Corruption Among Nations:

Investigating Causal Factors

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Abstract

Corruption has always impacted the health of all nations, and it appears there is no definitive cure. Today, nations of all different economic, social, and governmental backgrounds have varying levels of corruption within their governments. This study addresses the following research question: What factors determine the prevalence of corruption among nations? Several independent variables are addressed including female representation in government, level of education, income inequality, and economic development. The results determined that female representation and economic development significantly impact corruption levels. It was inconclusive whether inequality and education had any impact on corruption. This suggests that future policy should focus on improving female representation and economic development to lessen the effect of corruption.

I.   Introduction

Realism portents that state actions are self-serving. Applying this logic at the individual level

of analysis suggests that all decisions individuals make serve to benefit the self, frequently at the

expense of the collective. This notion is at the heart of what makes international cases of

corruption so corrosive to the afflicted country as well as to the international community.

Determining what makes one's government more corrupt than another is the first step towards

enacting policy that could institute real systemic change.

Corruption has existed since the creation of the earliest governmental systems, yet defining

the word can be as elusive as finding a way to end the practice. Some scholars argue that current

definitions are over-simplified and do not allow for nuance and scope in their meaning (Harrison,

2007, p. 673). In addition, Pearson (2013, p. 32-34) notes that given differing contexts across

nations and the variable areas of study that scrutinize the issue it can be nearly impossible to

formulate a generalizable definition. While this difficulty is apparent, it still becomes necessary

for the purposes of this study to identify one standard for comparison. Transparency International

(2018) states that:

> Corruption is the abuse of entrusted power for private gain. It can be classified
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> as grand, petty and political, depending on the amounts of money lost and the
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> sector where it occurs.

TI states that high corruption erodes the environmental, social, economic, and political

infrastructure of all afflicted countries (2018). Utilizing this definition and understanding the

adverse effects of corruption highlights the relevancy of studying the subject matter.

Consequently, recent events have shown examples of institutional corruption.

A nearly countless number of leaders and groups in various nations have been convicted or faced scandal for their participation in corruption. This includes the former long-time president of Indonesia, Suharto, who fell from power under accusations of corruption and nepotism after his resignation in 1998. The 1990s also saw former South Korean presidents Chun Do-wan and Roh Tae-woo convicted of corruption and bribery, respectively (McFarlane, 2013, p. 137-138). Recently, waves of corruption have been accompanied by increases in nationalism. In two separate cases the Olympics have been the inciting incident for corruption and human rights violations in both China and Russia. Liu Zahuda, who was a leader within the communist party of China, was arrested and originally sentenced to death for corruption that accrued while he oversaw construction of the 2008 Olympic games (Yardley, 2008). During the 2014 Winter Olympic games in Russia, the Russian government was found to be sponsoring the doping of its own athletes, using a nationalistic frame to justify corruption (Pelley, 2018). In no way are these cases isolated or idiosyncratic considering the prevalent worldwide level of corruption.

Historically, systems of election and government have been found to be rife with corruption. Some argue that corruption is systemically imbedded within the DNA of different countries and difficult to adapt over time (Uslaner & Rothstein, 2016, 227). For example, in the United States "Machine Politics" caused corruption whereby votes and influence became available for purchase by party bosses. Tammany Hall was a major political force in New York City for nearly two centuries. The reign of William M. Boss Tweed has been known to be particularly corrupt. Using his large power of political patronage, Tweed fraudulently reaped benefits for himself and his conspirators (Hirsch, 1945). Many presidents owe their electoral victory to a system that many would consider corrupt (McKean, 1948). Mexico shows historical evidence of corruption as well. Drug Cartels control and arguably hold more power than the official

government entity of Mexico. Forms of bribery and corruption are prevalent in many of the largest cities in Mexico. Juarez, a border city infamous for drug smuggling, has earned the conspicuous title "Murder capital of the world." Some have suggested viewing cartels as their own pseudo-sovereign political entities (Campbell, 2014). Given the power that Tammany Hall and drug cartels had over their respective governments it can be suggested corruption can have a major effect on the government of a country. These incidents are brief because a true history on international corruption would be expansive to the point of impossibility.

This study is structured in six sections to optimize organization and clarity. Seven sections encompass the entirety of the material. First, the introduction provides a short history of corruption related information. Second, a literature review analyzes relevant scholarly writings within the context of the research question. Third, is an explanation of relevant theory that underpins the research is introduced. Fourth, is the presentation of the methodology. Sixth is the presentation and analysis of the data. Lastly conclusions, implications, and future policy propositions will be suggested. For the purposes of this study, overall historical trends will be analyzed and coupled with appropriate theoretical concepts to be tested using empirical data.

