THE RELATIONSHIP BETWEEN CORRUPTION AND INCOME INEQUALITY: A CROSS-NATIONAL STUDY

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ABSTRACT

This paper analyzes the relationship between income inequality levels and corruption levels. The hypothesis of the paper is that income inequality levels are positively correlated with corruption levels, and is based upon theoretical arguments on incentive structures specific to high-inequality societies. The paper proposes OLS estimation and 2SLS regression models for data analysis, using Transparency International's Corruptions Perceptions Index and the World Bank's Control of Corruption Index as measures of corruption, Gini coefficients as measures of income inequality, and includes additional economic, political and cultural factors. Regression analysis results on the sample of 126 countries support the hypothesis of a positive correlation between income inequality and corruption. The results suggest that redistributive measures to mitigate income inequality may curb the negative economic effects of corruption.

The research and writing of this thesis
is dedicated to everyone who helped along the way.

Many thanks,
Michael A. Mehen

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Introduction

The costs of corruption, or the misuse of public office for private gain, are widespread and relatively similar across countries: corruption is associated with lower economic growth and foreign investment, diminished government legitimacy, the destabilization of democratic institutions and distortions in public spending. The World Bank has estimated that a total of $1 trillion dollars are paid in bribes annually, worldwide. That figure does not include the extent of public funds that are embezzled or the theft of public assets, for which estimates remain difficult. Moreover, the UN Economic and Social Council estimates that corruption prevents 30 percent of all development assistance from reaching its targeted destination.

Yet the reasons why corruption tends to be more rampant in some countries than others remain a source of debate. Cross-national variation in corruption has been the subject of increasing empirical research, largely owing to the development of indices of corruption for various countries that have sought to measure an inherently elusive phenomenon. The most commonly used indices are Transparency International's Corruption Perceptions Index (CPI), and the World Bank's Control of Corruption Index (CCI), each of which compile information from a number of sources, primarily survey data from investment consultants, international and domestic businesspeople, and expert panels on levels of perceived corruption. Despite the limitations of perception-based indices, research has yielded robust evidence of some patterns in cross-national variance that could be of potential use in designing and adapting anti-corruption initiatives and reforms to different national contexts.

The present paper employs data from perception-based indices on corruption to examine the relationship between income inequality and corruption. Income inequality has received relatively little attention from corruption researchers, though the studies that have been done show strong evidence of its association with corruption, albeit through different channels.

Moreover, existing studies rely on somewhat older data and exclude important factors cited in other studies on cross-national variation in corruption. By further examining the link between income inequality and corruption, a better understanding can be reached on whether this particular issue could be a target for reform, or, if intractable, a factor to be considered in devising anti-corruption strategies in countries with high degrees of inequality. Given the complexity of corruption, an extensive set of factors must be considered to tease out the effects of any single variable. The present paper's aim is to devise a more rigorous analytical model to further isolate and identify income inequality's relationship to corruption, as well as to employ more current data. In order to better account for this context it is useful to review broader, more general analyses of corruption that have yielded evidence on various factors before moving on to literature on the specific influence of income inequality.

Literature Review

An extensive amount of literature has been devoted to corruption, with much of the earlier work having a more theoretical or qualitative basis. The recent development of corruption perception measures, however, has led to the rapid growth over the last two decades of quantitative, empirical research into the factors behind corruption, which is the focus of the present paper.

Two surveys of literature on cross-national empirical research on corruption provide background on the prevailing consensus in the field. Lambsdorff (2005) lists several areas where evidence has been found for the correlation of specific factors with corruption: 1) regulatory quality - specifically the number of procedures, time and official cost of opening a business, (Djankov, et al. 2002) the vagueness and laxness of government regulation (Lambsdorff and Cornelius, 2000), and highly diversified tariff rates (Gatti, 1999); 2) lack of economic

competition - ineffective or non-existent antitrust laws (Ades and DiTella, 1996) and lack of integration into the global economy (Sandholtz and Gray, 2003); 3) government structure, where democratic regimes (though specifically those where democracy has been present for decades) were associated with less corruption than autocratic or authoritarian regimes (Montinola and Jackmann, 2002); and 4) forms of democracy, where parliamentary systems were associated with less corruption than presidential systems.

Treisman (2007) in his survey builds upon Lambsdorff by noting that "the strongest and most consistent finding of the new empirical work was that lower perceived corruption correlates closely with higher economic development," (p. 223) though the channels by which it does so is still a matter of debate. Treisman also outlines evidence that has emerged of correlations between levels of corruption and economies oriented toward natural resources, especially for exports, which are hypothesized to offer more avenues for bureaucrats to extract corrupt fees (Ades and Di Tella, 1999). It should also be noted that the author describes having failed to find significant linkages between corruption perceptions and income inequality (p. 239).

In addition to economic and governmental factors, country-specific culture and values variables have also yielded evidence of being possible influences on disparities in corruption levels across countries. Lambsdorff (2005) outlines research that has shown levels of trust and acceptance of hierarchy (La Porta et al., 1997) were positively and negatively correlated with levels of corruption, respectively. Other variables that have been examined include secular-rational attitudes towards authority as opposed to particularistic or family loyalty, where the former is correlated with less corruption (Sandholtz and Taagepera, 2005); and "generalized trust," or the belief that favors will be reciprocated (Lambsdorff and Cornelius, 2000).

Among the first and most seminal papers examining cross-national influences on corruption was Treisman (2000), which examined the relationships of various economic, cultural, legal and religious factors with levels of perceived corruption. The model's dependent variable was the CPI from 1996, 1997 and 1998. The results showed significantly lower levels of corruption among: (1) countries with a British colonial heritage, which the author hypothesized arose from common law traditions based on protecting private property from state encroachment; (2) countries with higher portions of Protestants in their populations, hypothesized to arise from "greater tolerance for challenges to authority and for individual dissent, even when threatening to social hierarchies," (p. 427); (3) countries where raw materials constitute a smaller share of exports; (4) countries with higher GDP per capita; (5) non-federalist states (i.e., more centralized states); (6) countries that have had continued democracy since 1950; and (7) countries with greater openness to trade. While the author left the interplay between cultural and economic factors to be explored in the future, the paper managed to identify a set of cultural and religious variables that henceforth would be routinely used in identifying other factors correlated with corruption.

Another possible influence on corruption is national levels of accountability and transparency, typically enhanced through an active and independent media and laws governing the financial transparency of political actors.

Brunetti and Weder (2001) examine the relationship between press freedom and corruption levels. The authors use an OLS estimation model, with corruption measured by the International Country Risk Guide (ICRG), which is based on subjective analysis of political, financial and economic data, and press freedom as measured by Freedom House. Their model includes additional variables for institutional quality, bureaucratic quality, GDP per capita,

human capital, trade openness and ethno-linguistic diversity. The authors find a statistically significant negative association between press freedom and independence and corruption levels.

Djankov et al. (2009) build upon studies addressing the relationship press freedom and corruption levels by examining an additional factor affecting the transparency and accountability of the public sector: national laws requiring that politicians disclose personal financial information, in particular assets, gifts and possible conflicts of interest. Using an OLS estimation model, with corruption measured by the ICRG, and including variables for democracy as measured by Freedom House, a proportional representation electoral system and press freedom, the authors find a statistically significant negative association between the existence of national public disclosure laws for politicians and levels of corruption.

Two articles have dealt specifically with the relationship between income inequality and corruption. Gupta et al. (2002) examined the relationship of corruption to income inequality by positing a series of channels. First, corruption could be correlated with income inequality due to diminished poverty reduction from a general attenuation of economic growth. Second, corruption could be correlated with skewed tax collection and administration that disproportionately favors wealthy groups. Third, corruption on the part of wealthy segments of the society could lead to the capture of funds through the creation of programs in their own favor, or through the siphoning of funds from taxes or duties, with each case correlated with income inequality. Fourth, the costs of corruption could be correlated with diminished human capital formation through lower education and health spending. Fifth, corruption creates generally higher risk premiums on investments that would ultimately reinforce income inequality by making investments by more marginal, less well-connected groups prohibitively expensive. The authors use empirical models to test the effects of corruption on income inequality. Gini coefficients for

a cross-section of 37 countries are regressed on natural resource abundance, education inequality, capital stock/GDP ratio, as well as other variables, and indices for corruption based on the CPI for 1995-1997.[1] The primary shortcomings of the paper, however, include: (1) its small sample size, (2) the relatively dated data in terms of corruption perception indices, which have now expanded in terms of their breadth of coverage and depth of survey information for each country's composite score, and (3) the use of a democracy measure indicating whether the country had been democratic for the past 46 years, which precluded analysis of discrepancies (which are considerable) in corruption perception scores among states relatively new to democracy.

