

Corruption and Economic Growth: An Asymmetric Relationship Across Economic Levels and Legal Origins

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Abstract

The purpose of the study is threefold. First, it evaluates the direction and magnitude of corruption on economic growth. Second, it tests the hypothesis of asymmetric impact in developed and developing economies. Third, it investigates the corruption-growth relationship across Legal-Origins. The research employs annual data for 152 countries over the period 2012-2021 and utilizes three-panel regression approaches: pooled OLS, cross-sectional fixed effect, and random effect. Given the empirical statistical results of the F-test, Breusch-Pagan LM test, and Hausman test, the fixed effect approach is superior. The results reveal that (1) the overall corruption deteriorates the economic growth, (2) the effect is twice as harmful in developing than in developed economies, and (3) the influence varies across Legal-Origins. Economic growth is adversely affected by Corruption in French and German civil law countries, and it does not affect British common law economies and Scandinavian legal origin. The introduction of non-universality in the corruption-growth linkage presented in the paper has implications in academic and public policy domains.

Keywords: Corruption; Legal Origin; Economic Growth

JEL Classification: D73, K00, O11

1. Introduction

In colloquial conversations, corruption is regarded as a vice almost unanimously. In academic literature, however, the relationship between corruption and economic growth is disputed. Most studies find a negative relationship between corruption and growth; some observe a positive connection, while others propose a mixed and relatively nonlinear or dynamic association. The impact of corruption might not be universal, as its aftermath may be asymmetric in different countries or groups of countries, given their specific conditions.

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This research identifies and explores two such conditions: income and Legal-Origins. First, the association between corruption and growth may partially be conditioned on its economic standing; that is, whether the country under discussion is developed or developing. Second, the influence of corruption on growth may vary given the country's legal origin. Legal systems, at large, determine the framework of institutions, which might offer deterrence or loopholes for the incidence of corruption. Intuitively, effective legal systems will keep corruption in check, while ineffective legal institutions might allow public officials to take undue advantage of the economic resources under their supervision. Moreover, legal institutions, in and of themselves, meaningfully impact the economic situation of a country (see, for example, Karkalakos, 2024 and Rasheed et. al, 2023). Here, the author feels it is incumbent to tersely describe the legal origin theory.

La Porta et al. (2008) adopted the concept of legal origin as the paradigm for the social control of economic life. Legal origin is the historical root of a country's legal structures; it has a bearing on how that country defines, interprets, and enforces various laws. Generally speaking, there are two legal origins, i.e., English common law and French civil law. Apart from these, German, Scandinavian, and Socialist legal traditions are assigned to some countries. La Porta et al. (2008) provide a political-economic perspective³ and Glaeser and Shleifer (2002) presents a structural and operational point of view⁴ on how the common and civil law differ. In terms of the philosophy of freedom, La Porta et al. (2008) made mention of the exposition by Hayek (1960) to distinguish the empiricist view of England and the rationalist approach of France.⁵

The present study identifies four Legal-Origins for analysis: British, French, German, and Scandinavian. Socialist law countries present the challenge of scarce and missing data. Inclusion of Legal-Origins in the corruption-growth model (1) controls for some of the unexplained impact of corruption on economic growth, (2) observes any noticeable trend within (across) the same (different) Legal-Origins, and (3) partially brings in the historical dimension for each country.

³ Common law represents a strategy of social control aimed at promoting private market outcome, while civil law aims to substitute these outcomes with allocations determined by the state.

⁴ Civil laws depend on professional judges, legal codes, and documental records, whereas common law relies on lay judges, more general legal principles, and oral arguments.

⁵ One [English common law] sees the essence of freedom in spontaneity and the lack of coercion, while the other [French civil law] believes it is achieved only through the pursuit and realization of a definitive social goal.

The primary objective of this study is to explore the asymmetric impact of corruption on economic growth across contexts like economic levels and legal origins. The hypotheses to be tested in the study are summarized below:

Hypothesis 1: The effect of corruption on economic growth is negative.

Hypothesis 2: This effect of corruption on growth, although negative, is different in developing and developed countries.

Hypothesis 3: The adverse effect of corruption on economic growth is asymmetric across Legal-Origins.

This research differs from previous research in the following respects. First, the analysis empirically tests the most recent (and reliably comparable) data for all the available countries and compares the results between developed and developing economies. Second, it brings into the picture the legal and historical dimensions to observe trends between countries within the same legal origin and across different legal descents. The current literature largely focuses on understanding the standalone connection between corruption and growth, or a third variable of interest (such as taxation). The identification of Legal-Origins, which might partly set the context for the nature of the association between corruption and economic growth, is nonexistent in the literature. By acknowledging the asymmetrical impact of corruption on growth, the study introduces non-universality in the corruption-growth model. Given the non-universality, this research opens avenues of discussion in academic and public policy spheres about the region-specific or condition-specific course of actions that might be taken. A particular policy, for instance, that proves effective in combating the incidence of corruption in developed countries may not be as successful in a developing economy.

The paper comprises five sections. The “Introduction” gives a background to the subject matter of corruption, economic growth, and Legal-Origins, identifies the research gap to be addressed by this study, and lays out the hypotheses to be tested. The “Literature Review” delves into the definitions of corruption and an overview of the existing studies that explored the corruption-growth relationship. Description of the data utilized in the present research and the econometric methodology employed are explained in the “Data and Methodology” section. “Results and Discussion” summarizes the models’ findings when applied to different panels and interprets the asymmetric results. Lastly, “Conclusion” concisely brings the undertaken research to a close, acknowledges the limitations, and presents avenues for future research.

2. Literature Review

2.1 Understanding Corruption: Causes and Consequences

Corruption is defined variably, and its definition is not independent of the context in which it is discussed. The commonly used definition – which is also what this study utilizes as context – is “the misuse of public office for personal benefit” (World Bank, 2020); or “the misuse of commit for personal benefit (Transparency International, n.d.-a). The etymological root of the word is from the Latin *rumpere*, which meant “to break” (Merriam-Webster, n.d.). Deliberately disregarding the arm's-length principle to gain an advantage for oneself or related individuals through this behavior (Tanzi, 1995). Elsewhere, the author discusses the causes, aftermath, scope, and potential treatments of corruption globally, which this section will continue to review.

