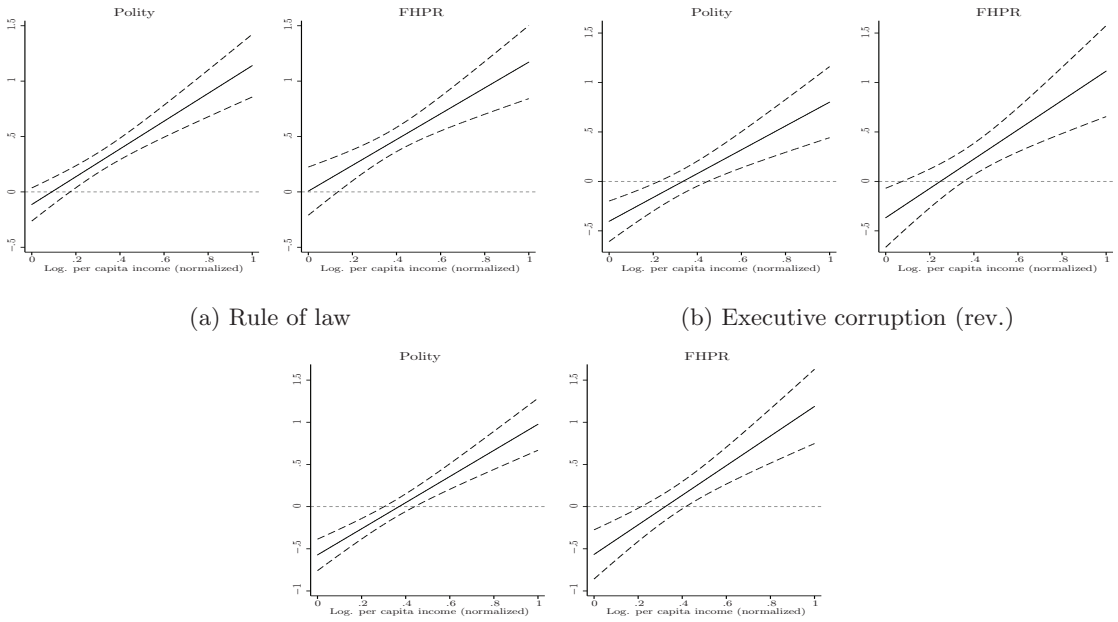
(f) DPT

(g) Telephone

(h) Internet

Figure 2.2: Marginal effects of democracy on the variables capturing education, health, and infrastructure for different levels of per capita income

Note: The figures depict the income-moderated marginal effects of the democracy indicators on the variables capturing the level of publicly provided goods. The dashed lines are 90 % confidence intervals. The marginal effect estimates are based on the GMM IV regressions shown in table 2.3 and table 2.4. For each dependent variable, the left (right) subfigure shows the marginal effects estimated with the Polity scores (FHPR scores) as democracy indicator.



(a) Rule of law

(b) Executive corruption (rev.)

(c) Public sector corruption (rev.)

Figure 2.3: Marginal effects of democracy on rule of law and corruption for different levels of per capita income

Note: The figures depict the income-moderated marginal effects of the democracy indicators on the variables capturing the level of publicly provided goods. The dashed lines are 90 % confidence intervals. The marginal effect estimates are based on the GMM IV regressions shown in table 2.3 and table 2.4. For each dependent variable, the left (right) subfigure shows the marginal effects estimated with the Polity scores (FHPR scores) as democracy indicator.

Figures 2.2 and 2.3 depict the marginal effects of the democracy indicators on the indicators of goods provision over the whole sample range of logged GDP per capita. With respect to the majority of the indicators, the 90% confidence intervals indicate that the estimated marginal effect is statistically significant at the 10% level for most values of per capita income. Furthermore, the plots show that, for most of the dependent variables, the sign of the estimated marginal effect changes at a value of normalized logged GDP per capita between 0.3 and 0.5. Taking the value of 0.3 as a conservative threshold, the estimates therefore indicate a negative effect of democracy for approximately 20% of the countries in the sample in 2014. The precise value of GDP per capita at which the effect of democracy is estimated to turn positive varies between the dependent variables.

An overview of estimated threshold incomes and the share of countries for which negative effects of democracy are predicted is provided in the appendix (see Table 2.9). In that regard, "Rule of law" is the only dependent variable for which no country is predicted to be adversely affected in 2014. However, democracy is found to lead to improvements in rule of law only in countries with relatively high income levels.

Since government investments may affect the level of publicly provided goods with a time lag, the econometric model (2.28) also was estimated for five-year-period lags of the independent variables. Figures 2.4 and 2.5 show the estimated marginal effects of the democracy indicators at the lowest and highest income levels in the sample for the contemporaneous ($l = 0$), the one-period ($l = 1$) and two-period ($l = 2$) lag models. For most regressions, the point estimates indicate that increases in the level of democracy are related to higher values of the dependent variables at high income levels, whereas the effect is negative at low levels of per capita income. According to the 90% confidence intervals, we find statistically significant marginal effects of lagged democracy on "Tertiary", "Mortality", "Physicians", "Internet", "Executive corruption" and "Public sector corruption". In case of "Secondary" and "Rule of law", the marginal effect at either the highest or the lowest GDP per capita is statistically significant when one-period lags of the independent variables are entered. On the whole, the estimation results presented in this section are in accordance with the hypotheses derived from the theoretical model in section 2.2.

2.5 Robustness

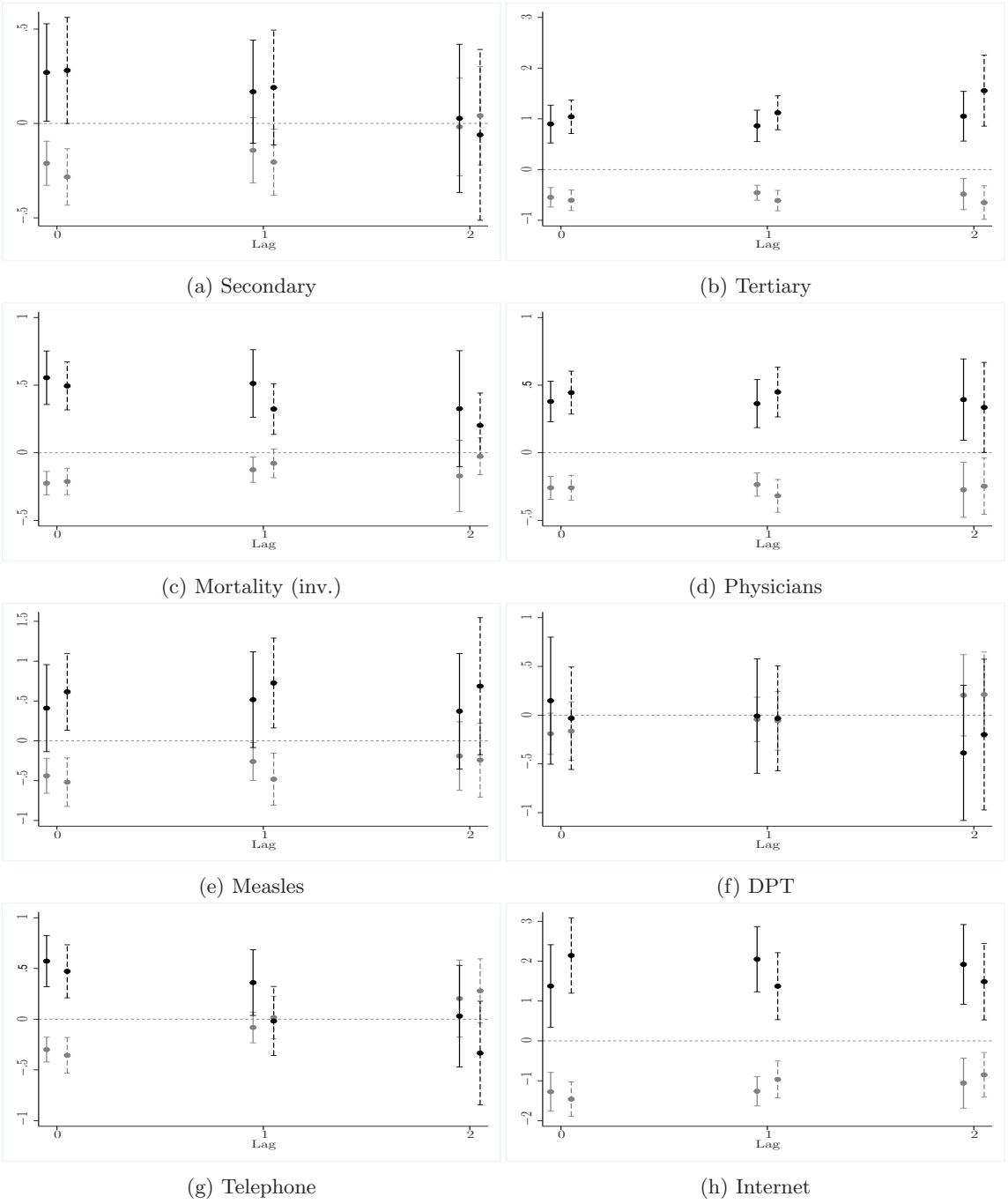
2.5.1 Alternative democracy indicators

To assess the robustness of our results with regard to the measurement of democracy, we use different alternative democracy indicators. Although frequently employed in empirical analyses, the FHPR scores have been criticized especially in previous comparative studies (see, e.g., Munck and Verkuilen, 2002). For that reason, we replace the FHPR scores with the the VDem "Electoral democracy index" (EDI) (Coppedge et al., 2017).[14] The EDI measures the degree to which the ideal of electoral democracy, particularly defined by the responsiveness of rulers to citizens, is achieved, on a continuous scale ranging from zero to one. Table 2.5 reports the results of the GMM instrumental variables estimations using the EDI as democracy indicator and the Polity scores as instrument. The marginal effect of the EDI is negative for all and significant for nine out of 11 dependent variables at the sample's lowest income level. Again except for "DPT", we find positive and significant interactions between democracy and income. In addition, for most indicators we find a positive marginal effect that reaches a significance level of 1% for the highest per capita income in the sample. Hence, the use of the EDI confirms our previous results.

In another variant, we replace the continuous democracy indicators utilized in the previous analyses with the dichotomous democracy measures provided by Cheibub et al. (2010) and Bjørnskov and Rode (2014), respectively.[15] Drawing on the work of Alvarez et al. (1996), the "Democracy-Dictatorship" measure (in the following denoted by CGV) of Cheibub et al. (2010) distinguishes democracies from non-democracies based on a

[14]Note that no overlaps exist between the indicators used to form the "Electoral democracy index" and our indicators of rule of law and corruption taken from the VDem data.

[15]We also estimated models using the democracy indicator of Boix et al. (2013), with qualitatively similar results.



(a) Secondary (b) Tertiary

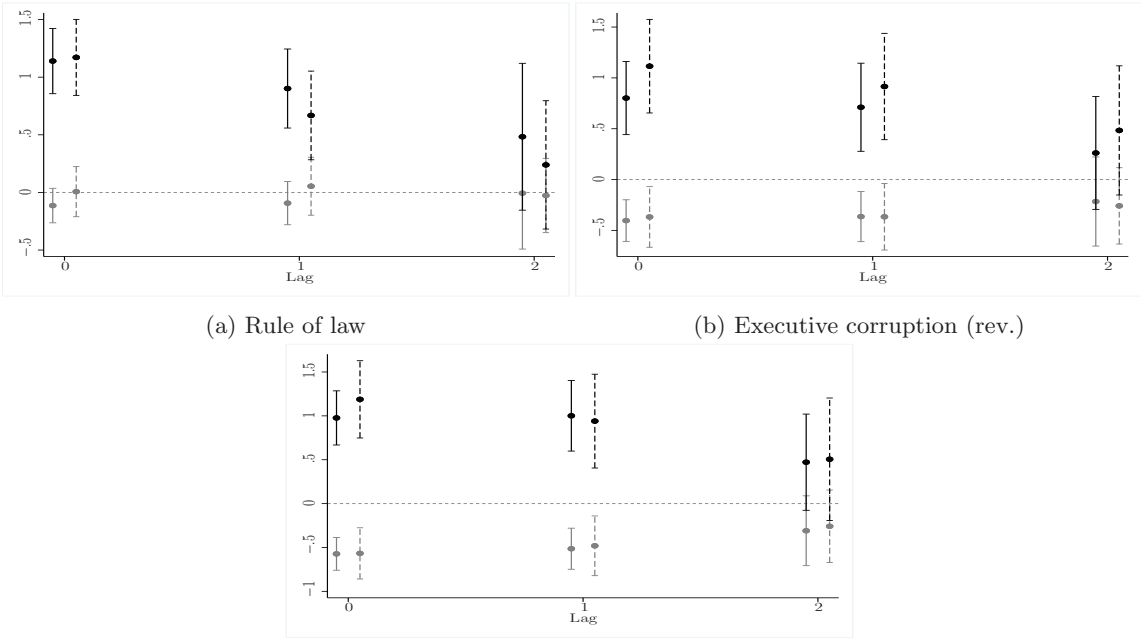
(c) Mortality (inv.) (d) Physicians

(e) Measles (f) DPT

(g) Telephone (h) Internet

Figure 2.4: Marginal effects of democracy on the variables capturing the level of publicly provided goods for different levels of per capita income

Note: The figures depict the marginal effects of the Polity scores (solid line) and the FHPR socres (dashed line) on the variables capturing the level of publicly provided goods at the highest (black lines) and the lowest (gray lines) income level in the sample, respetively. The whiskers are 90 % confidence intervals. The marginal effect estimates are based on the GMM IV regressions shown in table 2.3 and table 2.4.



(a) Rule of law

(b) Executive corruption (rev.)

(c) Public sector corruption (rev.)

Figure 2.5: Marginal effects of democracy on rule of law and corruption for different levels of per capita income

Note: The figures depict the marginal effects of the Polity scores (solid line) and the FHPR socres (dashed line) on the variables capturing governance at the highest (black lines) and the lowest (gray lines) income level in the sample, respetively. The whiskers are 90 % confidence intervals. The marginal effect estimates are based on the GMM IV regressions shown in table 2.3 and table 2.4.

minimalist conception of democracy as a method for choosing rulers. Bjørnskov and Rode (2014) (in the following denoted by BR) provide an updated and extended version of the CGV data. Because of averaging, the CGV and the BR scores entering our analysis represent the fractions of democratic years within the respective five-year time period. Analogous to the empirical strategy described in section 2.3, we estimate equation (2.28) by using the BR scores as independent variable and the CGV scores as instrument.[16]

The estimation results are shown in Table 2.6. Except for "Rule of law", the marginal effect estimates of democracy given the lowest GDP per capita in the sample are negative and statistically significant. For ten out of 11 dependent variables, a positive and significant interaction effect with income is revealed. Also in line with theory, the regression results show that moving from non-democracy to democracy increases the level of publicly provided goods in rich countries. The marginal effects of the BR indicator on the dependent variables are positive and, except for "DPT" and "Measles", statistically significant for the sample's highest income. The estimated effects in general point to substantial impacts of democracy.

[16]Instrumenting the CGV scores with the BR sores gives similar results.

Table 2.5: Results of GMM instrumental variables regressions using the VDem Electoral Democracy Index as democracy indicator

Dependent var.	EDI_t β_1		$GDPcap_t$ β_2		$EDI_t \times GDPcap_t$ β_3		$\beta_1 + \beta_3$		N	Ctry.	Instr.	Hansen	Diff.
$Secondary_t$	-0.37***	(0.12)	-0.01	(0.18)	0.54**	(0.24)	0.18	(0.16)	920	143	102	0.41	0.69
$Tertiary_t$	-0.66***	(0.14)	-0.39*	(0.22)	1.62***	(0.30)	0.96***	(0.19)	901	144	87	0.33	0.44
$Mortality_t$ (inv.)	-0.14**	(0.07)	0.11	(0.12)	0.64***	(0.18)	0.50***	(0.13)	1,145	145	119	0.10	0.03
$Physicians_t$	-0.25***	(0.07)	-0.07	(0.09)	0.75***	(0.19)	0.50***	(0.12)	1,025	145	119	0.28	0.34
$Measles_t$	-0.44*	(0.25)	-0.16	(0.37)	0.93*	(0.52)	0.49	(0.35)	779	145	91	0.12	0.02
DPT_t	-0.14	(0.21)	-0.18	(0.36)	0.10	(0.47)	-0.04	(0.33)	783	145	91	0.29	0.70
$Telephone_t$	-0.30**	(0.12)	0.40*	(0.21)	0.76***	(0.22)	0.46***	(0.15)	1,103	145	119	0.20	0.58
$Internet_t$	-1.52***	(0.24)	0.64	(0.42)	3.18***	(0.74)	1.65***	(0.57)	583	145	83	0.01	1.00
Rule of law_t	0.33***	(0.12)	-0.12	(0.19)	0.72**	(0.28)	1.05***	(0.18)	1,167	145	119	0.31	0.66
Executive $corruption_t$ (inv.)	-0.15	(0.20)	-0.40	(0.28)	1.18***	(0.42)	1.02***	(0.26)	1,167	145	119	0.68	0.93
Public sector $corruption_t$ (inv.)	-0.43**	(0.18)	-0.49*	(0.28)	1.63***	(0.39)	1.20***	(0.25)	1,167	145	119	0.49	0.68

Each row represents an econometric specification with the dependent variable given by the first column. The table presents the estimates for the VDem Electoral Democracy Index (EDI), logged GDP per capita (GDPcap), and their interaction. Control variables are included but not shown in the table. The table further shows the number of observations (N) and countries (Ctry.) included in the estimation, the number of instruments (Instr.), and the p-values of the Hansen-J-test (Hansen) and the Difference-in-Hansen test (Diff.). Control variables are included but not shown in the table. The full regression results are available upon request. Standard errors are given in parentheses. Standard error estimators are robust against heteroscedasticity and serial correlation within countries. Significance levels: *10%, **5%, ***1%.

Table 2.6: Results of GMM instrumental variables regressions using the BR scores as democracy indicator

Dependent var.	BR_t β_1		$GDPcap_t$ β_2		$BR_t \times GDPcap_t$ β_3		$\beta_1 + \beta_3$		N	Ctry.	Instr.	Hansen	Diff.
$Secondary_t$	-0.18***	(0.06)	0.09	(0.15)	0.38***	(0.14)	0.20**	(0.09)	962	149	87	0.23	0.64
$Tertiary_t$	-0.35***	(0.07)	-0.08	(0.17)	0.99***	(0.19)	0.64***	(0.13)	939	150	114	0.11	0.34
$Mortality_t$ (inv.)	-0.14***	(0.04)	0.19	(0.13)	0.43***	(0.12)	0.29***	(0.08)	1202	152	104	0.03	0.11
$Physicians_t$	-0.12***	(0.03)	0.14	(0.10)	0.32***	(0.09)	0.20***	(0.07)	1074	152	119	0.08	0.83
$Measles_t$	-0.27***	(0.10)	-0.17	(0.29)	0.54*	(0.28)	0.27	(0.20)	821	152	97	0.32	0.69
DPT_t	-0.18*	(0.10)	-0.45	(0.29)	0.24	(0.27)	0.06	(0.20)	825	152	97	0.67	0.84
$Telephone_t$	-0.19***	(0.04)	0.40**	(0.18)	0.56***	(0.12)	0.37***	(0.08)	1159	152	119	0.06	0.46
$Internet_t$	-0.98***	(0.19)	1.03**	(0.46)	2.23***	(0.50)	1.25***	(0.35)	612	152	77	0.00	0.81
Rule of law_t	0.03	(0.11)	0.14	(0.26)	0.66***	(0.25)	0.69***	(0.17)	1225	152	104	0.10	0.70
Executive $corruption_t$ (inv.)	-0.17*	(0.09)	-0.10	(0.26)	0.79***	(0.23)	0.61***	(0.15)	1225	152	119	0.18	0.23
Public sector $corruption_t$ (inv.)	-0.28***	(0.09)	-0.15	(0.27)	0.96***	(0.23)	0.68***	(0.15)	1225	152	119	0.36	0.15

Each row represents an econometric specification with the dependent variable given by the first column. The table presents the estimates for the Bjørnskov-Rode democracy indicator (BR), logged GDP per capita (GDPcap), and their interaction. Control variables are included but not shown in the table. The table further shows the number of observations (N) and countries (Ctry.) included in the estimation, the number of instruments (Instr.), and the p-values of the Hansen-J-test (Hansen) and the Difference-in-Hansen test (Diff.). The full regression results are available upon request. Standard errors are given in parentheses. Standard error estimators are robust against heteroscedasticity and serial correlation within countries. Significance levels: *10%, **5%, ***1%.

Table 2.7: Results of GMM instrumental variables regressions using the Polity scores as democracy indicator - estimations including further control variables

Dependent var.	Polity_t β_1		GDPcap_t β_2		$\text{Polity}_t \times \text{GDPcap}_t$ β_3		GDPcap_t^2 β_4		$\beta_1 + \beta_3$		N	Ctry.	Instr.	Hansen	Diff.
Secondary_t	-0.26***	(0.08)	0.43	(0.30)	0.54**	(0.21)	-0.59***	(0.22)	0.27*	(0.15)	882	145	92	0.48	0.77
Tertiary_t	-0.34***	(0.10)	-0.95***	(0.32)	0.77***	(0.22)	1.14***	(0.35)	0.43***	(0.15)	851	147	112	0.16	0.53
Mortality_t (inv.)	-0.19***	(0.06)	-0.09	(0.18)	0.61***	(0.14)	0.12	(0.17)	0.42***	(0.09)	1087	150	134	0.24	0.80
Physicians_t	-0.16***	(0.05)	-0.50***	(0.15)	0.33***	(0.12)	0.72***	(0.15)	0.18**	(0.08)	968	149	134	0.30	0.43
Measles_t	-0.32**	(0.15)	-0.57	(0.53)	0.41	(0.45)	0.24	(0.50)	0.09	(0.35)	767	150	116	0.13	0.20
DPT_t	-0.16	(0.13)	-0.05	(0.46)	0.02	(0.44)	-0.33	(0.44)	-0.14	(0.35)	772	150	116	0.24	0.64
Telephone_t	-0.21***	(0.08)	0.22	(0.33)	0.61***	(0.21)	-0.42	(0.33)	0.40**	(0.16)	1057	150	134	0.18	0.56
Internet_t	-0.77***	(0.22)	-1.23*	(0.67)	1.68***	(0.60)	2.13***	(0.56)	0.91**	(0.43)	589	150	91	0.01	0.98
Rule of law_t	0.00	(0.10)	-0.38	(0.35)	0.95***	(0.28)	0.28	(0.31)	0.96***	(0.20)	1103	150	134	0.67	0.26
Exec. corr._t (inv.)	-0.24*	(0.15)	-0.67	(0.41)	0.82**	(0.38)	0.60	(0.38)	0.56**	(0.27)	1103	150	134	0.31	0.30
Pub. sec. corr._t (inv.)	-0.39***	(0.13)	-0.92**	(0.44)	1.07***	(0.33)	0.71*	(0.37)	0.68***	(0.23)	1103	150	134	0.51	0.81

Each row represents an econometric specification with the dependent variable given by the first column. The table presents the estimates for the Polity IV scores (Polity), logged GDP per capita (GDPcap), a squared term of logged GDP per capita (GDPcap^2) and the interaction between the Polity scores and logged GDP per capita. The table further shows the number of observations (N) and countries (Ctry.) included in the estimation, the number of instruments (Instr.), and the p-values of the Hansen-J-test (Hansen) and the Difference-in-Hansen test (Diff.). Control variables are included but not shown in the table. The full regression results are available upon request. Standard errors are given in parentheses. Standard error estimators are robust against heteroscedasticity and serial correlation within countries. Significance levels: *10%, **5%, ***1%.

2.5.2 Control variables and nonlinearity

For further robustness checks, we extend the set of control variables by including "Trade" (imports plus exports as a percentage of GDP) and the square of logged GDP per capita to account for potential nonlinearities in the relationship between goods provision and logged per capita income. Since per capita income and democracy are correlated, neglecting such nonlinearities might lead to the erroneous estimation of a significant interaction between GDP per capita and the democracy indicators. The data on trade are derived from World Bank (2018). The modified econometric model is

$$g_{it} = \beta_1 D_{i,t-l} + \beta_2 y_{i,t-l} + \beta_3 D_{i,t-l} \times y_{i,t-l} + \beta_4 y_{i,t-l}^2 + \boldsymbol{X}_{i,t-l}\boldsymbol{\gamma} + v_i + \delta_t + \varepsilon_{it}. \quad (2.32)$$

Since $y_{i,t-l}$ is suspected to be endogenous, the same also is true for its square. The lag of the latter therefore enters the set of instruments used for GMM IV estimation.

The results of estimating (2.32) with the Polity scores as the measure of democracy are shown in Table 2.7.[17] Overall, the results do not deviate substantially from those of previous estimations.

2.6 Conclusion

Although most of the theoretical literature posits that democracy promotes government goods provision, the empirical evidence on that link is inconclusive. While some econometric studies indicate a "democratic advantage", others find no evidence for a relationship between political regimes and the level of publicly provided goods.

This paper reconsidered the connection between democracy and goods provision by means of a simple theoretical model. In line with the literature, the model relies on the assumption that democratic governments must satisfy a larger share of their citizenry than autocratic governments do in order to stay in office. Thus, democracy promotes goods provision as a tool to generate popular political support. We argue, however, that the larger amounts of resources a democratic government has to spend on goods provision also increases its incentives for kleptocratic behavior. Such reasoning counteracts and may even outweigh the positive incentive effect of democracy. The model indicates that that effect is particularly likely if income levels are low. Utilizing panel data on 11 indicators of goods provision we provided evidence for the hypotheses derived from the theoretical model. The results of instrumental variables regressions confirm that democracy promotes goods provision in relatively rich countries, whereas it reduces goods provision in poor countries. In that regard, we found evidence for a moderating role of income not only with regard to indicators of education, health and infrastructure, but also with regard to public corruption and the establishment of the rule of law. Through those channels, the provision of goods by the private sector is likely to be affected in a way that reinforces the hypothesized interaction between democracy and income. Our empirical findings are

[17] Similar evidence is obtained when using the FHPR as independent variable.

robust against different lag structures, alternative measures of democracy and additional control variables.

The implications of our results are twofold. First, although a democratic regime may unambiguously be beneficial to the ordinary people in many respects, it may not always be a blessing with regard to publicly provided goods. According to our results, democratization can be expected to induce improvements in education, health, infrastructure, and governance only if a country has already reached a certain income threshhold. In that sense, democracy may need development to materialize. Second, our results demonstrate that neglecting income as a moderator variable can obscure the relationship between regime type and government goods provision. Econometric analyses therefore should account for the interaction between democracy and per capita income.

2.7 Appendix

Table 2.8: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Secondary school enrollment ratio (%)	1451	61.49	34.02	0.14	164.57
Tertiary school enrollment ratio (%)	1342	20.56	21.26	0.00	107.75
Infant mortality (per 1,000 live births)	1891	55.80	47.85	1.70	273.80
Physicians per 1,000 people	1687	1.17	1.69	0.01	47.35
Measles immunization (%)	1243	75.59	22.96	1.00	99.00
DPT immunization (%)	1250	77.28	23.15	1.00	99.00
Active telephone lines (per 100 people)	1951	13.84	17.76	0.00	122.88
Internet users (per 100 people)	1047	15.81	23.62	0.00	95.83
GDP per capita (PPP adj. mill. 2011 US$)	1710	11658.01	17214.70	253.63	231222.90
Polity IV scores	1553	0.86	7.38	-10.00	10.00
Freedom House Political Rights scores	1510	3.82	2.17	1.00	7.00
Vdem Electoral Democracy index	1563	0.45	0.28	0.01	0.96
CGV democracy measure	1604	0.44	0.48	0.00	1.00
BR democracy measure	2201	0.46	0.48	0.00	1.00
Urban population (%)	2304	49.37	25.52	2.15	100.00
Population (millions)	2319	23.88	99.33	0.00	1350.84
Natural resources rents (2014 US$ per capita)	1646	1032.66	4645.92	0.00	63682.32
Civil conflict index	1582	0.66	1.55	0.00	9.00
Trade (% of GDP)	1624	78.40	50.37	0.67	444.81

The numbers shown in the table are descriptive statistics for the five-year averaged "raw" data. Note that the indicators are transformed previous to the regression analyses as described in section 2.3.

Table 2.9: Estimated threshold incomes ($\tilde{y}$) (GDP per capita in 2011 US$, PPP) based on table 2.3 and the shares of countries in 2014 for which adverse effects of democracy are predicted ($y < \tilde{y}$)

DV / Democracy measure	Polity		FHPR		EDI		BR	
	$\tilde{y}$	$y < \tilde{y}$	$\tilde{y}$	$y < \tilde{y}$	$\tilde{y}$	$y < \tilde{y}$	$\tilde{y}$	$y < \tilde{y}$
Secondary$_t$	\$5035	27%	\$7779	33%	\$25847	72%	\$6057	30%
Tertiary$_t$	\$3359	21%	\$3118	18%	\$4111	23%	\$2757	16%
Mortality$_t$ (inv.)	\$1814	11%	\$1967	12%	\$1152	3%	\$2248	15%
Physicians$_t$	\$4042	23%	\$3112	18%	\$2455	15%	\$3356	20%
Measles$_t$	\$8609	38%	\$5743	29%	\$6297	31%	\$7505	33%
DPT$_t$	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Telephone$_t$	\$2639	15%	\$4762	26%	\$3634	22%	\$2661	15%
Internet$_t$	\$6742	31%	\$4017	23%	\$6673	31%	\$5124	27%
Rule of law$_t$	\$471	0%	\$244	0%	\$11	0%	\$187	0%
Executive corruption$_t$ (rev.)	\$3151	18%	\$2293	15%	\$1526	8%	\$1836	11%
Public sector corruption$_t$ (rev.)	\$2486	15%	\$1375	6%	\$618	1%	\$1141	3%

The table shows the estimated threshold incomes ($\tilde{y}$) and the share of countries below these threshold incomes ($y < \tilde{y}$) for the Polity IV scores (Polity, table 2.3), the Freedom House Political Rights Scores (FHPR, table 2.4), the VDem Electoral Democracy Index (EDI, table 2.5), and the Bjørnskov-Rode democracy indicator (BR, table 2.6). If no significant interaction between democracy and GDP per capita was found, the correspondig cells are marked as not significant (n.s.).

Chapter 3

(When) Does democratization reduce state repression?

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Abstract Although there is consensus that full democracies are less repressive than other regime types, the patterns of state repression differ considerably between democratizing countries. Against this background, this paper examines heterogeneity in the relationship between democracy and government violations of human rights. Drawing on arguments from the civil war literature, we develop a simple model that highlights opposing effects of democracy on state repression. Consequently, the net effect of democracy is shown to be ambiguous. Furthermore, the model reveals that pacifying (adverse) effects of democracy are more likely to dominate in countries with higher (lower) income levels. These implications are tested empirically using different methodological approaches, including time-series cross-sectional regressions, event studies, and a recent generalization of the synthetic control method. Our analyses confirm that democratization is related to immediate and persistent reductions of repression in relatively rich countries, whereas we find no or even adverse effects in poor countries.

Keywords: State Repression, Human Rights Violations, Democracy, Democratization
JEL classification: D74, H10, O10

3.1 Introduction

The relationship between democracy and government violations of human rights has been analyzed in numerous empirical studies (see, e.g., Davenport, 2007c; Bueno De Mesquita et al., 2005; Fein, 1995; Hill and Jones, 2014; Jones and Lupu, 2018; Poe and Tate, 1994; Regan and Henderson, 2002). Although results are generally heterogeneous, there is consensus that full democracies are less repressive than other regime types. The "domestic democratic peace" (Davenport, 2007a,b) is therefore one of the core findings in the literature on state repression.