II.   Literature Review

The scholarly literature on corruption is quite expansive and well developed. Many different causal factors have been previously investigated through different lenses including behavioral, gender, economic, and educational. Within each grouping different factors connect to form a cohesive body of thought. Some bodies of thought tend to receive more attention than others when it comes to corruption and its implications.

The economics of corruption as a causal factor has received considerable scholarly attention (Azfar, Lee & Swamy, 2001; Brautigam & Knack, 2004; Fried, Lagunas & Venkataramani,

2010; Jong-Sung You & Khagram, 2005; Shleifer & Vishny, 1993; Schudel, 2008; Waldman,

1973,). Each study explained the economic concepts of corruption in different yet conjoining

ways. Contrast can be marked concerning studies involving microdata from specific countries or

occurrences (Bräutigam & Knack, 2004; Fried, Lagunas & Venkataramani, 2005). Findings

based on economic analysis draws direct implications related to inequalities in the macro, and

micro, economic sphere. Direct evidence supports the negative impact of income inequality on

the prevalence of corruption suggesting progressive tax schemes push the rich towards

corruption. Additionally, this shows that income inequality causes disadvantages in education

(Jong-Sung You & Khagram, 2005). On the individual level, it has been showed that Latin

American Police officers asked for a higher and more expensive volume of bribes from citizens

that distributed stereotypical signs of low socioeconomic status (Fried, Lagunas &

Venkataramani, 2005). Foreign aid as an economic consideration for fostering development was

compared with corruption records (Schudel, 2008; Bräutigam & Knack, 2004). Providing aid to

developing countries in sub-Saharan Africa served to increase political patronage and keep the

ruling elite in power at the expense of true development (Bräutigam & Knack, 2004).

   Different scholars have investigated the connection between socioeconomic information and

corruption perceptions (Fried, Lagunas & Venkataramani, 2005; Winters & Weitz-Shapiro,

2013). Specifically, those with a lower socioeconomic class have less tolerance for corruption

while those with a higher socioeconomic class have a higher tolerance for corruption (Winters &

Weitz-Shapiro, 2013). In a study that bears conceptual similarity though its high and low level of

classification of its variable, the linkage between education and public perception on corruption

has been explored (Tverdova, 2011; Hakhverdian & Mayne, 2012). General findings support the

notion that in low corruption countries high education levels support a belief in institutions and

at high corruption levels high education levels support a skepticism in institutions (Hakhverdian & Mayne, 2012).

More scholars have devoted time to studying the behaviors associated with what makes corruption permissible depending on the system that addresses or fails to address corruption efficiently (Chang & Golden, 2007; Gorta, 2013; Johnston, 1983; Yeh, 2011). Commonly addressed is the need for additional investigations by independent commissions in order to have more information to avoid misconceptions (Gorta, 2013; Yeh, 2011). On the micro level in sub-Saharan Africa Yeh (2011) suggested that to curb the factors that contribute to corruption, independent UN inspectors must investigate and impose sanctions. Others suggest safeguards to democratic structures because of the susceptibility of a democratic governments to be negatively impacted by corrupt practices (Chang & Golden, 2007; Jong-sung & Khagram, 2005; Winters & Weitz- Shapiro, 2013). The problem in democratic institutions was found to lie in the system of election that can produce corrupt incentives for political financing. Chang and Golden (2007) found that systems which were considered open--where members in the same party run against each other to get the nomination--were more corrupt than closed systems- direct selection of nominee by party elite—in districts that have a high number of voters.

Rather than research into democratic systems, research on the impact of education on corruption has been relatively scarce (Rumyantseva, 2005; Aspinall & Klinken, 2010). Uslaner & Rothstein (2016) noticed a connection that improvement in education since 1870 was the only indicator of lowered corruption and that state building was necessary to maintain and improve public sector education. Countries with high improvement in education tended to have less corruption. Using a differing perspective on education Rumyantseva (2005) looks at the macro condition of corruption in education systems while the findings of Aspinall & Klinken (2010)

focus on the micro investigation of education corruption in Indonesia. It was found that

developing countries also face more educational corruption (Rumyantseva, 2005) and agreed that

the relationship between education systems and corruption is under researched.

The impact of gender in relation to corruption has been an area that has not seen a high level

of research activity (Dollar, David & Fishman, 2001; Esplugas, 1997; Sung, 2003). Some

research forgoes statistical methods instead relying an analysis of a narrative on political

behavior to advocate the positive impact of female involvement in the system (Esplugas, 1997).