Tanzi (1998) identified some key factors directly and indirectly impacting the incidence of corruption. These included, among others, the quality of bureaucracy, taxation system, institutional weaknesses, undue interference with market prices, political races, public sector wages, magnitude and enforcement of penalties (on those caught), and leadership effects. Moreover, the author asserts that “lack of transparency in rules, laws, and processes creates a fertile ground for corruption.” The paper goes on to argue the consequences of corruption, which included a reduction in government’s regulatory control, distortion of incentives, welfare costs, detrimental impact on the earning potential of the poor, decline in investments (domestic and foreign), fall in government expenditure on human development sectors, decrease in tax revenue, and negative influence on the economy’s productivity. The author urges understanding corruption from an economic framework of demand and supply to devise strategies to fight it. The approaches include transparency in government, strengthening legal frameworks and enforcement, and active participation of civil society on the issue. Still, corruption is a prevalent issue throughout the globe, the author acknowledges, and would thus require context-specific strategies for public policy, which consider countries’ social, economic, and political situations.

Nwabuzor (2005) identified some of the causes of corruption, including inter alia, poverty, low economic freedom, lack of rule of law, and particular socio-cultural settings. This research also highlighted the adverse impact of corruption on the economy, labor, and governance. Aligned with the assertion of Tanzi (1998) and World Development Report 2000/2001: Attacking Poverty by World Bank (2001), the author claimed that “corruption represents a regressive tax that falls heavily on the poor.” Shabbir and Anwar (2007) inspected 2006 data for 41

developing countries to determine corruption's determinants. They concluded that all economic factors – average income, income distribution, economic freedom, education level, and globalization – are negatively related to the level of corruption in a developing country, while non-economic determinants – freedom of the press, degree of democracy, and people's religion – are not significant in explaining corruption.

2.2 Corruption and Growth

Hussain et al. (2023) investigated the effect of corruption in developed and developing countries concerning taxation and economic growth. Utilizing annual data from 1984 to 2016, the study examined 40 developed countries and 69 developing economies. Data for both country groups were divided into separate panels and analyzed independently to assess any distinctive results. The paper applied the Dynamic Ordinary Least Squares (DOLS) approach to estimate relationships between the variables and the Granger Causality Test to determine the directions of causal influence. Interestingly, they find that in developed countries, both taxation and corruption “lubricate the wheel” of economic growth. In contrast, in developing nations, effective taxation contributes to economic prosperity, but corruption “sands the wheel” of growth. In addition to other insights, unidirectional causality was observed from corruption to taxation in both groups of countries, and bidirectional causality was found between all variables in the long run.

Ahmad et al. (2012) attempted to establish a non-linear specification between corruption and real economic growth. Using Solow's original approach of growth accounting as the theoretical framework and the Generalized Method of Moments (GMM) estimation technique as the statistical model for the data of 71 countries from 1984 through 2009, they find a non-linear relationship between corruption and real GDP per worker. Specifically, their empirical results showed an inverted U-shaped curve between corruption and economic growth.

Trabelsi (2024), similarly contesting straightforward negatively associated linearity between corruption and economic growth, tested the hypothesis that the relationship between the variables is non-linear. Utilizing a panel dataset of 65 countries from 1987 to 2021, the study employed a Panel-Corrected Standard Errors (PCSE) non-linear growth model considering threshold effects. The analysis asserts a nuanced impact of corruption on growth: above an “optimal threshold,” which the author describes as a “moderate level of corruption,” the incidence of corruption is damaging to economic growth, but below that threshold, it may positively grease the process of economic development.

Threshold estimation in econometric regression is the technique to find a particular value beyond which a variable of interest changes its characteristics. Hansen (2000) provides a specific method for estimating least-squares parametric values for threshold, namely by sample splitting. Alfada (2019) employed this approach to develop a threshold model for Indonesia, studying the deteriorating impacts of corruption on economic growth in the country's provinces. The sample included data from 19 provinces between 2004 and 2015. To deal with endogeneity, the study utilized an instrumental variables two-stage least squares (2SLS) econometric approach. The impact of corruption (indicated by the number of corruption cases) on the regional GDP per capita growth rate is negative, with the threshold at 1.765 points. Provinces where the existence of corruption is below this threshold face deteriorating effects from corruption, and in provinces where the incidence of corruption is higher than the threshold, the destructive effects appear to be stronger.

Corruption has been studied to impact economic growth via different channels. Ahmad et al. (2012) found the hindering effect of corruption in the form of reduced domestic and foreign investment and non-optimal government expenditure in terms of spending and choice of public projects. Aghion et al. (2016) propose that the presence of (political) corruption intervenes with, and thereby deteriorates, the efficiency of translating tax revenue to public goods or infrastructure, which hinders entrepreneurial pursuits and innovation. The authors build an endogenous (Schumpeterian) growth model to analyze 25 years of State and county-level data (1983–2007) from the United States. Their results show that a higher level of local corruption dampens the positive effect of taxation on economic activities.

Breaking down the impact of corruption on the economy by introducing channels shows the multi-faceted and interconnected nature of the corruption nexus. Mo (2001) aimed to estimate quantitative values for the impacts of different transmission channels – namely, human capital, political stability, and investment – through which the incidence of corruption affects economic growth. The author theoretically approached the problem from the lens of an input-output relationship in the form of a general production function. Empirically, the paper applied the Ordinary Least Squares (OLS) model on a panel of 54 countries from 1970-1985. The results report that a one-unit increase in the corruption index is associated with a 0.545 decrease in the GDP growth rate. As far as transmission channels are concerned, political stability was responsible for 53 % of this total effect, followed by investment (21.4 %) and the human capital channel (14.8 %). The direct impact of corruption on growth accounted for 11.8 % of the total effect.

Intuitively, corruption could impact economic growth via different channels, and similarly, economic development could influence corruption, as a result of politico-economic institutional changes. Gründler and Potrafke (2019) considered this extension of the Lipset hypothesis to study the association between corruption and economic growth. The authors also identified that the Corruption Perceptions Index (CPI), owing to its methodology, was comparable after 2012, which many studies before this failed to consider. Therefore, for 2012-2018 and across 175 countries, the paper applied a dynamic panel regression with two-way FE and, to control for endogeneity, included four lags of the dependent variable (real GDP per capita). The analysis provided two interesting findings. First, corruption hurts growth: a one standard deviation increase in corruption score is associated with a 17 % decline in GDP per capita in the long run. Second, the effect is notably more so in autocratic economies and countries with low governance and rule of law effectiveness.