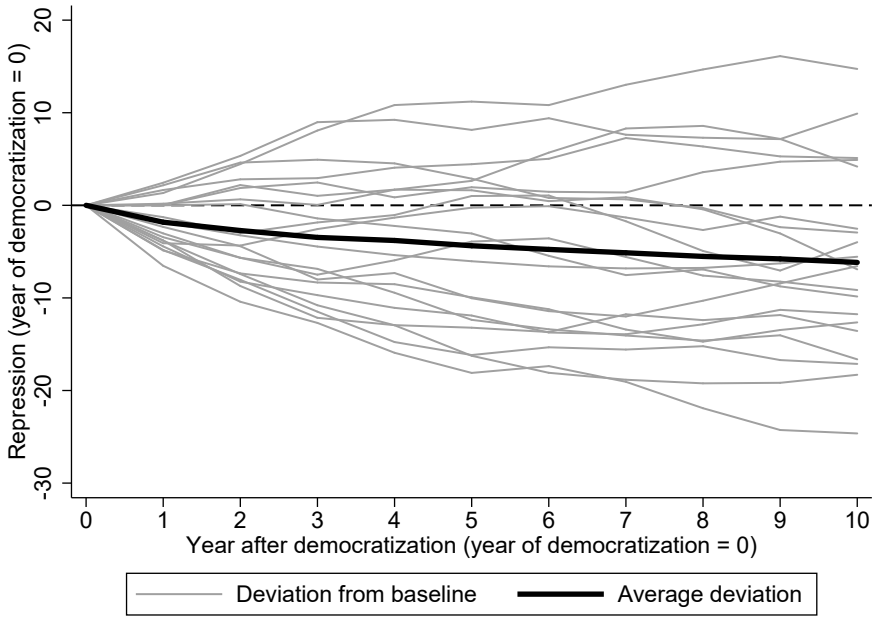
The evidence that full democracies show better human rights records than other regimes has proven to be robust against different methods and the inclusion of various confounders. Despite these differences in specifications and data, it is noteworthy that most empirical studies relate levels of repression to levels of democracy. In contrast, the evolution of repression around events of democratization[18] has rarely been examined. However, as we demonstrate below, investigating these events may provide important insights on dynamics and heterogeneity in the effect of democracy on repression. In fact, the patterns of human rights violations in the course of democratizations differ considerably between countries.

For illustration, Figure 3.1 depicts the changes in state repression after democratization for 20 countries, all of which remained democratic for at least 10 years after the regime change (data are from Fariss 2014 and Marshall and Gurr 2016, detailed descriptions of the indicators are provided below). On average, the data indicate an immediate decrease in the level of human rights violations after democratization. This trend continues until the end of the depicted time frame. This finding is broadly in line with the notion that democracy increases government respect for human rights. However, there is obvious heterogeneity in the individual patterns of state repression. While there are decreases in repression for most democratizing states, the size of the reductions varies considerably. Furthermore, some countries do not show decreased but increased levels of human rights violations directly after democratization. For most of these countries, repression does not return to its initial level within 10 years. In the light of previous evidence on the relationship between democracy and repression, the ambiguity of these patterns seems puzzling.

Against this background, this paper examines heterogeneity in the relationship between democracy and government violations of human rights. Drawing on arguments from the civil war literature, we highlight that democracy is not inevitably pacifying but can fuel violent political conflict by enhancing the opportunity of insurgents to organize and coordinate with each other. Incorporating this perspective into a simple formal model shows that the effect of democracy on state repression is ambiguous. A change from autocracy to democracy therefore does not necessarily reduce human rights violations. Furthermore,

[18] Although the theoretical model which is presented below has implications for both democratization and autocratization, our empirical analyses of regime changes focus on democratizations only. This is due to the fact that our dataset covers only a few events of autocratization fulfilling the conditions for a sufficiently large-scaled and persistent regime change (the conditions are described in more detail below). In the following, we therefore generally refer to the case of democratization, although our analyses could, in principle, be extended to autocratic regime changes.

Figure 3.1: Evolution of repression after democratization for 20 countries



Note: Repression is measured by the reversed and 0-100-normalized latent human rights scores of Fariss (2014). Data on democracy is from Marshall and Gurr (2016). Events of democratization are identified by the use of the "X-Polity" scores (Vreeland, 2008) as described below.

the model implicates that the relationship between democracy and repression is moderated by income. Democracy is found to be more likely to decrease repression in countries with higher income levels. In countries with low income levels, the adverse effects of democracy may dominate. The implications of the theoretical model are tested empirically using multiple indicators of state repression. Two empirical strategies are pursued. First, regression models relating levels of repression to levels of democracy are estimated based on time-series cross-sectional data for a large number of countries. Second, the evolution of repression in the course of rapid and stable democratizations is examined. In addition to the application of an event study framework, data on these democratizations are analyzed using a recent generalization of the synthetic control method (Xu, 2017). Our results confirm that democracy is likely to reduce repression in countries with high income levels whereas it may have no or even adverse effects in countries with lower income levels.

3.2 Related literature

Democratic governments are generally considered to be more responsive to the demands of their population than autocratic governments. By promoting bargaining and compromise, democratic political processes may reduce conflict and limit the use of repression by the executive. In line with this perspective, early studies find a negative relationship between

democracy and government violations of human rights (see, e.g., Henderson, 1991; Mitchell and McCormick, 1988; Poe and Tate, 1994). However, the greater freedom associated with democracy may also fuel the expression of opposition and, hence, the level of threat perceived by the political leaders. Given that the latter may respond with repression if conflict is not enclosed by political institutions, some authors argue that anocracies, i.e. regimes characterized by a mix of democratic and autocratic institutions, tend to be most repressive (Fein, 1995; Regan and Henderson, 2002). Drawing on a similar line of reasoning, multiple studies additionally indicate that anocracies face a higher risk of civil war (see, e.g., Fearon and Laitin, 2003; Hegre, 2001). These findings of increased political violence in countries at intermediate levels of democracy gave rise to the hypothesis that there is "more murder in the middle" (Fein, 1995).

Since its formulation, the "more murder in the middle" hypothesis has been under scrutiny. With respect to human rights, several studies have challenged the finding that anocracies are more repressive than full autocracies and full democracies. Often, these studies point to a threshold effect, indicating that only full democracy is associated with reduced repression whereas there are no systematic differences between countries at lower levels of democracy (see, e.g., Davenport and Armstrong, 2004; Bueno De Mesquita et al., 2005). Moreover, some authors highlight that the statistical relationship between democracy and political conflict may be flawed by measurement issues. In this respect, Vreeland (2008) points to conceptual overlaps between frequently used democracy measures like the Polity scores (Marshall and Gurr, 2016) and indicators of violent conflict. These overlaps particularly stem from components of democracy measures capturing violence in political competition. With the "X-Polity" scores, Vreeland (2008) introduces a variant of the Polity scores that excludes these potentially contaminated components. His analysis shows that the inverted-U shaped relationship between democracy and civil war disappears when the X-Polity scores are employed. With respect to state repression, conceptual overlaps with indicators of democracy have recently been stressed by Hill (2016). Nonetheless, the result that full democracies are less repressive than other regime types has remained robust against the exclusion of problematic components from democracy scores (see, e.g., Jones and Lupu, 2018).

In addition to the insights from aggregate measures of democracy, several papers chose a more disaggregate approach by emphasizing different roles of specific political institutions (see, e.g., Cingranelli and Filippov, 2010; Conrad et al., 2018; Bueno De Mesquita et al., 2005; Lupu, 2015). Other studies focus on heterogeneous effects of democracy on different forms of repression (see, e.g., Hill, 2016; Jackson et al., 2018). In contrast to the extensive analysis of these different facets of the relationship between democracy and repression, only a few studies examine the evolution of repression in the course of changes in the political regime. Zanger (2000) estimates the impact of regime changes on life integrity violations and finds heterogeneous effects. While democratization decreases repression during the transition period, a change from democracy to anocracy is related to higher levels of human rights violations. Similarly, Davenport (1999) presents evidence that de-

mocratization leads to immediate repressive withdrawals whereas autocratization increases human rights violations. In addition, Davenport shows that the effects of both types of events persist for several years. Cingranelli and Richards (1999) focus on democratizations and human rights practices after the end of the Cold War. Their results indicate that countries which became more democratic improved human rights practices with respect to political imprisonment. However, the authors also note that some of the post-Cold-War democratization cases cast doubt on a positive relationship between democratization and government respect for human rights. In a later study, Davenport (2004) reveals diverging effects of democracy and democratization. While democracy generally reduces repression, the process of democratization is found to have adverse impacts. In particular, Davenport shows that democratization is associated with increased political restrictions.

In summary, previous studies on the relationship between democracy and repression provide strong support for the hypothesis that full democracies are less repressive than other types of political regimes. With regard to the impact of democratization, evidence is less clear-cut and, in part, contradictory. Given these inconclusive results and the heterogeneity in the patterns of repression exemplified by Figure 3.1, there is reason to suspect that the relationship between democracy and state repression may depend on contextual factors. Since the literature has outlined both pacifying and adverse impacts of democracy, there may be conditions inducing the dominance of either positive or negative effects on state repression. Identifying these conditions may help to explain the different patterns of human rights violations observed for democratizing countries.

For closer examination, the following section presents a simple formal model of political regimes and state repression. Following arguments from Gleditsch et al. (2009) the model distinguishes between opposing effects of democracy on the motivation and the opportunity for rebellion. In this way, different channels through which democratic political regimes alter the use of repression by governments are highlighted. One the one hand, we derive a pacifying effect of democracy due to a better political representation of the citizens' preferences. On the other hand, the more liberal practices under democratic political regimes are shown to increase conflict by enhancing the opportunity of insurgents to organize and coordinate with each other. While the net effect on state repression therefore is found to be ambiguous, the model also reveals that the opposing effects of democracy are moderated by the level of income.

3.3 The model

We consider a continuum of citizens with mass normalized to unity. The citizens form two equally sized groups $i = 1, 2$, which are characterized by policy preferences $x_i \in [0, 1]$. These preferences may relate to an arbitrary field (e.g. health, education, foreign affairs, etc.) or may reflect ideological positions and therefore are not further specified. We only impose that the preferences of the two groups are represented by different points on the policy line, such that $x_1 < x_2$.

The population is ruled by a government $G \in \{A, D\}$. The type of the government depends on the political regime, which is either autocratic A or democratic D. In our model, these types of government differ with regard to how their citizens' preferences are represented. A democratic political regime ensures proportional representation of the two societal groups, resulting in equal share in government. In contrast, an autocratic political regime induces the dominance of one policy preference, e.g. due to group membership of the ruling dictator.

As will be outlined in detail below, the government makes two choices: First, it implements a policy $x \in [0, 1]$. Second, it chooses a certain level of repression $r \geq 0$ to counteract the threat of being overthrown by insurgents. The strength of the latter crucially depends on the citizens' (dis)satisfaction, which is determined in the following.

3.3.1 Model setup

Given the citizens' policy preferences x_i and the policy implemented by the government x, we can define $\Delta x_i = |x_i - x|$ as the deviation of the actual policy from the preferred policy of group i. Naturally, an increasing gap between the preferred and the implemented policy diminishes the citizens' political satisfaction. In addition, utility increases in economic satisfaction, which is determined by income y. Moreover, although targeted at those individuals trying to overthrow the government, repression r is likely to negatively affect the utility of all citizens, e.g. by reducing individual freedoms and increasing insecurity. Accordingly, the citizens' utility function is specified as

$$U_i = u(y) \cdot z(\Delta x_i) - r, \tag{3.1}$$

where $u' > 0, u'' < 0, z' < 0$, and $z'' < 0$. While a higher income level increases the citizens' utility at a decreasing rate, the marginal reduction of utility due to a larger deviation of the actual from the preferred policy increases (in absolute terms) in the magnitude of this deviation. Further deviations from their policy preferences thus are increasingly harmful to the citizens. The multiplicative formulation of the first term on the right hand side of (3.1) implies that the marginal utility of a "better" policy increases in income and vice versa. Hence, there is complementarity between political and economic satisfaction.[19] Finally, to reflect disutility from repression, r enters (3.1) with a negative sign.

The utility of a citizen is directly related to her attitudes towards the government. Individuals with a lower status-quo utility are more likely to be dissatisfied and willing to remove the current political leaders. To derive the mass of those insurgents n, we assume that a citizen is dissatisfied and aims to overthrow the government if her utility (3.1) falls below an individual-specific threshold level. With these threshold levels being uniformly distributed over $[-\xi, \xi]$, where $\xi > 0$ reflects the degree of heterogeneity in thresholds, the

[19] Note that the assumption of complementarity between political and economic satisfaction could be relaxed without altering the main implications of the theoretical model.

mass of insurgents is[20]

$$n = \frac{1}{2} - \delta \cdot u(y) \cdot [z(x - x_1) + z(x_2 - x)] + 2\delta r. \tag{3.2}$$

For notational convenience, we define $\delta = 1/(4\xi)$. Note that (3.2) uses the assumption that the government is formed by one or both groups of citizens. The government therefore has no incentive to choose a policy outside of $x \in [x_1, x_2]$. Hence, $\Delta x_1 = x - x_1$ and $\Delta x_2 = x_2 - x$. According to (3.2), the mass of insurgents increases in the level of repression as the latter diminishes the citizens' utility.[21] Furthermore, n is differently affected by income and policy changes. A higher income level unambiguously increases the citizens' utility and, thus, decreases the mass of insurgents. In contrast, the effect of a policy change is ambiguous as shifting the policy closer to the preference of one group of citizens simultaneously increases the deviation from the preference of the other group.

Given these opposing effects, there is a policy x^* that minimizes[22] the mass of insurgents. Formally, x^* is determined by

$$z'(x^* - x_1) = z'(x_2 - x^*) \tag{3.3}$$

and can be written explicitly as $x^* = (x_1 + x_2)/2$. As shown by (3.3), minimization of the mass of insurgents is achieved by minimizing aggregate political dissatisfaction and entails equal marginal disutility for both groups of citizens due to deviation of the implemented policy from their preferred policy. Thus, x^* is the mean of x_1 and x_2 on the policy line. We will therefore refer to x^* as the "fair" policy.

Even under a fair policy, there generally remain some individuals aiming to overthrow the government. We describe the corresponding threat posed to the survival of the government by the insurgents' activity level a. This activity level in turn is strongly related to the insurgents' opportunity to organize and coordinate with each other. As outlined by Gleditsch et al. (2009), democracy increases this opportunity due to greater openness and more liberal political practices. In particular, democratic political regimes provide the opportunity to legally form political organizations, which can facilitate the coordination between the dissatisfied. This opportunity is often not, or at least to a lesser extent, provided by autocratic political regimes. Hence, for a given mass of insurgents, we expect the activity level to be higher under democracy compared to autocracy.

To capture the essence of this argument while keeping notation as parsimonious as possible, we use the following formalization. We assume that there are $\rho > 1$ possible places of the country where an insurgent can operate. We further specify the activity level a as the maximum number of active insurgents at a given place. Under democracy, all dissatisfied citizens can coordinate their actions through a political organization and

[20] Note that we only consider interior solutions, i.e. $U_i \in]-\xi, \xi[$.

[21] We impose that $\partial n/\partial r = 2\delta < 1$, which ensures that repression is effective in counteracting the insurgents' attempt to overthrow the government. If this condition was not assumed to hold, the government would be removed from office regardless of its choice of r and x.

[22] x^* minimizes (3.2) since $\partial^2 n/\partial x^2 = -\delta \cdot u(y) \cdot [z''(x^* - x_1) + z''(x_2 - x^*)] > 0$.

therefore become active at the same location. The activity level under democracy thus is

$$a^D = n^D, \tag{3.4}$$

where n^D is the mass of insurgents under democracy. Under autocracy, the political organization and, hence, the opportunity for coordination are absent. In this case, the probability that an insurgent becomes active at a certain place is $\varphi = 1/\rho$. The probability of reaching an activity level similar to democracy therefore is $\varphi^n < 1$, which reflects the disadvantages faced by insurgents when operating under an autocratic political regime. For comparative static analysis, we focus on the average activity level under autocracy, which is given by

$$a^A = \varphi \cdot n^A, \tag{3.5}$$

where n^A is the mass of insurgents under autocracy. This stylized formulation is sufficient to capture the presumed adverse effect of democracy on domestic conflict: If $n^A = n^D$, it follows that $a^A < a^D$, which implies that the level of threat is higher for a democratic compared to an autocratic government when facing the same mass of dissatisfied citizens. However, as shown by (3.2), the mass of insurgents n depends on the policy choice x, which may differ between the political regimes.

In the following, we therefore derive the policies implemented under autocracy and democracy, respectively. For this purpose, we assume that the objective function of the government is represented by the weighted mean of the utilities of the two societal groups:

$$U_G = \theta_G \cdot U_1 + (1 - \theta_G) \cdot U_2, \tag{3.6}$$

with $\theta_G \in [0, 1]$ being the weight the government assigns to group 1, whereas $1 - \theta_G$ is the weight for group 2. As outlined below, θ_G therefore reflects differences in the composition of the government under autocracy and democracy. Note that the government obtains (3.6) only if it is not overthrown by the insurgents. This requires that the level of repression r is at least as high as the activity level a, i.e. $r \geq a$. If $r < a$, the level of repression is too low to withstand the insurgents' effort and the government is replaced. Taking this condition into account, we next describe the behavior of the democratic and the autocratic government with regard to repression r and policy x.[23]

3.3.2 Democratic government

The composition of the government under a democratic political regime is assumed to be representative of the population. Since the citizens form two equally sized societal groups, this implies that they have equal share in government. Accordingly, both groups have the same weight in the objective function (3.6), i.e. $\theta_D = 1/2$. Taking into account that the government stays in office only if the level of repression outweighs the activity level of the

[23]Note that we assume that the government's utility in case of holding office in equilibrium is always higher than the utility from leaving office. Hence, the latter option is not considered in the following.

insurgents, the democratic government's problem is

$$\max_{r,x} U_D = \frac{1}{2} \cdot u(y) \cdot [z(x - x_1) + z(x_2 - x)] - r \quad \text{s.t.} \quad r \geq a^D, \tag{3.7}$$

where a^D is given by (3.4). From (3.7) follows that the level of repression r^D and the policy x^D under democracy are described by

$$r^D = a^D, \tag{3.8}$$

$$z'(x^D - x_1) = z'(x_2 - x^D). \tag{3.9}$$

As shown by (3.8), the democratic government chooses the minimum level of repression required to stay in office in order to minimize social costs. Furthermore, (3.9) reveals that the democratic policy is characterized by equal marginal disutility of the two groups of citizens. Recall that this condition was already stated by (3.3). Hence, it holds that $x^D = x^* = (x_1 + x_2)/2$, implying that the democratic policy, ceteris paribus, minimizes the mass of insurgents. This result is directly related to the composition of the government. Since the preferences of the citizens are proportionally represented under democracy, the democratic policy is a compromise that generates some dissatisfaction in both groups but keeps aggregate political dissatisfaction at a minimum.

3.3.3 Autocratic government

The autocratic government is characterized by the dominance of one policy preference, i.e. $\theta_A \neq 1/2$. For simplicity and without loss of generality, we consider the extreme case of $\theta_A = 1$, which implies that the autocratic government promotes only the interest of group 1. The objective of the government thus becomes

$$\max_{r,x} U_A = u(y) \cdot z(x - x_1) - r \quad \text{s.t.} \quad r \geq a^A, \tag{3.10}$$

where a^A is given by (3.5). The resulting level of repression r^A and the policy x^A under autocracy are given by

$$r^A = a^A, \tag{3.11}$$

$$z'(x^A - x_1) = \frac{\gamma}{1 + \gamma} \cdot z'(x_2 - x^A), \tag{3.12}$$

where $\gamma = (\varphi\delta)/(1 - 2\varphi\delta) > 0$. According to (3.11), the autocratic government chooses a level of repression that just outweighs the insurgents' activity level. Similar to the democratic government, the autocratic government thus aims to keep the disutility induced by repression at a minimum. However, the two types of government differ with regard to their policy choice. Contrary to the first order condition of the democratic policy (3.9), the equation describing the autocratic policy (3.12) weights the disutility of group 2 by the factor $\gamma/(1 + \gamma) < 1$. Since $z(\cdot)$ is concave, this implies that $x^A < x^D$. This result has an intuitive interpretation. Like the democratic government, the autocratic government takes

the effect of its policy choice on the dissatisfaction of the citizens into account. However, the political dominance of group 1 induces a policy that is closer to x_1.

3.3.4 Implications for repression

The different policies under democracy and autocracy have implications for the mass of insurgents and, hence, for the level of repression. Recall that the democratic policy x^D was found to minimize political dissatisfaction. Since $x^A \neq x^D$, it follows that political dissatisfaction is higher under autocracy. In other words, democracy has a pacifying effect because of a better representation of the citizens' preferences. However, this pacifying effect is counteracted by the enhanced opportunity of the insurgents to organize and coordinate with each other. In this way, democracy increases the insurgents' activity level, which induces a higher level of repression. This higher level of repression, in turn, diminishes the citizens' utility and thus increases the mass of insurgents. Hence, the relation between n^A and n^D is ambiguous. For closer examination of the equilibrium levels of repression under autocracy and democracy, we define

$$\Delta r = r^A - r^D = \varphi \cdot n^A - n^D \tag{3.13}$$

as the difference in the repression levels under the two political regimes. Due to the ambiguity of the relation between n^A and n^D, the sign of (3.13) is also ambiguous. Generally, a change from autocracy to democracy therefore cannot be expected to reduce repression. However, using (3.2), the model reveals an interaction between democracy and income y. In particular, it can be shown that

$$\frac{\mathrm{d}\Delta r}{\mathrm{d}y} > 0 \iff z\left(\frac{\Delta x_1^A + \Delta x_2^A}{2}\right) > \varphi \cdot \left(\frac{1 - \partial n/\partial r}{1 - \varphi \cdot \partial n/\partial r}\right) \cdot \frac{z(\Delta x_1^A) + z(\Delta x_2^A)}{2}, \tag{3.14}$$

where $\partial n/\partial r = 2\delta$ is the marginal effect of repression on the mass of insurgents and $\Delta x_i^A = |x_i - x^A|$ is the deviation of the implemented policy under autocracy from the preference of group i. (3.14) holds by the virtue of Jensen's inequality and the fact that $\varphi < 1$. Thus, the difference in repression levels between autocracy and democracy increases in income. This implies that democratization is more likely to reduce repression in countries with higher income levels.

This interaction between democracy and income can be decomposed into three effects, which are represented by the three factors on the right hand side of (3.14). All of these effects work in the same direction: 1) Due to enhanced opportunities for coordination under democracy, the insurgents' activity level reacts more sensitive to changes in the mass of insurgents. Since the latter is affected by the economic satisfaction of the population, changes in income have a stronger impact on the level of repression under democracy. 2) Since repression enters the citizens' utility function (3.1) negatively, the stronger reduction of repression induced by a rise in income additionally induces a stronger decline in the mass of insurgents under democracy, which reinforces the effect described in 1). 3) Due

to the complementarity between political and economic satisfaction in the citizens' utility function, the marginal utility of a "better" policy increases in income. Since the democratic policy minimizes aggregate political dissatisfaction, this pacifying effect becomes more pronounced at high income levels.

Given these theoretical implications, we formulate the following hypothesis for empirical examination: *Democratization is more likely to reduce (increase) repression in countries with higher (lower) income levels.*

3.4 Data

To test the implication of our theoretical model empirically, we draw on multiple indicators of state repression. These and other indicators which we use within the framework of our analyses are described in more detail below. In addition, we discuss the measurement of democracy and the identification of democratizations against the backdrop of conceptual overlaps between indicators of repression and democracy.

3.4.1 Measuring state repression

We draw on four different indicators of government violations of human rights, which constitute our dependent variables. 1) We use data on government respect for human rights provided by Fariss (2014). Applying item response theory (IRT) models to indicators of repression from different sources, Fariss estimates government respect for human rights as a continuous latent variable. In addition to the synthesis of information from multiple datasets, this approach offers the advantage of improved country and time coverage compared to the individual indicators included in the measurement model. However, there is debate on the accuracy of the modeling strategy applied in Fariss (2014). The critique particularly relates to Fariss' diagnosis of a "changing standard of accountability" inherent to indicators of state repression (see, e.g., Cingranelli and Filippov, 2018; Fariss, 2018). While we take an agnostic standpoint with respect to this discussion, we provide evidence in the online appendix that our results are not driven by the assumption of a changing accountability standard. 2) As another measure of repression, we take the physical integrity rights index (PIR) provided by the CIRI Human Rights Data Project (Cingranelli et al., 2014). The PIR index captures torture, extrajudicial killing, political imprisonment, and disappearance on a scale ranging from 0 (no government respect for the related rights) to 8 (full government respect for the related rights). Finally, we draw on the Political Terror Scale (PTS) project (Gibney et al., 2017), which assesses repression based on country reports of Amnesty International and the U.S. State Department. Accordingly, the PTS provides two indicators, which we both employ as dependent variables: 3) the Amnesty scores and 4) the State Department scores. Both indicators code repression levels on a scale ranging from 1 (lowest level of repression) to 5 (highest level of repression). To harmonize the interpretation of our results, the signs of the latent human rights scores of

Table 3.1: Indicators of state repression

Indicator	Source	Description
Fariss scores[a,b]	Fariss (2014)	Continuous latent human rights scores derived from item response theory (IRT) model.
PIR index[a,b]	Cingranelli et al. (2014)	Index capturing torture, extrajudicial killing, political imprisonment, and disappearance on a scale ranging from 0 (no government respect for human rights) to 8 (full government respect for human rights)
Amnesty scores[b]	Gibney et al. (2017)	Index capturing repression on a scale ranging from 1 (countries under a secure rule of law, people are not imprisoned for their views, and torture is rare or exceptional. Political murders are extremely rare) to 5 (terror has expanded to the whole population. The leaders of these societies place no limits on the means or thoroughness with which they pursue personal or ideological goals)
State Department scores[b]	Gibney et al. (2017)	see: Amnesty scores

[a]indicator is reversed to measure repression; [b]indicator is normalized between 0 and 100.

Fariss (2014) and the PIR index are reversed in order to measure repression. Furthermore, we normalize all dependent variables between 0 and 100.[24] An overview of the indicators used to measure repression is provided in Table 3.1.

3.4.2 Measuring democracy

To measure democracy, we draw on the Polity IV Project (Marshall and Gurr, 2016), which provides data on democratic and autocratic characteristics of political regimes. However, as mentioned above, measuring democracy is not straightforward in our context due to conceptual overlaps with indicators of state repression. These conceptual overlaps particularly concern physical integrity rights violations due to violent suppression of opposition groups and components of free political competition included in measures of democracy (Hill, 2016). Hence, employing the Polity scores or other frequently used democracy indicators may yield misleading results.

To mitigate the problem of tautological links between measures of democracy and political violence, Vreeland (2008) introduces the X-Polity scores, which remove the suspicious components from the Polity index. While the Polity scores range from -10 to 10, Vreeland's X-Polity scores range from -6 to 7, with higher values indicating higher levels of democracy. Since their introduction, the X-Polity scores have been used in multiple studies to assess the relationship between democracy and violent conflict, including state repression (see, e.g., Jones and Lupu, 2018). We therefore choose the X-Polity scores as our basic measure of democracy. Since the only consensual finding in the literature on democracy and state repression is that countries at the highest levels of democracy show low levels

[24]Note that this normalization is irrelevant for the results of the ordered logit models presented below.

of repression, we specifically focus on fully democratic political regimes. For this purpose, we define a full democracy as a political regime with an X-Polity score ≥ 6. In the online appendix, we provide evidence that our results are robust with respect to the measurement of democracy.[25]

3.4.3 Identifying democratizations

Given our definition of full democracy, a democratization could be identified by a change from an X-Polity score < 6 to an X-Polity score ≥ 6 in successive years. However, this simple approach has several drawbacks as it does not account for all of the following issues: First, the Polity IV Project assigns the special codes -66 (interruption), -77 (interregnum), and -88 (transition) to some country-years. A democratization process involving one of these transition patterns could not be identified with the definition outlined above. Second, to ensure that changes in the political regime are sufficiently large-scaled to alter the level of repression, our indicator of democratization should capture only substantial changes in a countries' institutional structure. Third, to further facilitate the identification of the effects of democratization, a substantial change in the political regime should occur within a reasonably short time period. Fourth, to avoid that our results are driven by countries with highly volatile political regimes, the democratizing countries should show a minimum level of institutional stability.

To take these aspects into account, we propose a modified definition of regime transitions used in the Polity IV Project (see Marshall and Gurr, 2016). According to our definition, a country experienced a democratization if:

1. The country reached an X-Polity score ≥ 6 (full democracy).
2. There was either an associated three-point increase in the X-Polity scores within three years or less, or a four-point increase within four years or less, and so on.
3. There was no negative change in the X-Polity scores during the transition period. In this respect, the Polity codes -66 (interruption), -77 (interregnum), and -88 (transition) are ignored.
4. The country had been non-democratic for at least 10 years before the regime change.
5. The country remained democratic for at least 5 years after the regime change.

While the first condition requires that a country reaches full democracy, the second condition ensures that the change in the political regime as measured by the X-Polity scores is sufficiently large and rapid. The third condition excludes countries with adverse regime changes during the transition period while avoiding to exclude countries with short "specially coded" periods. While the fourth condition excludes countries which experienced

[25] Robustness checks include the use of the binary democracy indicators provided Cheibub et al. (2010) and Acemoglu et al. (2019) and alternative definitions of sufficiently large-scaled democratizations. The results are consistent with the evidence presented in this paper.

Table 3.2: Democratization events

Country	Year	Country	Year	Country	Year
Argentina	1983	Guatemala	1996	Peru	1980
Bolivia	1982	Hungary	1990	Philippines	1987
Brazil	1988	Kenya	2002	Poland	1991
Bulgaria	1990	Macedonia	2002	Portugal	1976
Cape Verde	1991	Madagascar	1992	Senegal	2000
Chile	1989	Mongolia	1992	Spain	1978
Comoros	2006	Pakistan	1988	Thailand	1992
Ecuador	1979	Panama	1989	Turkey	1961
Ghana	2004	Paraguay	1992	Uruguay	1985

Note: The table shows the countries that experienced a democratization according to the definition outlined above. The specified years are the first years of full democracy (X-Polity ≥ 6).

only a short history of autocratic rule, the fifth condition requires that the emerging democratic regime showed at least some durability. In combination, the latter two conditions exclude countries with highly volatile political regimes.

Based on this definition, 27 democratizations were identified. The countries and years of democratization are shown in Table 3.2. The values of GDP per capita for these countries in the year of democratization are shown in the appendix (Figure 3.6).

3.4.4 Moderator and control variables

Since our theoretical model predicts that the relationship between democracy and state repression is moderated by income, our empirical analyses include *GDP per capita* (in 2005 US$, PPP) as a proxy for the countries' income levels. This indicator is taken from the updated version 6.0 of Gleditsch (2002).

In addition, we account for other core determinants of state repression identified in the literature (see Davenport, 2007a; Hill and Jones, 2014). Since a larger *Population* is consistently found to be associated with higher levels of repression, we use data on the countries' number of inhabitants from Gleditsch (2002). Another strong predictor of state repression is *Intrastate conflict*, which is represented by a dummy variable taking on the value of 1 if a country experienced an internal armed conflict as defined by the UCDP/PRIO Armed Conflict Dataset (Gleditsch et al., 2002; Pettersson and Eck, 2018) and the value of 0 otherwise. Following Nordås and Davenport (2013), we control for *Youth bulges* by using the share of the population aged between 15 and 24 relative to the population aged 15 or older. Data on age groups is provided by the United Nations Population Division (2017). Finally, our models include *Trade openness* as measured by the sum of imports and exports relative to GDP (World Bank, 2018). To account for their highly skewed distributions, *GDP per capita* and *Population* enter the analyses in logarithmic form.

Our final dataset covers 166 countries in the period from 1960 to 2011. Our identification of countries in the international system at a given year follows the Quality of Government (QoG) Institute (Teorell et al., 2018). Summary statistics for all dependent

and independent variables are provided in the appendix (Table 3.4).

3.5 Results

Based on the data described above, we test the implication of our theoretical model by utilizing different methodological approaches. First, we adopt the standard approach in the literature and estimate time-series cross-sectional regressions relating levels of repression to levels of democracy. Second, we analyze the evolution of repression in the course of democratizations within an event study framework. Third, we investigate these events using the generalized synthetic control method. All of these analyses aim to test the hypothesis that the effect of democracy on repression is moderated by the level of income.

3.5.1 Time-series cross-sectional regressions

In the first step of our empirical analysis, we use time-series cross-sectional data for more than 160 countries in the period from 1960 to 2011. Our model specifications closely follow previous studies on the relationship between democracy and state repression. Model classes differ by dependent variable as described below.