Statistical research has found a definite connection between the number of women in parliament

and level of corruption suggesting that the higher proportion of women leaders results in a lower

perception of corruption among countries (Dollar, David & Fishman, 2001). This finding has

been influential in using feminist theory to explain corruption. However, the data has been

disputed by Sung (2003) who found that linking lower prevalence of corruption with a higher

level of female involvement led to a spurious connection due to the exclusion of a third factor,

political liberalization. It was suggested that liberalization was the true factor and that female

involvement was merely a coincidence. Despite the difference Dollar, David & Fishman (2001)

is still being used in more current academic writing as a precedent for the feminist position on

corruption (Tverdova, 2011).

This study attempts to determine what factors influence the level of corruption in countries.

Current academic literature focuses on individual independent variables but does not create a

holistic model. Further testing regarding the legitimacy of inequality and development satisfies

disputes in the economic lens of corruption and can provide new evidence or further question

previous studies. Compiling data on the number of women in parliament positions further

clarifies information from Dollar, David, & Fishman (2001) in the application of feminist theory.

The analysis of education data will satisfy an area that seems to be consistently under researched and could offer more insightful information as to what factors have the strongest relationship with corruption.

III.   Theoretical Overview

The theories of Modernization, Marxism, and Feminism all serve as theoretical underpinnings that drive the research question and selection of independent variables.

Modernization theory supposes the different ways that nations undergo transition from traditional to modern society. The process of modernizing states that "westernizing" society will have a positive impact on the entirety of a nation. The five original steps of becoming a modernized country in the order of their accrual include: traditional society, preconditions for economic take-off, economic take-off, drive to economic maturity, and the age of the age of high mass consumption. The statements assume that higher levels of education and economic development reflect a more modernized society, one that contains less corruption (Rostow, 1960). Moreover, a more educated populus is more apt to advance a society closer to the age of high mass consumption, therefore higher education assumes higher modernization. Economic development is the primary function of modernization theory and states the more developed an economy becomes the less likely there will be corruption and the more likely quality of life will be improved.

Marxist theory states that class struggles inevitably worsen society and that a classless society is the only way to achieve perfection (Marx & Engels, 1848) Marxism promulgates that the bourgeoisie, or the ruling class of capitalists, use their power in the inequality of income to assert their interests over the proletariat, or the working class, of society. This asserts that the capitalist system that guides most countries should produce more inequality. According to Marx

this inequality from the commodification of skills creates worsens and further polarizes society (Peet,1975, 566). Thus, through Marxist theory one could assume that income inequality would produce larger corruption due to classes struggling against each other.

The application of gender theory to international relations did not fully develop until the early 2000s as scholars found more implications relating gender and international policy. Feminist theory is derived from the constructivist school of thought which believes that much of what occurs today has been a product of the experiences of the past (Reiter, 2015, 1301-1302) How different nations treat gender directly influences its impact on holistic behavior of nations. Feminist theory is a sector of gender theory that advocates for the advancement of women in a world full of gender inequality (True, 2010,1). This feminist movement believes that more equality for women will improve the nation, and the world as a whole.

IV.   Methodology

The purpose of this study is to uncover the reasons behind why different countries have different levels of corruption. 180 countries represent both the developed and developing world. Studying both the developed and developing world provides a large global base to make credible generalizations. A Multiple regression analysis is utilized though the IBM Statistics Package for the Social Sciences (SPSS).

To answer this question hypotheses were constructed in accordance with prior research and theory. These hypotheses led to the inclusion of the following independent variables: level of education, level of income inequality, gender representation in government, and the level of economic development. All variables are measured with data from 2015.

A. Dependent Variable

For this study the Corruption Perceptions Index (CPI) is used as the measurement for the dependent variable. CPI is a measurement that began in 1995 and accumulates the perceptions of experts, analysts and businesspeople that interact with different countries around the world as to levels of corruption. After collecting these perceptions each country receives a score from 0 to 100. Higher scores reflect less levels of perceived corruption and lower scores reflect higher levels of perceived corruption. CPI scores are widely recognized as being a reputable source and are utilized in different scholarly studies (You & Khagram, 2005; Change & Golden, 2007; Uslaner & Rothstein, 2016). CPI data is measured for 2015, the base year, as well as 2016 and 2017. This additional data will be used to determine if there are any latent effects from variations in the independent variables that did not appear within the initial year.

B. Independent Variables

The first independent variable tests the hypothesized relationship between education outcomes and the level of corruption in nations. For this variable the Program for International Student Assessment (PISA) education scores are used as a measurement. PISA is a standardized test to measure literacy and ability in math, reading, and science. PISA is conducted every three years and was administered in the year 2015 with the data collected from the National Center for Education Statistics (NCES). The data is split into four different categories including Math, Reading, and Science scores along with an average for all three. This test is orchestrated by the Organization for Economic Cooperation and Development (OECD). Despite the OECD being an organization with limited membership, the test was administered to 60 participating countries. Scores are scaled between 0-1,000 with 0 being absolute illiteracy while 1,000 is extreme proficiency.

