

Executive Constraints and Economic Growth

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Abstract

Despite extensive research on the relationship between democracy and development, the aspects of democracy that are particularly important for this outcome are unclear. Here, I unpack the democracy-growth link by examining the economic effects of two forms of executive constraints: horizontal constraints, the power of the parliament to control the executive, and vertical constraints, the capacity of citizens to keep rulers accountable. Using a dynamic panel model, my results show that horizontal constraints decrease GDP per capita once controlled by the effect of democracy. Even though vertical constraints do not directly affect growth, they are strongly associated with less infant mortality, lower social unrest, and higher public expenditure. This research provides evidence that for a country to develop, it is more important to subject the ruler to free and fair elections rather than having a strong legislature constraining him.

Keywords: Democracy, executive constraints, institutions, economic growth

1 Introduction

Scholars widely contend that property rights enhancing institutions determine long-run development (Acemoglu, Johnson, and Robinson 2001, 2005; Rodrik, Subramanian, and Trebbi 2004; Acemoglu and Robinson 2012). In this view, institutions are constraints that structure human interaction, reducing transaction costs and enabling individuals to capture the expected gains of voluntary exchange (North and Thomas 1973; North 1990). Despite wide agreement that democratic institutions should have positive economic effects (Papaioannou and Siourounis 2008; Acemoglu et al. 2019; Colagrossi, Rossignoli, and Maggioni 2020; Knutsen 2021; Gerring, Knutsen, and Berge 2022), empirical analyses are

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contradictory, ranging from negative ([Barro 1996](#)) to no significant effects ([Przeworski et al. 2000; Gerring et al. 2005; Doucouliagos and Ulubaşoğlu 2008](#)).

At least some of this disagreement is due to scholars' use of composite regime concepts that neglect the varied nature of political regimes. In this article, I unpack democracy into two forms of executive constraints to unveil the paths through which specific regime components affect growth. I define each component as executive constraints because their primary role is to control rulers' behavior. The incentives produced by such controls determine the paths through which democracy influences development. Horizontal constraints, seen as commitment devices, are theorized to affect the incentives for capital investment, whereas vertical constraints are linked to better public goods provision such as education and health. Empirically, these relationships arise from regressing such outcomes by different measures of both constraints. This modeling is misleading since both institutions behave as regime components, hence absorbing the effect not only of the other but also the overall impact of democracy. Contrary to the literature, statistical analyses in this article show that horizontal constraints decrease growth in the short and long run once the democratization effect is controlled. These analyses also demonstrate a strong relationship between vertical constraints and human development indicators.

The article is organized as follows: Section 2 depicts the relevance of unpacking democracy into its classical components. Then, I show why treating each component in isolation can produce misleading results about their economic impact. Section 3 presents the data and the model estimating the effect of executive constraints on growth. Section 4 discusses the results, and section 5 concludes.

2 Unpacking the democracy-growth link

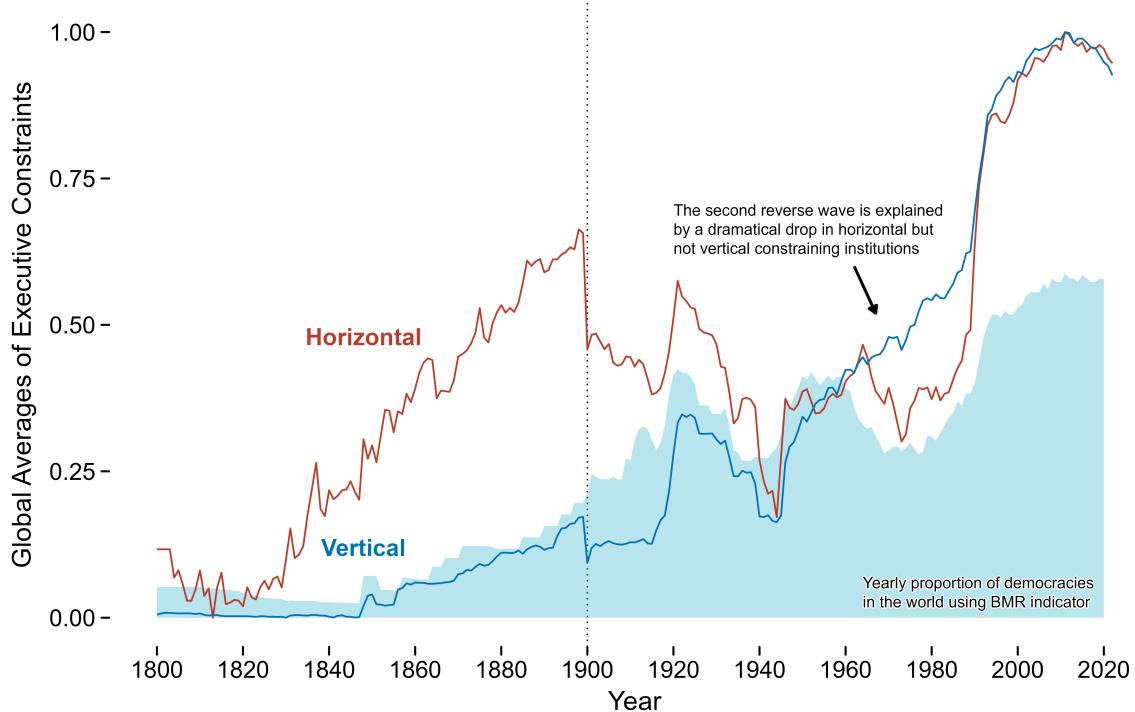
The relationship between democracy and economic growth has been a pivotal issue for social scientists over the past 50 years. [Doucouliagos and Ulubaşoğlu \(2008\)](#) report that differences in specification, measurement, and estimation account for much of the variation in findings. These differences can be large: they found a positive and significant impact of democracy in only 27% of the cases surveyed, while 21% were negative and non-significant, 37% were positive but non-significant, and 15% were negative and significant. A common issue is that researchers use composite democracy indicators, even when estimating the impact of specific regime components. As [Boese et al. \(2022\)](#) pinpoint, these indices "typically rely on indicators tapping into different regime dimensions, but then aggregate the information from all dimensions into one composite score." This means that studies that have relied on such indicators may be underestimating the potential impact of a wide range of institutions, preventing us from assessing which one is driving most of the regime effect. Highlighting one component's role almost exclusively over the other may explain why studies find such heterogeneous results in different outcomes.

