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Executive Constraints and Economic Growth

Erick Alvarez Barreno*

Department of Comparative Politics, University of Bergen, Norway
*Corresponding author. Email: erick.alvarez-barreno@uib.no

Abstract

Despite extensive research on democracy and development, the specific democratic institutions that drive economic growth remain unclear. This paper examines two forms of executive constraints: horizontal constraints, legislative checks on the executive; and vertical constraints, citizens' ability to hold executives accountable. While previous work emphasizes the role of horizontal constraints in securing property rights, I argue that vertical constraints primarily drive growth by expanding access to public goods. Using dynamic panel models, I find that vertical constraints significantly increase GDP per capita over time, whereas horizontal constraints have a negligible effect. I further test causal mechanisms, showing that horizontal constraints mainly encourage capital investment, while vertical constraints exert a stronger influence on human capital, leading to higher educational attainment, increased public spending, and lower infant mortality. These findings suggest that electoral contestation, not institutional checks on executive power, is the key democratic feature that facilitates economic development.

Keywords: democracy, executive constraints, economic growth, vertical accountability, horizontal accountability

Introduction

A growing body of evidence points toward democracy as a fundamental cause of growth (Acemoglu, Naidu et al 2019; Colagrossi et al 2020; Gerring, Knutsen and Berge 2022; Knutsen 2021). Proponents argue that democratic institutions secure property rights, ensure steady economic policies, and promote investment in both physical and human capital (North 1990; Knutsen 2013). Yet empirical findings on the democracy-growth link remain mixed, with some studies reporting negative effects of democracy on growth (Barro 1996) or no significant correlation (Alvarez et al 2000; Gerring et al 2005; Doucouliagos and Ulubaşoğlu 2008). To reconcile these discrepancies, scholars increasingly examine specific features of democratic governance, such as government structures and electoral rules (Persson and Tabellini 2005), party strength (Bizzarro et al 2018), bureaucracies (Cornell et al 2020), or executive constraints (Cox and Weingast 2018). While consensus has emerged that democracy matters for development, questions remain as to which democratic institution(s) matter the most.

Much of the theoretical work on democratic institutions has focused on executive constraints. A prominent line of research argues that horizontal constraints on the executive, such as legislatures, are sufficient to promote economic growth by fostering capital investment (North and Weingast 1989). Related scholarship contends that vertical constraints, such as electoral institutions, can threaten property rights and hinder growth by generating pressures for wealth redistribution (Przeworski and Limongi 1993). However, many scholars challenge this latter view, suggesting that free and fair elections align government policies toward majority preferences (Acemoglu and Robinson 2005). Consequently, vertically constrained governments prioritize the provision of goods with positive externalities such as education and health, improving living conditions and ultimately fostering economic growth (Lake and Baum 2001; Baum and Lake 2003; Besley and Kudamatsu 2006; Wang et al 2019; Gerring et al 2021).

In this article, I examine the relationship between executive constraints and economic growth, challenging the conventional view that horizontal constraints are the primary link between democracy and economic performance. Using a panel of 181 countries from 1950 to 2020, I find that while horizontal constraints increase capital investment —consistent with existing research— they do not significantly impact real GDP per capita once vertical constraints are accounted for. Instead, my findings strongly suggest that vertical constraints drive growth, increasing real GDP per capita by roughly one percent in the short run and about 30 percent in the long run. I also explore a plausible mechanism behind this relationship: vertical constraints are strongly associated with higher human capital, leading to higher educational attainment, increased public spending, and lower infant mortality rates. These results remain robust across different model specifications, variable choices, and econometric assumptions. Collectively, they indicate that electoral contestation, rather than horizontal accountability, is the key driver of democracy's positive effects on economic development.

1. Two forms of constraints with diverging outcomes

Executive constraints are institutions that limit rulers' discretionary use of power, but they operate through distinct channels. Horizontal constraints divide authority across relatively autonomous branches of government, typically through legislative oversight over the executive or an independent judiciary with legal instruments to review rulers' decisions. Vertical constraints, by contrast, hold leaders accountable to citizens through contested multiparty elections and extensive franchise rights (Dahl 1971). Historical evidence shows that these institutions do not emerge in a uniform sequence, and polities frequently combine them in different ways. While both are essential to a fully democratic order, some regimes developed horizontal constraints without vertical constraints —such as post-Glorious Revolution England (1688-1836), Sweden's Oskarian Era (1870–1907), or the late Ottoman Empire (1909–1917)—where parliaments or constitutions constrained rulers, but electorates remained narrow. Other regimes exhibit vertical accountability with weak horizontal checks, including the Third Republic of Korea (1963–1972), pre-Revolution Cuba (1952), or Ecuador under Rafael Correa (2007–2017).[1]

These cases illustrate two points. First, unidimensional measures of democracy fail to capture the institutional diversity that exists within regimes (Gerring, Knutsen and Berge 2022; Boese et al 2022). Second, the way constraints are configured matters: while both types may coexist, they produce distinct effects on economic outcomes. Specifically, horizontal constraints create incentives for capital investment by limiting state predation, whereas vertical constraints enhance human capital by generating redistributive pressures for public goods provision. The following subsections situate each form of constraint in relevant literature to clarify these mechanisms.

1.1 Investment without electoral democracy?

A large body of scholarship examines the role of horizontal constraints in establishing incentives for financial development. North and Weingast (1989) provide the most important contribution, suggesting that the Glorious Revolution initiated an era of "parliamentary supremacy" that discouraged the English Crown from engaging in predatory behavior. Other work generalizes this argument, suggesting that parliaments give investors a "credible signal that the state will not confiscate investment returns via taxation or frequent policy changes" (Wright 2008, 336). Accordingly, scholars have found that horizontal constraints positively influence private investment (Stasavage

[1] Tables A5 through A8 in the Supplementary Materials provide the full overview of these historical cases. I create dichotomous indicators for both types of constraints using data from Polity IV, following Cox and Weingast (2018) and Acemoglu et al. (2019). I describe these variables in the Data and Methods section. My sample covers around 198 countries from 1789 to 2022. I coded 9,490 country-year observations as not having either constraint, 795 as having only vertical, 847 as having only horizontal, and 5,829 observations as having both constraints.

2002; Wright 2008), while other authors suggest that they mitigate the investment downturns driven by electoral-related political uncertainty (Canes-Wrone and Park 2014; Canes-Wrone et al 2023).

