Factors Affecting Corruption in Developing and Emerging Countries

Jose Ernesto Chedraui

Fernanda Arcaraz

Andrea Botero

Abstract

Economic and social indices of a country are becoming increasingly important in explaining a developing and emerging country's level of corruption. Using a Control of Corruption indicator, explained by GDP per capita, we find evidence for corruption decreasing as GDP per capita increases in a simple regression model. Deeper analysis conducted by including the Human Development Index, and Social Progress Index demonstrates that there exists a stronger correlation between theses variables and corruption. While some variables (such as GDP per capita) lose significance in the multiple regression model, they still have an impact on corruption when regressed together. Consequently, corruption in developing and emerging countries is better explained when including HDI and SPI.

I. Introduction

Within the field of econometrics, corruption and its relationship with characteristics of a country such as level of education or life expectancy has been extensively researched. Our research aims to construct a model able to explain the level of corruption, dependent variable, in developing and emerging countries given a set of economic parameters as the independent variables: country's gross domestic product (GDP) per capita, human development index (HDI), and the social progress index (SPI). Initially, a simple-regression model is developed in order to show the effect of GDP per capita on the level of corruption for our sample countries. To more accurately justify our research, a multiple-regression analysis model is built where GDP per capita, HDI, and SPI are used as independent variables in order to predict the level of corruption. The reason this study analyzes developing and emerging countries instead of developed countries is based on our premise that governments which are still focused on achieving developed nation status can sometimes facilitate or speed up growth by advancing through loopholes or ignoring laws. This is done to achieve the national and international benefits that come with being a developed country.

The relationship between Gross Domestic Product per capita and corruption has always been a matter of speculation for developing countries. In some countries the correlation is quite evident while in others it's masked to prevent outcomes such as social unrest and decreased foreign direct investment. We chose to conduct further analysis on the relationship between corruption and essential growth variables for developing countries because the authors of this paper are from developing countries. We have experienced first-hand corruption in our countries, being this the reason for us to suspect that GDP per capita, HDI, and SPI may have an impact on the transparency of a developing nation and their overall competitiveness in the global market. The researchers have seen this vast difference in the above mentioned variables between our home countries and developed nations such as the United States, since we currently reside in the US which allows us to have an everyday life comparison.

While it might be logical to conclude that as corruption increases, economic growth in a country is slowed down, it is not so obvious to explain the level of transparency in a country's government by a number of general economic measures. What is the economic rationale behind this? Well, several papers have provided research on how economic growth can be related to corruption and other government-related factors, and some of these papers have been included in the literature review section of this paper. The rationale behind some of this past research was that corruption prevents an efficient allocation of resources, slowing down the growth on countries with these types of governments, as compared with other nations where growth is closer to an optimal rate. This economic rationale is relatively simple to explain, however, not much research has been done on the opposite relation; could government transparency be explained by GDP per capita, HDI, and SPI? The aim of our research is to give a concrete answer to this question. Therefore, increasing GDP per capita in developing and emerging countries may lead to a more efficient allocation of resources, and ultimately to a lower level of corruption.

II. Literature Review

In the literature for corruption and economic growth, one of the main arguments is how corruption and government spending have an impact on economic growth. The incidence of corruption and its effects on growth is influenced by "how the market for corruption is organized and by the nature of services provided by public officials" (Swaleheen), as this ultimately affects the amount of corruption in a given country. The results from a single cross-section regression indicates that corruption reduces growth significantly, showing that a one standard deviation change in corruption changes the rate of growth of real per capita GDP by 0.12 percentage points, which is larger than the effect of a one standard deviations change in the investment-GDP ratio. It is therefore demonstrated that corruption has a significant, nonlinear effect on the growth rate of real per capita income (Swaleheen). The econometric literature has also used regression models along with other econometric models and elasticities which concluded that corruption not only causes indirect effects on military and government spending, but also that the presence of corruption in these types of spending leads to negative impacts on economic growth (d'Agostino et al). The robustness of these results was proven by expanding different factors such as levels of economic development, therefore allowing the conclusion of policies aimed at reducing military burdens and corruption impact economic growth significantly. As the literature makes apparent, corruption has almost always been used as an explanatory variable for dependent factors such as real GDP per capita.

