Corruption, growth and institutions: is there a sacrifice rate in Latin America?

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Abstract

This research deals with corruption and growth in Latin America. Given the region's institutional volatility, constant change and lack of compliance with regulations, the question arises as to whether there is a trade-off between growth and corruption control at a certain level of institutional capacity. A panel analysis of 26 Latin American countries (2002-2021) was conducted using robust dynamic panel data models to test the hypothesis. The results revealed a quadratic relationship between growth and corruption, considering the endogeneity between institutions, corruption and growth, using Autoregressive Vector panel data.

Keywords: Institutions and growth; economic models of political processes; panel data models; Autoregressive Vector; economic development.

1. INTRODUCTION

Corruption and its effects on institutional change, income and economic performance continue to be debated in political science, public management and economics. According to Quesada *et al.* (2013), corruption is a complex phenomenon with both a political and an administrative dimension. Political corruption refers to collusion between the political class and spheres of power to obtain benefits in the absence of institutional controls and reliable accountability mechanisms. Administrative corruption refers to fraudulent acts committed by public officials who use their technical-professional spheres to violate regulations or favor individuals.

The discussion on corrupt practices in the developing world is far from over. Some argue that corruption mainly occurs in the civil service and that a high level of transparency can be achieved through administrative measures. Others argue that corruption is a political problem rooted in culture, which can lead to political failure due to cronyistic tendencies in all societies (Fukuyama, 2014).

Much academic work has focused on determining whether corruption can boost or limit economic growth, especially in developing economies. One hypothesis of economic literature is that corruption can severely limit economic performance in contexts with strong institutions and efficient bureaucracies. However, in contexts where institutions do not function adequately and bureaucratic inefficiencies occur, corruption can spur economic performance in the short term, especially in the developing world, by acting as a "greaser" of the economy. It is clear that corruption can also arise from actions between private parties interacting in markets and organizations; however, this phenomenon requires the participation of the public sector to become entrenched in the institutional fabric of a country.

The relationship between corruption, growth and institutions is not limited to the idea that the presence of functional institutions leads to more or less corruption and, therefore, to better or worse economic performance. It is important to consider how the effect of corruption relates to institutional change. When studying the effects of corruption from an economic and institutional point of view, sometimes too much attention is paid to formal rules for containing corrupt actions and neglects the fact that institutions in the developing world (especially in Latin America) still have limitations when it comes to combatting corruption as an institutionalized practice.

This paper seeks to empirically study the relationship between corruption and economic growth, considering that the evolution of institutional arrangements can influence economic performance. The hypothesis is that strengthening formal arrangements can improve economic performance by providing clear rules. However, in weak institutional contexts, corrupt practices may persist and limit progress.[1] In other words, the idea is to empirically validate that, in Latin American countries with a colonial past and low institutional development, there is a sacrifice rate between control of corruption and per capita income. This rate would depend on the strength of the institutional framework and its recent evolution, measured using indexes that capture the countries' institutional capacities.

This six-part paper discusses corruption and Latin American institutions in the 20th century, from the formation and nature of the region's democracies to the present day. Relevant literature on the relationship between corruption and economic performance was also consulted to analyze how malicious acts affect economies in the long run. Sections four and five detail the empirical strategy and discuss the model's results. The last part presents conclusions and perspectives for Latin America today.

2. CONSIDERATIONS REGARDING INSTITUTIONS AND CORRUPTION IN LATIN AMERICA

To understand corruption in Latin America, the formation process and the dynamics of its democracies must be considered. To this end, we need to define what is meant by institutions. North (1990) understood institutions (formal and informal) as a set of socially constructed rules that allow individuals to make strategic decisions in contexts of uncertainty. In this respect, institutions can be formal or informal, the former referring to discourses (Dryzek, 1996), unwritten rules, conventions, and social standards, while the latter is linked to written legal regulations endorsed by the legal-political regime (in a broad sense, through the State).

On this basis, the literature explores the existence of a relationship between institutions and the development of countries (Acemoglu *et al.*, 2001), but in the case of Latin America, this aspect is still not clear (Levitsky and Murillo, 2012). Following O'Donnell (1994, 1997, 2001, 2004 and 2010), democracies in the region are largely "delegative" and lack effective horizontal accountability mechanisms. This democratic typology is linked to a problematic institutional legacy (Acemoglu and Robinson, 2015), where corruption and political cronyism are institutionalized.

Delegative democracies mainly emerge from transitions from authoritarian regimes to democratic systems (O'Donnell, 1997). Although they allow for some level of vertical accountability through elections and legal guarantees, these structures often fail to control the illegal behavior of elected officials. These failures are due, in

part, to the absence of effective societal and horizontal accountability, crucial elements for good governance and prevention of corruption (Gómez, 2022; Ostrom, 2000).

The problem also lies in the persistence of deficient institutional designs and practices inherited from dictatorial times (Acemoglu and Robinson, 2015), typical of the Latin American social and institutional past. In these contexts of institutional weakness and democratic deficits, there is no effective link between civil society and institutions to ensure accountability (O'Donnell, 2004). This disconnection undermines the effectiveness of horizontal governance mechanisms and, in some cases, is exploited by the executive power to strengthen its dominance (O'Donnell, 1994).

This weakness in accountability mechanisms affects state capacities (Grassi and Memoli, 2016; Taş, 2015) and is associated with lower support for consolidated democracy (Kang and Lee, 2018). One consequence is that delegative democracies and weak accountability mechanisms in the region result in institutions prone to corruption and economic malfunctioning (Levitsky and Murillo, 2012; O'Donnell, 1994). This institutional fragility is compounded by instability and "constant substitution" in institutions, linked to political volatility, persistent inequality, and the rapid and often imitative design (institutional mimicry) of institutional mechanisms (Fukuyama, 2014).

The region's colonial and authoritarian history also influences its institutional development (O'Donnell, 1994; Przeworski, 1988). Economic reforms and the inability of governments to regulate effectively have reduced incentives for public ethics, favoring corruption (Acemoglu *et al.*, 2011; Soto, 2003). These conditions allow the elite to use bureaucracy for their own ends instead of for correcting market failures (Acemoglu *et al.*, 2021; Acemoglu and Verdier, 2000).

Another aspect to consider is the approach based only on economic efficiency to manage public organizations, as reflected in the implementation of the New Public Management paradigm. This model has led to a flexibilization of institutions and organizations without an adequate assessment of the risks of governance (Gaebler and Osborne, 1992; Ramió and Salvador, 2005), calling into question the institutional capacities that make it possible to fight corruption and drive economic performance. Corruption resulting from these contexts has serious economic effects, particularly in countries with weak institutional counterweights (Bayley, 1966; Gerring and Thacker, 2004; Sandholtz and Koetzle, 2000; Seligson, 2002).

In short, this complex web of historical, political and economic factors in the Latin American region generated a cycle of corruption and institutional instability that persists. Despite advances in understanding the economic costs of corruption, the question remains about how an apparently successful economic performance can coexist with a weak institutional framework and common corrupt practices as a more or less generalized reality, despite contexts, realities and narratives that may be disparate across Latin American countries.

3. LITERATURE ON THE LINK BETWEEN CORRUPTION AND ECONOMIC PERFORMANCE

The relationship between corruption and economic performance is relevant in academic literature. Some studies suggest that corruption could have ambivalent effects on the economy. For example, Leff (1964) argues that it can function as an insurance for businesses against inefficient regulations and poor government policies, which could stimulate entrepreneurial activity (Godinez and Liu, 2015). He argues that efficient firms could pay bribes to avoid regulatory obstacles, thus increasing their productivity.

However, other scholars raise concerns about the adverse effects of corruption. De Vaal and Ebben (2011), for example, propose that corruption could reduce investment in productivity and the provision of public goods, harming economic growth, especially in contexts with solid institutions.

Furthermore, it is argued that corruption can act as a lubricant in environments with weak institutions, normalizing actions that would not be possible in an environment with solid institutions and accountability. Although Méon and Weill (2010) found evidence that corruption can stimulate efficiency in developing countries with deficient institutions, Aparicio *et al.* (2016) refute this alleged benefit by showing that proper control of corruption and the effective functioning of institutions increase opportunities for entrepreneurship.

Most literature generally leans toward the idea that corruption negatively affects economic performance. Mauro (1995), for his part, shows how persistent corruption can adversely affect flows of private investment and, therefore, economic growth.