You and Khagram (2005) explored the possibility that the relationship between income inequality and corruption was a vicious circle, whereby corruption further entrenches existing income inequality. The authors base this theory upon a comparative analysis of 129 countries using the CCI and CPI as measures of the dependent variable, corruption levels, with averaged Gini coefficients for each country for each year between 1971 and 1996 as the measure of their primary independent variable of income inequality. The authors tested for the association of perceptions and norms on corruption for each country using the World Values Survey, and control for GDP per capita, trade openness, natural resource abundance, democracy, federalism, religion, legal origins and ethno-linguistic fractionalization.[2] Their results show a substantive negative association between income inequality and corruption perception index scores, as well

[1] A second model used various instruments for corruption levels, including a democracy variable, as well as ethnicity, latitude, initial levels of corruption and ratio of government spending to GDP. The regression using instruments yields more substantive results than the OLS regression, with a one standard deviation worsening in the country's corruption index score associated with an increase of 11 points in the country's Gini coefficient (where the average Gini coefficient among the country sample is 39).

[2] To address the issue of the direction of influence between the variables, the authors use "mature cohort size" as an instrumental variable for inequality, i.e. the ratio of the population aged 40 to 56 to that of the population between 15 and 69 years old; and distance from the equator and the prevalence of malaria as instruments for economic development.

as support for their hypothesis that income inequality has a stronger correlation with corruption in more democratic societies, as corruption becomes the means of preserving inequality where overt authoritarian oppression is impossible. The authors further explore this relationship through an interaction term between the Gini coefficients and a political rights score derived from the Freedom House index. The authors find a strong correlation between income inequality and perceptions of the acceptability of bribe taking by regressing data from the World Values Survey on country level data, with the primary independent variable being averaged Gini coefficients. An additional regression confirms the findings of Gupta et al. (2002), namely that corruption is significantly associated with income inequality. The authors interpret this as further evidence of a circular relationship between income inequality, and a possible explanation of the persistence of income inequality over time.

A more recent study by Andres and Ramlogan-Dobson (2011) used panel data from 19 Latin American countries between 1982 and 2002 and found a negative correlation between corruption and income inequality. Their model regressed Gini coefficients for each country on corruption as measured by the ICRG, as well as school enrollment rates, openness to trade, distribution of land resources, inflation, privatization and GDP per capita. The authors explained the negative correlation between corruption and income inequality based upon the relative prominence of informal sectors in Latin American countries, which disproportionately provide employment to the poorest segments of society. Where corruption is reduced, the reasoning runs, the informal sector shrinks, resulting in fewer jobs and a shift in income distribution. The authors also suggested that in the cases of the countries from their sample large-scale programs aimed at improving the welfare of the poor may also be those most prone to corruption in the first place. It

should be noted that the ICRG has been disputed as a reliable measure of corruption, and its use as such discouraged by the ICRG's editor-in-chief (Lambsdorff, 2005, p. 4)

Another recent study by Dincer and Gunlap (2012) focuses on income inequality and corruption in the United States and reports a positive correlation between the two. The authors regressed Gini coefficients from 48 states between 1981 and 1997 on the number of government officials in each state convicted of crimes related to corruption for the year, as well as demographic variables, unionization, tax and unemployment rates, and the employment shares of agriculture and manufacturing. The authors' choice of measurement for corruption is unusual, given that the figure could be claimed to reflect more political pressure, or the competence of police and the judiciary than corruption itself (Treisman, 2007, p. 216). The authors justify their choice by noting that the measurement is based on federal convictions and hence not dependent on variations in law enforcement across states. A valid comparable measure, however, does not exist for cross-national comparisons.

The present paper aims to expand upon research on income inequality as a factor in corruption by employing more recent data from the CPI, which has undergone significant changes to its methodology since 2002, when it was last used by You and Khagram (2005). It also seeks to add several variables to the models used in previous studies. These variables include the prevalence of civil society organizations, values from the Press Freedom index, and several indicator variables concerning country-specific laws on political contributions. In addition, two questions dealing with attitudes towards authority and income equality are taken from the World Values Survey conducted between 1996 and 2008.

Hypothesis, Methodology and Data Sources

Hypothesis

The theoretical basis of the hypothesis of this paper is grounded in previous research showing a positive correlation between income inequality and corruption levels (Gupta et al. 2002, You and Khagram, 2005). The argument for a positive correlation between income inequality and corruption levels is based upon the following premises: 1) In highly unequal societies, the rich or well-connected have greater resources to purchase influence illegally; 2) With increased inequality in a society, more pressure will be exerted by the poor for redistributive measures such as progressive taxation, leading to an added incentive for the rich or well-connected to employ political corruption in order to combat such measures and preserve the status quo; and 3) Given that high-inequality societies are more likely to insufficiently provide basic public services to the poor, the poor in turn will also depend on forms of corruption, albeit petty corruption, to secure these services.

Methodology

The model for corruption and income inequality is estimated using an OLS regression adapted from previous empirical research on corruption, specifically that of Treisman (2000) and You and Khagram (2005). In addition, following You and Khagram (2005), to address the issue of measurement error that may arise based upon the subjective nature of perception surveys, the variable "mature cohort size" relative to the adult population is used as an instrumental variable for income inequality in a 2SLS regression. This variable represents the relative size of the population ranging in age from 40 to 59 years of age to the population aged 15 to 69 years. Higgins and Williamson (1999) show that the relative size of the population aged between 40 to 59 years is a powerful predictor of inequality.

In each of the previous models, as well as the present one, the dependent variable is corruption level as measured by either Transparency International's Corruption Perception Index, or the World Bank Institute's Control of Corruption Index. The primary independent variable, income inequality, is measured by Gini coefficient values, following You and Khagram (2005), Gupta et al. (2002), and Dobson and Andres (2010).

Based on the results of model specification tests, the natural logarithm form for averaged Gini coefficient proved to be the best fit. In addition, both GDP per capita and trade openness, or the percentage of imports plus exports over GDP, were used in the natural logarithm form, as in previous models (Treisman, 2000, You and Khagram, 2005). Other variables that have been employed in previous studies that are present in the model used in this study included percentage of the population identifying as Protestant, an indicator variable for whether or not the country's legal code originated in socialist/communist laws, and democracy as measured by the 1996-2002 averaged Freedom House political rights score. As in You and Khagram (2005), a quadratic term was used for the Freedom House political rights score.[3]

Three variables were also created to test whether 1) GDP per capita, 2) socialist legal code origin and 3) democracy as measured by the averaged Freedom House political rights score, had associations with perceived corruption levels that varied depending on averaged Gini coefficient values. You and Khagram (2005) employed a similar variable for the Freedom House political rights score, based on the hypothesis that in more authoritarian regimes elites may use repression as a substitute for corruption, and hence income inequality would have less of a relationship to corruption in less democratic countries. Because an analogous relationship may

[3] A number of variables used in previous models, including measures of ethno-linguistic fractionalization, English Common Law, French, German and Scandinavian legal code origins, and the percentages of the population identifying as Catholic or Muslim were excluded from the model based upon their consistent lack of statistical significance in preliminary regression results.

exist in low versus high income countries, the relationship between GDP per capita and perceived corruption levels in terms of averaged Gini coefficients was also included. A similar variable for socialist legal code origin was included based on the fact that countries of this category frequently feature low levels of income inequality combined with high levels of corruption.

A series of additional regression analyses were conducted as added robustness checks and to examine the influence of other variables that have been cited in the literature as having relationships to perceived corruption levels.

Civil society organization prevalence as measured by the number of civil society organization per capita in a country, and press freedom as measured by each country's Press Freedom Index Score for 2002 were available for the entire sample of countries. Each of these variables is hypothesized to have a negative association with perceived corruption levels based on the literature (Brunetti and Weder, 2003, Grimes, 2008).

Two variables were also included concerning attitudinal/cultural variables. The first measured attitudes toward authority through responses to a question on the desirability of having a strong leader, ranked from 1 ("very good") to 4 ("very bad"). The second measured attitudes towards income distribution through responses ranging between 1 ("incomes should be made more equal") to 10 ("we need larger income differences as incentives for individual effort"). Based on the literature, the positive attitudes toward authority and income inequality are hypothesized to have a positive association with perceived corruption levels (Sandholtz and Taagepera, 2005).

