

# Relationships between corruption, electoral polarization, economic growth and inequality in the Peruvian case

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## **Abstract**

*This study analyzes the relationships between the variables of corruption, political polarization, economic growth, and income inequality for the Peruvian economy over the period 1998–2020. The methodology used to verify the degree of association and/or causality of the study variables were Pearson's correlation, linear, and quadratic regressions. The results point to a significant negative correlation between corruption and economic growth, and between electoral polarization and GDP, but that political polarization is positively associated with economic inequality measured by the Gini index ( $\alpha = 1\%$ ). It was also found that economic growth decreases inequality. Therefore, it is concluded that corruption decreases economic growth, but that there is a “U”-shaped relationship between corruption and the Gini index. Consequently, at lower levels of corruption, an increase in the corruption perceptions index (CPI) decreases the Gini coefficient, but at higher levels of corruption, a rise in the CPI increases income inequality. Finally, the global coronavirus crisis has aggravated inequality in developed and developing countries, so it is recommended that policymakers implement political measures to reduce economic inequality and, at the same time, mitigate political polarization.*

Keywords: Corruption, Political polarization, Economic growth, Inequality

JEL Classification: D63, D72, O43, P16

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## **1. Introduction**

In recent years, almost all Peruvian presidents in power from 1990 to 2020 have been investigated for corruption, the only exception being Valentín Paniagua, the transitional president from November 22, 2000 to July 28, 2001. Alberto Fujimori, sentenced for corruption, was pardoned in December 2017, but this pardon was annulled by the Supreme Court of Peru in October 2018 and in March 2022 the aforementioned pardon was restored. Another ex-president, Alan García (2006–2011) committed suicide in April 2019 while under investigation over the Odebrecht case, while another still, Alejandro Toledo (2001–2006), fled to the United States amid allegations of bribetaking. Since 2016, serious confrontations between the executive branch and Congress have led to the departure of three presidents, two of them in a single month (November 2020). From November

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17, 2020 to July 28, 2021, the transitional government of Francisco Sagasti led Peru without allegations of corruption.

Most recently, on June 6, 2021, candidates from the left and the right, Pedro Castillo and Keiko Fujimori, progressed to the second round of the presidential elections, reflecting great polarization towards the political extremes. According to Peru's National Office of Electoral Processes (ONPE), the eventual winner, Castillo, took 50.126% of the vote compared to Keiko Fujimori's 49.874%.

Although a decrease in Peru's Corruption Perceptions Index (CPI) was recorded in 2018, according to Samuel Rotta, executive director of Proética, this was due to the discovery of the criminal network known as *Los Cuellos Blancos del Puerto* ("The White Collars of the Port")—and the capture of senior justice sector figures, including high magistrates, operating within it—and of the *Club de la Construcción* ("Construction Club").<sup>1</sup> With regard to the Lava Jato corruption case—in which Odebrecht was central—74% of Peruvians believe that both the companies paying the bribes and the politicians receiving them share equal blame, according to Proética.

Using panel data from the United States, Melki and Pickering (2020) tested the hypothesis that party polarization reduces corruption. Defining polarization as the ideological distance between parties, they argued that this phenomenon can increase political responsibility, and indicated a correlation between corruption and polarization of 0.44.

Alfada (2019) adopted a non-linear approach based on the number of corruption cases investigated to determine the corruption threshold in the provinces of Indonesia over the period 2004–2015. They found that corruption has a detrimental effect on economic growth for provinces with levels of corruption below the threshold of 1,765 points, and a strong destructive effect for provinces with corruption levels above this threshold. For their part, Sáenz-Castro and García-González (2019) detected a positive correlation between corruption and inequality for 24 departments of Colombia in the period 2008 to 2017.

An Ipsos Perú survey conducted in May 2021 found that 86% of Peruvian citizens want changes to the country's economic model; the economists consulted argue that the neoliberal model applied in the last three decades perpetuates inequity (La República, May 04, 2021).

This study is important because corruption, as well as impeding Peru's economic development, generating considerable economic and social costs, and increasing inequality, encourages electoral polarization. According to the Office of the Controller and the Ombudsman's Office, in Peru corruption results in annual losses of more than 23 billion soles in public resources, in addition to curtailing fundamental rights, democracy, and the adequate provision of public services. There is a vital need for Peru's public officials to promote the common interests of the nation rather than private interests.

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<sup>1</sup> In November 2021, Indecopi's Free Competition Defense Commission sanctioned several construction companies (including major players such as Graña y Montero, Camargo y Correa, Altesa, CyM, Aramsa, Cosapi, and Obrainsa, among others) for illegally distributing 112 tenders between November 2002 and December 2016.

