Executive Constraints and Economic Growth

Erick Alvarez Barreno[†]

Working Paper

Abstract

Using panel data of 143 countries from 1950 to 2010, this article estimates the effects of executive constraints on economic growth. We illustrate two forms of constraints. Horizontal constraints are described as the powers of the parliament to control the executive, and vertical constraints as the capacity of citizens to control their rulers. Using this variation, we propose a regime typology based on whether a ruler is committed to securing rights, or whether he is politically accountable. Fixed effects and GMM estimates suggest that the only presence of horizontal constraints is associated with a decrease of 0.21 percent of GDP per capita. Vertical constraints have no significant effect, but the presence of both institutions is associated with an increase of 0.18 percent of GDP per capita. Our analysis shows an empirically relevant interaction between both institutions.

Keywords: Constraints on rulers, horizontal/vertical constraints, institutions, growth

1. Introduction

Scholars have widely contended that securing property rights and enforcing contracts have a positive effect on economic development (Acemoglu, Jonhson and Robinson 2001, 2005; Rodrik, Subramanian and Trebbi 2004; Acemoglu and Robinson 2012). Most of this literature centers on the critical role of institutions in reducing transaction costs and enabling individuals to capture the expected gains of voluntary exchange (North and Thomas 1973; North 1990). However, "markets cannot operate in an institutional vacuum" (Johnson and Koyama 2017, 13). For property rights to be secured, there is to be a centralized and powerful enough state to strengthen contract enforcement, resolve coordination failures, and prevent opportunistic behavior from occurring. Thus, not only economic institutions such as markets may provide basic development conditions, but the state – and those who govern it – must establish the foundations for them to properly evolve.

This assumption contrasts with the fact that some states could be extremely inefficient in ensuring basic political and economic rights; while others could be so despotic that they could become a major threat (Menard and Shirley 2005). Political institutions may pose constraints on rules in such a way to reduce the menace of arbitrary state predation. However, scholars have failed to determine their possible effects beyond their association to a regime type, and just a handful of studies have addressed the interplay of within regime institutional variation and its consequences. Thus, executive constraints may matter for development outcomes, but how can we define them to effectively include other institutions that develop the same function, to what extent (if any) do they shape economic outcomes, and through which channels their potential effect is produced?

[†] Department of Comparative Politics, University of Bergen. Email: erick.alvarez-barreno@uib.no

This article estimates the effect of executive constraints on economic growth by distinguishing two types of political controls. We treat horizontal constraints as the powers of the parliament to control the executive branch, whereas vertical constraints are the capacity of the electorate to keep the ruler accountable. Using Cox and Weingast (2017) measures of both institutions, we classify polities into four regime types based on whether a ruler is committed to securing rights or accountable to citizens' sanctions. Fixed effects and GMM estimates suggest that polities with the only presence of horizontal constraints grow less than other polities by about 0.21 percent of GDP per capita. Polities with the only presence of vertical constraints don't seem to perform significantly differently from other polities, but polities with both institutions are associated with an increase of about 0.18 percent of GDP per capita. We also found empirical evidence that supports the existence of a synergistic interaction between both types of constraints.

The remainder of the article is organized as follows. Section 2 surveys the literature that addresses the economic impacts of political regimes. Later, we define executive constraints and identify their potential economic roles. We conclude this section by presenting a regime typology that classifies countries based on whether their rulers are horizontally committed or vertically accountable. Section 3 describes the empirical strategy to assess some observable implications of our argument. Section 4 analyzes descriptive and estimation results, and Section 5 concludes.

2. Institutions, regimes, and development

One of the most puzzling questions for economics is to explain the economic success and failure of societies. Conventionally, scholars have cited as determinants of development factors such as technological change, accumulation of physical and human capital, reduction of markets' information costs, and productivity through an efficient resource allocation. The seminal work of North and Thomas contests this approach by arguing that these factors are not determinants of growth by themselves, but rather their consequences (1973, 2).

North's contributions consolidated the academic agenda that places institutions as key determinants of economic and political divergences.[1] Institutions are defined as the "rules of the game", or formally, the constraints devised by people that shape human interaction" (North 1990, 3). Institutions are crucial for growth because they reduce transaction costs, which allows for capturing the gains from voluntary exchange (North and Thomas 1973; North 1990). Thus, societies may adopt efficient economic organizational forms that induce individuals to produce socially beneficial activities – which happens when the relative individual benefit of undertaking these actions exceeds their cost. As Acemoglu, Johnson, and Robinson pinpoint, some ways in which

[1] To fully understand the argument of North and Thomas (1973) we should look at the difference between "fundamental" and "proximate" determinants of development. The proponents of this approach argue that factors listed such as innovation, education, or capital accumulation are considered proximate determinants because although they are important for grow, they do not constitute an explanation of sources that determine differences in prosperity across societies. On the contrary, fundamental determinants such as institutions, culture, or geography explain both the higher concentration of a proximate determinant such as education or capital, and the differences in prosperity between countries. For a more detailed explanation see Acemoglu, Gallego, and Robinson (2014).

these arrangements are organized "encourage people to innovate, to take risks, to save for their future, to find better ways of doing things, to learn and educate themselves, to solve collective action problems, and to provide public goods" (2005, 397).

As with political institutions, the literature has widely opted to analyze their effects as consequences of broader institutional designs such as democracy and autocracy. Though the extensive efforts, little consensus has been found about whether one or the other matters more for development. For example, Barro (1996a, 1996b) examines the determinants of growth across countries using linear regressions that include political, social, and economic factors. Using a panel of 100 countries from 1960 to 1990, Barro (1996b) examines the direct impact of democracy on growth. By including as controls some proximate determinants of development,[2] he finds that the overall effect of democracy on growth is weakly negative (Barro 1996b, 1). In later work, Barro (1997, 1) tersely concludes that "more political rights have no significant impact on growth."

With a sample of more than 4000 country-year observations ranging from 1950 to 1990, Alvarez et al. (2000) analyzes the impact of democracy on material welfare. They conclude that "total output grows at the same rate under the two regimes in both poor and richer countries" (Przeworski et al. 2000, 179). However, their research does find some evidence that democracies are associated with slightly higher per capita GDP growth than dictatorships. They also identify a greater variation in economic performance between different autocracies than between different democracies. This suggests that there may be a considerable institutional variation between dictatorships arguably playing a role in explaining their greater variation in growth levels. Gerring et al. (2005) reaches similar conclusions regarding the net effect of democracy on economic performance. The authors analyze democracy as a factor that accumulates over time, creating a stock of capital (i.e. physical, human, social, and political) that tends to affect growth. They conclude that democracy does not have a statistically significant economic effect (Gerring et al. 2005, 349). These results are supported using different indicators and specifications of their model.

Conversely, the influential work of Papaioannou and Siourounis (2008) examines the evolution of growth before and after incidents of permanent democratic transitions in a sample of 174 countries over the period 1960-2003. Their study is one of the main contributions that focuses on estimating the dynamic evolution of annual growth during a political transformation. Specifically, they use static and dynamic panel data techniques that control for general trends, time-invariant and country-specific characteristics. They show that a permanent democratic transition is associated with an increase of about 1% in annual real GDP per capita growth[3] (Papaioannou and Siourounis 2008, 1520). Their analysis also reveals some interesting facts. In some cases, transitions to democracy tend to occur during recessions that coincide with the downturn of the business cycle. After the transition, there seems to be an immediate increase in economic performance, which fluctuates in

[2] These factors are the maintenance of the rule of law and free markets, low government consumption, human capital accumulation and the initial level of GDP (Barro 1996b).

[3] Their estimates imply that in a country that abandons autocracy and consolidates representative institutions, annual growth accelerates after transition approximately 0.7% to 1.1% faster relative to the absence of regime change (Papaioannou and Siourounis 2008, 1533).

subsequent years. However, after the consolidation of democracy, happening arguably after the fifth, sixth, and seventh post-transition year, growth stabilizes at a higher rate than in the pre-transition period (Papaioannou and Siourounis 2008, 1542).

The case for democracy is supported by Acemoglu et al. (2019). The authors use dynamic panel models controlling for fixed effects and growth dynamics to estimate the effect of democracy on GDP per capita. Their results suggest that a country transitioning from autocracy to democracy achieves 20 percent more GDP per capita over the next 25 years than a country that remains nondemocratic (Acemoglu et al. 2019, 48). Their fixed effects and GMM estimates do not vary significantly with the implementation of different econometric strategies and specifications, including a semiparametric treatment effects model and an IV approach.[4] Finally, the authors also investigate the channels through which democracy increases GDP. They conclude that democracy contributes to growth by increasing investment, encouraging economic reforms, improving the provision of education and public health, and reducing social unrest (Acemoglu et al. 2019, 51).

2.1. Disentangling executive constraints and its consequences

Executive constraints are institutions that control the discretionary nature of power. North and Weingast (1989) describe them as the existence of a parliament endowed with sufficient powers to control the ruler, especially in his ability to raise revenue. In *Polity 5* they are defined as political constraints that can be imposed by any "accountability group" (Marshall and Gurr 2020). The latter definition expands the term to non-democratic political systems, suggesting that leaders of authoritarian regimes may also be subject to institutional controls. These definitions may be problematic as they only describe "horizontal" institutional barriers raised to control rulers' behavior, thus excluding other institutions that may also fulfill that same role.

We thus define horizontal constraints as institutions that split up the power of government into relatively autonomous branches. An effective division of power entails several institutional veto players capable enough of influencing political decision-making. These checks are imposed from legislative control over executive attributions (E.g., public budget), an independent judiciary with legal instruments to review rulers' decisions (E.g., Judicial Review), or constitutional mechanisms placed to remove rulers from office (E.g., impeachments, or votes of no confidence). Conversely, a single veto point reflects the situation of a leader who has unilateral control over political decision-making, which normally indicates the functioning of authoritarian rule.

