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Factors that explain corruption in the United States of America: A regression analysis

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ABSTRACT

Transparency International defines corruption as "the abuse of entrusted power for private gain." It is not a victimless act as it affects individuals and communities - politically as it threatens democracy and the rule of law; economically as it depletes the national wealth and encourage inefficient use of budget resources; socially as it corrodes the social fabric of society and destroys trusts; and environmentally as it degrades natural resources. Consequently, addressing corruption goes a long way in enhancing the quality of life of those affected by it. As such, addressing corruption requires understanding what factors affect or correlate with it, which is the goal of this study. This study examines several factors that impacted corruption among the 50 States of the United States of America using the United States Department of Justice's data on Federal Public Corruption Convictions Rate (FCCR) during a 10-year period (2007-2016) as a measure for corruption and an Ordinary Least Squares (OLS) regression technique. This study finds that higher economic growth, a lower incidence of poverty, and more available resources allocated toward law enforcement (toward police and corrections specifically) reduce corruption. These findings are used to draw policy implications for the parts of the United States that are not included in this study, namely, the territories, with particular interest in the U.S. territory of Guam.

Keywords: Corruption, United States, 50 states, OLS, Regression, Guam

INTRODUCTION

Transparency International defines corruption in general terms as "the abuse of entrusted power for private gain." Corruption is further classified into "grand, petty and political, depending on the amounts of money lost and the sector where it occurs." (transparency.org)

One measure of corruption that Transparency International publishes on an annual basis is the Corruption Perception Index (CPI), another is the Global Corruption Barometer (CGB), which measure country-level corruption. In the past 10 years, between 2007 and 2017, the CPI for the U.S. has ranged from 71 to 76 out of a maximum score of 1 This score has ranked the U.S. between 14th and 24th out of 165 to 180 countries for which estimates are available. Although there was some variation in corruption perceptions in the U.S. as a whole, the year-to-year fluctuations in the CPI estimates are most likely not significant. More importantly, these country-level estimates mask a greater variation in corruption incidences that exists at the state-level and prompt the question of why

corruption might be more prevalent in some U.S. states than in others. What factors explain or correlate with this greater variation is the focus of this study.

Research Question

The main research question addressed by this study is "What are the factors that explain or correlate with corruption among the 50 States of the United States of America?" Consistent with earlier studies, this study will use the United States Department of Justice's data on Federal Public Corruption Convictions Rate (FCCR) as a measure for corruption during the latest 10-year period (2007-2016) during which data is available. Along with data on several factors identified from the literature review that explain or correlate with corruption, an Ordinary Least Squares (OLS) regression technique will be used.

Significance Of The Study

Dass, Nanda, and Xiao (2016) and Johnson et al. (2013) agree that corruption is a critical area of study. The importance of this research is due, in large part, to the harmful, negative effects that corruption has on an economy, effects that can then compound and be transmitted systemic-wide and affect individuals and communities in a multifaceted manner. Thereby, understanding corruption is vital toward contributing to the continued and successful growth of an economy (Dass, Nanda, & Xiao; 2016). While there is a good amount of research on the cause and consequence of corruption (Johnson et. al., 2013), there is still a strong need for data that is more reliable and detailed with regard to said cause and consequence of public corruption (Cordis & Milyo, 2016).

The existing literature on what factors may explain a greater variation in corruption incidences that exists at the state-level and prompt the question of why corruption might be more prevalent in some U.S. states than in others is limited to two studies. One study by Alt & Lassen (2011) explored the impact of prosecutorial resources on corruption convictions measured using the U.S. Department of Justice's Federal Corruption Conviction Rates (FCCR). The authors found that greater prosecutorial resources, such as the number of attorneys, resulted in greater conviction numbers. Their research reported significant estimated coefficients regarding the attorney and conviction relationship. This result is notably congruent with system capacity theory. Their research also found that the division of government (separation of power through the party and branches of government) seemed associated with lower corruption incidences while term limits with higher corruption incidences. Lastly, their work affirmed known political and economic causal corruption correlates such as checks and balances, income, education, population, and the fiscal scale.

The second study that looked at corruption among the 50 states of the U.S. is by Ruane (2015). Like Alt & Lassen (2011), Ruane used the FCCR during a 10-year period between 2004 and 2013 as a measure for corruption, 16 explanatory variables, listed below, and an Ordinary Least Squares (OLS) regression technique to identify which factors explain or correlates to state-level corruption.

- Economic Growth
- Unemployment Rate
- Poverty Rate
- Population Density
- Urban Population
- Population Married 2 or more times

- Number of Interstate Miles
- Graduation Rate for 2-4 Year College Education
- Suicide Rate
- Federal Government Funding Per Capita
- State Spending as percent of Gross State Product
- Government Employment as percent of Total Employment
- Political Party of the State Governor (1=Democrat; 0=Republican)
- Percent of Democrats in the State Senate
- Percent of Democrats in the State House of Representatives
- Average Temperature Throughout the Year

Limitations

Alt & Lassen (2011) and Ruane (2015) point to the difficulty of finding U.S. state-level corruption and used the FCCR as the measure of state-level corruption as a substitute. However, the FCCR measure itself has limitations and caution must be taken when interpreting empirical analysis that used it, including this study. The FCCR reflects the number of public corruption cases that had been convicted in the U.S. Federal courts per 100,000 residents. As such, this measure represents a lower-end or conservative estimate of corruptions, as it requires: 1) that corruption has occurred and 2) that evidence of such corruption existed at the level that was acceptable to the Federal court. This narrow definition does not include public corruption in the U.S. that did not lead to legal prosecution as well as those that led to legal prosecution but did not lead to convictions. This means that there is a higher number of actual corruption incidences, only some of which get reported, among which only some offenders are caught and prosecuted in the court of law and only some of which are ultimately convicted and included in the FCCR.