Education outcomes are tested against corruption in adherence with academic literature and international theory. This research builds off of ideas suggested by Uslaner and Rothstein (2016). And introduces more empirical data and interest that others suggested have been lacking when regarding education (Rumyantseva, 2005; Aspinall & Klinken, 2010). In addition, the study of education outcomes can lend support to modernization theory. Modernization theory connects to education though the belief that Western social development advances society and leads to better outcomes. Thus, the direction of the relationship should be positive with higher levels of education correlating with lower levels of corruption. As CPI increases on the y-axis indicating lower levels of corruption, PISA scores should increase on the x-axis showing increased levels of education. Thus, the following research hypothesis is proposed:

H_1: There is a positive relationship between the level of education

outcomes and the level of corruption.

H_0: There is no relationship between the level of education

outcomes and the level of corruption.

The next independent variable measured and tested is the level of income inequality. The measurement is attained through the World Bank's GINI inequality index. The scoring of the index is within 0 and 100. 0 represents perfect equality and 100 represents perfect inequality. Other scholars have investigated past correlations with inequality and corruption (You & Khagram, 2005). However, that test did not utilize 2015 data and used CPI averaged with another measurement for calculating corruption. This research will further confirm prior studies and the correlative evidence or lead to more dispute. Modernization theory supports the application of income inequality to corruption. Modernization theory considers westernization and the development of relative economic equality to produce for favorable outcomes. In

addition, Marxist theory believes that class struggle produces inequality that contributes to

undesirable conditions for the residents of that country, therefore an increase in corruption. The

direction of the correlation is negative as countries that have more inequality also have more

corruption. As CPI scores increase on the y-axis, GINI scores should decrease on the x-axis.

Thus, the following research hypothesis is proposed:

> H_2: There is a negative relationship between the level of inequality
>
> and the level of corruption.
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> H_0: There is no relationship between the level of inequality and the
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> level of corruption.

The third independent variable tested and measured is the level of female representation

in parliament positions. The measurement for this variable comes from the World Bank's

percentage of women in parliament positions. The percentage given per country is the ratio of

women that hold a government or parliament position within the country. In accordance with

feminist theory, and research from Dollar, David and Fishman (2001), the number of women in

parliament positions should have an impact on the level of corruption in a country. The direction

of the relationship in relation to the measurements is positive as the higher percentage of female

represents should produce less corruption. As CPI scores increase on the y-axis and indicate

lower perceived corruption, the percentage of female representation should also increase on the

x-axis. The following research hypothesis is proposed:

> H_3: There is a positive relationship between the number of women
>
> in parliament positions and the level of corruption.
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> H_0: There is no relationship between the number of women in
>
> parliament positions and the level of corruption.

The final independent variable to be tested and measured is the level of economic development. The measurement for this variable comes from the World Bank's GDP per capita in current US$. Using the American dollar allows for a consistent basis for comparison across countries that utilize different forms of currency. After gathering this data, it was observed that the data was heavily skewed right and therefore was not of high quality. In order to incorporate this information into the study a transformation resulting in higher quality had to occur. The natural log (ln) of GDP per capita was taken to normalize the distribution of the data. Reasoning behind the choice lies in accordance with modernization theory and builds off research in the economic realm of corruption literature. The direction of the correlation is positive because of the measurement of CPI used for corruption. As the level of economic development increases on the x-axis corruption scores increase on the y-axis. This shows that when a country is more economically developed, they experience less corruption. Thus, the following research hypothesis is proposed:

H_4: There is a positive relationship between level of economic

development and the level of corruption.

H_0: There is no relationship between the level economic

development and the level of corruption.

V.   Analysis and Findings

First a correlation matrix was constructed to determine the correlations of the independent variables and the dependent variables. The correlation matrix confirmed that all of the independent variable measures were significantly correlated to all three dependent variables at the 99th confidence level. Income Inequality was the only variable to be have a negative correlation coefficient at the 99th confidence interval. All of the independent variables--with the

exception of one pair—also significantly correlated to one another. The only exception was

female representation in parliament positions and income inequality. The significance between

those two variables did not reach the 99th or 95th percentile. The primary concern with

independent variables that correlate with one another is that this could result in collinearity

problems when constructing the model.