Preliminary regressions results showed no statistically significant relationship between perceived levels of corruption and national laws requiring the public disclosure of politicians' financial information, in contrast to the findings of Djankov et al. (2009). In order to examine a complementary aspect of the transparency of financial influence over political actors, four variables concerning each country's laws on political contributions and transparency were used instead. These included 1) bans on corporate donations to political parties, 2) ceilings on contributions to political parties, 3) ceilings on raisings by political parties, and 4) requirements for the disclosure of contributions to political parties.

The model is as follows:

$$Y = \beta_0+\beta_1X_1+\beta_2X_2 +\beta_3X_3+\beta_4X_4 +\beta_5X_5 +\beta_6X_6 +\beta_7X_7+ \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + +\beta_{11}X_{11}+\beta_{12}X_{12} +\beta_{13}X_{13}+\beta_{14}X_{14} +\beta_{15}X_{15}+ \beta_{16}X_{16} + \beta_{17}X_{17} + \beta_{18}X_{18} + \varepsilon$$

Where:

Y = cpp/cci: Corruption level, measured by 1) Corruption Perceptions Index: 0 (most corrupt) to 10 (least corrupt) 2) Control of Corruption Index: -2.5 (most corrupt) to 2.5 (least corrupt) for each country. Data from 2003-2010

X_1 = ln gini: Income Inequality level, measured by the natural logarithm of averaged Gini coefficient values for each country, ranging from 0 (least inequality) to 100 (most inequality). Data from 1996-2002

X_2 = lgdp: Economic development, measured by the natural logarithm of GDP per capita. Data from 1996-2002

X_3 = ltrade: trade openness, measured by the natural logarithm of percentage imports plus exports over GDP. Data from 1996-2002.

X_4 = natres: Natural resource abundance: measured by share of fuel, ore and metal exports from total merchandise exports. Data from 1996-2002.

X_5 = democ: Democracy: measured by the averaged Freedom House political rights score. Data from 1996-2002

X_6 = democsq: squared Democracy term, as measured by the averaged Freedom House political rights score from 1996-2002.

X_6 = soc_leg: indicator variable for whether the country's legal code originated in Socialist/Communist laws.

X_7 =prot: Percentage of population identifying as Protestant Christians.

X_8=soc_leg*gini: Variable for whether the country's socialist legal code origin has a varying association with corruption depending on averaged Gini coefficient value.

X_9 =democ*gini: Variable for whether the country's averaged Freedom House political rights score has a varying association with corruption depending on averaged Gini coefficient value.

X_{10} =GDPperCap*gini: Variable for whether the country's averaged GDP per capita has a varying association with corruption depending on averaged Gini coefficient value.

X_{11} = cso_prev: civil society organization prevalence as measured by the number of civil society organizations per capita from 2002.

X_{12} = press_free: Press Freedom Index score from 2002.

X_{13} =ban_corp: indicator variable for whether a country bans corporate donations to political parties.

X_{14}=ceil_cont: indicator variable for whether a country imposes ceilings on contributions to political parties.

X_{15}=ceil_raise: indicator variable for whether a country imposes ceilings on raisings by political parties.

X_{16} =disc_cont: indicator variable for whether a country requires public disclosure of contributions to political parties.

X_{17}=WVS_auth: variable from the World Values Survey measuring responses to a question on the desirability of having a strong leader, ranked from 1 ("very good") to 4 ("very bad").

X_{18} =WVS_income: variable from the World Values Survey measuring attitudes toward income distribution ranging between 1 ("incomes should be made more equal") to 10 ("we need larger income differences as incentives for individual effort").

ε = unexplained variance, error term

β_0 = Y-intercept

β_0, β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8, β_9, β_{10}, β_{11}, β_{12}, β_{13}, β_{14}, β_{15}, β_{16}, β_{17}, β_{18} = coefficients of respective independent variables

Exhibit 1 below defines these variables in greater detail, and presents the predicted relationship between each of the independent variables and the dependent variable. The theoretical basis for the predicted relationship is cited in the column listing previous studies.

Exhibit 1. Primary Variable Definitions, Predicted Relationships and Sources

	Variable Name	Definition	Predicted Sign	Previous Studies	Source
Y	CCI/CPI	Corruption level: measured by 1) Corruption Perceptions Index: 0 (most corrupt) to 10 (least corrupt) 2) Control of Corruption Index: -2.5 (most corrupt) to 2.5 (least corrupt) for each country	N/A	You and Khagram (2005), Treisman (2000), Gupta et al. (2002)	Transparency International, Corruption Perception Index; World Bank Institute, World Governance Indicators, Control of Corruption Index
X_1	lGini	Income Inequality level: measured by natural logarithm of Gini ceofficient values for each country, ranging from 0 (least inequality) to 100 (most inequality)	+	You and Khagram (2005), Dobson and Andres (2010), Gupta et al. (2002)	Standardized World Income Inequality Database (SWIID
X_2	lGDP	Economic development: measured by the natural logarithm of GDP per capita	-	You and Khagram (2005), Dobson and Andres (2010), Treisman (2000)	United Nations Statistics Division, World Development Indicators
X_3	ltrade	Trade openness: measured by the natural logarithm of percentage imports plus exports over GDP	-	You and Khagram (2005), Dobson and Andres (2010), Treisman (2000)	World Development Indicators
X_4	Natres	Natural resource abundance: measured by share of fuel, ore and metal exports from total merchandise exports	+	You and Khagram (2005), Treisman (2000)	World Development Indicators
X_5	Democ	Democracy: measured by the Freedom House political rights score averaged 1996-2002	-	You and Khagram (2005), Treisman (2000)	Freedom House, Freedom in the World, Political Rights Index
X_6	Democsq	Squared Democracy term, measured by the Freedom House political rights score (1996-2002)	-	You and Khagram (2005), Treisman (2000)	Freedom House, Freedom in the World, Political Rights Index

X_7	soc_leg	Dummy variable for whether the country's legal code originated in Socialist/Communist laws	+	You and Khagram (2005), Treisman (2000)	You and Khagram (2005), from La Porta et al. (1999)
X_8	soc_leg*gini	Variation in association between socialist legal code origin and corruption depending on Gini coefficient value	+	You and Khagram (2005), Treisman (2000)	You and Khagram (2005), from La Porta et al. (1999
X_9	democ*gini	Variation in association between Freedom House political rights score and corruption depending on Gini coefficient value	-	You and Khagram (2005), Treisman (2000)	Freedom House, Freedom in the World, Political Rights Index
X_{10}	GDP*gini	Variation in association between GDP per capita and corruption depending on Gini coefficient value	-	You and Khagram (2005), Treisman (2000)	World Development Indicators, SWIID
X_{11}	cso_prev	Number of Civil Society Organizations per capita in 2002	-	Grimes (2008)	Grimes (2008)
X_{12}	press_free	Press Freedom Index score for 2002	-	Brunetti and Weder (2003)	Reporters Sans Frontieres 2002 Press Freedom Index
X_{13}	ban_corp	Dummy variable for whether a country bans corporate contributions to political parties	-	Djankov et al. (2009)	International Institute for Democracy and Electoral Assistance (IDEA) Database (2002)
X_{14}	ceil_cont	Dummy variable for whether a country has a ceiling on contributions to political parties	-	Djankov et al. (2009)	IDEA Database (2002)
X_{15}	ceil_raise	Dummy variable for whether a country has a ceiling on raisings by political parties	-	Djankov et al. (2009)	IDEA Database (2002)

X_{16}	disc_cont	Dummy variable for whether a country requires disclosure of contributions to political parties	-	Djankov et al. (2009)	International Institute for Democracy and Electoral Assistance Database (2002)
X_{17}	WVS_auth	Attitudes towards authority, measured by responses to WVS question on desirability of strong leadership	-	Sandholtz and Taagepera (2005)	World Values Survey (1996-2008)
X_{18}	WVS_inc	Attitudes towards income distribution, measured by responses to WVS question on desirability of income eqaulty	+	Sandholtz and Taagepera (2005)	World Values Survey (1996-2008)

It should be noted that data for variables X_{13} through X_{18} were available for a significantly smaller number of countries. This required separate regression analyses in order to maximize the number of countries included in each sample. As a result, variables X_1 to X_{10} can be considered the primary model for exploring the association between perceived corruption and income inequality, while the remaining variables either offer robustness checks for this relationship or tentative explorations of the influences of additional factors.