The cornerstone of the *commitment* argument is that institutions providing horizontal checks on rulers protect property rights, which generates a more predictable business environment. Investors require certainty that they can own the benefits of their productive operations once earned. This connection has led scholars to argue that as long as there is some credible commitment institution, there is no need for other democratic features to ensure prosperity (e.g. Cox and Weingast 2018). Indeed, there is a long tradition among political philosophers and scientists considering democratic institutions outside of horizontal constraints as a threat to property rights protection. In this view, electoral democracy generates demands for immediate public consumption, threatening the profits of capital holders, thereby reducing investment and hindering growth (Przeworski and Limongi 1993).

While the commitment literature suggests a positive relationship between horizontal constraints and capital investment, recent empirical evidence remains ambiguous. Measures of legislative strength often overlap with the presence of participatory institutions, raising concerns that the estimated effects attributed to horizontal constraints may also reflect the influence of electoral accountability. Figure 1 illustrates this complexity by showing the distribution of investment as a share of GDP across 163 countries between 1960 and 2018, broken down by regime type. I refer to democracies as regimes with both horizontal and vertical constraints, while autocracies are regimes with neither. Although polities with only horizontal constraints display the highest average investment, this result is based on a small number of cases and is accompanied by substantial variance, offering only weak support for the commitment argument. By contrast, polities combining horizontal and vertical constraints consistently outperform those without any institutional checks, suggesting that democracy is not inherently inimical to capital investment and that institutional complementarities may be more consequential than the independent effect of horizontal checks on rulers.

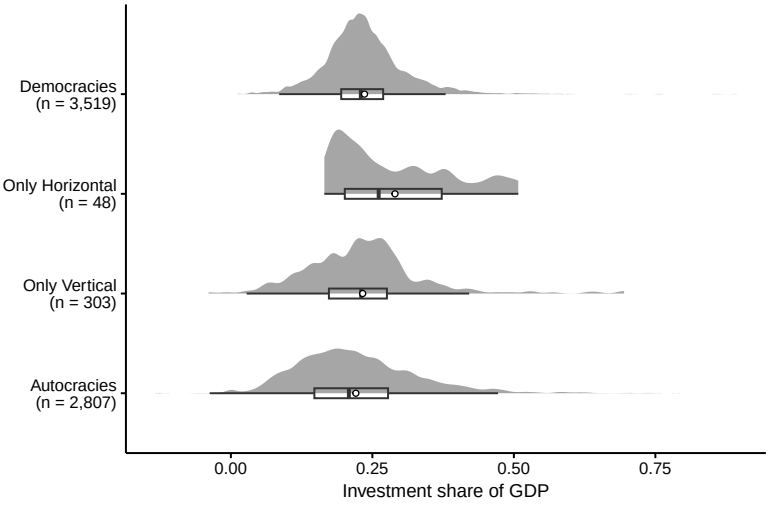

Figure 1. Mean and distribution of capital investment by regime type (sample: 163 countries between 1960 and 2018)

Another relevant limitation of the commitment argument is that it relies heavily on the Glorious Revolution as evidence of how horizontal constraints shape economic development. Scholars point to the Revolution's role in fostering representative institutions that transferred authority to a broad segment of society (Cox 2012). However, such accounts overlook a crucial limitation: those represented in the English Parliament after 1688 already belonged to privileged economic and political

elites, while the vast majority remained excluded—less than two percent of the population had voting rights in the eighteenth century (Acemoglu and Robinson 2012). Polities grounded only in horizontal constraints often consolidate oligarchic orders that protect elite property rights without extending benefits to the broader public. Such systems may foster financial markets and private investment, but they are unlikely to generate the provision of public goods—such as education, health, or infrastructure—required for sustained and inclusive economic development. This limitation raises an important question: if horizontal checks alone primarily serve elite interests, how do institutions that incorporate broader participation and electoral accountability—vertical constraints—reshape rulers' incentives and the distributional foundations of economic growth? The next subsection turns to this question.

1.2 Electoral institutions in action

While the relationship between democracy and investment remains contested and results are mixed (Gerring, Knutsen and Berge 2022), there is a strong consensus that vertical constraints—by expanding accountability beyond elites (Lührmann et al 2020)–systematically improve welfare outcomes and the provision of public goods. Electoral democracy has been shown to increase life expectancy (Besley and Kudamatsu 2006) and expand social spending in health and education (Lindert 2004; Mulligan et al 2004; Haggard and Kaufman 2020). Similarly, Wang et al (2019) demonstrate that the quality of competitive elections reduces infant mortality, and Gerring et al (2021) find that electoral competition is more strongly associated with human capital formation than other institutional features of democracy. Miller (2015) shows that contested elections—whether in autocracies or democracies—promote growth through gains in education, health, gender equality, and civil liberties. Subnational studies further demonstrate that participatory institutions amplify the political voice of marginalized groups (Besley et al 2005; 2007), and improve the targeting of welfare programs (Gonçalves 2014; Touchton et al 2021).

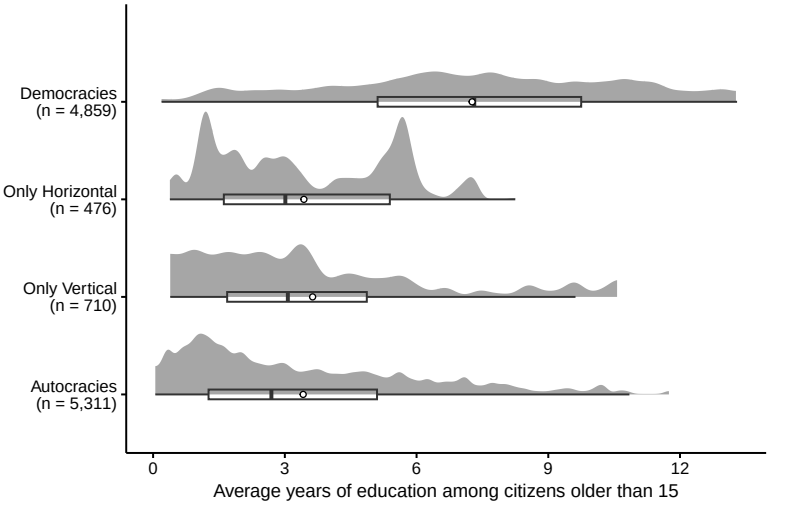

Figure 2. Mean and distribution of average years of education among citizens older than 15 by regime type (sample: 183 countries between 1820 and 2018)

Figure 2 shows that vertical constraints play a central role in shaping human capital outcomes. The figure plots the distribution of average years of education among citizens aged 15 and older across 183 countries between 1820 and 2018, again divided by regime type. Polities with only vertical

constraints display higher average years of schooling among citizens over age 15 than both polities with only horizontal constraints and autocratic regimes without institutional checks. Moreover, polities that combine vertical and horizontal constraints exhibit the highest average educational attainment of all institutional arrangements. These patterns hold when using alternative indicators of human capital, such as secondary school enrollment rates and infant mortality rates, drawn from the World Bank's World Development Indicators.