Next, the process of creating a multiple linear regression analysis began in order to determine

causality. This analysis allows for prediction in the variation of the dependent variable using the

independent variables. The first model reflects the 2015 condition and is shown in Table 1 as

follows:

Table 1:

CPI for 2015	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
PISA Math	1.644 (.112)	-3.124 (.004)	-.636 (.530)	X	X	X	X
PISA Reading	1.873 (.072)	-1.974 (.059)	.650 (.521)	X	X	X	X
PISA Science	3.307 (.003)	3.660 (.001)	X	X	X	X	X
PISA Average	-2.326 (.028)	X	X	.234 (.816)	2.355 (.022)	X	X
GINI Inequality Index	-1.508 (.144)	-2.005 (.055)	-1.164 (.254)	-.864 (.395)	X	-1.591 (.118)	X
% of Women in Parliament	1.061 (.298)	.603 (.552)	1.161 (.256)	1.239 (.225)	1.099 (.277)	2.002 (.051)	2.191 (.030)
LnGDP Per Capita	6.749 (.000)	6.657 (.000)	4.671 (.000)	4.706 (.000)	7.561 (.000)	9.862 (.000)	15.174 (.000)
Adj R-Squared	.845	.820	.740	.745	.764	.763	.639
N	33	33	33	33	55	55	141
F	26.702	26.004	19.770	19.770	60.304	60.086	125.999

Significance reported in (). T-score reported above each significance.

Seven different models were run in order to attempt to make the most efficient and least

biased regression. The model 1 in table 1 contained all independent variables and had an adjusted

R-square of .845. The adjusted R-square is a value that communicates what percentage of the

variation in the dependent variable is accounted for in the independent variables. This percentage

allows for the prediction of the dependent variable using the independent variables. An adjusted

R-square .845 means that the independent variables can explain the variability of the dependent

variable 84.5% of the time. A beginning value of 84.5% predictability is extremely high.

However, as expected with multiple education variables that were heavily correlated with each

other, collinearity was a major issue. Collinearity causes the model to become biased because

multiple independent variables communicate the same information within the model. VIF scores

were used to determine the extent of the collinearity. An acceptable VIF can have a ceiling of

anywhere between 10 and 4. A ceiling of 10 allows for more collinearity while a ceiling of 4

allows for less collinearity. (O'Brien, 2007, 674). For this study to form a precise model the

acceptable VIF score must be less than 4. In the first model VIF scores for PISA math, reading,

science, and average were in the stratosphere with scores of 1072.361, 729.463, 725.150, and

6937.233 respectively. The VIF scores of the other variables of GINI, Percentage of Women in

Parliament, and LnGDP per capita were 3.270, 2.074, and 3.807 respectively. These VIF's show

that these three variables had relatively low collinearity in the model. Additionally, Since PISA

average had the highest VIF score it was removed from Model 2.

In Model 2 the adjusted R-square dropped down to .820 upon removing the PISA average.

However, collinearity problems still existed. The VIF's of PISA Math, Reading, and Science

were 38.672, 26.992, and 53.091 respectively. PISA science was removed because it had the

highest VIF score. Model 3 consisted of the Independent Variables of PISA Math, PISA

Reading, GINI inequality index, Percentage of Women in Parliament Positions, and LnGDP per capita. As expected, PISA math and PISA reading both had VIF scores at 19.434 and 14.026. At this point it was realized that both PISA Math and PISA Reading should be taken out. Instead they were replaced with the previously removed variable of PISA average. Considering that they all had collinearity issues it was believed that the average of the three would better suit the education data within the model.

In model 4 the adjusted r-squared was .745 and the four independent variables were the GINI inequality index, percentage of women in parliament positions, LnGDP per Capita and PISA average. All of these variables had VIF scores within the appropriate range. However, after running the collinearity diagnostics it was apparent that multiple variables were communicating the majority of their variation on the same dimension. Similarity in dimensions between variables means that information from each variable is producing duplicate information within the model therefore creating additional bias. A choice had to be made on whether to keep GINI Inequality Index or PISA average considering they both had more than half of their variability on dimension 5. The choice was made to remove the GINI index.

Model 5 contained the Percentage of Women in Parliament Positions, LnGDP per capita, and PISA average. All had acceptable VIF scores but again contained variability on similar dimensions. LnGDP per capita had 86% of its variability on dimension 4 and PISA average put 76% on dimension 4 as well. LnGDP per capita was the better performing variable with a higher F-score and increased significance in the model. As a result, PISA average was removed. Model 6 saw the reinsertion of the GINI inequality index to test its collinearity with the other independent variables now that PISA average was no longer in the model. Again, all variables had acceptable VIF scores but problems when running collinearity diagnostics. Both GINI and

LnGDP per capita had the majority of their variability on dimension 4 with GINI at 52% and

LnGDP per capita at 82%. As a result, LnGDP per capita was still the better preforming variable

so the GINI was removed.