Several studies have applied disaggregated measurement strategies when studying the role of certain institutions, such as executive constraints (Cox and Weingast 2018; Fjelde, Knutsen, and Nygård 2021). Scholars have also unpacked features such as political accountability (Lührmann, Marquardt, and Mechkova 2020) and polyarchy dimensions (Alexandra Boese and Charles Wilson 2023). Boese et al. (2022) propose perhaps the most comprehensive approach, constructing a cube of democracy based on three dimensions: participation, electoral contestation, and constraints on the executive. They successfully trace many regime convergence and divergence patterns masked by conventional measures, such as participation experiencing an even improvement across regions since WWII, even where other aspects, such as contestation and constraints, were absent.

I use a similar approach by using executive constraints as regime components. I focus on these institutions because the limitation of the power itself is a key dimension of democracy, and they have a theoretically and empirically strong link with economic growth. Horizontal constraints provide checks on rulers' behavior by splitting up the power of the government into relatively autonomous branches. These checks can be imposed from legislative control over executive attributions (e.g., public budget) or an independent judiciary with legal instruments to review rulers' decisions (e.g., judicial review). Vertical constraints keep leaders accountable to most of the population. These institutions bind the will of power holders with the interests of organized masses through contested multi-party elections and extensive franchise rights (Dahl 1971). Consequently, institutions providing electoral oversight allow for vertical accountability, in which citizens can evaluate and accordingly sanction their rulers.

Figure 1 depicts how the evolution of both components has been uneven across modern history.¹ There was a great divergence between the levels of both institutions during the 19th century, driven by Western countries' early political development, characterized by the implementation of legislatures with binding powers over the executive while the rest of the countries remained highly unequal, restricting multiparty competition or imposing legal restrictions on the right to vote. During the 20th century, there was a dramatic increase in contestation and participation levels, converging within the second and third waves of democratization. The levels of both constraints differ during the Cold War period: the second reverse wave appears to be driven by a sudden drop in horizontal constraining institutions rather than vertical. This observation makes sense as most of the world has been experiencing a constant development in vertical constraints such as enfranchisement since the mid-20th century. The next section explores the relationship between these components and growth. I discuss the literature that has portrayed how distinct the theoretical effects of both constraints are on specific growth mechanisms. Then, I present statistical evidence about such relationships.

1. I used Fjelde, Knutsen, and Nygård's (2021) approach to construct an index for each constraint because they are based on V-Dem mid-level democracy indices traced back to the 18th century.



Data: V-Dem and Boix, Miller and Rosato (2020)

Figure 1: Global averages of vertical and horizontal constraints (1800-2020)

2.1 Investment without democracy?

North and Weingast (1989) is perhaps the most prominent contribution linking horizontal constraints to economic development. Analyzing the England post-Glorious Revolution, they found that constraints over the crown were conducive to capital market formation and a greater state capacity to raise revenues. These institutions are seen as “commitment devices” that turn credible ruler’s promises to secure individual rights. Rulers are the principal menace to private property since they hold power over the confiscatory capacity of the state. The existence of horizontal constraints enables other institutional veto players to bind rulers’ decisions to their interests. Many studies have tried to generalize such an argument, suggesting that horizontal constraints give investors a “credible signal that the state will not confiscate investment returns via taxation or frequent policy changes” (Wright 2008, 336). Scholars have found a positive effect of checks and balances and binding legislatures in private investment (Stasavage 2002; Wright 2008), while others have studied the role of such constraints in mitigating the pervasive impacts of electoral cycles in costly-to-undo investments (Canes-Wrone and Ponce de Leon 2015; Canes-Wrone, Ponce de León and Thieme 2023). Accordingly, Cox and Weingast (2017) conclude that to reduce a country’s risk of getting stuck in an instability-poverty trap, “it is more important to have a strong legislature constraining the executive than to subject him to free and fair elections” (Cox and Weingast 2017, 280).