Further analysis of indirect/direct effects of corruption and its impact at different levels based on the country has been conducted in the literature. It has been found by researchers that corruption has a direct effect on growth. In addition, the same manipulation of other variables did not lead to as big of a change in GDP as corruption did. To analyze further, the researchers describe the relationship of corruption on GDP as negative but one which declines as corruption increases. Eventually there is so much corruption that its effect on GDP is no longer significant. However, since this finding seemed too generalized, they analyzed at a deeper level to see how corruption affects countries within their sample. They concluded that if a country has almost none to zero corruption, the effect of an increase in corruption will have a significant negative effect on GDP. They also found that in countries where corruption is already prevalent, corruption actually increases growth, because of the "grease-in-the-wheel" effect which explains how governments allowing businesses to sidestep policies can lead to increased production therefore increased GDP. Overall, the researchers conclude that although GDP is the most affected by corruption in their samples, its level of impact depends on the nature of the country in terms of existing corruption.

Another topic in the literature that analyzes corruption is the effects it has on the relationship between foreign direct investment (FDI) and growth in developing countries. Most of the literature in this area conducts semi-parametric growth models, with GDP per capita as the dependent variable and FDI as the independent, and the index of corruption as a factor influencing the dependent variable. Additionally, the models identify the overall effect of corruption in economic growth both directly and indirectly by affecting other control variables on growth. The results from one specific model in Delgado et al showed how corruption significantly reduces the effectiveness of FDI on growth for 70% of developing countries, and strongly suggests that the returns to FDI is a main channel through which corruption reduces economic growth. This effect occurs as corruption weakens the effectiveness of FDI on growth; therefore, through various independent studies, it is concluded that decreasing levels of corruption may significantly increase the benefits from FDI and growth in developing countries (Delgado et al).

The underlying nature of a country to explain current corruption goes hand in hand with the quality of governance and its effect on the debt to growth ratio of a country. Utilizing the existing literature by linking quality of governmental institutions and economic growth, an approach to explaining the previous effect has been undertaken in various studies. Since 1996, attention has been drawn to corruption when considering the factors stopping a country's economy from growing. This happened 20 years ago, during the World Bank's annual meeting, a time when corruption consequences were already significant. Economists shared different papers explaining how debt can prevent a country from growing. Academicians also researched how control of corruption matters for growth. What is interesting about a particular study is how the ideas shared by economists and academicians were put together to explain the dependence of debt-growth ratio to corruption and democracy (Jalles). The model in the paper uses data from 72 developing countries on control of corruption and values of debt to GDP ratios, among others. It has mainly been researched within the literature how a corrupted government will use debt to finance public projects that won't necessarily bring growth. Instead, corrupted institutions try to find financed projects that allow for more corruption. The conclusions gathered from the literature give way to countries with lower corruption being able to manage their debt better than countries with higher corruption indexes.

It can be seen how the existing literature helps develop our research even if it gives a completely different approach to a fairly similar subject. Rather than measuring growth by a single factor, studies have looked at growth as part of a ratio with the country's debt. Also, corruption has been measured in different ways (such as control) as opposed to how we've chosen to measure it (through strength and transparency of the government). Finally, all of the literature focuses on explaining various factors in a country through corruption as opposed to the other way around. That is what makes our research unique; the data used for the chosen variables come from different measures and, most importantly, the explanatory variables are switched with the explained compared to past research conducted, giving a different approach to explaining differences in prosperity for developing and emerging countries.

III. Data

As it was stated in the introduction, the purpose of this paper is trying to explain corruption in developing and emerging countries by a set of economic parameters and measures of development; a measure of corruption will be the dependent variable, and it will be ultimately explained by three independent variables: the gross domestic product (GDP) per capita of the developing country, the human development index (HDI), and the social progress index (SPI). We believe that these three independent variables really encompass the economic environment in a country. The GDP per capita directly measures the ratio between the economic output of a country and its population. The HDI measures quality of life in the country for it is calculated from life expectancy, education levels, and the gross national income, all three modified and standardized to produce the index. With a higher life expectancy, education, and per capita income, citizens have a greater chance of playing a watchdog role in the government since their quality of life (measured directly by the HDI) is better. Finally, the social progress index measures three important aspects of a country: basic human needs, foundations of wellbeing, and opportunity. Within the three sectors, there are components such as personal safety, health and wellness, and personal rights respectively. Typically, the more of each of the components within the three measures, the greater quality of life resulting in a greater awareness of the government's practices by the public. Therefore, HDI and SPI can be used to explain levels of corruption in a country since citizens have a greater chance of being speculative of a government's practices. For our research, data on GDP per capita, HDI, and SPI was collected from the year 2014 since that is the most recent year for which data was available for all three variables in our data sources.