In this context, the objective of this study is to determine the relationships between corruption, electoral polarization, economic growth, and income inequality. The article is divided into three parts. The literature review conceptualizes the variables and the empirical evidence. Then, the methodology section details the data sources and indicators of corruption, inequality, and electoral polarization. In the third section, the results are presented, the correlations and regressions are applied, and the findings are discussed in the light of previous studies.

## 2. Literature Review

Transparency International's CPI measures the perceived levels of corruption in the public sector. From 1998 to 2011, the maximum possible score in the index was 10 (country without corruption). In 2012, the maximum score was changed to 100. Transparency International defines corruption as the abuse of entrusted power for private gain. Both income inequality and violence are directly linked to it, as the effects of weak democratic governance and corrupt practices (Transparency International, 2012).

Hongdao et al. (2018) studied the effects of the rule of law on economic growth and the prevention of corruption in China. They noted that reducing corruption increases economic growth. They also showed that the rule of law plays an intermediate role in the prevention of corruption and stimulates economic growth, and that economic growth significantly lowers the level of control of corruption.

In a study of the polarization of society in Europe, García (2019) used the European Social Survey (ESS) to analyze the political inclinations of European citizens between 2006 and 2016. Using a scale from 0 (extreme left) to 10 (extreme right), they detected that preferences for the most extreme options increased very little.

Employing the generalized method of moments (GMM) for a panel of 48 countries from 2012 to 2019, Afonso and Rodrigues (2021) observed an adverse effect of corruption (measured using the CPI) on the growth of GDP per capita. In addition, they found that developing economies, regardless of government size, benefit less from the reduction in corruption; in short, the size of government is not enough in itself to explain the influence of corruption on economic activity (Afonso and Rodrigues, 2021).

Guirola (2021) argued that political polarization can affect economic results because hostility towards opponents (that is, affective polarization) shapes subjective expectations. First, he examined 134 cabinet changes between 1990 and 2019 in 27 European countries and showed that supporters on the left and right shift their economic expectations in opposite directions in the aftermath.

Winkler (2019) studied the effect of income inequality on political polarization and found that an increase in the Gini coefficient at the local level increases the probability of supporting a political party on the extreme left or right of the ideological spectrum.

Quiroz (2013) highlighted the historical significance of corruption (which he defined as the misuse of political-bureaucratic power to obtain economic or political advantages contrary to development goals) in Peru, as well as its causes and consequences, from the colonial era to 2000.

Specifically, he focused on how the generations-old networks of systemic and cyclical corruption in the public and private spheres limit development and generate economic and institutional costs as well as poverty. Conversely, control of corruption stimulates development.

Shack et al. (2020) estimated that in 2019, Peru lost around 15% of its overall executed public budget to corruption and functional misconduct. The three most affected regions were Callao, Lambayeque and Pasco, and at the national government level the sectors most impacted were the transport and communications, health, and education.

Sulemana and Kpienbaareh (2018), using panel data for 48 countries between 1996 and 2016, showed that higher levels of income inequality are associated with lower levels of corruption and suggested a changing relationship between income inequality and corruption across countries with different income trajectories. They also found that corruption causes income inequality; the results of OLS, random effects, and fixed effects models revealed a U-shaped relationship between income inequality and corruption for low- and lower-middle-income African countries.

Peru's CPI in 2020 was 38 (International Transparency). By contrast, Uruguay, with a CPI that same year of 71, is the cleanest country in Latin America. This annual index reflects the perceptions of domestic and international businesspeople, academics, and risk analysts.

According to Fariñas and Ferlin (2020), corruption does not impede economic growth but it does deepen social inequality. Gupta et al. (2002) detected that high and growing corruption increases income inequality and poverty. Narayan and Sharmila (2019) pointed out that the economic literature has tested the relationship between corruption and income inequalities using a variety of data sources and techniques, but that economic research in this field is still young.

González and Sánchez (2019) built a theoretical microeconomic model and showed that in Mexico the poor are more affected than the rich by state corruption, since this phenomenon exacerbates economic inequality and/or concentration of wealth.

Increased corruption has been associated with higher income inequality elsewhere. An OLS estimate found that an increase of one unit of corruption (one unit reduction in corruption) increases the Gini income distribution coefficient by approximately 1.54 points; that is, the increase in corruption increases income inequality in African countries (Gyimah-Brempong, 2002).

In Peru, the majority of the population faces a daily struggle for survival and has a highly cynical view of national politics, largely because very few individuals are punished for corrupt practices (Ioris, 2016).