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 need to ensure certainty that they can own the returns of their productive operations once earned. This means that as long as there is some credible commitment institution, there is no need for other democratic features to ensure prosperity. These ideas are based on the classical liberal concern that majority-based institutions could threaten an individual’s self-determination. Accordingly, scholars have treated democracy as a threat to property rights and investment. In this view, democracy generates demands for immediate public consumption. These demands threaten the profits of capital holders, which reduces investment and retards growth (Przeworski and Limongi 1993, 54). For instance, dictatorships can better force savings and set a development model in motion. Because there is little or almost no electoral accountability in dictatorships, an authoritarian government has fewer pressures to allocate public resources toward immediate consumption. As a result, dictators can make long-term investments independent of the desires of a “short-sighted” electorate (Przeworski and Limongi 1993).

To generalize such an argument, one should expect the levels of horizontal constraints to be positively correlated with the levels of investment. Indeed, the Pearson correlation coefficient between both is slightly positive and significant (see Figure 2). Scholars have performed a similar approach by estimating the effect of such constraints controlled by economic factors determining investment. However, these models treat such constraints as isolated regime institutions without considering that they are a fundamental component of democratic politics. Consequently, the alleged impact of horizontal constraints could be absorbing not only the overall effect of democracy but also the potential impact of other sets of institutions.

Figure 2 shows no systematic evidence in favor of the commitment literature. The plot depicts the relationship between investment and horizontal constraint levels using a sample of 159 countries from 1960 to 2010. I grouped each observation as being or not democratic using Acemoglu et al. (2019) dichotomous variable. Most of the observations coded as having high levels of horizontal constraints and being democratic are concentrated on the right hand of the panel. Pearson correlation coefficients for each group demonstrate that neither dictatorships nor democracies seem to perform differently in accumulating physical capital (although there is a slightly positive correlation within the democracy group). More importantly, countries coded as having higher levels of horizontal constraints in the non-democratic group seem not to attract more capital than their counterparts, as suggested by the commitment literature. Hence, no clear correlation exists between having more horizontal constraints and private investment.