Before coming up with the model described above, other independent variables were included in the multiple-regression analysis to try and determine which variables best explained the level of corruption in developing countries. Some of these other variables were the type of government in the country, included as a dummy variable, the level of unemployment in the country, the income tax rate collected in the country, and the Gini index which measures the degree of inequality in the distribution of family income in a country. Details of this model are included further in the paper; since none of these additional variables proved strong significance in explaining corruption, they were not included in the final model. Possible reasons for this reduction in the model's statistical significance are presented along with the model's details.

For determining which countries to use for our research, we referred to the 26th IUGG General Assembly that published a list of developing and emerging countries based upon United Nations sources (refer to Appendix A). The World Bank was used as a source to determine each country's GDP per capita. Additionally, this source categorizes countries' GDPs based on groups defined by high, medium, or low income; thus, based on these groups and the list found from the General Assembly, 134 developing countries were chosen for this analysis. Furthermore, we used the Developing Programme of the United Nations' annual HDI (Human Development Index) data for our analysis. Since the most updated data for HDI was 2014, this was used as the reference year for the rest of the gathered data. The Control of Corruption was gathered from the World Bank's Worldwide Governance Indicators (WGI). Lastly, the SPI (Social Progress Index) was gathered from The Social Progress Imperative Organization webpage. The sources for the additional variables, not included in the final model, can be seen in the table below.

As it was discussed above, the final model incorporates three independent variables: GDP per capita, SPI, and HDI. All three explain the control of corruption index. The descriptive statistics for these variables, and others used to construct different experimental models are shown below in Table 1 and Table 2.

Table 1: Variable Descriptions and Sources

Variable	**Variable Description**
Control of Corruption (worldcpi)	Control of Corruption from Worldwide Governance Indicators (WGI) from 2014. According to the WGI, this index "reflects perception of the extent to which public power is exercised for private gain, including both perry and grand forms of corruption, as well as 'capture' of the state by elites and private interests". The index ranges from -2.5(weak, very corrupt) to 2.5 (strong, transparent government).
GDP per Capita (gdperc)	Gross Domestic Product per capita from the year 2014, measured in US dollars, recorded by World Bank.
HDI (Life Expectancy, Education Index, and Gross National Income)	Human Development Index in 2014 (ratio from 0-1) from The Developing Programme of the United Nations' annual HDI report. Measured by life expectancy at birth, education index, and GNI per capita.
SPI (Basic Human Needs, Foundations of Wellbeing, and Opportunity)	Social Progress Index in 2014 (in percentage, from 0-100) was gathered from The Social Progress Imperative Organization webpage. Composed of 3 dimensions: Basic Human Needs, Foundations of Wellbeing, and Opportunity.

Unemployment	Levels of unemployment from the year 2014 gathered from Trading Economics given as a percentage for each country included in the study.
Gini index (gini2010)	The Gini index (ranging from 0, being income distributed with perfect equality, to 100, being income distributed with perfect inequality) measures the degree of inequality in the distribution of family income in a country. The data was gathered from the CIA World Factbook. GINI coefficient for developing countries dated between 2010-present. The majority of the countries had data for 2014, however for those that did not, data from previous years (2010-2013) was used.
Government Type (govparr, govpresr, govsemir)	Three dummy variables were created for the four most common government types for these countries. If the country had a certain government type, the dummy variable for such type acquired a value of 1. One government type was left without a dummy variable for not all are included in the model due to multicollinearity. The four main government types for the list of countries are Presidential Republic (govpresr), Parliamentary Republic (govparr), Semi-Presidential Republic (govsemir), and Constitutional Monarchy. The benchmark model is the one where the country has a Constitutional Monarchy (all the three dummy variables for the other types are zero).
Personal Income Tax Rate (tax)	This variable represents the percent of income taxed in each of the developing countries. Data was gathered from Trading Economics.