Dzhumashev (2013) investigates the association between economic growth and bureaucratic corruption using a mathematical and theoretical lens rather than an empirical one. Using an endogenous growth model, the paper analyzes governance metrics (for example, the size of public spending) and their interaction with corruption to evaluate the latter's effects on growth. It offers multiple behavioral and public policy insights on the subject matter. First, corruption positively impacts the economy only if the size of the government is above an optimal (threshold) level. Second, as an economy develops, the incidence of corruption reduces. Third, the growth level achieved through corruption is sub-optimal; it is lower than what could be achieved by the economy, under the same conditions, with the absence of corruption. Hence, the paper points towards the opportunity cost of corruption. Fourth, ensuring private agents do not evade taxation, rather than targeting bureaucrats, is more effective in reducing corruption.

Corruption, by definition, describes the abuse of entrusted power by personnel in public offices. The military is a public institution that offers security services; it is funded by public funds and is operated under the government's authority. As a public office, the military is not devoid of corruption. Due to how military organizations function, given their objectives that demand covertness and their monopolistic or monopsonistic place in the security market, it can be argued that corruption in this institution might be doubly incentivized, given the lack of supervision and restraint. The seminal study of Gupta et al. (2001), building on the public-choice framework, explored the relationship between military spending and corruption. Applying cross-sectional and panel data analysis techniques to a dataset

of 120 countries from 1975 through 1995, they found a significant and positive association between corruption and military expenditure.

Expanding on the above study, Hudson and Jones (2008) retested the results and investigated the bidirectional relationship between corruption and military expenditure. They examined whether an increase in military spending causes a rise in corruption, or vice versa. The authors utilized panel data from 131 countries from 1984 through 2006, executing two regression models by rotating corruption and military indicators as independent variables. Rise in military expenditure per soldier and arms imports, they conclude, increases corruption. Reversely, military expenditure is positively impacted by the country's area and the size of internal threats, while arms imports are influenced by the size of external threats, GDP per capita, and corruption. The significant bidirectional link between the military spending indicator and corruption, where military expenditure causes corruption and corruption augments spending, traps an economy into a spiraling loop, other things being equal.

Ali and Solarin (2020) further extend the work of Hudson and Jones (2008), utilizing a public-choice framework and focusing on the newly available data from 1996 through 2016. Their analysis includes 59 developing countries and employs the GMM technique for panel data analysis to examine the association between corruption on military spending. Their findings hold that countries with a higher corruption score exhibit increased military expenditures and burdens. Moreover, efforts to reduce corruption will not only contribute to economic efficiency, particularly concerning the military institution, but will also improve the government's fiscal imbalances (Ali and Solarin, 2020).

Excess military spending is argued to dampen opportunities for economic growth. Moreover, the level of military expenditure can impact how corruption and growth are associated. For this, d'Agostino et al. (2012) delve into the interplay between military spending, economic growth, and corruption within an endogenous growth framework. Employing a dynamic econometric approach using the GMM estimator, the authors examine the panel data of 53 African countries from 2003 to 2007. Although government investment in public projects directly promotes growth, the study finds that high military burdens and current government spending, coupled with corruption, can reduce it. This is because of corruption in an economy. The authors additionally estimate elasticities from their econometric model to conduct a sensitivity analysis on the involved variables. The results report that a reduction in military expenditure can directly lead to improved macroeconomic performance and indirectly "stem the effects of corruption."

Corruption also affects firm performance. Building on the Augmented-Solow Growth model, by introducing corruption parameters to capture the effects of corruption on multi-factor productivity, Coupet Jr (2003) explored the “real effects of corruption on a firm’s production function.” The author used data from 82 countries and took averages of involved variables (except for the dependent variable, which is real GDP per worker) over 1960-1989 to conduct two cross-sectional pooled OLS analyses. The first analysis employed the dependent variable’s 1989 logarithmic values; the second utilized growth values (logarithmic difference of 1960-1989). The results showed a negative and linear association between a country’s standard of living and corruption, regardless of country size. Moreover, for the OECD sample, more nuanced findings were discovered.

Different indicators and measures have been used in the empirical studies related to corruption. Spyromitros and Panagiotidis (2022) performed a twofold analysis in their study. First, they examined and compared the different processes of corruption measurement. Out of three generations of indicators, the second generation is friendliest to econometric analyses. Second, the paper explored the impact of corruption on economic performance, using the Corruption Perception Index (CPI), Control of Corruption Index (CCI), and International Country Risk Guide (ICRG) – one at a time – as the focused explanatory variable. The econometric models were built on the Augmented-Solow Growth theoretical model and integrated Autoregressive and FMOLS techniques. Panel data of 83 developing economies over the period 2012-2018, results showed that a 1% increase in corruption is associated with a 0.2 % or 4 % decline in growth. The authors also divided the entire panel into five geographical regions, as classified by the World Bank. They found, interestingly, that corruption is significantly detrimental to growth in European, Central Asian, East Asian, Pacific, and Sub-Saharan African countries, while it has positive and significant effects on growth in Latin American and Caribbean nations. The effect is non-significant in Middle Eastern and North African countries.

2.3 Corruption and Legal-Origins: Theory

The division of the panel in Spyromitros and Panagiotidis (2022), according to geographical regions, held the suggestion that the impact of corruption is different, given the region being discussed. The author of the present study similarly hypothesizes that the effects of corruption, instead of leaving a universal footprint, might be different given the legal origin of the country being discussed. The existing literature, though theoretically acknowledging the role of legal frameworks in the association between corruption and growth, does not empirically

test the (possibly differing) signs and magnitudes of the influence of corruption on growth across Legal-Origins. One of the aims of the present research is to empirically test this hypothesis that has remained unattended in the literature.

Legal origins – and how they influence the legal structures of a country – have direct and indirect bearings on economic outcomes. La Porta et al. (2008) provided a comprehensive summary of the findings of research on Legal-Origins. They quantitatively evaluated the different Legal-Origins across economic metrics, governance indicators, and financial institutions. On average, they found that common law countries tend to have better property rights protection, more efficient judicial systems, and higher levels of financial development than civil law countries. Civil law countries, moreover, tend to manifest regulation, property rights, political freedom, and efficiency of government (Glaeser & Shleifer, 2002).