Data Sources

The data used in this analysis for the dependent variable of national corruption levels were taken from Transparency International's Corruption Perceptions Index (CPI) and the World Bank Institute's Control of Corruption Index (CCI). Data for the primary independent variable of income inequality measured by Gini coefficient came from the Standardized World Income Inequality Database, adapted from the United Nations University World Income Database.

The CPI and CCI are based on survey data reflecting the opinions of international business people, country experts and country inhabitants on perceived levels of corruption. The CPI ranges from 0 (most corrupt) to 10 (least corrupt), while the CCI is a standardized score ranging from -2.5 (most corrupt) to 2.5 (least corrupt), with a mean of zero and a standard deviation of one. The Gini coefficient ranges from 0 to 100, with Gini of 0 signifying perfect equality and a Gini of 100 signifying that a sole individual or household possesses the entirety of the country's income. Data from the CPI and CCI were taken from 2003-2010 and averaged, while the Gini coefficients for each country were averaged from 1996-2002. A total of 126 countries comprise the sample used in this analysis.

Table 1 below presents data on corruption levels for each country in the present sample measured by the CPI in descending order, as well as each country's corresponding averaged Gini coefficient. Table 2, which follows, presents data on corruption levels for every country in the present sample measured by the CCI in descending order, as well as each country's corresponding averaged Gini coefficient. In each table the averaged corruption score is listed in the middle column, while the averaged Gini coefficient is listed in the right column.

Table 1: Corruption levels by country as measured by the Corruption Perceptions Index (CPI), averaged 2003–2010, with corresponding Gini coefficient, averaged 1996-2002.

COUNTRY	AVG. CPI 2003-2010	GINI 1996-2002	COUNTRY	AVG. CPI 2003-2010	GINI 1996-2002	COUNTRY	AVG. CPI 2003-2010	GINI 1996-2002
Low-level			**Mid-level**			**High-level**		
New Zealand	9.5	33.11	Latvia	4.4	32.32	Argentina	2.8	46.11
Denmark	9.4	22.37	Namibia	4.4	64.74	Guatemala	2.8	52.36
Finland	9.4	23.71	Greece	4.2	33.73	Mozambique	2.7	43.46
Singapore	9.3	39.89	Sierra Leone	4.2	49.01	Zambia	2.7	55.66
Sweden	9.2	22.79	Poland	4.2	29.45	Belarus	2.7	26.77
Iceland	9.2	25.15	Bulgaria	3.9	25.54	Bolivia	2.6	54.24
Switzerland	9.0	27.96	Turkey	3.9	43.15	Vietnam	2.6	35.41
Netherlands	8.8	24.40	El Salvador	3.9	47.72	Gambia	2.6	48.89
Australia	8.7	30.94	Croatia	3.8	29.85	Nicaragua	2.6	51.73
Norway	8.7	23.80	Colombia	3.8	50.74	Uganda	2.6	41.75
Canada	8.6	30.71	Trinidad and Tobago	3.8	37.47	Niger	2.5	45.99
Luxembourg	8.5	26.35	Ghana	3.7	38.47	Iran	2.5	42.65
U.K.	8.2	34.08	Brazil	3.7	51.29	Nepal	2.5	43.96
Austria	8.2	26.31	Peru	3.5	54.02	Ethiopia	2.5	37.36
Germany	8.0	27.56	Thailand	3.5	47.46	Honduras	2.5	50.24
Ireland	7.6	32.00	China	3.4	37.81	Kazakhstan	2.5	32.79
Japan	7.4	31.12	Mexico	3.4	48.35	Philippines	2.5	44.62
U.S.A.	7.4	37.02	Panama	3.4	51.57	Ukraine	2.5	33.10
Belgium	7.3	26.34	Jamaica	3.4	51.65	Yemen	2.4	33.48
Chile	7.2	51.74	Romania	3.4	28.05	Russia	2.4	42.33
France	7.1	25.76	Morocco	3.3	39.70	Indonesia	2.4	33.46
Spain	6.7	33.43	Lesotho	3.3	57.17	Laos	2.3	35.34
Uruguay	6.4	41.73	Burkina Faso	3.3	56.37	Pakistan	2.3	32.31
Estonia	6.4	35.57	Sri Lanka	3.2	41.72	Ecuador	2.3	52.19
Slovenia	6.3	24.75	Senegal	3.2	40.34	Papua New Guinea	2.2	47.85
Portugal	6.3	35.24	India	3.2	33.89	Cameroon	2.2	47.84
Israel	6.2	34.14	Macedonia	3.2	32.94	Paraguay	2.2	52.77
Cyprus	5.9	26.94	Swaziland	3.2	51.38	Venezuela	2.1	44.05
Taiwan	5.7	29.30	Rwanda	3.1	44.26	Azerbaijan	2.1	37.15
Botswana	5.7	52.17	Bosnia and Herzegovina	3.1	29.87	Burundi	2.1	37.86
South Korea	5.1	29.74	Egypt	3.1	37.43	Nigeria	2.1	47.84
Cape Verde	5.1	52.82	Serbia	3.1	28.96	Central African Republic	2.1	48.18
Jordan	5.1	37.53	Georgia	3.0	38.25	Kenya	2.1	47.21
Hungary	5.0	29.30	Dominican Republic	3.0	46.36	Kyrgyzstan	2.1	36.56
Malaysia	4.9	44.00	Madagascar	3.0	43.45	Cote D'Ivoire	2.1	43.82
Mauritius	4.9	41.30	Djibouti	3.0	39.79	Cambodia	2.1	43.53
Lithuania	4.8	32.89	Malawi	2.9	46.63	Tajikistan	2.0	31.37
Costa Rica	4.8	43.78	Mali	2.9	44.19	Guinea-Bissau	2.0	38.97
Italy	4.8	33.83	Algeria	2.9	34.46	Angola	2.0	53.20
South Africa	4.7	62.20	Armenia	2.9	41.18	Uzbekistan	2.0	36.47
Czech Republic	4.6	25.81	Mongolia	2.9	33.72	Bangladesh	1.9	35.16
Tunisia	4.6	40.15	Albania	2.9	28.66	Turkmenistan	1.9	32.99
Slovakia	4.4	24.17	Moldova	2.8	41.91	Guinea	1.8	39.49

Source: Transparency International, Corruption Perception Index 2003-2010, Standardized World Income Inequality Database, United Nations University World Income Inequality Database.

Notes: CPI ranges from 0 ("Highly Corrupt") to 10 ("Very Clean); Gini coefficient ranges from 0 to 100.

Table 2: Corruption levels by country as measured by the Control of Corruption Index (CCI), averaged 2003-2010, with corresponding Gini coefficient, averaged 1996-2002.

COUNTRY	AVG. CCI 2003-2010	GINI 1996-2002
Low-level		
Denmark	2.456	22.37
Finland	2.410	23.71
New Zealand	2.365	33.11
Singapore	2.263	39.89
Iceland	2.217	25.15
Sweden	2.208	22.79
Netherlands	2.099	24.40
Switzerland	2.095	27.96
Australia	2.026	30.94
Norway	2.007	23.80
Canada	1.980	30.71
Austria	1.958	26.31
Luxembourg	1.906	26.35
Germany	1.795	27.56
U.K.	1.769	34.08
Ireland	1.631	32.00
U.S.A.	1.429	37.02
France	1.405	25.76
Chile	1.395	51.74
Belgium	1.359	26.34
Japan	1.288	31.12
Spain	1.154	33.43
Cyprus	1.060	26.94
Portugal	1.037	35.24
Botswana	1.009	52.17
Slovenia	0.935	24.75
Estonia	0.913	35.57
Israel	0.852	34.14
Taiwan	0.678	29.30
Cape Verde	0.577	52.82
Hungary	0.519	29.30
Mauritius	0.497	41.30
Costa Rica	0.481	43.78
South Korea	0.452	29.74
Czech Republic	0.344	25.81
Slovakia	0.336	24.17
South Africa	0.299	62.20
Poland	0.287	29.45
Jordan	0.283	37.53
Greece	0.242	33.73
Namibia	0.239	64.74
Malaysia	0.227	44.00
Latvia	0.225	32.32