Broadly, the empirical evidence highlights the redistributive mechanism through which vertical constraints foster development in ways that horizontal checks alone cannot. By lowering barriers to participation, vertical constraints compel governments to act more like regulated monopolies, supplying a larger volume of goods at lower costs (Baum and Lake 2003). They also reduce entry barriers to political power, enabling citizens to articulate preferences, select leaders, and demand welfare-enhancing services (Pinto and Timmons 2005). Electoral competition then aligns government policy with the interests of the median voter, who, under inclusive institutions, represents a broad constituency that is inclined to prioritize investments in goods with positive externalities, such as education and healthcare. Voting thus operates both as an accountability mechanism that disciplines leaders who neglect welfare provision (Ferejohn 1986; 1999; Barro 1973) and as a check on predatory behavior (Benhabib and Przeworski 2010). These dynamics suggest a clear causal chain: vertical constraints expand accountability, which redirects state resources toward human capital formation, and the accumulation of human capital sustains higher levels of economic development.

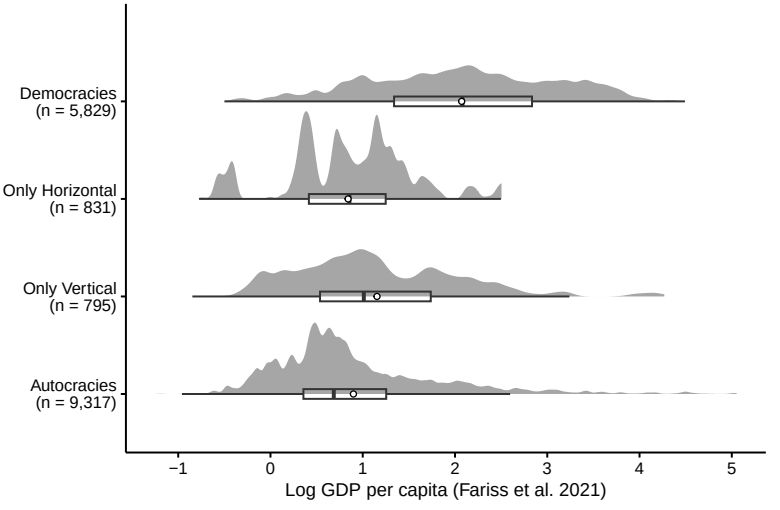

Figure 3. Mean and distribution of log GDP per capita by regime type (sample: 183 countries between 1800 and 2018)

Figure 3 illustrates how different institutional configurations shape economic performance, measured as GDP per capita in log points (Fariss et al 2022) across 183 countries between 1800 and 2018. Contrary to the core claims of the commitment literature, polities with only horizontal constraints perform no better than those without any institutional checks. By contrast, country-years with vertical constraints exhibit higher levels of GDP per capita, and those combining vertical and horizontal constraints display the highest levels of all, providing empirical support for the argument that polyarchic components interact in complementary ways to foster development (Gerring et al 2021). In sum, the data cumulatively suggests that vertical constraints are the primary channel through which democracy enhances human capital and, therefore, economic growth. This challenges the perspectives that privilege horizontal constraints alone, underscoring instead the distributive

and growth advantages that emerge when rulers are held accountable to a broad electorate. The next section outlines the econometric strategy employed to evaluate these dynamics systematically, assessing the independent effects of both constraints on economic growth and its proximate sources.

2. Data and Methods

I construct a baseline dataset covering 196 polities from 1789 to 2022, comprising 27,555 country-year observations. For the main analysis, I restrict the sample to 181 countries between 1950 and 2020, reflecting both data availability—particularly from the World Bank Development Indicators—and the requirements of panel modeling. To address the fact that executive constraints often emerge during episodes of regime change, I also estimate models using two extended samples: the full baseline dataset and another sample of 183 countries between 1900 and 2020, capturing a broader institutional variation across the three waves of democratization. As the main dependent variable, I use the natural logarithm of real gross domestic product (GDP) per capita,[2] measured in 2011 U.S. dollars, obtained from the Maddison Project Database version 2023 (Bolt and Zanden 2024). This variable is available for 169 countries and the period up to 2022.

Following Cox and Weingast (2018) and Acemoglu et al. (2019), I code a country as having horizontal constraints on the executive when there are institutional constraints imposing "substantial limitations" on the use of power by a country's chief executive, as measured by the Polity IV project (Marshall and Gurr 2020). Following Cox and Weingast again, I code a country as having vertical constraints on the executive when at least one of its chief executives was elected through a competitive election, according to Polity.

I use dichotomous indicators for both constraints to facilitate the interpretation of their effects on economic outcomes, particularly over time. This approach intuitively captures the short-term impact of having—or not having—a specific political institution (i.e. executive constraints), avoiding the complexities of interpreting effects based on varying institutional levels across years. To address potential measurement errors, I conduct several robustness tests using alternative measurement strategies. My findings remain consistent across multiple specifications, including a binary indicator that combines Polity IV with an arbitrary cut-off of the continuous accountability indices constructed by Lührmann, Marquardt, and Mechkova (2020).[3] Additional robustness tests incorporate constraints indicators from Fjelde, Knutsen, and Nygård (2021) based on V-Dem mid-level democracy indices, and variations in the Polity IV cut-offs used to construct Cox and Weingast's horizontal and vertical constraints variables.

2.1 The Model

I estimate a dynamic two-way fixed effects model, following the baseline specification of Acemoglu et al. (2019):

$$Y_{ct} = \alpha_c + \delta_t + \xi C_{ct} + \sum_{j=1}^{4} \tau_j Y_{ct-j} + \varepsilon_{ct} \quad (1)$$

Y_{ct} denotes the natural logarithm of real gross domestic product (GDP) per capita measured in 2011 U.S. dollars for country c and time t. α_c and δ_t are country and year fixed effects respectively. Country fixed effects (α_c) absorbs countries' time-invariant characteristics, such as geography, natural resources, social norms, and even the persistent legacies of colonization that may shape both political

[2]Level measures of GDP per capita are frequently used in economic research (e.g. Acemoglu et al., 2019). Although widely unnoticed, this decision may explain why economists tend to be more optimistic on the relationship between democracy and growth than political scientists (Cruz et al 2024).