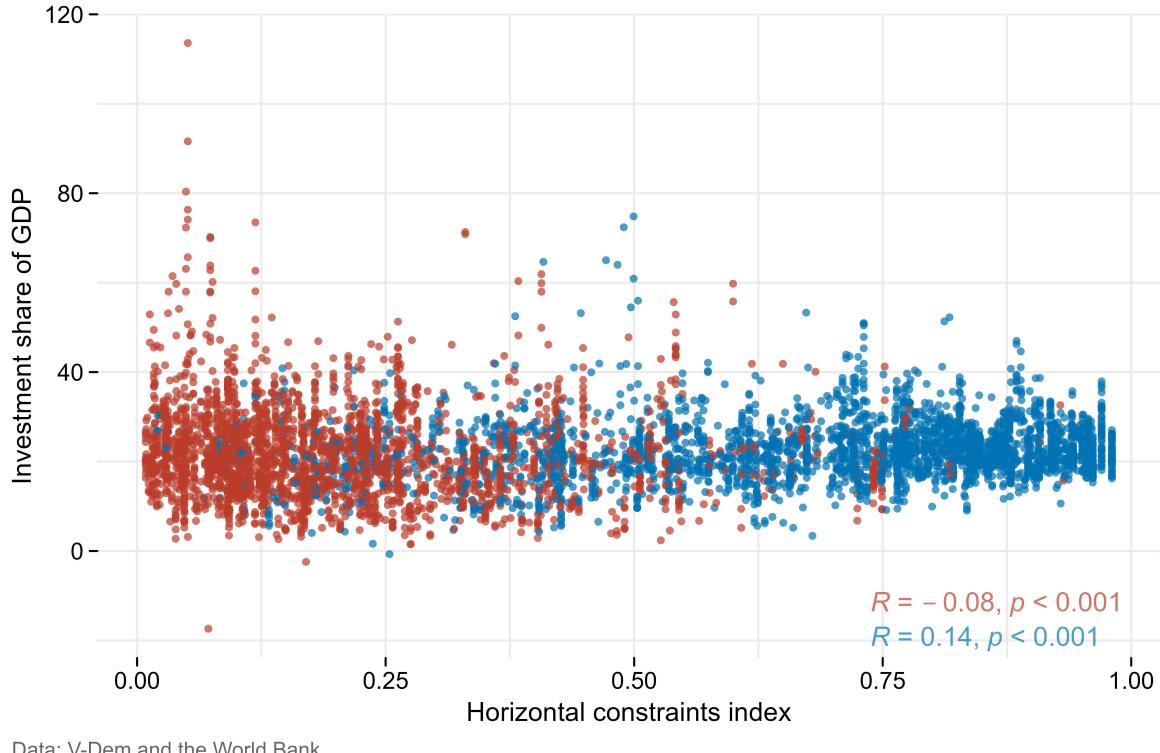
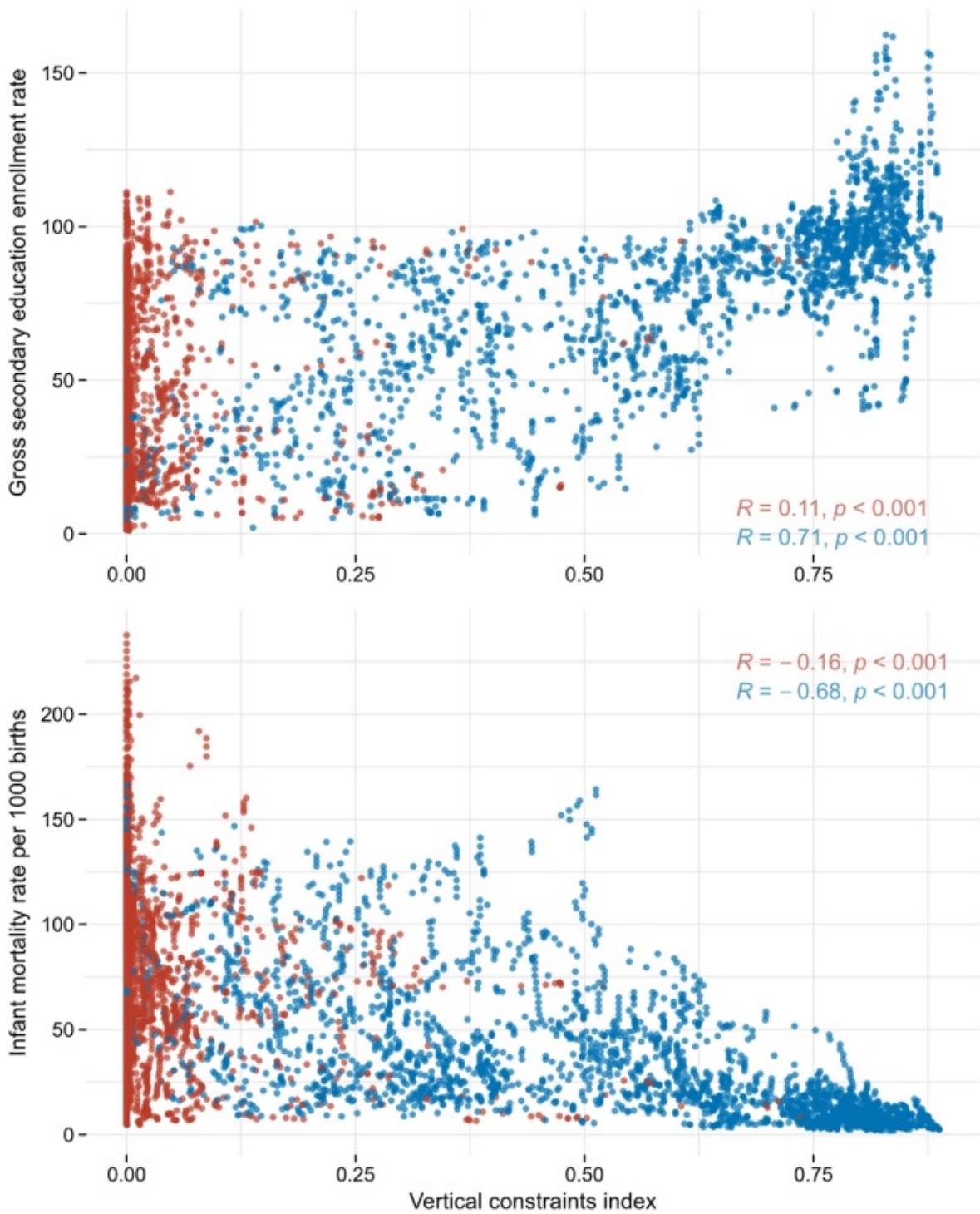


Figure 2: The relationship between horizontal constraints and investment

2.2 Electoral institutions in action

While the relationship between democracy and private investment is still contested, empirical evidence suggests that vertical constraints influence growth through enhancing human capital. Besley and Kudamatsu (2006) found a robust correlation between democracy and life expectancy. Electoral democracy also leads to greater public investment in health and education (Mullingan and Sala-i-Martin 2004; Haggar and Kaufman 2008), and suffrage extension to women and the poor is associated with higher levels of social spending (Lindert 2004). Most recently, Wang, Mechkova, and Andersson (2019) show that the quality of competitive elections has a consistently negative effect on the infant mortality rate. Gerring et al. (2021) found that competitive elections are more strongly associated with human development than other aspects of democracy. Finally, Miller (2015) stresses that contested elections, both in autocracies and democracies, promote human development through health, education, gender equality, and civil liberties. Cassani (2019, 19) asserts this argument, suggesting that “competitive autocracies display higher ratios of school enrollment and lower rates of child mortality relative to military, one-party, and hegemonic-party regimes.”