Furthermore, the FCCR is different from measures of corruption that reflect individual's perception of corruption such as Transparency International's Corruption Perception Index (CPI) or Global Corruption Barometer (CGB).

REVIEW OF RELATED LITERATURE

Existing studies on the topic of corruption fall in four main categories: those that identify what causes, explains or correlates with corruption; those that focus on the consequences of corruption; those that design, propose or evaluate anti-corruption measures; and those that focus on and evaluate existing measures of corruption.

In the first category, studies use microeconomic theories (often, based on a cost-benefit analysis framework) or macroeconomic theories (e.g., by identifying systemic factors such as socio-economic, cultural/institutional, demographic and political, public administration or legal factors that lead to greater or lesser corruption activities) or a combination of both theories. Several studies use these theories to formulate testable hypotheses and design empirical studies using different levels of data, ranging from national (involving one country) or international (involving many countries), with some including all countries at any level of development while others focus on developed countries (DCs), less-developed countries (LDCs), or other country groupings, e.g., small island developing states (SIDS). Among national studies of corruption for the United States, only two studies identified earlier used state-level data.

As the heavily marked d sections of the literature map in Figure 1 shows, this study will contribute to the existing literature on the causes of corruption, will use

macroeconomic theories to derive several testa on ble hypotheses and design an empirical study that uses state-level U.S. data and a quantitative/statistical approach (OLS-regression analysis).

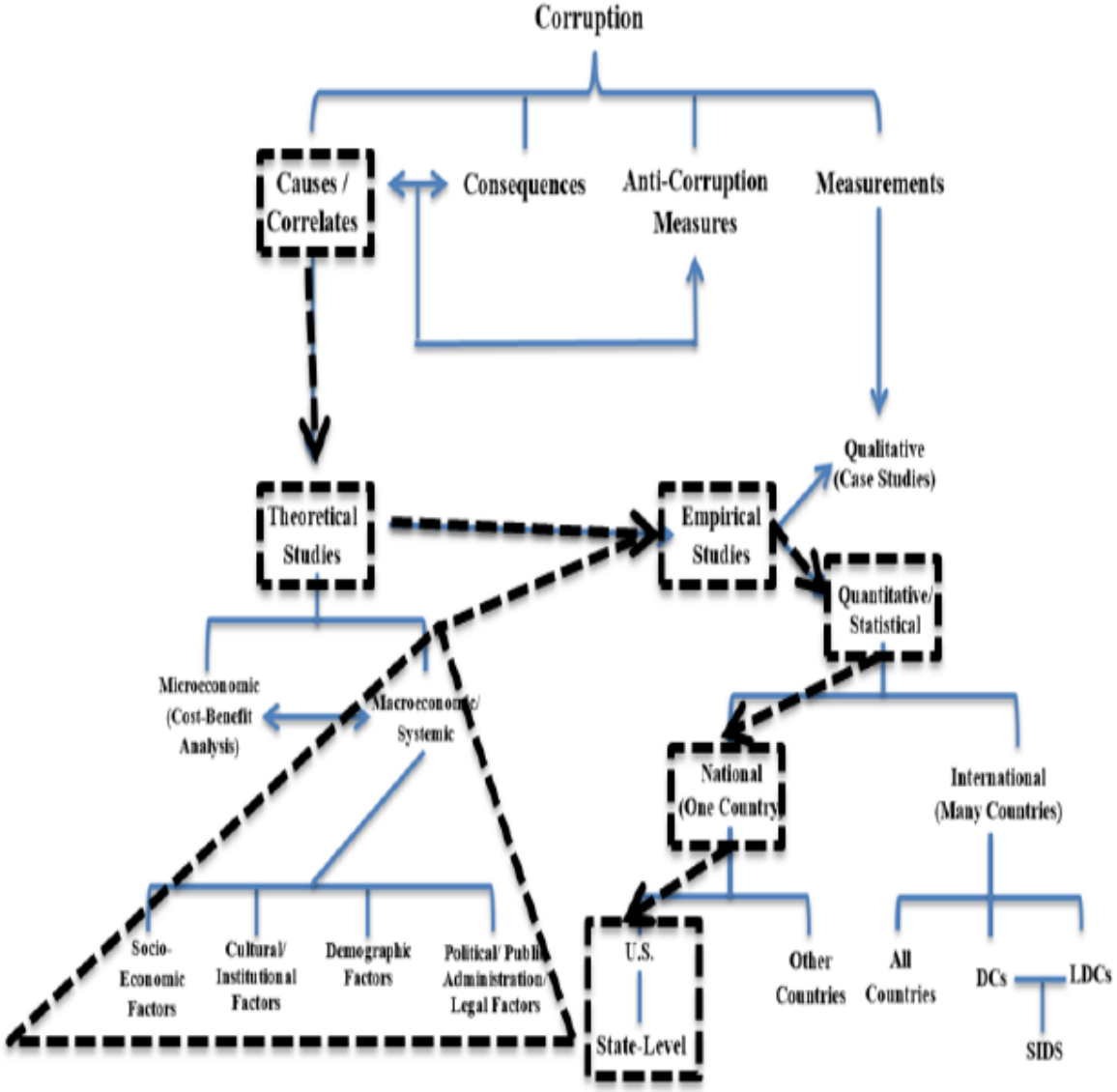


Figure1. *Literature Map on the Topic of Corruption*

In reviewing existing studies on the causes of corruption, several factors had been identified that explain or correlate with corruption incidences. These factors and their effects on corruption are discussed below.