[3]Figure A1 in the Supplementary Materials shows that Polity IV variables strongly correlate the V-Dem horizontal and vertical accountability indexes created by Lührmann, Marquardt, and Mechkova (2020).

and economic development (Papaioannou and Siourounis 2008). Year fixed effects (δ_t) capture global shocks and trends common to all countries, such as the worldwide impact of the 1970s oil crises (Cox and Weingast 2018). Finally, ξ measures the effect of horizontal and/or vertical constraints, C_{ct} based on Polity IV indicators.

Following Acemoglu et al. (2019), I include up to four lags of GDP per capita on the right-hand side of Equation 1. Growth outcomes such as GDP are highly persistent, with current values influenced by past levels. While most dynamic panel models include one or two lags to capture such temporal dynamics, Acemoglu et al. (2019) incorporate up to eight lags, assuming that there is a temporary dip in GDP four to five years before democratization. In line with this reasoning, I assume that "minor" political transitions—characterized by changes in horizontal and vertical constraints—may also be preceded by short-run downturns.[4] The four lags in my model thus account for both the autoregressive dynamics of GPD and pre-transition dips.

This model also relies on a standard sequential exogeneity assumption, which requires that the error term be uncorrelated with past GDP, as well as current and past values of both executive constraints and covariates. To satisfy this condition, a sufficient number of GDP lags must be included to eliminate serial correlation in the residuals. However, this dynamic specification raises two econometric concerns: potential endogeneity of lagged GDP and unobserved heterogeneity in past covariates. Country fixed effects address the latter, but the inclusion of lagged dependent variables still introduces an asymptomatic bias of order 1/T, commonly referred to as the Nickel bias (Nickell 1981). This implies that past GDP may remain correlated with the error term, violating the exogeneity assumption and leading to biased estimates.

To address these concerns, I complement the fixed effects model with robustness checks using the Difference Generalized Method of Moments (GMM) estimator of Arellano and Bond (1991).[5] Nevertheless, given the relatively long time dimension of the data (each country is observed, on average, 54.6 times), the dynamic panel bias is likely to be unsubstantial, and the fixed effect estimates remain my main focus.

3. Estimation results

Using the model in Equation 1, this section reports estimation results showing the empirically relevant interplay between executive constraints and economic development. The first set of analyses demonstrates that vertical constraints–not horizontal–determine short and long-run economic growth. However, and consistent with the literature, a second set of analyses shows that both forms of constraints are correlated with proximate growth sources such as physical and human capital. These findings hold regardless of model specifications, variable choices and econometric assumptions.

Table 1 reports estimation results for the effect of executive constraints on log real GDP per capita using the dichotomous measures of these constraints drawn from Polity IV. All columns show results including controls for a full set of country and year fixed effects and four lags of log real GDP per capita. I multiply the reported coefficients by 100 to ease interpretation.[6] I also report robust standard errors to account for heteroskedasticity and serial correlation at the country level in parentheses. Columns 1 through 3 describe results using the within (fixed effects) estimator. Column 4 uses the Arellano and Bond (1991) GMM estimator, and Columns 5 and 6 reproduce the results in Column 3 using different samples that capture observations from the 20th and 19th centuries correspondingly. In the first two columns, I describe the respective long-run effects for horizontal and vertical constraints, while in the rest of columns I report this effect only for vertical constraints.[7]

[4]See Figure A2 in the Supplementary Materials for Acemoglu's assumption and Figures A3 and A4 for executive constraints.

[5]Section A3.2. in the Supplementary Materials provides a detailed discussion about sequential exogeneity. Section A3.3. tests the model sensitivity to different GMM assumptions and discusses the problem of too many instruments.

[6]Because of Y's logarithmic transformation, the equation's functional form corresponds to a log-level model. The interpretation of β_1 follows the form $\%\Delta y = (100 \times \beta_1)\Delta x$ as described in Wooldridge (2020).

[7]Under sequential exogeneity, persistency and stationarity of the time series, I can estimate Equation 1 with a standard

Table 1. The effect of executive constraints on (log) real GDP per capita

	Within estimates			GMM estimates	20th century	19th century
	(1)	(2)	(3)	(4)	(5)	(6)
Horizontal constraints	.380		−.238	−.113	−.388	−.145
	(.207)		(.339)	(.433)	(.256)	(.207)
Vertical constraints		.605	.787	1.39	1.04	.982
		(.236)	(.382)	(.488)	(.247)	(.219)
Effect after 25 years	9.22	14.65	19.05	27.75	23.99	22.14
	(5.17)	(5.98)	(9.45)	(9.51)	(5.98)	(5.36)
Long-run effect	14.76	23.48	30.50	36.28	42.79	41.64
	(8.78)	(10.48)	(15.91)	(12.58)	(12.46)	(12.84)
Persistence of GDP	.974	.974	.974	.961	.958	.976
	(.004)	(.004)	(.004)	(.006)	(.004)	(.004)
Unit root test t-statistics	-5.28	-5.35	-5.39		-1.46	-.922
p-value (reject unit root)	.00	.00	.00		.072	.178
Lags used for instruments				70		
GMM total instruments				5,995		
AR2 test p-value				.159		
Observations	8.519	8.519	8.519	8.362	10.514	12.264
Countries in the sample	156	156	156	156	156	156
Years included	65	65	65	65	115	219

Note: The table presents estimates of the effect of executive constraints on log real GDP per capita. Reported coefficients are multiplied by 100. Robust standard errors against heteroskedasticity and serial correlation at the country level are reported in parentheses. All specifications are controlled for a complete set of country and year fixed effects and four lags of log GDP per capita. Columns 1-3 report results using the within estimator, column 4 uses the Arellano and Bond (1991) GMM estimator on results presented in column 3. The AR2 row reports the p-value for a test of serial correlation in the residuals of the GDP series, AR1 test p-value is omitted; still, all values are less than .00. Columns 5 and 6 report the results of Column 3 using different samples covering the 19th and 20th centuries. Finally, the first two columns report long-run effects for horizontal and vertical constraints correspondingly, whereas the rest of columns report this effect only for vertical constraints.