What are the potential economic consequences of horizontal constraints? By analyzing the Glorious Revolution of 1688, North and Weingast (1989) found that constraints over the royal prerogatives of William III of Orange were conducive to capital market development, a greater government's

[4] Acemoglu et al. (2019. 51) use regional waves in transitions to and from democracy as an instrument for country-level democracy. In this specification, their analysis finds that a democratization increases GDP per capita by about 25 percent in the first 25 years.

capacity to raise revenues, and the ensuing harnessing of innovations introduced by the Industrial Revolution. Within their study, these institutions are seen as "commitment devices"[5] that turn credible ruler's promises to secure individual rights of relevant social actors. As noted, rulers are the principal menace to citizens' rights 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. Hence, the ruler is obliged to respect individual rights (i.e. property rights), something that, in the absence of the commitment, he would not have incentives to do.

Empirical studies show that horizontal constraints tend to increase the level of private investment because they generate certainty about the political environment, and they reinforce the confidence of investors about the security of their assets. Using data on private investment in 74 developing countries, Stasavage (2002, 42) finds that, on average, the change from a system without checks and balances to one in which the executive and the parliament are controlled by different political parties increases private investment by 16 percentage points. Stasavage's methodological approach also shows that there is some sort of variance in private investment levels across countries without checks and balances. Which means that there are differences across autocracies in their capacity to foster private investment.

Other studies associate political uncertainty resulting from electoral processes with incentives to make irreversible productive investments (Bernanke 1983). Canes-Wrone and Park argue that "the larger the effects of an electoral outcome on an individual's financial situation, the more likely she should be to delay costly-to-undo investments" (2014, 87). Their analysis shows that investment would decline due to the uncertainty produced by the electoral competition. Moreover, Canes-Wrone and Ponce de Leon claim that democratic development should reduce "inverse electoral investments and opportunistic business cycles" (2015, 19). They specifically suggest that the lesser the degree of executive power oversight, the greater the political uncertainty associated with electoral competition and, consequently, the larger the decline in private investment. This outcome is reproduced when political power "faces few institutional constraints, government transparency is low, and freedom of speech is curtailed" (Canes-Wrone and Ponce de Leon 2015, 19).

On the other hand, an outstanding scholarly tradition pinpoints that retrospective voters should control politicians whose performance is perceived as bad. For instance, Barro (1973, 19) develops a model in which the electoral process serves as a mechanism to align the interests of politicians with the interests of their constituents. Ferejohn (1986; 1999) argues that voting can be exercised as an accountability mechanism when politicians fail to meet a determined citizen's welfare threshold. Consequently, electoral controls should be seen as "vertical" constraints on rulers, that may allow for political accountability to occur, in which citizens can evaluate and accordingly sanction the ruler.

[5] For Sanchez-Cuenca, a commitment is "a manipulation of your set of alternatives enabling you to achieve an outcome that would be impossible to attain in the absence of the commitment" (1998, 79-80). This manipulation adopts two forms: constraining our available sets of alternatives or imposing high costs on some of those alternatives.

Vertical constraints are institutions that bind power holders with political stakeholders besides formal state institutions. This relationship is understood as a principal-agent interaction in which the former (voters) delegate key attributions to the latter (rulers) to represent their interests. Within this approach, elections may solve the problems of adverse selection and moral hazard that emerge from the agency relationship. In Persson, Roland, and Tabellini, these institutions perform at least four distinct functions:

> (1) They aggregate and represent voter's conflictive preferences; (2) they aggregate and disperse information about correct political decisions; (3) they address the problem of adverse selection by allowing citizens to select the most competent individuals for public office; and (4) they provide a mechanism to control moral hazard by holding elected officials accountable to citizens (1996, 2).

How may they contribute to economic growth? Some studies suggest that they influence economic factors when political accountability is produced. Benhabib and Przeworski (2010) distinguish two restrictions that make politicians accountable: electoral and criminal controls. The former occurs when governments are politically accountable to citizen sanctions, while the latter occurs when governments are criminally accountable to other entities. They conclude that countries in which rulers are accountable grow faster than countries in which they are not. This is because, when rulers extract resources beyond a socially justified threshold, voters would have the capacity to remove them from office, generating in turn political incentives for better public management (Benhabib and Przeworski 2010, 79). In other words, elections may contribute to growth when they allow citizen sanction over rulers' performance, producing in turn more incentives for good governance.

2.2. Two functions, four rulers

The literature suggests that horizontal constraints tend to create a commitment to secure property rights, which encourages beneficial economic activities such as investment. This is generated by reinforcing actors' certainty that their property will not be expropriated and that the rules of the game will not be changed at rulers will. Meanwhile, when vertical constraints strengthen political accountability, they tend to promote policy improvements that are conducive to better economic results. In sum, there are two essential functions through which executive constraints may contribute to economic growth: horizontal ones through credible commitments, and vertical ones through electoral accountability.

Empirical evidence suggests that these institutions emerge in different periods and follow different orders. For example, there are democratic political systems with an effective division of powers, and free and fair elections. Others may present different combinations of both types of constraints such as systems with exiguous checks and balances, but where regular elections are held, or systems in which the leader is controlled neither by the parliament nor by the citizenry.

The English case illustrates this point. The need to levy taxes by the Stuarts between 1603 and 1651 encouraged conflicts between their supporters and opponents. Between 1686 and 1688, King

James II excluded the Whigs from the political process and then tried to do the same with his supporters, the Tories. These actions prompted his final overthrow, and the Crown's offering to William III of Orange in exchange for abiding by The Bill of Rights, which protected the interests of the actors represented in the Parliament. As a result of the Glorious Revolution of 1688, the new constitutional foundation provided various actors with veto power over government decisions, creating the foundations of a division of powers (North and Weingast 1989, 818).

Although this "constitutional watershed" (Cox 2012) allowed the formation of representative institutions that ceded power to a broader segment of society, political inequalities still prevailed. Barely two percent of the English population could vote in the 18th century (Acemoglu and Robinson 2012, 230). What is more, the franchise in the country was not extended until 1832, then in 1867 and 1884 by incorporating most of the adult male population, and finally in 1919 and 1928 when women were finally included (Acemoglu and Robinson 2000, 1182).

The English case shows the fact that the introduction of checks and balances preceded the extension of universal suffrage by many years until finally the country was democratically arranged. This means that if we consider the extension of the franchise to the majority of the adult male population that took place in 1884, and the last extension between 1919 and 1928, England had between 196 and 240 years of institutional performance reflected by the exclusive presence of horizontal constraints (taking 1688 as its year of introduction), and between 131 and 87 years of institutional performance characterized by the presence of both constraints (taking 2015 as a reference year).

This case also allows the argument that there may be an interaction between horizontal and vertical constraints, constructing at least four types of regimes accordingly to all their possible combinations. These types determine the extent to which a ruler is committed to protecting rights, and/or is accountable to citizens' sanctions. Therefore, we should expect to observe countries with committed and accountable rulers (presence of both constraints); countries with committed, but unaccountable ones (presence of horizontal, absence of vertical), countries with uncommitted, but accountable ones (absence of horizontal, presence of vertical); and, finally, countries with neither committed nor accountable rulers (absence of both constraints). Table 1 describes this typology:

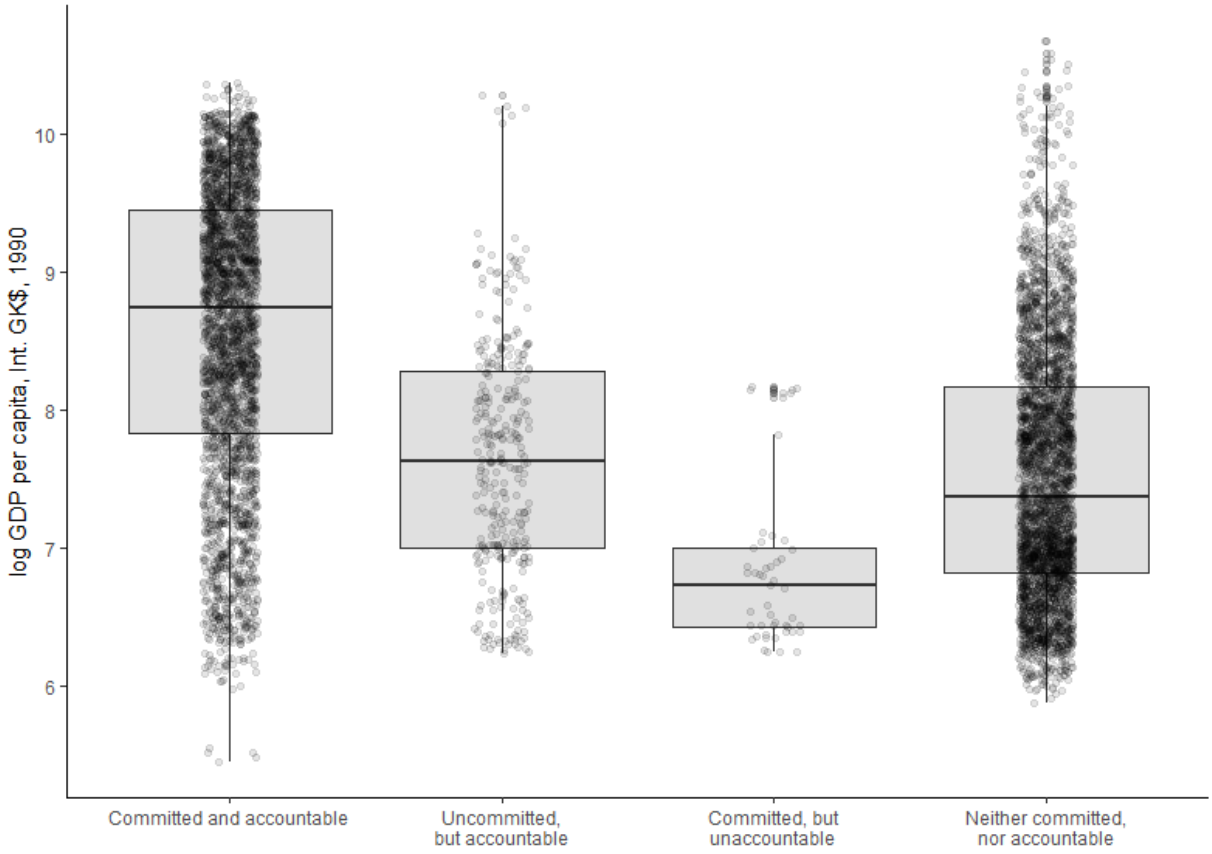
Table 1. Type of ruler as a function of the presence and/or absence of executive constraints