***H1**: Higher GDP reduces corruption.*

The first variable identified to explain corruption is the size of the economy, as measured by Gross Domestic Product or GDP (Brown & Shankman, 2007; Treisman, 2007; and Alt & Lassen, 2011). According to Brown and Shankman (2007) most of the exisitng studies regarding corruption have focused on the economic costs or socialeconomic variables of corruption. Moreoever, much of this prior research was done through a cross-sectional framework. Brown and Shankman (2007) and Treisman (2000) both agree that there is a negative correlation between GDP and the rate of corruption.

To test, Brown & Shankman (2007) used a Granger methodology on panel data, to

include a time series regression analysis taking into account a time lag. Treisman (2000) used a regression procedure that started with nested regressions using first plausibly exogeneous variables and then adding other variables depending on the change. While the direction of the causality is not always clear Brown & Shankman (2007) found that the time frame of analysis matters. Their work concluded that an increase in GDP can affect corruption differently, i.e., a short-term increase in GDP tends to increase corruption while a long-term increase in GDP tends to lower corruption. Treisman (2000) found that, compared to lower income economies, higher income economies tend to have lower rates of corruption.

***H1a**: Higher economic development reduces corruption.*

A related variable was identified by Shabbir and Anwar (2007) who focused on corruption in developing economies. They hypothesized and found statistically significant support for the negative relationship between an economy's level of development (measured in their study as per-capital real GDP measured in purchasing power parity (PPP) terms) and corruption. Their review of related literature summarized a number of studies whose empirical findings showed a negative relationship between the level of economic development and corruption (Brown, et al. (2005), Kunicova & Rose-Ackerman (2005), Lederman, et al. (2005), and Damania, et al. (2004)). However, Shabbir and Anwar also found studies (Braun & Di Tella (2004) and Frechette (2001)) that show a positive relationship between the level of economic development and corruption. Similarly, Goel & Nelson's (2010) literature review asserted that greater economic prosperity reduces corruption. This is consistent with a study by Alt & Lassen (2011) which looked at corruption among the 48 states in the continental U.S. and used per capita real GDP as a control variable, citing previous studies for justification (Meier & Holbrook (1992); Goel & Nelson (1998); Adserà et al. (2003); Boylan & Long (2003); Alt & Lassen (2003, 2008); and Glaeser & Saks (2006)).

***H1b**: Higher economic growth reduces corruption.*

In his study of corruption among the 50 U.S. states, Ruane (2015) found that states with faster economic growth tend to have lower corruption and explained that a growing economy creates more opportunities for gainful and legitimate employment. In such a growing economy corruption activities are comparatively less rewarding and riskier.

***H2**: Larger population increases corruption.*

The second variable found to explain corruption is population. Alt & Lassen (2011), referencing the work of Maxwell & Winters (2004), hypothesized that larger populations tend to increase corruption. On the other hand, using regression analysis, Lecuna (2011) found insignificant strength regarding the direct association of population and corruption.

***H2a**: Higher population density increases corruption.*

A related variable is population density. Chowdhury (2007), who studied corruption among Asia-Pacific economies using an Ordered Probit model, hypothesized and found support for a positive correlation between population density and corruption (measured by CPI). More specifically, stating that the pressures of a more congested population put a strain on governance and therefore increasing corruption. Similarly,

Ruane (2015) also hypothesized and concluded that states in the U.S. with higher population density tend to have higher corruption. Ruane's (2015) use of the Federal Public Corruption Convictions Rate (FCCR) to measure corruption also purported that higher population density suggests more tipsters, more tipsters thereby lead to an increase in the reporting of corruption crimes. In this way, higher population density represents individuals operating in "close quarters." The idea of close quarters suggests that it is easier to keep a close eye on each other and each other's activities. Should those activities be acts of corruption then the reporting of those acts becomes more likely.

***H2b**: Higher urban population increases or decreases corruption.*

Related to total population and population density is the degree of urbanization. The degree of urbanization is usually measured by the share of the total population who reside in the urban area, i.e., a merged and incorporated area, like a city, town, or village. While, Alt & Lassen (2011) and Goel & Nelson (2010) both supported the notion that higher population density increases corruption the former identified this variable as one of several control variables. The latter associated urbanization with the need for a larger government scale, which increased the opportunity for corruption activities. Ruane (2015) suggested that the larger the population living in an urban setting, the more impersonal relationships are and the greater the temptation to engage in acts of corruption. On the other hand, Churchill, Agbodohu & Arhenful, P. (2013) noted that urban citizens tend to be more educated than rural citizens and therefore have greater civic involvement, including pushing for greater government accountability, which reduces corruption.

***H3**: Higher poverty increases corruption.*

The third variable identified to explain corruption is the rate of poverty. Unver & Koyuncu (2016), using unbalanced panel data and a multivariate fixed time effects model (FEM), found a positive correlation between poverty rate and the rate of corruption. Here, places with higher poverty levels tend to experience higher levels of corruption. Although Ruane (2015) included poverty rates as an explanatory variable for corruption and hypothesized a positive relationship, his regression result based on data for the 50 U.S. states did not find statistical significance to this hypothesis.

***H4**: Higher educational attainment reduces corruption.*

The fourth variable identified in the literature to explain corruption is the level of higher education. Goel & Nelson (2010) referred to "greater" education as a level of education after high school to include associates, bachelors, masters or doctoral degrees, which they found to reduce corruption. Measuring higher education differently to include high school education or higher, Alt & Lassen (2011) followed earlier studies such as Meier & Holbrook (1992); Goel & Nelson (1998); Adserà et al. (2003); Boylan & Long (2003); Alt & Lassen (2003, 2008); and Glaeser & Saks (2006) and Maxwell & Winters (2004) and found that higher education negatively affects state-level corruption.