3. Data and Methodology

3.1. Data Collection and Analysis

The study employs a quantitative panel regression approach using annual data from 2012 to 2021 for 152 countries to test the hypotheses introduced in the Introduction. For the objectives of this study, data for all the available countries have been collected from World Development Indicators (WDI) available at the World Bank’s Databank, Transparency International, and La Porta et al. (2008). Due to the updated methodology of calculating the Corruption Perceptions Index, it has been comparable over time since 2012. Hence, data for all the variables have been collected from 2012 through 2021. The description of selected variables is provided in Table 1.

Table 1: Variables Selected for the Analysis

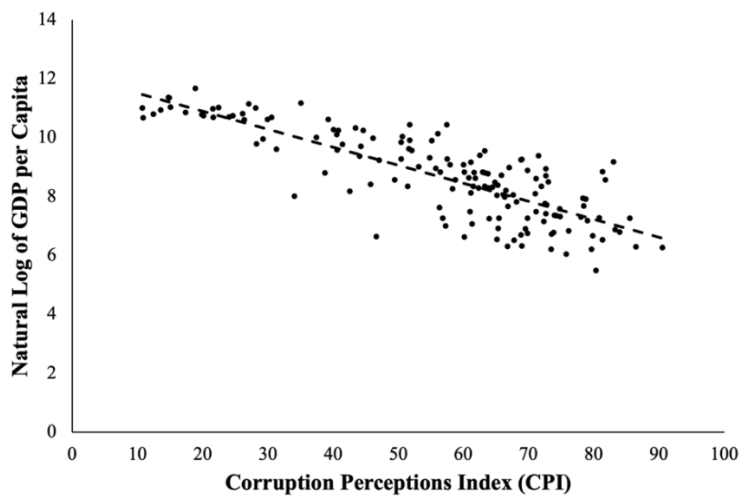
Variables	Description	Source
<i>GDP Per Capita</i>	Natural log of GDP per capita (current US\$)	WDI
<i>CPI</i>	Corruption Perceptions Index inverted by subtracting from 100	Transparency International
<i>FCE</i>	Natural log of final consumption expenditure (current US\$)	WDI
<i>Inflation</i>	Inflation, GDP deflator (annual %)	WDI
<i>Trade</i>	Measure of trade openness: sum of exports and imports divided by Gross Domestic Product	WDI
<i>IR</i>	Real interest rate (%)	WDI
<i>PS</i>	Score of perceived political stability and absence of violence or terrorism, ranging from approximately negative 2.5 to positive 2.5	WDI

The correlation coefficient between GDP per capita and CPI is noteworthy: -0.74. It a priori suggests a strong negative association between the two indicators. This inverse correlation can be visualized in a scatter plot by collapsing the panel dataset by the mean values of each country across time for CPI and GDP per capita. This is done in Figure 1; each scatter point represents one country's mean value from 2012 to 2021. Descriptive statistics of the relevant variables in the complete panel are provided in Table 2. For descriptive statistics only, gross values for GDP per capita and final consumption expenditure are used instead of logarithmic.

Table 2: Descriptive Statistics – All Countries

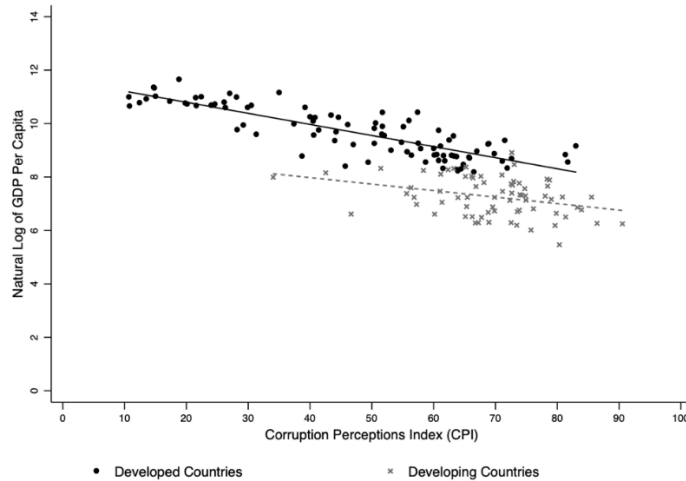
Variable	Mean	Standard Deviation	Min	Max	Count
GDP per capita	15,058	21,002	217	133,711	1,520
CPI	56	19.6	8	92	1,520
FCE	3.99E+11	1.50E+12	9.87E+08	1.94E+13	1,474
Inflation	6.2	22.2	-30.2	605	1,511
Trade	0.94	0.66	0.02	5.31	1,480
IR	6.1	9.6	-81.1	60.9	939
PS	-0.2	-0.95	-3	1.62	1,520

Figure 1: Mean CPI vs Mean GDP Per Capita – All Countries



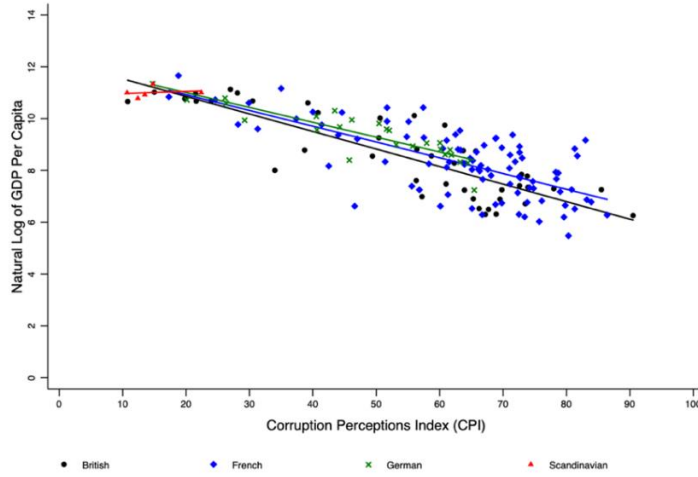
As observed in Figure 2, developing economies not only lie below developed countries in GDP per capita level, but are also clustered more closely at the right-hand of the plot's quadrant; hence revealing that corruption is particularly high in almost all developing countries. Perceived corruption is dispersed in developed nations; some indicate a low level of corruption, while others portray a high incidence of corruption.