	Presence of horizontal constraints	**Absence of horizontal constraints**
Presence of vertical constraints	*Committed and accountable ruler*	*Uncommitted but accountable ruler*
Absence of vertical constraints	*Committed but unaccountable ruler*	*Neither committed nor accountable ruler*

Source: The author.

The relationship between contestation and participation institutions is not trivial. Figure 1 reports a box plot with information on GDP per capita (Bolt and van Zanden 2014), and our typology of rulers based on Polity IV measures of horizontal and vertical constraints correspondingly. Here we can observe an arguably positive relationship between countries coded with committed and accountable rulers and the level of GPD per capita. The two intermediate categories report a decreasing relationship, while the fourth category presents a higher level of development than the third, but no higher than the second and much lower than the first. The pattern of observations represented in the diagrams fits some of the empirical descriptions already mentioned. Particularly, if we look at the first and fourth boxes, we can see a higher concentration of observations at higher levels of GDP per capita for the case of countries coded with committed and accountable rulers, and a higher concentration of observations at lower levels of GDP per capita for countries with neither committed nor accountable rulers.

Figure 1. GDP per capita and type of ruler



Source: The author with information from Bolt and van Zanden (2014).

3. Data and Methods

To empirically assess our argument, we examine the political institutions of an unbalanced panel of 143 countries between 1950 and 2010. However, several analyses are conducted using

subsamples that vary in terms of the number of countries and the number of years available. The overall sample covers a total of 7603 country-year observations, but this number changes depending on the availability of information. The entry year for each country is 1950 but varies according to its year of independence or the first year in which its growth data were available. The exit year corresponds to 2010 for all countries.

To measure economic growth, we use the natural logarithm of gross domestic product (GDP) per capita measured in 1990 U.S. dollar international prices (dollar Geary-Khamis). This variable is conventionally used in literature, and it is available for the unbalanced panel of 143 countries between 1950 and 2010. Its information was obtained from the Maddison Project Database version 2013 (Bolt and van Zanden 2014), whose statistics correspond to a historical and exhaustive study of the world's economic growth over centuries.

3.1. Key independent variables: Horizontal and vertical constraints

As Cox and Weingast (2017), we measure horizontal constraints using the concept of Polity IV (variable *xconst*) which describes the degree of checks and balances between the various parts of the government on a 7-point scale. Marshall and Gurr describe that this variable refers to "the extent of institutional constraints[6] on the decision-making powers of the chief executive, whether an individual or a collective executive" (2020, 61). They explain that their notion of executive constraints uses the notion of "horizontal accountability" described in democratic literature, except that it is assumed that dictatorships may also be subject to certain institutional controls.

To capture the presence of horizontal constraints, we generate a dummy from the concept of Polity IV which is equal to 1 when country *i* in time *t* has "substantial limitations" (xconst = 5), fits into the "intermediate category number three" (xconst = 6), or there is "parity or subordination of the executive" to other state powers (xconst = 7). Meanwhile, a country *i* in time *t* does not have horizontal constraints when Polity IV classifies it as "unlimited executive authority" (xconst = 1), "intermediate categories one and two" (xconst = 2; xconst = 4), and it has "moderate limitations" (xconst = 3). Our dataset has both the ordinal 7-point scale variable from Polity IV, and our dummy.

On the contrary, we measure vertical constraints based on the dichotomous coding of Boix, Miller, and Rosato (2012). Accordingly, a country classified as an electoral democracy in their classification is treated as a country with presence of vertical constraints.[7] The information for this

[6] "Limits on the chief executive may be imposed by any "accountability group" in the polity." These groups are the legislative and judicial branches of government in western democracies, and other groups such as "the ruling party in a one-party system, a council of nobles or powerful advisors in monarchies, and the military in coup-prone polities" (*Addendum B: Polity IV Executive Constraints Concepts* in Marshall and Gurr 2020, 61-65).

[7] Boix, Miller, and Rosato define a country as democratic when it satisfies the following conditions for the dimensions of contestation and participation in Robert Dahl's theory of polyarchy: "Contestation: 1. The executive is directly or indirectly elected in popular elections and is accountable directly to the voters or to a legislature. 2. The legislature (or the executive if directly elected) is elected in free and fair elections. Participation: 1. A majority of adult males have the right to vote" (2012, 1530-31).

variable is available for all countries and years of the sample. Another way to measure this concept is with the Polity IV indicator related to the "competitiveness of executive selection" (*xrcomp* variable in Marshall and Gurr 2020). As Cox and Weingast (2017), a country is considered to have vertical constraints when at least one of the chief executives was elected by a competitive election (*xrcomp* = 2), or the heads of the executive are elected through elections with two or more parties or candidates (*xrcomp* = 3). In contrast, there is an absence of vertical constraints when transfers of power are not regulated (*xrcomp* = 0), and when the heads of the executive are determined by hereditary succession (*xrcomp* = 1) (Marshall and Gurr 2020, 20). Both the ordinal scale and the dummy are available for all countries and years of the sample.

Lastly, to evaluate the potential effects for every type of ruler presented in Table 1, we created four dummies from Polity IV and Boix, Miller and Rosato (2012) variables described above. For instance, a country *i* is coded as having both constraints when both horizontal and vertical measures are equal to 1 in time *t*. The country is coded as 0 in all remaining cases. The remaining categories follow the same codification pattern based on whether a country is previously coded as having or not either one or both constraints.

3.2. Control variables

To construct the set of control variables, our research takes as a reference empirical studies that have successfully estimated the evolution (either static or dynamic) of annual growth during the irruption of political transformations. Thus, building on the contributions of Papaioannou and Siourounis (2008, 1548), and Acemoglu, Naidu, Restrepo, and Robinson (2019) the first set of controls 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), primary and secondary education enrollment rate, and infant mortality rate, all from the World Bank Development Indicators (WDI). In addition, we also include as controls the level of total factor productivity (henceforth TFP) in constant national prices from the Penn World Table version 10.0 (PWT 10.0) constructed by 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).

3.3. Econometric model

A dynamic panel data model with country and year-fixed effects is proposed to estimate the effect of executive constraints on economic growth. We incorporate entity fixed effects that would account for 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 some countries (Papaioannou and Siourounis 2008, 1525). On the other hand, time-fixed effects would reflect 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, 285-286).

As Acemoglu et al. (2019), our specification includes lags of the dependent, which allows for controlling for GDP dynamics. According to the authors, a standard assumption of this type of 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 (formally described as "sequential exogeneity"). For this reason, this specification requires the incorporation of sufficient lags of the dependent variable to eliminate the residual of this autocorrelation. Finally, the inclusion of lags of GDP also allows for controlling for the impact of many economic factors such as commodity prices, agricultural productivity, and technology (Acemoglu et al. 2019, 57). Our specification is formally represented in the following equation:

$$Y_{it} = \alpha_i + \delta_t + \beta HC_{it} + \lambda VC_{it} + \vartheta(HC \times VC)_{it} + \sum_{j=1}^{p} \gamma_j Y_{it-j} + \eta X'_{it} + \varepsilon_{it} \quad (1)$$

Where the subscript *i* represents the country and *t* the year. The dependent variable Y_{it} is the natural logarithm of gross domestic product (GDP) per capita measured in 1990 U.S. dollar international prices. α_i is a contry-specific fixed effect, and δ_t the year fixed effect, both represented as vectors of dichotomous variables for each cross-sectional and temporal unit. β is the coefficient that captures the impact of horizontal constraints HC_{it}, and λ the impact of vertical ones VC_{it}. The coefficient ϑ is the effect of the interaction between HC_{it} and VC_{it}. Since both variables are binary or dichotomous, this multiplicative term would report coefficients of all possible combinations between both, which would generate a serious multicollinearity problem. For such reason, our interaction term only reports the coefficient of the presence of both EC (when their respective coding is equal to 1) as compared to their absence. γ_j is the coefficients of *p* lags of the dependent variable since this value (represented as *j*) is equal to 1. Similar to Acemoglu et al. (2019), up to a total of 8 lags of GDP per capita are included, so γ_j will reflect regressors from the first lag or when $j = 1$, i.e. Y_{it-1}, through the last lag or when $j = 8$, i.e. Y_{it-8}. η is the coefficient of a set of control variables, X'_{it} described above: investment, infant mortality, primary and secondary schooling, trade, fiscal revenue, social unrest, and market reforms. Finally, ε_{it} is the error term.