Using the continuous reversed latent human rights scores of Fariss (2014), we model the expected level of repression for country i in year t as

$$E[r_{it}|D_{it}, y_{it}, \boldsymbol{x}_{it}, r_{i,t-1}] = \beta_0 + \beta_1 D_{it} + \beta_2 y_{it} + \beta_3 D_{it} \times y_{it} + \boldsymbol{x}'_{it}\boldsymbol{\gamma} + \rho \cdot r_{i,t-1}, \qquad (3.15)$$

where r is repression, D is democracy, y is logged GDP per capita, and $\boldsymbol{x}$ represents a set of control variables. β_0, β_1, β_2, β_3, $\boldsymbol{\gamma}$, and ρ denote regression coefficients. Note that (3.15) includes a lag of the dependent variable to account for the persistence of repressive practices. Furthermore, the model includes a multiplicative interaction term between democracy and logged GDP per capita. This allows the marginal effect of democracy to vary with the level of income. According to the implications of our theoretical model, we expect that the negative relationship between repression and democracy is more pronounced in countries with higher income levels, i.e. $\beta_3 < 0$. In addition, we normalize logged GDP per capita between 0 (lowest sample income) and 1 (highest sample income). Hence, the marginal effect of democracy on state repression is given by β_1 for a country with the lowest sample income, whereas it is given by $\beta_1 + \beta_3$ for a country with the highest sample income.[26]

Linear models like (3.15) are also often estimated for the (reversed) PIR index, the Amnesty scores, and the State Department scores (see, e.g., Danneman and Ritter, 2014; Poe and Tate, 1994; Regan and Henderson, 2002). However, for comparability with most of the recent time-series cross-sectional studies, we take the ordinal nature of these indicators

[26] More formally, note that the change in the expected level of repression given a change in the political regime is $\Delta E[r_{it}|\Delta D_{it}, y_{it}, \boldsymbol{x}_{it}, r_{i,t-1}] = \beta_1 \Delta D_{it} + \beta_3 y_{it} \Delta D_{it}$. Hence, the change in repression associated with a change from autocracy to democracy ($\Delta D_{it} = 1$) at the lowest sample income ($y_{it} = 0$) is given by $\Delta E[r_{it}|\Delta D_{it} = 1, y_{it} = 0, \boldsymbol{x}_{it}, r_{i,t-1}] = \beta_1$. For the highest sample income ($y_{it} = 1$), this change becomes $\Delta E[r_{it}|\Delta D_{it} = 1, y_{it} = 1, \boldsymbol{x}_{it}, r_{i,t-1}] = \beta_1 + \beta_3$.

into account (see, e.g., Bueno De Mesquita et al., 2005; Hill, 2016; Nordås and Davenport, 2013).[27] We therefore apply ordered logistic regression models, specifying the cumulative probabilities of the $j = 1, 2, \ldots, J$ categories of these repression indicators as

$$P(r_{it} \leq j | D_{it}, y_{it}, \boldsymbol{x}_{it}, r_{i,t-1}) = F(\kappa_j - \beta_0 - \beta_1 D_{it} - \beta_2 y_{it} - \beta_3 D_{it} \times y_{it} - \boldsymbol{x}'_{it}\boldsymbol{\gamma} - \rho \cdot r_{i,t-1}), \quad (3.16)$$

where $F(\cdot)$ is the cumulative logistic distribution function and κ_j are threshold parameters. Note that (3.16) includes the same regressors as (3.15). Likewise, a positive (negative) sign of a regression coefficient indicates a positive (negative) relationship between the regressor and the dependent variable. However, the nonlinear formulation of (3.16) has the drawback that β_3 generally does not correspond to the interaction effect of democracy and logged GDP per capita. In extreme cases, the interaction effect may even be of opposite sign (Ai and Norton, 2003). To account for this issue, we additionally calculate average marginal effects of democracy on the probabilities of the lowest and the highest scores of the repression indicators for different levels of income. To mitigate the problem of omitted variable bias, we use logged *Population*, *Intrastate Conflict*, *Youth bulges*, and *Trade* as control variables. Furthermore, we follow the literature by including time dummies in all models.

The estimation results are shown in Table 3.3. For reference, each of the models is first estimated without the interaction term between democracy and logged GDP per capita (regressions (1), (3), (5), and (7)). The results obtained with these specifications are in line with those of previous studies. Across all repression indicators, the estimated effect of democracy is negative and statistically significant, indicating that full democracies are less repressive than other regime types. The coefficient of logged GDP per capita is negative and significant when using the State Department Scores as dependent variable only. Including the interaction term between democracy and logged GDP per capita changes the results drastically. In line with the implications of the theoretical model, the coefficient of the interaction term is negative and significant for all repression indicators. Furthermore, the coefficient of *Democracy* turns insignificant in regression (2) and positive and significant in the remaining interaction models (4), (6), and (8). These findings suggest that democracy may have no or even adverse effects on repression at low income levels.

The marginal effect plots shown in Figure 3.2 support this interpretation. For the reversed Fariss scores, we find no evidence for effects of democracy on repression at low levels of income. Significant negative effects are revealed at higher values of GDP per capita only. With respect to the reversed PIR index, the Amnesty scores, and the State Department scores, the ordinal logistic regressions indicate adverse effects of democracy in relatively poor countries. For all of these measures of repression, the average marginal effect of democracy on the lowest repression level is significantly negative at low values of GDP per capita and significantly positive at higher values of per capita income. This implies that democracy is associated with a higher (lower) probability of reaching the

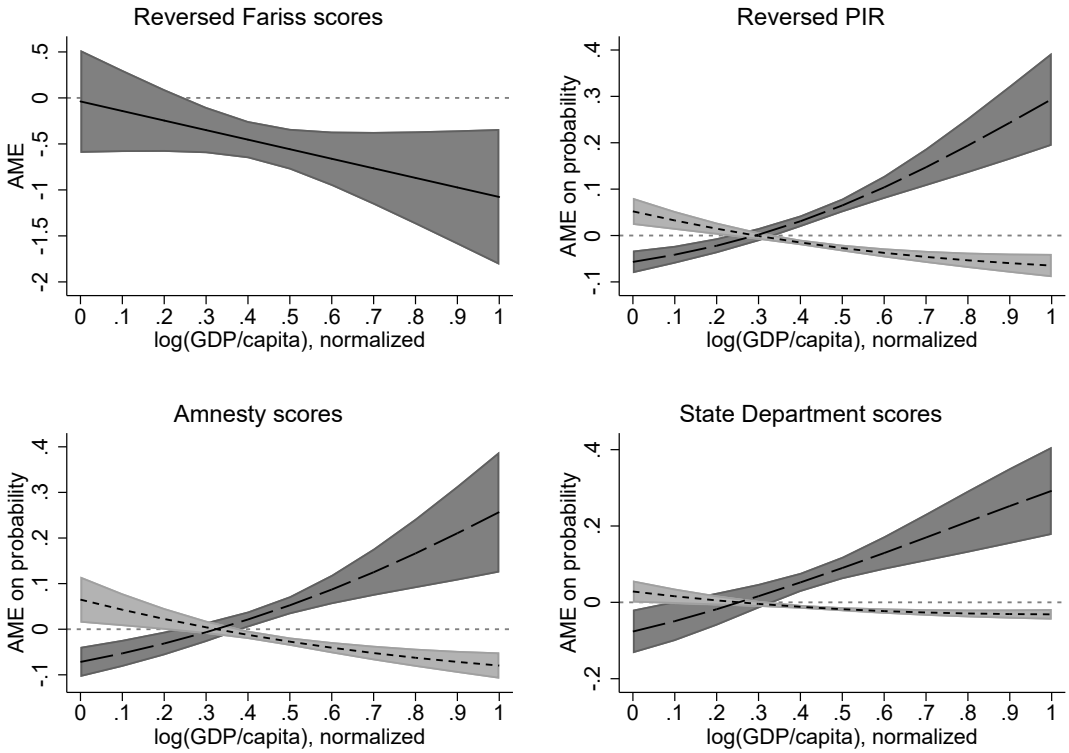
[27] Fitting linear models for these dependent variables yields qualitatively similar results.

Table 3.3: Linear and ordered logistic regressions for indicators of state repression

Dependent variable	Reversed Fariss scores		Reversed PIR		Amnesty scores		State Department scores	
Model	linear		ordered logit		ordered logit		ordered logit	
Regression No.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Democracy	-0.484***	-0.038	-0.706***	1.521***	-0.544***	1.543***	-0.722***	1.035**
	(0.100)	(0.283)	(0.112)	(0.355)	(0.127)	(0.477)	(0.126)	(0.459)
log(GDP/capita)	0.003	0.196	-0.423	0.835	-0.049	0.959*	-1.264***	-0.500
	(0.305)	(0.319)	(0.538)	(0.559)	(0.505)	(0.522)	(0.478)	(0.524)
Democracy × log(GDP/capita)		-1.039*		-5.190***		-4.756***		-4.083***
		(0.624)		(0.838)		(1.043)		(1.020)
log(Population)	0.091***	0.093***	0.257***	0.257***	0.175***	0.163***	0.233***	0.228***
	(0.027)	(0.028)	(0.036)	(0.033)	(0.039)	(0.042)	(0.035)	(0.040)
Intrastate conflict	0.819***	0.836***	1.345***	1.416***	1.333***	1.372***	1.624***	1.645***
	(0.127)	(0.128)	(0.151)	(0.158)	(0.147)	(0.150)	(0.160)	(0.164)
Youth bulges	2.416***	2.051**	4.452***	2.620**	4.878***	3.537***	4.328***	2.823**
	(0.725)	(0.808)	(1.093)	(1.055)	(1.074)	(1.034)	(1.127)	(1.120)
Trade openness	-0.001	-0.001	-0.001	-0.002**	-0.001	-0.002*	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
lagged DV	0.972***	0.971***	1.100***	1.066***	2.180***	2.130***	2.575***	2.531***
	(0.003)	(0.003)	(0.042)	(0.041)	(0.088)	(0.088)	(0.089)	(0.089)
Observations	6,069	6,069	3,899	3,899	3,628	3,628	4,414	4,414
Countries	166	166	161	161	163	163	162	162

Note: All regression include year dummies. Standard error estimators are clustered by country. Estimated standard errors are shown in parentheses. Significance levels: *10%, **5%, ***1%. Estimated intercepts and threshold parameters for ordinal logistic regressions are not shown in the table.

Figure 3.2: Average marginal effects (AME) of democracy by income level



Note: The subfigures depict the estimated average marginal effects (AME) of democracy on each repression indicator for different levels of income with 95% confidence intervals. Income is measured by the logarithm of GDP per capita and is normalized between 0 (lowest sample income) and 1 (highest sample income). For the reversed Fariss scores, the solid line represents the estimated AME derived from (3.15). For the reversed PIR, the Amnesty scores, and the State Department scores, AMEs are derived from (3.16). The long-dashed lines represent the AME on the lowest level of repression (i.e. the lowest score of the repression indicator) whereas the short-dashed lines represent the AME on the highest level of repression (i.e. the highest score of the repression indicator).

lowest repression level in countries with higher (lower) income levels. In accordance with this result, we find significant positive (negative) average marginal effects of democracy on the highest level of repression at low (high) income levels. Thus, poor democracies are predicted to have a higher probability of showing extensive human rights violations than other regime types. This relationship is reversed at higher income levels.

With respect to the control variables, our results are in line with findings reported in the literature. Across all regressions, a larger population, the presence of intrastate conflict, and larger youth bulges are associated with higher levels of repression. For international trade, evidence is less conclusive as most of the estimated effects are insignificant.

In summary, the results of the time-series cross-sectional regressions support the implications of the theoretical model. While democracy is related to lower repression at relatively high income levels, there is evidence for adverse effects of democracy at low values of per capita income. However, the results are subject to some limitations. First, the

statistical models (3.15) and (3.16) do not capture dynamics in the relationship between democracy and state repression around *events* of democratization as suggested by Figure 3.1. Second, the regressions presented in this section do not account for the stability of political regimes. Hence, one concern regarding these results may be that the adverse effects of democracy at low income levels are driven by poor and short-lived democracies. To address these issues, the next section turns to the analysis of repression in the course of stable democratizations within an event study framework.

3.5.2 Event studies

Event studies have been a popular tool for the analysis of financial market data for decades (see, e.g., MacKinlay, 1997). More recently, variants of this method have also been applied in other fields like public finance and development studies (see, e.g., Hoynes et al., 2011; Hoynes and Schanzenbach, 2012; Huang, 2010). Event studies aim to assess systematic changes in an outcome variable before and after a specific event of interest. The focus of these analyses therefore is not on calender years t but on event years τ. The objective of our event study is to examine the evolution of repression before and after democratization. Hence, $\tau = 0$ is defined as the year of the completed regime change, i.e. the first calender year, in which a previously non-democratic country reached a X-Polity score of 6 or 7. To examine the dynamics of repression around this event, we choose a time frame of 10 years before and after democratization ($\tau = -10, -9, \ldots, 10$). In addition to dynamics, the second issue addressed within the event study framework is the stability of democratizations. To avoid that our results are driven by highly unstable political regimes, we focus on the 27 democratizing countries (shown in Table 3.2) which fulfill the two stability conditions outlined above: 1) The countries had previously been non-democratic for at least 10 years. 2) The countries remained democratic for at least 5 years after democratization. In combination, these conditions exclude cases of highly unstable political regimes, which may show systematically different patterns of state repression.

Our event study models specify the expected level of repression for country i in event year τ and corresponding calender year t as

$$E[r_{it\tau}|\boldsymbol{Z}_\tau, y_{it\tau}, \boldsymbol{x}_{it\tau}] = \sum_{\substack{\tau=-10 \\ \tau\neq-2}}^{10} \alpha_\tau \cdot Z_\tau + \sum_{\substack{\tau=-10 \\ \tau\neq-2}}^{10} \beta_\tau \cdot Z_\tau \times y_{it\tau} + \eta \cdot y_{it\tau} + \boldsymbol{x}'_{it\tau}\boldsymbol{\gamma}, \qquad (3.17)$$

where Z_τ denotes event year dummies, which are equal to 1 for event year τ and 0 otherwise. Note that the coefficients α_τ of these dummies can vary over event years. Thus, they capture systematic temporal changes in repression within the considered time frame. Given that our theoretical model predicts that repression decreases after democratization in relatively rich countries whereas there may be no or even adverse effects in poor countries, the second term on the right hand side of (3.17) introduces interactions between the event year dummies and logged GDP per capita with regression coefficients β_τ. In this

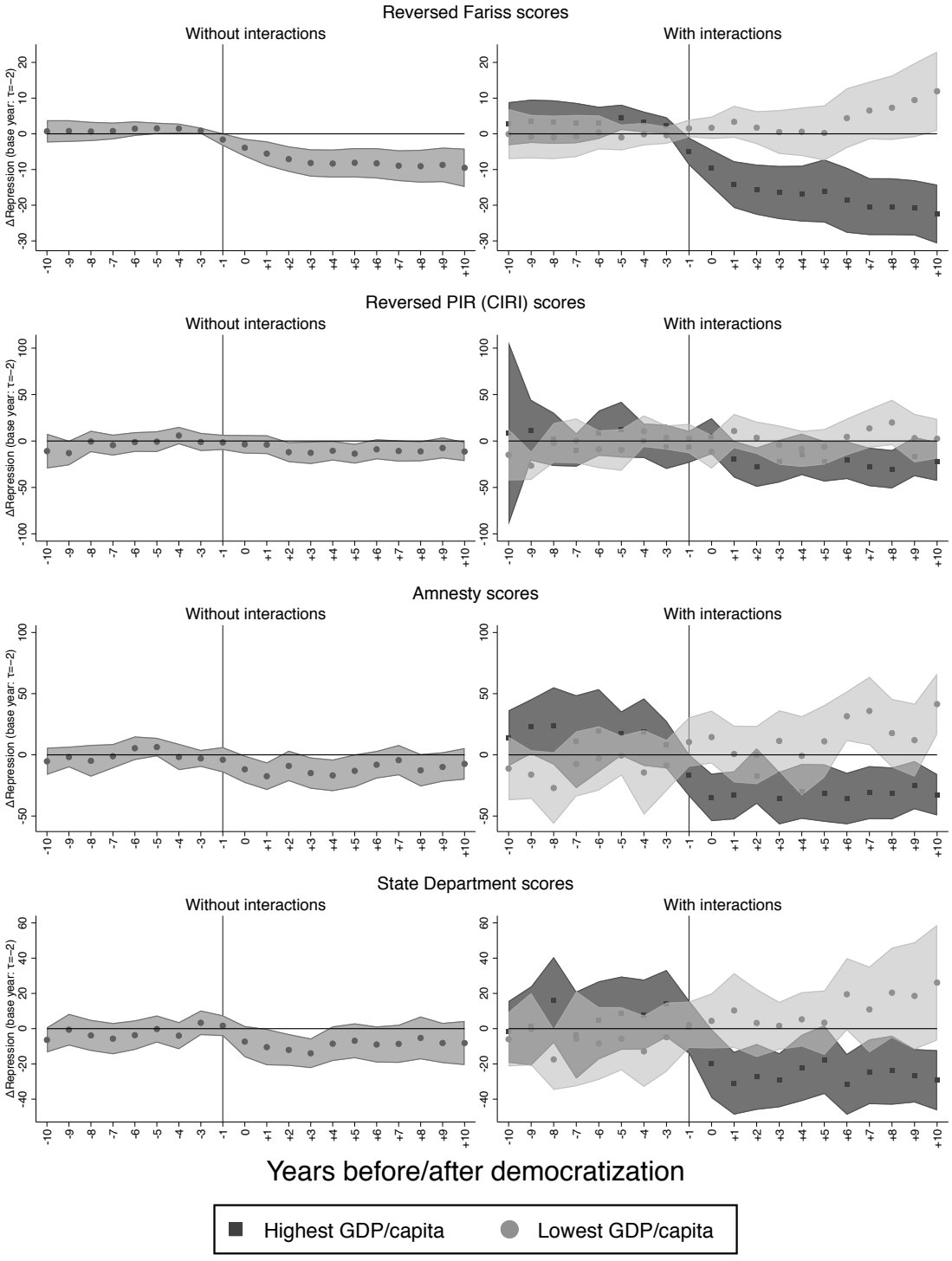
way, the estimated level of repression at a specific event year may vary by income. Based on this specification, we consider the evolution of repression over event years for the lowest and the highest GDP per capita in the sample of democratizing countries. All time effects are estimated relative to a baseline event year. Given that there may be anticipatory effects of democratizations, we choose two years before the democratization event ($\tau = -2$) as reference.[28] The event study models include the same set of control variables that has been used in the time-series cross-sectional regressions described above. All estimations include calender year dummies.

The results of the event studies are visualized in Figure 3.3. The subfigures on the left hand side depict the results of event studies for the four repression indicators without the interaction terms between the event year dummies and logged GDP per capita. The subfigures on the right hand side show the results obtained from the interaction models. For the reversed Fariss scores, the event study without interaction terms indicates a roughly constant repression level before the baseline event year. One year before the establishment of full democracy, repression starts to decrease. This trend continues for four to five years. In the remaining observation period, the estimated level of repression then stabilizes at a lower level compared to the pre-democratization period. These results suggest that the establishment of democracy is, on average, associated with immediate and persistent repressive withdrawals. Including interactions between the event years and logged GDP per capita reveals considerable heterogeneity between countries. While there is little evidence for systematic deviations in the period before the baseline event year, there is divergence between poor and rich countries after democratization. In line with the implications of the theoretical model, we estimate a strong reduction of repression as measured by the Fariss scores for a country with the highest per capita income in our event study sample. In contrast, the estimated pattern for a country with the lowest GDP per capita indicates that repression does not change significantly or may even increase after democratization. Qualitatively similar results are obtained from the event studies for the other repression indicators. The estimations for the PIR, the Amnesty, and the State Department scores without interactions between event years and logged GDP per capita indicate small to modest and often insignificant reductions of repression after democratization. The interaction models generally reveal that relatively rich countries show significant decreases in human rights violations after democratization relative to the baseline year. With respect to poorer countries, there is no evidence for a declining repression level after the democratic regime change.

To sum up, the analysis of stable democratizations within an event study framework supports the hypothesis derived from our theoretical model. While we find immediate and persistent reductions of repression in countries with high income levels, there is no evidence for pacifying effects of democratizations in countries with low income levels.

[28] Note that different choices of the baseline event year result in equivalent statistical models and results. This choice only affects the interpretation of the estimated coefficients α_τ, and β_τ, as they indicate deviations of repression from the baseline event year.

Figure 3.3: Results of event studies with and without interactions between event years and logged GDP per capita



Note: The subfigures on the left hand side show the estimated level of repression relative to the baseline year ($\tau = -2$) without interactions with logged GDP per capita. The subfigures on the right hand side are based on models including interaction terms between the event years and logged GDP per capita. For these models, the estimated event-year effects are evaluated at the lowest and the highest income of the democratizing countries included in the sample. All figures show 90% confidence intervals.

Although the event study analyses complement the previously presented time-series cross-sectional regressions by overcoming some of their shortcomings, a main drawback of the event study approach is its exclusive focus on democratizing states. The exclusion of all other countries from the analysis entails a loss of potentially useful information. In the following, we aim to exploit this additional information while maintaining the focus on dynamics of repression in the course of stable democratizations.

3.5.3 Generalized synthetic control estimations

While event studies exclude units that did not experience the event of interest, the discarded data may provide information on changes in the outcome variable that would have taken place in the absence of the event. More specifically, the evolution of repression in countries without democratization may help to assess how repression levels would have evolved in countries which became democratic if the regime changes did not happen. The estimation of such "counterfactuals" is at the heart of the synthetic control method introduced by Abadie and Gardeazabal (2003) and Abadie et al. (2010, 2015). In its basic version, this method considers one unit which experienced the event (or the intervention) and a group of units (the "control group") in which the event did not occur. Using data on the outcome and selected covariates prior to the event, a "synthetic control unit" is constructed as a weighted average of the control group units. This synthetic control unit should provide a good approximation of the event-unit in the pre-event period. In the post-event period, the evolution of the outcome of this synthetic control unit is regarded as the counterfactual for the event-unit. The differences in the post-event outcome values between the event-unit and the (synthetic) counterfactual then serve as effect estimates of the event of interest.

With respect to our setting, this basic version of the synthetic control method has the disadvantage of permitting only one unit which experienced the event. Hence, utilizing information provided by data on multiple democratizations within the framework of one analysis is not possible. Fortunately, a generalization of the synthetic control method which allows for multiple target countries has recently been proposed by Xu (2017). This "generalized synthetic control method" offers additional advantages over its predecessor. First, it assesses the uncertainty of effect estimates by using a bootstrap procedure. Second, it relies on an interactive fixed effects model which is robust against correlation between the event of interest and unobserved unit and time heterogeneities. For our analysis of democratization and repression, the model underlying the generalized synthetic control estimations can be written as

$$r_{it} = \delta_{it} \cdot d_{it} + \boldsymbol{x}'_{it\tau}\boldsymbol{\gamma} + \boldsymbol{\lambda}'_i \boldsymbol{f}_t + \varepsilon_{it}, \tag{3.18}$$

where d_{it} equals 1 if country i became democratic before year t and equals 0 otherwise. Note that the coefficient δ_{it} of this dummy can vary over countries and years. In particular, this allows the effect of the democratization to evolve over time. Our main quantity of interest is the average effect of democratization at a given year after the event. This

quantity is estimated by the mean of the estimated δ_{it} across all democratizing countries. The model (3.18) further includes a vector of unobserved common factors $\boldsymbol{f}_t$ with loadings stored in the vector $\boldsymbol{\lambda}_i$. These factors are assumed to underly both the group of democratizing countries and the group of "control" countries. Again, all estimations presented in this section include the same covariates $\boldsymbol{x}$ that have already been used in the previous analyses. The model is completed by an error term ε_{it}.

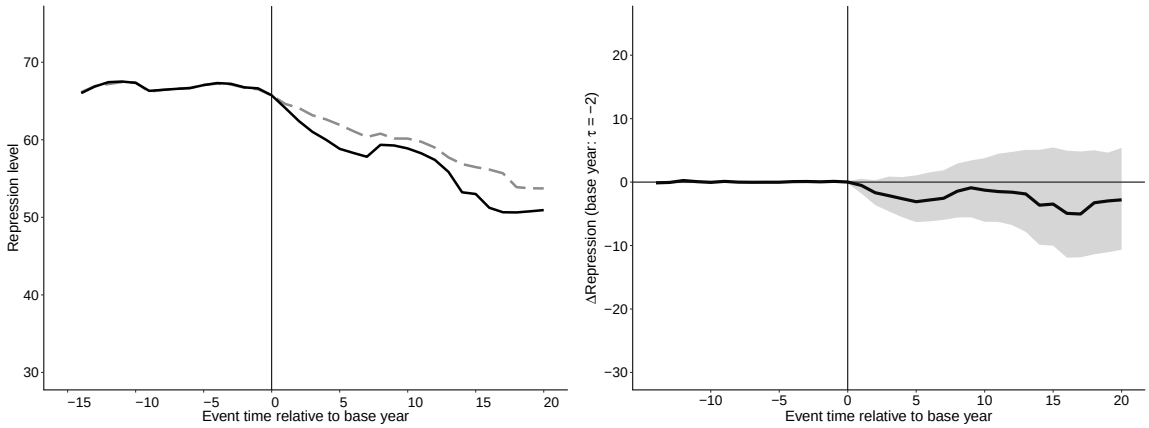
The generalized synthetic control estimation proceeds in three steps. First, (3.18) without the dummy d_{it} is estimated using only control group data to obtain estimates of regression coefficients $\boldsymbol{\gamma}$, unobserved common factors $\boldsymbol{f}_t$, and factor loadings $\boldsymbol{\lambda}_i^{cc}$ for the control group countries (cc). Second, using the estimated regression coefficients and common factors from the first step, the factors loadings $\boldsymbol{\lambda}_i^{dc}$ for the democratizing countries (dc) are estimated by minimizing the mean squared error of the predicted repression levels in the pre-democratization period. Third, given these estimates for $\boldsymbol{\gamma}$, $\boldsymbol{f}_t$, and $\boldsymbol{\lambda}_i^{dc}$, counterfactuals for the democratizing countries in the period after democratization are constructed. Similar to the basic version of the synthetic control group, the differences between the counterfactuals and the observed repression levels then serve as estimates for the effects of democratization δ_{it}.

A limitation we face when applying the generalized synthetic control method is that the PIR index, the Amnesty scores, and the State Department scores are discrete in nature. Averaging other countries' scores to generate a synthetic control therefore would generally result in estimates which are outside the set of values these indicators can take on. While the only suitable repression indicator for the following analysis therefore is given by the continuous reversed human rights scores of Fariss (2014), we show in the online appendix that using data from Cingranelli and Filippov (2018), which differ from Fariss' data with respect to the underlying measurement model, leads to similar results.

To define the group of democratizing countries, we rely on the same conditions that have previously been used for the event studies. However, missing values in covariates result in a poor coverage of the pre-democratization period for 6 of these 27 democratizing states. Since the pre-democratization period is essential for the construction of a synthetic control estimate, these countries had to be dropped from the analyses.[29] The generalized synthetic control estimations presented in the following therefore are based on 21 democratizing countries. The control group sample for these countries consists of all country-years characterized by an X-Polity score < 6 (no full democracy). To separate event and control group units, non-democratic time periods of the democratizing countries are not included in the control group sample. Similar to the event studies, we take anticipatory effects of institutional changes into account and choose two years before democratization ($\tau = -2$) as our base year.

[29] Namely: Bulgaria, Hungary, Macedonia, Paraguay, Poland, and Turkey were dropped from the analyses. For these countries, missing values particularly arise in the variable *Trade openness*. As we show in the online appendix, excluding this covariate from the analysis increases the number of included democratizing countries to 26 and yields similar results. In case of Macedonia, there is a lack of pre-democratization data for all covariates, which generally prevents the inclusion of this country.

Figure 3.4: Generalized synthetic control estimates



Note: Repression is measured by the reversed and 0-100-normalized latent human rights scores of Fariss (2014). The subfigure on the left hand side shows the average repression level of the democratizing countries (solid line) and the average repression level of the synthetic control group (dashed line). The subfigure on the right hand side depicts the differences between democratizing and control group countries with bootstrapped 90% confidence intervals.

The results of the generalized synthetic control estimation including all democratizing countries are shown in Figure 3.4. The solid line in the subfigure on the left hand side shows the evolution of the average repression level of the democratizing countries. The dashed line depicts the evolution of the average repression level of the synthetic control units. Obviously, the synthetic control units provide a good approximation of the democratizing countries in terms of repression in the pre-event years. In this period, the two lines are almost indistinguishable. Subsequent to the base year, the patterns start to diverge. While repression is estimated to decrease in both groups, this reduction is more pronounced for the group of democratizing countries. Thus, the results of the synthetic control estimation suggest a negative effect of democratization on government violations of human rights. However, given that the dependent variable is normalized between 0 and 100, this effect is relatively small in magnitude. The subfigure on the right hand side provides a more effect-oriented visualization by showing the differences between the average repression levels in the groups of democratizing and synthetic control countries. Here, the estimated pacifying effect of democratization is reflected by the slightly negative evolution of the solid line after the base year. However, the depicted bootstrapped confidence interval indicates that the estimated negative effect is insignificant for the whole observation period subsequent to the base year. On the whole, these results do not provide evidence for relevant and significant reductions of repression after democratization.

This finding is not surprising if the predictions of the theoretical model are correct. While we expect pacifying effects of democratization in countries with relatively high income levels, there may be no or even adverse effects in poor countries. To test these more specific hypotheses, Figure 3.5 shows generalized synthetic control estimates for different

income groups.[30] While the subfigures on the left hand side show the effect plots for groups of poor countries, the subfigures on the right hand side illustrate the estimated effects for groups of rich countries. The plots in the first row depict estimation results for the ten poorest and the ten richest countries, respectively. While we find negative, though insignificant, effects of democratization on repression for the ten richest countries, we estimate positive but also insignificant effects for the ten poorest countries. Restricting the sets of considered units to the eight poorest and richest countries again reveals insignificant effects for the countries with the lowest income levels. In contrast, the synthetic control estimates indicate negative and significant reductions of repression after democratization for the eight richest countries. Considering more extreme income groups further accentuates these diverging patterns. While the estimations for the six and the four poorest democratizing countries do not indicate reductions of repression after the regime change, the pacifying effects found for countries with higher income levels become more pronounced when the group of rich countries is further restricted. Both the plot for the six and the four richest democratizing countries indicate significant decreases in government violations of human rights. These decreases occur immediately after the base year and persist until the end of the depicted time frame. Furthermore, considering the four richest instead of the eight richest democratizing countries approximately doubles the estimated "long-run" effect of democratization.

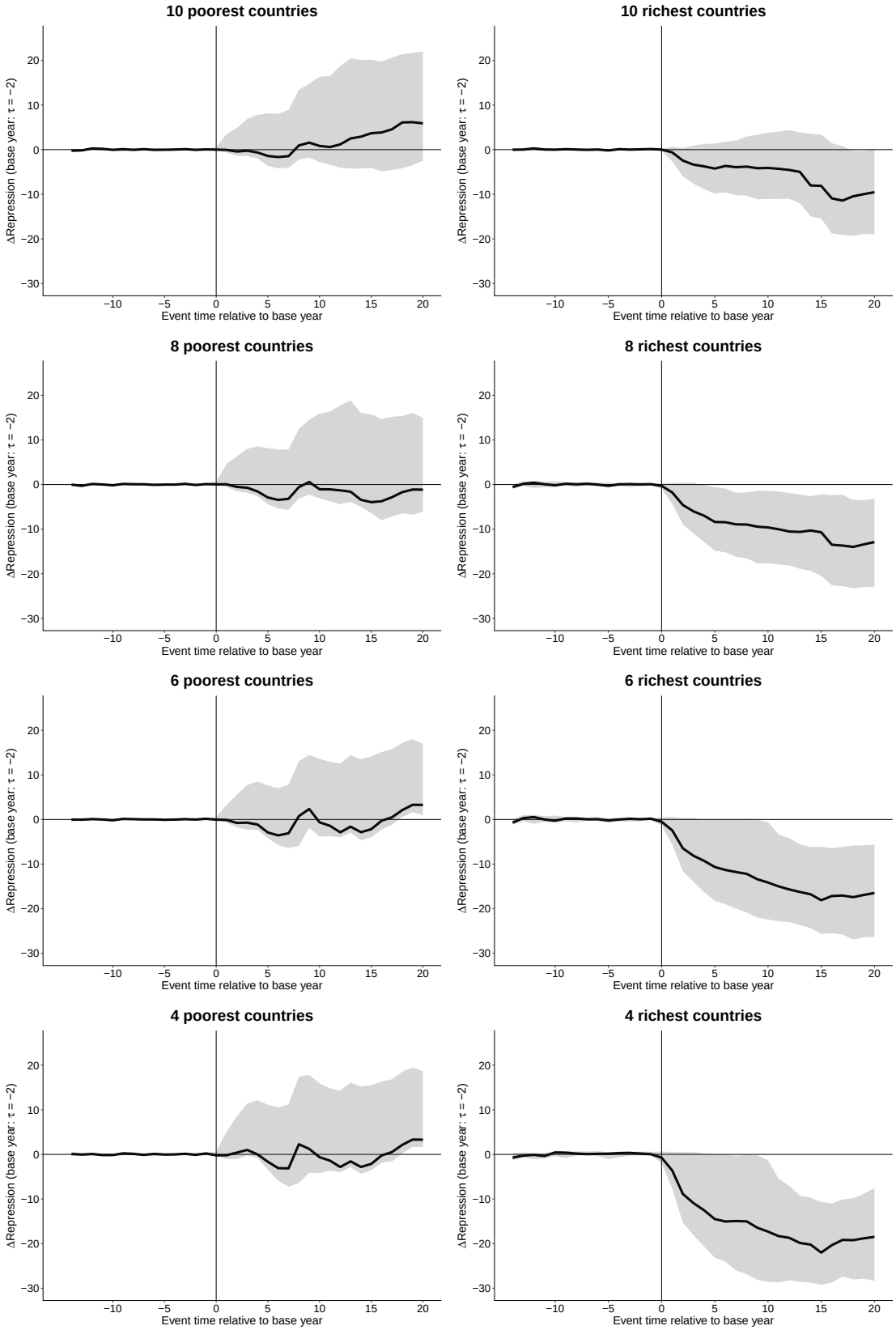
In summary, these findings provide further support for the hypothesis derived from the theoretical model. While democratization is related to decreases in repression in countries with relatively high income levels, the generalized synthetic control analysis does not indicate pacifying effects of democratization in countries with low income levels.