***H5**: Higher overall government employment increases corruption.*
***H5a**: Higher government employment in law enforcement positions reduces corruption and/or increases corruption convictions.*

The fifth variable found in the literature to explain corruption is the size or scale of the government. One measure of this is level of government employment, which Goel &

Nelson (2009) hypothesized to reduce corruption, although their findings show that overall government employment had a statistically significant effect on corruption but that government employment in law enforcement, including police and corrections employees, reduces corruption. Along the same lines, Alt & Lassen (2011) included the court or legal system, which they referred to as "prosecutorial resources" and found evidence that show these resources to deter corruption, in general. However, given that they measured corruption using the FCCR (corruption convictions), prosecutorial resources were expected to lead to increased successful convictions of corruption cases, thereby increase this measure of corruption. Ruane (2015) looked at the share of government employment to total employment in the U.S. states and hypothesized a positive correlation, i.e., in states where the share of government employment is higher, corruption tends to be higher, as government employment presents the opportunity to engage in corruption. His findings did not support this hypothesis.

***H5b**: Higher overall government revenues or expenditures increase or decrease corruption (or corruption convictions).*

Another measure of the scale or size of the government is the amount of government revenues or expenditures calculated on a per-capita basis. Following an earlier study by Goel & Nelson (1998) as well as their own earlier studies in 2003 and 2008, Alt & Lassen (2011) hypothesized that corruption increases with the revenues or expenditures of the government as higher budgetary resources represented higher temptation for government employees to engage in corruption. On the other hand, Churchill, Agbodohu & Arhenful, P. (2013) noted the opposite, i.e., that larger public budget reduces corruption, cited an earlier study by Elliot (1997).

Related to H5a, Ruane (2015) used the state's government spending as a proxy for the state's resources to support law enforcement, pointing out that the more resources the state has to prevent, investigate or prosecute corruption, the more successful it will be to get a conviction against corruption cases.

***H5c**: Higher federal funding going to state governments increases corruption.*

Among state government's budgetary resources, Ruane (2015) focused specifically on the amount of U.S. federal funding received by the states, which are subjected to complex procurement laws. As such, there is great temptation to not follow these laws, which increases corruption. Similarly, Goel & Nelson (2010) argued that higher federal funding leads to higher corruption. Because military spending is funded through the U.S. federal budget, a study by Gray and Kaufmann (1998) cited in Chowdhury (2007) suggested, "politicians and bureaucrats favor large-scale defense projects, as their value and secretive nature allow more opportunities for rent seeking behavior" (p.3). Consequently, higher military spending or budget tends to be associated with higher corruption.

***H6**: Higher employment rate (lower unemployment rate) reduces corruption.*

The sixth variable identified to explain corruption is employment rate, or its opposite, unemployment rate. Saha (2009) pointed out that high level of employment discourages corruption. Ruane (2015) hypothesized that higher unemployment rate increases corruption, although his findings showed the opposite.

***H7**: Higher religiosity (or stronger religious belief) reduces corruption.*

In addition to economic factors, Shabbir & Anwar (2007) included non-economic factors such as democracy, press freedom and religion, following earlier studies that identified these variables to explain corruption. Because the level of democracy and the press freedom are expected to not have much variation among the U.S. states, this study will focus on how religion affects corruption, hence, the seventh (and last) variable will the some measure of religion. As cited in Shabbir & Anwar, studies by Chang & Golden (2004) as well as by Herzfeld & Weiss (2003) found a negative relation between the share of population affiliated with particular religion and corruption while studies by Paldam (2001) and La Porta, et al. (1999) found evidence of the opposite relation. Treisman (2000) described how religious traditions can affect corruption in two ways: First, in countries where 'hierarchical religions' dominate, citizens are less likely to challenge public officials, which reduces the pressure against corruption; and Second, religious traditions condition an individual's loyalty and where loyalty to family is stronger than loyalty to others in the community, corruption increases. In this study, we will measure religion differently based on self-identification of how religious an individual considers himself/herself to be and hypothesize a negative relation.

***H8**: Higher number of women government officials reduces corruption.*

Liu (2016) cited a study by Dollar et al. (2001) that looked at the effect of gender on corruption (measured using the PRS Group's International Country Risk Guide's corruption index) and found that "the larger the number of women in the total number of government officials is, the lower the degree of corruption is" (p. 174).

The hypotheses discussed above are summarized in Table 1 and in a Conceptual Framework in Figure 2.

Table 1. *Test Hypotheses*

***H1**: Higher GDP reduces corruption.*
***H1a**: Higher economic development reduces corruption.*
***H1b**: Higher economic growth reduces corruption.*
***H2**: Larger population increases corruption.*
***H2a**: Higher population density increases corruption.*
***H2b**: Higher urban population increases/decreases corruption.*
***H3**: Higher poverty increases corruption.*
***H4**: Higher educational attainment reduces corruption.*
***H5**: Higher overall government employment increases corruption.*
***H5a**: Higher government employment in law enforcement positions reduces corruption and/or increases corruption convictions.*
***H5b**: Higher overall government revenues or expenditures increase/decrease corruption (or corruption convictions).*
***H5c**: Higher federal funding going to state governments increases corruption.*
***H6**: Higher employment rate (lower unemployment rate) reduces corruption.*
***H7**: Higher religiosity (or stronger religious belief) reduces corruption.*
***H8**: Higher number of women government officials reduces corruption.*