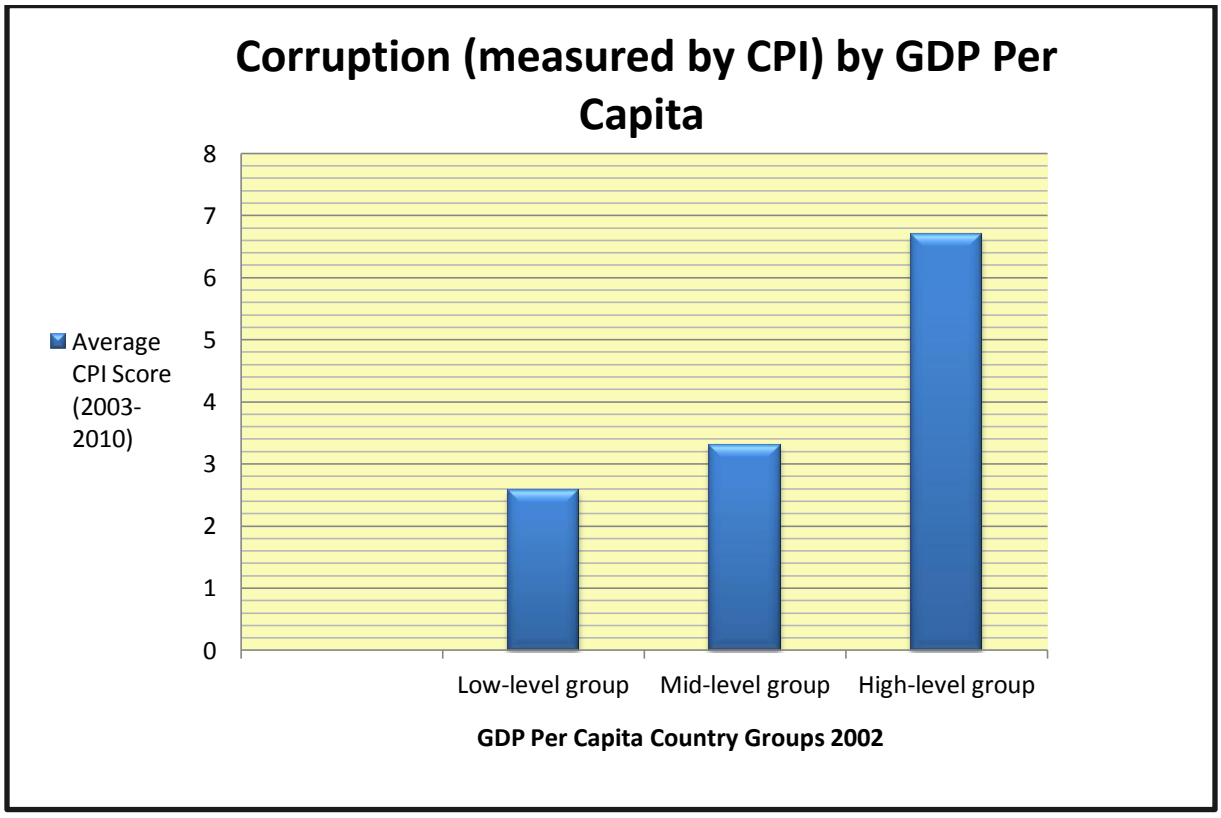
COUNTRY	AVG. CCI 2003-2010	GINI 1996-2002
Mid-level		
Italy	0.224	33.83
Lithuania	0.178	32.89
Croatia	0.089	29.85
Tunisia	-0.012	40.15
Turkey	-0.030	43.15
Brazil	-0.043	51.29
Lesotho	-0.061	57.17
Ghana	-0.086	38.47
Madagascar	-0.096	43.45
Bulgaria	-0.119	25.54
Rwanda	-0.163	44.26
Colombia	-0.196	50.74
Romania	-0.196	28.05
Trinidad and Tobago	-0.199	37.47
Peru	-0.252	54.02
Burkina Faso	-0.253	56.37
Sri Lanka	-0.258	41.72
Mexico	-0.264	48.35
Morocco	-0.271	39.70
Thailand	-0.279	47.46
Panama	-0.310	51.57
Bosnia and Herzegovina	-0.314	29.87
El Salvador	-0.315	47.72
Macedonia	-0.325	32.94
Serbia	-0.331	28.96
Swaziland	-0.332	51.38
Georgia	-0.336	38.25
Senegal	-0.374	40.34
India	-0.405	33.89
Jamaica	-0.445	51.65
Argentina	-0.450	46.11
Mozambique	-0.470	43.46
Mali	-0.475	44.19
Djibouti	-0.485	39.79
Algeria	-0.534	34.46
China	-0.535	37.81
Iran	-0.536	42.65
Mongolia	-0.559	33.72
Malawi	-0.564	46.63
Egypt	-0.570	37.43
Bolivia	-0.579	54.24
Guatemala	-0.615	52.36
Armenia	-0.624	41.18

COUNTRY	AVG. CCI 2003-2010	GINI 1996-2002
High-level		
Gambia	-0.626	48.89
Albania	-0.630	28.66
Zambia	-0.639	55.66
Nepal	-0.643	43.96
Nicaragua	-0.645	51.73
Vietnam	-0.645	35.41
Dominican Republic	-0.650	46.36
Philippines	-0.688	44.62
Ethiopia	-0.688	37.36
Moldova	-0.719	41.91
Belarus	-0.772	26.77
Indonesia	-0.775	33.46
Niger	-0.782	45.99
Honduras	-0.800	50.24
Ecuador	-0.805	52.19
Uganda	-0.810	41.75
Ukraine	-0.822	33.10
Yemen	-0.865	33.48
Russia	-0.907	42.33
Pakistan	-0.921	32.31
Kenya	-0.926	47.21
Sierra Leone	-0.929	49.01
Cote D'Ivoire	-0.938	43.82
Kazakhstan	-0.977	32.79
Cameroon	-0.984	47.84
Guinea	-1.033	39.49
Central African Republic	-1.034	48.18
Burundi	-1.034	37.86
Azerbaijan	-1.038	37.15
Venezuela	-1.042	44.05
Tajikistan	-1.059	31.37
Nigeria	-1.069	47.84
Uzbekistan	-1.071	36.47
Guinea-Bissau	-1.088	38.97
Kyrgyzstan	-1.118	36.56
Cambodia	-1.137	43.53
Paraguay	-1.161	52.77
Papua New Guinea	-1.195	47.85
Uruguay	-1.195	41.73
Bangladesh	-1.207	35.16
Laos	-1.215	35.34
Angola	-1.319	53.20
Turkmenistan	-1.388	32.99

Source: World Bank Institute, World Governance Indicators, Control of Corruption Index 2003-2010, Standardized World Income Inequality Database, United Nations University World Income Inequality Database.
Notes: CCI ranges from -2.5 ("very poor control") to 2.5 ("excellent control"); Gini coefficient ranges from 0 to 100.

Figure 1 below shows corruption levels for each country in the sample as measured by the CPI according to GDP per capita. The low-, mid- and high- level designations of GDP per capita are based upon each country's placement within the bottom, middle and top thirds among countries in the sample. The figure shows a clear positive correlation between CPI scores and GDP per capita, with higher CPI scores indicating lower levels of corruption.