4. The Effect of Executive Constraints

4.1. Descriptive statistics

Table 2 reports summary statistics for observations coded with the presence and absence of horizontal constraints. Countries coded as horizontally constrained appear to perform better economically than their unconstrained counterparts (with a difference of $5128.94 in favor of the former). In terms of infant mortality rate per 1000 births, there is a difference of almost 49 percentage points between the two groups. Unconstrained countries have a disturbingly much higher rate (83.2 percent). On the other hand, horizontally constrained countries appear to have higher levels of both primary (difference of 14.9 percent) and secondary schooling (difference of 36.7 percent), a higher index of market reforms (difference of 25.3 points), a moderately higher

human capital index (difference of 0.8 points), a moderately higher protection of property rights implying lower investment risk (difference of 1.6 points), and a moderately lower level of corruption (difference of 0.9 points). There are no significant differences in productivity, government stability, the level of investment in physical capital, trade, and tax revenue.

Table 2. Statistical summary for the presence and absence of horizontal constraints

	Horizontally unconstrained			Horizontally constrained		
	N	Mean	St. Dev.	N	Mean	St. Dev.
GDP per capita	3817	2983.741	3850.625	3060	8112.681	6825.808
Investment Profile (0-12)	1274	6.276	2.265	1773	7.901	2.423
Human capital index	2966	1.568	0.445	3143	2.359	0.651
TFP in const. nat. prices	1914	1.066	0.556	2711	0.913	0.251
Government Stability (0-12)	1274	7.496	2.482	1773	7.704	1.933
Corruption (0-6)	1274	2.512	1.029	1773	3.469	1.413
Investment share of GDP	2530	0.219	0.103	2617	0.235	0.069
Infant mortality rate	3172	83.189	48.341	2951	34.434	34.132
Primary-school enrollment rate	2337	86.298	28.494	2285	101.188	15.012
Secondary-school enrollment rate	1958	38.429	27.546	1999	75.142	29.702
Trade share of GDP	2608	0.644	0.505	2692	0.685	0.394
Tax revenue share of GDP	2783	0.158	0.093	2337	0.205	0.097
Market reforms index (0-100)	2519	26.444	22.538	2438	51.709	25.175

Source: The author.

Table 3 reports that countries coded as vertically constrained have higher levels of economic performance as measured by GDP per capita (there is a difference of $4780.7 in favor of the former). Unconstrained countries appear to have a much higher rate of infant mortality (83.2 percent) than their constrained counterparts (34.4 percent). In terms of schooling level, constrained countries have higher primary and secondary enrollment rates (percentage differences in favor of 14.9 and 36.7, respectively). Likewise, there are moderate differences in favor of the constrained countries in terms of factors such as lower investment risk (difference of 1.6 points), higher human capital index (difference of 0.7 points), lower corruption (difference of 0.9 points), and higher market reform index (difference of 25 points). Finally, there are no substantial differences in the level of productivity, government stability, investment in physical capital, trade, and tax revenue.

Table 3. Statistical summary for the presence and absence of vertical constraints

	Vertically unconstrained			Vertically constrained		
	N	Mean	St. Dev.	N	Mean	St. Dev.

GDP per capita	3537	2944.051	3832.785	3340	7724.74	6759.853
Investment Profile (0-12)	1148	6.28	2.25	1899	7.79	2.457
Human capital index	2720	1.56	0.43	3389	2.309	0.671
TFP in const. nat. prices	1731	1.084	0.575	2894	0.912	0.251
Government Stability (0-12)	1148	7.426	2.488	1899	7.733	1.965
Corruption (0-6)	1148	2.509	1.031	1899	3.408	1.409
Investment share of GDP	2312	0.221	0.103	2835	0.233	0.072
Infant mortality rate	2937	83.843	48.45	3186	37.428	36.729
Primary-school enrollment rate	2203	86.583	28.81	2419	100.104	16.13
Secondary-school enrollment rate	1834	38.415	27.549	2123	73.01	30.793
Trade share of GDP	2411	0.651	0.483	2889	0.676	0.425
Tax revenue share of GDP	2568	0.159	0.095	2552	0.2	0.096
Market reforms index (0-100)	2301	25.451	22.5	2656	50.496	25.13

Source: The author.

To contrast the information presented so far, Table 4 reports summary statistics of observations coded as democracies and non-democracies based on the dichotomous classification of Boix, Miller and Rosato (2012). Again, some familiar patterns can be observed such as democracies are on average richer than non-democracies (with a difference of $5574.5), have a much lower infant mortality rate per 1000 births (with a difference of 48, 2 percentage points), have a more educated population (with a difference in favor of 12.9 percent for primary schooling and 35.9 percent for secondary schooling), and have a higher market reforms score than their counterparts (difference of 24.8 points). There are moderate differences between the two regimes in indicators such as the protection of property rights (difference of 1.8 points in favor of democracies), the human capital index (difference of 0.8 points in favor of democracies), and the level of corruption (difference of 1.1 points in favor of democracies). Finally, there appear to be no significant differences in the level of productivity, government stability, investment in physical capital, trade, and tax revenue.

Table 4. Statistical summary by regime type

	Non democracies			Democracies		
	N	Mean	St. Dev.	N	Mean	St. Dev.
GDP per capita	4230	2891.595	3763.51	2890	8466.073	6832.535
Investment Profile (0-12)	1478	6.158	2.312	1685	7.934	2.467
Human capital index	3279	1.592	0.449	2980	2.378	0.658
TFP in const. nat. prices	2116	1.053	0.535	2596	0.91	0.252
Government Stability (0-12)	1478	7.367	2.521	1685	7.713	1.929

Corruption (0-6)	1478	2.436	1.075	1685	3.53	1.393
Investment share of GDP	2809	0.217	0.101	2475	0.235	0.068
Infant mortality rate	3577	81.588	47.899	2770	33.372	33.722
Primary-school enrollment rate	2571	87.647	28.056	2154	100.573	15.49
Secondary-school enrollment rate	2125	39.483	27.47	1915	75.417	30.445
Trade share of GDP	2932	0.654	0.494	2519	0.669	0.394
Tax revenue share of GDP	3101	0.158	0.092	2205	0.206	0.098
Market reforms index (0-100)	2772	27.353	23.575	2331	52.112	24.557

Source: The author.

Figure 2 presents a scatter plot between GDP per capita and the Polity IV measure of executive constraints, both variables averaged over the period 1950-2010. Countries were reported with their respective abbreviations based on the World Bank nomenclature. The blue line represents a linear regression generated to simulate the relationship between the variables described in the plot. In addition, a Pearson correlation coefficient and its respective p-value have been computed. From its values (reported in the upper right corner of the graph) we can determine that there is a positive and moderately strong correlation between both indicators. Specifically, the coefficient presents a value of 0.61 out of 1, and its p-value is less than 0.001. This suggests that the more restricted the executive is in a country, the higher its level of growth as measured by the natural logarithm of GDP per capita. Another aspect to consider in the plot is the existence of several outliers such as the United Arab Emirates, Kuwait, Qatar, Singapore, and Saudi Arabia.

Figure 3 presents a scatter plot between GDP per capita and the Polity IV competitiveness of executive selection measure, both variables averaged over the period 1950-2010. As in the previous figure, the Pearson correlation coefficient reports a positive and moderately strong correlation between both variables. In particular, the coefficient presents a value of 0.64 out of 1, and its p-value is less than 0.001. This means that the more competitive the political process for selecting the executive in a country, the higher is the level of growth measured by the natural logarithm of GDP per capita. It should be noted that these observations are descriptive but not causal in nature. The figure also presents some outlier cases. United Arab Emirates, Kuwait, Qatar, and Singapore again show high levels of GDP per capita, but much lower levels in the competitiveness indicator.

Based on the correlations presented, it can be concluded that at least descriptively there is a strong and positive relationship between GDP per capita and measures that capture information on democratic political institutions in general, and widely used codifications of constraints on rulers. Accordingly, there seems to be a higher degree of economic development in political systems characterized as democratic (as defined by Boix, Miller, and Rosato 2012), with the presence of horizontal and/or vertical constraints (both according to different Polity IV definitions and measurements), and with committed and accountable rulers (according to the variable constructed for this research).