Table 2: Summary Statistics of Variables

Variable	*Observations*	*Mean*	*Std. Dev.*	*Min*	*Max*
Control of Corruption	134	-0.496	0.622	-1.61	1.48
GDP per Capita	131	4,438.997	3,949.716	286	21,317.4
HDI	131	0.625	0.128	0.35	0.84
SPI	94	57.042	10.551	32.6	77.75
Unemployment	134	11.592	9.922	0.5	54
Income Tax Rate	134	23.798	10.867	5.2	60
Gini Index	91	40.709	9.496	23.7	63.2
Government Type 1.	134	0.440	0.498	0	1
Government Type 2	134	0.172	0.378	0	1
Government Type 3	134	0.112	0.316	0	1

Government Type 1: Parliamentary Republic
Government Type 2: Presidential Republic
Government Type 3: Semi-Presidential Republic

Table 3: Correlation Among Variables:

	SPI	HDI	GDP / capita	Unemployment	Gov. Type: 1	Gov. Type: 2	Gov. Type: 3	Income Tax	Gini Index
SPI	1								
HDI	0.878	1							
GDP per capita	0.624	0.728	1						
Unemployment	-0.200	-0.215	-0.158	1					
Gov. Type: 1	0.363	0.317	0.273	0.010	1				
Gov. Type: 2	-0.274	-0.397	-0.258	-0.002	-0.500	1			
Gov. Type: 3	0.100	0.093	-0.051	0.288	-0.167	-0.299	1		
Income Tax	-0.074	-0.220	-0.134	-0.013	-0.083	0.168	-0.065	1	
Gini Index	-0.042	-0.196	-0.054	0.105	-0.264	0.414	-0.241	0.370	1

Government Type 1: Parliamentary Republic
Government Type 2: Presidential Republic
Government Type 3: Semi-Presidential Republic

Something important to note from *Table 2* above is that the number of observations changes for some of the variables, because certain data was not available for all countries (as for the case of the Gini coefficient described in *Table 1*). The minimum and maximum values for each of the variables is also represented in this table. Furthermore, the variables chosen did not offer a given value to some of the countries listed for the paper.

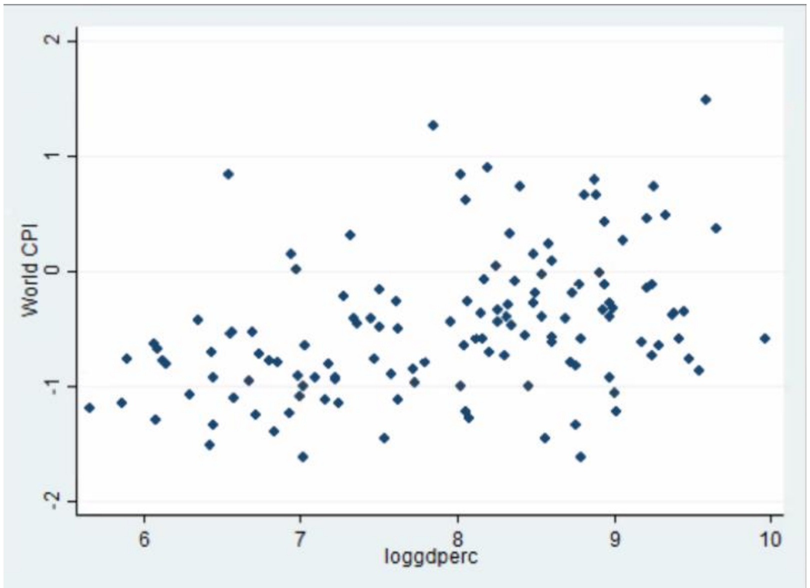
In regards to the Gauss Markov Assumptions, our data meets Assumption 1, linear in slope and intercept parameters, and this can be seen in the table included in the results' section. In addition, we have ensured a random sample of countries (Assumption 2) by including the developing and emerging countries that the 26th IUGG General Assembly published in a list (as described previously in this research) instead of manually deciding which countries to use in our sample, because that could cause sample bias. Passing to Assumption 3, it can be seen from the data of the independent variables that their variance is bigger than zero. For instance, if looking at GDP per capita, the actual data for any given country will be different than the GDP of any other country; thus the GDP variable will have positive variance. Additionally, from the methodology used to calculate each of the independent variables, there is no perfect correlation between any of them. This can also be seen in *Table 3*, where only the Social Progress Index and the Human Development Index have a relatively high correlation ($\square^2$=0.878), however it is not a perfect correlation (all other correlations yielded even lower $\square^2$values). Doing a simple regression model between any of the independent variables never results in R^2 being equal to one (refer to *Table 3*). Therefore, there is no perfect correlation among any of the independent variables. For our simple regression, Assumption 4 ($E(u|x)=0$) is not met, because there are factors contained in the error term which are correlated with GDP per capita, such as HDI. Because of the violation of Assumption 4, additional independent variables were incorporated into the regression when constructing the multiple regression analysis, thus meeting Assumption 4. Finally, for Assumption 5 ($Var(u|x) = \sigma^2$), the variance of the unobserved factors/error term for our multiple regression will remain constant given the chosen independent variables, and leaving no variables in the error term that could vary depending on the explicitly included independent variables.