3.6 Conclusion

The relationship between democracy and state repression has been examined extensively in the empirical literature. While studies generally agree that full democracies are less repressive than other regime types, the evidence obtained from analyses of regime changes is inconclusive. Moreover, the patterns of state repression in the course of democratizations differ substantially between countries. The objective of this paper was to examine heterogeneity in the relationship between democracy and government violations of human rights. In line with arguments from the civil war literature, we highlighted that democracy may not be inevitably pacifying but may fuel violent conflict due to enhanced opportunities of insurgents to organize and coordinate with each other. By incorporating this perspective into a simple formal model, we derived opposing effects of democracy on state repression. While democratic political regimes are shown to reduce conflict and repression because of a better representation of the citizens' preferences, the enhanced coordination opportunities of insurgents result in increased levels of repression. Consequently, the net

[30] An overview of the countries' income levels in the year of democratization is given in the appendix (Figure 3.6).

Figure 3.5: Generalized synthetic control estimates for different income groups



Note: The subfigures show generalized synthetic control estimates for different groups of countries which are defined via their income level at the year of completed democratization. All subfigures show 90% bootstrap confidence intervals.

effect of democracy is found to be ambiguous. However, the model reveals that the relative strength of the opposing effects of democracy depends on the level of income. Democracy is found to be more likely to reduce repression in countries with higher income levels. In poor countries, the adverse effects of democracy may dominate.

To test these implications of the theoretical model empirically, we used different methodological approaches. First, we estimated cross-sectional time-series regressions relating levels of repression to levels of democracy for a large number of countries. Second, we analyzed the evolution of repression around stable democratizations within an event study framework. Third, these democratization events were additionally examined using a recent generalization of the synthetic control method (Xu, 2017). All of these analyses consistently indicate that democracy is likely to reduce government violations of human rights in countries with high income levels. In contrast, democracy may have no or even adverse effects on state repression in relatively poor countries.

By offering insights into heterogeneous effects of democracy, our analyses may help to explain some of the observed differences between countries with respect to the evolution of repression around democratizations. In addition, our results indicate that the "domestic democratic peace" (Davenport, 2007a,b) may be a "conditional domestic democratic peace" as the pacifying effects of democracy are found to dominate in countries with relatively high income levels only.

Of course, our findings are subject to limitations. While we highlighted the role of income levels, there may be other contextual factors which moderate the effect of democracy on state repression. Identifying such factors would further contribute to a better understanding of the relationship between democracy and government violations of human rights. Furthermore, we did not consider the interrelations between economic development and democracy. In addition to the link from income to democracy established by modernization theory (see Lipset, 1959), there may also be effects of democracy on income. If democracy does cause growth (Acemoglu et al., 2019), the populations of initially poor countries may also benefit from democratization in terms of human rights in the long run. Another interesting route for future research therefore could be the analysis of dynamic relationships between income, democracy, and state repression.

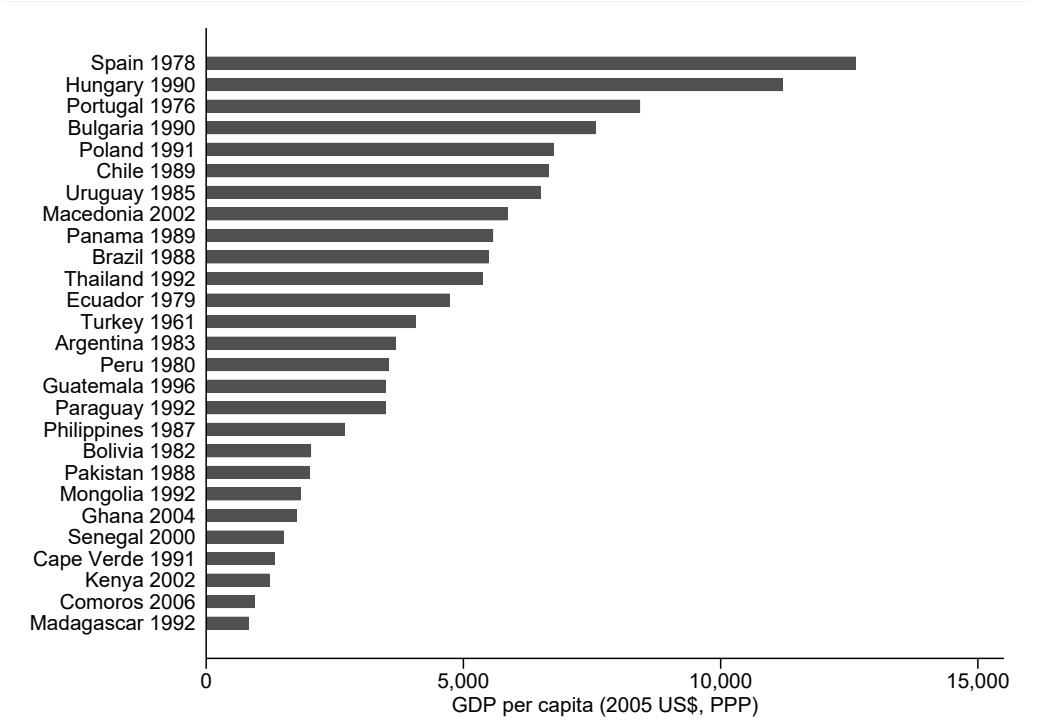
3.7 Appendix

Table 3.4: Summary statistics

Variable	N	Mean	Std. Dev.	Min	Max
Latent human rights scores	8,562	0.29	1.39	-3.11	4.71
PIR (CIRI)	4,884	4.93	2.34	0	8
Amnesty scores	4,846	2.73	1.11	1	5
State Department scores	5,834	2.40	1.16	1	5
X-Polity	7,283	1.18	4.92	-6	7
Full democracy	7,283	0.34	0.47	0	1
GDP/capita (2005 US$, PPP)	8,446	9,128.79	19,252.38	132.82	632,239.50
Population (in 1,000)	8,446	30,129.99	109,417.50	9.00	1,324,353.00
Youth bulges	8,238	29.28	7.03	11.37	43.81
Trade openness	6,892	74.13	48.15	0.02	531.74

The table shows summary statistics for the variables included in our analyses. Note that some of these variables are transformed before entering the models as described in the text.

Figure 3.6: Income levels in the year of democratization



3.8 Online Appendix

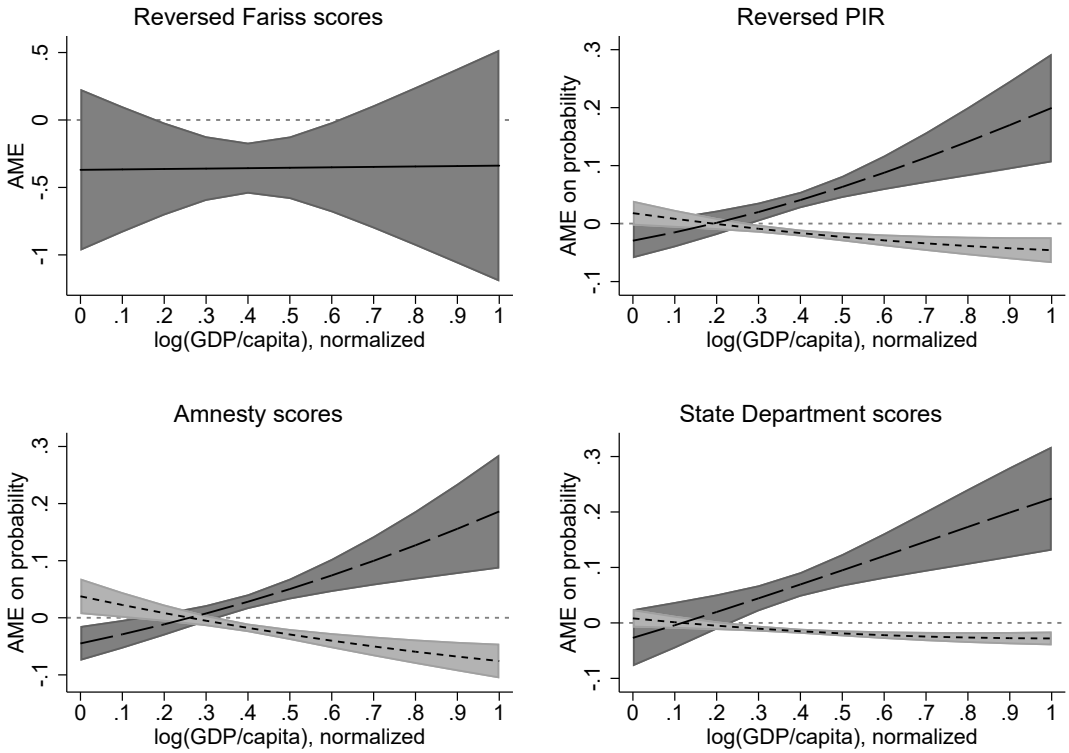
This online appendix presents robustness checks of the empirical results shown in the paper. The following analyses mainly focus on the measurement of democracy and the identification of democratizations. In addition, the robustness of our results against the use of an alternative indicator of state repression is assessed.

Section 3.8.1 presents the results of time-series cross-sectional regressions using alternative democracy indicators. For the democratizing countries identified by the use of these indicators, event studies are conducted in section 3.8.2. In another event study analysis, presented in section 3.8.3, we investigate different threshold conditions with respect to the minimum increase in the X-Polity score required for a sufficiently large-scaled democratization. Section 3.8.4 shows the results of generalized synthetic control estimations based on alternative democracy indicators. Section 3.8.5 assesses the stability of the results of generalized synthetic control estimations against the exclusion of trade openness as a covariate. Finally, section 3.8.6 shows the results of event studies and generalized synthetic control estimations using an indicator of state repression generated by Cingranelli and Filippov (2018).

3.8.1 Time-series cross-sectional regressions using alternative democracy indicators

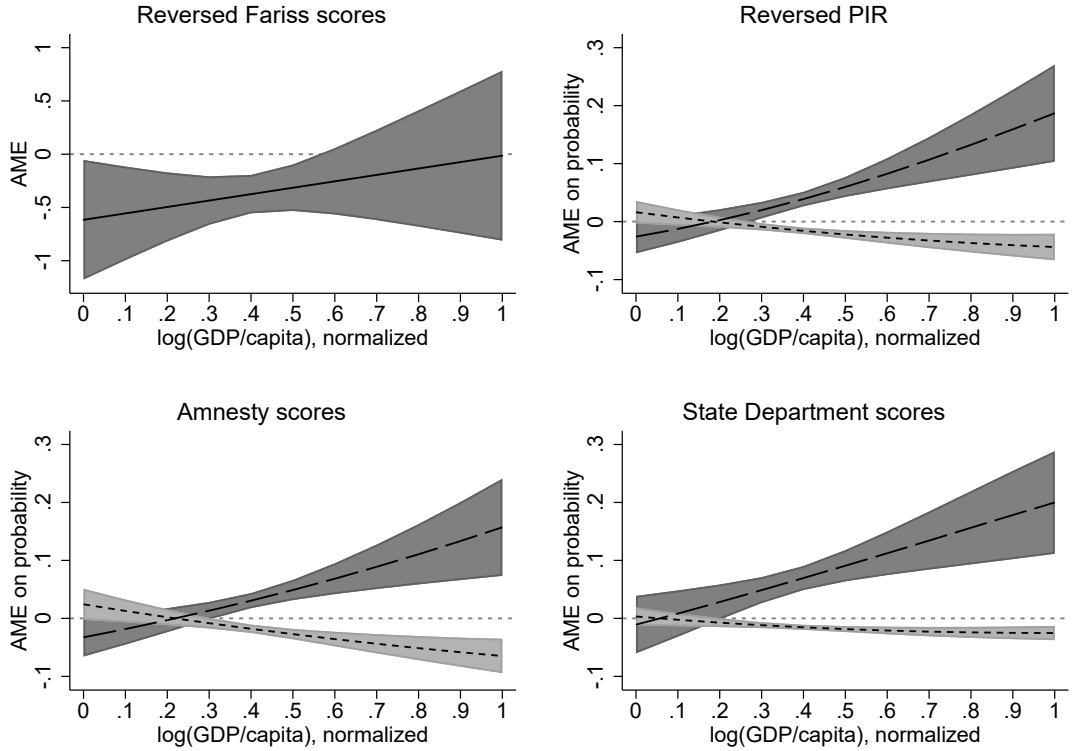
This section presents the results of time-series cross-sectional regressions where the X-Polity-based democracy measure is replaced by democracy indicators from Cheibub et al. (2010) (CGV) and Acemoglu et al. (2019) (ANRR), respectively. Both indicators are binary and only distinguish between autocracies (coded as 0) and democracies (coded as 1). The results obtained by using the CGV democracy indicator are shown in Table 3.5 whereas the results obtained by using the ANRR democracy indicator are presented in Table 3.6. For both indicators, we find significant negative interactions with logged GDP per capita when using the reversed PIR index, the Amnesty scores, and the State Department scores as dependent variables. We do not find interaction effects when using the reversed human rights scores of Fariss (2014). The estimated marginal effects of democracy are depicted by Figures 3.7 and 3.8, respectively. On the whole, these results are broadly in line with the hypothesis that democracy is associated with lower levels of repression in relatively rich countries whereas it may have no or even adverse effects in poorer countries.

Figure 3.7: Average marginal effects (AME) of democracy as measured by CGV by income level



Note: The subfigures depict the estimated average marginal effects (AME) of democracy on each repression indicator for different levels of income with 95% confidence intervals. Income is measured by the logarithm of GDP per capita and is normalized between 0 (lowest sample income) and 1 (highest sample income). For the reversed Fariss scores, the solid line represents the estimated AME. For the reversed PIR, the Amnesty scores, and the State Department scores the long-dashed lines represent the AME on the lowest level of repression (i.e. the lowest score of the repression indicator) whereas the short-dashed lines represent the AME on the highest level of repression (i.e. the highest score of the repression indicator).

Figure 3.8: Average marginal effects (AME) of democracy as measured by ANNR by income level



Note: The subfigures depict the estimated average marginal effects (AME) of democracy on each repression indicator for different levels of income with 95% confidence intervals. Income is measured by the logarithm of GDP per capita and is normalized between 0 (lowest sample income) and 1 (highest sample income). For the reversed Fariss scores, the solid line represents the estimated AME. For the reversed PIR, the Amnesty scores, and the State Department scores the long-dashed lines represent the AME on the lowest level of repression (i.e. the lowest score of the repression indicator) whereas the short-dashed lines represent the AME on the highest level of repression (i.e. the highest score of the repression indicator).

Table 3.5: Linear and ordered logistic regressions for indicators of state repression using the CGV democracy indicator

Dependent variable	Reversed Fariss scores		Reversed PIR		Amnesty scores		State Department scores	
Model	linear		ordered logit		ordered logit		ordered logit	
Regression No.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CGV	-0.357***	-0.370	-0.557***	0.552*	-0.421***	0.884***	-0.708***	0.312
	(0.096)	(0.304)	(0.103)	(0.319)	(0.102)	(0.337)	(0.109)	(0.310)
log(GDP/capita)	-0.249	-0.259	-0.971*	0.170	-0.521	0.750	-1.846***	-0.951*
	(0.360)	(0.413)	(0.524)	(0.567)	(0.507)	(0.527)	(0.487)	(0.510)
CGV ×		0.031		-2.876***		-3.387***		-2.645***
log(GDP/capita)		(0.714)		(0.804)		(0.834)		(0.761)
log(Population)	0.096***	0.096***	0.257***	0.255***	0.168***	0.165***	0.244***	0.243***
	(0.027)	(0.027)	(0.033)	(0.031)	(0.037)	(0.038)	(0.031)	(0.032)
Intrastate conflict	0.849***	0.849***	1.352***	1.389***	1.335***	1.369***	1.715***	1.727***
	(0.125)	(0.126)	(0.155)	(0.158)	(0.147)	(0.150)	(0.170)	(0.172)
Youth bulges	2.691***	2.705***	4.862***	3.557***	4.804***	3.633***	4.149***	2.958**
	(0.857)	(0.923)	(1.163)	(1.182)	(1.079)	(1.068)	(1.166)	(1.201)
Trade	-0.001	-0.001	-0.000	-0.002	-0.000	-0.002	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
lagged DV	0.973***	0.973***	1.063***	1.049***	2.102***	2.061***	2.530***	2.501***
	(0.003)	(0.004)	(0.043)	(0.042)	(0.085)	(0.084)	(0.087)	(0.087)
Observations	6218	6218	3659	3659	3425	3425	4417	4417

Note: All regression include year dummies. Standard error estimators are clustered by country. Estimated standard errors are shown in parentheses. Significance levels: *10%, **5%, ***1%. Estimated intercepts and threshold parameters for ordinal logistic regressions are not shown in the table.

Table 3.6: Linear and ordered logistic regressions for indicators of state repression using the ANRR democracy indicator

Dependent variable	Reversed Fariss scores		Reversed PIR		Amnesty scores		State Department scores	
Model	linear		ordered logit		ordered logit		ordered logit	
Regression No.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ANRR	-0.385***	-0.616**	-0.553***	0.509*	-0.438***	0.590*	-0.721***	0.127
	(0.094)	(0.284)	(0.099)	(0.302)	(0.101)	(0.317)	(0.105)	(0.299)
log(GDP/capita)	-0.315	-0.530	-1.162**	0.125	-0.634	0.530	-1.998***	-1.097**
	(0.349)	(0.413)	(0.512)	(0.606)	(0.493)	(0.547)	(0.481)	(0.532)
ANRR ×		0.602		-2.760***		-2.693***		-2.212***
log(GDP/capita)		(0.663)		(0.777)		(0.765)		(0.726)
log(Population)	0.093***	0.092***	0.254***	0.254***	0.173***	0.172***	0.239***	0.239***
	(0.026)	(0.026)	(0.033)	(0.032)	(0.035)	(0.036)	(0.031)	(0.032)
Intrastate conflict	0.808***	0.796***	1.287***	1.338***	1.305***	1.341***	1.654***	1.672***
	(0.121)	(0.122)	(0.155)	(0.154)	(0.144)	(0.146)	(0.163)	(0.164)
Youth bulges	2.525***	2.785***	4.471***	3.373***	4.635***	3.727***	3.988***	3.094***
	(0.824)	(0.884)	(1.080)	(1.083)	(1.020)	(1.018)	(1.089)	(1.106)
Trade	-0.001	-0.001	-0.000	-0.001	-0.000	-0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
lagged DV	0.973***	0.974***	1.103***	1.088***	2.144***	2.114***	2.529***	2.507***
	(0.003)	(0.003)	(0.043)	(0.042)	(0.086)	(0.085)	(0.083)	(0.083)
Observations	6218	6218	3659	3659	3425	3425	4417	4417

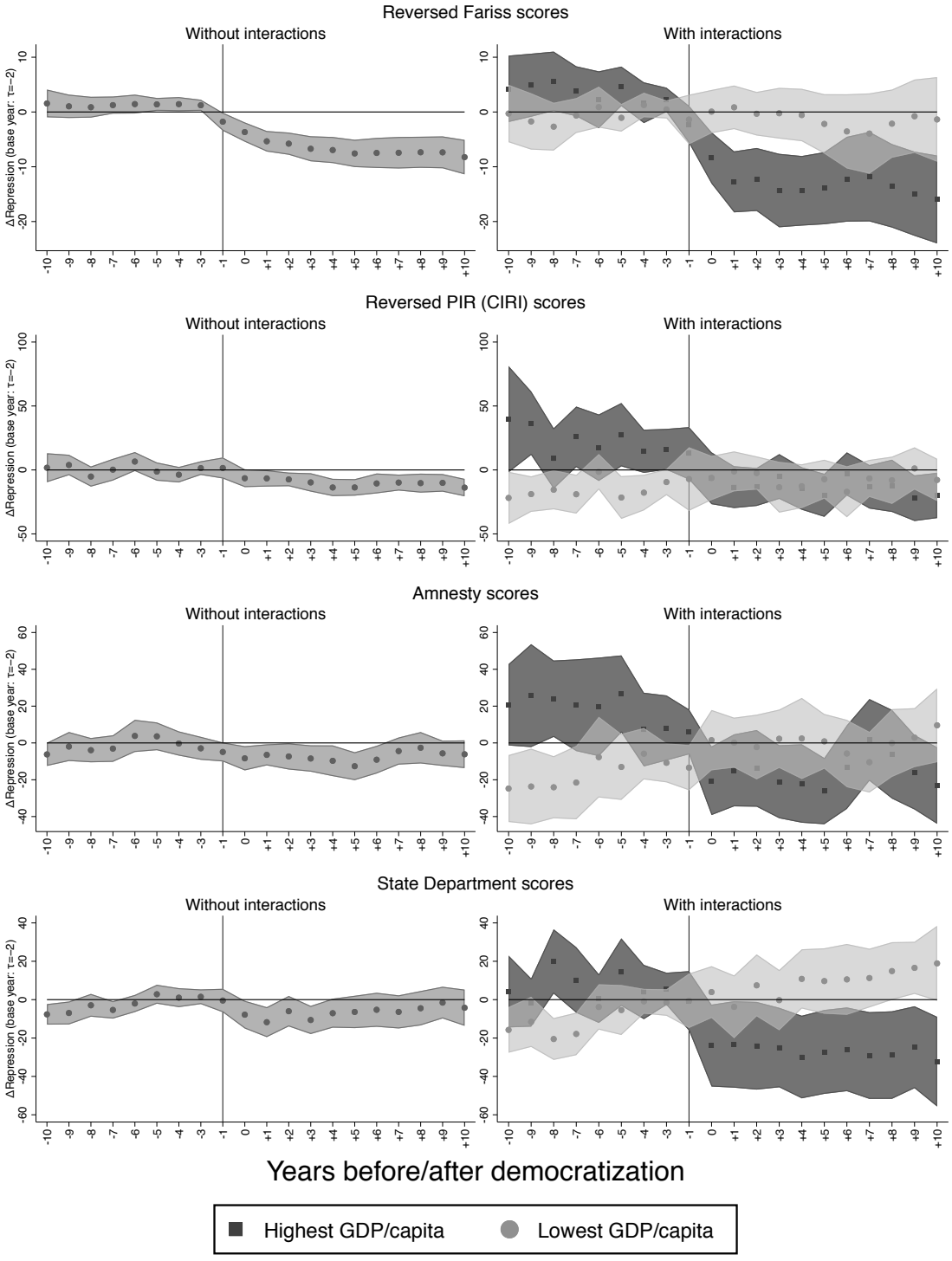
Note: All regression include year dummies. Standard error estimators are clustered by country. Estimated standard errors are shown in parentheses. Significance levels: *10%, **5%, ***1%. Estimated intercepts and threshold parameters for ordinal logistic regressions are not shown in the table.

3.8.2 Event studies using alternative democracy indicators

In the following, we present the results of events studies based on democratizations identified using the CGV and the ANRR democracy indicator, respectively. Since both indicators are binary, a democratization is defined as a change in the respective indicator from 0 (autocracy) to 1 (democracy). The countries and years of democratization are shown in Tables 3.7 (CGV) and 3.8 (ANRR). Note that we excluded countries with multiple democratizations from our analyses to avoid that our results are distorted by adverse regime changes and time overlaps.

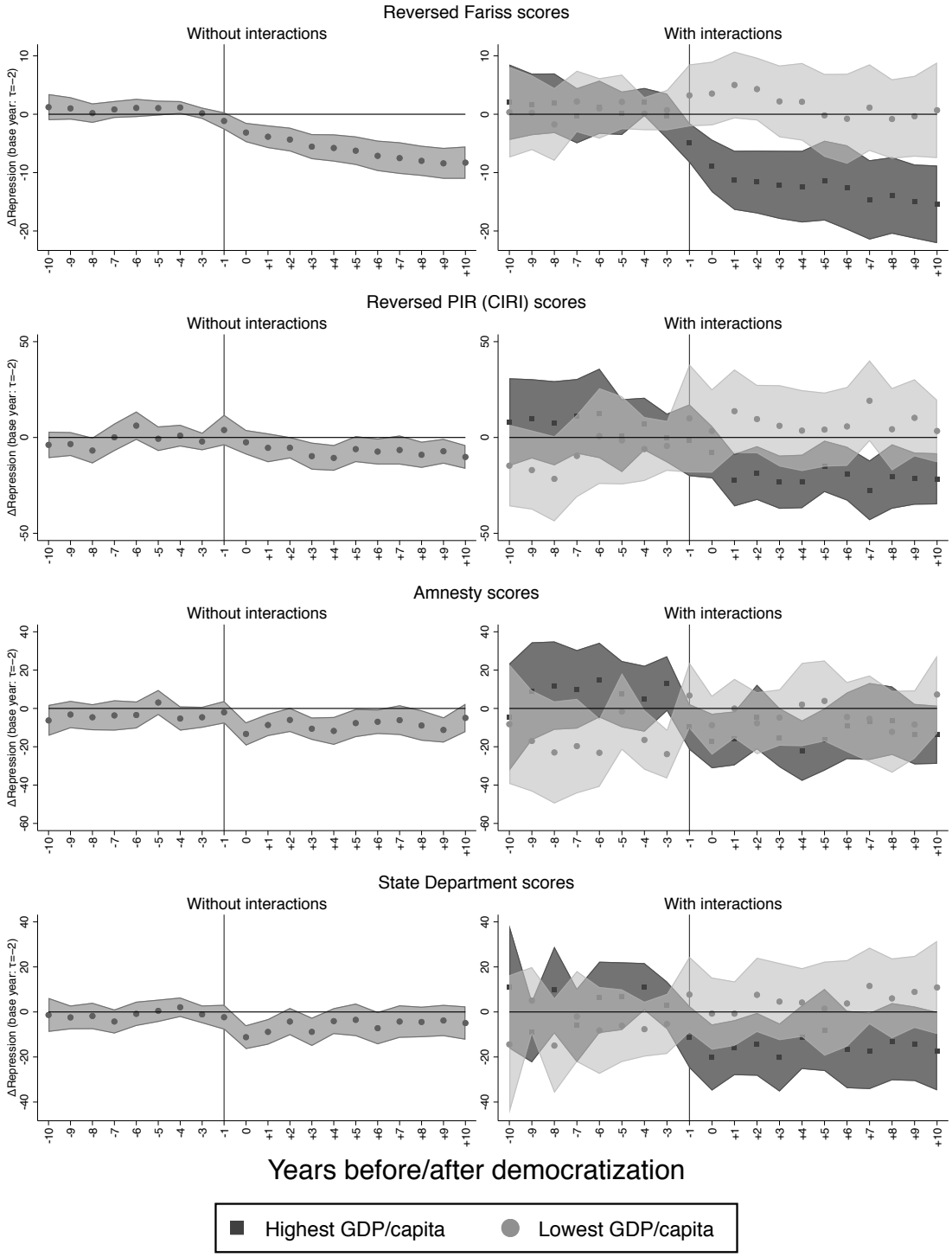
Figure 3.9 and Figure 3.10 depict the results based on the CGV and the ANRR indicator, respectively. For the reversed Fariss scores and the reversed PIR index, we find significant reductions of repression after democratization at the highest GDP per capita in the event sample, whereas there are no significant effects at the lowest sample value of per capita income. With respect to the Amnesty and the State Department scores, results are qualitatively similar, although the estimated negative effects at the highest value of GDP per capita are insignificant for some of the event years after democratization. On the whole, these results are in line with those shown in the paper.

Figure 3.9: Results of event studies with and without interactions between event years and logged GDP per capita using the CGV democracy indicator



Note: The subfigures on the left hand side show the estimated level of repression relative to the baseline year ($\tau = -2$) without interactions with logged GDP per capita. The subfigures on the right hand side are based on models including interaction terms between the event years and logged GDP per capita. For these models, the estimated event-year effects are evaluated at the lowest and the highest income of the democratizing countries included in the sample. All figures show 90% confidence intervals.

Figure 3.10: Results of event studies with and without interactions between event years and logged GDP per capita using the ANRR democracy indicator



Note: The subfigures on the left hand side show the estimated level of repression relative to the baseline year ($\tau = -2$) without interactions with logged GDP per capita. The subfigures on the right hand side are based on models including interaction terms between the event years and logged GDP per capita. For these models, the estimated event-year effects are evaluated at the lowest and the highest income of the democratizing countries included in the sample. All figures show 90% confidence intervals.

Table 3.7: Democratization events identified based on the CGV democracy indicator

Country	Year	Country	Year	Country	Year
Albania	1991	Ghana	1993	Panama	1989
Bangladesh	1986	Honduras	1982	Paraguay	1989
Benin	1991	Hungary	1990	Philippines	1986
Brazil	1985	Indonesia	1999	Poland	1989
Bulgaria	1990	Kenya	1998	Portugal	1976
Cape Verde	1990	Korea, South	1988	Romania	1990
Central African Republic	1993	Madagascar	1993	Sao Tome and Principe	1991
Chile	1990	Malawi	1994	Senegal	2000
Comoros	1990	Mali	1992	Spain	1977
Congo, Republic of	1992	Mexico	2000	Sri Lanka	1989
Dominican Republic	1966	Mongolia	1990	Taiwan	1996
Ecuador	1979	Nepal	1990	Turkey	1961
El Salvador	1984	Nicaragua	1984	Uganda	1980
Fiji	1992	Nigeria	1999	Uruguay	1985
Georgia	2004	Pakistan	1988	Venezuela	1959

Table 3.8: Democratization events identified based on the ANRR democracy indicator

Country	Year	Country	Year	Country	Year
Bangladesh	1991	Honduras	1982	Panama	1994
Benin	1991	Hungary	1990	Paraguay	1993
Bolivia	1982	Indonesia	1999	Peru	1980
Brazil	1985	Kenya	2002	Philippines	1987
Bulgaria	1991	Korea, South	1988	Poland	1990
Burundi	2003	Lebanon	2005	Portugal	1976
Cape Verde	1991	Lesotho	1993	Romania	1990
Central African Republic	1993	Liberia	2004	Sao Tome and Principe	1991
Chile	1990	Madagascar	1993	Senegal	2000
Comoros	1990	Malawi	1994	South Africa	1994
Congo, Republic of	1992	Mali	1992	Spain	1978
Djibouti	1999	Mexico	1997	Taiwan	1992
Dominican Republic	1978	Mongolia	1993	Uganda	1980
Ecuador	1979	Mozambique	1994	Uruguay	1985
El Salvador	1982	Nepal	1991	Zambia	1991
Ghana	1996	Nicaragua	1990	Zimbabwe	1978
Guatemala	1986	Niger	1991		
Guyana	1992	Pakistan	1988		

3.8.3 Event studies based on different regime change threshold values for the identification of democratizations

In the paper, we defined a country to have experienced a democratization if:

1. The country reached an X-Polity score ≥ 6 (full democracy).
2. There was either an associated three-point increase in the X-Polity scores within three years or less, or a four-point increase within four years or less, and so on.
3. There was no negative change in the X-Polity scores during the transition period. In this respect, the Polity codes -66 (interruption), -77 (interregnum), and -88 (transition) are ignored.
4. The country had been non-democratic for at least 10 years before the regime change.
5. The country remained democratic for at least 5 years after the regime change.