Using the median voter theorem, Pinto and Timmons (2005) depict how this relationship works. In this view, highly inclusive and extensively open systems (concurring elections and universal suffrage) reduce entry barriers to power, allowing citizens to reg-



Data: V-Dem and the World Bank

Figure 3: The relationship between vertical constraints and human capital

ister their preferences and select their leader. Political competition allows voters to use the state to redistribute wealth from rich to poor. Restricting or enhancing electoral institutions would move the median voter to a closer political preference centered either on accumulating physical capital that could benefit the wealthy or targeting human capital to alleviate the needs of the majority. Consequently, more competitive regimes are more likely “to provide goods with positive externalities, such as schools and health care, raising the level of human capital” (Pinto and Timmons 2005, 34). In sum, higher degrees of participation and public contestation tend to create more inclusive political systems, increasing the size of the electorate (Bueno de Mesquita and Smith 2011). Rulers facing broader winning coalitions should have more incentives to provide public goods because of the redistributive pressures of the median voter.

Besides the median voter argument, two more explanations highlight the relevance of electoral institutions. First, voting can be an accountability mechanism when politicians fail to meet a determined citizen’s welfare threshold (Ferejohn 1986, 1999). Accordingly, elections may align rulers’ interests with their constituents’ needs (Barro 1973) or reduce potential predatory behavior by making rulers accountable (Benhabib and Przeworski 2010). Second, bottom-up participatory institutions can produce efficient resource allocation and better provision of public goods by solving collective action problems. These institutions are channels through which organized citizens can translate their demands into concrete political results (Abers 2000; Fung and Wright 2003; Avritzer 2006, 2010; Zaremba, Lavalle, and Guarneros-Meza 2017). Studies suggest that participatory institutions such as *Gram Sabha* in India, or the participatory budgeting in Brazil have strong positive effects on different outcomes such as public spending, tax revenue, living standards, social benefits, and the supply of specific goods (Besley, Pande and Rao 2005, 2007; Gonçalves 2014; Touchton, Wampler and Peixoto 2020).

Figure 4 shows the relationship between vertical constraints and human development. As before, I distinguish two groups of country-year observations based on whether they are coded as being democratic or not. Although authoritarian regimes that develop vertical constraints appear to be slightly correlated with both indicators, democracies are those regimes strongly correlated with higher education enrollment levels and better living conditions.

3 Data and Methods

Because each constraint is a component of democracy, having them as the only treatment in the model would mask their real impact, as each will absorb the effect of the other and some of the effects of democracy. For instance, I propose a dynamic two-way fixed effects panel model that accounts for unit and year heterogeneity and GDP dynamics. I also include a dichotomous indicator of democracy, ruling out its effect from the potential

impact of its components. The baseline analysis is based on an unbalanced panel of 159 countries between 1960 and 2010. The dependent variable is the level of economic growth measured as the natural logarithm of gross domestic product (GDP) per capita measured in 1990 U.S. dollar international prices. As a democracy measure, I use the Acemoglu et al. (2019) binary indicator. Additional variables used include investment (as gross capital formation as a percentage of GDP), trade (as the sum of exports and imports of goods and services as a share of GDP), gross primary education and secondary education enrollment rates, and infant mortality rate, all from the World Bank Development Indicators (WDI). I also include the level of total factor productivity (henceforth TFP) in constant national prices and the human capital index from the Penn World Table (Feenstra, Inklaar, and Timmer 2015); tax revenues as a percentage of GDP from Hendrix (2010); the economic reforms index from Giuliano et al. (2013); and the dichotomous measure of social unrest constructed by Acemoglu et al. (2019) from Banks and Wilson (2013).

3.1 Horizontal Constraints

I use Fjelde, Knutsen, and Nygård (2021) approach to construct a horizontal constraints indicator (*hci*). This variable is computed as the average of two V-Dem indices capturing legislative constraints on the executive (*v2xlg_legcon*) and judicial constraints on the executive (*v2x_jucon*). Both variables range from 0 to 1 and measure the legislature's and judiciary's de facto capabilities to monitor and hold the executive accountable effectively. The legislative constraints index is formed by taking the point estimates from a Bayesian factor analysis model of four indicators: the extent to which the legislature questions officials in practice, executive oversight, the extent to which the legislature investigates in practice, and legislature opposition parties. The judicial constraints index is also constructed from a Bayesian factor analysis from five variables: whether the executive respects the constitution, compliance with the high court, and whether the high court and the lower court are independent (Coppedge et al. 2023b, 51). Both mid-level indices may be partial substitutes when determining the degree of horizontal constraints (Fjelde, Knutsen, and Nygård 2021, 229). This means that even though a country would need high scores of both components to have strong horizontal constraints, one can still constrain a ruler's behavior without the other. However, as Boese et al. (2022) suggest, it is also plausible that a strong legislature may be more effective in constraining the executive than an independent judiciary. Accordingly, I follow the Coppedge et al. (2019) approach and compute the index using the average of its multiplicative and additive procedures. Thus, the aggregation formula is the following: $Hconst = \frac{1}{2}const_{avg} + \frac{1}{2}const_{mult}$.