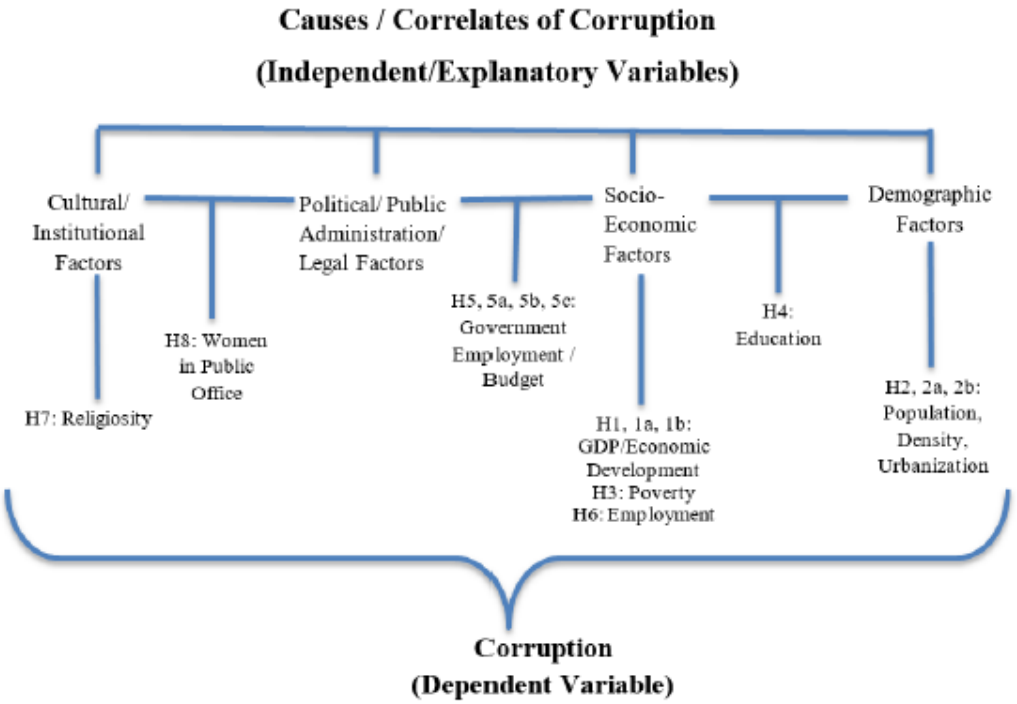


Figure 2. *Conceptual Framework*

METHODOLOGY

Definition of Variables and Sources of Data

As summarized in Table 1 and Figure 2, this study uses a regression model with corruption as the dependent variable and is measured using the FCCR, due to the limited available data at the state-level in the U.S. as noted earlier.

Based on the hypotheses presented in the previous section and summarized in Table 1 and Figure 2 and combined with the available data, the independent or explanatory variables in this study consist of the following:

- Gross State Product (GSP) in the year 2016 taken from the U.S. Department of Commerce, Bureau of Economic Analysis.
- Gross State Product per capita (GSPPC) in the year 2016 was calculated using the GSP in 2016 divided by the total population data from the U.S. Census Bureau.
- Economic growth (ECONGROWTH) represents the percent-growth in GSP between 2016 and 2017 using data from the U.S. Department of Commerce, Bureau of Economic Analysis.
- Population density (POPDENSITY) in the year 2010 was taken from the U.S. Census Bureau (2010, October 05).
- Urban population (URBANPOP) as percent of the total population in the year 2010 was taken from the Iowa State University of Science and Technology, Urban Percentage of the Population for States, Historical.
- Poverty rate (POVERTYRATE) in 2016 was taken from the U.S. Census Bureau.
- Graduation rates for 2 and 4-year college education (COLLEGEGRADUATE) for the school year 2009-2010 were taken from the U.S. Department of Education (2012, July 12).
- Government employment (GOVJOBS) was calculated using data on employees on nonfarm payrolls by state and selected industry sector for the year between December

2015 and December 2016 from the U.S. Bureau of Labor Statistics (2017, January 24) and divided by the total employment.

- Government spending per capita (GOVSPENDINGPC) for the year 2016 was taken from The Henry J. Kaiser Family Foundation.
- POLICECORRSPENDINGPC was the average state and local government spending on police and corrections departments over the period 2007-2016 taken from Urban Institute-Brookings Institution Tax Policy Center (2017, December 15), and divided by the population.
- Federal funding per capita (FEDFUNDINGPC) was measured by the total amount of U.S. federal government contracts awarded for work performed in the 50 U.S. states over the period between fiscal year 2008 and 2015 from the USAspending.gov, divided by the total population.
- Unemployment rate (UNEMPLRATE) was the average over the period 2007-2016 using data from the U.S. Department of Labor, Bureau of Labor Statistics.
- Religious belief (RELIGIOSITY) was measured by the percent of adults who indicated in a Pew Research survey that they are "highly religious" (Lipka and Wormald, 2016 February 29).
- Women in legislature (WOMENLEGISLATURE) was measured by the percent of women in the state legislature average over the period 2009-2016 and taken from the National Conference of State Legislature (NCSL).

Due to multicollinearity with POPDENSITY and URBANPOP, total population was not included as an independent/explanatory variable in the regression model nor was test hypothesis H2.