Figure 2. Relationship between executive constraints and GDP per capita

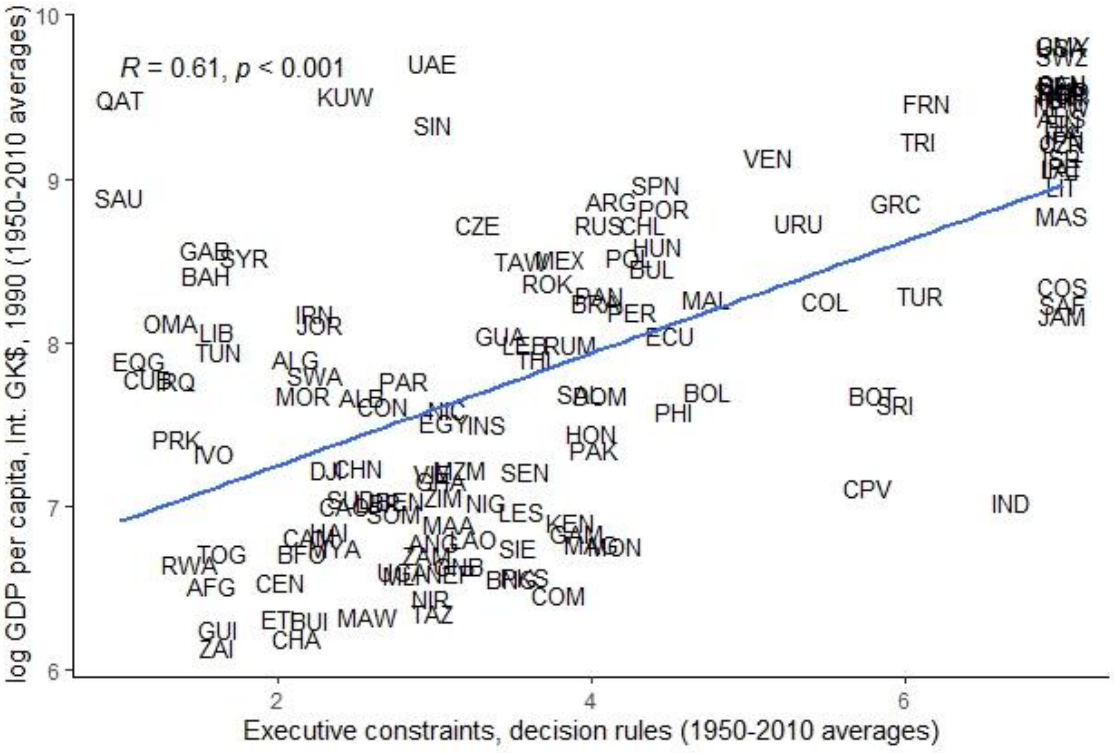
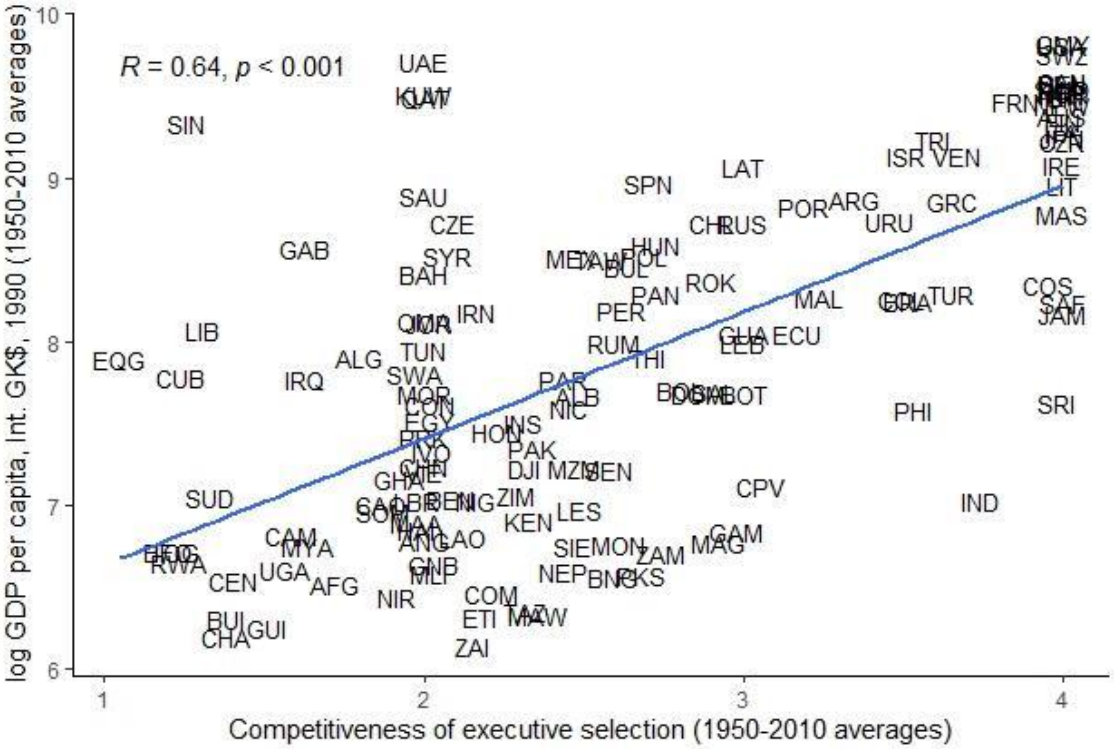


Figure 3. Relationship between competitiveness and GDP per capita



Source: The author from Bolt and van Zanden (2014), and Polity IV.

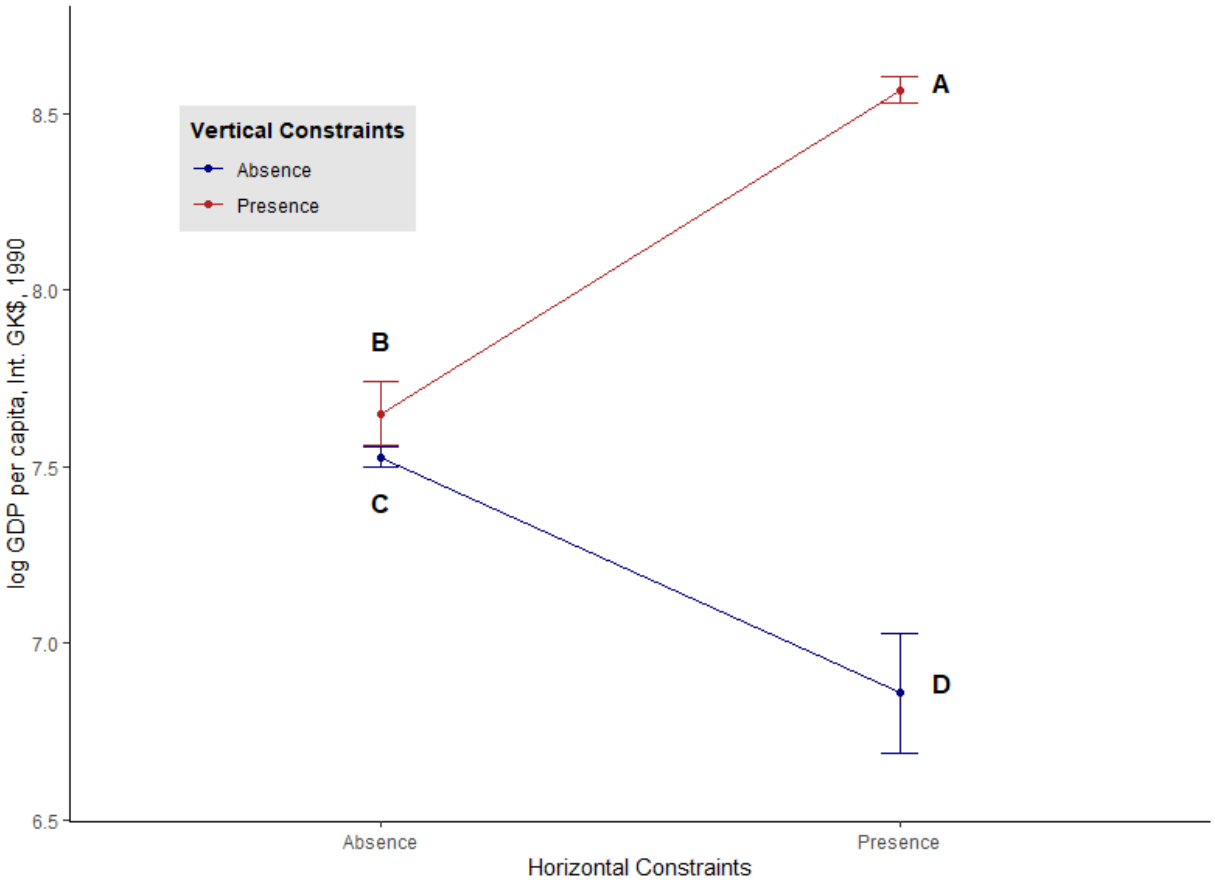
4.2. Estimation results

Recall Equation 1 presented in the following terms:

$$Y_{it} = \alpha_i + \delta_t + \beta HC_{it} + \lambda VC_{it} + \vartheta(HC \times VC)_{it} + \sum_{j=1}^{p} \gamma_j Y_{it-j} + \eta X'_{it} + \varepsilon_{it} \quad (1)$$

Here, the key coefficients to interpret the effect of the executive constraints are β, λ, and ϑ. The first two coefficients represent the effect of each type of constraint separately, while the third one reflects the effect of the interaction between both institutions.

Figure 4. Log GDP per capita (average over 1950-2010) as a function of executive constraints.



Note.– Each point depicts the means of log GDP per capita by one of the four possible combinations of the interaction between horizontal and vertical constraints. To construct these variables, I used the codification proposed by Cox and Weingast (2017). Observations were codified as horizontally constrained when they have at least "substantial constraints" on the Polity IV executive constraints indicator (Marshall and Gurr, 2020). Observations were codified as vertically constrained when at least one of the chief executives was elected as a result of a competitive election, as measured by the indicator "competitiveness of executive selection" on Polity IV. GDP information came from the Maddison Project (Bolt and van Zanden 2014).

Figure 4 reports an interaction plot for the natural logarithm of GDP per capita (averaged for the period 1950-2010) as a function of the presence and/or absence of horizontal and vertical constraints. The trajectories illustrated reveal that both institutions have a synergistic interaction. This type of interaction occurs when two variables combine to amplify an effect. Therefore, the

average GDP per capita for countries with the absence of both institutions (or countries with neither committed nor accountable rulers in our typology, spatially located at point C in the figure) is lower than the average GDP for countries with the presence of vertical and absence of horizontal constraints (uncommitted but accountable rulers located at point B in the figure). However, the average GDP of autocracies appears to be substantially low when compared to the cases of countries that have only introduced horizontal constraints (point D in the figure). On the contrary, for the case of countries that have already introduced vertical constraints, the introduction of horizontal ones (point A in the figure) seems to substantially favor their growth prospects.