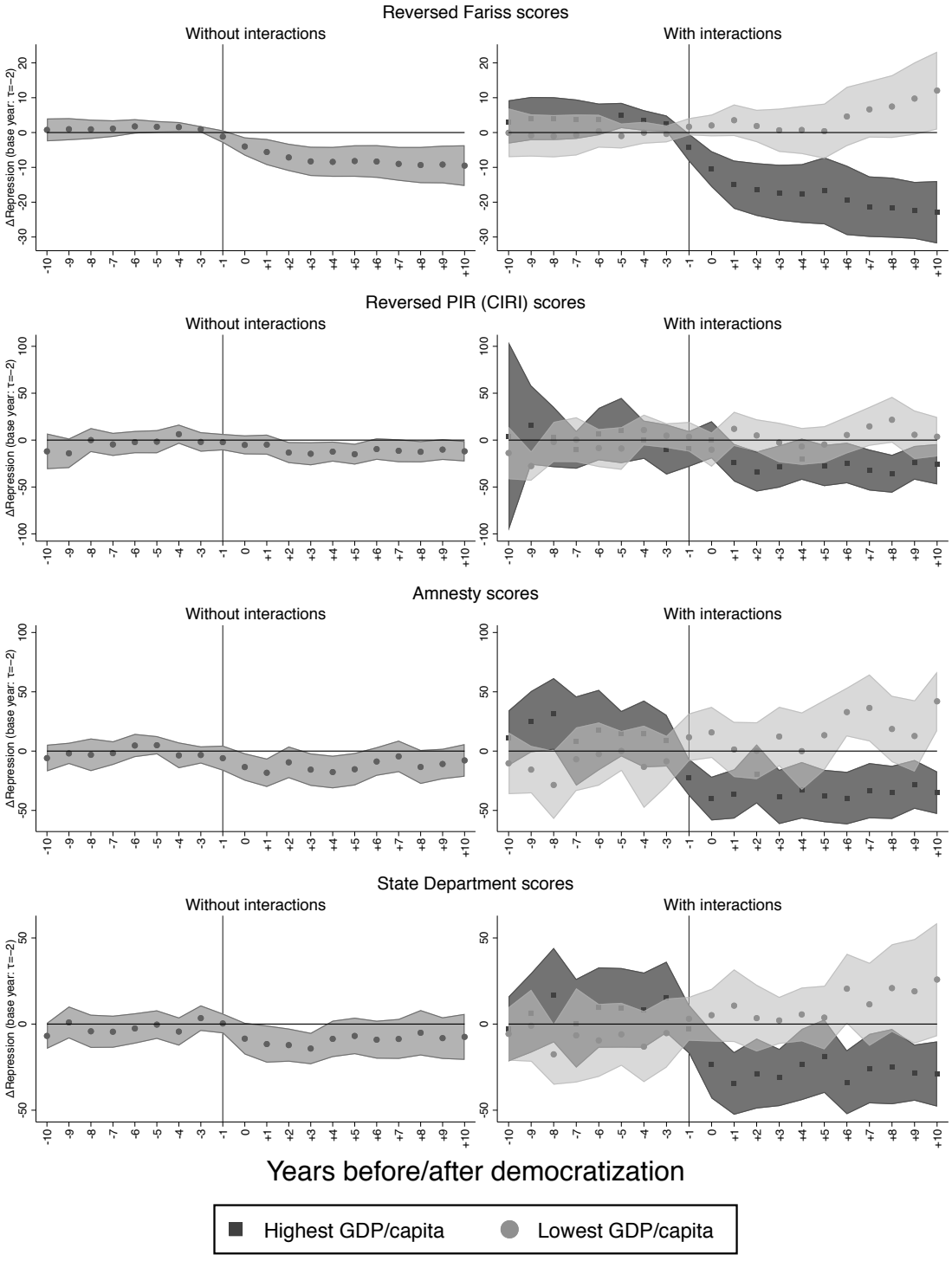
Condition 2. was imposed to ensure that the regime change is sufficiently rapid and large-scaled to be reflected in changes in the level of state repression. In the following, we present results of event studies obtained by replacing condition 2. by:

2a. *More restrictive condition*: There was either an associated four-point increase in the X-Polity scores within three years or less, or a five-point increase within four years or less, and so on.

2b. *Less restrictive condition*: There was either an associated two-point increase in the X-Polity scores within three years or less, or a three-point increase within four years or less, and so on.

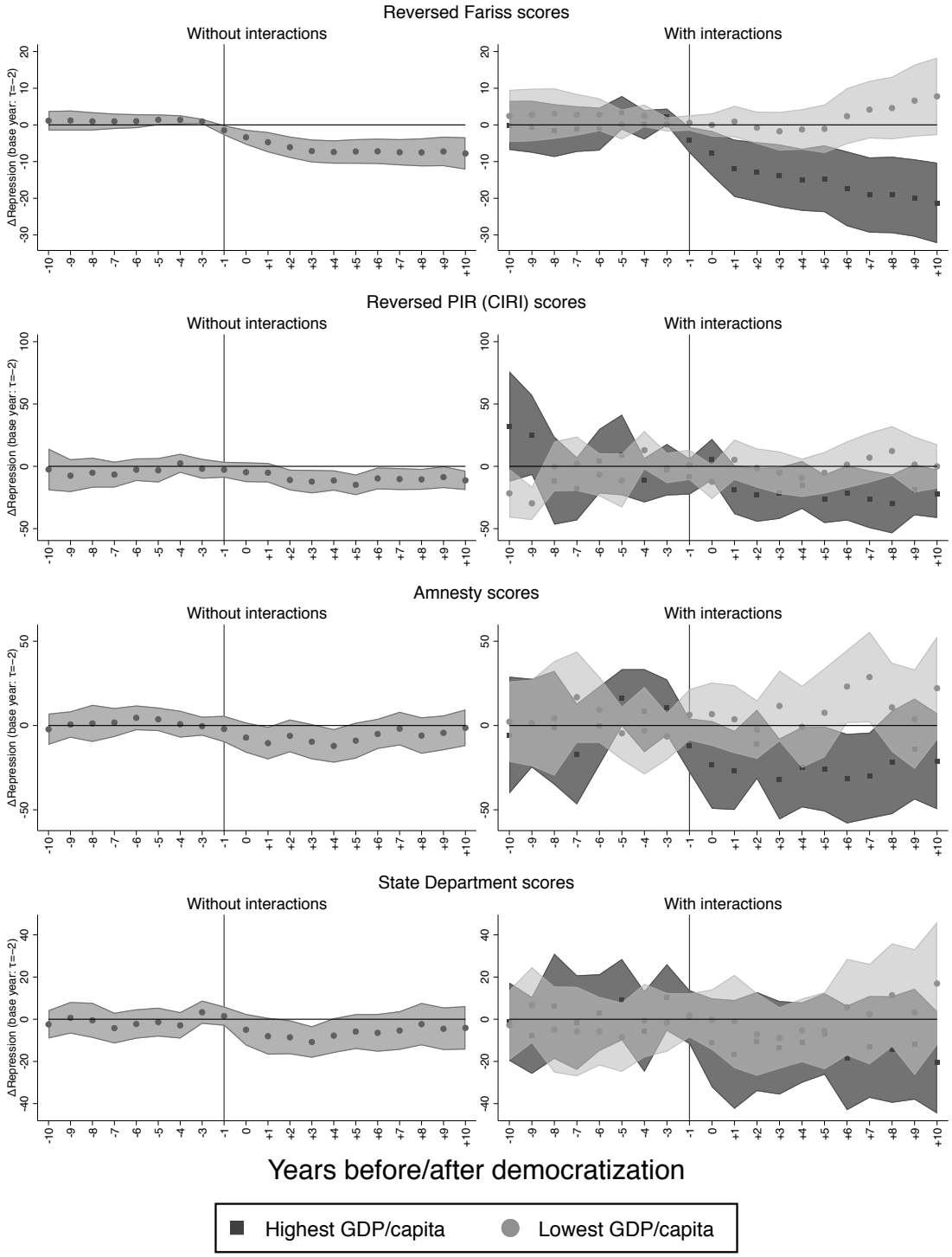
The results based on the more restrictive condition 2a. are shown in Figure 3.11. Compared to the results presented in the paper, the negative effects of democratization for relatively rich countries become more pronounced when the required magnitude of the change in the X-Polity scores is increased. This finding is in line with the notion that larger changes in the institutional structure of a country are reflected in stronger changes in state repression. Figure 3.12 depicts the results of the event studies based on the less restrictive condition 2b. The inclusion of countries which experienced less sizable changes in the political regime yields (in absolute terms) smaller point estimates and larger confidence intervals. These findings provide some evidence that imposing more restrictive conditions on the significance of the regime change promotes the identification of effects of democratization. On the whole, the event studies shown in this section provide further evidence for different patterns of state repression in the course of democratizations in countries with different income levels.

Figure 3.11: Results of event studies with and without interactions between event years and logged GDP per capita based on the more restrictive condition 2a.



Note: The subfigures on the left hand side show the estimated level of repression relative to the baseline year ($\tau = -2$) without interactions with logged GDP per capita. The subfigures on the right hand side are based on models including interaction terms between the event years and logged GDP per capita. For these models, the estimated event-year effects are evaluated at the lowest and the highest income of the democratizing countries included in the sample. All figures show 90% confidence intervals.

Figure 3.12: Results of event studies with and without interactions between event years and logged GDP per capita based on the less restrictive condition 2b.

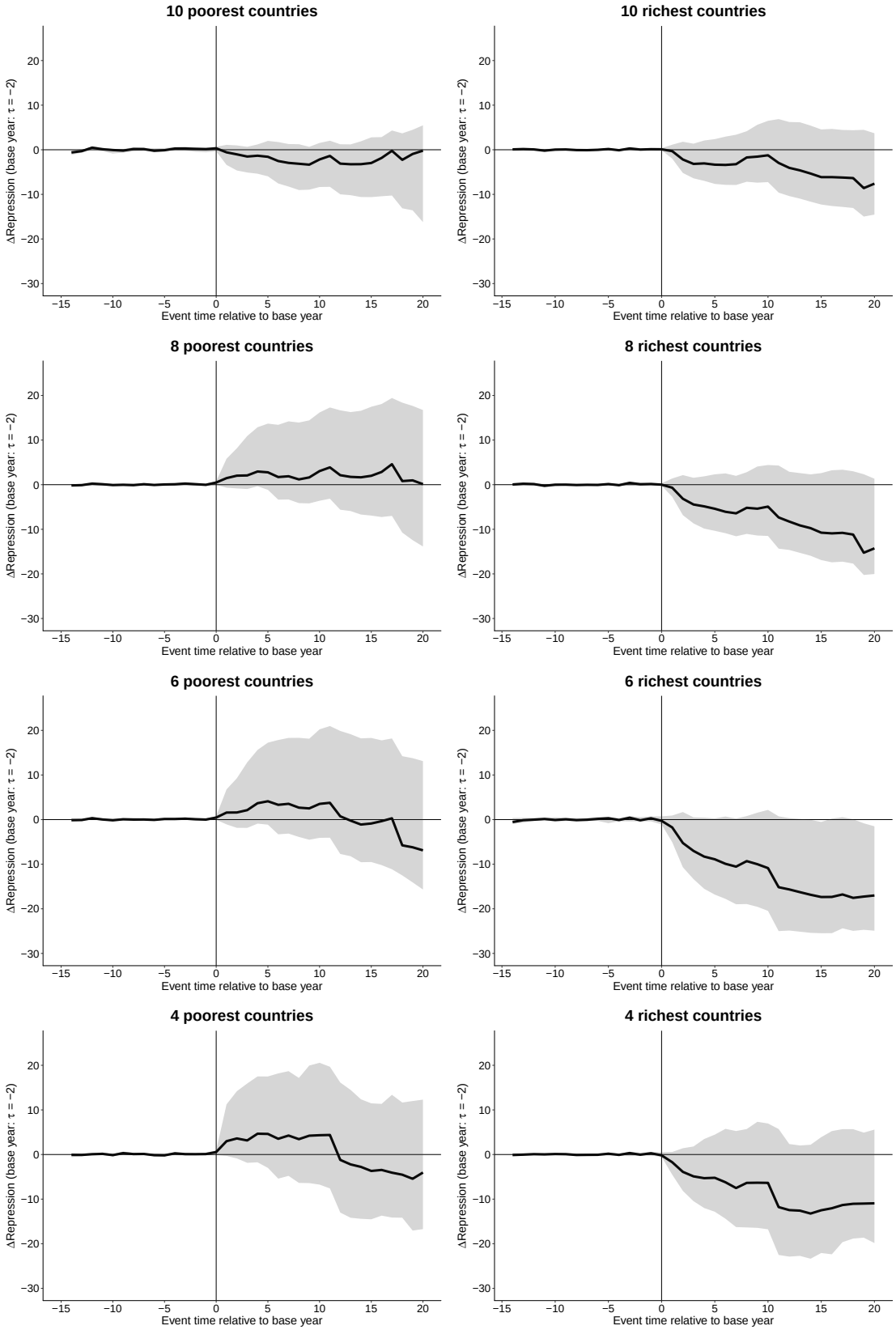


Note: The subfigures on the left hand side show the estimated level of repression relative to the baseline year ($\tau = -2$) without interactions with logged GDP per capita. The subfigures on the right hand side are based on models including interaction terms between the event years and logged GDP per capita. For these models, the estimated event-year effects are evaluated at the lowest and the highest income of the democratizing countries included in the sample. All figures show 90% confidence intervals.

3.8.4 Generalized synthetic control estimations using alternative democracy indicators

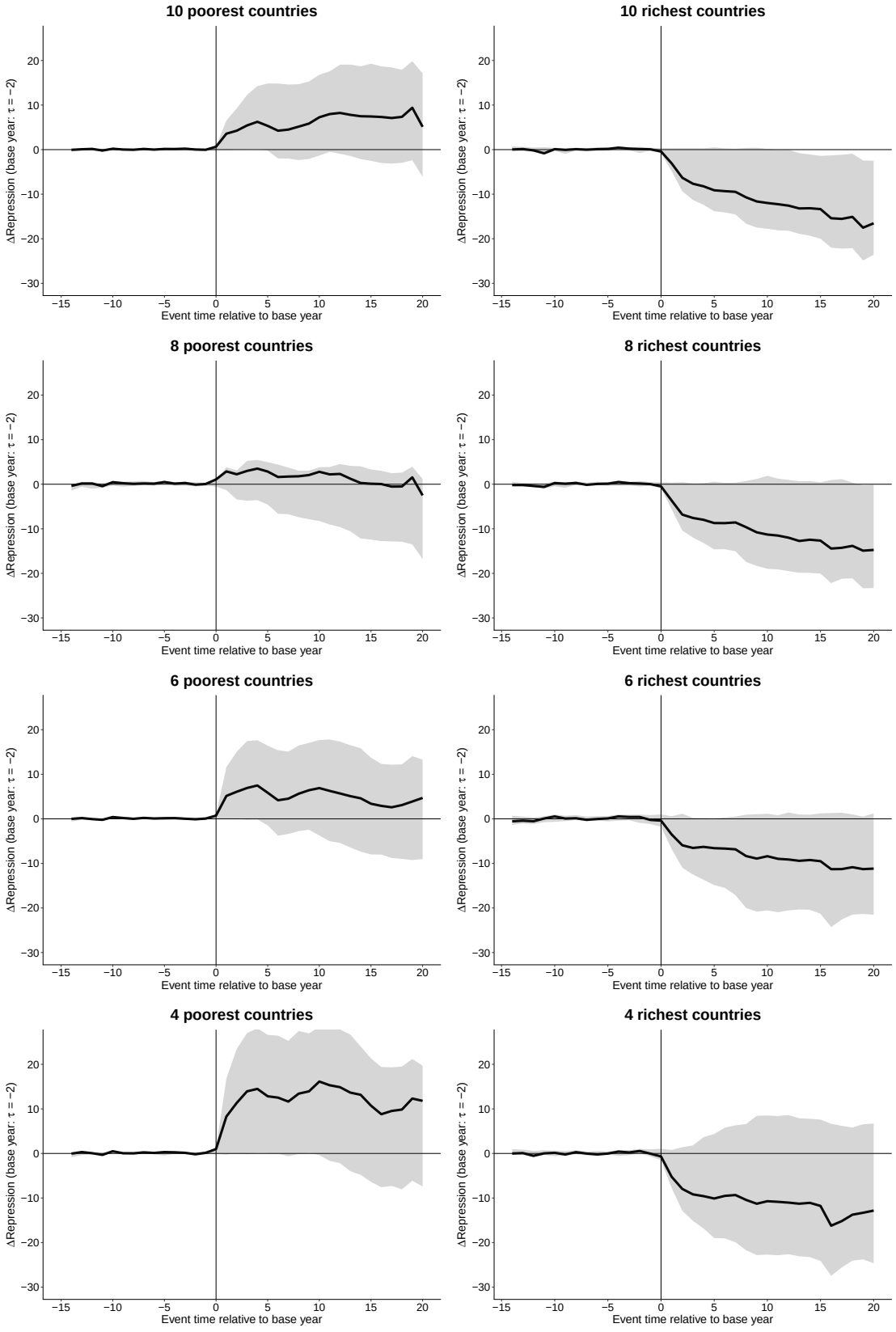
This section presents generalized synthetic control estimations (Xu, 2017) using the CGV and the ANRR democracy indicator, respectively. While Figure 3.13 shows the results obtained with the CGV democracy indicator, Figure 3.14 presents the results obtained with the ANRR democracy indicator. According to the point estimates, we find evidence for positive or only slightly negative effects of democratization on state repression in relatively poor countries. In contrast, we find more pronounced reductions of repression after democratization in relatively rich countries. These results support the implications of the theoretical model. The confidence intervals indicate a relatively high degree of uncertainty of the point estimates, which may likely reflect the fact that we cannot impose conditions ensuring that only countries with substantial changes in the political regime enter our analyses when using the CGV and the ANRR democracy (see section 3.8.3 for the relevance of related threshold conditions).

Figure 3.13: Generalized synthetic control estimates for different income groups using the CGV democracy indicator



Note: The subfigures show generalized synthetic control estimates for different groups of countries which are defined via their income level at the year of completed democratization. All subfigures show 90% bootstrap confidence intervals.

Figure 3.14: Generalized synthetic control estimates for different income groups using the ANRR democracy indicator

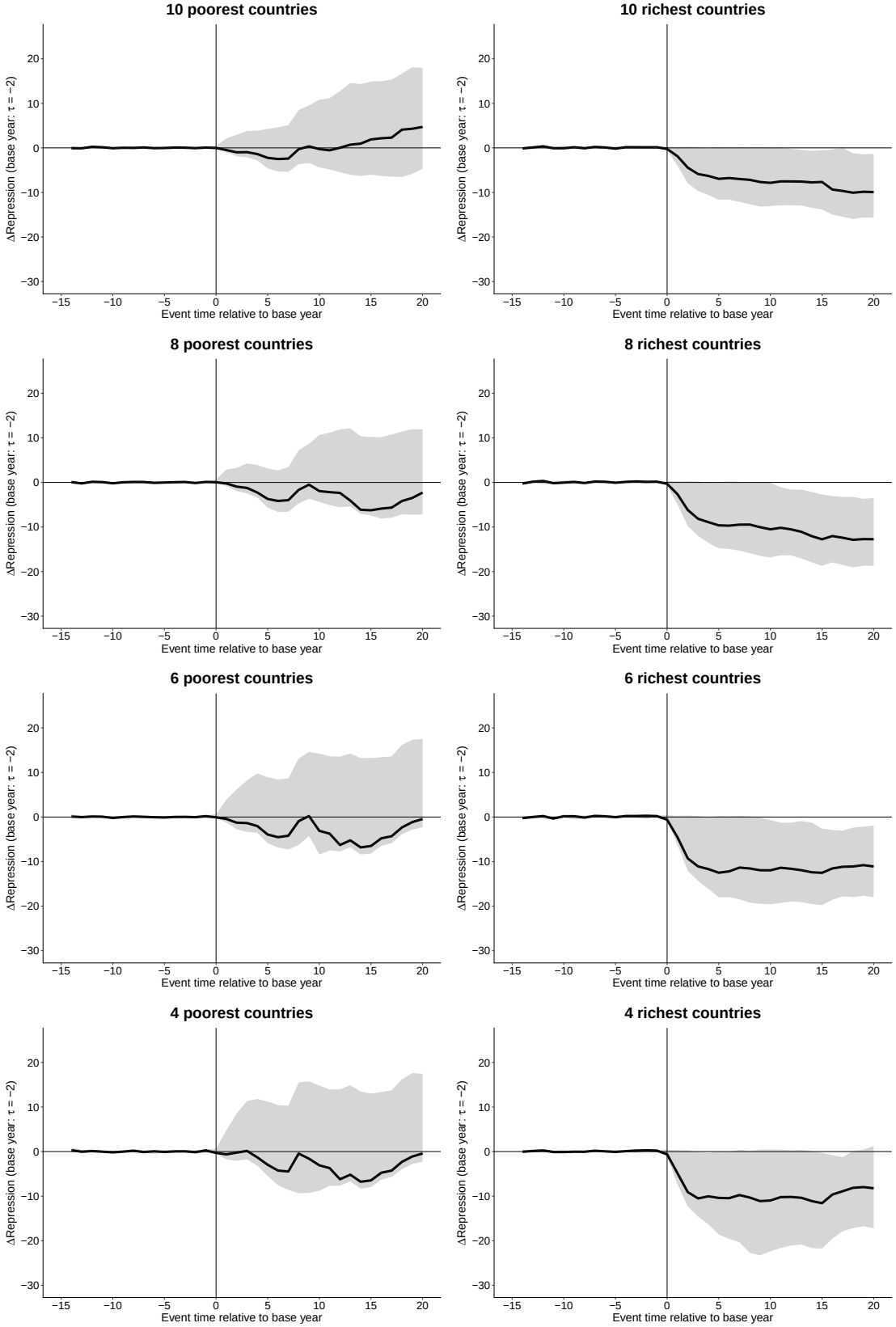


Note: The subfigures show generalized synthetic control estimates for different groups of countries which are defined via their income level at the year of completed democratization. All subfigures show 90% bootstrap confidence intervals.

3.8.5 Generalized synthetic control estimations without trade openness as covariate

The results of the generalized synthetic control estimations presented in the paper are based on data for only 21 of the 27 identified democratizing countries. This reduction in the number of countries was particularly due to a low pre-democratization coverage of the variable *trade openness*. In this section, we present results of generalized synthetic control estimations excluding *trade openness* from the econometric model, which increases the number of included countries to 26. As shown by Figure 3.15, our results remain robust against these changes. While we find significant negative effects of democratization on repression in groups of relatively rich countries, we do not find significant decreases in government violations of human rights in groups of relatively poor countries.

Figure 3.15: Generalized synthetic control estimates without trade openness as covariate



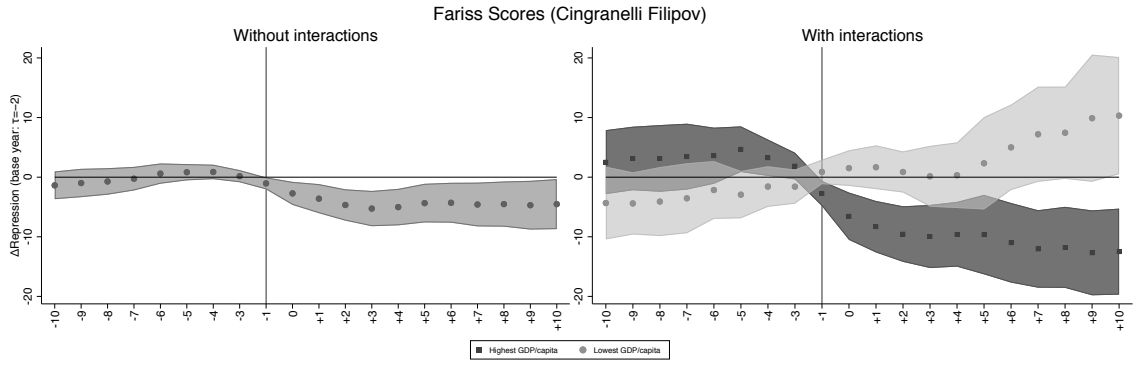
Note: The subfigures show generalized synthetic control estimates for different groups of countries which are defined via their income level at the year of completed democratization. All subfigures show 90% bootstrap confidence intervals.

3.8.6 Event study and generalized synthetic control estimations based on human rights data from Cingranelli and Filippov (2018)

The latent human rights scores provided by Fariss (2014) have been criticized, particularly due to the underlying assumption of a changing standard of accountability (see Cingranelli and Filippov, 2018). In this section, we use data from Cingranelli and Filippov (2018) who use an alternative measurement model that was used to challenge Fariss' diagnosis of improving human rights practices over time. We conduct event studies and generalized synthetic control estimations to provide evidence that our results are robust against the use of this alternative indicator. Analogous to Fariss' scores, the human rights scores generated by Cingranelli and Filippov (2018) are reversed to measure repression and normalized between 0 and 100.

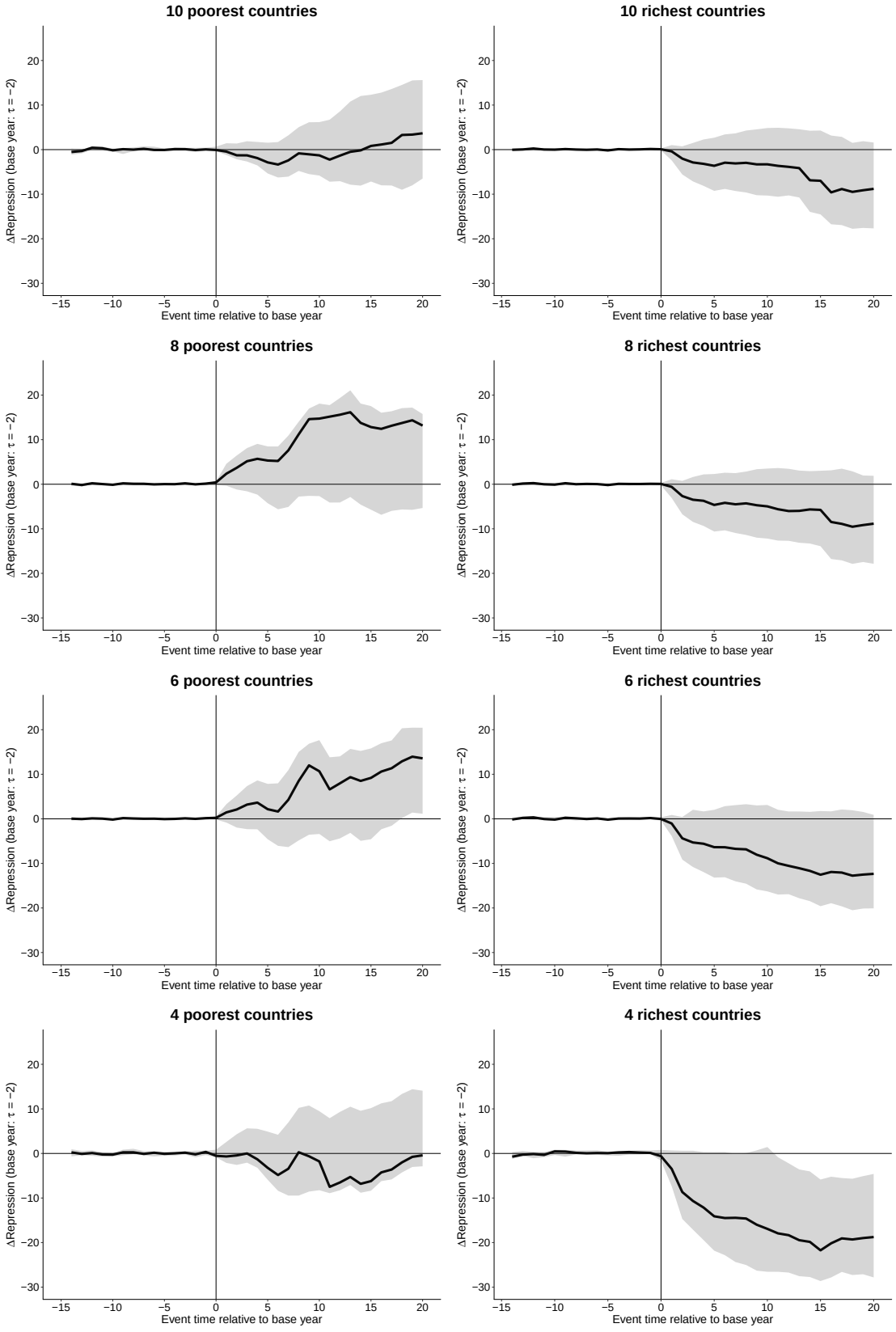
While the results of the event studies are shown by Figure 3.16, the results of the generalized synthetic control estimations are shown by Figure 3.17. In line with the evidence obtained from the latent human rights scores of Fariss (2014), both analyses indicate that democratization is followed by reductions of state repression in relatively rich countries whereas we find no or even adverse effects in poor countries.

Figure 3.16: Results of event studies with and without interactions between event years and logged GDP per capita based on data human rights data from Cingranelli and Filippov (2018).



Note: The subfigure on the left hand side shows the estimated level of repression relative to the baseline year ($\tau = -2$) without interactions with logged GDP per capita. The subfigure on the right hand side is based on models including interaction terms between the event years and logged GDP per capita. For this model, the estimated event-year effects are evaluated at the lowest and the highest income of the democratizing countries included in the sample. All figures show 90% confidence intervals.

Figure 3.17: Generalized synthetic control estimates with the reversed latent human rights scores as estimated in Cingranelli and Filippov (2018) as dependent variable



Note: The subfigures show generalized synthetic control estimates for different groups of countries which are defined via their income level at the year of completed democratization. All subfigures show 90% bootstrap confidence intervals.

Chapter 4

Democracy and the transnational dimensions of low-level conflict and state repression

Author: Martin Roessler

Abstract This paper examines the transnational dimensions of low-level conflict and state repression. In this regard, special emphasis is placed on the role of political regimes. Drawing on a simple model, we argue that democracy has opposing effects on conflict intensity. On the one hand, democracy satisfies demand for political participation and thus reduces conflict potential. On the other hand, we highlight that domestic democracy may spur dissatisfaction and conflict abroad, which, in turn, may induce conflict spillovers. As a result, the net effects of democracy on low-level conflict and state repression are ambiguous. Moreover, we find that democracy is more likely to decrease (increase) conflict intensity in democratic (autocratic) environments. Similarly, more democratic (autocratic) environments decrease (increase) conflict intensity in democratic (autocratic) countries. These hypotheses are confirmed by using panel data on different types of low-level conflict and state repression for 160 countries in the period from 1950 to 2011.

Keywords: Democray, Low-level Conflict, Intrastate Conflict, State Repression
JEL classification: D74, H10

4.1 Introduction

The spread of internal violence in the Middle East and North Africa during the Arab Spring is the most popular example of conflict contagion in recent times. Observations of those conflict spillovers have fueled the literature on intrastate conflict for decades. It is now well established that conflicts in neighboring countries increase the risk of domestic conflict (see, e.g., Bosker and de Ree, 2014; Garcia and Wimpy, 2016; Gleditsch, 2007; Hegre and Sambanis, 2006; Metternich et al., 2017). In this regard, most studies focus on high-intensity conflicts like civil wars. While the spatial dimensions of those events have been addressed extensively, the transnational causes and consequences of "low-level" conflict and violence, such as protests and riots, have received less attention. This lack of research stands in contrast to the fact that low-level conflict is highly prevalent and often precedes more intensive forms of violence. Moreover, governments may respond to related threats with repression, which, at least in recent history, is estimated to have claimed more lives than other forms of conflict (Rummel, 1997). Illustrating the spatial distribution of low-level conflict, Figure 4.1 shows the number of anti-government demonstrations, general strikes, and riots per 100,000 person-years in the period from 2000 to 2011 (data are from Banks and Wilson, 2017, a more detailed description of the indicators is provided below). The relative frequency of these conflicts varies considerably, with the incidence rate virtually equaling 0 for some and exceeding 5 for other countries. Despite this heterogeneity, there is also evidence for spatial clustering, particularly regarding high incidence rates. This observation is in line with the implications of well-known mechanisms like demonstration effects, that may induce spillovers of low-level conflict between countries (see, e.g., Bamert et al., 2015; Kuran, 1998).