Regression Model

This study uses an Ordinary Least Squares (OLS) regression analysis technique to estimate the following regression equation using variables defined earlier:

$$FCCR = b_0 + b_1\,GSP + b_2\,GSPPC + b_3\,ECONGROWTH + b_4\,POPDENSITY + b_5\,URBANPOP + b_6\,POVERTYRATE + b_7\,COLLEGEGRADUATE + b_8\,GOVJOBS + b_9\,GOVSPENDINGPC + b_{10}\,POLICECORRSPENDINGPC + b_{11}\,FEDFUNDINGPC + b_{12}\,UNEMPLRATE + b_{13}\,RELIGIOSITY + b_{14}\,WOMENLEGISLATURE$$

The expected signs on the coefficients correspond to the *a priori* hypotheses H1 to H8 presented earlier and summarized in Table 1:

- GSP reduces FCCR: $b_1 < 0$ (H1)
- GSPPC reduces FCCR: $b_2 < 0$ (H1a)
- ECONGROWTH reduces FCCR: $b_3 < 0$ (H1b)
- POPDENSITY increases FCCR: $b_4 > 0$ (H2a)
- URBANPOP increases FCCR: $b_5 > 0$ (H2b)
- POVERTYRATE increases FCCR: $b_6 > 0$ (H3)
- COLLEGEGRADUATE reduces FCCR: $b_7 > 0$ (H4)
- GOVJOBS increases FCCR: $b_8 > 0$ (H5)
- GOVSPENDINGPC increases FCCR: $b_9 > 0$ (H5b)
- POLICECORRSPENDINGPC increases FCCR: $b_{10} > 0$ (H5a, a variant of H5 and H5b)
- FEDFUNDINGPC increases FCCR: $b_{11} > 0$ (a variant of H5c)

- UNEMPLRATE increases FCCR: $b_{12} > 0$ (H6)
- RELIGIOSITY reduces FCCR: $b_{13} < 0$ (H7)
- WOMENLEGISLATURE reduces FCCR: $b_{14} < 0$ (H8)

EMPIRICAL RESULTS AND DISCUSSION

The regression equation presented earlier was estimated using OLS and processed using Eviews 9. Results are presented in Table 2. Although not presented in Table 2, the regression model yielded acceptable estimates for other statistics, including the R^2, adjusted R^2 and F-test. Diagnostic tests were performed to ensure that the regression analysis results satisfied the assumptions of the Classical Linear Regression Model, especially in terms of testing to make sure that problems of multicollinearity, heteroskedasticity and model specification do not exist.

Table 2: OLS Regression Results

Dependent Variable: FCCR

Method: Least Squares

Date: 05/20/18 Time: 07:21 Sample: 1 50

Included observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.644831	7.473231	0.487718	0.6288
GSP	-3.23E-07	7.74E-07	-0.417000	0.6792
GSPPC	-3.12E-05	6.08E-05	-0.513116	0.6111
ECONGROWTH	**-50.40393**	**28.29923**	**-1.781106**	**0.0836 ***
POPDENSITY	0.001207	0.001532	0.787514	0.4363
URBANPOP	0.011486	0.022097	0.519813	0.6065
POVERTYRATE	**0.325042**	**0.156709**	**2.074171**	**0.0455 ****
COLLEGEGRADUATE	3.108396	9.454536	0.328773	0.7443
GOVJOBS	-0.199598	0.429109	-0.465146	0.6447
GOVSPENDINGPC	-0.000266	0.000217	-1.229411	0.2271
POLICECORRSPENDINGPC	**0.011803**	**0.005653**	**2.088056**	**0.0441 ****
FEDFUNDINGPC	-3.68E-06	2.47E-06	-1.489586	0.1453
UNEMPLRATE	-0.184649	0.296528	-0.622703	0.5375
RELIGIOSITY	-1.047918	5.030144	-0.208328	0.8362
WOMENLEGISLATURE	-2.745289	6.783689	-0.404690	0.6882

R-squared	0.492403	Mean dependent var	3.237314
Adjusted R-squared	0.289364	S.D. dependent var	2.042824
S.E. of regression	1.722085	Akaike info criterion	4.168274
Sum squared residuals	103.7952	Schwarz criterion	4.741881
Log likelihood	-89.20685	Hannan-Quinn criteria	4.386707
F-statistic	2.425164	Durbin-Watson stat	2.184803
Prob(F-statistic)	0.016872		

** The coefficient is statistically significant at the 5% level. *** The coefficient is statistically significant at the 10% level.

The results reported in Table 2 show statistically significant support for the role of three factors, all primarily economic, in explaining corruption in the 50 U.S. states. The first factor supported by evidence at the 10% significance level is shown by a positive value for b_3 (-50.41), suggestive that states with faster economic growth tends to have lower corruption as measured by the FCCR. This result is consistent with *a priori* hypothesis ***H1b****: Higher economic growth reduces corruption.* More specifically, the estimated coefficient indicates that, for every one-percentage point growth in the state's economy, the FCCR is reduced by 50, most likely reflecting the more plentiful economic opportunities that exist when an economy is growing and the higher rewards that these opportunities offer dissuade individuals from engaging in corruption acts in the first place. With a smaller number of corruption acts committed, an even smaller number will be apprehended, of which only some of them will lead to convictions.

The results reported in Table 2 also suggest a positive effect of poverty rate on corruption as shown by the estimated value of b_6 of +0.325, to be interpreted as, for every one percentage point increase in poverty rate increases the FCCR by 0.325 convictions, or better yet, an additional ten percentage point in the poverty rate would result in an additional 3 corruption convictions. This result was found to be statistically significant at the 5% level and supports *a priori* hypothesis ***H3****: Higher poverty increases corruption.* Part of this result reflects the fact that the poor are often marginalized and less empowered than those with higher incomes, thus limiting their participation in the economy and their ability to improve their access to higher-paying opportunities and better livelihood. Even worse, the poor also are less likely to engage in civic and political participation, if not for the simple fact that a segment of the poor are busy working just to earn enough to "get by". This reduces their desire or availability, or both, to monitor the behavior of public officials and to take measures to prevent or discourage them from engaging in corruption.