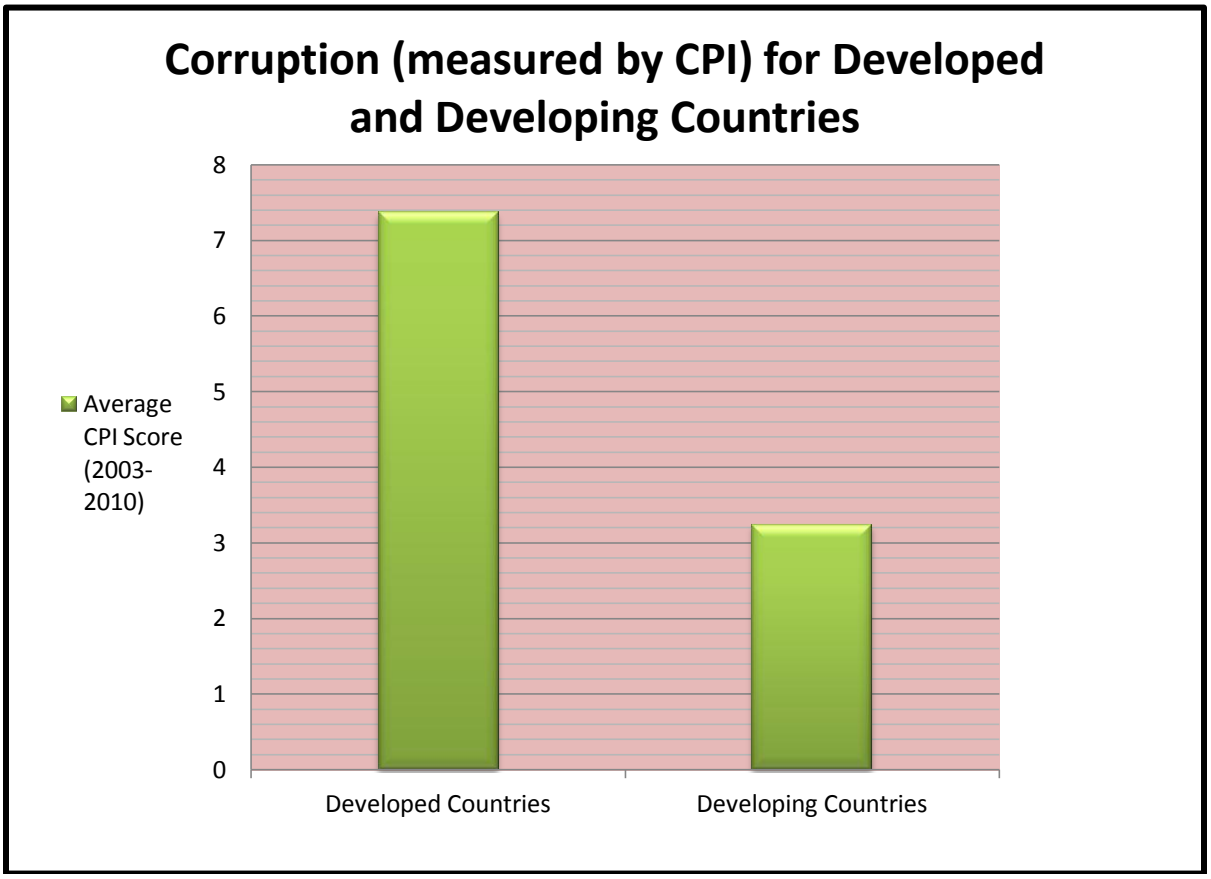
Figure 1: Corruption levels per country groups based on GDP per capita (USD), 2002.



Source: United Nations Statistics Division
Note: "Low-level group" denotes the lowest third of countries from the sample in terms of GDP per capita in 2002 (ranging from 779 to 112 USD). "Mid-level group" denotes the middle third of countries from the sample in terms of GDP per capita (ranging from 3924 to 882 USD). "High-level group" denotes the highest third of countries from the sample in terms of GDP per capita, (ranging from 50983 to 3965 USD).

Figure 2 continues in a similar vein, comparing corruption levels according countries' "developed" or "developing" status, based upon categorizations from the International Monetary Fund's *World Economic Outlook* from April 2012. Figure 2 shows that developed countries from the sample had higher averaged CPI scores (less corrupt) than developing countries from the sample.

Figure 2: Corruption levels for Developed versus Developing Countries.

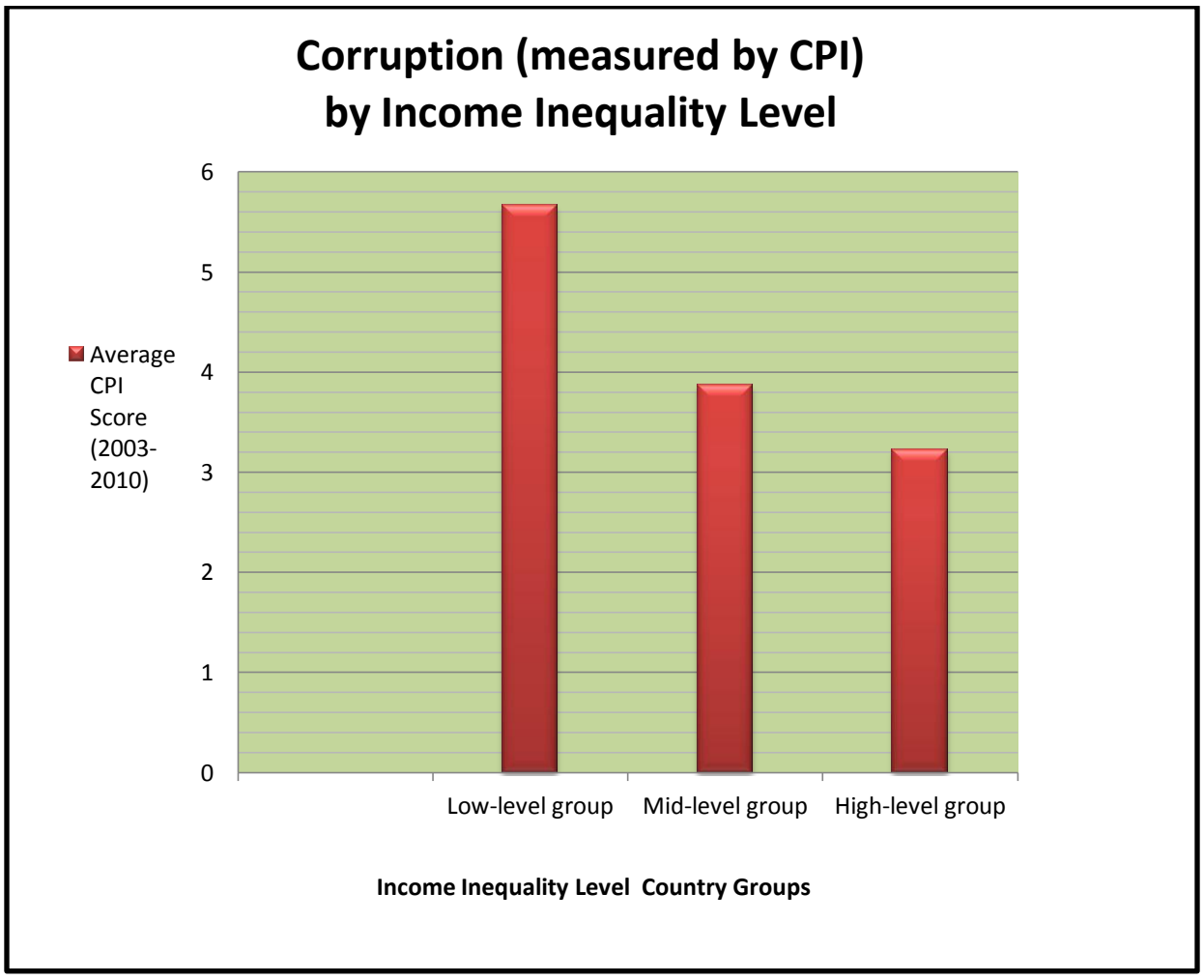


Source: For Developed/Developing country assignation, International Monetary Fund, *World Economic Outlook*, April 2012; for corruption levels, Transparency International, Corruption Perceptions Index, 2003-2010.

Figure 3 below shows corruption levels according to levels of income inequality. Corruption again is measured by the CPI, while income inequality level is based upon a country's placement with the bottom, middle and top thirds of the sample by Gini coefficient,

with the low-level group having the lowest Gini coefficients and hence lowest levels of income inequality. The figure shows higher CPI scores (i.e. less corruption) among countries with lower levels of income inequality, with averaged CPI scores among each group decreasing as income inequality levels increase.

Figure 3: Corruption levels per country groups based on Income Inequality levels (averaged Gini coefficient, 1996-2002)



Note: "Low-level group" denotes the lowest third of countries from the sample in terms of income inequality, (Gini ranging from 22.3—33.5). "Mid-level group" denotes the middle third of countries from the sample in terms of income inequality, (Gini ranging from 33.7-43.6). "High level group" denotes the highest third of countries from the sample in terms of income inequality, (Gini ranging from 43.6-64.8).

Data on GDP per capita, natural resource abundance and trade openness were taken from the World Bank's World Development Indicator database, and used averaged data from 1996-2002. Data for the democracy variable were taken from Freedom House's Freedom in the World Index, specifically each country's political rights score averaged over the same period. Legal code origin data was taken from La Porta et al. (1999).

For the supplementary variables, data for the press freedom variable were taken from the Reporters Sans Frontieres 2002 Press Freedom Index. Data on the prevalence of civil society organizations, as measured by the number of organizations per capita in each country, were taken from Grimes (2008), and reflects rates from 2000. Attitudinal/cultural variable data were taken from the World Values Survey (1996-2008). Data on the political contribution laws for each country were taken from the International Institute for Democracy and Electoral Assistance (IDEA), and represent a cross-section from 2002.[4]

[4] Appendix 1 presents pairwise correlations between the independent variables of the primary model, and indicates a lack of multicollinearity.