In this context, he also determines statistically significant relationships between corruption and a reduction in private investment. In his findings, Mauro (1995) points out that corruption decreases investment in two different ways. It indirectly strengthens bureaucratic inefficiency and, as a result, discourages private investment. The direct effect on investment occurs when public officials intentionally divert private investment from some sectors to others, following a criterion of seeking personal profit rather than economic benefit.[2]

A second area of research focuses on the impact of corruption on income levels, income distribution and business efficiency. Studies by (Gupta *et al.*, 2002; Johnson *et al.*, 1999; Kaufmann and Wei, 1999) have significantly impacted subsequent research. Gupta *et al.* (2002) found that corruption can increase inequality by up to 11 points, according to the Gini coefficient, and can affect the income of the poorest people. In addition, Kaufmann and Wei (1999) found that corruption benefits wealthier groups by institutionalizing advantages for specific powerful interests through business survey data.

The study by Kaufmann and Wei (1999) highlights the fact that businesses that spend a lot of time negotiating with public officials to obtain benefits often face significant capital losses. Li *et al.* (2000) contribute to the field by examining the relationship between corruption and income inequality, as measured by the Gini coefficient. Their findings suggest that corruption significantly affects income inequality across countries.

Literature in this area is extensive and covers various dimensions of economic performance, including income distribution, foreign direct investment, public debt and more (Anokhin and Schulze, 2009; Borja, 2017; Chong and Gradstein, 2007; to name a few). In general, these studies conclude that corruption hurts the economy and increases inequality.

Ahmad *et al.* (2012) explore a quadratic relationship between corruption and GDP, suggesting that there could be a "tolerable level" of corruption that does not harm economic growth. Dobson and Ramlogan-Dobson (2010) also address a trade-off between corruption and inequality, especially in the Latin American context. Saha and Gounder (2013) take a non-linear approach and suggest that corruption could catalyze growth in the preliminary stages of development, although this effect is reversed over time.

Recently, Albrecht and De la Torre (2021), more in line with the focus of this paper, have added to the available evidence that, in the short term, corruption and political instability could have positive effects on Latin American economic growth, although these effects are unsustainable in the long term. Thus, corruption has multiple and

complex implications for economic performance and inequality. In this respect, although some studies suggest that certain levels of corruption may be “tolerable” or even beneficial in the short term, the general view is that corruption is detrimental to the economy and contributes to income inequality.

4. EMPIRICAL STRATEGY AND MODEL APPROACH: SOME CLARIFICATIONS

This study reviews the impact of institutions on economic performance, with a particular focus on the regions of Latin America, the Caribbean and South America. Unlike previous research, corruption is modeled in quadratic terms, suggesting an effect of diminishing returns in developing economies. Two strategies are employed: the first considers multiple variables related to state capacity to assess the non-linear impact of corruption, and the second is based on the theoretical model of Acemoglu *et al.* (2011) and De Vaal and Ebben (2011), but with adaptations of the work of Levitsky and Murillo (2012) and O'Donnell (1994, 1997 and 2004) regarding the model of constant substitution in institutional terms, which occurs in the delegative democracies studied by the latter. This mixed approach permits the capture of the non-linear effect of corruption while controlling factors such as government effectiveness and population growth, validating bidirectionality between institutions and economic growth through the use of autoregressive data panel vector techniques where bidirectionality is supported by evidence from Granger causality tests (Qamruzzaman, 2017; Saadaoui and Chtourou, 2022).

The study uses the World Bank's Governance Indicators database (s. f. a) and that of Kaufmann *et al.* (2010), covering 26 Latin American countries from 2002-2021 and considers heterogeneity through dummy variables referring to colonial origin. The selected strategy and basis provide complete and relatively uniform data, facilitating an empirically corroborative analysis. Variables include GDP per capita (slope variable) and population size as a control variable. Table 1 summarizes the modeled variables.

Table 1. Variables used in the model

Independent variables	*Abbreviation*	*Definition*
Control of corruption	Ccorrup	From 1 to 100, this indicator measures the government's capacity to control corruption based on surveys of entrepreneurs and citizens and reflects on the use of public power for private ends.
Control of corruption (squared)	ccorrup2	Dummy variable that models the dynamics of diminishing returns in the behavior of institutional performance relative to income.
Accountability	Freedom	Indicator ranging from 1-100 that measures the quality of accountability and citizen perception of participation and freedoms in authority selection processes.
Political stability	Estpol	Indicator ranging from 1-100 that evaluates party stability and democratic strength, reflecting the perception of risk of government destabilization.
Government effectiveness	Efectgob	Indicator that evaluates government effectiveness, quality of public services, independence from political pressures and government credibility.
Quality of regulation	Calreg	Regulatory quality that captures the government's ability to formulate and implement policies that encourage private sector development.
Rule of law	Impley	Indicator that measures confidence in legal rules, quality of contract enforcement, property rights and probability of crime.
Population	Pob	This indicator refers to the number of inhabitants per country per year, expressed in millions of people.
Culture	Culture	Dummy variable that reflects the colonial origin of the country in question, which is represented by values from 1 to 5 and refers to: 1 = Spanish; 2 = French; 3 = Portuguese; 4 = Dutch; 4 = English;

Source: WGI database by Kaufmann et al. (2010), World Bank WDI database (s. f. a).

Based on a linear model with distributed panel lags:

$$Y_{it} = \alpha_i + \sum_{k=1}^{n} C_{i,t-k}\gamma + X_{it}\,\beta + \nu_{it} \qquad (1)$$

Where *i* expresses the number of individuals and *t* represents the time periods. Y_{it} refers to the variable of interest in the study, γ refers to the vector of coefficients of interest, α_i represents the unobservable heterogeneity, $C_{i,t-k}$ refers to the vector of variables of interest *k* is the optimal number of lags[3] and X_{it} refers to the vector of *k* institutional independent variables, β to the vector of *k* coefficients and v_{it} to idiosyncratic error.

For this study, the resulting reduced form is:

$$Ln(PIB)_{it} = \beta_0 + \sum_{k=1}^{n} \beta_1 CO + \sum_{k=1}^{n} \beta_2 CO_{it}^2 + \beta_3\, LE_{it} + \beta_4 EP_{it} + \beta_5 EG_{it} + \beta_6 CR_{it} + \beta_7 IL_{it} + \beta_8 Ln\,(P)_{it} + \delta_1 OC_{it} + \varepsilon_{it} \qquad (2)$$

Where $Ln(PIB)_{it}$ refers to the natural logarithm of GDP per capita PPP in dollars, *CO* is the corruption perception index of the World Bank (s. f. b), CO^2 refers to the returns to scale (or quadratic) of corruption.

LE refers to freedom of expression, capacity for political articulation and association (*voice and accountability*), *EP* to political stability, *EG* to government effectiveness, *CR* to regulatory quality, *IL* to the rule of law, *P* to population, *δOC* to a vector of dummy variables reflecting the colonial origin or countries and ε_{it} to

compound error ($\varepsilon_{it} = \alpha_i + v_{it}$). For the estimation of the model, variance estimates such as Beck and Katz (1995) and Driscoll and Kraay (1998) were used, which correct the model for the presence of heteroscedasticity, autocorrelation[4] and contemporaneous correlation, given the diagnoses carried out on the models.

$$\Delta Y_{it}^{*} = \sum_{i=1}^{k} \Delta Y_{i,t-k}^{*} \phi + \Delta X_{it}^{*} \beta + e_{it}^{*}$$

Where * represents the number of *k* equations of the autoregressive panel, $\Delta Y_{it}^{*} = (Y1_{it}, Y2_{it}, \ldots Yk_{it})$ the set of vectors of *k* equations of the system variables (and the *t* - *k* vector refers to said regressed variable in *k* periods), $\Delta X_{it}^{*}\beta = (X1'_{it}\,\beta, X2'_{it}\,\beta, \ldots, Xk'_{it}\,\beta)$ is the independent variable vector within each of the reduced-form equations of the system, and $e_{it}^{*} = (e1_{it}, e2_{it}, \ldots, ek_{it})$ is the vector with the error terms of the equation system. To deal with the bias of dynamic panels, generalized methods of moments (GMM) estimation is used, using lags of the dependent variables as instruments. First differences were used to remove specific panel effects.

5. ANALYSIS OF RESULTS

Descriptive statistics

Table 2 shows the paired correlation between the variables in the model. All state capacity measures, from corruption control (CO) to regulatory quality (CR), show a solid positive relationship with the dependent variable. Only the variable of the logarithm of the total population (Ln(P)) shows a weaker but negative relationship. In turn, this shows a negative but less intense relationship with the governance indicators, except for regulatory quality, for which no strong or statistically significant association exists.