Figure 2: Mean CPI vs Mean GDP Per Capita – Developed and Developing Countries



Moreover, the slope of the mean line associated with developed countries is steeper than the slope mean line associated with developing countries. The overall impact of corruption on growth, therefore, might be different for developed and developing countries. To analyze and model these two groups separately, the study breaks down the complete panel dataset into two parts: one panel including developed countries and the other including developing countries. Separating the panels also resolves unwanted multicollinearity.

Due to the scarcity of data for countries associated with Socialist law, this study refrains from conducting a separate analysis of Socialist legal origin. The relationship between GDP per capita and CPI for the remaining four Legal-Origins is visualized in Figure 3. Among the Legal-Origins, Scandinavian law countries have the highest mean GDP per capita and the lowest mean CPI, followed by German, French, and British legal-origin countries.

Figure 3: Mean CPI vs Mean GDP Per Capita – Legal-Origins

4. Model Specification

The study employed three-panel regression techniques: Pooled OLS, one-way Fixed Effect (FE), and Random Effect (RE). Pooled OLS assumes no difference between the countries in the sample and treats the panel as a large cross-section. One-way FE assumes that all countries are different and controls for area-specific conditions (such as institutional, cultural, and geographical differences). Contrarily, the RE model supposes unobserved (and random) variation between groups in explaining the relationship between the dependent and independent variables.

First, the specification for pooled OLS regression is given in (1).

$$GDP\ per\ Capita_{it} = \alpha_0 + \alpha_1 CPI_{it} + \alpha_2 FCE_{it} + \alpha_3 Trade_{it} + \alpha_4 IR_{it} + PS_{it} + \varepsilon \quad (1)$$

Where *GDP per capita* is the natural log of GDP per capita, *CPI* is the Corruption Perceptions Index is inverted to a scale from 0 (no corruption) to 100 (extreme corruption), *FCE* is the final consumption expenditure, *Trade* is the measure of trade openness, *IR* represents the interest rate, *PS* indicates political stability, and ε is the idiosyncratic error term. Next, the FE model in (2) introduces country dummies.

$$GDP\ per\ Capita_{it} = \alpha_0 + \alpha_1 CPI_{it} + \alpha_2 FCE_{it} + \alpha_3 Trade_{it} + \alpha_4 IR_{it} + PS_{it} + \sum_{l=1}^m \delta_l Country_l + \varepsilon \quad (2)$$

Lastly, the RE model's specification replaces the fixed effect with the cross-sectional RE term μ_i , as in (3).

$$GDP\ per\ Capita_{it} = \alpha_0 + \alpha_1 CPI_{it} + \alpha_2 FCE_{it} + \alpha_3 Trade_{it} + \alpha_4 IR_{it} + PS_{it} + \mu_i + \varepsilon \quad (3)$$

The complete panel consisting of 152 countries in the sample is divided, first, into developed and developing countries' sub-panels and, second, into Legal-Origins sub-panels. The finalized models are separately applied to these seven panels (one for all countries, two for income-based classification, and four for Legal-Origins). An F-test was conducted to compare pooled OLS and FE models. The Breusch-Pagan LM Test was carried out to compare pooled OLS and RE models. Lastly, the Hausman test was applied to decide between FE and RE specifications.

5. Results and Discussion

First and foremost, the study aimed to quantify the general association between corruption and growth for all available countries. As observed in Table 3, Pooled OLS models (Models 1 and 2) – which treat the dataset as a large cross-section – show a significant and negative association between growth and corruption. A ten-unit increase in the corruption perceptions index is associated with a 0.25 – 0.26% decline in GDP per capita.

In FE models with country dummies (Models 3 and 4), the relationship remains negative and significant, but with a much lower magnitude. Upon controlling for country-specific conditions, a ten-unit increase in corruption is associated with a 0.03% decrease in GDP per capita. With RE, a ten-unit increase in corruption is associated with a 0.05 – 0.06% decrease in GDP per capita.

For all three modelling approaches (pooled, FE, and RE), two models have been defined: one with interest rate and one with inflation. For all the models in Table 3, interest rate represents an inverse relationship with growth, but the impact of inflation is insignificant and approximately zero. Moreover, in line with economic theory, the impact of final consumption expenditure, trade openness, and political stability on GDP per capita is significant and positive in all models. The F-test, Breusch-Pagan LM, and Hausman test indicate FE models to be the most superior.

Table 3: Regression Results – All Countries

<i>(Dependent variable is Natural Log of GDP Per Capita)</i>						
Independent Variables	<i>Pooled</i>		<i>Fixed Effect</i>		<i>Random Effect</i>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
CPI	- 0.025*** (-0.002)	- 0.026*** (-0.002)	- 0.003*** (-0.001)	-0.003*** (-0.001)	-0.005*** (-0.001)	- 0.004*** (-0.001)
FCE	0.329*** (-0.012)	0.333*** (-0.011)	0.743*** (-0.018)	0.771*** (-0.014)	0.668*** (-0.017)	0.702*** (-0.014)
Trade	0.373*** (-0.041)	0.494*** (-0.030)	0.369*** (-0.018)	0.327*** (-0.014)	0.399*** (-0.019)	0.365*** (-0.015)
IR	- 0.007*** (-0.002)		- 0.001*** (0.000)		-0.001*** (0.000)	
Inflation		-0.000 (-0.001)		-0.000 (0.000)		-0.000 (0.000)
PS	0.464*** (-0.041)	0.378*** (-0.030)	0.031*** (-0.012)	0.027*** (-0.01)	0.050*** (-0.013)	0.047*** (-0.011)
Constant	1.679*** (-0.383)	1.525*** (-0.322)	- 9.923*** (-0.437)	- 10.549*** (-0.344)	-7.997*** (-0.429)	- 8.763*** (-0.345)
Observations	917	1469	917	1469	917	1469
R ²	0.757	0.805	0.998	0.998		
No. of Cross Sections			106	152	106	152

*Note: Standard errors are in parentheses. ***, **, and * represents the significance level at 1%, 5%, and 10%, respectively.*

The results of the models, when applied to the developed countries panel, are shown in Table 4. Pooled OLS regression revealed a significant and negative relationship between economic growth and corruption: a ten-unit increase in perceived corruption in developed economies is associated with a 0.31-0.32 % decline in GDP per capita. In the case of FE and RE, the relationship remains significantly inverse: a ten-unit rise in corruption is related to a 0.02% and 0.03 % decline in GDP per capita, respectively.