Against this background, this paper considers the relationship between low-level conflict and state repression from a transnational perspective. In this regard, special emphasis is placed on the role of political regimes. Drawing on a simple formal model, we show that democracy may have opposing effects on low-level conflict. On the one hand, we follow arguments from the literature indicating that inclusive political institutions have a pacifying effect, e.g. by satisfying demand for political participation. On the other hand, we highlight an indirect channel through which democracy may increase the risk of internal conflict. We argue that people evaluate participation possibilities relative to those provided by the political systems of proximate countries. Higher levels of domestic democracy thus tend to increase political dissatisfaction particularly in neighboring autocracies. This increased dissatisfaction abroad may lead to conflict events, which, in turn, can induce conflict spillovers. As a result, the net effect of democracy on low-level conflict is ambiguous. Moreover, the model reveals an interaction between domestic and neighboring democracy, implicating that 1) domestic democracy is more likely to decrease (increase) internal conflict and repression in democratic (autocratic) environments and 2) neighboring democracy is more likely to decrease (increase) internal conflict in democratic (autocratic) countries. These hypotheses are tested using panel data on 160 countries in the period

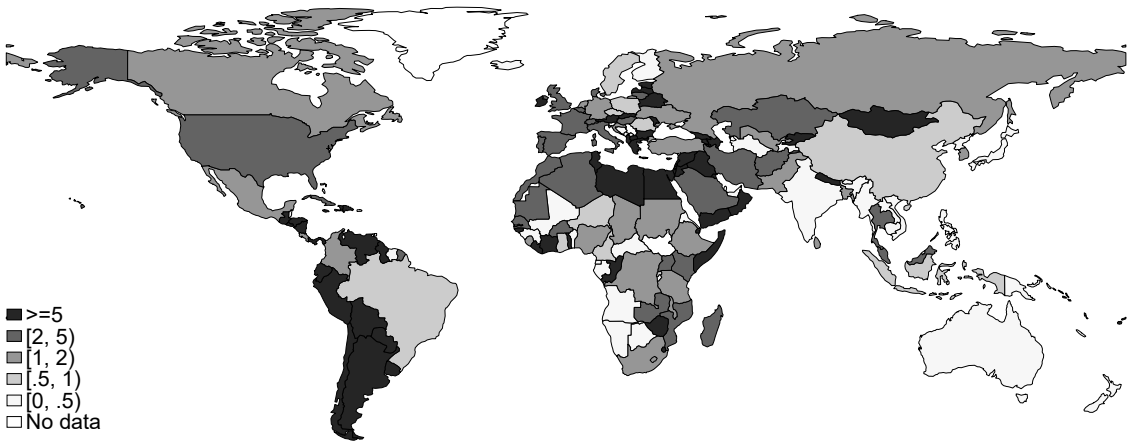


Figure 4.1: Number of anti-government demonstrations, general strikes, and riots per 100,000 person-years (2000 - 2011)

from 1950 to 2011. Utilizing different measures of proximity, including geographical distance, ethnic proximity, and bilateral migrant stocks, we confirm the hypotheses derived from the theoretical model. Furthermore, our results suggest that geographical distance may be more relevant for the interaction effect deduced from the theoretical model than the other considered types of proximity.

4.2 Intrastate conflict and political regimes

Empirical studies have identified several variables that are robustly linked to intrastate conflict. These include low income levels, large populations, youth bulges, and recent political instability (see, e.g., Blattman and Miguel, 2010; Hegre and Sambanis, 2006; Urdal, 2006). With regard to the role of democracy, evidence is less conclusive. Due to inclusive political institutions and mechanisms for non-violent contestation, democracy is sometimes supposed to reduce the risk of intrastate conflict (see, e.g., Gurr, 2000). However, there is substantial evidence that contradicts the hypothesis that more democratic countries are internally less conflict prone (see, e.g., Collier and Hoeffler, 2004; Fearon and Laitin, 2003). Multiple studies find a non-monotonic relationship between democracy and conflict, indicating that countries with a mix of autocratic and democratic institutions - so called anocracies - show the highest levels of violence (see, e.g., Fein, 1995; Hegre and Sambanis, 2006; Hegre, 2014). One explanation for this finding is that democracy may have opposing effects on the motivation and the opportunity for internal conflict (Gleditsch et al., 2009). One the one hand, democracy may reduce the motivation for rebellion by assuring political rights and by providing opportunities to influence government policies. On the other hand, the greater openness and the more liberal practices under democratic political regimes can provide greater opportunity to organize insurrections. However, the finding that anocracies show higher levels of political violence has been challenged, particularly due to measurement problems. Highlighting conceptional overlaps between conflict indica-

tors and the Polity scores (Marshall and Gurr, 2016) as a widely used democracy measure, Vreeland (2008) demonstrates that the inverted-U-shaped relationship between democracy and civil war disappears when the most problematic components are removed from the Polity scores. Hill (2016) presents similar evidence on the relationship between democracy and state repression. Utilizing techniques of statistical learning, Jones and Lupu (2018) reveal complex relationships between different types of violence and democracy. Their results support the hypothesis that there is "more violence in the middle" only under specific conditions. While evidence that anocracies are more violent is relatively strong regarding minor civil conflicts, the authors find no support for this relationship with respect to state repression. Regarding the latter, most studies examining government violations of human rights focus on domestic influence factors (for an overview of core findings see Davenport, 2007a; Hill and Jones, 2014). A notable exception is the study of Danneman and Ritter (2014). Highlighting that governments are likely to anticipate the risk of conflict contagion, Danneman and Ritter provide evidence that conflicts in neighboring countries are related to higher levels of repression. According to the authors, this reflects the preemptive use of repression as a measure against the threat of domestic uprising. More generally, both governments and dissidents may base their decisions on expectations about each other's behavior (De Jaegher and Hoyer, 2018; Lawrence, 2017; Ritter and Conrad, 2016). Following these insights, rebellion and repression should be considered simultaneously.

The model presented in the following draws on some of the arguments outlined above when describing the relationships between democracy, low-level conflict, and state repression. Its main contribution is to highlight a mechanism through which domestic and neighboring democracy interact when determining the risk of domestic unrest.

4.3 The model

We consider two countries, k and l. In each country, there are insurgents I, who try to overthrow the government G by mobilizing dissatisfied citizens. The government thus is faced with a certain level of threat, which is represented by the activity level of government opponents a. To withstand this threat, the government can utilize two tools. First, it can use surveillance s to impede the insurgent's mobilization efforts. Second, it can counteract its opponents activity with repression r. We assume that the government of the respective country stays in office if

$$\kappa \cdot r \geq a, \tag{4.1}$$

where $\kappa > 0$ is an efficiency parameter. The effective level of repression exerted by the government thus has to outweigh the government opponents' activity level. If $\kappa \cdot r < a$, the level of repression is too low to withstand the government opponent's effort and the government is replaced. It is noteworthy that we will impose that (4.1) holds in equilibrium. Rather than describing armed conflict like civil war, we thus focus on cases of low-level conflict, when repression of public protest and uprising is sufficient to secure office. In

deriving the magnitude of such conflict, we follow the literature by taking conflict spillovers, as well as domestic factors, into account. The activity level of government opponents in country k therefore is decomposed into domestically induced activity a_k^k and spillovers from the other country a_k^l:

$$a_k = a_k^k + a_k^l. \tag{4.2}$$

Introducing the transmission parameter $\varphi \in]0, \kappa[$, the spillover effect is

$$a_k^l = \varphi \cdot a_l. \tag{4.3}$$

Expression (4.3) links the activity level of government opponents in both countries, such that a higher level of conflict abroad increases domestic conflict and, by symmetry, vice versa. With $\varphi < \kappa$, we impose that repression is sufficiently effective to counteract conflict spillovers between the countries.

Domestic attempts to remove the government originate from the dissatisfaction of the citizens. However, an individual's dissatisfaction is necessary but not sufficient for her participation in protest or rebel activities. Dissatisfied individuals instead have to be mobilized by the insurgents. Normalizing the size of the population to unity, we let n_k denote the mass and the share of dissatisfied citizens in country k. Given that the share m_k of these citizens is mobilized against the government, we express the domestically induced activity level as $a_k^k = n_k \cdot m_k$. This formulation implies that the activity level is proportional to the mass of mobilized citizens.[31]

As mentioned above, the government can use surveillance in order to impede the insurgents' efforts. A higher level of surveillance makes it harder for the insurgents to organize and to recruit and thus increases the costs of mobilization. Formally, we assume that the insurgents have one unit of available time. The time costs q_k of mobilization are linked to surveillance s_k according to $q_k = (1 + s_k)m_k$. Hence, a higher level of surveillance induces higher time costs for a given level of mobilization. Since the insurgents' try to maximize the activity directed at overthrowing the government, the insurgent's objective is

$$\max_{m_k} n_k \cdot m_k + \varphi \cdot a_l \quad \text{s.t.} \quad (1 + s_k)m_k \leq 1. \tag{4.4}$$

The resulting share of mobilized dissatisfied citizens is

$$m_k = \frac{1}{1 + s_k}. \tag{4.5}$$

According to (4.5), the insurgents can mobilize the total mass of dissatisfied citizens if the government does not use surveillance as a preventive measure ($s_k = 0 \Longrightarrow m_k = 1$). Increases in the level of surveillance reduce the mass and share of active government opponents due to increased time costs of mobilization.

Whether or not a citizen i can potentially be mobilized crucially depends on her well-

[31] Relaxing the proportionality-assumption does not change the implications of the model qualitatively.

being, which is driven by economic and political factors. A citizen's utility therefore is linked to income y_k^i and political satisfaction z_k^i according to $U_k^i = \log y_k^i + \log z_k^i$. Income is related to the individual's human capital h_k^i, such that $y_k^i = \theta_k \cdot f(h_k^i)$, where $f' > 0$ and $\theta_k > 0$ is a country-specific productivity parameter. Political satisfaction is determined by the relation of supply $p(d_k)$ and demand $\bar{p}_k^i$ for political participation possibilities, i.e.

$$z_k^i = \frac{p(d_k)}{\bar{p}_k^i}, \tag{4.6}$$

where $d_k \in [0, 1]$ denotes the level of democracy. Here $d_k = 0$ and $d_k = 1$ correspond to a fully autocratic and a fully democratic political regime, respectively. A higher individual-specific demand thus decreases satisfaction with given (limited) participation possibilities. By $p'(d_k) > 0$, we impose that the latter increase in the level of democracy. In addition, we allow for limited participation even under autocratic political regimes. i.e. $p(0) > 0$. Note that we abstract from direct adverse effects of democracy, e.g. due to increased opportunities of insurgents to organize insurrection (see, e.g., Gleditsch et al., 2009). This is done to simplify the analysis of the main mechanisms highlighted within the framework of this model. However, these potential adverse impacts of democracy are taken into account within the empirical framework as described in the next section.

Given the previous results, the utility function of an individual in country k becomes

$$U_k^i = \log\left(\theta_k \cdot f(h_k^i)\right) + \log\left(\frac{p(d_k)}{\bar{p}_k^i}\right). \tag{4.7}$$

When evaluating government performance, we assume that each citizen compares her status-quo utility (4.7) with the utility she would obtain when living in the neighboring country. With the assumption that living conditions in neighboring countries serve as reference point, we closely follow approaches that are common in models of migration incentives (see, e.g., Borjas, 1989; Kennan and Walker, 2011).[32] However, our model does not only consider relative economic wealth but also relative political satisfaction. The individual's utility potentially obtained in the neighboring country is

$$U_k^{i,l} = \log\left(\theta_l \cdot f(h_k^i)\right) + \log\left(\frac{p(d_l)}{\bar{p}_k^i}\right). \tag{4.8}$$

Note that the first term on the right hand side of (4.8) is the individual's utility from income she would earn in country l. The second term captures foreign political participation possibilities and therefore represents utility potentially derived from the merits of democracy abroad. To reveal implications for internal conflict, we define a citizen to be dissatisfied if $U_k^{i,l} - U_k^i > \log \varepsilon_i^k$, where ε_i^k represents the citizen's tolerance for deviations from the reference utility. Thus, ε_i^k may for instance capture exogenous factors determining the individual's support for the government. Utilizing previous results and assuming that

[32] For reasons of simplicity, our model abstracts from the possibility of migration.

ε_i^k is uniformly distributed over $]0, \delta_k[$, a dissatisfied individual is characterized by

$$\theta_{lk} \frac{p(d_l)}{p(d_k)} > \varepsilon_k^i, \tag{4.9}$$

and the resulting mass of dissatisfied individuals amounts to

$$n_k = \gamma_k \frac{p(d_l)}{p(d_k)}, \tag{4.10}$$

where $\theta_{lk} := \theta_l/\theta_k$ and $\gamma_k := \theta_{lk}/\delta_k$.[33] As is obvious from (4.9) and (4.10), dissatisfaction is driven by the democracy levels of the two countries. A higher domestic democracy level d_k has a pacifying effect as it increases political participation possibilities. On the contrary, a higher democracy level abroad d_l increases participation possibilities in the reference country and, thus, lowers satisfaction with domestic political institutions. This is a direct result of the assumption that citizens evaluate their living conditions relative to those in the neighboring country. Improvements in the latter therefore may increase dissatisfaction and make mobilization of citizens against the government more likely. To counteract this threat, the government makes strategic use of surveillance and repression. While (4.5) implies that surveilling the insurgents reduces the number of mobilized citizens, some amount of repression is in general required to combat the remaining active government opponents. Due to the need to finance the police, the military, secret service activities, etcetera, both surveillance and repression are costly. Since there are opportunity costs of related expenditures (e.g. reduced budget for achieving other policy objectives or reduced private consumption of the political leaders), the government has an incentive to keep these costs to a minimum. Setting prices to unity and taking into account that the effective level of repression has to outweigh the activity level of its opponents, the government's objective is

$$\min_{r_k, s_k} r_k + s_k \quad \text{s.t.} \quad \kappa \cdot r_k \geq n_k \cdot m_k + \varphi \cdot a_l, \tag{4.11}$$

where m_k is given by (4.5) and n_k is given by (4.10). The resulting levels of surveillance and repression are

$$s_k^* = \begin{cases} 0 & : n_k \leq \kappa \\ \sqrt{n_k/\kappa} - 1 & : n_k > \kappa \end{cases}, \tag{4.12}$$

$$CI_k^* := r_k^* = a_k = \begin{cases} n_k/\kappa + (\varphi \cdot a_l)/\kappa & : n_k \leq \kappa \\ \sqrt{n_k/\kappa} + (\varphi \cdot a_l)/\kappa & : n_k > \kappa \end{cases}. \tag{4.13}$$

Expression (4.12) shows that the government utilizes surveillance only if its marginal effect on the activity level of government opponents ($\mathrm{d}a_k/\mathrm{d}s_k|_{s_k=0} = -n_k$) exceeds the

[33] For convenience, we only consider cases where $n_k \in]0, 1[$, i.e. in particular $\gamma_k \frac{p(d_l)}{p(d_k)} < 1$.

efficiency of repression κ in magnitude. This reflects that spending on surveillance is efficient only if it is less costly than the use of repression for securing office. In particular, a low efficiency of repression and a high number of mobilizable dissatisfied citizens make preventive measures more attractive to the government. If $n_k > \kappa$, the level of surveillance increases in the number of dissatisfied individuals. Expression (4.13) states that the equilibrium level of repression is equal to the activity level of government opponents, i.e. $r_k^* = a_k$. In the following, we therefore use the notation CI to denote conflict intensity, which captures both repression and the activity of government opponents in equilibrium. If $n_k \leq \kappa$, the government relies exclusively on repression since the use of surveillance would be inefficient. In this case, repression is proportional to the number of dissatisfied citizens. Furthermore, due to conflict spillovers, repression and the domestic activity level are linked to the intensity of conflict in the neighboring country a_l. If $n_k > \kappa$, repression becomes a concave function of n_k as some of the potential activity of government opponents is suppressed by surveillance. However, also in this case repression increases in the number of dissatisfied citizens and the level of conflict abroad.

By symmetry, analogous formulations for s_l^*, r_l^*, and a_l can be derived. This results in four different unique equilibria, whose realization depends on whether or not the governments of the two considered countries use surveillance. However, since the implications of the model are qualitatively similar in all cases, we only focus on the case characterized by $n_k \leq \kappa$ and $n_l \leq \kappa$ in the following. Using (4.10) and (4.13), conflict intensity can then be expressed as

$$CI_k^* = \frac{\kappa}{\kappa^2 - \varphi^2} \left[\gamma_k \frac{p(d_l)}{p(d_k)} + \varphi \cdot \frac{\gamma_l}{\kappa} \frac{p(d_k)}{p(d_l)} \right]. \tag{4.14}$$

Note that the the equilibrium described by (4.14) exists because by assumption repression is sufficiently effective to counteract conflict spillovers, i.e. $\varphi < \kappa$. While the first term in square brackets represents domestically induced conflict, the second term captures conflict spillovers from the neighboring country. Consequently, the relative political participation possibilities of the two countries enter (4.14) twice. Differentiating with respect to d_k and d_l, respectively, yields

$$\frac{\partial CI_k^*}{\partial d_k} = \frac{\kappa}{\kappa^2 - \varphi^2} \left[-\gamma_k \frac{p(d_l)}{p(d_k)^2} + \varphi \cdot \frac{\gamma_l}{\kappa} \frac{1}{p(d_l)} \right] p'(d_k), \tag{4.15}$$

$$\frac{\partial CI_k^*}{\partial d_l} = \frac{\kappa}{\kappa^2 - \varphi^2} \left[\gamma_k \frac{1}{p(d_k)} - \varphi \cdot \frac{\gamma_l}{\kappa} \frac{p(d_k)}{p(d_l)^2} \right] p'(d_l). \tag{4.16}$$

As is obvious from (4.15) and (4.16), both increases in the domestic and the foreign democracy level have opposing effects on conflict intensity. On the one hand, higher levels of domestic democracy d_k have a pacifying effect due to increased political participation possibilities. On the other hand, these improvements lead to a higher level of dissatisfaction in the neighboring country since citizens form their attitudes towards the government based on relative utility. This results in conflict spillovers, which counteract the direct negative effect of domestic democracy. In a similar manner, a higher foreign democracy level d_l

spurs domestic dissatisfaction but reduces conflict spillovers by decreasing the intensity of conflict in the neighboring country. Hence, the net effects of domestic and foreign democracy on low-level conflict are ambiguous. These results may provide an explanation for the inconclusive empirical evidence on the impact of democracy on domestic conflict in previous studies.

Although there is no clear sign of (4.15) and (4.16), the model reveals an interaction between domestic and foreign democracy levels:

$$\frac{\partial^2 CI_k}{\partial d_l \partial d_k} = \frac{\partial^2 CI_k}{\partial d_k \partial d_l} = \frac{\kappa}{\kappa^2 - \varphi^2} \left[-\gamma_k \frac{1}{p(d_k)^2} - \varphi \cdot \frac{\gamma_l}{\kappa} \frac{1}{p(d_l)^2} \right] p'(d_k) \cdot p'(d_l) < 0. \tag{4.17}$$

The interpretation of (4.17) is twofold. First, the increase in conflict intensity induced by an increase in the foreign democracy level is higher in more autocratic countries $[\partial^2 CI_k/(\partial d_l \partial d_k) < 0]$. Intuitively, democratization abroad increases the lack of participation possibilities perceived by citizens under autocracy while it constitutes a "catch-up" process from the perspective of citizens under democracy. As an increasing "democratic deficit" affects dissatisfaction stronger than a decreasing "democratic advantage", the marginal effect of foreign democracy decreases in the domestic democracy level. Second, the pacifying effect of democracy is larger in democratic environments $[\partial^2 CI_k/(\partial d_k \partial d_l) < 0]$. Thus, steps towards democracy are predicted to be particularly effective in reducing conflict intensity if the population's reference countries are democratic. This reflects that the effect of democratization is the stronger the more a country "lags behind" with respect to political rights. Based on these results, we formulate the following empirically testable hypotheses:[34]

H_1: Domestic democracy is more likely to reduce (increase) low-level conflict and state repression in democratic (autocratic) environments.

H_2: Neighboring democracy is more likely to reduce (increase) low-level conflict and state repression in democratic (autocratic) countries.

4.4 Empirical evidence

4.4.1 Data and methods

Dependent variables

To test these hypotheses empirically, we utilize multiple measures of low-level conflict and state repression. We follow Danneman and Ritter (2014) and operationalize low-level conflict with three indicators: 1) *Anti-government demonstrations*, i.e. peaceful public gatherings of at least 100 people for the primary purpose of displaying or voicing their opposition to government policies or authority.[35] 2) *General strikes*, i.e. strikes of 1,000 or more indus-

[34] Note that we do not formulate hypotheses for surveillance as we are not aware of any data on surveillance allowing to test these hypotheses empirically.

[35] Demonstrations of a distinctly anti-foreign nature are excluded.

trial or service workers that involve more than one employer and that are aimed at national government policies or authority. 3) *Riots*, defined as violent demonstrations or clashes of more than 100 citizens involving the use of physical force. All data are from Banks and Wilson (2017). We use dichotomous variables indicating whether or not a specific event (demonstration, strike, or riot) occurred in a country-year to measure the presence (or absence) of the respective type of intrastate conflict. As a robustness check, we also estimate statistical models with the number of events as dependent variable. Data on state repression are provided by the CIRI Human Rights Data Project (Cingranelli et al., 2014). The CIRI *Physical Integrity Rights Index (PIR)*, captures government respect for human rights on a scale ranging from 0 (no government respect for human rights) to 8 (full government respect for human rights). However, as outlined by Vreeland (2008) and Hill (2016), there is a conceptional overlap between democracy and conflict in general and between democracy and state repression in particular. This overlap basically stems from PIR components capturing violence aimed at suppressing opposition groups, which are closely related to components of democracy indicators measuring free political competition. For this reason, these components are removed from the PIR scores (and, as described below, from the democracy index).[36] Furthermore, we reverse the signs of these modified PIR scores to measure repression. In addition, we use the *Amnesty* scores and the *State Department* scores of the Political Terror Scale Project (Gibney et al., 2017). Both indicators measure state repression on a scale ranging from 1 (lowest level of repression) to 5 (highest level of repression) based on the country reports of Amnesty International and the U.S. State Department, respectively. Note, however, that we cannot remove potentially problematic components from the Amnesty and the State Department scores since the Political Terror Scale Project does not provide disaggregated data. To facilitate the interpretation of our regression results, all indicators of state repression are normalized between 0 and 1.

Democracy

Our main explanatory variables are the domestic democracy level and the democracy level of neighboring countries. As a frequently used indicator of democracy, we employ the Polity scores (Marshall and Gurr, 2016), which measure a country's level of democracy in discrete steps between -10 (full autocracy) and 10 (full democracy). However, due to the conceptional overlap between conflict and democracy outlined above, we follow Vreeland (2008) and remove the problematic components from the Polity index. Our modified "X-Polity" index thus ranges between -7 and 6. Analogous to the repression indicators, the "X-Polity" scores are normalized between 0 and 1 to ease the interpretation of regression results.

While the operationalization of domestic democracy is relatively straightforward, the construction of a proxy for the democracy level of neighboring countries is more difficile. In particular, when aggregating the democracy scores of neighboring countries, a measure of

[36] Using the unmodified PIR scores does not change the results qualitatively.

proximity between the country under consideration and its neighbors has to be determined. This measure should assign greater weights to more proximate countries. In terms of the theoretical model, this corresponds to the operationalization of the transmission parameter φ. In general, the average democracy level of neighboring countries $\bar{d}_{it}$ for country i in year t is defined as

$$\bar{d}_{it} = \frac{\sum_{\substack{j=1 \\ j \neq i}}^{n} w_{ijt} d_{jt}}{\sum_{\substack{j=1 \\ j \neq i}}^{n} w_{ijt}}, \quad i, j = 1, 2, \ldots, n; \tag{4.18}$$

where d_{jt} denotes the democracy level of country j and w_{ijt} is a measure of proximity between country i and j at time t. One obvious approach to determine the proximity between two countries is geographical distance. However, some authors suggest that there are better measures of proximity in the context of conflict spillovers. Against this background, we utilize multiple measures of proximity and follow Danneman and Ritter (2014) in taking an "agnostic" stance regarding the arguments beyond the choice of different concepts. However, since Danneman and Ritter find "degraded distance" to yield the best fit in their statistical analyses of state repression and neighboring conflict, we follow this evidence and adopt degraded distance as the central measure of proximity in our study. In the following, we describe degraded distance and other measures in greater detail.

Degraded distance

Given the minimum geographical distance τ_{ijt} between the countries (in kilometers), degraded distance is defined as

$$w_{ijt}^{\text{degraded}} = \begin{cases} 1 - \left(\frac{\tau_{ijt}}{950}\right)^{\frac{1}{4}} & : \tau_{ijt} < 950 \\ 0 & : \tau_{ijt} \geq 950 \end{cases}. \tag{4.19}$$

Due to the exponent of 1/4, the weight assigned to a neighboring country j decreases rapidly with its distance to country i. However, positive weights are assigned to countries with a distance up to 950 km. Degraded distance thus ranges between 0 and 1.

Direct contiguity

Another proximity measure based on geographical distance is direct contiguity. Two countries are directly contiguous if they share a common border. Formally, the corresponding weights are defined as

$$w_{ijt}^{\text{contiguity}} = \begin{cases} 1 & : \tau_{ijt} = 0 \\ 0 & : \tau_{ijt} > 0 \end{cases}. \tag{4.20}$$

The resulting democracy score of neighboring countries (4.18) therefore is the arithmetic mean of the democracy scores of all contiguous countries.

Migrant stocks

International migrants may shape attitudes of friends and family still living in the home country. For instance, Pérez-Armendáriz and Crow (2010) argue that migrants living in democratic countries may foster democratic attitudes of those living in less democratic countries via different channels, including migrant returns, cross-border communication, and migrant information networks. Another measure of proximity employed in our empirical analysis therefore is based on bilateral migration stock data provided by Özden et al. (2011).[37] Our migrant stock measure of proximity simply is

$$w_{ijt}^{\text{migrants}} = M_{ijt}, \tag{4.21}$$

where M_{ijt} denotes the number of migrants from country i living in country j at time t. Hence, the share of the global migrants from country i living in country j serves as the weight when averaging the democracy scores of the neighboring countries according to (4.18). In contrast to the two measures based on geographical distance described above, the migrant-stock approach allows geographically distant countries to serve as reference point for the citizens.

Ethnic proximity

The literature on the diffusion of civil war provides some evidence that conflict spillovers are particularly likely along ethnic lines (see, e.g., Bosker and de Ree, 2014; Buhaug and Gleditsch, 2008). Since people may tend to compare their own living conditions with those of members belonging to the same ethnic group abroad, we construct two measures of ethnic proximity. Data on ethnic groups are derived from the Ethnic Power Relations (EPR) Core Dataset 2014 (Vogt et al., 2015). The EPR dataset provides information on the population shares of ethnic groups for 165 countries from 1946 to 2013. Our measure of ethnic proximity makes use of these data as follows. Let S_{eit} denote the population share of ethnicity $e = 1, 2, \ldots, E$ in country i at time t. The *ethnic proximity* of country i and country j then is defined as

$$w_{ijt}^{\text{ethnic}} = \sum_{e=1}^{E} S_{eit} \cdot S_{ejt}. \tag{4.22}$$

Note that (4.22) represents the probability of randomly drawing two persons (one per country) belonging the same ethnic group from the populations of i and j. Hence, w_{ijt}^{ethnic} ranges between 0 and 1 with higher values indicating greater proximity.

[37] The dataset includes estimates of bilateral migration stocks for the decades of 1960 - 2000. Since the time period covered by our dataset ends in 2011, we use the latest available migrant stock data to construct weights for the years up to 2011.

Degraded ethnic proximity

While taking ethnic similarity into account, (4.22) neglects geographical distance between the countries. However, for a given degree of similarity in ethnic structure, populations of geographically proximate countries may form the more important reference group compared to populations of geographically distant countries. For this reason, we additionally consider *degraded ethnic proximity*, which combines degraded distance (4.19) and ethnic proximity (4.22):

$$w_{ijt}^{\text{degraded ethnic}} = w_{ijt}^{\text{degraded}} \cdot w_{ijt}^{\text{ethnic}}. \tag{4.23}$$

Since (4.19) assigns a weight of 0 to a country if distance exceeds 950 km, $w_{ijt}^{\text{degraded ethnic}}$ only considers the ethnic proximity of geographically proximate countries. Moreover, the highest possible weight of 1 is placed on bordering countries with the same ethnic structure whereas the weight decreases in both ethnic and geographical distance.

Table 4.1 shows the sample correlations of the neighboring democracy scores calculated using the proximity measures discussed above. While the scores based on measures of geographical distance are highly correlated, the weakest correlation is revealed between the scores based on migrant stocks and those based on ethnic proximity.

Table 4.1: Correlation matrix of the democracy scores of neighboring countries calculated using different measures of proximity

Proximity measure	(1)	(2)	(3)	(4)	(5)
Degraded distance (1)	1				
Direct contiguity (2)	0.94	1			
Migrant stocks (3)	0.69	0.67	1		
Ethnic proximity (4)	0.45	0.48	0.28	1	
Degraded ethnic proximity (5)	0.89	0.96	0.64	0.48	1

The table shows Pearson correlation coefficients. N = 6,908.

Control variables

To accurately estimate the effects of domestic and foreign democracy on low-level conflict and repression, we control for several important variables identified in the literature. To capture effects of economic prosperity, we use (the log of) GDP per capita taken from the expanded GDP and population data (version 6.0 beta) (Gleditsch, 2002). Since our theoretical model implicitly contains relative productivity θ_{lk} as a parameter influencing dissatisfaction, we also include the (log of) the average per capita income of the neighboring countries and its interaction with (the log of) domestic GDP per capita. The weights used to aggregate GDP per capita of neighboring countries are chosen analogous to those used to calculate the average democracy level (see above). We also control for (the log of) population size which is derived from the same data source as the GDP data. Furthermore, recent studies point to the role of youth bulges for intrastate conflict and repression (see, e.g., Hill and Jones, 2014; Nordås and Davenport, 2013; Urdal, 2006). Hence, we control

for the size of youth bulges defined as the number of people aged 15-25 relative to the population aged 15+. The data are from United Nations Population Division (2017). Since the focus of our analysis is on low-level conflict, we also assess the robustness of our results with regard the inclusion of variables capturing high-intensity conflict. At the domestic level, we include a dummy variable that is coded as 1 if a conflict has resulted in more than 1.000 battle-related death over time and is coded as 0 otherwise. Another similarly coded dummy assesses the presence of such conflicts in neighboring countries. In addition, the interaction between domestic and foreign high-intensity conflict is included since particularly peaceful countries could be affected by spillovers from neighboring countries (see Danneman and Ritter, 2014). Data on high-intensity conflict are from the UCDP/PRIO Armed Conflict Dataset version 17.2 (Allansson et al., 2017; Gleditsch et al., 2002).

Statistical models

In general, we model the conditional expectation of the dependent variable y_{it} for country i at year t as

$$E[y_{it}|\cdots] = g^{-1}(\beta_1 d_{it} + \beta_2 \bar{d}_{it} + \beta_3 d_{it} \times \bar{d}_{it} + \boldsymbol{x}'_{it}\boldsymbol{\gamma} + \rho y_{i,t-1} + \alpha_i + \delta_t), \tag{4.24}$$

where $g(\mu)$ is a link function, d_{it} is the domestic democracy level $\bar{d}_{it}$ is the average democracy level of the neighboring countries, $\boldsymbol{x}$ denotes control variables, and $\beta_1, \beta_2, \beta_3$, and $\boldsymbol{\gamma}$ are regression coefficients. Note that (4.24) includes an interaction term between the domestic and the foreign democracy level, $d_{it} \times \bar{d}_{it}$, which implicates that the marginal effect of domestic democracy on the dependent variable may be moderated by the neighboring democracy level and vice versa. Based on the hypotheses derived from the theoretical model, we expect the marginal effect of domestic (neighboring) democracy to decrease in the level of neighboring (domestic) democracy. The inclusion of the interaction term allows for these effect moderations across all models nested in (4.24). Furthermore, all regressions include a lag of the dependent variable $y_{i,t-1}$ with coefficient ρ to capture persistence of conflict. α_i and δ_t represent unobserved country- and time-fixed effects, respectively. To avoid an omitted variable bias due to correlation between such unobserved characteristics and explanatory variables, we generally apply fixed effects estimation.