Table 2. Correlation matrix

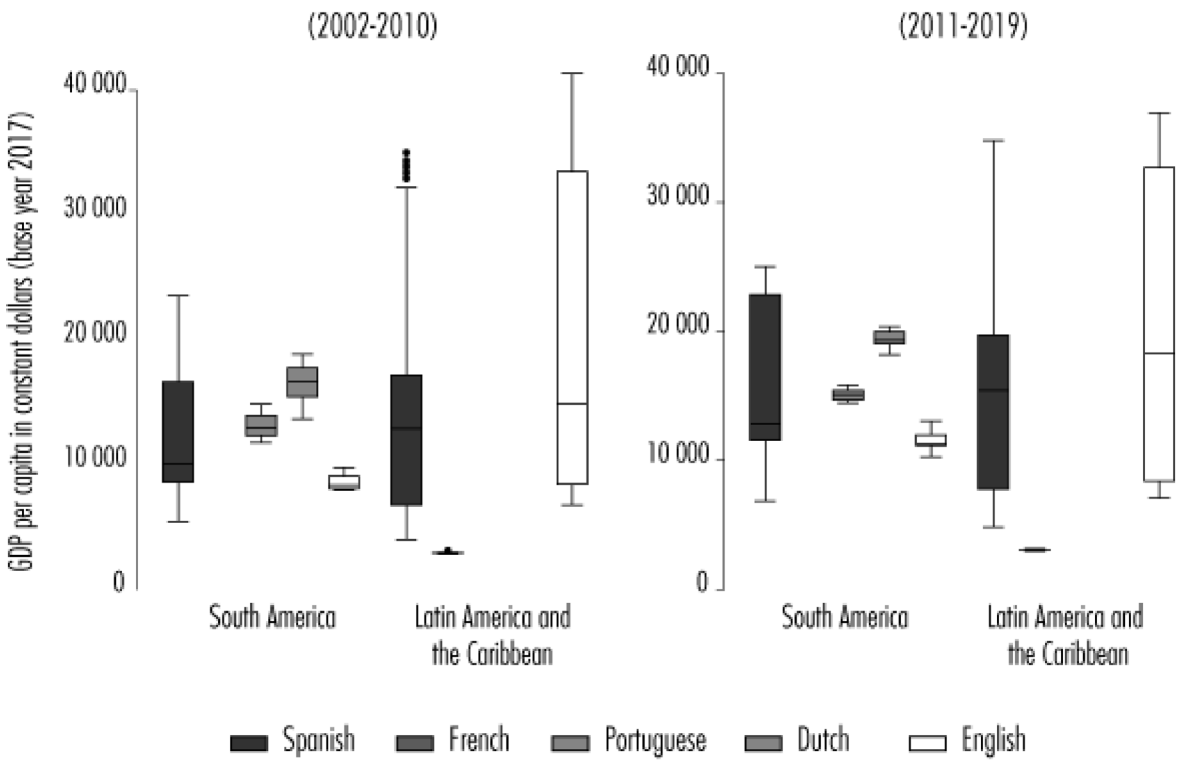
	Ln(GDP)	CO	EG	LI	IP	Ln(P)	EP	CR
Ln(GDP)	1.0	0.645***	0.748***	0.717***	0.73***	-0.133**	0.575***	0.613***
CO	0.645***	1.0	0.867***	0.899***	0.892***	-0.372***	0.776***	0.72***
EG	0.748***	0.867***	1.0	0.872***	0.874***	-0.289***	0.707***	0.78***
LI	0.717***	0.899***	0.872***	1.0	0.891***	-0.383***	0.825***	0.715***
IP	0.73***	0.892***	0.874***	0.891***	1.0	-0.354***	0.784***	0.799***
Ln(P)	-0.133**	-0.372***	-0.289***	-0.383***	-0.354***	1.0	-0.563***	-0.0718
EP	0.575***	0.776***	0.707***	0.825***	0.784***	-0.563***	1.0	0.536***
CR	0.613***	0.72***	0.78***	0.715***	0.799***	-0.0718	0.536***	1.0

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Source: compiled by the authors.

Figure 1 shows a box plot of GDP per capita by region and colonial origin of the countries. Although there are differences in the average level between countries of Spanish colonial origin in the regions of South America (SA) and Latin America and the Caribbean (LA&C), we can see that, in the lower limit of the first quartile, there are more countries in LA&C with less than US$10,000 per capita than in SA. On the other hand, the Latin American countries of English colonial origin are diverse in terms of income levels (in other words, there is a significant level of variability in their per capita income levels). They show more substantial growth in the region in terms of the median, while countries of Dutch origin in South America show average levels of per capita income and with much less variation than countries of Spanish colonial origin in SA.

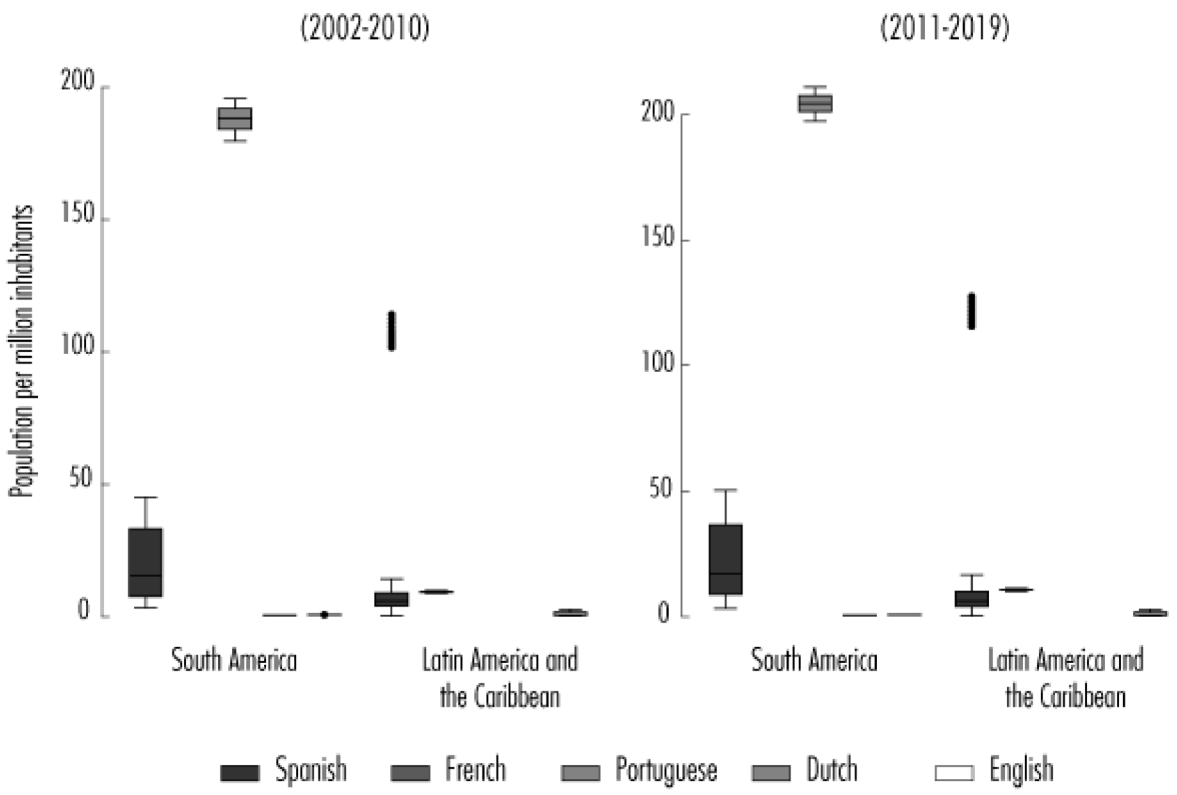
Figure 1. Economic growth by region and colonial origin, 2002-2019



Source: Compiled by the authors using data from the World Bank (s.f.a and s.f.b).

Figure 2 shows the total population broken down by colonial origin and region. Countries of Spanish colonial origin in South America have an average population of 10 million, although the third quartile range extends to 50 million in 2011-2019, with Colombia, Argentina and Peru having the highest. In the case of countries of Spanish origin, the range from the first to the third quartile is much lower than in South America, but atypical data exists, exceeding 120 million inhabitants by 2019 (in the case of Mexico). This indicates that heterogeneity among countries in terms of total population is extremely high.