Vertical constraints display consistently positive and statistically significant effects across all specifications reported in Table 1. In the model of Column 3, which includes both horizontal and vertical constraints, the presence of vertical constraints is positive and significant, with a coefficient of .787 (standard error = .382).[8] By contrast, horizontal constraints have a weak and insignificant relationship with real GPD per capita. Indeed, even in the model presented in Column 1, which estimates the effect of horizontal constraints on growth in isolation, this effect is statistically negligible. These results imply that when countries strengthen mechanisms of vertical accountability—such as free and fair elections and open political competition—they experience higher levels of economic development over time.[9]

fixed effects estimator (Acemoglu et al., 2019). Consistent with the stationarity assumption, the AR2 row reports the p-value for a test of serial correlation in the residuals of the GDP series, the AR1 test p-value is omitted; still, all values are less than .00. These diagnostics suggest that the dynamic panel estimates are well-behaved and that results are not driven by serial correlation or spurious persistence.

[8]Section A4.4. in the Supplementary Materials provides additional robustness, including several additional covariates, such as the log of population, trade volume as a fraction of GDP, and a dichotomous measure of social unrest.

[9]Table A11 in the Supplementary Materials provides an additional robustness using a latent variable measure of GDP per capita based on the information from the most widely used indicators (Fariss et al., 2022). The main pattern of results are robust to these specifications, even when including an interaction term between both constraints (see Tables A10-A12).

3.1 Robustness checks

Leveraging the expanding availability of cross-national data on democratic institutions, columns 5 and 6 of Table 1 introduce two robustness checks for the fixed effects estimates, using alternative samples that span up to 219 years and 156 countries. This historical breadth is essential, as institutional variation in horizontal and vertical constraints was more pronounced in earlier centuries. Regimes characterized primarily by horizontal constraints were more prevalent in the nineteenth century, whereas the development and diffusion of vertical accountability mechanisms expanded during the twentieth century—particularly during the three waves of democratization.

The Arellano and Bond (1991) GMM estimates in Column 4 provide an additional robustness test against endogeneity from lagged GDP. I also provide another test addressing the "problem of too many instruments" (Roodman 2007) by capping and collapsing available lags for instrumentation.[10] Across these alternative samples and specifications, my findings remain robust: vertical constraints exhibit a strong and positive effect on economic growth, whereas horizontal constraints do not. This pattern persists even when accounting for possible endogeneity through dynamic specifications, suggesting that the observed relationship is not merely a reflection of reverse causality—whereby wealthier societies adopt better institutions. Crucially, the absence of a comparable effect for horizontal constraints further strengthens this conclusion. If economic development alone prompted institutional improvements, we would expect both types of constraints to rise with income. Instead, only vertical constraints show a systematic link with higher GDP per capita, underscoring its distinctive and durable role in fostering economic growth.

3.2 Long-run effects

Here I show how the cumulative long-run effects of executive constraints on growth are derived from Equation 1. This helps to differentiate the long-run effects between countries with cumulative years of having only horizontal or vertical constraints. My findings suggest that the long-run effect of horizontal constraints is insignificant, whereas introducing vertical constraints has a consistently positive impact on long-run economic growth. Because Equation 1 describes a dynamic panel model, key coefficients are interpreted as contemporaneous effects. Thus, the cumulative long-run effects are obtained by iterating the short-run estimates based on the dynamics modeled in Equation 1. This effect is then given by the following formula:

$$\frac{\hat{\xi}}{1 - \sum_{j=1}^{4} \hat{\tau}_j} \tag{2}$$

Where $\hat{\xi}$ denotes the parameter estimates for both executive constraints, and $\hat{\tau}$ denotes the parameter estimates of the lagged values of real GDP per capita. Applying this formula to the estimates in Column 3 of Table 1, my findings suggest that the introduction of institutions providing electoral accountability consistently increases real GDP per capita by roughly 30 per cent in the long run (standard error = 15.91). Remarkably, the presence of institutions providing horizontal accountability does not significantly affect long-term development. These findings are plotted in Figure 4, which shows the estimated log real GDP per capita effect caused by transitions with vertical and horizontal constraints. Yearly effects are obtained by forward iteration of the estimated process

[10] An issue widely noticeable in the GMM estimator is the high proliferation of instruments, also known as the "problem of too many instruments" (Roodman, 2007). Because the number of instruments grows with T and all available lags included in the estimation equation, the GMM becomes inconsistent as the number of instruments becomes too large (Mehrhoff 2009). Even though there is no rule of thumb to select the "optimal set of instruments" for GMM estimation, Roodman (2007) suggests some minimally arbitrary robustness and specification tests for the GMM by reducing the instrument count by either limiting the lag depth or "collapsing" the instrument set (Mehrhoff, 2009). Section A3.3. in the Supplementary Materials discusses this problem and shows that my findings remain robust to any of these strategies.

modeled in Equation 2. The introduction of vertical constraints consistently increases growth over time, whereas the effect of introducing horizontal constraints is negligible.

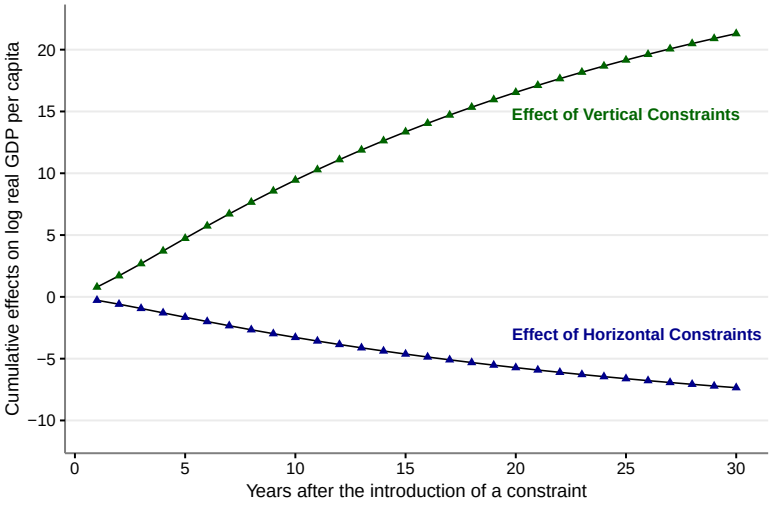

Figure 4. Dynamic effects of executive constraints on log real GDP per capita

3.3 The effect on proximate sources of growth

This final section examines whether there is a relationship between both forms of constraints and proximate sources that determine economic growth. Horizontal constraints should enhance growth through private investment, while vertical constraints should promote human capital outcomes such as education and health. I draw again on Acemoglu et al. (2019) to use the following dynamic model to evaluate these potential mechanisms:

$$m_{ct} = \alpha_c + \delta_t + \xi C_{ct} + \sum_{j=1}^{4} \tau_j Y_{ct-j} + \sum_{j=1}^{4} \zeta_j m_{ct-j} + \varepsilon_{ct} \tag{3}$$

Where m_{ct} corresponds to one of several potential mechanisms depicted in the literature: investment as gross capital formation as a percentage of GDP from the WDI of the World Bank, the percentage of primary school-aged population enrolled in primary education from Barro and Lee (2013) in the V-Dem Dataset (Coppedge et al 2023), tax revenues as percentage of GDP from Hendrix (2010), and the infant mortality rate per 1000 live births from Gapminder compiled from the UNICEF dataset on infant mortality, Mitchell (1998) historical statistics and the Human Mortality Database. This model assumes the same dynamic properties of Equation 1, with the exception that it includes lagged values of real GDP per capita on the right-hand side to control for the mechanical effect of economic development on each mechanism.