3.2 Vertical Constraints

I draw again on Fjelde, Knutsen, and Nygård to construct a vertical constraints index (vci) that reflects the extent to which a country has both “free and fair elections and inclusive citizenship” (2021, 228). This variable is constructed using a multiplicative aggregation formula based on five mid-level V-Dem indices: suffrage, elected officials, freedom of association, freedom of expression, and clean elections. The first indicator refers to the adult population’s suffrage share (v2x_suffr). The elected official’s index (v2x_elecöff) measures whether the chief executive and the legislature are – directly or indirectly – elected through popular elections. The freedom of association index (v2x_frassoc_thick) takes six indicators reflecting the autonomy, bans, and barriers to political parties, multiparty elections, and entry/exit and repression of civil society organizations. Freedom of expression and alternative sources of information (v2x_freexp_altinf) takes nine indicators capturing different aspects of press and media freedom, freedom of discussion, and freedom of academic and cultural expression. The clean elections index (v2xel_frefair) refers to the absence of registration fraud, systematic irregularities, government intimidation of the opposition, vote buying, and election violence (Coppedge et al. 2023b, 47-50). I also agree with the multiplicative aggregation logic drawn by Fjelde, Knutsen, and Nygård (2021) to cope with the role of vertical constraints. One of the most important notions behind this concept is that these institutions must serve as instruments for vertical accountability. For instance, clean elections may enhance accountability only if most of the population enjoys the right to vote, or freedom of expression and association are important only if clean elections are held.

3.3 Econometric model

To estimate the effect of executive constraints on economic growth, I used a two-way fixed effects dynamic panel model, replicating the baseline model proposed by Acemoglu et al. (2019). I incorporate individual fixed effects that will absorb country-specific characteristics that do not vary over time, such as geography, natural resources, social norms, and even the long-term impact of colonization strategies that may have influenced both the economic and political development of countries (Papaioannou and Siourounis 2008, 1525). Unit-invariant time-fixed effects would capture influences of global trends on growth that are common to all countries in the sample, such as, for example, the impacts produced by the two oil shocks that occurred in the 1970s (Cox and Weingast 2017).

As Acemoglu et al. (2019), my specification includes lagged dependent variables, which allows for controlling for GDP dynamics and the dip in GDP produced years preceding democratization (see Appendix XX). Accordingly, a standard assumption of this model is that the key independent variable and past values of the dependent are orthogonal to current and future values of the dependent variable and that the error

term has no serial autocorrelation. For this reason, this model requires sufficient lagged dependent variables to eliminate the residual of this autocorrelation. GDP lags also allow for controlling the impact of many economic factors, such as commodity prices, agricultural productivity, and technology (Acemoglu et al. 2019, 57). The model is formally represented in the following equation:

$$y_{ct} = \alpha_c + \delta_t + \beta D_{ct} + \xi C_{ct} + \sum_{j=1}^p \gamma_j y_{ct-j} + \varepsilon_{ct} \quad (1)$$

Where y_{ct} is the natural logarithm of gross domestic product (GDP) per capita measured in 1990 U.S. dollars international prices for country c and time t . α_c and δ_t are unit and time-fixed effects correspondingly. β is the coefficient capturing the effect of democracy measured by Acemoglu et al. (2019). ξ is the impact of horizontal or vertical constraints C_{ct} . γ_j reports coefficients for up to 8 lags of the dependent variable Y_{ct-j} . Finally, the error term is ε_{ct} .

4 Estimation results

This section reports estimation results from different specifications of Equation 1. The dependent variable is the natural logarithm of GDP per capita, and the reported coefficients are multiplied by 100 to ease their interpretation.² Robust standard error against heteroskedasticity and serial correlation at the country level are reported in parentheses. Column 3 of Table 1 presents my preferred specification, including four GDP per capita lags. These estimates imply that controlling for the effect of democracy, one unit increase in the horizontal constraints index decreases GDP per capita by .028 percent in the short run. This means autocratic regimes developing more horizontal constraints grow less than their democratic counterparts. Appendix XX controls this effect by democracy and the vertical constraints index. Here, the vertical constraints index is estimated to be positive with a coefficient of .021 (standard error = .011). Appendix XX provides additional robustness tests by changing the ANRR democracy indicator to the BMR variable and using different constraint measures. Again overall patterns remain: conditional on democracies, higher levels of horizontal constraints retard growth, while the effect of vertical ones is positive but weakly significant.

Table 2 provides an additional specification of Equation 1, using dichotomous measures of executive constraints based on Polity IV variables (see Appendix XX). The first row replicates Acemoglu et al. (2019) within and GMM estimates, while the rest of the

2. Because of Y's logarithmic transformation, the equation's functional form corresponds to a log-level model. Thus the interpretation of β_1 follows the form $\% \Delta y = (100 \times \beta_1) \Delta x$ as described in Wooldridge (2020). Hence, the reported coefficients are multiplied by 100, reflecting the effect of unit increases of the X s in percentage changes in GDP per capita.

panel shows the impact of horizontal constraints conditional on such effect. Here, the presence of horizontal constraints is estimated to be negative and significant, with a coefficient of 1.24 (standard error = .582). These estimates compare observations coded as having horizontal constraints controlled by those already coded as democratic. In other words, these results imply that developing horizontal constraints in authoritarian political settings would decrease GDP per capita by roughly 1 percent in the short run. Accordingly, Appendix XX provides estimates of country-year observations coded as only horizontally or vertically constrained regimes.³ Again, horizontal constraints negatively influence growth, decreasing GDP per capita by 1.063 percent (standard error = .505). The effect of vertical constraints on growth – although positive – is insignificant.