Figure 2. Box plot, population per million inhabitants by region and colonial origin

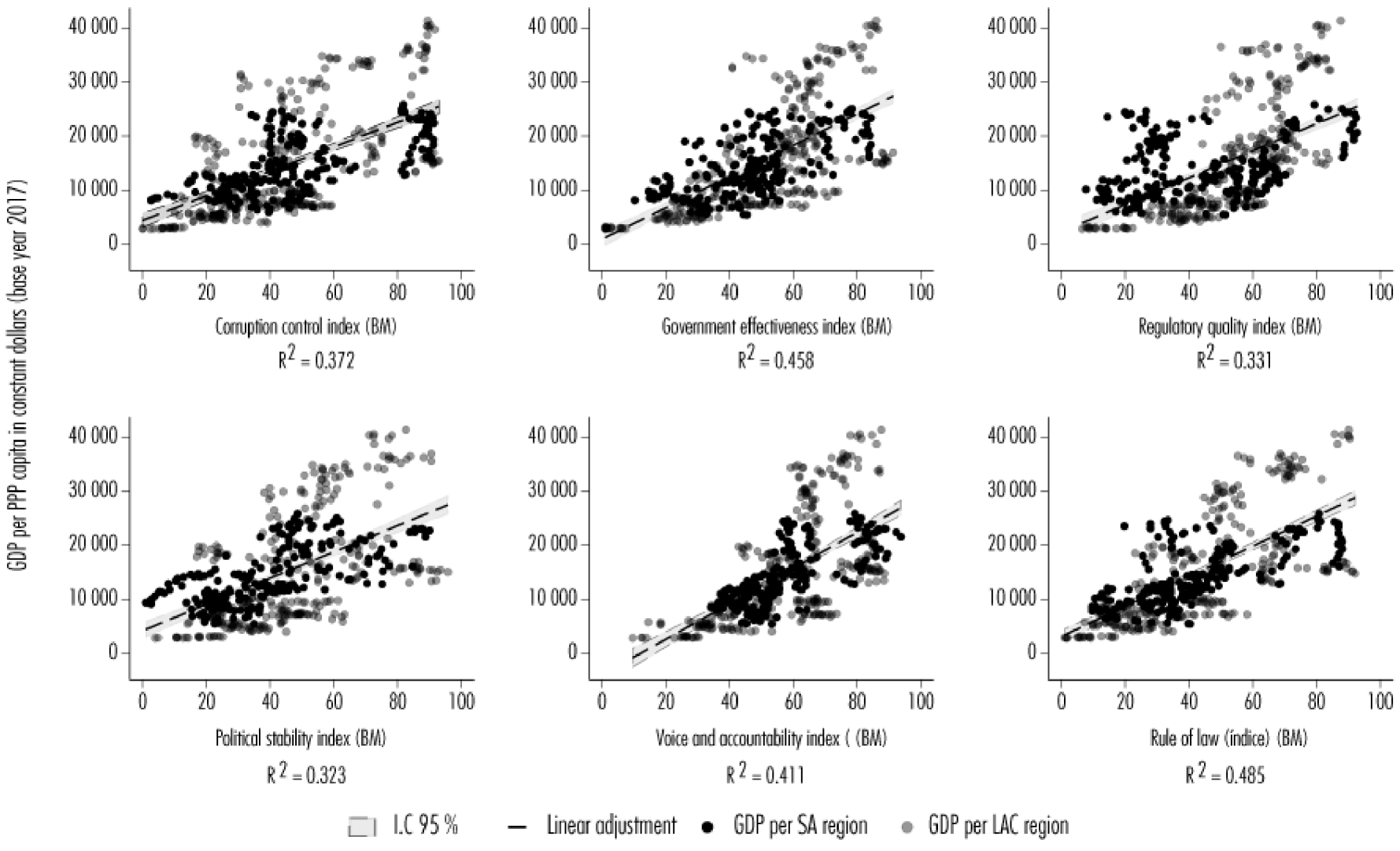


Source: Compiled by the authors using data from the World Bank (s.f.a and s.f.b).

Institutional indicators

Figure 3 shows several significant trends linking institutional variables with per capita income. In general, all the variables studied show a positive correlation with per capita income, although they vary in strength and regional adjustment.

Figure 3. Scatter plot of per capita income and institutional indicators, 2002-2021



Source: Compiled by the authors using data from the World Bank (s.f.a and s.f.b).

For example, government effectiveness has a relatively high adjustment in LA&C with an R^2 of 0.4842, compared to an R^2 of 0.4235 in South America. Political stability also demonstrates regional differences: a one-point increase in the scale is associated with an increase in per capita income of US$181.05 in South America

and US$291.16 in LA&C, although with a lower R^2 in the latter region. Judicial effectiveness (the rule of law) demonstrates significant variability between the two regions; a one-point increase in the index is associated with an increase of US$335 in LA&C, compared to US$178.69 in South America.

Finally, although participatory institutions generally better predict per capita income in the US$10 to US$20,000 range in Latin America, the correlation is more robust in certain ranges of the institutional participation scale.

Unit root tests

For the specification of the VAR model, unit root tests were performed (Hadri, 2000; Levin *et al.*, 2002; Pesaran, 2007)[5] where the variables in level and first differences were tested and the variables in first differences were found to be stationary.[6]

Results of the regression models

Table 3 presents the results of the proposed estimations, with several approximation methods, ranging from fixed effects with robust standard errors with the presence of autocorrelation and heteroscedasticity to methods corrected by contemporaneous correlation (estimations by Driscoll and Kraay (1998) and PCSE panel models by Beck and Katz (1995)). Some significant lags are shown in the corruption control index, but generally, all show expected signs in all specifications. Regulatory quality is a statistically significant variable with expected signs in almost all specifications, in the same way as government effectiveness. In contrast, voice and accountability show no significance except in one of the proposed regressions (corrected standard error panel with no fixed effects (5)), while the rule of law shows importance in almost all model iterations depicted in Table 3.

Table 3. Results of panel data regressions

	(1)	(2)	(3)	(4)	(5)	(6)
	EF	*EFD&K*	*EA*	*EAD&K*	*PCSE*	*PCSEFE*
CO	-0.002	-0.002	-0.002	-0.002	0.002	-0.002
	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)
$CO_{i,t-1}$	-0.003*	-0.003	-0.003*	-0.003	0.002	-0.003*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
$CO_{i,t-2}$	-0.003	-0.003*	-0.003	-0.003*	0.003	-0.001
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
CO^2	0.000	0.000	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$CO^2_{i,t-1}$	0.000*	0.000*	0.000**	0.000*	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$CO^2_{i,t-2}$	0.000	0.000***	0.000	0.000***	-0.000	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CR	0.005*	0.005***	0.005*	0.005**	0.001	0.001
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
EG	0.003	0.003***	0.003	0.003***	0.002**	0.001*
	(0.002)	(0.000)	(0.002)	(0.001)	(0.001)	(0.001)
LI	-0.001	-0.001	-0.001	-0.001	0.003*	-0.000
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
EP	-0.000	-0.000	-0.000	-0.000	0.001	0.000
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
IP	0.002	0.002**	0.002	0.002**	0.003**	0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln(P)	0.039	0.039	0.045	0.045	0.032***	-0.036
	(0.396)	(0.140)	(0.075)	(0.079)	(0.009)	(0.178)
N	468	468	468	468	468	468
Countries	26	26	26	26	26	26
EF Countries	Si	Si	No	No	No	Si
$\sigma^2 I$	Robust	Drisc/Kraay	Robust	Drisc/Kraay	PCSE	PCSE
Temporary EF	Si	Si	Si	Si	Si	Si
R^2 (Within)	0.591	0.591	0.590	0.590	0.452	0.553
RMSE	0.0814	0.0814	0.0846	0.0846	0.0668	0.0440

Notes: standard errors in parentheses. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Random effects models include dummy variables by colonial origin, which were not included in the table.

Source: compiled by the authors.

The robust Hausman and Mundlak tests show that there is a systematic difference between the fixed and random effects coefficients. Although they are based on different estimates, it should be noted that the model that best minimizes the mean square error is the fixed effects model with a corrected standard error panel because it corrects autocorrelation by applying the Prais-Winsten transformation to the estimation in question. Post-estimation tests indicate that the model has corrected the contemporaneous correlation by applying the Pesaran CD statistic.[7]

Based on the fact that model (6) is the one that minimizes the variance, it was decided to test the coefficients to observe the quadratic relationship described in this paper. Since the model chooses to observe the cumulative temporal effect, the following equation is used to test the hypothesis that the relationship between growth and corruption is:

$$CO\gamma_{lp} = \frac{\sum_{i=0}^{k} CO\gamma_{i,t-k}}{\sum_{i=0}^{k} 2 * CO^{2}\gamma_{i,t-k}},\ k = 2$$

Where $CO\gamma_{tp}$ is the cumulative non-linear effect of corruption on economic growth. The hypothesis test shows that there is a quadratic relationship in the coefficients. From an average of 32.10 points on the corruption control scale, we begin to observe decreasing returns to scale of corruption control.