These observations have important implications. First, they provide empirical evidence that there is a relevant interaction between horizontal and vertical constraints, in which their different combinations are associated with different economic outcomes. Second, the figure also suggests that the order in which different political institutions were introduced across societies matters for growth. The most relevant observation is that the joint impact of both constraints appears to be notably larger than the sum of their individual impacts. In particular, the introduction of horizontal constraints is found to produce a greater economic benefit to countries that have already introduced vertical constraints, compared to countries with no constraints at all.

The following tables report estimation results from different specifications derived from Equation 1. Table 5 provides fixed effects estimates. Columns 1 and 5 report estimates of a static panel with fixed effects, that is, our baseline model without including lags of the dependent variable. Columns 2-4 and 6-8 report these same estimates controlling for different numbers of lags. The dependent variable is the natural logarithm of GDP per capita. Using this logarithmic transformation allows us to interpret the regression coefficients in percentage changes (Angrist and Pischke 2015, 60). Additionally, robust standard errors against heteroscedasticity and serial autocorrelation are reported in parentheses for all estimates.

Our preferred specification in Table 5 is the one presented in column 7, which includes four lags of the dependent variable. The coefficient for our horizontal constraints binary indicator is -0.205 (standard error of 0.064). The estimate presents a negative and highly significant relationship between horizontally constrained rulers and growth (99 percent confidence level). This suggests that the solely presence of horizontal constraints is associated with a decrease of about 0.21 percent of GDP per capita, conditional on the controls included in the model (other growth determinants, vertical constraints performance alone, the interaction performance, and several lags of the dependent variable). The coefficient of our vertical constraints binary indicator remains not significantly different from zero, so the presence of these institutions seems not to affect economic growth. On the contrary, observations coded with committed and accountable rulers present a positive and highly significant coefficient (coefficient of 0.18 and standard error of 0.058). This suggests that the presence of both constraints is associated with a 0.18 percent increase in GDP per capita, compared to the absence of both institutions and conditional on the controls included in the model.

Table 5. The effect of executive constraints on log GDP per capita (fixed effects estimates)

	OLS with individual fixed effects				OLS with individual and time fixed effects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Horizontal constraints	–.712***	–.185***	–.191***	–.204***	–.664***	–.200***	–.205***	–.219***
	(.133)	(.029)	(.061)	(.074)	(.143)	(.060)	(.064)	(.073)
Vertical constraints	.007	.011	.010	–.002	.019	.006	.003	–.008
	(.036)	(.012)	(.011)	(.013)	(.038)	(.011)	(.011)	(.013)
Horizontal × Vertical	.632***	.153***	.161***	.184***	.591***	.174***	.182***	.206***
	(.141)	(.031)	(.055)	(.069)	(.150)	(.053)	(.058)	(.069)
Investment share of GDP	.719***	.253***	.279***	.289***	.600***	.242***	.270***	.284***
	(.110)	(.032)	(.053)	(.060)	(.104)	(.047)	(.048)	(.056)
Infant mortality rate	–.002***	–.0002	–.0001	–.00004	–.001	–.0004	–.0003	–.0002
	(.001)	(.0001)	(.0002)	(.0002)	(.001)	(.0002)	(.0002)	(.0002)
Human capital index	.755***	.206***	.200***	.214***	.595***	.207***	.206***	.217***
	(.056)	(.010)	(.049)	(.051)	(.071)	(.060)	(.059)	(.062)
Trade share of GDP	.038	–.004	–.001	–.003	.071**	–.0005	.0001	–.004
	(.035)	(.008)	(.008)	(.009)	(.033)	(.008)	(.008)	(.010)
TFP in const. nat. prices	.372***	.115***	.113***	.112***	.324***	.113***	.109***	.109***
	(.042)	(.007)	(.031)	(.030)	(.043)	(.033)	(.031)	(.031)
Tax revenue share of GDP	.528***	.196***	.209**	.227***	.479***	.208**	.223**	.236***
	(.133)	(.032)	(.092)	(.085)	(.132)	(.087)	(.088)	(.081)
Social unrest	–.056***	–.021***	–.025***	–.025***	–.053***	–.021***	–.024***	–.025***
	(.013)	(.006)	(.006)	(.006)	(.012)	(.006)	(.006)	(.006)
Log GDP, first lag		.502***	.445***	.444***		.491***	.433***	.431***
		(.012)	(.094)	(.090)		(.072)	(.091)	(.087)
Log GDP, second lag		.284***	.170***	.165***		.283***	.167***	.158***
		(.011)	(.046)	(.053)		(.038)	(.046)	(.053)

Log GDP, third lag			.177***	.173***			.177***	.167***
			(.062)	(.051)			(.061)	(.051)
Log GDP, fourth lag			.003	–.001			.016	.001
			(.060)	(.057)			(.059)	(.056)
Log GDP, fifth lag				.077				.079
				(.086)				(.085)
Log GDP, sixth lag				–.031				–.023
				(.065)				(.065)
Log GDP, seventh lag				–.104				–.095
				(.073)				(.072)
Log GDP, eight lag				.057				.066
				(.051)				(.050)
R^2	.542	.819	.814	.789	.293	.699	.700	.675
R^2 Adjusted	.532	.815	.810	.784	.273	.690	.691	.664
Observations	7603	7317	7031	6459	7603	7317	7031	6459
Countries in the sample	143	143	143	143	143	143	143	143

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

Note.– The table presents estimates of the effect of executive constraints on the natural logarithm of GDP per capita. Columns 1-4 present the results for the estimator with individual fixed effects, and columns 5-8 for the estimator with individual and time fixed effects. Robust standard errors against heteroscedasticity and serial autocorrelation are reported in parentheses. Columns 1 and 5 report results for the static panel analysis, while the remaining columns report results for the dynamic panel. Columns 2 and 6 include two lags of the dependent variable, columns 3 and 7 include four, and columns 4 and 8 include eight lags as controls.

Source: The author.

Estimates with fixed effects from dynamic panel models such as those presented in Table 5 have an asymptomatic bias of order 1/T, known as the Nickell bias. This is a product of the violation of the assumption of strict exogeneity in dynamic panel models (Nickell 1981 in Acemoglu et al 2019, 62). Thus, the lags of the dependent variable included in equation 1 may be correlated with the idiosyncratic and non-stochastic characteristics of the cross-sectional units (Montero 2010). Table 6 provides estimates with the Generalized Method of Moments (GMM) to address this bias. This estimator uses instrumental variables based on lags of the dependent variable and differences of the other variables in the model (Montero 2010, 1). Columns 1, 2 and 3 present results using Blundell and Bond (1998) systematic MGM estimator, while columns 4, 5 and 6 present results with the difference MGM estimator of Arellano and Bond (1991). Columns 1 and 4 include two lags as controls, columns 3 and 5 include four, and columns 4 and 6 include eight.

Our preferred specification is the one presented in column 2 which includes four lags and is estimated with the systematic MGM. Most patterns observed in previous specifications are maintained. The coefficient of the executive constraint's indicator remains negative and highly significant (coefficient of -0.46 and standard error of 0.14). This suggests again that the sole presence of horizontal constraints is associated with a decrease of about 0.46 percent of GDP per capita, keeping everything else constant. Vertical constraints do not appear to have a significant impact on growth. However, the indicator capturing information on the presence of both institutions has a positive and highly significant coefficient (coefficient of 0.22 and standard error of 0.07). This suggests that committed and accountable rulers are associated with an increase of around 0.22 percent in GDP per capita, conditional on the controls included in the model.

Table 6. The effect of executive constraints on log GDP per capita (GMM estimates)

	GMM Blundell and Bond (1998)			GMM Arellano and Bond (1991)		
	(1)	(2)	(3)	(4)	(5)	(6)
Horizontal constraints	–.458***	–.454***	–.471***	–.604**	–.545**	–.534*
	(.141)	(.142)	(.155)	(.248)	(.253)	(.281)
Vertical constrains	.024	.027	.035	.003	.001	–.005
	(.021)	(.022)	(.026)	(.022)	(.025)	(.027)
Horizontal × Vertical	.224***	.220***	.225***	.294**	.268**	.256*
	(.069)	(.070)	(.076)	(.122)	(.126)	(.137)
Investment share of GDP	.267***	.310***	.376***	.235***	.268***	.324***
	(.066)	(.062)	(.072)	(.074)	(.078)	(.088)
Infant mortality rate	–.001***	–.001***	–.001***	–.001	–.001	–.0005
	(.0004)	(.0004)	(.0004)	(.0005)	(.0005)	(.0004)
Human capital index	.243***	.229***	.222***	.319***	.308***	.299***
	(.069)	(.063)	(.065)	(.093)	(.090)	(.086)
Trade share of GDP	.008	.008	.009	–.005	–.017	–.011
	(.019)	(.019)	(.020)	(.011)	(.010)	(.011)
TFP in const. nat. prices	.160***	.146***	.138***	.143***	.136***	.129***
	(.048)	(.044)	(.044)	(.042)	(.042)	(.039)
Tax revenue share of GDP	.221**	.214**	.210**	.373***	.378***	.368***
	(.091)	(.088)	(.085)	(.136)	(.128)	(.118)
Social unrest	–.018**	–.024***	–.026***	–.017***	–.025***	–.021***
	(.008)	(.009)	(.010)	(.006)	(.006)	(.006)
Log GDP, first lag	.488***	.321***	.257***	.387***	.327***	.304***
	(.081)	(.088)	(.086)	(.076)	(.082)	(.082)
Log GDP, second lag	.277***	.188***	.118**	.242***	.157***	.147**
	(.035)	(.048)	(.051)	(.037)	(.048)	(.057)

Log GDP, third lag		.200***	.166***		.154***	.166***
		(.058)	(.057)		(.055)	(.057)
Log GDP, fourth lag		.071	.059		.036	.023
		(.059)	(.048)		(.060)	(.053)
Log GDP, fifth lag			.110			.049
			(.083)			(.075)
Log GDP, sixth lag			.022			.009
			(.068)			(.049)
Log GDP, seventh lag			–.054			–.084
			(.074)			(.074)
Log GDP, eight lag			.111**			.049
			(.052)			(.049)
Hansen-Sargan Test (p-value)	1	1	1	1	1	1
Observations used	14391	13919	12775	7174	6888	6316
Countries in the sample	143	143	143	143	143	143

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

Note.– The table presents estimates of the effect of executive constraints on the natural logarithm of GDP per capita. Columns 1-3 present the results for the Blundell and Bond (1998) GMM estimator, and columns 4-6 for the Arellano and Bond (1991) GMM estimator. All specifications include a full set of country and year fixed effects as controls. Robust standard errors against heteroscedasticity and serial autocorrelation are reported in parentheses. Columns 1 and 4 include two lags of the dependent variable, columns 2 and 5 include four, and columns 3 and 6 include eight lags as controls. The Hansen-Sargan test reports the validity of the instruments implemented in each specification (Ho = instruments are valid).