The final model consisted of both percentage of women in parliament positions and LnGDP

per capita. There were no collinearity issues as both of their VIF scores were in the acceptable

range and they communicated their information on different dimensions. Both were still

significant to the model within the 95th confidence interval. LnGDP still accounted for

significantly higher influence within the model. This showcases the importance of economic

development in determining the corruptness of the country. The adjusted R-square for the model

was .639 which means these independent variables account and predict 63.9% of the variation in

the dependent variable. The ANOVA analysis revealed the final model was significant at the 99[%]

confidence interval and had a high F-score of 125.999. This model gains more credibility

because it derives from 141 cases.

After running all of the independent variables with the dependent variable year of CPI

2015 the next step was to run all of the independent variables against the dependent variable of

CPI 2016. This was done to observe if any latent effects occurred after the first year. If a change

occurred this could affect the new model and implications would be drawn showing that some

changes only occur over time. This information is below in table 2:

Table 2:

CPI for 2016	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PISA Math	1.319 (.199)	-2.659 (.013)	-.083 (.934)	X	X	X
PISA Reading	1.381 (.179)	-2.314 (.028)	.264 (.794)	.412 (.683)	2.809 (.007)	X
PISA Science	5.850 (.008)	3.669 (.001)	X	X	X	X
PISA Average	-1.882 (.071)	X	X	X	X	X
GINI Inequality Index	-.922 (.365)	-1.379 (.179)	-.633 (.532)	.791 (.436)	X	X
% of Women in Parliament	1.383 (.179)	1.012 (.320)	1.510 (.142)	1.552 (.132)	1.681 (.099)	2.766 (.006)
LnGDP Per Capita	6.033 (.000)	6.107 (.000)	4.151 (.000)	4.301 (.000)	6.594 (.000)	15.226 (.000)
Adj R-Squared	.829	.813	.730	.739	.756	.637
N	33	33	33	33	55	146
F	23.913	24.959	18.862	24.412	57.903	129.150

Significance reported in (). T-scores reported above each significance.

The process of narrowing down variables occurred in the same way that it had in the creation of

a model for 2015. In models 1, 2, and 3 significant collinearity problems arose with all of the

education data. The VIF scores were much higher than the acceptable range and each was

communicating most of their data on the 6th dimension. These findings were to be expected

considering the results of the 2015 model. By model 4 the only independent variables to be

tested included PISA reading, GINI inequality index, LnGDP per capita, and percentage of

women in parliament positions. In model 4 all VIF scores were within acceptable ranges but the

GINI index and percentage of women in parliament positions both put the majority of their

variability on dimension 3. This shows that the two variables were acting in a collinear manner, therefore making the model more biased.

Model 5 contained just PISA Reading, LnGDP and percentage of women in parliament positions. However, despite the very strong adjusted r-squared score of .756 as what happened at this point in the 2015 version the collinearity diagnostics showed that both LnGDP per capita and PISA reading were both communicating the majority of their variability on dimension 4. Therefore, the variable that was performing the worst in the model was PISA reading so it was removed. The final model, model 6, was comprised of the same variables of the 2015 model which were the percentage of women in parliament positions and LnGDP per capita. The final adjusted R-squared was .637 which means that the model predicted 63.7% of the variation in the dependent variable of corruption. A slight decline occurred from the 63.9% predictability of the 2015 model. A decline of on .2 is to be expected because of the change in the dependent variable. This shows that there was not a lot of volatility in predictability of the model with the progression of one year. However, it is notable that the significance of women in parliament positions within the model changed from .030 to .006. This finding suggests that the effect of women in parliament positions became more significant over time. Additionally, the number of cases grew from 141 in 2015 to 146 making this information more credible. The rise in cases can be attributed to a gain in available CPI scores in the year 2016. According to the ANOVA analysis this model was also significant at the 99[%] confidence interval with a higher F-score of 129.150 showing that the model retained its importance over time.

The final latency model with two-year conditions was run with the CPI scores from the year 2017. This information is in table 3 below:

CPI for 2017	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PISA Math	.988 (.332)	-2.623 (.014)	-.053 (.958)	X	X	X
PISA Reading	1.048 (.305)	-2.282 (.031)	.291 (.773)	.528 (.601)	2.900 (.005)	X
PISA Science	2.182 (.020)	3.655 (.001)	X	X	X	X
PISA Average	-1.526 (.139)	X	X	X	X	X
GINI Inequality Index	-.985 (.334)	-1.381 (.179)	-.683 (.529)	-.825 (.416)	X	X
% of Women in Parliament	1.073 (.293)	.790 (.436)	1.320 (.197)	1.355 (.186)	1.470 (.148)	2.596 (.010)
LnGDP per Capita	6.168 (.000)	6.318 (.000)	4.359 (.000)	4.523 (.000)	7.002 (.000)	14.690 (.000)
Adj R-Squared	.831	.823	.744	.753	.771	.616
N	33	33	33	33	55	149
F	24.179	26.518	20.221	26.176	62.760	120.691

Significance reported in (). T-scores reported above each significance.