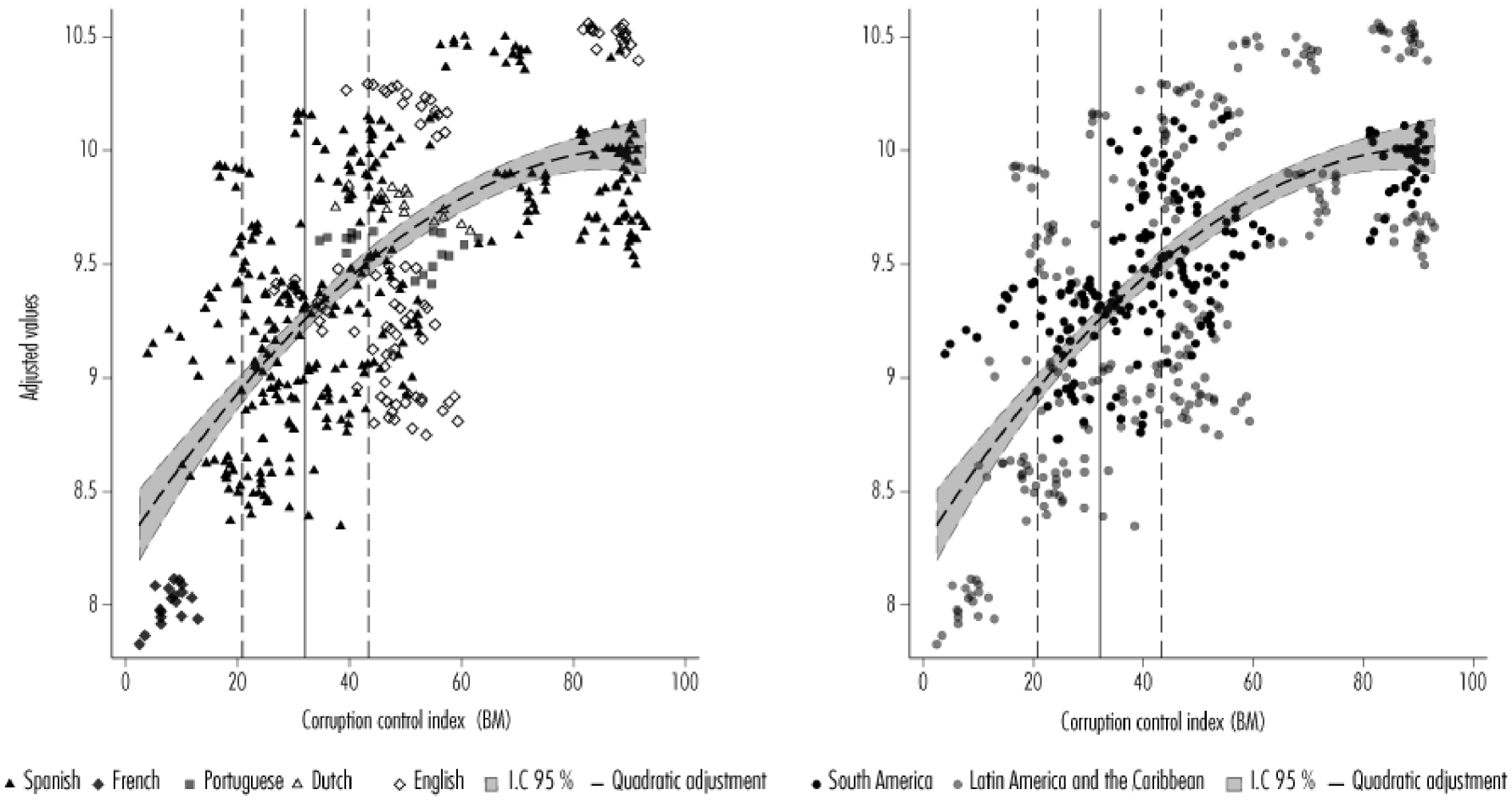
Table 4. Hypothesis test results

Ln(GDP)it	*Coef.*	*Std. err.*	*z*	*P>z*	*[95%*	*conf. interval]*
$CO\gamma_{lp}$	-32.0984	5.737847	-5.59	0.000	-43.3444	-20.8525

Source: compiled by the authors using data from the World Bank (s.f.a and s.f.b).

Figure 4 shows the results of the model in a scatter plot concerning the corruption control index according to colonial origin. The countries in the sample of Spanish colonial origin follow the expected trend, as do those of English origin, although with increased dispersion. In turn, the results of the model are observed according to regions, with both regions (South America and LA&C) following the sacrifice rate.

Figure 4. Model Predictions and Corruption Control Index
by Colonial Origin and Region, 2002-2021



Source: Compiled by the authors using the results of the fixed effects model with corrected standard error panels. The dotted lines are the confidence intervals and the non-dotted line is the point estimate of the quadratic relationship hypothesis test.

Verification of Robustness

The empirical strategy of the previous section may suffer from a problem referred to in the empirical strategy section, which is the endogenous and bidirectional relationship between growth and institutions, especially between growth and corruption. North (1990) discusses that, even in contexts of low economic regulation, corruption can affect the allocation of resources (financial, factor inputs, including human capital), which may be reflected in future growth. In the previous strategy, variables reflecting state capacity dimensions were included in an attempt to obtain the best possible estimate with a one-equation model.

To verify consistency, a scenario was proposed in which the relationship between state capacity, growth, and corruption is non-linear and endogenous. For this purpose, a panel data autoregressive vector model was specified. Likewise, as in the previous section, there is a quadratic relationship between corruption and growth, in addition to the fact that the Granger test shows a bidirectional relationship between growth and corruption.[8]

Hansen's test of over-identified restrictions indicates that the instruments used (four lags of the endogenous variables) permit the solution of endogeneity and the problems associated with the dynamic panel bias evidenced by Nickell (1981). The tests to determine the optimal number of lags for the Autoregressive Vector showed that one lag is the optimal level to specify the model based on information criteria, thus incorporating institutional path dependence into the data-generating process.

Hypothesis tests of the $CO_{i,t-1}$ and $CO^2_{i,t-1}$ coefficients show a quadratic relationship between growth and output. From 47.12 points out of 100 on the growth scale [39.26-54.97] per capita, income growth starts to decline.

Figure 6 shows that, despite the heterogeneity by region and colonial origin (insofar as there are specificities in the economic development paths of each country), the "sacrifice rate" is more evident in countries with a Spanish colonial past and those in the Latin America and Caribbean region.