The impact of final consumption expenditure, trade openness, and political stability on economic growth is positive and significant in all models. In pooled OLS, the coefficient of interest rate, although negative, is insignificant, while that of inflation is negative and significant. However, in FE and RE models, interest rate

possesses an inverse relationship while the impact of inflation is non-existent. Model valuation results indicate that fixed-effects models are the most superior.

Table 4: Regression Results – Developed Countries

<i>(Dependent variable is Natural Log of GDP Per Capita)</i>						
	<i>Pooled</i>		<i>Fixed Effect</i>		<i>Random Effect</i>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
Independent Variables						
CPI	-0.032*** (0.002)	-0.031*** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.003** (0.001)	-0.003*** (0.001)
FCE	0.176*** (0.013)	0.165*** (0.010)	0.781*** (0.028)	0.759*** (0.022)	0.580*** (0.025)	0.561*** (0.020)
Trade	0.164*** (0.034)	0.289*** (0.024)	0.402*** (0.025)	0.328*** (0.017)	0.439*** (0.028)	0.390*** (0.019)
IR	-0.002 (0.003)		-0.002*** (0.001)		-0.002*** (0.001)	
Inflation		-0.005** (0.002)		0.001 (0.000)		0.000 (0.001)
PS	0.136*** (0.047)	0.061* (0.032)	0.053*** (0.017)	0.056*** (0.013)	0.076*** (0.019)	0.076*** (0.015)
Constant	6.420*** (0.402)	6.624*** (0.320)	-10.667*** (0.701)	-9.961*** (0.555)	-5.518*** (0.649)	-4.897*** (0.503)
Observations	512	859	512	859	512	859
R^2	0.737	0.775	0.995	0.996		
No. of Cross Sections			59	88	59	88

*Note: Standard errors are in parentheses. ***, **, and * represents the significance level at 1%, 5%, and 10%, respectively.*

When estimated for developing countries' data, the results are shown in Table 5. According to pooled OLS models, going up ten points in the perceived corruption scale brings down the average GDP per capita by a proportion of 0.08-0.09 %. Comparing this result with developed countries, the impact of corruption on growth appears *lower* in developing countries. This finding, however, reverses FE and RE models, which associate a ten-unit increase in corruption with a 0.05-0.06 % decrease in GDP per capita. Unlike Hussain et al. (2023), who found that corruption may “lubricate the wheel” of growth in development economics, this analysis finds that corruption “sands the wheel” of growth in both developed and developing countries. Compared with developed countries' results, corruption has

around twice as adverse an impact on growth in developing economies. That is, the economic toll of corruption is heavier in the latter.

Table 5: Regression Results – Developing Countries

<i>(Dependent variable is Natural Log of GDP Per Capita)</i>						
	<i>Pooled</i>		<i>Fixed Effect</i>		<i>Random Effect</i>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
Independent Variables						
CPI	- 0.008*** (0.003)	- 0.009*** (0.003)	- 0.005*** (0.001)	-0.005*** (0.001)	- 0.006*** (0.002)	- 0.006*** (0.002)
FCE	0.264*** (0.019)	0.284*** (0.015)	0.725*** (0.023)	0.777*** (0.019)	0.632*** (0.023)	0.680*** (0.019)
Trade	0.602*** (0.086)	0.576*** (0.055)	0.332*** (0.026)	0.319*** (0.026)	0.373*** (0.028)	0.372*** (0.028)
IR	- 0.011*** (0.002)		-0.001* (0.000)		-0.001* (0.000)	
Inflation		0.001* (0.001)		-0.000 (0.000)		-0.000* (0.000)
PS	0.338*** (0.051)	0.281*** (0.035)	0.007 (0.016)	-0.000 (0.015)	0.033* (0.017)	0.023 (0.016)
Constant	1.492*** (0.496)	1.001** (0.411)	- 9.715*** (0.556)	- 11.019*** (0.469)	- 7.438*** (0.561)	- 8.617*** (0.484)
Observations	405	610	405	610	405	610
R^2	0.473	0.490	0.993	0.989		
No. of Cross Sections	-	-	47	64	47	64

Note: Standard errors are in parentheses. ***, **, and * represents the significance level at 1%, 5%, and 10%, respectively.

The direction of impact of control variables appears to be straightforwardly consistent with what is proposed in economic theory, except for a few caveats. Inflation is slightly positive and significant in models 1 and 2, but approaches zero in models 3 to 6. The influence of political stability on growth, although displaying a strong positive relation in pooled OLS regressions, withers to insignificance (except in model 5). One likely explanation for the insignificance of political stability is that for developing countries, the majority of the values are concentrated on the negative end of the scale; that is, most developing economies face political

instability. Thus, the sample might have insufficient variance to explain any meaningful connection with economic growth. Instability in the political realm may also be acting as a transmission channel for corruption, as Mo (2001) found. All diagnostic tests point towards FE models being the most superior.

5.1. Legal Origins

This sub-section lays out the results of the models for Legal-Origins' panels.

5.1.1. *British Law Countries*

When data for British law countries is utilized, the results appear in Table 6. Pooled OLS regression (models 1 and 2) revealed a significant and negative association between economic growth and perceived corruption. A ten-unit rise in corruption score is associated with a 0.57-0.61 % decline in GDP per capita.

Upon incorporating country-FE or RE, the impact of corruption on economic growth wanes, except for in model 5, which associates a ten-unit rise in corruption with a 0.03 % decline in GDP per capita. Model 3, 4, and 6 results conclude a non-existent impact of corruption. A series of F-tests, Breusch-Pagan LM, and the Hausman test indicate FE models to be the most superior. Hence, the estimation results for the British law countries' panel reveal insignificant effects of corruption on economic growth.

The impact of final consumption expenditure, trade openness, and interest rate on GDP per capita in all models is as per the economic literature. Inflation, if utilized in place of interest rate, exhibits no impact on GDP per capita. Political stability, as in the case of developing economies, and although displaying a strong positive relation with growth in pooled OLS regressions, withers to insignificance in models 3 to 6. It might be interesting to explore, theoretically and empirically, the reasons for political stability not playing as crucial a role in British law countries as it does in general.