Table 2 shows that both horizontal and vertical constraints appear to affect the channels depicted by the literature, particularly those findings suggested by Cox and Weingast (2018) and Gerring et al (2021). In the table, I report three sets of analyses for each outcome: an analysis that includes only horizontal constraints in the first column, another for only vertical constraints in the second column, and an analysis including both constraints in the third column. Results shown in Column 3 of Table 2 suggest that horizontal constraints significantly increase private investment by 2.13 per cent in the

short run (standard error = 1.08), and by 9.25 per cent in the long run (standard error = 4.61); vertical constraints show no significant relationship with this outcome in either model that includes them.

On the other hand, the results in Column 6 of Table 2 suggest that vertical constraints substantially increase primary-school enrollment by .244 percent in the short run (standard error = .101) and 10.09 percent in the long run (standard error = 4.20). Horizontal constraints do not have a statistically significant effect on education after controlling for vertical constraints. In a similar vein, Column 9 of Table 2 shows that the presence of vertical constraints increases tax revenue by 3.93 per cent in the short run (standard error = 1.62) and roughly by 17 per cent in the long run (standard error = 6.62). Horizontal constraints show no significant relationship with tax revenue in either model. Finally, Column 12 of Table 2 suggests that vertical constraints significantly decrease child mortality rate by .613 in the short run (standard error = .232) and 36.54 in the long run (standard error = 12.18). Horizontal constraints once again show no significant relationship with infant mortality after controlling for the effect of vertical constraints.

Table 2. The effect of executive constraints on proximate determinants of growth

	Log of investment share in GDP			Primary-school enrollment			Log of tax share in GDP			Child mortality rate		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Horizontal constraints	2.12		2.13	.150		–.047	2.24		-1.06	-.256		.224
	(1.04)		(1.08)	(.057)		(.105)	(1.53)		(1.99)	(.140)		(.192)
Vertical constraints		1.70	-.008		.206	.244		3.14	3.93		-.442	-.613
		(1.12)	(1.27)		(.055)	(.101)		(1.32)	(1.62)		(.165)	(.232)
Effect after 25 vears	9.17	7.39	9.20	5.61	7.64	9.04	9.56	13.36	16.70	-8.09	-13.91	-19.30
	(4.25)	(4.70)	(4.58)	(2.12)	(2.02)	(3.72)	(6.62)	(5.59)	(6.57)	(4.13)	(4.44)	(6.22)
Long-run effect	9.22	7.44	9.25	6.25	8.54	10.09	9.62	13.45	16.81	-15.40	-26.31	-36.54
	(4.26)	(4.72)	(4.61)	(2.37)	(2.28)	(4.20)	(6.67)	(5.63)	(6.62)	(7.87)	(8.49)	(12.18)
Persistence of DV	.770	.772	.770	.976	.976	.976	.767	.766	.766	.983	.983	.983
	(.019)	(.019)	(.019)	(.003)	(.003)	(.003)	(.039)	(.039)	(.039)	(.003)	(.003)	(.003)
Observations	5.797	5.797	5.797	5.474	5.474	5.474	4.747	4.747	4.747	8.520	8.520	8.520
Countries	146	146	146	103	103	103	120	120	120	156	156	156

Note: The table presents estimates of the effect of executive constraints on several growth channels. Reported coefficients are multiplied by 100. Robust standard errors against heteroscedasticity and serial correlation at the country level are reported in parentheses. All specifications are controlled for a full set of country and year fixed effects and four lags of log real GDP per capita. Column 3 reports the long-run effects for horizontal constraints, whereas columns 6, 9 and 12 report this information for vertical constraints.

Conclusion

This article challenges the conventional wisdom that horizontal constraints on rulers, such as checks and balances, are either sufficient or the most important condition for growth (Cox and Weingast, 2018). Building on Acemoglu et al.'s dynamic panel models, I show that horizontal constraints do not significantly affect short- or long-run economic growth. Instead, my findings indicate that vertical constraints are the driving force through which democracy fosters development. Two arguments help explain this result. First, as Gehlbach and Keefer (2011) argue, horizontal checks are not the only institutions capable of addressing commitment problems between investors and the state. Strong and institutionalized political parties can serve similar functions, even in nondemocratic settings, by ensuring credible commitments to private actors. This suggests that mechanisms protecting capital investment are neither unique to horizontal constraints nor central to explaining long-run development. Second, my results show that vertical constraints exert their influence primarily by expanding access to education, health, and other public goods. These investments in human capital not only improve welfare in the short run but also generate cumulative gains in productivity, innovation, and state capacity that compound over time. In this sense, while private investment

is important, it is the broad-based accumulation of human capital under conditions of electoral accountability that provides the more durable foundation for sustained economic growth.

From a policy perspective, these findings suggest that strengthening electoral accountability—by ensuring broad suffrage, competitive multiparty elections, and the effective translation of citizen demands into policy—is essential for fostering long-run development. Institutional reforms that focus narrowly on constraining executive power through legislatures or judiciaries, while valuable, are unlikely to generate comparable developmental returns unless paired with mechanisms that expand accountability to the broader electorate. The pathway to sustained growth, therefore, lies not in insulating property rights for elites but in deepening democratic participation that channels state resources into human capital formation and, ultimately, more inclusive prosperity.

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References

Acemoglu D, Naidu S, Restrepo P and Robinson JA (2019) Democracy Does Cause Growth. *Journal of Political Economy* **127**(1), 47–100. ISSN: 0022-3808. doi: 10.1086/700936.

Acemoglu D and Robinson JA (2005) *Economic Origins of Dictatorship and Democracy*. Cambridge University Press. ISBN: 9780521855266. doi: 10.1017/CBO9780511510809.