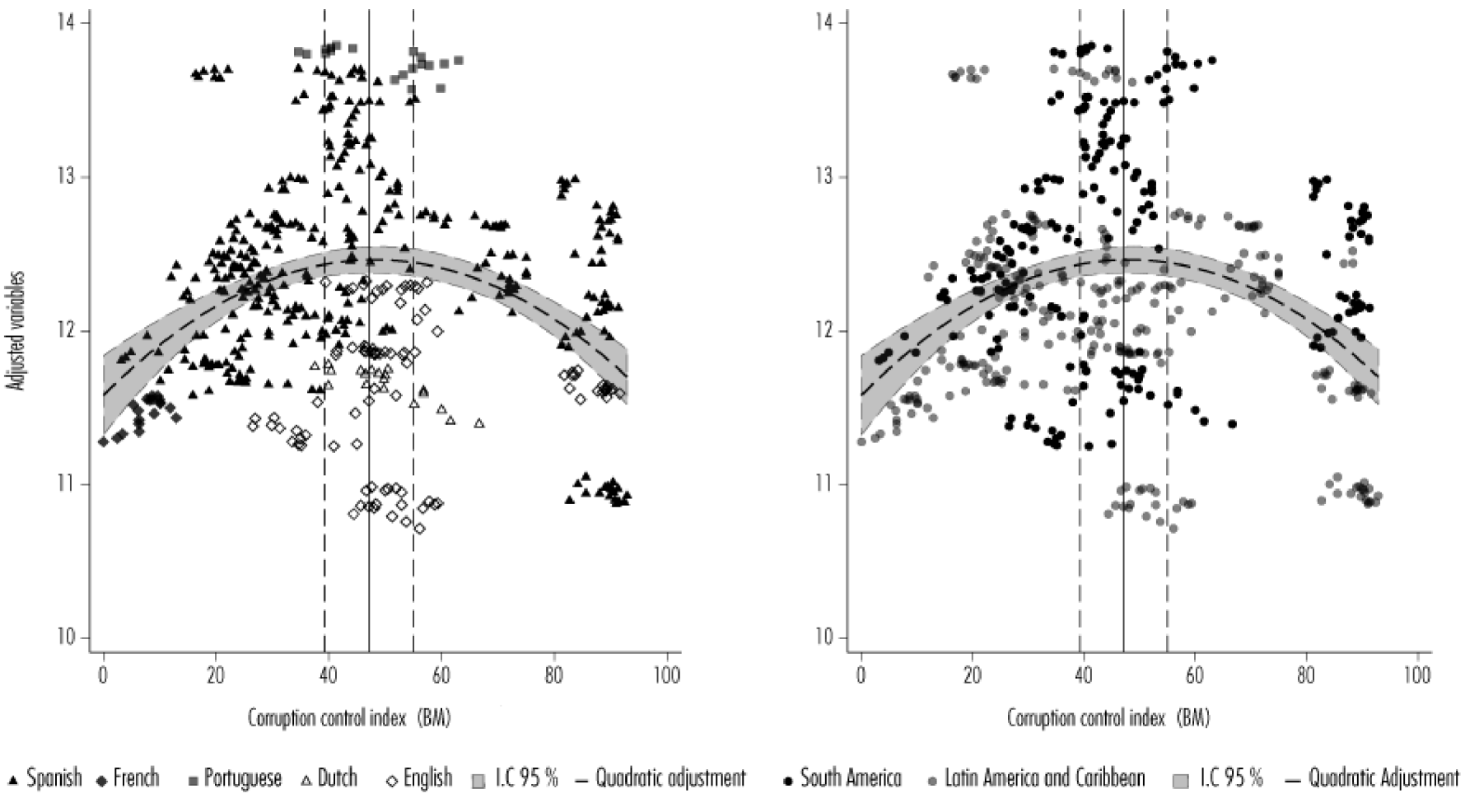
Table 5. Panel Data VAR Results

	(1) Ln(GDP)	CO	CO2	EG	Ln(P)
Ln(GDP) i,t-1	0.65***	-28.02*	-2248.84*	25.89***	0.01**
	(0.16)	(11.40)	(976.41)	(7.86)	(0.00)
CO i,t-1	0.02***	-1.01***	-92.13***	0.71***	-0.00***
	(0.00)	(0.26)	(25.23)	(0.19)	(0.00)
CO i,t-1	-0.00**	0.01**	0.88**	-0.01***	0.00***
	(0.00)	(0.00)	(0.30)	(0.00)	(0.00)
EG i,t-1	-0.00**	0.15***	13.29**	-0.09*	0.00
	(0.00)	(0.04)	(4.37)	(0.04)	(0.00)
Ln(P) i,t-1	0.38	30.71	4260.33*	23.62	0.98***
	(0.47)	(17.47)	(2101.31)	(24.39)	(0.01)
N	468				
Country	26.00				
Hansen test	85.63				
p-value	0.19				
σ^2I	Robusto				

Notes: standard errors in parentheses. Four lags were used as instruments and unobservable heterogeneity was removed using first difference transformation. Generalized methods of moments were used to deal with dynamic panel bias. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Source: prepared using data from the World Bank (n. f. a and n. f. b).

Figure 5. Panel VAR model predictions of economic growth and corruption control index by region and colonial origin, 2002-2021



Source: Compiled by the authors with data from the World Bank (s. f. a. and s. f. b).

6. DISCUSSION OF RESULTS

This paper aimed to estimate whether there is a sacrifice rate or a trade-off between growth and corruption, especially in the context of countries with institutional drift, volatile institutions, and institutionalization of distrust due to the lack of accountability mechanisms in various dimensions (vertical and horizontal societal). The research is consistent with the work of Aparicio *et al.* (2016), Méon and Weill (2010), Albrecht and De la Torre (2021), as well as an empirical corroboration of the theoretical model of De Vaal and Ebben (2011) and that of Acemoglu *et al.* (2011), concerning countries with low economic development and institutional design problems, which hinder economic performance in the presence of weak institutions or, in O'Donnell's terms, institutionalized malicious practices.

According to the results of this study, this phenomenon is because, in countries with lower GDP per capita, the income elasticity concerning control of corruption is higher before reaching a score of 32 points out of 100, a stage from which diminishing returns begin to be observed. In other words, the 32 points of the corruption control indicator are the breakpoint where the so-called "sacrifice rate" occurs. When correcting for possible endogeneity and dynamic panel bias, the sacrifice rate is 47 points out of 100. This indicator illustrates that although the gains in transparency and mitigation of political and administrative corruption generate initial dynamics of economic growth in the short term by freeing the economy from certain rules (both formal and informal) that hinder business activity, in the long run, these improvements in transparency are not sustained because they are dependent on the institutional framework where corruption tends to be entrenched and manifests itself in the mature stages of the process.

With regard to the political and institutional issue, there is a certain consensus in economic, political and public management literature that institutional conditions (understood as norms, practices, values and cultures) can hinder or accelerate GDP growth processes and, consequently, economic development. However, in many cases, these dynamics have been studied linearly from a strictly economistic approach, leaving aside the institutional dynamics that can modify countries' per capita GDP growth trajectory. This is a particular issue for Latin American countries, many of which, throughout the 19th century, exhibited economic indicators similar or superior to their peers in the developed world, especially Europe and Asia. According to the results of this research, a worthy explanation is the weakness of institutions, which in the long run ends up institutionalizing practices that may permit short-term economic growth but limit the strengthening of democracies and formal rules that characterize developed economies that maintain a long-term development path.

This is consistent with the idea of Levitsky and Murillo (2012) that institutions in Latin America cannot enforce design standards due to their volatility over time. This indicates that even improvements in accountability and institutions, as shown by O'Donnell (1994, 1997 and 2004), may not be sufficient for several reasons: horizontal accountability (which are usually the counterweights, separation and autonomy of the branches of government) can be highly reactive to cases of corruption so that, without improvements to the institutional framework in other dimensions such as regulatory quality, accountability and political participation, legal security and government effectiveness, a correct transition to institutionalized democracies is not possible.

7. CONCLUSIONS AND FINAL CONSIDERATIONS

This paper evaluates whether there is a sacrifice rate in improvements in state transparency to fight corruption (in other words, improvements in horizontal accountability) and economic growth, as measured by the countries' per capita income over the period 2002-2021. Despite the heterogeneity between nations and the limitations of a one-equation model, a trade-off between growth and corruption is observed, even when adjusting for indicators that capture State Capacity. This adds an empirical contribution to the discussions on the institutional history of the region of Latin America and provides indirect evidence regarding the constant institutional replacement model as a possible explanation for the region's unique economic and social development situation.

This means that unless institutional volatility is reduced, in other words, institutional mimicry is eliminated. Reforms are adopted on a state level, which are based on informal discourse and social norms; formal improvements to increase the transparency of public administration will only result in limited economic growth in countries like these, with a colonial past and an institutional drift that is generally extractivist and not very inclusive (except some countries).

However, the empirical contribution is not without limitations. The World Bank's governance indicators (s. f. b) measure people's perceptions of the dimensions of governance and governability, which these indicators attempt to assess. Thus, the result ends up being consistent with other research that uses institutional indicators with similar consistency. The research opens up the possibility of investigating the specific mechanisms that facilitate this phenomenon.

ANNEXES

Table A1. Hadrian's unit root test

	z statistic test
Ln(GDP)	40.635**
CO	25.027**
CO^2	26.247**
EG	26.441**
Ln(P)	51.277**
Δ Ln(GDP)	6.688**
Δ CO	-1.614
Δ CO^2	-1.993
Δ EG	-1.407
Δ Ln(P)	27.647**

Note: Ho = all panels are stationary. Variables with the letter delta (Δ) represent variables in the first difference.* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Source: compiled by authors using data from the World Bank (s. f. a. and s. f. b).

Table A2. Levin, Lin and Chu test

	Non-adjusted tδ statistic	*Adjusted tδ* statistic*
Ln(GDP)	-4.931	-1.115
CO	-7.738	-2.410**
CO^2	-8.541	-3.500**
EG	-5.773	-0.309
Ln(P)	-3.788	-2.112**
Δ Ln(GDP)	-8.898	2.359
Δ CO	-15.668	-3.394**
Δ CO^2	-15.502	-3.158**
Δ EG	-14.400	-1.212
Δ Ln(P)	-5.780	-0.905

Note: Ho = panels contain unit roots. Variables with the letter delta (Δ) represent variables in the first difference. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Source: Compiled by the authors using data from the World Bank (s. f. a. and s. f. b).

Table A3. Pesaran CIPS* test

	CIPS test*
Ln(GDP)	-1.646006
CO	-2.839558***
CO^2	-2.83127***
EG	-3.151789***
Ln(P)	-1.961643
Δ Ln(GDP)	-3.339454***
Δ CO	-4.420201***
Δ CO^2	-4.607989***
Δ EG	-4.341947***
Δ Ln(P)	-2.95677***

Note: Ho = panels contain unit roots. Variables with the letter delta (Δ) represent variables in the first difference. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Source: compiled by the authors using data from the World Bank (s. f. a. and s. f. b).