Source: The author

5. Conclusions

Scholars has opted to analyze the consequences of political institutions by include them into broader institutional designs such as democracy and autocracy. Although these efforts, we seem to lack a consensus on which type of regime produces better economic outcomes. Likewise, this approach does not consider the potential impact of within-institutional variations. For this reason, the main contribution of this research has been to design a novel approach that allows us to exploit the many institutional combinations that may arise in society.

Our descriptive analysis suggests that democratic institutions are associated with good economic performance. Henceforth, we observe a higher degree of economic development in democratic political systems (as defined by Boix, Miller, and Rosato 2012) and polities with committed and accountable rulers (according to the variable constructed for this research). Measures of different democratic institutions also suggest that they on average are associated with higher levels of wealth, lower infant mortality rates, higher levels of education, and greater capacity to carry out market reforms. In addition, moderate differences in favor of democratic institutions were observed for the protection of property rights, the human capital index, and the level of corruption. Lastly, we found no significant differences in levels of productivity, government stability, investment in physical capital, trade, and tax revenue.

Formally, to estimate the effect of executive constraints on economic growth, we performed a dynamic panel analysis with different specifications. The results obtained indicate that there is a negative (significant) effect of the presence of horizontal constraints on the level of GDP per capita; vertical constraints have no significant effect, but there is a positive (significant) effect of the presence of both compared to their absence. Our preferred specification shows that the presence of horizontal constraints is associated with a decrease of about 0.21 percent in GDP per capita compared to cases coded with the presence of other constraints and holding all else constant. In contrast, we found that the presence of both constraints is associated with an increase of about 0.18 percent of GDP per capita, compared to observations coded with the absence of both constraints and conditional on the controls included in the model.

Contrary to the literature, our results suggest that the only presence of horizontal constraints does not generate a positive impact on growth. This finding is a product of controlling the performance of horizontal constraints by other determinants of growth, and the relative performance of other types of rulers. Our study also found empirical evidence that supports the existence of a synergistic interaction between both types of constraints. This means that the joint effect of both institutions is much greater than the sum of their parts.

References

Acemoglu, Daron, Francisco A. Gallego, and James A. Robinson. 2014. “Institutions, Human Capital, and Development.” *The Annual Review of Economics*, 6, pp. 875-912.

Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2001. "The Colonial Origins of Comparative Development: an Empirical Investigation." *The American Economic Review*, 91 (5), pp. 1369-1401.

_____. 2005. "Institutions as a Fundamental Cause of Long-Run Growth." In Aghion, y Durlauf (*Editors)*. *Handbook of Economic Growth*, Volume 1A., Elsevier B.V., pp. 387-472.

Acemoglu, Daron, Suresh Naidu, Pascual Restrepo, and James A. Robinson. 2019. "Democracy Does Cause Growth." *Journal of Political Economy*, 127 (1), pp. 47-100.

Acemoglu, Daron, and James A. Robinson. 2012. *Por qué fracasan los países: los orígenes del poder, la prosperidad y la pobreza*. Barcelona. Deusto, Grupo Planeta.

Angrist, Joshua, and Jörn-Steffen Pischke. 2009. *Most Harmless Econometrics: An Empiricist's Companion*. Princeton y Oxford, Princeton University Press.

Arellano, Manuel and Bond, Stephen. (1991). "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *The Review of Economic Studies*, 58 (2), pp. 277-297. https://doi.org/10.2307/2297968

Banks, Arthur S., and Kenneth A. Wilson. 2013. "Cross-National Times-Series Data Archive." Jerusalem: Databanks International. https://www.cntsdata.com/

Barro Robert. J. 1996a. "Institutions and Growth, an Introductory Essay." *Journal of Economic Growth* 1(2), pp. 145-148.

_____. 1973. "The Control of Politicians: An Economic Model." *Public Choice*, 14, pp. 19-42.

_____. 1996b. "Democracy and economic growth." *Journal of Economic Growth*, 1(1), pp. 1–27.

_____. 1997. *Determinants of Economic Growth: A Cross-Country Empirical Study*. Cambridge, MA: The MIT Press.

Benhabib, Jess, and Adam Przeworski. 2010. "Economic Growth under Political Accountability." *International Journal of Economic Theory*, 6, pp. 77-95.

Bernanke, Ben S. 1983. "Irreversibility, Uncertainty, and Cyclical Investment." *The Quarterly Journal of Economics*, 98 (1), pp. 85-106.

Bizzarro, Fernando, John Gerring, Carl Henrik Knutsen, Allen Hicken, Michael Bernhard, Svend -Erik Skaaning, Michael Coppedge, and Staffan I. Lindberg. 2018. "Party Strength and Economic Growth." *World Politics*, 70 (2), pp. 275-320.

Blundell, Richard, and Stephen Bond. 1998. "Initial conditions and moment restrictions in dynamic panel data models." *Journal of Econometrics*, 87, pp. 115-143.

Boix, Carles, Michael K. Miller, and Sebastian Rosato. 2018, "Boix-Miller-Rosato Dichotomous Coding of Democracy, 1800-2015." https://doi.org/10.7910/DVN/FJLMKT, Harvard Dataverse, V3.

Bolt, Jutta; Inklaar, Robert; de Jong, Herman and van Zanden, Jan Luiten. (2018). Rebasing Maddison: New Income Comparisons and the Shape of Long–Run Economic Development. GGDC Research Memorandum, 174. https://www.rug.nl/ggdc/html_publications/memorandum/gd174.pdf

Canes-Wrone, Brandice, and Christian Ponce de León. 2015. "Electoral Cycles and Democratic Development." *Manuscript*, Princeton University.

Canes-Wrone, Brandice, and Jee-Kwang Park. 2014. "Elections, Uncertainty and Irreversible Investment." *British Journal of Political Science*, 44, pp. 83-106.

Cassani, Andrea. 2019. "Autocracies and Human Development." *W. Paper*, V-Dem Institute.

Clark, Tom S., and Drew A. Linzer. 2015. "Should I Use Fixed or Random Effects?" *Political Science Research and Methods*, 3 (2), pp. 399-408. DOI: https://doi.org/10.1017/psrm.2014.32

Cornell, Agnes, Carl Henrik Knutsen, and Jan Teorell. 2020. "Bureaucracy and Growth." *Comparative Political Studies*, 53 (14), pp. 2246-2282.

Cox, Gary W. 2012. "Was the Glorious Revolution a Constitutional Watershed?" *The Journal of Economic History*, 72 (3), pp. 567-600.

Cox, Gary W., and Barry R. Weingast. 2017. "Executive Constraint, Political Stability and Economic Growth." *Comparative Political Studies*, 51 (3), pp. 279-303.

Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer. 2015. "The Next Generation of the Penn World Table." *American Economic Review*, 105 (10), pp. 3150-3182, available for download at: www.ggdc.net/pwt.

Ferejohn, John. 1986. "Incumbent Performance and Electoral Control." *Public Choice*, 50 (1/3), Carnegie Papers on Political Economy, 6, Proceedings on the Carnegie Conference on Political Economy, pp. 5-25.

_____. "Accountability and authority: Toward a political theory of electoral accountability". In Przeworski, Adam, Susan Stokes, and Bernard Manin (Editors). *Democracy, accountability, and representation*. Cambridge, Cambridge University Press, pp. 131-153.

Ganghi, Jennifer. 2008. "Dictatorial Institutions and their Impact on Economic Growth." *European Journal of Sociology*, 49, pp. 3-30.

Gerring, John, Philip Bond, William T. Barndt, and Carola Moreno. 2005. "Democracy and Economic Growth: A Historical Perspective." *World Politics*, 57 (3), pp. 323-364.

Gerring, John, Carl Henrik Knutsen, and Jonas Berge. 2022. "Does Democracy Matter?" *Annual Review of Political Science*, 25, pp. 357-75.

Giuliano, Paola, Prachi Mishra, and Antonio Spilimbergo. 2013. "Democracy and Reforms: Evidence from a New Dataset." *American Economic Journal: Macroeconomics*, 5 (4), pp. 179-204.

Greif, Avner. 2000. "The fundamental problem of exchange: A research agenda in Historical Institutional Analysis." *European Review of Economic History*, 4, pg. 251-284.

_____. "Commitment, Coercion, and Markets: The Nature and Dynamics of Institutions Supporting Exchange." In Menard, and Shirley (*Editors*). *Handbook of New Institutional Economics*. Netherlands, Springer, pp. 727-786.