Acemoglu D and Robinson JA (2012) *Why Nations Fail: the Origins of Power, Prosperity, and Poverty*. New York: Crown Publishers.

Arellano M and Bond S (1991) Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies* **58**(2), 277–297. ISSN: 00346527, 1467937X. doi: 10.2307/2297968. http://www.jstor.org/stable/2297968.

Barro RJ (1973) The Control of Politicians: An Economic Model. *Public Choice* **14**, 19–42. ISSN: 00485829, 15737101. http://www.jstor.org/stable/30022701.

Barro RJ (1996) Democracy and Growth. *Journal of Economic Growth* **1**(1), 1–27. ISSN: 13814338, 15737020. http://www.jstor.org/stable/40215879.

Barro RJ and Lee JW (2013) A new data set of educational attainment in the world, 1950–2010. *Journal of Development Economics* **104**, 184–198. ISSN: 0304-3878. doi: https://doi.org/10.1016/j.jdeveco.2012.10.001. https://www.sciencedirect.com/science/article/pii/S0304387812000855.

Baum MA and Lake DA (2003) tech. rep. The Political Economy of Growth: Democracy and Human Capital. 2, 333–347.
Benhabib J and Przeworski A (2010) Economic growth under political accountability. *International Journal of Economic Theory* **6**(1), 77–95. ISSN: 1742-7355. doi: 10.1111/j.1742-7363.2009.00123.x.
Besley T, Besley T, Pande R and Rao V (2005) Participatory Democracy in Action: Survey Evidence from South India. *Journal of the European Economic Association* **3**(2/3), 648–657. ISSN: 15424766, 15424774. http://www.jstor.org/stable/40005007.
Besley T and Kudamatsu M (2006) Health and Democracy. *The American Economic Review* **96**(2), 313–318. ISSN: 00028282. http://www.jstor.org/stable/30034665.
Besley T, Pande R and Rao V (2007) Political Economy of Panchayats in South India. *Economic and Political Weekly* **42**(8), 661–666. ISSN: 00129976, 23498846. http://www.jstor.org/stable/4419281.
Bizzarro F, Gerring J, Knutsen CH, Hicken A, Bernhard M, Skaaning SE, Coppedge M and Lindberg SI (2018) Party Strength and Economic Growth. *World Politics* **70**(2), 275–320. ISSN: 10863338. doi: 10.1017/S0043887117000375.
Boese VA, Gates S, Knutsen CH, Nygård HM and Strand H (2022) Patterns of Democracy over Space and Time. *International Studies Quarterly* **66**(3). ISSN: 14682478. doi: 10.1093/isq/sqac041.
Bolt J and Zanden JL van (2024) Maddison-style estimates of the evolution of the world economy: A new 2023 update. *Journal of Economic Surveys*. ISSN: 14676419. doi: 10.1111/joes.12618.
Canes-Wrone B and Park JK (2014) Elections, Uncertainty and Irreversible Investment. *British Journal of Political Science* **44**(1), 83–106. ISSN: 0007-1234. doi: 10.1017/S000712341200049X. https://www.cambridge.org/core/product/identifier/S000712341200049X/type/journal_article.
Canes-Wrone B, Ponce de León C and Thieme S (2023) Institutional constraints on the executive, investment, and elections. *Presidential Studies Quarterly* **53**(2), 273–292. ISSN: 17415705. doi: 10.1111/psq.12822.
Colagrossi M, Rossignoli D and Maggioni MA (2020) Does democracy cause growth? A meta-analysis (of 2000 regressions). *European Journal of Political Economy* **61**. ISSN: 01762680. doi: 10.1016/j.ejpoleco.2019.101824.
Coppedge M, Gerring J, Knutsen CH, Lindberg SI, Teorell J, Altman D, Bernhard M, Cornell A, Fish MS, Gastaldi L, Gjerløw H, Glynn A, Grahn S, Hicken A, Kinzelbach K, Marquardt KL, McMann K, Mechkova V, Neundorf A, Paxton P, Pemstein D, Ryd\'en O, Römer J von, Seim B, Sigman R, Skaaning SE, Staton J, Sundström A, Tzelgov E, Uberti L, Wang Yt, Wig Tore and Ziblatt D (2023) *V-Dem Codebook v13.*
Cornell A, Knutsen CH and Teorell J (2020) Bureaucracy and Growth. *Comparative Political Studies* **53**(14), 2246–2282. ISSN: 0010-4140. doi: 10.1177/0010414020912262. https://doi.org/10.1177/0010414020912262.
Cox GW (2012) Was the glorious revolution a constitutional watershed? *Journal of Economic History* **72**(3), 567–600. ISSN: 00220507. doi: 10.1017/S0022050712000307.
Cox GW and Weingast BR (2018) Executive Constraint, Political Stability, and Economic Growth. *Comparative Political Studies* **51**(3), 279–303. ISSN: 15523829. doi: 10.1177/0010414017710254.
Cruz A, Gerring J and Knutsen CH (2024) tech. rep. Synthesizing Research through Total Model Space: The Case of Democracy and Growth.
Dahl RA (1971) *Polyarchy; participation and opposition*. eng. New Haven: Yale University Press. ISBN: 0300013914.
Doucouliagos H and Ulubaşoğlu MA (2008) Democracy and Economic Growth: A Meta-Analysis. *American Journal of Political Science* **52**(1), 61–83. ISSN: 00925853, 15405907. http://www.jstor.org/stable/25193797.
Fariss CJ, Anders T, Markowitz JN and Barnum M (2022) New Estimates of Over 500 Years of Historic GDP and Population Data. *Journal of Conflict Resolution* **66**(3), 553–591. ISSN: 0022-0027. doi: 10.1177/00220027211054432. https://doi.org/10.1177/00220027211054432.
Ferejohn J (1986) Incumbent Performance and Electoral Control. *Public Choice* **50**(1/3), 5–25. ISSN: 00485829, 15737101. http://www.jstor.org/stable/30024650.
Ferejohn J (1999) Accountability and Authority: Toward a Theory of Political Accountability. In *Democracy, Accountability, and Representation*. Cambridge University Press, 131–153. doi: 10.1017/CBO9781139175104.005. Available at https://www.cambridge.org/core/product/identifier/CBO9781139175104A013/type/book_part.
Fjelde H, Knutsen CH and Nygård HM (2021) Which Institutions Matter? Re-Considering the Democratic Civil Peace*. *International Studies Quarterly* **65**(1), 223–237. ISSN: 0020-8833. doi: 10.1093/isq/sqaa076.
Gehlbach S and Keefer P (2011) Investment without democracy: Ruling-party institutionalization and credible commitment in autocracies. *Journal of Comparative Economics* **39**(2), 123–139. ISSN: 01475967. doi: 10.1016/j.jce.2011.04.002.
Gerring J, Bond P, Barndt WT and Moreno C (2005) Democracy and Economic Growth: A Historical Perspective. *World Politics* **57**(3), 323–364. ISSN: 00438871, 10863338. http://www.jstor.org/stable/40060105.
Gerring J, Knutsen CH and Berge J (2022) Does Democracy Matter? *Annual Review of Political Science* **25**, 357–375. doi: 10.1146/annurev-polisci-060820. https://doi.org/10.1146/annurev-polisci-060820-.
Gerring J, Knutsen CH, Maguire M, Skaaning SE, Teorell J and Coppedge M (2021) Democracy and human development: issues of conceptualization and measurement. *Democratization* **28**(2), 308–332. ISSN: 1351-0347. doi: 10.1080/13510347.2020.1818721.
Gonçalves S (2014) The Effects of Participatory Budgeting on Municipal Expenditures and Infant Mortality in Brazil. *World Development* **53**, 94–110. ISSN: 0305750X. doi: 10.1016/j.worlddev.2013.01.009.
Haggard S and Kaufman RR (2020) *Development, Democracy, and Welfare States: Latin America, East Asia, and Eastern Europe*. Princeton University Press.
Hendrix CS (2010) Measuring state capacity: Theoretical and empirical implications for the study of civil conflict. *Journal of Peace Research* **47**(3), 273–285. ISSN: 00223433. http://www.jstor.org/stable/20752162.