Table 6: Regression Results – British Legal Origin Countries

<i>(Dependent variable is Natural Log of GDP Per Capita)</i>						
Independent Variables	Pooled		Fixed Effect		Random Effect	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CPI	- 0.057*** (0.004)	- 0.061*** (0.004)	-0.000 (0.002)	0.002 (0.001)	-0.003* (0.002)	0.000 (0.002)
FCE	0.234*** (0.021)	0.225*** (0.023)	0.794*** (0.023)	0.851*** (0.021)	0.724*** (0.026)	0.795*** (0.023)
Trade	0.210*** (0.045)	0.344*** (0.048)	0.208*** (0.025)	0.307*** (0.026)	0.228*** (0.030)	0.335*** (0.030)
IR	-0.009** (0.004)		-0.001*** (0.000)		-0.001** (0.001)	
Inflation		0.000 (0.001)		-0.000 (0.000)		-0.000 (0.000)
PS	-0.088 (0.072)	- 0.221*** (0.074)	0.019 (0.018)	-0.009 (0.019)	0.036* (0.021)	0.011 (0.021)
Constant	5.433*** (0.691)	5.813*** (0.748)	- 11.498*** (0.603)	- 13.053*** (0.547)	- 9.550*** (0.682)	- 11.549*** (0.608)
Observations	242	352	242	352	242	352
R ²	0.876	0.846	0.999	0.999		
No. of Cross Sections	-	-	28	36	28	36

Note: Standard errors are in parentheses. ***, **, and * represents the significance level at 1%, 5%, and 10%, respectively.

5.1.2. French Law Countries

The results of French law countries' analysis are summarized in Table 7. Pooled OLS regressions revealed a significant and inverse association between economic growth and perceived corruption. A ten-unit increase in corruption score is associated with a 0.16 % decline in GDP per capita. Compared to pooled OLS results of the British LO panel, the impact of corruption appears to be much lower in French LO countries. Introducing FE or RE reduces the magnitude of the impact of corruption to 0.04-0.06, but the direction remains negative and the coefficient stands significant. FE models are diagnostically the most superior. Unlike in British LO, corruption is starkly detrimental in the case of French LO, with a magnitude almost comparable to that found in the developing economies panel.

In line with economic literature, the impact of final consumption expenditure, trade openness, and political stability on GDP per capita is positive and significant in all models. French legal origin countries, although bearing the toll of corruption as much as developing countries, do not exhibit the same lack of association between political stability and economic growth. Interest rate displays an inverse relation with growth in pooled OLS cases, but becomes insignificant in FE and RE. Inflation, on the other hand, displayed an insignificant connection to growth in pooled OLS but became significantly negative in FE and RE. Such nuanced behavior of interest rate and/or inflation in French Legal-Origins is worth exploring in future research.

Table 7: Regression Results – French Legal Origin Countries

	<i>(Dependent variable is Natural Log of GDP Per Capita)</i>					
	<i>Pooled</i>		<i>Fixed Effect</i>		<i>Random Effect</i>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
Independent Variables						
CPI	-0.016*** (0.003)	-0.016*** (0.002)	-0.004*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.006*** (0.001)
FCE	0.411*** (0.017)	0.420*** (0.015)	0.667*** (0.026)	0.700*** (0.021)	0.619*** (0.024)	0.646*** (0.019)
Trade	0.662*** (0.083)	0.592*** (0.043)	0.490*** (0.026)	0.363*** (0.020)	0.514*** (0.027)	0.395*** (0.021)
IR	-0.009*** (0.003)		-0.001 (0.001)		-0.001 (0.001)	
Inflation		0.001 (0.002)		-0.001* (0.000)		-0.001** (0.000)
PS	0.593*** (0.054)	0.484*** (0.037)	0.034** (0.016)	0.042*** (0.014)	0.050*** (0.016)	0.059*** (0.014)
Constant	-0.993* (0.511)	-1.241*** (0.444)	-8.195*** (0.628)	-8.823*** (0.511)	-6.969*** (0.593)	-7.409*** (0.487)
Observations	510	818	510	818	510	818
R ²	0.708	0.773	0.997	0.997		
No. of Cross Sections	-	-	60	86	60	86

Note: Standard errors are in parentheses. ***, **, and * represents the significance level at 1%, 5%, and 10%, respectively.

5.1.3. German Law Countries

The results of German law countries' analysis are summarized in Table 8. Pooled OLS models revealed an inverse and significant association between economic growth and corruption. A ten-unit rise in corruption is related to 0.31-0.35% decrease in GDP per capita. The coefficient is twice as high as in the French LO case. Controlling for either country-specific characteristics or unobserved heterogeneity reduces the magnitude of the impact of corruption to 0.03-0.06, but the direction remains negative and the coefficient stands significant. Hence, upon introducing FE or RE, the relationship between corruption and growth is approximately similar in German LO as it was in French LO. Moreover, FE models prove to be the most superior.

The direction of impact of control variables is as per theory. Interest rates and inflation display insignificance in pooled OLS models but become significant when heterogeneity controls are introduced. Moreover, unlike in the French LO panel, political stability exhibits an insignificant relationship with economic growth in German LO only in the case of FE.

Table 8: Regression Results – German Legal Origin Countries

Independent Variables	<i>(Dependent variable is Natural Log of GDP Per Capita)</i>					
	<i>Pooled</i>		<i>Fixed Effect</i>		<i>Random Effect</i>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
CPI	- 0.035*** (0.003)	- 0.031*** (0.002)	-0.003* (0.002)	-0.003** (0.001)	-0.004** (0.002)	- 0.006*** (0.002)
FCE	0.207*** (0.016)	0.196*** (0.012)	0.881*** (0.053)	0.907*** (0.035)	0.505*** (0.041)	0.531*** (0.031)
Trade	0.522*** (0.084)	0.518*** (0.050)	0.159*** (0.049)	0.145*** (0.032)	0.307*** (0.060)	0.338*** (0.042)
IR	-0.007 (0.005)		- 0.005*** (0.001)		- 0.005*** (0.001)	
Inflation		-0.004 (0.003)		0.004*** (0.001)		0.003*** (0.001)
PS	0.262*** (0.065)	0.325*** (0.049)	0.039 (0.028)	0.022 (0.019)	0.076** (0.036)	0.048* (0.027)
Constant	5.199***	5.257***	-0.003*	13.326***	3.476***	4.028***