The last explanatory variable found to have statistically significant effect on the dependent variable, FCCR, is the POLICECORRSPENDINGPC, or the average amount spent by state and local governments toward police and corrections departments expressed on a per-capita basis. This is represented by the estimated value of b_{10} (+0.0118), which is statistically significant at the 5% level, and suggest that an additional budget equivalent to $100 per person that state and local governments allocate to support law enforcement in

general and police and corrections departments in particular will lead to an increase in the apprehension and prosecution of corruption activities, increasing corruption convictions by 1 per 100,000 residents. This provides indirect support to two *a priori* hypotheses, namely ***H5b****: Higher government employment in law enforcement positions reduces corruption and/or increases corruption convictions*, and ***H5c****: Higher overall government revenues or expenditures increase/decrease corruption (or corruption convictions)*.

CONCLUSION

Given the limitation of state-level corruption data, this study followed two earlier studies in their use of the only data available, which is the United States Department of Justice's data on Federal Public Corruption Convictions Rate (FCCR), for which the latest data available is for the 10-year period between 2007 and 2016. The FCCR is used as the dependent variable of the OLS regression model.

As for the independent/explanatory variables, several factors were identified from the literature review to explain or correlate with corruption and a total of eight general hypotheses or its 14 variants were tested in the empirical study. This study using 50 U.S. states pointed to only three factors, all primarily economic in nature with aspects of social and political/public administration/legal aspects, were found to significantly affect corruption (FCCR): higher economic growth, a lower incidence of poverty, and more available resources allocated toward law enforcement (toward police and corrections specifically) reduce corruption. These findings answer the research question posed by this study: What are the factors that explain or correlate with corruption among the 50 States of the United States of America?

Implications For Guam

Guam is an unincorporated and organized territory of the United States and is one of five permanently inhabited U.S. territories. A part of the United States but apart from most of the considerations of the U.S. mainland Guam, and other territories like it, is often excluded in a significant amount of U.S. studies. While the available data is focused on the 50 United States there are opportunities for policy implications for Guam. Our findings show that higher economic growth reduces corruption, poverty increases corruption, and budget resources going to law enforcement (to police and corrections specifically) increase corruption; mindful that corruption is measured as federal corruption convictions. The following are policy implications for each of the three economic factors found significant in this study.

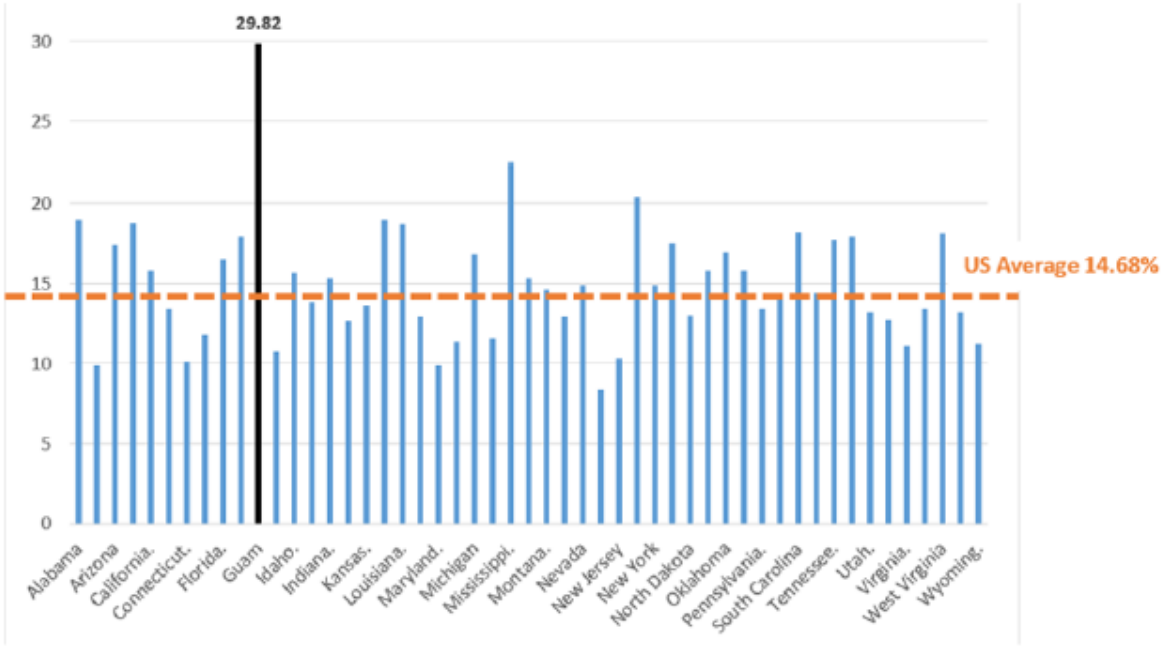
Economic Growth and Corruption

Spector (2016) argues that there is an intrinsic benefit toward having effective anti-corruption programs. His research points out that strong anti-corruption initiatives are "more important to achieving social, political, economic, and human development benefits for society..." (p.421). This is significant because this positive perspective can amass, compound, and yield significant benefits. Simply put, if higher economic growth reduces corruption then reducing corruption increases economic growth, produces economic gain, and exemplify good governance, thus creating a virtuous (as opposed to vicious) cycle that is socially desirable. This, he adds, is in line with sound motivation for policymakers.