III. Results

STATA Results:

As it was mentioned above, the simple regression model will try and explain corruption from GDP per capita for each of the countries. Because of this, a scatter plot of log GDP per capita in x and Control of Corruption in y is provided below. After conducting different analyses, the logarithm of the GDP per capita explained the level of corruption the best (gave a higher R-squared value and p-value significance), which is why such was chosen instead in the final model instead of just GDP per capita.

Simple Regression Scatter Plot: Control of Corruption vs. Log(GDP per capita)



As evident, the scatter plot does shows a slight positive correlation between the variables (R^2 = 0.152), and the simple regression model yielded statistical significance at a 1% level for the GDP per capita variable. Since a more positive score for corruption (approaching 2.5), indicates a more transparent and stronger government, the scatter plot supports the initial hypothesis, that an increasing level of GDP per capita often explains a lower level of corruption (higher score) in developing and emerging countries. The STATA output for this model 1, the simple regression, can be found in the Appendix B. However, the multiple regression model will try to further explain the additional independent variables' impact on the dependent variable.

After running our simple and multiple regression models, we generated the following outputs to supplement our analysis. *Table 4* below provides details of the different models developed and their respective significances. As seen in the table, even though model 2 (STATA output shown in the Appendix B) gave the highest R-squared value (R^2 = 0.414), only one independent variable contained a significance level of 1%, SPI. On the other hand, model 3 (STATA output in Appendix B) represented the highest significance in the independent variables with HDI and SPI containing high significance (more than 1%), and log(GDP per capita) proven jointly significance with HDI and SPI as showed in the robustness test below. Additionally, the number of observations remained greater in model 3 (n= 91) when compared to the model 2 (n= 55), which also proves a stronger model. Therefore, model 3 was chosen as the final model, as it presented greater significance of variables and larger sample size.

Table 4: OLS Regression Estimates: Summary Table with all models and significance

Dependent Variable: Control of Corruption			
Independent Variables	Model 1: Simple Regression: Corrup = β_0 + $\beta_1$log(GDP per capita) + u	Model 2: Corrup= β_0 + $\beta_1$log(GDP per capita) + β_2HDI + β_3SPI + β_4Unempl + β_5IncomeRate + β_6GovType + u	Model 3 (final): Corrup = β_0 + $\beta_1$log(GDP per capita) + β_2HDI + β_3SPI + u
log(GDP per capita)	0.232*** (t-stat)	-0.137 (t-stat)	0.0459 (t-stat)
HDI (Human Development Index)		-0.259 (t-stat)	-2.538** (t-stat)
SPI (Social Progress Index)		0.0368*** (t-stat)	0.0532*** (t-stat)
Unemployment Percent		0.0049 (t-stat)	
Gini Coefficient		0.0118* (t-stat)	
Personal Income Tax Rate		0.0029 (t-stat)	
Dummy coefficient: Presidential Republic		-0.336** (t-stat)	
Dummy coefficient: Parliamentary Republic		-0.088 (t-stat)	
Dummy coefficient: Semi-Presidential Republic		0.0642 (t-stat)	