A similar start to producing the best model occurred while using the 2017 dependent variable as the 2016 and 2015 variable. The independent variables of PISA Math, PISA Reading, PISA science, and PISA average were all were expectedly collinear and were systematically removed from each successive model based on which had the highest VIF score as well as which was preforming the worst within the confines of the model.

 By model 4 the only variables left were PISA reading, GINI inequality index, percentage of women in parliament positions, and LnGDP per capita. All of the VIF scores for this model were acceptable but the collinearity diagnostics again revealed that the percentage of women in parliament positions and the GINI inequality index had most of their variation on the third

dimension. GINI inequality index was removed from model 5 because it was preforming more

poorly within the model than PISA reading. Model 5 contained the independent variable of PISA

reading, LnGDP per capita, and Women in Parliament positions. As in the previous models PISA

reading and LnGDP per capita were heavily collinear both putting the majority of their

variability on dimension 4. As a result, PISA reading was again removed because it was

preforming poorly compared to LnGDP per capita. Model 6, the final model, contained only

percentage of women in parliament positions and LnGDP per capita. These two variables had

acceptable VIF scores and no collinearity issues. This final model for 2017 had an adjusted R-

squared of .616 meaning that the 2015 independent variables predicted 61.6% of the variation in

the 2017 dependent variable of CPI scores. The ANOVA analysis revealed that this model was

also significant at the 99th confidence interval and had a slightly lower F-score. This was based

on 149 cases which given the large N makes gives the study a more credibility.

  Given that all of the models for 2015, 2016 and 2017 came down to the same independent

variables they can be compared across years to try and discern any differences among

contributing variables. Each model for 2015, 2016, and 2017 is shown:

	2015	2016	2017
Economic Development (LnGDP per capita)	.777**** (15.714)	.768**** (15.226)	.755**** (14.690)
% of Women in Parliament Positions	.112* (2.191)	.140** (2.766)	.134** (2.596)
Adj R-Squared	.639	.637	.616
F	125.999	129.150	120.691
N	141	146	149

Significance Levels: *=.05 **=.01 **=.005 ****=.001

  It is shown when comparing models that the importance of GDP per capita always remains

very significant with an F-score that continues to hover around 15. The standardized coefficients

beta of LnGDP per capita for the years 2015, 2016, and 2017 are .777, .768, and .755

respectively. This shows that for every 1 standard deviation change in LnGDP per capita the

dependent variable will change at around .765 of a standard variation. This shows that LnGDP

has a very large amount of power within the model. The significance of GDP per capita does not

decline through the three-year period. However, the t-score does experience a slight decline. The

percentage of women in parliament positions becomes slightly more significant as time passed.

The significance in 2015 only reached the .05 level, but in 2016 and 2017 the significance was at

the .01 level. In addition, the standardized coefficients beta for women in parliament positions

increase after 2015, showing more power within the model. This implies that the effect of

women in parliament positions becomes more important as more time passes.

The direction of the relationship also is in accordance with the proposed hypotheses. CPI rates

corruption perceptions on a scale of 0 to 100 with zero being high corruption and 100 being no

corruption. As a result, as these points are plotted on the y-axis higher values mean less

corruption. On the x-axis as we move further right for both gender representation for females in

parliament and economic development larger values reflect more representation and more

development. Thus, the positive nature of these relationships showcases that more female

representation and more economic development has causality with less corruption.

Overall the results of the study were promising. It was assumed before that collinearity would

become an issue given education measurements of reading, math and science that were heavily

associated with one another. The adjusted R-squared of each of the final models consistently

hovered in the 60% range while the F-score maintained its very high value in the 120s. This

shows that some variables within the model were very significant predictor factors to the level of

corruption in a county. The relationship between economic development and corruption seems to

be extremely important. Given the consistent performance of the model it shows that changes in

corruption over time is a gradual, non-volatile process. While these factors were important the constant factor remained significant at the 99% confidence interval within each model. The constant factor communicates that more significant factors could be added to the model to improve predictability.