Among the possible impacts of COVID-19, it is necessary to investigate how the coronavirus crisis affects regional and global economic relationships (Karabag, 2020). According to Jungkunz (2021), the COVID-19 pandemic has the potential to reinforce social and political polarization by intensifying social differences, since it disparately affects the poorest in society.

### **3. Methodology**

This study estimates the degree to which corruption, political polarization, economic growth and income inequality were related in Peru over the study period 1998–2020. To this end,

secondary data was collected on the study variables. Corruption is measured using Transparency International's (CPI). As noted earlier, from 1998 to 2011 the index's scale ran from 0 to 10 (the latter denoting a "very clean country") and from 2012 this was changed to 0–100. For the present study period, 1998–2020, the score was standardized from 0 to 100 (multiplying by 10 the CPI score of Peru for the years 1998–2011). Economic growth based on GDP at constant 2007 prices was obtained from the Central Reserve Bank of Peru. Inequality was measured by way of the World Bank Gini index and electoral polarization, while the electoral polarization measure is based on the final second-round results of five presidential election processes (2001, 2006, 2011, 2016, and 2021) as declared by Peru's ONPE.

As a proxy of electoral polarization, the percentage difference (spread) between the winner and the loser of the second round was taken into account; for example, in 2001, the winner obtained 53.1% and the loser 46.9%, so the spread was 6.2%; During the following five years the spread continuously decreased until 2016, when it was 0.2% between the winner Pedro Pablo Kuczynski (center right), and the loser Keiko Fujimori (right). Since in Peru presidential elections are held every five years, the polarization proxy per year without a presidential election corresponds to the average between the spreads of the previous and subsequent year in which the second round of a presidential election takes place.

#### 4. Results and Discussion

**Table 1. Correlations: Corruption, economic growth, and inequality, Peru 1998–2020**

		GDP (Millions of soles at 2007 prices)	Corruption Perceptions Index	Polarization: Spread of presidential elections, final ONPE results (2001, 2006, 2011, 2016, and 2021)	Gini_Index
GDP (Millions of soles at 2007 prices)	Pearson's correlation	1	-0.491*	-0.983**	-0.951**
	Sig. (bilateral)		0.017	0.000	0.000
	N		23	20	23
CPI	Pearson's correlation		1	0.061	0.499*
	Sig. (bilateral)			0.799	0.015
	N			20	23
Polarization: Spread of presidential elections, final ONPE results (2001, 2006, 2011, 2016, and 2021)	Pearson's correlation			1	0.939**
	Sig. (bilateral)				0.000
	N				20

\*. The correlation is significant at the 0.05 level (bilateral).

\*\* . The correlation is significant at the 0.01 level (bilateral).

A strong negative correlation was found between the CPI and economic growth at the 5% significance level. Another finding is that electoral polarization is inversely related to GDP, but political polarization is directly associated with the Gini index ( $\alpha = 1\%$ ), which is also evidenced by Winkler (2019) for European regions. There is also a significant direct correlation ( $\alpha = 5\%$ ) between corruption and inequality, similar to the result obtained by Sáenz-Castro and García-González (2019). Our finding is also in line with Gyimah-Brempong (2002), who showed that corruption slows economic growth, and that corruption is positively correlated with income inequality.

According to the ANOVA, the linear regression model is adequate and the causal relationship between corruption and GDP is corroborated, in that corruption is shown to negatively affect GDP

at the 5% level of significance (Table 3). Moreover, it was found that higher polarization causes lower GDP in constant terms ( $\alpha = 1\%$ ).

**Table 2. Analysis of variance, GDP dependent variable at 2007 prices, Peru 1998-2020**

ANOVA <sup>a</sup>						
Model		Sum of squares	df	Quadratic mean	F	Sig.
1	Regression	217813243782.188	2	108906621891.094	319.192	0.000b
	Residual	5800315329.879	17	341195019.405		
	Total	223613559112.067	19			

a. Dependent variable: GDP (Millions of soles at 2007 prices).

b. Predictor variables: (Constant), Polarization: Presidential election spread, final ONPE results (2001, 2006, 2011, 2016, and 2021).