Knutsen CH (2013) Democracy, State Capacity, and Economic Growth. *World Development* **43**, 1–18. ISSN: 0305750X. doi: 10.1016/j.worlddev.2012.10.014.
Knutsen CH (2021) A business case for democracy: regime type, growth, and growth volatility. *Democratization* **28**(8), 1505–1524. ISSN: 1743890X. doi: 10.1080/13510347.2021.1940965.
Lake DA and Baum MA (2001) tech. rep. The Invisible Hand of Democracy: Political Control and the Provision of Public Services.
Lindert PH (2004) *Growing Public*. Cambridge University Press. ISBN: 9780521529167. doi: 10.1017/CBO9780511510717.
Lührmann A, Marquardt KL and Mechkova V (2020) Constraining Governments: New Indices of Vertical, Horizontal, and Diagonal Accountability. *American Political Science Review* **114**(3), 811–820. ISSN: 15375943. doi: 10.1017/S0003055420000222.
Marshall MG and Gurr TR (2020) *Polity 5. Political Regime Characteristics and Transitions, 1800-2018. Dataset Users' Manual*.
Mehrhoff J (2009) *A solution to the problem of too many instruments in dynamic panel data GMM*, Discussion Paper. ISBN: 9783865585769. Available at http://www.bundesbank.de.
Miller MK (2015) Electoral authoritarianism and human development. *Comparative Political Studies* **48**(12), 1526–1562. ISSN: 15523829. doi: 10.1177/0010414015582051.
Mitchell BR (1998) *International Historical Statistics*. London: Palgrave Macmillan UK. ISBN: 978-1-349-14740-3. doi: 10.1007/978-1-349-14738-0.
Mulligan CB, Gil R and Sala-i-Martin X (2004) Do Democracies Have Different Public Policies than Nondemocracies? *Journal of Economic Perspectives* **18**(1), 51–74. ISSN: 0895-3309. doi: 10.1257/089533004773563430.
Nickell S (1981) Biases in Dynamic Models with Fixed Effects. *Econometrica* **49**(6), 1417–1426. ISSN: 00129682, 14680262. doi: 10.2307/1911408. http://www.jstor.org/stable/1911408.
North DC and Weingast BR (1989) Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England. *The Journal of Economic History* **49**(4), 803–832. ISSN: 00220507, 14716372. http://www.jstor.org/stable/2122739.
North DC (1990) *Institutions, Institutional Change and Economic Performance*. Cambridge University Press. ISBN: 9780521397346. doi: 10.1017/CBO9780511808678.
Papaioannou E and Siourounis G (2008) Democratisation and Growth. *The Economic Journal* **118**(532), 1520–1551. ISSN: 00130133, 14680297. http://www.jstor.org/stable/20108873.
Persson T and Tabellini G (2005) *The Economic Effects of Constitutions*. vol 1. The MIT Press. Available at https://EconPapers.repec.org/RePEc:mtp:titles:0262661926.
Pinto PM and Timmons JF (2005) The political determinants of economic performance political competition and the sources of growth. *Comparative Political Studies* **38**(1), 26–50. ISSN: 00104140. doi: 10.1177/0010414004270886.
Przeworski A, Alvarez ME, Cheibub JA and Limongi F (2000) *Democracy and Development*. Cambridge University Press. ISBN: 9780521790321. doi: 10.1017/CBO9780511804946.
Przeworski A and Limongi F (1993) Political Regimes and Economic Growth. *Journal of Economic Perspectives* **7**(3), 51–69. ISSN: 0895-3309. doi: 10.1257/jep.7.3.51.
Roodman D (2007) tech. rep. A Note on the Theme of Too Many Instruments A Note on the Theme of Too Many Instruments *. Available at www.cgdev.org.
Stasavage D (2002) Private Investment and Political Institutions. *Economics and Politics* **14**(1), 41–63. ISSN: 0954-1985. doi: 10.1111/1468-0343.00099.
Touchton M, Wampler B and Peixoto T (2021) Of democratic governance and revenue: Participatory institutions and tax generation in Brazil. *Governance* **34**(4), 1193–1212. ISSN: 0952-1895. doi: 10.1111/gove.12552.
Wang YT, Mechkova V and Andersson F (2019) Does Democracy Enhance Health? New Empirical Evidence 1900–2012. *Political Research Quarterly* **72**(3), 554–569. ISSN: 1938274X. doi: 10.1177/1065912918798506.
Wooldridge JM (2020) *Introductory econometrics : a modern approach*, Seventh Edition. Boston: Cengage Learning. Available at https://search.library.wisc.edu/catalog/9910154038602121.
Wright J (2008) Do authoritarian institutions constrain? How legislatures affect economic growth and investment. *American Journal of Political Science* **52**(2), 322–343. ISSN: 00925853. doi: 10.1111/j.1540-5907.2008.00315.x.