That Guam's economy grew an average of 1% annually between 2007 and 2016 suggests slow economic growth, although admittedly better than zero or negative growth. (U.S. Department of Commerce, Bureau of Economic Analysis, 2017) Given our finding that a faster economic growth tends to reduce corruption, the opposite applies to Guam.

Poverty and Corruption

Negin, Rashid, & Hesam (2010) assert that developing communities are more prone to marginalization and exclusion. This, in context, lends to a higher tendency for corruption. To this end, the authors report that successful anti-corruption initiatives must be linked to alternative basic needs interventions and strategic inclusion of social, political and cultural capital. Criticisms of the "trickle-down" approach may be correct in highlighting cases where economic growth failed to reduce poverty incidences but the experience with poverty targeting programs has taught us of the difficulty of identifying the targeted beneficiaries of these programs and ensuring that these programs designed to alleviate poverty in fact do so and not distort the overall incentive system encouraged by the market and regulated by the government. Since such programs involve the government, they are subjected to inefficiency in the use of limited resources, especially in cases where corruption is present. These issues favor a broad-based approach to poverty alleviation through employment programs primarily created by the market while finding role for the government to create and maintain economic conditions and infrastructure that are conducive to the creation of remunerative employment opportunities, which includes strategies that promote political and economic opportunities for decision-making and creating a fair and rewarding incentive system. Such effective community interventions thereby include the promotion of inclusiveness, the promotion of lawfulness, and the promotion of accountability.



Source: U.S. Census Bureau (50 states); author's own calculation for Guam

Figure 3. *Poverty Rates in the 50 U.S. States and Guam (2010)*

Since Guam's poverty rate estimate is not available, it has been calculated in this study to facilitate comparison with poverty rates in the 50 U.S. states, which are published by the U.S. Census Bureau. The calculation was for the year 2010, which was the last year that data for household income distribution in Guam was available. Using the 2010 U.S. federal poverty threshold of $22,113 for a family of four, including two children and applying the same figure to Guam (some would argue this figure should be higher to reflect the higher cost of living in Guam), it was found that 29.82% of household in Guam had incomes below the poverty threshold. As Figure 3 shows, this is higher than the poverty rates in any of the 50 states and more than twice the average poverty rate of 14.82%. Hence, our finding that higher poverty tends to be associated with higher corruption does not predict favorably for Guam.

Budget Resources and Corruption

Gutierrez-Garcia and Rodríguez (2016) cite anti-corruption policies as one of four strategies in the prevention and control of law enforcement. Internal controls, human resource management, and external environmental/external controls make up the other three. These authors maintain that anti-corruption law enforcement policies should design and promote a code of ethics, empowering supervisory level ombudsman, create an ethics commission, and reward ethical behavior. Citing Punch (2000), Gutierrez-Garcia and Rodríguez (2016) also advocate for policies that combine multiple anti-corruption strategies.

Guam's government is one of many faced with limited budget resources. Economic wisdom suggests using these limited budget resources to maximize the social benefits, including the reduction of corruption opportunities and incidences. Our finding suggests that higher budget resources specifically allocated toward law enforcement (in this case, police and corrections) have the effect of discouraging public officials from pursuing opportunities to engage in corruption activities as these resources promote the apprehension and conviction of corruption incidences.

While all three factors found to affect corruption in the 50 U.S. states present Guam with the challenge as these factors combine to predict a higher incidence of corruption for Guam, they also provide stakeholders in Guam with useful information with regard to which areas must be targeted or which issues addressed as anti-corruption strategies are identified.

Future Agenda for Measuring Corruption

A final note is in order with regard to how corruption is measured, which has been highlighted as a limitation of this study. Goel & Nelson (2009) caution against a singular analysis as an appropriate measure of corruption. Similarly, they warn against the illusion of an ideal corruption measure. None exist and there is no one measure that is superior over the other. In this way, policy must not be bound by such fallacies either. On the other hand, although Treisman (2000) would have agreed and also pointed to the challenges of measuring corruption and that existing measures tend to be "subjective", he later acknowledged that these measures tend to correlate with each other. This correlation is important, despite subjectivity and measurement errors in each corruption measure, as it indicates that collectively, these measures suggest a picture that increase our understanding of the factors that affect corruption, however it is measured. Using statistical techniques to check for the robustness of results and their sensitivity to the

corruption measure used (Treisman used three measures of "perceived" corruption) further shed light to the study of corruption. His statement that "(w)hile the complexity of the issues and the weakness of available statistical techniques makes it essential to be cautious, the analysis does suggest some interesting results." Analyses by Treisman and others cited in this study, along with our findings, are based on multiple measures and constitute a multidimensional approach to study corruption and provide the proper grounding for the design of effective anti-corruption policies.

Efforts must continue to improve upon existing measures of corruption as well as introduce new and better measures of corruption. This will allow researchers in future studies to check for the sensitivity of findings to the measurements of corruption used by the different studies. As for Guam, the FCCR used in this study is currently not available for Guam only but combines data for Guam and the Commonwealth of the Northern Mariana Islands. Future studies must attempt to calculate the FCCR for each of these economies. On the other hand, one positive development in regard to measuring corruption in Guam was the survey conducted by the University of Guam-Regional Center for Public Policy (RCPP) in late-2015. This survey adopted Transparency International's Global Corruption Barometer (GCB) methodology, was the first one of its type to be conducted for Guam, and would allow one to compare Guam's survey results with more than 100 countries around the world for which the GCB was calculated in 2015.

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