4.1 Long-run effects

Equation 1 specifies a fixed effects panel model that includes lagged dependent variables, controlling for dynamics such as the time-persistency behavior of GDP and the economic shocks produced by democratization processes. This implies that key coefficients must be interpreted as contemporaneous effects and that GDP dynamics determine how this effect unfolds over time. Iterating the short-run estimates, the cumulative long-run effect of executive constraints on growth is given by the following formula:

$$\frac{\hat{\xi}}{1 - \sum_{j=1}^p \hat{\gamma}_j} \quad (2)$$

Where $\hat{\xi}$ denotes the parameter estimates of executive constraints, and $\hat{\gamma}$ denotes the parameter estimates of the lagged dependent variables included in the model. Applying this formula to the estimates from column 3 in Table 2, I find that transitions characterized by evolving only horizontal constraints decrease GDP per capita by 27.55 percent in the long run (standard error = 12.67), conditional on the impact of democratic transitions.⁴ These estimate simulations imply that developing some degree of checks and balances in an authoritarian political setting negatively affects short- and long-term growth. In other words, political regimes that are not fully democratized would experience declines in growth if they only develop horizontally constraining institutions.

Figure 4 plots the estimated log GDP per capita change caused by transitions developing only horizontal constraints. Yearly effects are obtained by forward iteration of the estimated process modeled in Equation 2. This figure simulates what the development path would look like if a non-democratic political regime were to develop only horizon-

3. Horizontally constrained observations are coded as having only horizontal but no vertical constraints, and vertically constrained observations follow the same logic, having vertical but no horizontal constraints. Both indicators use the Polity IV variables described in Appendix XX.

4. Appendix XX shows a similar pattern using the estimates in Table 1; here, every unit increase in horizontal constraints decreases GDP per capita by .676 percent in the long run (standard error = .246 percent).

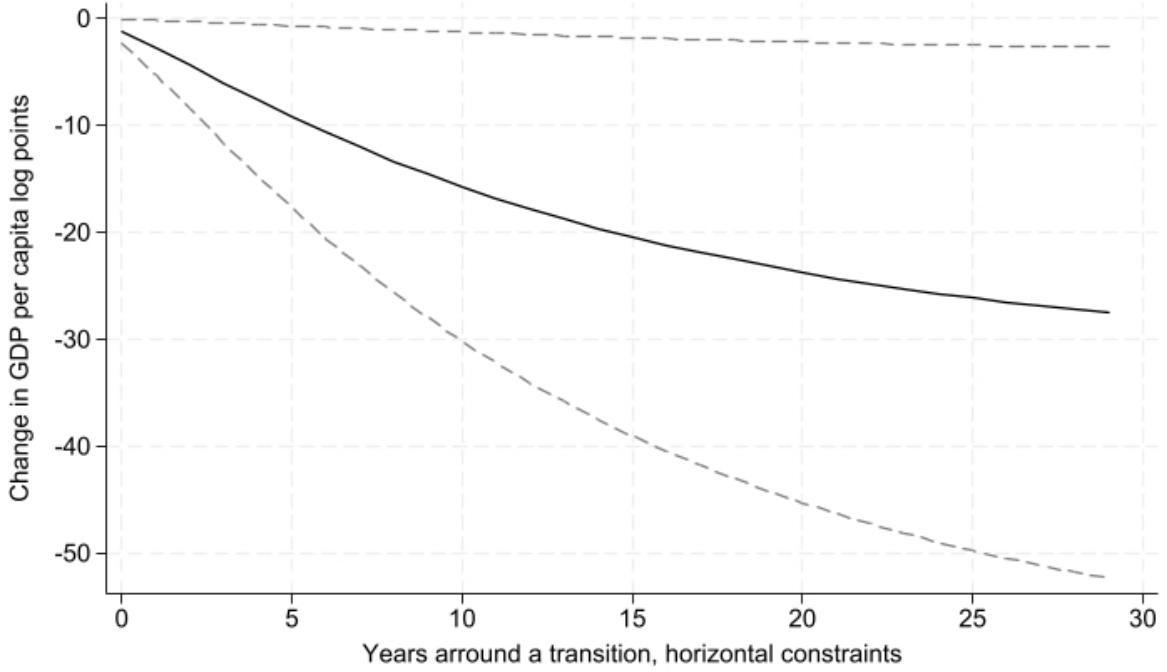


Figure 4: Dynamic panel model estimates of the over-time effects of horizontal constraints on log GDP per capita

tal constraints. As shown, countries following such a transition path would experience consistently declining growth over the long run.⁵

Explain the negative effect of horizontal constraints: - There are other sources of commitment and no direct effect of any constraint through investment. - Societies that are profoundly unequal with exclusive political systems.