Intercept	-2.325*** (t-stat)	-1.835*** (t-stat)	-2.333*** (t-stat)
No. of obs.	131	55	91
R-square	0.152	0.414	0.372

Significant at *10%, **5%, ***1%

Next, robustness tests were conducted. As it can be seen in *Table 4*, taking the log of GDP per capita yielded high statistical significance for such variable in model 1. Passing then to model 3, which is the final model, it can be seen that SPI and HDI are still statistically significant at different confidence levels, but the same is not true for GDP per capita. Two robustness tests are conducted below on model 3 to check whether log(GDP per capita) and HDI or log(GDP per capita) and SPI, respectively, are jointly significant.

The first null hypothesis is that ($ß_1, ß_2$) both are equal to zero. This results in the following restricted model:

Restricted Model #1: Corrup = $ß_0 + ß_1$SPI + u

F-Statistic Formula:

$$F^0 = \frac{(SSR_R - SSR_{UR})/q}{SSR_{UR}/(n-k-1)} \sim F_{q,n-k-1}$$

Using the STATA output results from the restricted model 1, the results from model 3, and the formula for the F-Stat, the F-statistic is calculated to test the null hypothesis. Using *q=2* restricted variables, *n=91* observations in the unrestricted model, and *k=3*, the value for such F-statistic is equal to 7.753. Since the F-statistic is greater than the critical value obtained (about 3.10 at a 5% confidence) with *q=2* and degrees of freedom in the denominator = 90 (closest to 87), the null hypothesis is rejected and it can be concluded that the log(GDP per capita) and HDI are jointly significant at a 5% confidence level.

The second null hypothesis is that ($ß_1, ß_3$) both are equal to zero. This results in the following restricted model:

Restricted Model #2: *Corrup =* $ß_0 + ß_1$*HDI+ u*

Using the STATA output (seen in the Appendix) for this restricted model 2, the results from model 3, the F-statistic is calculated. With *q=2* restricted variables, *n=91* observations in the unrestricted model, and *k=3*, the value for such F-statistic is equal to 70.22. Since the F-Statistic is again greater than the critical value obtained previously (about 3.10 at a 5% confidence), the null hypothesis is rejected and it can be concluded that log(GDP per capita) and SPI are also jointly significant at a 5% confidence level.

IV. Conclusion

As it has been stated in this paper, past research has been done to analyze if the level of corruption in a country could affect its economic situation, and conclusions have been made stating that this is the case: as a country's government is more corrupt, it has a lower income. Our research aimed to investigate if this relationship could be inverted, where if a country has more income, its level of corruption decreases.

We can conclude from our research that log(GDP per capita) is positively correlated with the Control of Corruption index in the simple regression model. This is because as GDP per capita increases, corruption is more controlled (approaching a score of 2.5 which is typically seen in a strong, transparent government). An attempt to explain corruption through including more variables such as unemployment, income tax rate, and government type was conducted. However, all variables, except SPI, lost significance which led to the elimination of model 2 as the final model. Instead, there is a better explanation for corruption in model 3. Although log(GDP per capita) loses statistical significance in our chosen model 3, there is sufficient evidence to conclude a joint significance between HDI with GDP per capita and SPI with GDP per capita. That means that together HDI and GDP per capita have a greater effect on explaining corruption than they do by themselves. The same applies to SPI with GDP per capita. This is more than likely due to the fact that these indices contain similar (but not perfectly correlated) explanatory factors that are used to calculate them.

An important caveat to note is that even though we didn't choose model 2 as our final model, the effects of unemployment, income tax rate, and government type should not be ruled out when explaining corruption in developing and emerging countries. Different methodologies to conduct the measurement of each of these excluded variables could represent a greater impact on corruption than what was discovered in model 2. Therefore, suggestions for further research would include researching different ways in which the excluded variables of model 2 have been analyzed so that they can be incorporated into model 3 since they further explain corruption. In addition, although we determined that as GDP per capita increases, corruption is more controlled, the exact rationale behind this correlation was not determined. We advise further investigation to discover this rationale.