VI.   Conclusion

The purpose of this study was to uncover the factors that influence the prevalence of corruption among nations. The creation of models allowed for the rejection of the null hypothesis proposed in association with H_4 and H_3. This empirical evidence suggests a positive and significant relationship between corruption perceptions and the level of number of women in parliament positions and economic development. This suggests further support for the theories of modernization, and feminism. This support stems from modernization's belief that more development produces less corruption and the feminist belief that equality of gender representation improves society. The null hypotheses associated with H_1 and H_2 did not have enough evidence to support a rejection of the null hypothesis. This does not mean that no connection exists, however during the creation of the model it was shown to be less of a causal factor than number of women in parliament positions and economic development. Additionally, in each model the constant factor was significant suggesting that there are more factors that influence corruption that are not accounted for in these models.

While a significant relationship did occur, each variable did not receive equal power in the model. Economic development was very strongly correlated with prevalence of corruption in nations more than any other variable. As a result, it seems that countries that want to avoid corruption should do everything in their power to develop their economies which could include diversification and cooperation with other nations. In addition, keeping women in leadership

roles seemed to reduce corruption as well. This means that countries should try to elect female leadership to reduce corruption levels.

Rather than keeping these simplistic answers this research highlights areas of study that could be further explored. It can be argued that the effect of economic development is masked by modernized countries that have relatively low amounts of corruption. Further research would look into only the developing world and its relation to economic development. Specific regions such as sub-Saharan Africa would be examined. Additionally, political liberalization would be examined alongside women in parliament positions to determine their correlation and further examine findings by Sung (2003). The measurement of CPI could be investigated further as well. The extent to which economic development influenced corruption perceptions resulted in very high scores. Further research would test economic development against other dependent variables that measure corruption such as the World Bank's CIPA index. Since CPI is based on perceptions it could be hypothesized that these scores are biased against countries with a low level of development, thus questioning the validity of CPI as a measurement.

Corruption is a practice among nations that negatively affects the population as a whole. The practice damages economics, infrastructure, and the lives of everyday citizens that have to deal with the repercussions of their leaders. Further research is important to try and find the factors that influence corruption. By determining causal factors and focusing on improving them, the negative influence of corruption within countries should dissipate. With more research, the ability to further understand and improve is a distinct and optimistic possibility.

VII.   Appendix

Figure 1:

Correlations

		Corruption Perceptions Index 2015	Corruption Perceptions Index 2016	Corruption Perceptions Index 2017	PISA Math	PISA Reading	PISA Science	PISA Average	GINI Inequality Index	Percentage of Women in Parliment Positions	LnGDPpercapita
Corruption Perceptions Index 2015	Pearson Correlation	1	.990**	.985**	.681**	.703**	.690**	.699**	-.339**	.261**	.800**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.006	.001	.000
	N	167	167	167	65	65	65	65	65	150	158
Corruption Perceptions Index 2016	Pearson Correlation	.990**	1	.994**	.705**	.726**	.715**	.723**	-.350**	.275**	.799**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.004	.000	.000
	N	167	176	176	65	65	65	65	65	157	164
Corruption Perceptions Index 2017	Pearson Correlation	.985**	.994**	1	.711**	.732**	.722**	.730**	-.365**	.274**	.788**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.003	.000	.000
	N	167	176	180	65	65	65	65	65	160	167
PISA Math	Pearson Correlation	.681**	.705**	.711**	1	.951**	.974**	.987**	-.645**	.388**	.701**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.003	.000
	N	65	65	65	65	65	65	65	39	57	64
PISA Reading	Pearson Correlation	.703**	.726**	.732**	.951**	1	.968**	.985**	-.466**	.396**	.708**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.003	.002	.000
	N	65	65	65	65	65	65	65	39	57	64
PISA Science	Pearson Correlation	.690**	.715**	.722**	.974**	.968**	1	.992**	-.579**	.374**	.665**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.004	.000
	N	65	65	65	65	65	65	65	39	57	64
PISA Average	Pearson Correlation	.699**	.723**	.730**	.987**	.985**	.992**	1	-.572**	.391**	.701**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.003	.000
	N	65	65	65	65	65	65	65	39	57	64
GINI Inequality Index	Pearson Correlation	-.339**	-.350**	-.365**	-.645**	-.466**	-.579**	-.572**	1	-.152	-.353**
	Sig. (2-tailed)	.006	.004	.003	.000	.000	.000	.000		.254	.005
	N	65	65	65	39	39	39	39	65	57	63
Percentage of Women in Parliment Positions	Pearson Correlation	.261**	.275**	.274**	.388**	.396**	.374**	.391**	-.152	1	.163*
	Sig. (2-tailed)	.001	.000	.000	.003	.002	.004	.003	.254		.046
	N	150	157	160	57	57	57	57	57	160	150
LnGDPpercapita	Pearson Correlation	.800**	.799**	.788**	.701**	.708**	.665**	.701**	-.353**	.163*	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.005	.046	
	N	158	164	167	64	64	64	64	63	150	167

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

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