	(0.513)	(0.372)	(0.002)	(0.865)	(1.042)	(0.781)
Observations	146	249	146	249	146	249
R^2	0.905	0.905	0.996	0.997		
No. of Cross Sections	-	-	16	25	16	25

*Note: Standard errors are in parentheses. ***, **, and * represents the significance level at 1%, 5%, and 10%, respectively.*

5.1.4. Scandinavian Law Countries

Results in the case of Scandinavian legal origin countries are shown in Table 9. Unlike all other panels, pooled OLS models revealed a positive and significant association between corruption and economic growth. A ten-unit rise in corruption score relates to a 0.23-0.33 decline in GDP per capita in Scandinavian LO economies. With country-FE, the corruption coefficient became insignificant. This might partially be due to the low incidence of corruption on average in Scandinavian LO countries, and thus, there is less variance in the sample for the model to capture any significant information. Interestingly, RE models present the same results as pooled OLS regressions. This can be explained by the non-existent variance/standard deviation of panel-wise effects in the RE model, implying that the data points do not exhibit unobserved heterogeneity. FE models, as expected, are superior as per the results of the F-test.

The impact of control variables appears consistent with economic theory, except for a few caveats. When either interest rate or inflation is employed, their coefficients are insignificant. The influence of political stability on economic growth becomes negative when country dummies are added. This can partially be explained by the fact that Scandinavian LO countries, on average, are most stable politically among other Legal-Origins, and thus, there is a lack of variance in the sample.

It is worth mentioning here that the panel for Scandinavian countries is rather small, with a total of fifty observations only (at most). Hence, the reliability of the results in Scandinavian law countries' panel is open to question, especially when an increasing number of controls are added in FE models, thereby reducing degrees of freedom.

Table 9: Regression Results – Scandinavian Legal Origin Countries

Independent Variables	<i>(Dependent variable is Natural Log of GDP Per Capita)</i>					
	<i>Pooled</i>		<i>Fixed Effect</i>		<i>Random Effect</i>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
CPI	0.023** * (0.006)	0.033** * (0.010)	-0.006 (0.008)	-0.001 (0.003)	0.023*** (0.006)	0.033** * (0.010)
FCE	0.259** * (0.019)	0.191** * (0.038)	0.740*** (0.122)	0.720*** (0.063)	0.259*** (0.019)	0.191** * (0.038)
10	0.882** * (0.108)	0.447** * (0.163)	0.539*** (0.114)	0.465*** (0.060)	0.882*** (0.108)	0.447** * (0.163)
Trade	-0.003 (0.003)		-0.002 (0.002)		-0.003 (0.003)	
Inflation		0.009 (0.009)		0.002 (0.002)		0.009 (0.009)
PS	0.365** (0.137)	0.620** * (0.174)	0.077 (0.118)	-0.031 (0.045)	0.365*** (0.137)	0.620** * (0.174)
Constant	3.067** * (0.619)	4.467** * (1.220)	-7.689** (2.743)	7.925*** (1.535)	3.067*** (0.619)	4.467** * (1.220)
Observations	19	50	19	50	19	50
R^2	0.905	0.905	0.984	0.984		
No. of Cross Sections	-	-	2	5	2	5

Note: Standard errors are in parentheses. ***, **, and * represents the significance level at 1%, 5%, and 10%, respectively.

In a nutshell, the overall effect of corruption on economic growth is (1) negative if all countries are considered, (2) negative for developed and developing countries separately, but the impact is approximately doubly high in magnitude for the latter, (3) negative for French and German legal origin countries, and (4) insignificant for British and Scandinavian legal origin countries.

6. Conclusion

The study aimed to evaluate the impact of corruption on economic growth and investigate its asymmetric effects in (1) developed and developing economies

and (2) across Legal-Origins. Existing studies have observed the changes in the impact of corruption on growth in developed and developing countries, but identifying Legal-Origins as an explanatory element in corruption-growth empirical modeling is a novel contribution. To achieve the aim of the study, the analysis employed annual data for 152 countries from 2012 through 2021, and utilized three-panel regression approaches: pooled OLS, cross-sectional FE, and RE. Given the result of F-tests, Breusch-Pagan LM, and Hausman tests, the FE approach is superior to either pooled OLS and RE.

Failing to reject the proposed hypotheses, the results provided threefold insights. First, the overall impact of corruption on economic growth is negative. Second, the aftermath of corruption in developing economies is approximately twice as adverse as in developed countries. Third, the influence of corruption varies across Legal-Origins; it has a negative impression on growth in French and German civil law countries and an insignificant effect in British common law and Scandinavian Legal-Origins. The magnitude of the impact of perceived corruption is slightly higher in French LO than in German LO.

6.1. Limitations and Implications

From a definitional point of view, the measure for corruption utilized in the study provides a perceived level of corruption in a country, as the actual measurement of the clandestine phenomenon is unfeasible. Additionally, it may be argued that surveys collected to boil down the incidence of corruption, the definition of which may differ across regions and legal structures, into a numerical figure may bias the score of perceived corruption in a particular context. For example, de Maria (2008) contested that Transparency International's CPI, failing to consider local and cultural contexts, inherently has a "Western" pivot. Still, as the most widely used measure for corruption and considered a close approximation of the actual phenomenon, the variable serves the purpose of the study.

An important limitation encountered was the paucity of macroeconomic data, which pushed the scope of the study to exclude the analysis of Socialist LO countries. Moreover, the number of observations used in Scandinavian LO analysis is less than optimal, partly due to the short list of countries belonging to it.

The study does not dive deeper into the possible reasons as to why the impact of corruption varies in developed and developing countries and across

Legal-Origins. This acts more as a guide and reference for future research than a limitation. Moreover, given the findings that the impact of corruption is not universal, the research opens avenues of discussion in academic and public policy spheres about the course of action that might be taken. A particular policy, for instance, that proves effective in combating the incidence of corruption in developed countries may not be as successful in a developing economy. This research acts as an empirical starting point for scholars and public policy experts to assess the local contexts of a country, including its legal origin, to define the general spirit with which that country should address the corruption phenomenon.

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