The statistical models are further specified as follows. For the dichotomous variables *Demonstrations*, *Strikes* and *Riots*, we use the logistic link function, i.e. $g(\mu) = \log(\mu/(1-\mu))$, yielding the fixed effects logistic regression model. For modeling the *Number of Demonstrations*, *Strikes* and *Riots*, we use fixed effects negative binomial regression with link function $g(\mu) = \log(\mu)$. In contrast to Poisson regression, negative binomial regression does not assume equidispersion, i.e. equality of mean and variance, but explicitly models overdispersion. Since the assumption of equidispersion is unlikely to hold in empirical applications (e.g. due to omitted explanatory variables), accounting for overdispersion is essential for obtaining valid standard error estimates. Finally, we follow Danneman and Ritter (2014) in choosing a linear link function, $g(\mu) = \mu$, for our indicators of state

repression, namely the (modified) *PIR*, the *Amnesty*, and the *State Department* scores. Accordingly, linear fixed effects regression is applied in these cases. The standard error estimators are clustered by country to account for heteroskedasticity and serial correlation.

4.4.2 Results

Degraded distance

Table 4.2 shows the regression results for the dichotomous low-level conflict variables using degraded distance as proximity measure. In a first fixed effects logistic regression (Regression No. 1), we estimate the effects of domestic and neighboring democracy on the probability of anti-government demonstrations without the multiplicative interaction term between these democracy variables. This model specification does not provide evidence for significant effects of domestic or foreign democracy on internal conflict. While the same is true for domestic per capita income, the coefficient of neighboring GDP per capita is negative and significant at the 10% level, indicating that a higher per capita income in neighboring countries decreases the risk of domestic conflict. The estimated effects of population size and youth bulges are in line with the literature as higher values of both variables are found to be associated with a higher probability conflict occurrence. Regression No. 2 accounts for interactions between domestic and neighboring democracy and domestic and neighboring per capita income. The interaction term between domestic democracy and neighboring democracy is negative and statistically significant. This indicates that the marginal effects of domestic and foreign democracy may be moderated according to the hypotheses derived from the theoretical model. Similar evidence is obtained regarding GDP per capita. As demonstrated in Regression No. 3, these findings remain stable when controlling for domestic and neighboring high-intensity conflict and a quadratic term of domestic democracy. The latter is included to capture that anocracies, i.e. hybrid political regimes, may be more prone to domestic conflict than autocracies and democracies. Interestingly, there is no evidence for impacts of high-intensity conflict on anti-government demonstrations. The quadratic term of the domestic democracy indicator is statistically insignificant.

Although the negative sign of the interaction term between domestic and neighboring democracy is in line with theory, it has to be interpreted with caution. As shown by Ai and Norton (2003), the magnitude of the interaction effect is not equal to the coefficient of the interaction term in nonlinear models. The interaction effect may even be of opposite direction. In addition, the significance test for the coefficient of the interaction term may be misleading. To account for these issues, we calculate the average marginal effects of domestic and foreign democracy. However, this is not possible for fixed effects logit models.[38]

[38]Technically, calculation of marginal effects is infeasible after fixed effects logit estimation because this would require values for the fixed effects, which are not estimated but eliminated from the likelihood function.

Table 4.2: Regressions for dichotomous indicators of low-level conflict. Proximity measure: Degraded distance

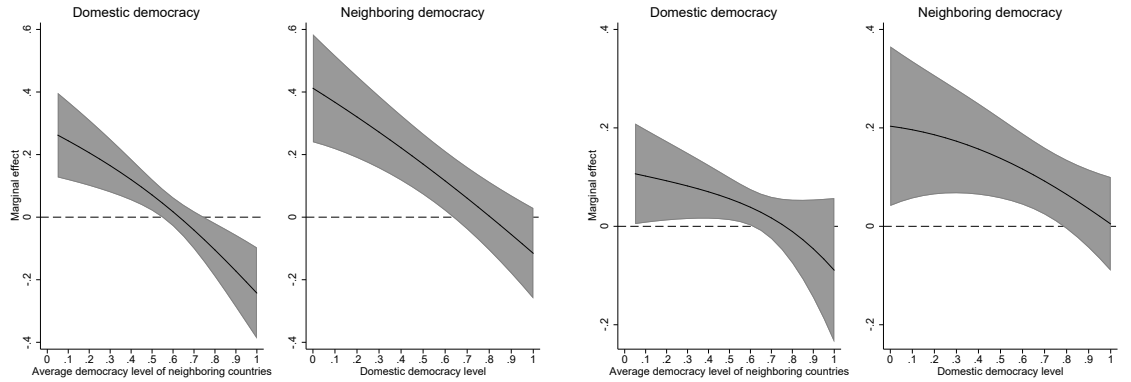
Dependent variable	Anti-government demonstrations				Strikes				Riots			
Model	FE Logit	FE Logit	FE Logit	Logit	FE Logit	FE Logit	FE Logit	Logit	FE Logit	FE Logit	FE Logit	Logit
Regression No.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dom. Democracy	0.16	1.55***	1.91**	2.47***	1.18***	2.69***	2.36**	3.65***	0.28	2.13***	3.03***	3.00***
	(0.21)	(0.42)	(0.78)	(0.89)	(0.30)	(0.64)	(1.18)	(1.31)	(0.21)	(0.43)	(0.80)	(0.84)
Neigh. Democracy	0.05	2.09***	1.95***	3.10***	-0.21	2.09**	2.35**	3.87***	-0.36	2.31***	2.19***	2.49***
	(0.41)	(0.67)	(0.71)	(0.66)	(0.57)	(1.02)	(1.09)	(1.05)	(0.42)	(0.68)	(0.71)	(0.71)
Dom. Democracy ×		-2.91***	-2.66***	-3.85***		-3.12***	-3.38***	-3.81***		-3.92***	-3.54***	-3.89***
Neigh. Democracy		(0.75)	(0.83)	(0.88)		(1.14)	(1.29)	(1.35)		(0.78)	(0.87)	(1.00)
(Dom. Democracy)^2			-0.44	-0.04			0.46	-0.65			-1.01	-0.44
			(0.78)	(0.79)			(1.18)	(1.12)			(0.79)	(0.82)
Dom. GDP/capita, log.	-0.06	1.80***	1.81***	1.27***	-0.24	0.22	-0.02	1.72**	-0.13	0.80	0.72	0.85*
	(0.12)	(0.59)	(0.59)	(0.42)	(0.20)	(1.00)	(1.01)	(0.71)	(0.12)	(0.59)	(0.59)	(0.47)
Neigh. GDP/capita, log.	-0.26*	1.47***	1.48***	1.23***	0.39	0.80	0.55	1.84***	-0.12	0.78	0.67	0.88**
	(0.15)	(0.55)	(0.56)	(0.39)	(0.25)	(0.92)	(0.93)	(0.67)	(0.15)	(0.56)	(0.56)	(0.45)
Dom. GDP/capita, log. ×		-0.22***	-0.22***	-0.13***		-0.05	-0.03	-0.21**		-0.11	-0.10	-0.10*
Neigh. GDP/capita, log.		(0.07)	(0.07)	(0.05)		(0.11)	(0.12)	(0.08)		(0.07)	(0.07)	(0.06)
Population, log.	0.69***	0.20	0.20	0.40***	0.69*	0.49	0.53	0.28***	0.57**	0.26	0.28	0.38***
	(0.23)	(0.26)	(0.26)	(0.04)	(0.39)	(0.46)	(0.46)	(0.06)	(0.25)	(0.27)	(0.27)	(0.04)
Youth bulges	0.04**	0.03*	0.03*	0.01	0.02	0.01	0.00	-0.01	0.03*	0.02	0.01	0.03**
	(0.02)	(0.02)	(0.02)	(0.01)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Dom. high-int. conflict			-0.04	0.14			-0.22	-0.22			0.09	0.21
			(0.27)	(0.26)			(0.39)	(0.29)			(0.27)	(0.36)
Neigh. high-int. conflict			0.02	-0.09			-0.24	-0.18			-0.21*	-0.16
			(0.11)	(0.12)			(0.17)	(0.18)			(0.12)	(0.12)
Dom. high-int. conflict ×			0.15	-0.01			0.51	0.28			-0.20	-0.29
Neigh. high-int. conflict			(0.28)	(0.32)			(0.42)	(0.33)			(0.29)	(0.35)
Lagged dependent Variable	0.78***	0.74***	0.74***	1.27***	0.71***	0.69***	0.69***	1.84***	0.89***	0.85***	0.84***	1.35***
	(0.08)	(0.08)	(0.08)	(0.09)	(0.13)	(0.13)	(0.13)	(0.15)	(0.08)	(0.08)	(0.08)	(0.09)
Observations	7,047	7,047	7,047	7,382	5,173	5,173	5,173	7,382	6,747	6,747	6,747	7,382

Standard errors in parentheses. Significance levels: * 10%, ** 5%, *** 1%. Abbreviations: FE = Fixed effects, Dom. = Domestic; Neigh. = Neighboring, GDP = Gross Domestic Product, log. = logarithmic, high-int = high-intensity.

Table 4.3: Regressions for indicators of state repression. Proximity measure: Degraded distance

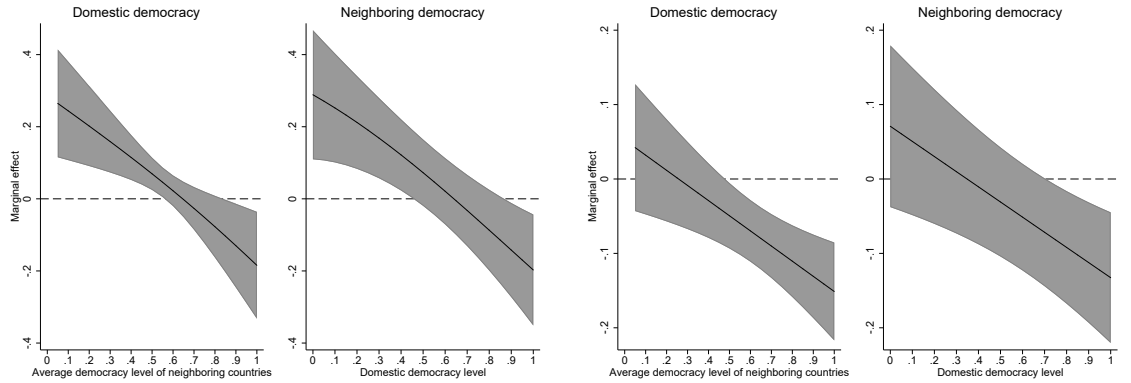
Dependent variable	Reversed PIR scores			Amnesty scores			State Department scores		
Model	Linear FE	Linear FE	Linear FE	Linear FE	Linear FE	Linear FE	Linear FE	Linear FE	Linear FE
Regression No.	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
Dom. Democracy	-0.06***	0.05	0.00	-0.07***	0.05	0.10	-0.09***	-0.01	-0.02
	(0.02)	(0.05)	(0.08)	(0.02)	(0.05)	(0.07)	(0.02)	(0.04)	(0.07)
Neigh. Democracy	-0.07*	0.08	0.07	-0.14***	0.00	-0.03	-0.05	0.06	0.04
	(0.04)	(0.07)	(0.07)	(0.05)	(0.07)	(0.07)	(0.04)	(0.06)	(0.06)
Dom. Democracy ×		-0.22***	-0.20**		-0.22***	-0.17**		-0.16**	-0.13*
Neigh. Democracy		(0.08)	(0.08)		(0.08)	(0.08)		(0.07)	(0.07)
(Dom. Democracy)^2			0.04			-0.07			-0.00
			(0.08)			(0.08)			(0.07)
Dom. GDP/capita, log.	-0.01	0.03	0.05	-0.02	0.03	0.02	-0.02**	0.05	0.05
	(0.01)	(0.07)	(0.06)	(0.01)	(0.07)	(0.07)	(0.01)	(0.05)	(0.05)
Neigh. GDP/capita, log.	-0.01	0.02	0.05	-0.04**	0.01	0.01	-0.01	0.05	0.06
	(0.02)	(0.08)	(0.07)	(0.02)	(0.07)	(0.06)	(0.02)	(0.06)	(0.05)
Dom. GDP/capita, log. ×		-0.00	-0.01		-0.01	-0.01		-0.01	-0.01
Neigh. GDP/capita, log.		(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.01)
Population, log.	-0.01	-0.04	-0.01	-0.04	-0.07**	-0.06**	-0.01	-0.04	-0.02
	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)
Youth bulges	0.00	0.00	0.00	0.00	0.00	0.00	0.00**	0.00*	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Dom. high-int. conflict			0.10***			0.12***			0.12***
			(0.03)			(0.03)			(0.03)
Neigh. high-int. conflict			-0.00			0.00			-0.00
			(0.01)			(0.01)			(0.01)
Dom. high-int. conflict ×			0.04			-0.02			-0.00
Neigh. high-int. conflict			(0.03)			(0.03)			(0.03)
Lagged dependent Variable	0.48***	0.48***	0.43***	0.51***	0.50***	0.46***	0.55***	0.54***	0.51***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Observations	4,158	4,158	4,158	3,939	3,939	3,939	4,712	4,712	4,712
R^2 (within)	0.31	0.31	0.34	0.32	0.32	0.34	0.41	0.42	0.44

Standard errors in parentheses. Significance levels: * 10%, ** 5%, *** 1%. Abbreviations: FE = Fixed effects, Dom. = Domestic; Neigh. = Neighboring, GDP = Gross Domestic Product, log. = logarithmic, high-int = high-intensity.



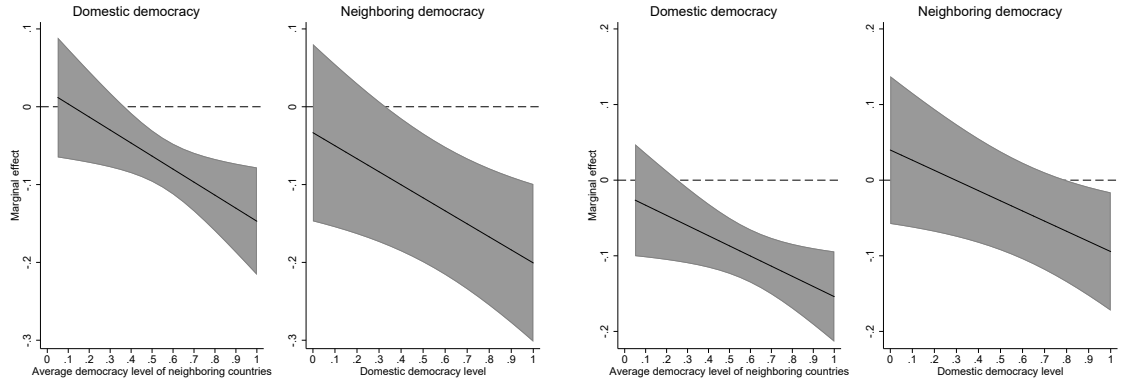
(a) Anti-government demonstrations

(b) Strikes



(c) Riots

(d) Modified PIR index



(e) Amnesty scores

(f) State Department scores

Figure 4.2: Marginal effect estimates of domestic and neighboring democracy on conflict and repression indicators with 90% confidence intervals
Note: Figures 4.2a - 4.2c are based on the logit models shown in table 4.2 and depict estimated marginal effects on the probability of observing a conflict event. Figures 4.2d - 4.2f are based on linear fixed effects regressions shown in table 4.3 and depict estimated marginal effects on the repression indicators.

For that reason, Regression No. 4 shows the results of fitting a "standard" logit model with time dummies and clustered standard errors to the data. The results are similar to those obtained by the use of fixed effects logistic regression. The marginal effects plots based on regression No. 4 are shown in Figure 4.2a. Due to normalization of the democracy variables between 0 and 1, the depicted marginal effects approximate the effect of full-scale democratization on the probability of anti-government demonstrations. The plots strongly support the moderation effects deduced from the theoretical model. While domestic democratization is found to increase the probability of anti-government demonstrations in strongly autocratic environments by about 20%, it has a negative impact of roughly the same size in fully democratic environments. Furthermore, democratization of neighboring countries is estimated to increase the probability of anti-government demonstrations in fully autocratic countries by approximately 40% whereas we do not find significant effects for democracies.

The same statistical models specified for anti-government demonstrations were fitted with strikes and riots as dependent variables. The results are shown by Regression No. 5-12 of Table 4.2. The evidence obtained regarding both strikes and riots is also in line with theory. Across all models capturing moderation effects, the coefficients of domestic democracy, neighboring democracy, and the interaction term are similar to those obtained with anti-government demonstrations as dependent variable. This similarity is also reflected in the marginal effect plots. According to Figure 4.2b, the probability of general strikes increases with higher levels of domestic democracy in autocratic environments whereas it is not systematically affected when democratization takes place in a relatively democratic environment. Moreover, the probability of strikes in autocratic countries increases in the average democracy level of the neighboring countries whereas there is no statistically significant marginal effect for democracies. Regarding riots, Figure 4.2c also indicates adverse effects of domestic democracy on internal conflict if the neighboring countries are autocratic. On the contrary, we find negative and significant marginal effects of domestic democracy in democratic environments. The probability of riots is positively associated with the democracy levels of neighboring countries for strongly autocratic countries whereas the effect turns negative for full democracies.

The results for the indicators of state repression using degraded distance as proximity measure are shown in Table 4.3. According to Regression No. 13, there is evidence that domestic and neighboring democracy are associated with lower levels of repression as measured by the reversed PIR scores. Including an interaction between the democracy variables in Regression No. 14 reveals the expected negative moderation effect. As shown by Regression No. 15, this finding is robust against controlling for high-intensity conflict at home and abroad. Figure 4.2d shows that the marginal effect of domestic democracy on state repression is insignificant when the neighboring countries are relatively autocratic. Similarly, an increase in the democracy scores of neighboring countries is not found to affect state repression significantly in autocratic countries. However, increases in domestic (neighboring) democracy are negatively associated with the PIR measure of repression in

more democratic environments (countries), respectively. The results obtained with the Amnesty scores (Regressions No. 16-18) and the State Department scores (Regression No. 19-21) yield similar evidence. Graphically, this is illustrated by the marginal effect plots for the Amnesty scores (Figure 4.2e) and the State Department scores (Figure 4.2f), respectively. Across all regressions shown in Table 4.3, there is no evidence for direct or interaction effects of domestic and neighboring per capita income on government respect for human rights. A positive effect of youth bulges is found with the State Department scores as dependent variable only. Furthermore, while domestic high-intensity conflict is consistently found to be associated with higher levels of state repression, the results do not support an interaction with high-intensity conflict in neighboring countries.

Summing up, the regressions using degraded distance as proximity measure provide strong evidence for the hypotheses derived from the theoretical model. Domestic democracy is found to be associated with higher (lower) levels of low-level conflict in autocratic (democratic) environments. Regarding state repression, a negative impact of domestic democracy is revealed only in sufficiently democratic environments. Increases in the neighboring countries' democracy levels are associated a with higher level of protest and uprising in autocracies whereas there is no evidence for impacts on democratic countries. Neighboring democracy is found to reduce state repression particularly in full democracies whereas the results to not indicate systematic effects on autocratic countries.

Other proximity measures

The evidence presented above is based on degraded distance as measure of proximity between two countries. The main regression results obtained by the use of other proximity measures are summarized in Table 4.4. All regressions include the full set of control variables (not shown in the table). Some findings are noteworthy. While the results obtained with direct contiguity as proximity measure are relatively similar to those obtained with degraded distance, this is not true for the migrant stock and the ethnic proximity measure. When measuring proximity based on migrant stocks or ethnic similarity, the coefficients of the interaction terms between domestic and neighboring democracy are insignificant in most of the regressions for indicators of state repression. For ethnic proximity, this is also true when using strikes or riots as dependent variable. In contrast to the "raw" measure of ethnic proximity, using degraded ethnic proximity yields a sizable and significantly negative coefficient of the interaction term between the democracy levels at home and abroad. However, there is little evidence for an interaction effect from regressions explaining state repression. On the whole, these results indicate that geographical distance may be more important for the hypothesized mechanisms than other types of distance considered here.

Table 4.4: Regressions for indicators of low-level conflict and state repression. Alternative proximity measures

Proximity measure	Dependent variable Model	Demonstrations Logit	Strikes Logit	Riots Logit	Reversed PIR Linear FE	Amnesty Linear FE	State Dept. Linear FE
Direct contiguity	Dom. Democracy	3.05***	4.06***	3.42***	0.01	0.09	-0.01
		(0.90)	(1.38)	(0.86)	(0.09)	(0.07)	(0.07)
	Neigh. Democracy	2.47***	2.84***	1.86***	0.08	-0.05	0.03
		(0.51)	(0.82)	(0.55)	(0.06)	(0.05)	(0.05)
	Dom. Democracy ×	-2.77***	-2.17**	-2.52***	-0.14**	-0.12*	-0.09*
	Neigh. Democracy	(0.67)	(1.08)	(0.77)	(0.06)	(0.06)	(0.05)
Migrant stocks	Dom. Democracy	2.30**	3.44**	2.88***	0.06	0.10	0.01
		(1.04)	(1.60)	(0.96)	(0.10)	(0.09)	(0.08)
	Neigh. Democracy	1.12***	2.04***	1.16**	0.02	-0.06	-0.02
		(0.40)	(0.65)	(0.45)	(0.06)	(0.05)	(0.04)
	Dom. Democracy ×	-0.74	-1.54*	-1.64**	-0.13*	-0.06	-0.08
	Neigh. Democracy	(0.63)	(0.91)	(0.71)	(0.07)	(0.07)	(0.06)
Ethnic proximity	Dom. Democracy	3.52***	4.56***	3.62***	0.05	0.15	-0.04
		(1.05)	(1.47)	(0.94)	(0.10)	(0.10)	(0.09)
	Neigh. Democracy	2.39	-0.49	2.48	0.22	0.18	-0.11
		(2.56)	(4.09)	(2.62)	(0.31)	(0.27)	(0.23)
	Dom. Democracy ×	-2.02*	-0.96	-1.62	-0.16	-0.17	0.02
	Neigh. Democracy	(1.07)	(1.69)	(1.10)	(0.12)	(0.13)	(0.10)
Degraded ethnic proximity	Dom. Democracy	3.00***	4.13***	3.50***	0.01	0.09	-0.01
		(0.92)	(1.40)	(0.87)	(0.09)	(0.08)	(0.08)
	Neigh. Democracy	1.91***	2.55***	1.74***	0.09*	-0.02	0.05
		(0.59)	(0.73)	(0.51)	(0.05)	(0.05)	(0.04)
	Dom. Democracy ×	-2.30***	-1.93**	-2.31***	-0.11*	-0.09	-0.07
	Neigh. Democracy	(0.69)	(0.96)	(0.68)	(0.05)	(0.06)	(0.05)

Standard errors in parentheses. Significance levels: * 10%, ** 5%, *** 1%. The full set of control variables is included but not shown in the table. The full regression results are shown in the online appendix. Abbreviations: FE = Fixed effects, Dom. = Domestic; Neigh. = Neighboring, GDP = Gross Domestic Product.

Count data models

In the analyses outlined above, the variables capturing anti-government demonstrations, strikes, and riots have been dichotomized, indicating whether or not an event occurred in a given country-year. However, this involves some loss of information on the severity of conflict that may be reflected in the *number* of events per country-year. Using degraded distance as proximity measure, we therefore estimate fixed effects negative binomial models using the number of events as dependent variables. The results are shown in Table 4.5. In line with the logistic regressions presented in Table 4.2, the coefficients of both domestic and neighboring democracy are positive and statistically significant. In addition, the coefficient of the interaction term is negative and significant at the 1% level.

Table 4.5: Regressions for count data conflict variables. Proximity measure: Degraded distance

Dependent variable	Number of Demonstrations	Number of Strikes	Number of Riots
Model	FE NB	FE NB	FE NB
Regression No.	(22)	(23)	(24)
Dom. Democracy	2.92***	2.96***	3.40***
	(0.56)	(0.94)	(0.57)
Neigh. Democracy	3.62***	2.62***	2.65***
	(0.47)	(0.94)	(0.51)
Dom. Democracy ×	-3.66***	-3.23***	-3.86***
Neigh. Democracy	(0.58)	(1.08)	(0.63)
(Dom. Democracy)^2	-0.75	-0.30	-1.05*
	(0.53)	(0.93)	(0.54)
Dom. GDP/capita, log.	0.63*	-0.10	0.28
	(0.33)	(0.68)	(0.36)
Neigh. GDP/capita, log.	0.34	0.17	0.24
	(0.31)	(0.64)	(0.34)
Dom. GDP/capita, log. ×	-0.06	-0.01	-0.04
Neigh. GDP/capita, log.	(0.04)	(0.07)	(0.04)
Population, log.	0.19***	0.15	0.08**
	(0.03)	(0.11)	(0.04)
Youth bulges	-0.01	0.02	0.01
	(0.01)	(0.02)	(0.01)
Dom. high-int. conflict	-0.02	-0.27	0.02
	(0.18)	(0.33)	(0.19)
Neigh. high-int. conflict	-0.12	-0.24*	-0.20**
	(0.08)	(0.14)	(0.08)
Dom. high-int. conflict ×	0.13	0.42	-0.23
Neigh. high-int. conflict	(0.19)	(0.36)	(0.21)
Lagged dependent Variable	0.07***	0.24***	0.07***
	(0.01)	(0.03)	(0.01)
Observations	7,047	5,173	6,747

Standard errors in parentheses. Significance levels: * 10%, ** 5%, *** 1%. Abbreviations: FE = Fixed effects, NB = Negative binomial, Dom. = Domestic; Neigh. = Neighboring, GDP = Gross Domestic Product, log. = logarithmic, high-int = high-intensity.

4.5 Conclusion

It is a core finding in empirical conflict research that intrastate conflicts tend to be contagious. While this has particularly been documented for high-intensity conflicts like civil war, spillovers of low-level conflict have been examined less often. By drawing on a simple theoretical model, this paper offered a stylized analysis of spillovers of low-level conflict between countries. Particular emphasis was placed on the role of political regimes. The model highlighted two opposing effects of democracy on the intensity of low-level conflict and state repression: on the one hand, inclusive political institutions have a pacifying effect as they increase the scope for political participation and, thus, reduce dissatisfaction of the population. On the other hand, we argued that people assess domestic political participation possibilities relative to those offered by the political systems of proximate countries. Increased domestic political participation possibilities therefore may result in increased dissatisfaction abroad, particularly in more autocratic countries. This may fuel intrastate conflict in neighboring countries which, in turn, may result in conflict spillovers. Hence, the net effect of domestic democracy on conflict intensity is ambiguous. Similar implications have been derived for the impact of neighboring democracy. Moreover, the model revealed an interaction effect, stating that domestic democracy is more likely to decrease (increase) conflict intensity in democratic (autocratic) environments. Likewise, neighboring democracy is more likely to decrease (increase) conflict intensity in democratic (autocratic) countries. We provided empirical evidence for these hypotheses by utilizing data on low-level conflict and state repression in a panel of 160 countries in the period from 1950 to 2011. In this regard, geographical proximity between countries was found to be more relevant for the hypothesized relationships than ethnic ties or migrant stocks.

Our results underline the importance of transnational effects when analyzing intrastate conflict. They also shed light on more complex interactions between political institutions of neighboring countries in relation to low-level conflict. Although higher levels of domestic democracy may reduce domestic dissatisfaction and, thus, conflict potential, they may also spur dissatisfaction in neighboring countries. According to our results, democratization is most likely to reduce internal conflict in democratic neighborhoods. In autocratic environments, conflict intensity may even increase. Moreover, our results show that a democratic neighborhood is not unambiguously beneficial but increases conflict intensity in autocracies. Future research examining the links between political regimes, low-level conflict, and state repression should take these complex relationships into account.

Chapter 5

Democratic institutions, repression, and economic development in non-democratic regimes: theory and evidence

Authors: Alexander Kemnitz, Martin Roessler

Abstract This paper provides a theoretical rationale for the simultaneous use of repression and democratic institutions by a non-democratic government, as is often observed in reality. We find that economic development has different impacts on the levels of repression and democracy, depending on whether it appears in the form of rises in income or in education: A higher income level reduces democracy, whereas more education leads to both more democracy and more repression. These theoretical implications are corroborated by dynamic panel data regressions.

Keywords: Democracy; Repression; Non-democratic Government Economic Development
JEL classification: C33, D72, K38, H11, O10

5.1 Introduction

Government violations of human rights like political imprisonment, torture, and killings are widespread. At least in recent history, state repression is estimated to have claimed more lives than other forms of political conflict (Rummel, 1997).

Against this background, many empirical studies have aimed to identify determinants of state repression. One important finding of this literature is that the relation between repression and democracy is far from monotonous. While full democracies are generally less repressive than full autocracies, some studies find anocracies, i.e. regimes characterized by a mix of democratic and autocratic institutions, to show higher levels of repression than full autocracies and full democracies (see, e.g., Fein, 1995; Regan and Henderson, 2002). While these "more murder in the middle"-results have been challenged for being driven by conceptional overlaps between indicators of repression and democracy (Hill, 2016; Vreeland, 2008), consensus prevails that only fully democratic political regimes are associated with a substantial reduction in human rights violations (Davenport and Armstrong, 2004; Bueno De Mesquita et al., 2005; Jones and Lupu, 2018).

This finding suggests that the institutions of democracy have to be sufficiently strong to constrain political leaders effectively. But by the same token, democratic institutions in autocratic regimes should be considered as instruments of the ruling elite. In particular, they can reflect policy concessions made by non-democratic governments aimed at preventing rebellion (Gandhi and Przeworski, 2006). Consequently, trying to explain differences in repression levels between non-democracies by differences in their institutional structures is not conducive, as the latter are not exogenous. Rather, both repression and political institutions have to be interpreted as tools of non-democratic leaders, with their utilization depending on other underlying factors.

This paper provides a closer examination of the determinants of repression and democratic political institutions in non-democratic political regimes. We present a simple theoretical model based on a non-democratic leader caring for both private consumption and political power, which is able to explain the concomitant use of repression and democratic concessions. This model predicts different facets of economic development to have different implications for human rights violations and democracy levels: While higher income levels are associated with lesser democratic concessions, an increase in the educational attainment of the population increases both repression and democracy. Using data on 458 non-democratic political leaders of 101 countries in the period from 1962 to 2010, these implications are confirmed by dynamic panel data estimations.

5.2 Repression, democracy, and economic development

The political economy literature agrees broadly that repression is an essential instrument of non-democratic rulers to secure office. From a theoretical perspective, Wintrobe (1990, 1998) argues that the extent of repression depends crucially on the preferences of the polit-

ical leader. To save budget, a "tinpot" dictator who is exclusively interested in maximizing private consumption applies the minimum level of repression required to stay in office. On the contrary, a "totalitarian" who is interested in maximizing power over the population exerts higher levels of repression.

Non-democratic rulers do not survive by using repression alone. To prevent rebellion, autocrats can also provide economic benefits through reduced taxes, subsidies, and public investment (see, e.g., Acemoglu and Robinson, 2005; Bar-El, 2009; Grossman, 1995; Gwatipedza and Janus, 2018). As shown by Desai et al. (2009), those economic benefits may be strategically complemented by policy concessions. Acemoglu and Robinson (2000) highlight that concessions in terms of political rights are not necessarily effective, as they may be viewed as a sign of weakness and therefore spur a revolution. Then, the ruling elite may go for either large-scale repression or full-scale democratization instead of an intermediate option. However, despite endorsing historical examples by Acemoglu and Robinson (2000), quantitative evidence suggests that the partial implementation of democratic institutions by non-democratic leaders generally prolongs their survival by broadening their basis of support (Gandhi and Przeworski, 2007). More specifically, popular support may be generated by policy concessions, which require an institutional setting of legislatures and parties (Gandhi and Przeworski, 2006).