References

- 26th IUGG General Assembly. "List of Developing Countries." Home. Web. 28 Sep. 2016.
- "Country Comparison: Distribution of Family Income- GINI Index." CIA World Factbook. Central Intelligence Agency, n.d. Web. 10 Nov. 2016.
- D'Agostino, Giorgio, J. Paul Dunne, and Luca Pieroni. "Government Spending, Corruption and Economic Growth." World Development 84 (2016): 190-205. ScienceDirect. Web. 21 Sept. 2016.
- Delgado, Michael S., Nadine Mccloud, and Subal C. Kumbhakar. "A Generalized Empirical Model of Corruption, Foreign Direct Investment, and Growth." Journal of Macroeconomics 42 (2014): 298-316.
- "GDP per Capita." *The World Bank.* Accessed November 7th, 2016.
- "Government Type." CIA World Factbook. Central Intelligence Agency, n.d. Web. 11 Nov. 2016.
- "Human Development Index." *UNDP.* Accessed November 7th, 2016.
- *International Monetary Fund.* World Economic Outlook Database. October, 2014. Accessed October 2, 2016.
- Jalles, Joao Tovar. "The Impact of Democracy and Corruption on the Debt-Growth Relationship in Developing Countries". *Journal of Economic Development.* Volume 36, Issue 4, Pages 41-72, December 2011.
- "List of Countries by Personal Income Tax Rate." Trading Economics. N.p., n.d. Web. 9 Nov. 2016.
- Pi, Jiancai, and Yu Zhou. "The Impacts Of Corruption On Wage Inequality And Rural-Urban Migration In Developing Countries." *Annals Of Regional Science* 54.3 (2015): 753-768. *EconLit*. Web. 5 Oct. 2016.
- "Social Progress Index." *Social Progress Imperative.* Accessed: November 7th, 2016.
- Swaleheen, Mushfiq. "Economic Growth with Endogenous Corruption: An Empirical Study." Public Choice 146.1/2 (2011): 23-41. JSTOR. Web. 24 Sept. 2016.
- "Unemployment Rate." Trading Economics. N.p., 10 Nov. 2016. Web. 12 Nov. 2016.
- "World Governance Indicators." World Governance Indicators. The World Bank Group, 2016. Web. 8 Nov. 2016.

Appendix:

A. List of Developing and Emerging Countries:

Afghanistan	Comoros	Islamic Republic of Iran	Morocco	Sri Lanka
Albania	Democratic Republic of the Congo	Iraq	Mozambique	St. Lucia
Algeria	Republic of Congo	Jamaica	Myanmar	St. Vincent and the Grenadines
Angola	Costa Rica	Jordan	Namibia	Sudan
Argentina	Côte d'Ivoire	Kazakhstan	Nepal	Suriname
Armenia	Djibouti	Kenya	Nicaragua	Swaziland
Azerbaijan	Dominica	Kiribati	Niger	Tajikistan
Bangladesh	Dominican Republic	Kyrgyzstan	Nigeria	Tanzania
Belarus	Ecuador	Laos	Pakistan	Thailand
Belize	Egypt	Lebanon	Palau	Timor-Leste
Benin	El Salvador	Lesotho	Panama	Togo
Bhutan	Eritrea	Liberia	Papua New Guinea	Tonga
Bolivia	Ethiopia	Libya	Paraguay	Trinidad and Tobago
Bosnia and Herzegovina	Fiji	FYR Macedonia	Peru	Tunisia
Botswana	Gabon	Madagascar	Philippines	Turkey
Brazil	The Gambia	Malawi	Romania	Turkmenistan
Bulgaria	Georgia	Malaysia	Russia	Tuvalu
Burkina Faso	Ghana	Maldives	Rwanda	Uganda
Burundi	Grenada	Mali	Samoa	Ukraine
Cabo Verde	Guatemala	Marshall Islands	São Tomé and Príncipe	Uzbekistan
Cambodia	Guinea	Mauritania	Senegal	Vanuatu
Cameroon	Guinea-Bissau	Mauritius	Serbia	Venezuela
Central African R	Guyana	Mexico	Seychelles	Vietnam
Chad	Haiti	Micronesia	Sierra Leone	Yemen
Chile	Honduras	Moldova	Solomon Islands	Zambia
China	India	Mongolia	South Africa	Zimbabwe
Colombia	Indonesia	Montenegro	South Sudan	