_____. 2006. *Institutions and the Path to the Modern Economy. Lessons from Medieval Trade*. New York, Cambridge University Press.

Hamilton, Alexander, James Madison and John Jay. 2001 (1780). *El Federalista*. México, Fondo de Cultura Económica.

Hendrix, Cullen S. 2010. "Measuring State Capacity: Theoretical and Empirical Implications for the Study of Civil Conflict." *Journal of Peace Research*, 47 (3), pp. 273-85.

International Country Risk Guide (ICRG), The Political Risk Rating, Table 3B: Researcher's Dataset. 2018. The PRS Group, Inc.

Johnson, Noel D., and Mark Koyama. 2017. "States and Economic Growth: Capacity and Constraints"(*Accepted Manuscript*). *Explorations in Economic History*, 64, pp. 1-20.

Knutsen, Carl Henrik. 2012. "Democracy and economic growth: A survey of arguments and results." *International Area Studies Review*, 15 (4), pp. 393-415.

Knutsen, Karl Henrik. 2018. "Autocracy and Variations in Economic Development Outcomes." *Working Paper*, V-Dem Institute.

Maddison Project Database, version 2013. Bolt, J., and J. L. van Zanden (2014). "The Maddison Project: collaborative research on historical national accounts." *The Economic History Review*, 67 (3): 627–651, working paper.

Maquiavelo, Nicolás. 1873. *Discursos sobre la primera década de Tito Livio*. Alianza Editorial.

Marshall, Monty G., and Ted Robert Gurr. 2020. "Polity 5. Political Regime Characteristics and Transitions, 1800-2018. Dataset Users' Manual." *Center for Systemic Peace*.

Menard, Claude, and Mary M. Shirley. 2005. "Introduction." In Menard, and Shirley (*Editors*). *Handbook of New Institutional Economics*. Netherlands, Springer, pp. 1-18.

Montero. R (2010). "Panel dinámico." *Documentos de Trabajo en Economía Aplicada*. Universidad de Granada. Spain.

North, Douglas C. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge, Cambridge University Press.

North, Douglas C., and Barry R. Weingast. 1989. "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England." *The Journal of Economic History*, 49 (4), pp. 803-832.

North, Douglas C., and Robert P. Thomas. 1973. *The Rise of Western World: A New Economic History*. Cambridge, Cambridge University Press.

Olson, Mancur. 1993. "Dictatorship, Democracy, and Development." *The American Political Science Review*, 87 (3), pp. 567-576.

Papaioannou, Elias, and Gregorios Siourounis. 2008. "Democratisation and Growth." *The Economic Journal*, 118 (532), pp. 1520-1551.

Persson, Torsten, Gerard Roland, and Guido Tabellini. 1997. "Separation of Powers and Political Accountability." *The Quarterly Journal of Economics*, 112 (4), pp. 1163-1202.

Przeworski, Adam, Michael E. Alvarez, José Antonio Cheibub, and Fernando Limongi. 2000. *Democracy and Development: Political Institutions and Well-Being in the World, 1950 – 1990*. Cambridge, Cambridge University Press.

Przeworski, Adam, and Fernando Limongi (1993). "Political Regimes and Economic Growth." *American Economic Association*, 7 (3), pp. 51-69.

Rodrik, Dani, Arvind Subramanian, and Francesco Trebbi. 2004. "Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development." *Journal of Economic Growth*, 9 (2), pp. 131-165.

Sanchez –Cuenca, Ignacio. 1998. "Institutional Commitments and Democracy." *European Journal of Sociology*, Volume 39, Issue 01, May 1998, pp 78-109.

Shirley, Mary M. 2005. “Institutions and Development.” In Menard, y Shirley (*Editors*). *Handbook of New Institutional Economics*. Netherlands, Springer, pp. 611-638.

Stasavage, David. 2002. “Private Investment and Political Institutions.” Economics and Politics, 14 (1), pp. 41-63.

Stock, James H., and Mark W. Watson. 2020. *Introduction to Econometrics*. Fourth Edition, Pearson Education Limited.

The World Bank. (s. f.). World Development Indicators. https://databank.worldbank.org/source/world–development–indicators

Weingast, Barry R. 1993. “Constitutions as Governance Structures: The Political Foundations of Secure Markets.” *Journal of Institutional and Theoretical Economics*, 149 (1), pp. 286-311.

_____. “The Economic Role of Political Institutions: Market-Preserving Federalism and Economic Development.” *The Journal of Law, Economics, and Organization*, 11 (1), pp. 1-31.

Zuazu, Izaskun. 2018. “Electoral Systems and Income Inequality: A tale of Political Equality.” *Working Paper Series: IL*. 109/18, University of the Basque Country.

Appendix 1

List of countries for the base specification (with their respective observed periods)

East Asia and Pacific	Europe and Central Asia	Europe and Central Asia	Middle East and North Africa	North America	South Asia	Sub-Saharan Africa
Australia (1950-2010)	Albany (1950-2010)	Argentina (1950-2010)	Saudi Arabia (1950-2010)	Canada (1950-2010)	Afghanistan (1950-2010)	Angola (1975-2010)
Cambodia (1953-2010)	Germany (1990-2010)	Bolivia (1950-2010)	Algeria (1962-2010)	United States of America (1950-2010)	Bangladesh (1971-2010)	Benin (1960-2010)
China (1950-2010)	Austria (1950-2010)	Brazil (1950-2010)	Bahrain (1971-2010)		Bhutan (1950-2010)	Botswana (1966-2010)
North Korea (1950-2010)	Belgium (1950-2010)	Chile (1950-2010)	Egypt (1950-2010)		India (1950-2010)	Burkina Faso (1960-2010)
South Korea (1950-2010)	Bulgaria (1950-2010)	Colombia (1950-2010)	United Arab Emirates (1971-2010)		Nepal (1950-2010)	Burundi (1962-2010)
Philippines (1950-2010)	Czechoslovakia (1950-1992)	Costa Rica (1950-2010)	Iraq (1950-2010)		Pakistan (1950-2010)	Cabo Verde (1975-2010)
Fiji (1970-2010)	Cyprus (1960-2010)	Cuba (1950-2010)	Iran (1950-2010)		Sri Lanka (1950-2010)	Cameroon (1960-2010)
Indonesia (1950-2010)	Denmark (1950-2010)	Ecuador (1950-2010)	Israel (1950-2010)			Chad (1960-2010)
Solomon Islands (1978-2010)	Spain (1950-2010)	El Salvador (1950-2010)	Jordan (1950-2010)			Comoros (1975-2010)
Japan (1950-2010)	Finland (1950-2010)	Guatemala (1950-2010)	Kuwait (1961-2010)			Côte d'Ivoire (1960-2010)
Laos (1954-2010)	France (1950-2010)	Guyana (1966-2010)	Lebanon (1950-2010)			Ethiopia (1950-2010)
Malaysia (1957-2010)	Greece (1950-2010)	Haiti (1950-2010)	Libya (1951-2010)			Gabon (1960-2010)
Mongolia (1950-2010)	Netherlands (1950-2010)	Honduras (1950-2010)	Morocco (1956-2010)			Gambia (1965-2010)
Myanmar (1950-2010)	Hungary (1950-2010)	Jamaica (1962-2010)	Oman (1950-2010)			Ghana (1957-2010)
New Zealand (1950-2010)	Ireland (1950-2010)	Mexico (1950-2010)	Qatar (1971-2010)			Guinea (1958-2010)
Papua New Guinea (1975-2010)	Italy (1950-2010)	Nicaragua (1950-2010)	Syria (1950-2010)			Equatorial Guinea (1968-2010)
Singapore (1965-2010)	Latvia (1991-2010)	Panama (1950-2010)	Tunisia (1956-2010)			Guinea-Bissau (1974-2010)
	Lithuania (1991-2010)					Kenia (1963-2010)
	Luxembourg (1950-2010)					Lesotho (1966-2010)
	Norway (1950-2010)					Liberia (1950-2010)
	Poland (1950-2010)					Madagascar (1960-2010)
						Malawi (1964-2010)
						Mali (1960-2010)
						Mauritius (1968-2010)

Thailand (1950-2010) Taiwan (1950-2010) Vietnam (1976-2010)	Portugal (1950-2010) United Kingdom (1950-2010) Czech Republic (1993-2010) Romania (1950-2010) Russia (1992-2010) Sweden (1950-2010) Switzerland (1950-2010) Turkey (1950-2010)	Paraguay (1950-2010) Peru (1950-2010) Dominican Republic (1950-2010) Suriname (1975-2010) Trinidad and Tobago (1962-2010) Uruguay (1950-2010) Venezuela (1950-2010)	Djibouti (1977-2010)	Mauritania (1960-2010) Mozambique (1975-2010) Niger (1960-2010) Nigeria (1960-2010) Central African Republic (1960-2010) Republic of Congo (1960-2010) Democratic Republic of Congo (1960-2010) Rwanda (1962-2010) Senegal (1960-2010) Sierra Leone (1961-2010) Somalia (1960-2010) Swaziland (1968-2010) South Africa (1950-2010) Sudan (1956-2010) Tanzania (1961-2010) Togo (1960-2010) Uganda (1962-2010) Zambia (1964-2010) Zimbabwe (1980-2010)

Note.– The sample covers a total of 143 countries observed between 1950 and 2010, with a total of 7603 country-year observations. The table describes all these countries listed according to the World Bank's regional classification. The observed or available period for each case is provided in parentheses.

Source: The author.

Appendix 2

Fit chart between observed values (red line) and imputed values (green line)