Obviously, the significance of such concessions depends on the preferences not only of the leader, but also of the population. Acemoglu and Robinson (2005) argue that instrumental demands for democratization can be grounded in the desire to redistribute income by enforcing the preferences of the (poor) median voter. Moreover, democracy may be intrinsically valuable for citizens. According to modernization theory (Lipset, 1959), economic development in general and education in particular are related to sustaining belief in democratic norms and higher demand for political participation. Modernization theory thus establishes a causal link from economic development to democracy. The empirical validity of this hypothesis has been challenged, with some authors positing that causality runs in the other direction (see Acemoglu et al., 2008, 2019). Despite extensive examination, evidence on the modernization hypothesis has remained inconclusive (see, e.g., Cervellati et al., 2014; Castelló-Climent, 2008; Lundberg et al., 2016; Moral-Benito and Bartolucci, 2012).

Although there is no clear link between general economic development and democracy at the macro-level, the link between education and democratic preferences appears to be robust at the micro-level. More educated citizens are found to be more likely to form democratic values and show demand for political participation, also when living under non-democratic political regimes (see, e.g., Chong and Gradstein, 2015; Evans and Rose, 2007, 2012). As an explanation, Chong and Gradstein (2015) propose that an individual's costs of monitoring politicians decrease in the level of education. Consequently, educated citizens are more likely to support democratic practices and institutions which can promote the accountability of political leaders. In this regard, the role of income is less clear-cut. There is some evidence that citizens belonging to the high-income group tend to support

democracy to a lesser extent than those belonging to the low-income or medium-income group (Shafiq, 2010). This finding is in line with the notion that political support is at least in part instrumental and, hence, depends on economic wellbeing.

Based on these considerations, the model developed in the following section comprises both the rationale of non-democratic political leaders and a more differentiated perspective on the link between economic development and political support.

5.3 The model

In the spirit of Wintrobe (1990, 1998), we consider a non-democratic leader L, whose utility depends on her level of political power p and private consumption c:

$$U_L = u(p) + v(c), \tag{5.1}$$

where $u(\cdot)$ and $v(\cdot)$ are well-behaved concave functions ($u' > 0 > u'', v' > 0 > v''$), ensuring interior solutions for the sake of convenience.

The level of L's political power is considered as the extent to which she can act at her own discretion. Obviously, democracy erects institutional constraints on this power due to a constitution, an independent legislature, modes of political competition, etcetera. Thus, we express political power as: $p = \bar{d} - d$, with $\bar{d}$ as some maximum degree of democracy viable for an autocratic regime and $d \in [0, \bar{d}]$ as the democracy level actually provided.

Private consumption c equals L's budget B net of repression expenditures r required to stay in power described in detail below: $c = B - r$. In order to raise her budget, L taxes the gross income of the economy y at a tax rate τ.[39] The relation between tax rate and revenue is of a Laffer-type: $B = q(\tau) \cdot y$ with $q'(0) \in (0, 1]$, $q''(\tau) < 0$, and $q'(\hat{\tau}) = 0, \hat{\tau} \leq 1$. The budget increases with the tax rate less than proportionally and only up to some threshold rate $\hat{\tau}$.

Superseding autocratic L necessitates a rebellion. Here, we follow Bar-El (2009) by assuming that the mobilization potential for insurgence increases in the discontent of the general population. However, we extend that approach by positing that not only economic but also political issues matter for dissatisfaction.[40] Let the utility of the general population be denoted by:

$$U_P = w((1 - \tau)y) + s(d - e),$$

where $w(\cdot)$ and $s(\cdot)$ are well-behaved concave functions ($w' > 0 > w'', s' > 0 > s''$) depicting economic and political satisfaction, respectively. While economic satisfaction is determined by disposable income $(1 - \tau)y$, political satisfaction depends on the difference between supply and demand for democracy. In line with the modernization theory of

[39] We normalize population size to unity. Hence, y denotes both total and per capita income.

[40] In Bar-El (2009), utility functions of citizens are defined over private consumption only. The same applies to the leader, who does not derive utility from political power per se. Similar assumptions hold in Acemoglu and Robinson (2000).

Lipset (1959), the latter is represented by the level of education e, which diminishes the utility from the actual democracy level d.

Like in Bar-El (2009), members of the general population are assumed to disapprove of L and mobilize when utility falls below their threshold levels. Moreover, these threshold levels follow a uniform distribution in some interval $[\underline{U}, \overline{U}]$, with $\underline{U}$ and $\bar{U}$ reflecting the most servile and critical attitudes towards L, respectively. Consequently, the share of the general population dissatisfied with L and receptive for rebellion amount to:

$$N = 1 - \frac{w((1-\tau)y) + s(d-e) - \underline{U}}{\overline{U} - \underline{U}}, \tag{5.2}$$

In order to prevent the mobilization of N and maintain office, L must exert repression. With ϕ denoting the per capita cost of containing the dissatisfied, repression expenditures result as:

$$r = \phi \cdot N = \varphi \cdot \left(\overline{U} - w((1-\tau)y) - s(d-e)\right), \tag{5.3}$$

with $\varphi = \phi/(\overline{U} - \underline{U})$ for notational convenience. According to (5.3), improving satisfaction by reducing taxes and/or providing more democracy saves on repression expenditures. However, democracy decreases political power and lower taxes reduce L's budget.

Thus, the problem of L is to choose the level of democracy and the tax rate in order to maximize utility subject to the requirement that the disapproved are contained. In formal terms:

$$\max_{d,\tau} u\left(\bar{d} - d\right) + v\left(q(\tau)y - r\right), \tag{5.4}$$

with r given by (5.3). This leads to first order conditions:

$$d: \qquad -u'(\bar{d} - d) + v'(q(\tau)y - r) \cdot \varphi \cdot s'(d-e) = 0, \tag{5.5}$$

$$\tau: \qquad v'(q(\tau)y - r) \cdot y \cdot [q'(\tau) - \varphi \cdot w'((1-\tau)y)] = 0. \tag{5.6}$$

Applying Cramers Rule yields:

$$\frac{\mathrm{d}\tau}{\mathrm{d}e} = 0 \tag{5.7}$$

$$\frac{\mathrm{d}d}{\mathrm{d}e} = \frac{\varphi^2 \cdot v''(s')^2 + \varphi \cdot v's''}{u'' + \varphi \cdot v's'' + \varphi^2 \cdot v''(s')^2} > 0, \tag{5.8}$$

$$\frac{\mathrm{d}\tau}{\mathrm{d}y} = \frac{\varphi \cdot w'' \cdot (1-\tau)}{q'' + \varphi \cdot w'' \cdot y} > 0 \tag{5.9}$$

$$\frac{\mathrm{d}d}{\mathrm{d}y} = -\frac{\varphi \cdot v''s' \cdot (q + \varphi \cdot w' \cdot (1-\tau))}{u'' + \varphi \cdot v's'' + \varphi^2 \cdot v''(s')^2} < 0. \tag{5.10}$$

A more educated population has no consequences on the tax rate, but leads to more democracy, whereas a higher per capita income increases the tax rate and weakens democratic institutions. Moreover, by (5.8)-(5.10), repression grows with the level of education, but

reacts ambiguously on a per capita income increase:

$$\frac{\mathrm{d}r}{\mathrm{d}e} = \varphi \cdot s' \cdot \left(1 - \frac{\mathrm{d}d}{\mathrm{d}e}\right) = \frac{\varphi \cdot s' u''}{u'' + \varphi \cdot v' s'' + \varphi^2 \cdot v''(s')^2} > 0 \tag{5.11}$$

$$\frac{\mathrm{d}r}{\mathrm{d}y} = -\varphi \left(w' \cdot \left(1 - \tau - y \cdot \frac{\mathrm{d}\tau}{\mathrm{d}y}\right) + s' \cdot \frac{\mathrm{d}d}{\mathrm{d}y}\right) \tag{5.12}$$

$$= -\varphi \left(\frac{q'' w' \cdot (1-\tau)}{q'' + \varphi \cdot w'' \cdot y} - \frac{\varphi \cdot v''(s')^2 (q + \varphi \cdot w' \cdot (1-\tau))}{u'' + \varphi \cdot v' s'' + \varphi^2 \cdot v''(s')^2}\right) \gtreqless 0. \tag{5.13}$$

These findings can be interpreted as follows. Encouraging demands for democracy, a rising level of education increases dissatisfaction among the general population unambigously. L minimizes her utility loss of containment by sacrificing both private consumption and political power. This entails not only combating dissatisfaction by increasing repression $[\frac{\mathrm{d}r}{\mathrm{d}e} > 0]$, but also mitigating discontent by offering more democracy $[\frac{\mathrm{d}d}{\mathrm{d}e} > 0]$. However, a rising per capita income has an inconclusive effect on dissatisfaction. On the one hand, rises in per capita income lead to higher disposable income $[\mathrm{d}(1-\tau)y/\mathrm{d}y = 1 - \tau - y \cdot \mathrm{d}\tau/\mathrm{d}y > 0]$, which reduces economic dissatisfaction. On the other hand, it increases $L's$ budget $[\mathrm{d}B/\mathrm{d}y = q + q' \cdot y \cdot \mathrm{d}\tau/\mathrm{d}y > 0]$ which spurs her demand for both private consumption and political power. Thus, democracy is dismantled $[\frac{\mathrm{d}d}{\mathrm{d}y} < 0]$ and political dissatisfaction grows. As a consequence, economic and political discontent move in opposite directions, leaving the impact on overall dissatisfaction and hence on repression expenditures ambiguous $[\frac{\mathrm{d}r}{\mathrm{d}y} \gtreqless 0]$.

Summarizing, the model predicts a non-democratic leader to respond differently to economic development in terms of income and in terms of education, allowing us to investigate the following hypotheses:[41]

H_d^y: A higher per capita income is associated with a lower level of democracy.

H_d^e: A higher level of education is associated with a higher level of democracy.

H_r^e: A higher level of education is associated with a higher level of repression.

5.4 Empirical evidence

To test the hypotheses derived above, we utilize the Archigos data set of political leaders (Goemans et al., 2009). The office entry and exit dates reported in the Archigos data allow us to match political and economic conditions to non-democratic rulers. In contrast to previous empirical analyses at the country level, we therefore can exploit changes in political institutions and repression within the tenure of a specific leader. Furthermore, this approach enables us to control for leader-specific characteristics (see below).

Our dependent variables are Democracy and Repression, measured by two commonly used indicators (see, e.g. Acemoglu et al., 2008; Heid et al., 2012; Hill and Jones, 2014).

[41] As our theoretical result on the relation between r and y is ambiguous, we abstain from a fully-fledged empirical examination. However, we report respective regression results in Tables 5.1 - 5.3. Moreover, lacking tax rate data prevent us from testing the effects of income and education on τ.

For democracy we take the "Polity scores" (Marshall and Gurr, 2016), which measure a country's level of democracy in discrete steps between -10 (full autocracy) and 10 (full democracy). Repression is operationalized by the "Physical Integrity Rights Index" (PIR) of the CIRI Human Rights Data Project (Cingranelli et al., 2014). The PIR captures human rights violations including torture, extrajudicial killing, political imprisonment, and disappearance on a scale ranging from 0 (no government respect for the related human rights) to 8 (full government respect for the related human rights). To measure repression, we reverse the signs of the PIR scores. Furthermore, both the Polity and the reversed PIR scores are normalized between 0 and 100 to facilitate the interpretation of the regression results presented below.

Income is represented by (the logarithm of) GDP per capita retrieved from the Penn World Table 9.0 (Feenstra et al., 2015). The GDP data are expressed in mil. 2011 US$ purchasing power parities to avoid distortions due to price and exchange rate fluctuations. Education is measured by the average years of schooling of the population aged 25 and over (Barro and Lee, 2013). Since the schooling data are available only in 5-year intervals, we apply linear interpolation.

Our econometric baseline specification closely follows Acemoglu et al. (2008) and includes (the log of) population and age structure as controls. Population is given by the country's number of inhabitants. Age structure is represented by the median age and the fraction of the population in the age groups 0-15, 15-30, 30-45, and 45-60. All of these data are from United Nations Population Division (2017).

To assess the robustness of our results, a second specification additionally includes other control variables employed in the literature on democracy and state repression. To capture effects of domestic violence, we include two dummy variables from the UCDP/PRIO Armed Conflict Dataset (Allansson et al., 2017; Gleditsch, 2002) representing "minor" conflicts (between 25 and 999 battle-related deaths in a given year) and intrastate wars (at least 1.000 deaths), respectively. To control for possible agglomeration effects, we include urbanization, i.e. the number of people living in urban areas as a percentage of the total population, and (the log of) population density, i.e. the number of people per square km of land area (both from World Bank, 2018). Furthermore, we utilize measures of ethnic and religious fractionalization (Alesina et al., 2003) to capture links between population heterogeneity and political institutions / repression. To account for adverse effects of natural resource abundance highlighted in the resource curse literature (for an overview see Frankel, 2010), we employ (the log of) oil and gas production in 2014 US$ per capita (Ross and Mahdavi, 2015). Since governments in only recently established political regimes may face special conditions, the durability of the current political regime as measured by the years since the last regime change (Marshall and Gurr, 2016) also enters as a control variable. At the individual level, we control for the age of the political leader (Goemans et al., 2009). Our final sample constitutes an unbalanced panel covering 458 leaders of 101 countries in the period from 1962 to 2010. The specific observations included in our analyses vary according to the definition of non-democratic political regimes. For our baseline def-

inition, we follow Marshall and Elzinga-Marshall (2017) and consider all countries with a Polity score ≤ 5 (on the original scale) as non-democratic. The robustness of our results against different thresholds is assessed in section 5.6.

Our econometric strategy relies on a linear model shown by (5.14). Here D denotes the dependent variable (democracy / repression), e are the population's average years of schooling, and y is the logarithm of GDP per capita. Control variables and their regression coefficients are represented by $\boldsymbol{x}$ and $\boldsymbol{\gamma}$, respectively. Following the majority of empirical studies on democracy and state repression, we include a lag of the dependent variable with autoregressive coefficient ρ to account for the persistence of political institutions and human rights practices. Furthermore, it is likely that changes in our explanatory variables are reflected in changes in democracy and repression only with a time lag. For this reason, (5.14) links the current level of democracy / repression to the one-period lags of the explanatory variables. While ε_{lit} represents the idiosyncratic error term, leader and time fixed effects are denoted by η_l and δ_t, respectively. Note that η_l also captures country fixed effects as leaders are nested within countries.

$$D_{lit} = \rho \cdot D_{li,t-1} + \beta_1 e_{li,t-1} + \beta_2 y_{li,t-1} + \boldsymbol{x}'_{li,t-1}\boldsymbol{\gamma} + \eta_l + \delta_t + \varepsilon_{lit}, \tag{5.14}$$

Due to normalization of the dependent variables, β_1 represents the expected change in the indicator of democracy / repression as a percentage of its theoretical range that is induced by a 1-year increase in the average years of schooling. Similarly, $\beta_2/100$ approximates the expected percentage change in the dependent variable (relative to its theoretical range) associated with a 1%-increase in per capita income. β_1 and β_2 represent the short-term effects of education and income, whereas long-term effects can be derived by additional calculations. In general, the cumulated change in the dependent variable over K periods due to persistent changes in education and income in period $t = 0$ is

$$\Delta D_{liK} = \sum_{k=1}^{K} \rho^{k-1}(\beta_1 \mathrm{d}e_{li0} + \beta_2 \mathrm{d}y_{li0}). \tag{5.15}$$

In the following, (5.15) serves as the basis for our estimations of long-term effects. A problem arising when applying fixed effects estimators to dynamic panel data models like (5.14), particularly in large N - small T settings, is the so called "Nickell bias" (Nickell, 1981). This bias stems from correlation between the lagged dependent variable and the error term. One estimator that overcomes this problem is the difference GMM estimator, which estimates (5.14) in first differences and uses higher order lags as instruments for the differenced variables (Arellano and Bond, 1991). However, the difference GMM estimator potentially suffers from small sample bias, particularly in the presence of a highly persistent dependent variable (Alonso-Borrego and Arellano, 1999). In settings with large ρ, e.g. in case of highly persistent political institutions, difference GMM additionally faces the problem that lagged levels are weak instruments for subsequent changes. An alternative estimator with the potential to avoid these shortcomings is the system GMM estimator (Arellano and

Bover, 1995; Blundell and Bond, 1998). System GMM imposes additional orthogonality conditions which can result in large asymptotic efficiency gains. Hence, this estimator is frequently applied in empirical studies on democracy and economic development (see, e.g., Castelló-Climent, 2008; Heid et al., 2012). As a drawback, system GMM generates numerous internal instruments, which may overfit the instrumented variables. To avoid this problem, we restrict the number of lags used as instruments to roughly 1/3 of the number of available lags and additionally collapse the instrument matrix as described by Roodman (2009b). As specification tests, we apply the Hansen J-test for validity of instruments and the Difference-in-Hansen test for validity of the additional moment conditions, respectively. In both cases, low p-values indicate potential validity problems. We also test for autocorrelation of the error term of order 1 and 2. While first-order autocorrelation is expected due to differencing of the estimating equation, we should not reject the null hypothesis of no second-order autocorrelation for our estimation to be valid. Furthermore, while our theoretical model examines effects of education and income on democracy and repression, some authors posit that causality runs in the opposite direction (see, e.g., Acemoglu et al., 2019). This would result in correlation between our main explanatory variables and the error term and lead to biased estimates of the regression coefficients. To account for this issue, we use lags of $e_{li,t-1}$ and $y_{li,t-1}$ as additional instruments. In all estimations, we cluster standard errors at the country level and thus allow for heteroscedasticity and autocorrelation of the errors of all leader-years within a country.

5.5 Results

Table 5.1 shows the regression results for non-democratic political regimes defined by a Polity score ≤ 5. Model (1) gives the estimates of the baseline specification with democracy as the dependent variable. The coefficient of Education is positive and significant at the 1%-level and thus indicates a positive association between Democracy and the population's average years of schooling. Also in line with theory, the negative coefficient of log GDP per capita implicates that an increase in per capita income is related to a lower level of democracy in the following period. These results remain robust against the inclusion of additional control variables in model (2). Although the coefficients of Education and log GDP per capita become smaller in magnitude, they show the expected sign and remain statistically significant. According to our long-term effect estimates, an additional year of schooling increases a country's democracy score by approximately 28% (47%) of its theoretical range over 5 (10) years. An increase of per capita GDP by 1% is estimated to result in a relative reduction of the democracy score by roughly 0,6% (1%) over 5 (10) years. The large difference between short-term and long-term effects stems from the high persistence of political institutions that is reflected by coefficients of the lagged democracy score of roughly 0.9. In sum, the estimation results of model (1) and (2) support the hypotheses H_d^e and H_d^y.

Model (3) shows the results of the baseline specification with Repression as the depen-

dent variable. The coefficient of Education is positive and significant, implicating that an increase in the population's educational attainment is related to an increase in repression. This finding is in line with hypothesis H_r^e. The estimated effect of log GDP per capita on repression is insignificant. This is consistent with our theoretical model, which highlights

Table 5.1: System GMM estimates of (5.14). Dependent variables: Democracy (Polity scores) and Repression (reversed PIR scores)

Model	(1)	(2)	(3)	(4)
Dependent variable	Democracy$_{lit}$		Repression$_{lit}$	
Education$_{li,t-1}$	6.47***	3.16***	3.78**	5.03**
	(1.88)	(1.02)	(1.91)	(2.07)
log(GDP/capita$_{li,t-1}$)	-14.14***	-9.77***	-3.85	-5.72
	(4.40)	(3.72)	(3.65)	(5.28)
log(Population$_{li,t-1}$)	-0.87	-0.42	5.73***	4.41***
	(0.85)	(0.50)	(0.87)	(0.92)
Age structure$_{li,t-1}$	[0.13]	[0.31]	[0.03]	[0.02]
Minor conflict$_{li,t-1}$		0.13		11.68***
		(1.45)		(2.41)
Intrastate war$_{li,t-1}$		-0.77		17.51***
		(1.57)		(4.06)
Urbanization$_{li,t-1}$		0.17*		0.09
		(0.09)		(0.11)
log(Population density$_{li,t-1}$)		-0.02		1.18
		(0.56)		(0.95)
Ethnic fractionalization$_{li,t-1}$		-0.93		-2.09
		(3.33)		(6.09)
Religious fractionalization$_{li,t-1}$		-2.77		-6.77
		(3.09)		(6.11)
log(Resources/capita$_{li,t-1}$)		0.21		0.27
		(0.18)		(0.23)
Regime durability$_{li,t-1}$		0.01		0.13**
		(0.04)		(0.06)
Leader age$_{li,t-1}$		0.01		-0.08
		(0.04)		(0.07)
Dependent variable$_{li,t-1}$	0.93***	0.87***	0.35***	0.33***
	(0.07)	(0.07)	(0.05)	(0.05)
Long-run effects				
Education: 5 years	27.9***	12.08***	5.81**	7.50**
log(GDP/capita) : 5 years	-60.94***	-37.33**	-5.91	-8.53
Education: 10 years	46.86***	17.93***	5.84**	7.53**
log(GDP/capita) : 10 years	-102.30**	-55.42**	-5.95	-8.57
Observations	3,609	2,847	1,727	1,557
Instruments	111	119	111	119
AR1	[0.00]	[0.00]	[0.00]	[0.00]
AR2	[0.89]	[0.77]	[0.17]	[0.30]
Hansen J-test	[0.58]	[0.82]	[0.77]	[0.99]
Diff-in-Hansen test	[0.60]	[0.68]	[0.94]	[0.18]

Standard errors are clustered by country and shown in parentheses. p-values are in square brackets. Significance levels: *10%, **5%, ***1%. The sample includes non-democratic regimes defined by a Polity score ≤ 5.

opposing effects of income on repression leaving the net effect ambiguous. The inclusion of further control variables in model (4) does not change these results qualitatively. While the association between repression and the population's average years of schooling remains positive, we do not find a statistically significant effect of income. Due to the lower persistence of repression compared to democracy, the estimated long-term effects of education on repression do not deviate heavily from the short-term effects. According to model (4), an additional year of schooling increases the repression indicator by approximately 7.5% of its theoretical range over 5 to 10 years.

With regard to the control variables, we find weak evidence for a positive impact of urbanization on democracy, which is line with the theory of Lipset (1959). Consistent with core results in the literature on state repression, a larger population and intrastate conflict are found to be associated with higher levels of human rights violations (see, e.g., Davenport, 2007a; Hill and Jones, 2014). In addition, model (4) reveals a positive relationship between regime durability and repression. According to the model diagnostics, we find evidence for first-order but not for second-order autocorrelation of the error terms. Furthermore, the null hypotheses of the Hansen J-test and the Difference-in-Hansen test are not rejected at conventional significance levels. Thus, these tests do not cast doubt on the validity of the specifications shown in table 5.1.

Im summary, the regression results presented in this section support the implications of our theoretical model. In non-democratic regimes, a higher level of education is found to increase democracy and repression, whereas higher income levels are related to lower democracy levels.

5.6 Robustness

5.6.1 Variation of the democracy threshold

The results derived above rely on a sample of non-democratic countries defined by a Polity score ≤ 5. However, results should not depend qualitatively on the exact threshold used to define a non-democratic political regime. For robustness, we estimate model (2) and model (4) for threshold Polity scores between 3 and 7, representing a low and a high democracy threshold, respectively. The results obtained with Democracy as the dependent variable are shown in table 5.2. Across all threshold values, we find positive effects of Education and negative effects of log GDP per capita. The estimated short-run and the long-run effect are of comparable magnitude across all models. Similarly, the results shown in table 5.3 indicate that our findings regarding Repression are robust against variations of the threshold Polity score. While the estimation results of models (10) to (14) suggest that an increase in the population's educational attainment increases repression, there is no evidence for a systematic impact of log GDP per capita.

Table 5.2: System GMM estimates of (5.14) with Democracy as dependent variable using different threshold Polity scores for the definition of a non-democratic regime

Model	(5)	(6)	(7)	(8)	(9)
Dependent variable			Democracy_{lit}		
Threshold Polity score	Polity ≤ 3	Polity ≤ 4	Polity ≤ 5	Polity ≤ 6	Polity ≤ 7
$\text{Education}_{li,t-1}$	2.80**	2.66**	3.16***	3.78***	4.45***
	(1.12)	(1.16)	(1.02)	(1.21)	(1.40)
$\log(\text{GDP/capita}_{li,t-1})$	-10.23**	-10.31***	-9.77***	-10.92***	-11.86***
	(4.02)	(3.90)	(3.72)	(3.94)	(4.22)
Long-run effects					
Education: 5 years	13.13**	12.49**	12.08***	15.19***	18.68***
log(GDP/capita) : 5 years	-47.96**	-48.40**	-37.33***	-43.88***	-49.80***
Education: 10 years	24.26**	23.12**	17.93***	23.68***	30.49***
log(GDP/capita) : 10 years	-88.63*	-89.59*	-55.42**	-68.42**	-81.31**

Standard errors are clustered by country and shown in parentheses. Significance levels: *10%, **5%, ***1%. The full set of control variables is included but not shown in the table. Number of observations: Model (5): N = 2572; Model (6): N = 2670; Model (7): N = 2847; Model (8): N = 3122; Model (9): N = 3332.

Table 5.3: System GMM estimates of (5.14) with Repression as dependent variable using different threshold Polity scores for the definition of a non-democratic regime

Model	(10)	(11)	(12)	(13)	(14)
Dependent variable			Repression_{lit}		
Threshold Polity score	Polity ≤ 3	Polity ≤ 4	Polity ≤ 5	Polity ≤ 6	Polity ≤ 7
$\text{Education}_{li,t-1}$	6.19**	6.47**	5.03**	5.75**	6.66**
	(2.94)	(2.59)	(2.07)	(2.63)	(2.71)
$\log(\text{GDP/capita}_{li,t-1})$	-2.46	-7.23	-5.72	-6.35	-8.20
	(7.02)	(7.02)	(5.28)	(5.77)	(6.28)
Long-run effects					
Education: 5 years	9.06**	9.53**	7.50**	7.86**	8.92**
log(GDP/capita) : 5 years	-3.59	-10.65	-8.53	-8.68	-10.97
Education: 10 years	9.09**	9.56**	7.53**	7.87**	8.93**
log(GDP/capita) : 10 years	-3.60	-10.68	-8.57	-8.69	-11.00

Standard errors are clustered by country and shown in parentheses. Significance levels: *10%, **5%, ***1%. The full set of control variables is included but not shown in the table. Number of observations: Model (10): N = 1375; Model (11): N = 1401; Model (12): N = 1557; Model (13): N = 1791; Model (14): N = 1972.

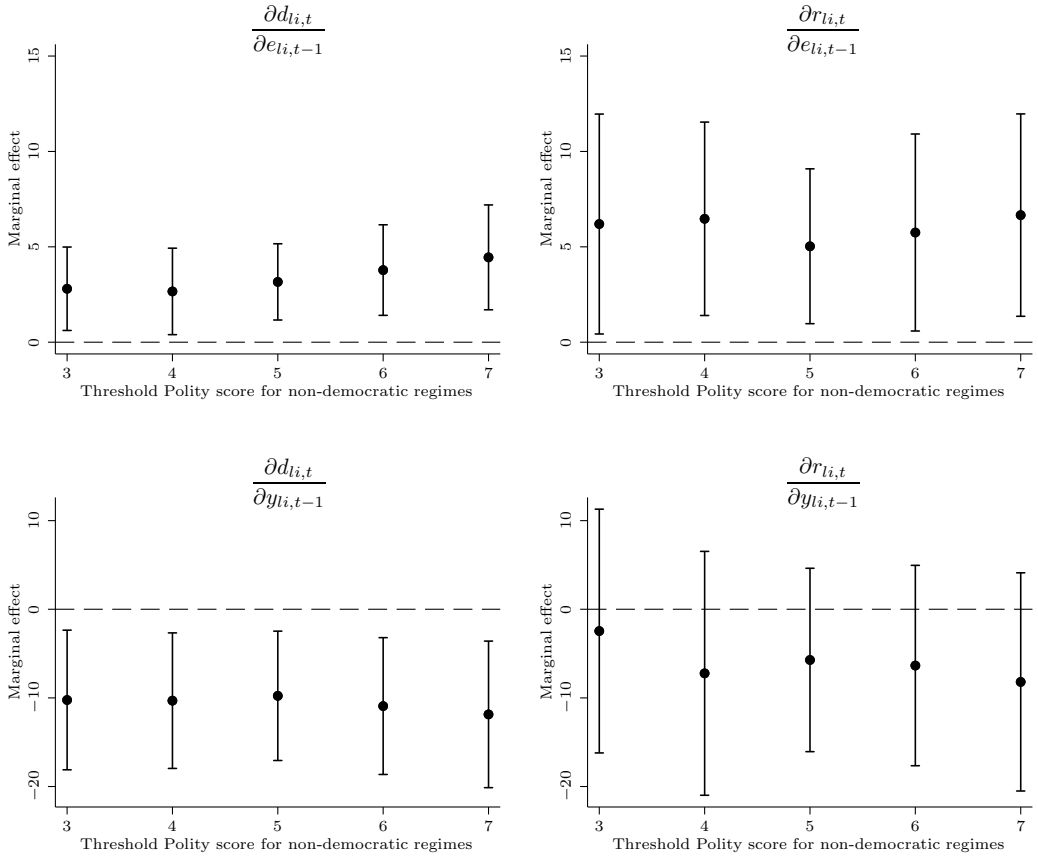


Figure 5.1: Marginal effects of education and income on democracy and repression by threshold Polity score

Figure 5.1 illustrates the estimated short-run effects of Education and log GDP per capita on Democracy and Repression with 95% confidence intervals derived from Tables 5.2 and 5.3. Obviously, there is no substantial variation in effect sizes across the different threshold Polity scores.

5.6.2 Regressions for democratic regimes

Our theoretical model considers the behavior of a non-democratic leader, who utilizes repression and political institutions. Due to a system of checks and balances, leaders under democratic political regimes are expected to have limited capability to use these instruments in general and repression in particular to secure office. Hence, we should not find evidence for the hypotheses derived in section 5.3 when estimating (5.14) based on a sample of democratic leaders. Table 5.4 shows the results for democratic political regimes defined by a Polity score ≥ 8.[42] In fact, we do not find evidence for effects of Education or

[42]To account for adverse regime changes, model (15) also includes observations where $\text{Polity}_{lit} < 8$ if $\text{Polity}_{li,t-1} \geq 8$.

Table 5.4: System GMM estimates of (5.14) for democratic political regimes (Polity score ≥ 8)

Model	(15)	(16)
Dependent variable	Democracy_{lit}	Repression_{lit}
$\text{Education}_{li,t-1}$	-1.79	0.99
	(1.66)	(2.34)
$\log(\text{GDP/capita}_{li,t-1})$	-6.84	-7.87
	(5.84)	(6.87)

Standard errors are clustered by country and shown in parentheses. Significance levels: *10%, **5%, ***1%. The full set of control variables is included but not shown in the table. Number of observations: Model (15): N = 1864; Model (16): N = 1347.

log GDP per capita on repression. Similarly, the insignificant effect of log GDP per capita in model (15) does not point to adverse effects of income on democracy under democratic political leaders. There is also no evidence that higher (lower) levels of education increase (decrease) democracy under highly democratic political regimes.

5.7 Conclusion

This paper has presented some new evidence on the relation between repression, democratic institutions, and economic development in non-democracies. First, it has combined the common notion of repression as one tool of non-democratic leaders with insights on the strategic use of democratic institutions highlighted in previous studies (Gandhi and Przeworski, 2006, 2007). Drawing on a simple model, the paper has provided a rationale for the complementary use of both instruments. Second, based on arguments relating education to democratic preferences (see, e.g., Chong and Gradstein, 2015), diverging effects of education and income on the popular political support for non-democratic governments have been highlighted. As a result, the paper has offered theoretical and empirical evidence that non-democratic governments respond differently to economic development, depending on whether it appears in the form of increasing education or per capita income. While higher education levels are found to be related to more democracy and more repression, there is evidence that increases in per capita income reduce concessions in terms of democratic institutions.

Our model leaves multiple interesting routes for extension for future research. We have set up a static model in which dynamic repercussions are absent. One extension therefore concerns anticipation of possible effects of current democratization on future income as suggested by Acemoglu and Robinson (2005). Moreover, we have considered education as a variable conducive to demands for democracy which is exogenous to the political leader. This opposes the view that autocratic governments can use education strategically in order to indoctrinate in their favor (Lott, 1999). While our empirical results cast some doubt

on the effectiveness of such a strategy, it could be a relevant aspect when extending the model by investments in public education (see, e.g., Testa, 2018). Finally, by focusing on direct effects, we have not considered any interrelations between education and income. To the extent that education determines income or vice versa, their net effects on democratic institutions and repression under non-democratic political regimes could be examined.

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