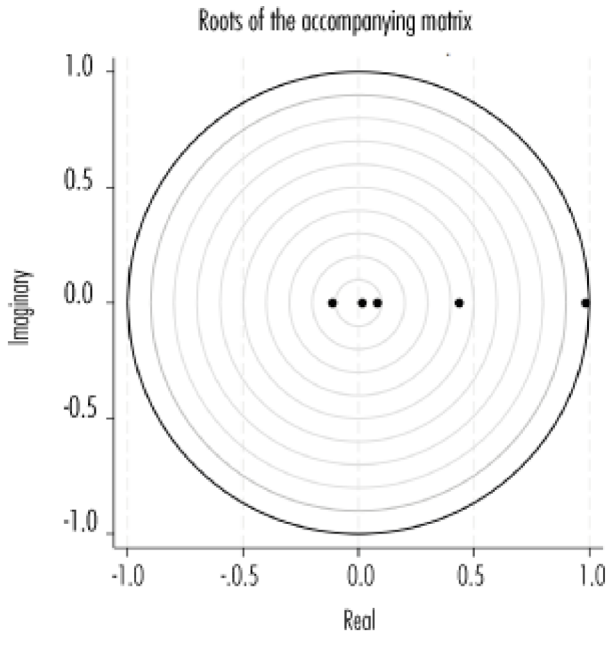
Table A4. Table of VAR optimal lags choice and over-identification test for GMM

	CD	*J*	*J pvalue*	*MBIC*	*MAIC*	*MQIC*
1	1	95.59084	.0546398	-361.2574	-54.40916	-175.4386
2	1	52.14031	.3906801	-252.4252	-47.85969	-128.546

Note: four lags of the model variables were used as instruments.

Source: compiled by the authors using data from the World Bank (s. f. a. and s. f. b).

Figure A1. Auto-regressive Vector Accompanying Matrix



Source: Compiled by the authors with data from the World Bank (s. f. a. and s. f. b).

Table A5. Granger causality test

	chi2	*df*	*Prob > chi2*
#1 Ln(GDP)			
CO	11.06865	1	.000878
CO^2	8.727301	1	.0031348
EG	10.16664	1	.00143
Ln(P)	.6776001	1	.4104143
All	14.60232	4	.0056012
#2 CO			
Ln(GDP)	6.037099	1	.0140083
CO^2	10.26848	1	.0013532
EG	13.77976	1	.0002055
Ln(P)	3.089766	1	.0787861
All	24.9703	4	.000051
#3 CO^2			
Ln(GDP)	5.304628	1	.0212688
CO	13.33803	1	.0002601
EG	9.246327	1	.0023597
Ln(P)	4.110608	1	.042615
All	28.96644	4	7.94e-06
#3 EG			
Ln(GDP)	10.84902	1	.0009885
CO	14.80838	1	.000119
CO^2	11.45302	1	.0007138
Ln(P)	.9373779	1	.3329531
All	19.15167	4	.0007338
#4 Ln(P)			
Ln(GDP)	6.712251	1	.0095753
CO	13.04564	1	.000304
CO^2	15.46001	1	.0000843
EG	.1621086	1	.6872226
All	14.78546	3	.0020095

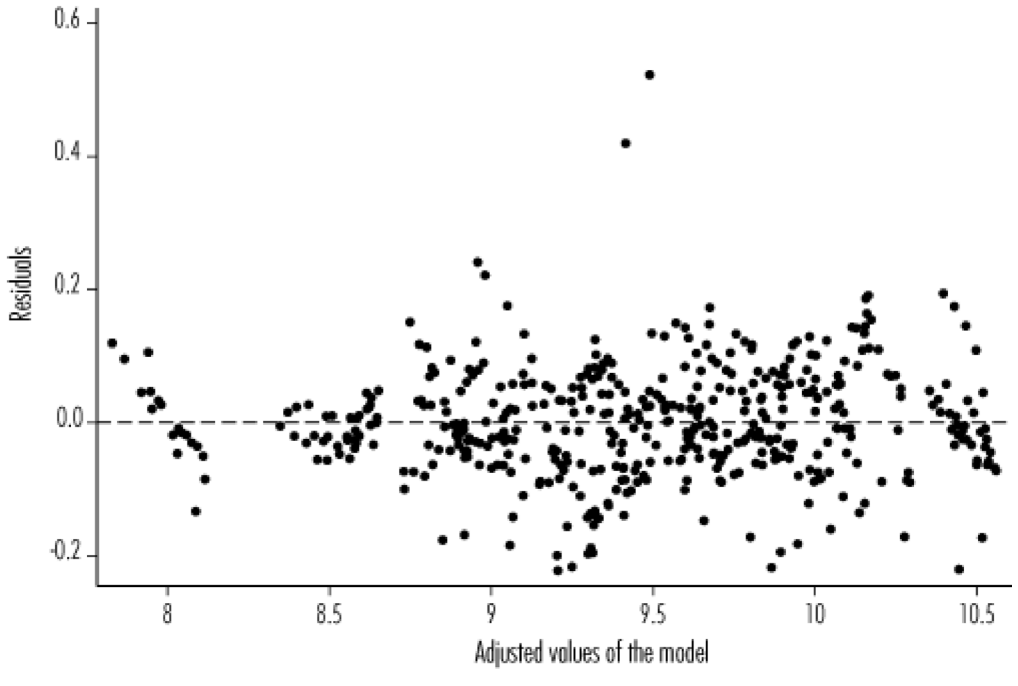
Source: prepared by the authors with data from the World Bank (n. d. a. and n. d. b).

Table A6. Non-linearity test for VAR panel

Ln(GDP)it	*Coef.*	*Std. err.*	*z*	*P>z*	*[95 %*	*conf. interval]*
CO γlp	-47.117	4.0112	-11.746	0.0000	-54.979	-39.256

Source: compiled by the authors using data from the World Bank (s. f. a. and s. f. b).

Figure A2. Scatterplot of residuals and predictions from the corrected standard error panel model



Source: Compiled by the authors using data from the World Bank (s. f. a. and s. f. b).

BIBLIOGRAPHY

Acemoglu, D. and Verdier, T. (2000). The choice between market failures and corruption. *American Economic Review*, 90(1). https://doi.org/10.1257/aer.90.1.194

_____ and Robinson, J. A. (2015). The rise and decline of general laws of capitalism. *Journal of Economic Perspectives, 29(1).* https://doi.org/10.1257/ jep.29.1.3

_____, Johnson, S. and Robinson, J. A. (2001). The colonial origins of comparative development: an empirical investigation. *American Economic Review, 91(5).* https://doi.org/10.1257/aer.91.5.1369

_____, Ticchi, D. and Vindigni, A. (2011). Emergence and persistence of inefficient states. Journal of the European Economic Association, 9(2). https://doi.org/10.1111/j.1542-4774.2010.01008.x

_____, Egorov, G. and Sonin, K. (2021). Institutional change and institutional persistence. In *The Handbook of Historical Economics* (pp. 365-389). Elsevier. https://doi.org/10.1016/B978-0-12-815874-6.00021-6

Ahmad, E., Ullah, M. A. and Arfeen, M. I. (2012). Does corruption affect economic growth? *Latin American Journal of Economics, 49(2).* https://doi.org/1O.7764/LAJE.49.2.277

Albrecht, J. and De La Torre, D. (2021). Efectos heterogéneos de la corrupción y la inestabilidad política sobre el crecimiento económico: un estudio para América Latina. *Universidad de Piura Campus Lima.* https://www.academia.edu/download/69489956/TIE1_corregido.pdf

Anokhin, S. and Schulze, W. S. (2009). Entrepreneurship, innovation, and corruption. *Journal of Business Venturing, 24(5).* https://doi.org/10.1016/j.jbusvent.2008.06.001

Aparicio, S., Urbano, D. and Audretsch, D. (2016). Institutional factors, opportunity entrepreneurship and economic growth: Panel data evidence. *Technological Forecasting and Social Change, 102.* https://doi.org/10.1016/j.techfore.2015.04.006

Bayley, D. H. (1966). The effects of corruption in a developing nation. *Western Political Quarterly, 19(4).* https://doi.org/10.2307/445147

Beck, N. and Katz, J. N. (1995). What to do (and not to do) with time-series cross-section data. *American Political Science Review, 89(3).* https://doi.org/10.2307/2082979

Borja, K. (2017). Corruption indicators, foreign capital, and economic growth in developing countries. *The Journal of Developing Areas, 51(4).* https://www.jstor.org/stable/26416964

Chong, A. and Gradstein, M. (2007). Inequality and institutions. *The Review of Economics and Statistics, 89(3).* https://doi.org/10.1162/rest.89.3.454

De Vaal, A. and Ebben, W. (2011). Institutions and the relation between corruption and economic growth. *Review of Development Economics, 15(1).* https://doi.org/10.1111/j.1467-9361.2010.00596.x

Dobson, S. and Ramlogan-Dobson, C. (2010). Is there a trade-off between income inequality and corruption? Evidence from Latin America. *Economics letters, 107(2).* https://doi.org/10.1016/j.econlet.2009.12.038

Driscoll, J. C. and Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics, 80(4).* https://doi.org/10.1162/003465398557825

Dryzek, J. S. (1996). The informal logic of institutional design. *The Theory of Institutional Design.* https://doi.org/10.1017/CBO9780511558320.005

Fukuyama, F. (2014). State-building. In *State-building.* Cornell University Press.