Analysis

Three sets of regression analyses were performed. Each set supported the hypothesis of a positive association between income inequality and corruption.[5]

The first set includes the largest sample of countries, and examines the relationship most broadly, using a concise model including only control variables that in previous tests demonstrated consistent significance. In addition, owing to the availability of data, four models include variables related to sectors that are frequently the focus of anti-corruption campaigns: the per capita number of civil society organizations and the Press Freedom index score for each country from 2002. As a further robustness check, the first set of regression analyses included three models using an instrumental variable for income inequality. Mature cohort size, or the ratio of the population aged 40 to 59 years old relative to the population 15 to 69 years is instrumented for the Gini coefficient, following You and Khagram (2005).

Table 3 presents the results of the first set of regression analyses using the largest sample. Each of the six models explained more than 83 percent of the variation in corruption, indicating strong predictive power in determining future levels of corruption.

In the three OLS estimations, the natural logarithm of the averaged 1996-2002 Gini coefficient showed a statistically strong positive association with corruption levels as measured by the averaged CPI from 2003-2010.[6] In all three OLS estimations, the natural logarithm of the averaged Gini coefficient was significant at the 1 percent level. In the three IV 2SLS regressions, the natural logarithm of the averaged Gini coefficient (instrumented for with mature cohort size,

[5]Model diagnostics for all three sets of regression analyses are listed in Appendix 2.The results of the White test showed no issues with heteroscedasticity. For the link test results, the "hat" p-value should be significant, and the "hat squared," or the coefficient of the squared linear predictor, should be insignificant, which was the case for all of the models. The results of the Ramsey's RESET test for omitted variables ("ovtest") show no bias in this regard. For the three 2SLS regressions, the first stage regression t-statistic value for "mature cohort size" was above the critical threshold of 3.2.

[6] The sign in the coefficient of the Gini is inverted because CPI scores range from 1 (most corrupt) to 10 (least corrupt).

or “mature”) retained its statistically significant association with corruption levels, although to a lesser degree at the 10 percent level. The six models strongly suggest the robustness of the positive relationship between income inequality and corruption.

The natural logarithm of GDP per capita in all six models showed a strongly statistically significant negative association with perceived corruption levels at the 1 percent level, as expected from the literature (Treisman, 2000). Percentage of the country identifying as Protestant also showed a very robust statistically significant negative association with perceived corruption levels, a relationship that has also been revealed by previous studies (La Porta, et al. 1997).

Other variables that have been employed in previous cross-country empirical corruption research included natural resource abundance, socialist legal code origins and democracy as defined by Freedom House political rights score, showed statistically significant associations with corruption to a slightly lesser extent, but with the expected signs. The use of a quadratic term by You and Khagram (2005) for the Freedom House political rights score was reaffirmed in all of the models.

Three variables were used to examine whether socialist legal code origin, Freedom House index score and GDP per capita varied according to the natural logarithm of the averaged Gini coefficient value. In contrast to You and Khagram (2005), who found that income inequality had a stronger positive association with perceived corruption levels in countries with higher democracy scores, this relationship was shown to be statistically significant only once, in OLS (3), and in that instance at the 10 percent level. OLS (3) included Press Freedom Index score as an additional independent variable, which may have contributed toward greater variation in the democracy score.

At the same time, two variables previously unexplored in the literature showed statistically significant associations with perceived corruption levels in multiple models. The variable examining socialist legal code origin and Gini coefficients showed a statistically significant positive association with perceived corruption levels in four of the six models at the 10 percent level, and in OLS(1) at the 5 percent level. Post-socialist or currently socialist legal code countries frequently combine high levels of corruption with moderate to low levels of income inequality. The results suggest that in these countries higher income inequality is still associated with higher levels of corruption, and that the relationship intensifies as income inequality increases.

The variable examining GDP per capita and Gini coefficients showed a statistically significant positive association with perceived corruption levels in five of the six models, including two, OLS(1) and OLS(2), where it was significant at the 5 percent level. The relationship these results suggest is that the association between income inequality and corruption is greater in higher-income countries. A possible explanation for why this might be the case derives from the theoretical underpinnings of the relationship between corruption and income inequality generally: corruption in highly unequal societies arises from effort by the rich to preserve their status through corrupt practices at the expense of poorer segments of the population (You and Khagram, 2005). This phenomenon may be more intense in higher income countries where the lower segments of society may experience enough affluence to be politically active or conscious, and hence more of a threat than in societies where the bottom rungs are concerned more with basic subsistence.

The two variables tied to current strategies of anti-corruption campaigns, civil society organization prevalence and the Press Freedom Index score, show no statistically significant

association with perceived corruption levels, in contrast to the findings of Brunetti and Weder (2001). The implications of these results will be discussed in the following section.

Table 3: Broad sample OLS and IV 2SLS regression results with CPI as dependent variable

	OLS (1)	IV (1)	OLS (2)	IV (2)	OLS (3)	IV(3)
ln Gini (mature in 2SLS)	-2.47838 [-2.69]***	-0.0895989 [-1.65]*	- 2.510235 [-2.73]***	-0.096143 [-1.83]*	-2.582441 [-2.93]***	-0.096129 [-1.66]*
ln GDP per capita	0.4332971 [3.67]***	0.4470075 [4.09]***	0.4523089 [3.75]***	0.4695604 [4.22]***	0.4365194 [3.66]***	0.4523555 [4.12]***
ln Trade Openness	0.1677375 [0.76]	0.1905632 [0.90]	0.1070257 [0.40]	0.1248013 [0.49]	0.1396707 [0.62]	0.1525278 [0.71]
Nat. Res.	-0.0069576 [-2.07]**	-0.006652 [-1.83]*	-0.0063688 [-1.83]*	-0.0060065 [-1.64]*	-0.0068967 [-2.04]**	-0.0065243 [-1.77]*
Democ.	-0.8782379 [-2.17]**	-1.110569 [-1.85]*	0 .0473765 [-2.15]**	-1.099721 [-1.90]*	-0.9485129 [-2.37]**	-1.233837 [-1.88]*
Democ. Squared	0.0495753 [1.48]	0.0429035 [1.31]	0.0473765 [1.49]	0.0397867 [1.25]	0.0492527 [1.51]	0.0425395 [1.32]
Socialist Legal	-2.83252 [-2.56]**	-2.827603 [-2.06]**	-2.773812 [-2.57]**	-2.858771 [-2.17]**	-2.703419 [-2.28]**	-2.660782 [-1.94]*
Protestant %	1.458848 [3.77]***	1.560678 [3.72]***	1.40283 [3.59]***	1.483077 [3.52]***	1.491951 [4.01]***	1.610904 [4.08]***
Soc. Leg.* Gini	0.0637597 [2.16]**	0.0622719 [1.75]*	0.0625207 [2.16]**	0.0633298 [1.85]*	0.0601273 [1.89]*	0.0574389 [1.61]
Democ.* Gini	0.0089491 [1.55]	0.0158262 [1.21]	0.0083483 [1.46]	0.016396 [1.29]	0.0098456 [1.68]*	0.0177899 [1.24]
GDPperCap.* Gini	1.80e-06 [2.21]**	1.55e-06 [1.72]*	1.71e-06 [1.96]**	1.39e-06 [1.48]	1.82e-06 [2.21]**	1.55e-06 [1.73]*
Civil Society Org. Prevalence			0.0070129 [0.91]	0.0079974 [1.03]		
Press Freedom					0.0047298 [0.66]	.0067697 [0.85]
Observations	**126**	**125**	**125**	**124**	**126**	**125**
F-Statistic/Chi sq.	**84.17**	**894.98**	**75.48**	**904.51**	**83.39**	**861.26**
R-Squared	**0.8399**	**0.8336**	**0.8414**	**0.8343**	**0.8409**	**0.8340**

Robust t statistics in brackets. *significant at 10%; **significant at 5% ; ***signifcant at 1%

The second set of regressions included four indicator variables that have not been previously used in models attempting to analyze the relationship between corruption and income inequality, and which concern the laws in each country concerning contributions to political

parties. CPI averaged between 2003-2010 was again used as the dependent variable. Owing to missing data for these variables, the sample in this set of regression analyses is smaller than that of the first.

Table 4 presents the results of the second set of regression analyses. Each of the six models explained more than 84 percent of the variation in corruption, indicating a strong predictive power in determining future levels of corruption.

OLS (4) shows that within this sample of countries the primary model employed in OLS (1) still yields similar results, with averaged Gini coefficient, the log of GDP per capita, socialist legal code origin and percentage of Protestants all significant at least at the 5 percent level.