**Table 3. Multiple linear regression, Peru 1998-2020**

Coefficients <sup>a</sup>						
Model		Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Typical error	Beta		
1	(Constant)	705505.529	77885.590		9.058	0.000
	Corruption perception index	-4813.770	2137.560	-0.088	-2.252	0.038
	Polarization: Spread of presidential elections, Final ONPE results% (years 2001, 2006, 2011, 2016 and 2021)	-47240.869	1890.965	-0.978	-24.982	0.000

a. Dependent variable: GDP (Millions of soles at 2007 prices)

R square =97.4%, DW=1.884

**Table 4. Analysis of variance, Gini Index dependent variable, Peru 1998–2020**

ANOVA <sup>a</sup>						
Model		Sum of squares	df	Quadratic mean	F	Sig.
1	Regression	0.124	3	0.041	119.919	0.000b
	Residual	0.006	16	0.000		
	Total	0.130	19			

a. Dependent variable: LGini

b. Predictor variables: (Constant), LPBI, CPI, Polarization: Spread of presidential elections, final ONPE results (2001, 2006, 2011, 2016 and 2021)

**Table 5. Regression, dependent variable: natural logarithm of the Gini index, Peru 1998–2020**

Coefficients <sup>a</sup>						
Model		Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Typical error	Beta		
1	(Constant)	8.732	1.069		8.172	0.000
	Polarization: Spread of presidential elections, ONPE at 100% (years 2001, 2006, 2011, 2016 and 2021)	-0.012	0.010	-0.331	-1.224	0.239
	Corruption perception index	-0.005	0.003	-0.111	-1.741	0.101
	LGDP	-0.366	0.076	-1.318	-4.786	0.000

a. Dependent variable: LGini

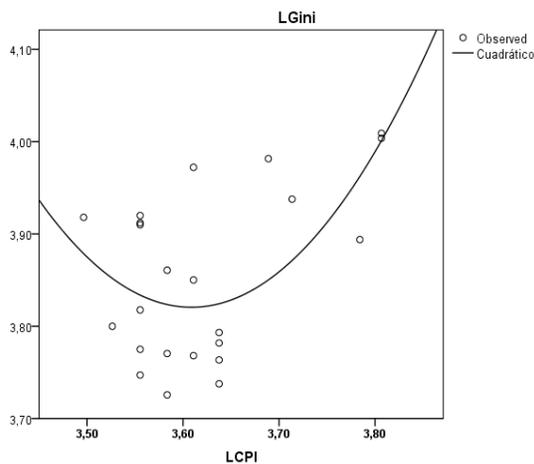
R square =95.7%, DW=1.681

We find that higher economic growth decreases inequality. However, corruption (CPI) negatively affects inequality with a p-value of 10.1%, slightly higher than  $\alpha = 10\%$ , but polarization does not influence inequality (Table 5).

When the quadratic regression was applied to corruption and inequality in terms of the natural logarithms LCPI and LGini, respectively (Table 6), the result was a “U”-shaped curve (Figure 1).

**Table 6. Quadratic regression between corruption and the Gini index, Peru 1998–2020**

	Coefficients				
	Non-standardized coefficients		Standardized coefficients	t	Sig.
	B	Typical error	Beta		
LCPI	-33.247	15.349	-31.486	-2.166	0.043
LCPI ** 2	4.606	2.095	31.955	2.198	0.040
(Constant)	63.812	28.093		2.271	0.034



**Figure 1. “U” -shaped curve between corruption and the Gini index, Peru 1998–2020**

Based on the results obtained, it can be inferred that low levels of corruption reduce inequality until it reaches a minimum, after which a greater increase in the CPI causes greater inequality. Similarly to this finding, Sulemana and Kpienbaareh (2018) evidenced a U-shaped relationship between income inequality and corruption for African countries.

The COVID-19 pandemic has reinforced political polarization (Jungkunz, 2021), and has also deepened income inequality in both developed and developing countries. Using the World Values Survey from 1990 to 2020, Gu and Wang (2021) found a strong association between economic inequality (increased Gini coefficient) and political polarization, globally. In the Peruvian case, there is also evidence of a significant positive correlation between the Gini index and political polarization; therefore, it is recommended that as a palliative to the coronavirus pandemic crisis, policymakers implement political measures to reduce economic inequality and mitigate political polarization.

## 5. Conclusion

The goal of this study was to estimate the relationships between corruption, electoral polarization, economic growth, and income inequality in Peru. A strong negative correlation was found between the Corruption Perception Index (CPI) and economic growth. In terms of causality, corruption was found to decrease economic growth. Both corruption and political polarization negatively impact GDP in the Peruvian case. Electoral polarization is inversely related to GDP and directly to the Gini index ( $\alpha = 1\%$ ). The higher the growth, the lower the inequality. Likewise, a “U”-shaped relationship is evidenced between corruption and income inequality. At lower levels of corruption the increase in the CPI decreases the Gini index, and at important levels of corruption there is a direct relationship between the CPI and inequality.

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