4.2 Mechanisms of growth

Finally, the following equation is used to evaluate the potential mechanisms via which executive constraints might affect growth:

$$m_{ct} = \alpha_c + \delta_t + \xi C_{ct} + \sum_{j=1}^p \gamma_j y_{ct-j} + \sum_{j=1}^p \eta_j m_{ct-j} + \varepsilon_{ct} \quad (3)$$

Where m_{ct} corresponds to one of several potential mechanisms: investment, economic reforms, trade, taxes, primary and secondary school enrollment rates, infant mortality rate, and the social unrest dummy. This model assumes the same dynamic properties of Equation 1; thus, lagged dependent variables on the right-hand side of the equation account for the persistent behavior of each outcome. Additionally, GDP lags in the right-

5. Appendix XX plots the estimated log GDP per capita change caused by unit increases on the horizontal constraints index in non-democratic cases. The graph depicts the same consistent negative impact as Figure 4.

hand side control for both the dip in GDP preceding democratization and the mechanical effect of greater GDP on some of the intermediately variables (Acemoglu et al. 2019). Appendix XX shows estimation results from this model. Horizontal constraints have a positive but insignificant effect on outcomes such as private investment. In contrast, vertical constraints are associated with more public spending, less infant mortality, and less propensity for social unrest.

5 Conclusion

In recent years, the case for democracy has been strengthened by the accumulation of scientific contributions and evidence pointing to it as a fundamental cause of growth. However, we still don't have conclusive arguments about what aspect of democratic politics drives such an effect. This research's main contribution is to uncover how particular components of democracy influence growth separately and jointly and identify the channels through which these institutions may influence development. This research shows that horizontal constraints decrease growth in the short and long run once controlled by the effect of democracy. Vertical constraints do not directly affect growth but strongly influence outcomes such as infant mortality, public expenditure, and social unrest. Further research could examine whether these two institutions compete in moderating physical and human capital stocks and analyze whether the sequence in which they emerge in society matters for other social and economic outcomes.

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Table 1: The effect of horizontal constraints on (log) GDP per capita

	Within estimates				Arellano and Bond estimates			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Democracy	2.55	1.62	1.58	1.82	2.78	1.78	1.82	1.80
	(.474)	(.392)	(.386)	(.437)	(.670)	(.547)	(.514)	(.509)
Horizontal constraints, 0-100 index	−.057	−.034	−.028	−.030	−.077	−.044	−.039	−.031
	(.0124)	(.010)	(.010)	(.011)	(.020)	(.016)	(.015)	(.015)
Log GDP, first lag	.976	1.28	1.24	1.21	.941	1.23	1.19	1.17
	(.007)	(.039)	(.035)	(.041)	(.010)	(.041)	(.034)	(.040)
Log GDP, second lag		−.309	−.194	−.180		−.287	−.168	−.166
		(.039)	(.037)	(.042)		(.040)	(.037)	(.041)
Log GDP, third lag			−.034	−.021			−.024	−.017
			(.031)	(.032)			(.029)	(.031)
Log GDP, fourth lag				−.047	−.061		−.060	−.060
				(.018)	(.026)		(.017)	(.025)
p-value lags 5-8					.780			.877
AR1 test p-value						.00	.00	.00
AR2 test p-value						.010	.151	.399
Observations	5,930	5,803	5,541	4,986	5,725	5,601	5,345	4,796
Countries in the sample	159	159	159	159	159	159	159	159
Observations per group (in years)	7-50	7-49	6-47	2-43	6-49	6-48	5-46	1-42
	avg 37.3	avg 36.5	avg 34.8	avg 31.4	avg 36	avg 35.2	avg 33.6	avg 30.2

Table 2: The effect of the presence of horizontal constraints on (log) GDP per capita

	Within estimates				Arellano and Bond estimates			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Democracy effect, Acemoglu et al. 2019	.973*** (.294)	.651*** (.248)	.787*** (.226)	.887*** (.245)	.959** (.477)	.797* (.417)	.875** (.374)	.659* (.378)
Democracy effect, horizontal as control	1.51* (.766)	.984* (.577)	1.38** (.594)	1.66** (.700)	2.17** (1.07)	1.56* (.832)	1.69** (.845)	1.78** (.851)
Presence of horizontal constraints	-1.29* (.719)	-.933* (.538)	-1.24** (.582)	-1.42** (.689)	-1.383 (.931)	-.985 (.725)	-.975 (.758)	-1.101 (.781)
Log GDP, first lag	.968*** (.007)	1.28*** (.040)	1.24*** (.039)	1.21*** (.044)	.936*** (.011)	1.20*** (.046)	1.18*** (.042)	1.16*** (.045)
Log GDP, second lag		-.312*** (.039)	-.227*** (.049)	-.217*** (.053)		-.268*** (.043)	-.205*** (.048)	-.199*** (.051)
Log GDP, third lag			-.009 (.031)	-.002 (.031)			-.003 (.030)	.008 (.030)
Log GDP, fourth lag			-.044* (.022)	-.070*** (.025)			-.042* (.024)	-.063*** (.024)
p-value lags 5-8				.221				.017
AR1 test p-value					.00	.00	.00	.00
AR2 test p-value					.021	.299	.395	.084
Observations	5,786	5,668	5,421	4,878	5,570	5,453	5,211	4,673
Countries in the sample	153	153	153	153	153	153	153	152
Observations per group (in years)	6-50 avg 37.8	5-49 avg 37	3-47 avg 35.4	1-43 avg 31.9	4-49 avg 36.4	3-48 avg 35.6	1-46 avg 34.1	0-42 avg 30.7

Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.