B. STATA Outputs:

Simple Regression STATA Results. Dependent Variable: Control of Corruption

Source	SS	df	MS			
				Number of obs	=	131
				F(1, 129)	=	23.03
Model	7.47880697	1	7.47880697	Prob > F	=	0.0000
Residual	41.8956899	129	.32477279	R-squared	=	0.1515
				Adj R-squared	=	0.1449
Total	49.3744968	130	.379803822	Root MSE	=	.56989

worldcpi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
loggdperc	.232319	.0484126	4.80	0.000	.1365335	.3281045
_cons	-2.324725	.3879935	-5.99	0.000	-3.09238	-1.557071

Multiple Regression Model STATA Results with all independent variables. Dependent Variable: Control of Corruption

Source	SS	df	MS			
				Number of obs	=	55
				F(9, 45)	=	5.24
Model	5.72246692	9	.635829657	Prob > F	=	0.0001
Residual	5.46402435	45	.121422763	R-squared	=	0.5116
				Adj R-squared	=	0.4139
Total	11.1864913	54	.207157246	Root MSE	=	.34846

worldcpi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
loggdperc	-.1374031	.1146258	-1.20	0.237	-.3682713	.0934651
tax	.0028767	.0048055	0.60	0.552	-.0068021	.0125554
hdi	-.2594757	1.418742	-0.18	0.856	-3.116969	2.598018
spi	.0367535	.0116719	3.15	0.003	.0132451	.060262
unemployment	.0049157	.0059101	0.83	0.410	-.0069879	.0168194
govparr	-.0881782	.1648231	-0.53	0.595	-.420149	.2437925
govpresr	-.335602	.1357983	-2.47	0.017	-.6091139	-.0620902
govsemir	.0641915	.2186483	0.29	0.770	-.3761888	.5045718
gini2010	.0118377	.0065255	1.81	0.076	-.0013054	.0249807
_cons	-1.835057	.4993883	-3.67	0.001	-2.840876	-.8292372

Final Multiple Regression Model STATA Results. Dependent Variable: Control of Corruption

Source	SS	df	MS			
				Number of obs	=	91
				F(3, 87)	=	17.17
Model	9.66590253	3	3.22196751	Prob > F	=	0.0000
Residual	16.323909	87	.187631138	R-squared	=	0.3719
				Adj R-squared	=	0.3503
Total	25.9898116	90	.288775684	Root MSE	=	.43316

worldcpi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
loggdpperc	.0458835	.1007498	0.46	0.650	-.1543676	.2461347
spi	.0532387	.0097812	5.44	0.000	.0337974	.0726799
hdi	-2.537772	1.085728	-2.34	0.022	-4.695775	-.3797699
_cons	-2.333223	.4255308	-5.48	0.000	-3.179011	-1.487434

Restricted Model #1: $Corrup = \beta_0 + \beta_1 SPI + u$

Source	SS	df	MS			
				Number of obs	=	94
				F(1, 92)	=	42.36
Model	8.85551641	1	8.85551641	Prob > F	=	0.0000
Residual	19.2333053	92	.209057667	R-squared	=	0.3153
				Adj R-squared	=	0.3078
Total	28.0888217	93	.302030341	Root MSE	=	.45723

worldcpi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
spi	.0292471	.0044938	6.51	0.000	.0203221	.0381721
_cons	-2.224491	.2606358	-8.53	0.000	-2.742136	-1.706846

Restricted Model #2: $Corrup = \beta_0 + \beta_1 HDI + u$

Source	SS	df	MS			
				Number of obs	=	131
				F(1, 129)	=	23.98
Model	7.93445682	1	7.93445682	Prob > F	=	0.0000
Residual	42.6763101	129	.330824109	R-squared	=	0.1568
				Adj R-squared	=	0.1502
Total	50.6107669	130	.389313592	Root MSE	=	.57517

worldcpi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
hdi	1.925697	.3932131	4.90	0.000	1.147715	2.703679
_cons	-1.710239	.2506523	-6.82	0.000	-2.20616	-1.214317