Gaebler, T. and Osborne, D. (1992). *Reinventing Government.* Plume, NY.

Gerring, J. and Thacker, S. C. (2004). Political institutions and corruption: The role of unitarism and parliamentarism. *British Journal of Political Science, 34(2).* https://doi.org/10.1017/S0007123404000067

Godinez, J. R. and Liu, L. (2015). Corruption distance and FDI flows into Latin America. *International Business Review, 24(1).* https://doi.org/10.1016/j.ibusrev.2014.05.006

Gómez, L. E. M. (2022). Turismo, vaivenes y desigualdad: cómo repercuten las instituciones participativas y de transparencia en la actividad turística y su incidencia en la desigualdad en Latinoamérica (2002-2019). *Ciencia, Economía y Negocios, 6(1).* https://doi.org/10.22206/ceyn.2022.v6i1. pp57-84

Grassi, D. and Memoli, V. (2016). Political determinants of state capacity in Latin America. *World Development, 88*. https://doi.org/10.1016/j.world-dev.2016.07.010

Gupta, S., Davoodi, H. and Alonso-Terme, R. (2002). Does corruption affect income inequality and poverty? *Economics of Governance, 3(1).* https://doi.org/10.1007/s101010100039

Hadri, K. (2000). Testing for stationarity in heterogeneous panel data. *The Econometrics Journal, 3(2).* https://doi.org/10.1111/1368-423X.00043

Johnson, S., Kaufmann, D. and Zoido-Lobatón, P. (1999). *Corruption, public finances and the unofficial economy, 2169.* World Bank Publications. https://doi.org/10.1596/1813-9450-2169

Juodis, A. and Reese, S. (2022). The incidental parameters problem in testing for remaining cross-section correlation. *Journal of Business & Economic Statistics, 40(3).* https://doi.org/10.1080/07350015.2021.1906687

Kang, Y. and Lee, D. (2018). Delegative democratic attitudes: Theory and evidence from the Asian barometer survey. *International Political Science Review, 39(4).* https://doi.org/10.1177/0192512117702755

Kaufmann, D. and Wei, S.-J. (1999). *Does "grease money" speed up the wheels of commerce?* National Bureau of Economic Research. Cambridge. https://doi.org/10.3386/w7093

_____, Kraay, A. and Mastruzzi, M. (2010). Response to "What do the worldwide governance indicators measure?". *The European Journal of Development Research, 22(1).* https://doi.org/10.1057/ejdr.2009.49

Leff, N. H. (1964). Economic development through bureaucratic corruption. *American Behavioral Scientist, 8(3).* https://doi. org/10.1177/000276426400800303

Levin, A., Lin, C.-F. and James Chu, C.-S. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics, 108(1).* https://doi.org/10.1016/S0304-4076(01)00098-7

Levitsky, S. and Murillo, M. V. (2012). Construyendo instituciones sobre cimientos débiles: lecciones desde América Latina. *Politai, 3(5).* https://revistas.pucp.edu.pe/index.php/politai/article/view/14124

Li, H., Xu, L. C. and Zou, H. (2000). Corruption, income distribution, and growth. *Economics & Politics, 12(2).* https://doi.org/10.1111/1468- 0343.00073

Mauro, P. (1995). Corruption and growth. *The Quarterly Journal of Economics, 110(3).* https://doi.org/10.2307/2946696

Méon, P.-G. and Weill, L. (2010). Is corruption an efficient grease? *World Development, 38(3).* https://doi.org/10.1016/j.worlddev.2009.06.004

Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica: Journal of the Econometric Society, 49(6).* https://doi.org/10.2307/1911408

North, D. C. (1990). *Institutions, institutional change and economic performance.* Cambridge University Press.

O'Donnell, G. A. (1994). Delegative democracy. *Journal of Democracy, 5(1).* https://heinonline.org/HOL/LandingPage?handle=hein.journals/ jnlodmcy5&div=8&id=&page=

_____ (1997). Rendición de cuentas horizontal y nuevas poliarquías. *Nueva Sociedad, 152.* https://static.nuso.org/media/articles/downloads/2645_1.pdf

_____ (2001). Accountability horizontal. La institucionalización legal de la desconfianza política. *Isonomía, 14.* https://www.isonomia.itam.mx/index.php/revista-cientifica/article/view/526

_____ (2004). Accountability horizontal: la institucionalización legal de la desconfianza política. *Revista Española de Ciencia Política, 11.* https://recyt.fecyt.es/index.php/recp/article/view/37355

_____ (2010). Revisando la democracia delegativa. *Casa del Tiempo, 31.* https://www.uam.mx/difusion/casadeltiempo/31_iv_may_2010/casa_del_tiempo_eIV_num31_02_08.pdf

Ostrom, E. (2000). El gobierno de los bienes comunes. *La evolución de las instituciones de acción colectiva.* Fondo de Cultura Económica.

Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics, 22(2).* https://doi.org/10.1002/jae.951

Prais, S. J. and Winsten, C. B. (1954). *Trend estimators and serial correlation.* Cowles Commission discussion paper Chicago. https://cowles.yale.edu/sites/default/files/2023-05/s-0383.pdf

Przeworski, A. (1988). Democracy as a contingent outcome of conflicts. *Constitutionalism and democracy.* Cambridge University Press. https://doi.org/10.1017/CBO9781139173629.003

Qamruzzaman, M. (2017). Innovation and economic growth: evidence from financial institutional innovation. *Journal on Innovation and Sustainability. RISUS ISSN 2179-3565, 8(2).* https://doi.org/10.24212/2179-3565.2017v8i2p126-141

Quesada, M. G., Jiménez-Sánchez, F. and Villoria, M. (2013). Building local integrity systems in southern Europe: the case of urban local corruption in Spain. *International Review of Administrative Sciences, 79(4).* https://doi.org/10.1177/0020852313501125

Ramió, C. and Salvador, M. (2005). *Instituciones y nueva gestión pública en América Latina*. Fundació Cidob Barcelona.

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy, 98(5, part 2).* https://doi.org/10.1086/261725

Saadaoui, H. and Chtourou, N. (2022). Do institutional quality, financial development, and economic growth improve renewable energy transition? some evidence from Tunisia. *Journal of the Knowledge Economy.* https://doi.org/10.1007/s13132-022-00999-8

Saha, S. and Gounder, R. (2013). Corruption and economic development nexus: Variations across income levels in a non-linear framework. *Economic Modelling, 31.* https://doi.org/10.1016/j.econmod.2012.11.012

Sandholtz, W. and Koetzle, W. (2000). Accounting for corruption: Economic structure, democracy, and trade. *International Studies Quarterly, 44(1).* https://doi.org/10.1111/0020-8833.00147

Seligson, M. A. (2002). The impact of corruption on regime legitimacy: A comparative study of four Latin American countries. *Journal of Politics, 64(2).* https://doi.org/10.1111/1468-2508.00132

Soto, R. (2003). *La corrupción desde una perspectiva económica.* https://repositorio.uc.cl/server/api/core/bitstreams/2fdea8a9-8e93-4d3b-a122-44327ce4c982/content

Taş, H. (2015). Turkey - from tutelary to delegative democracy. *Third World Quarterly, 36(4).* https://doi.org/10.1080/01436597.2015.26175

World Bank (s. f. a). *Data Bank: World Development Indicator.*

World Bank (s. f. b). *Data Bank: Worldwide Governance Indicators*.

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[1] The trade-off approach to corruption is not new. Ahmad *et al.* (2012) carried out an exercise of this nature for developing economies. Similarly, for Latin America, Dobson and Ramlogan-Dobson (2010) had already proposed this trade-off between corruption and inequality.

[2] These statements are made considering a scenario of "endogenous growth", where private investment plays an important role in economic growth and its affectation may, in turn, reduce the performance of the economy as a whole. For more on endogenous models, see Romer (1990). Beyond this approach, "neoclassical" growth models also assess the fall in economic growth for reasons associated with the reduction of investment (Mauro, 1995).

[3] The optimal number of lags was estimated using the following formula: $m(T) = floor\left[4(T/100)^{2/9}\right]$.

[4] Models with corrected standard error panels do not correct for serial autocorrelation. For this purpose, the Prais and Winsten (1954) transformation with an AR(1)-type autoregressive component is used. This specification has the dual purpose of correcting statistical problems and modeling the dependence on the institutional past for Latin American economies.

[5] For the Levin, Liu and Chu (LLC) test and Pesaran's CIPS* (Augmented Cross Sectional Independent Panel Stationary test), two lags were used for the white noise tests. For the test, LLC was for models with no intercept and no constant while a linear trend was assumed for CIPS*.

[6] See annexes.

[7] A weighted version with Rademacher weights was applied due to the problems of incidental parameters experienced by the Pesaran test discussed in the literature (Juodis and Reese, 2022).

[8] See annexes.