Of the four variables introduced in this set of regression analyses, Ceiling on Raisings by Parties was not statistically significant in any of the models in which it was included. Ceiling on Contributions to Political Parties, which equals 1 if a ceiling exists on how much a donor can contribute to political parties, showed a strongly statistically significant positive association with perceived levels of corruption at the 1 percent level in both models in which it was included. Ban on Corporate Donations to parties, which equals 1 if such a ban exists, also showed a positive statistically significant association with perceived levels of corruption. When added to the baseline model in OLS (6), it was statistically significant at the 5 percent level.

Disclosure of contributions to political parties, which equals 1 if provisions exist for such disclosures, was not statistically significantly associated with perceived levels of corruption when added to the primary model without the other political contribution law variables in OLS (8). However, when these other variables are added, disclosure of contributions to parties showed

a statistically significant negative association with perceived levels of corruption at the 5 percent level.

Table 4: OLS regression results including political contribution law variables, with CPI as dependent variable

	OLS (4)	OLS (5)	OLS (6)	OLS (7)	OLS (8)	OLS (9)
ln Gini 96-02	-2.11371 [-2.29]**	-2.084833 [-2.29]**	-1.797456 [1.96]**	-2.052633 [-2.16]**	-2.422066 [-2.66]***	-1.865776 [-2.17]**
ln GDP per capita	0.4403099 [2.67]***	0.4444293 [3.00]***	.4507693 [3.08]***	0.4860377 [3.07]***	0.4689443 [2.96]***	0.4168615 [2.90]***
ln Trade Openness	0.2326711 [0.83]	0.294852 [1.19]	.1728847 [0.74]	0.2637247 [1.02]	0.2676561 [1.00]	0.1508558 [0.69]
Nat. Res.	-0.0092761 [-1.21]	-0.0126598 [-1.72]*	-0.0118708 [-1.55]	-0.0118442 [-1.50]	-0.0117493 [-1.55]	-0.0157517 [-2.15]**
Democ.	-1.181471 [-2.00]**	-1.677329 [-3.27]***	-1.633677 [-3.14]***	-1.47539 [-2.76]***	-1.597338 [-3.03]***	-1.794625 [-3.67]***
Democ. Squared	0.1108992 [1.72]*	0.1762847 [2.77]***	0.2038065 [3.17]***	0.1793372 [2.74]***	0.1664469 [2.78]***	0.2379157 [3.95]***
Socialist Legal	-2.719907 [-2.32]**	-2.04889 [-1.83]*	-3.058895 [-2.36]**	-2.581472 [-2.09]**	-3.044978 [-2.56]**	-3.229774 [-2.93]***
Protestant %	1.323566 [3.11]***	1.250829 [2.97]***	1.000289 [2.12]**	1.451121 [3.339]***	1.445329 [3.46]***	1.00403 [2.14]**
Soc. Leg.* Gini	0.0605684 [1.91]*	0.0441062 [1.38]	0.081675 [2.30]**	0.0541604 [1.60]	0.0650575 [-2.56]**	0.0814863 [2.60]***
Democ.* Gini	0.008804 [1.24]	0.0126441 [1.70]*	0.0073496 [0.96]	0 .008336 [1.05]	0 .0124243 [1.75]*	0.0066267 [0.91]
GDPperCap.* Gini	2.13e-06 [1.99]**	2.07e-06 [2.37]**	2.21e-06 [2.52]**	1.79e-06 [1.86]*	1.74e-06 [1.75]*	1.98e-06 [2.65]***
Ban on Corporate Contributions		-0.4520381 [-2.38]**				-0.3491639 [-1.71]*
Ceiling on Contributions			-0.7079061 [-2.91]***			-0.8693655 [-2.74]***
Ceiling on Raisings by Parties				-0.1704927 [-0.65]		0.2697542 [1.08]
Disclosure - Party Contributions					0.1284557 [0.61]	0.5319564 [2.21]**
Observations	**88**	**85**	**85**	**85**	**86**	**84**
F-Statistic/Chi sq.	**73.36**	**77.88**	**68.19**	**67.46**	**67.99**	**60.94**
R-Squared	**0.8499**	**0.8694**	**0.8687**	**0.8571**	**0.8567**	**0.8832**

Robust t statistics in parentheses. *significant at 10%; **significant at 5% ; ***significant at 10%

There are several interesting aspects to the results of the second set of regressions. The first is that two variables that could be expected to curb the influence of wealthier segments of society, the ban on corporate donations and the ceiling on contributions to political parties, are actually associated with higher levels of corruption. This apparent contradiction could, however, be the result of the specific nature of the laws rather than their spirit: by capping or outright banning different forms of influence seeking, the laws may effectively push underground activities that otherwise could be regulated.

This possible explanation is supported in part by the results of OLS (9), where the four political contribution law variables are included in a single model. Both the ban on corporate contributions and the ceiling on contributions variables remain statistically significant, at the 10 and 1 percent levels, respectively. The existence of laws requiring the disclosure of contributions to political parties, however, becomes strongly statistically significant at the 5 percent level, and is negatively associated with perceived corruption levels. The results suggest that while restricting contributions may have an adverse effect, greater controls on the transparency and openness of such contributions may be effective.

These results complement the findings of Djankov et al. (2009) on the negative association between the transparency of finances for political actors and corruption by focusing not solely on politicians themselves but their financial backers as well. Moreover, the evidence of this association lends weight to the theoretical basis for the relationship between income inequality and corruption proposed by You and Khagram (2005).

Table 5 present the results of the third set of regressions. Each of the three models explained more than 85 percent of the variation in corruption.

The third set of regression analyses looked specifically at attitudinal and cultural variables gleaned from the World Values Survey. Data on these variables included a smaller sample of countries. The two variables included in the regression analyses concerned attitudes toward authority (specifically, the desirability of having a "strong leader," ranked on a scale of 1 to 4) and income distribution (whether incomes should be more (1) or less (10) equal).

Unfortunately, the first regression using the baseline model shown in OLS (1) with CPI as the dependent variable failed to show a significant relationship between income inequality and corruption.

Three models using a different measure of corruption, the World Bank Control of Corruption Index (CCI), as the dependent variable were run using the data from the World Values Survey. In all three models income inequality shows a strongly statistically significant association with perceived corruption levels. The cultural/attitudinal variables, however, showed no significant associations in the regressions in which they were included.

Table 5: OLS and IV 2SLS regression results including World Values Survey data, with CCI as dependent variable

	OLS (10)	OLS (11)	OLS (12)
ln Gini 96-02 (mature in 2SLS)	-1.182542 [-2.15]**	-1.193438 [-2.09]	-1.186832 [-2.23]**
ln GDP per capita	0.2565139 [3.85]***	0.2577338 [3.83]	0.2406433 [3.63]***
ltrade	0.2064824 [2.09]**	0.2048721 [1.99]	0.2291974 [2.20]**
Nat. Res.	-0.0053409 [-1.97]**	-0.0053938 [-1.91]	-0.00509 [-1.74]*
Democ.	-0.4835904 [-3.09]***	-0.4811823 [-3.01]	-0.4707958 [-2.91]***
Democ. Squared	0.0218071 [1.28]	0.0214743 [1.24]	0.0199857 [1.17]
Socialist Legal	-0.2238982 [-0.45]	-0.2338924 [-0.44]	-0.3088672 [-0.64]
Protestant %	0.9748985 [4.51]***	0.9783137 [4.45]	0.9665201 [4.48]***
Soc. Leg.* Gini	0.0001592 [0.01]	0.0005089 [0.03]	0.0021443 [0.16]
Democ.* Gini	0.0089625 [2.35]**	.0089689 [2.34]	0.0090001 [2.31]**
GDPperCap.* Gini	8.00e-07 [2.31]**	8.00e-07 [2.29]	8.19e-07 [2.42]**
WVS Authority		-.0213888 [-0.14]	
WVS Income			-0.0480838 [-0.83]
Observations	**83**	**83**	**83**
F-Statistic/Chi sq.	**66.25**	**60.16**	**61.79**
R-Squared	**0.8581**	**0.8581**	**0.8599**

Robust t statistics in parentheses. *significant at 10%; **significant at 5% ; ***significant at 10%

Policy Implications

Corruption is a highly complex phenomenon that has been associated with a multitude of economic, legal, cultural and demographic factors. Any anti-corruption campaign will fail if it focuses on a single perceived cause at the expense of others. Moreover, much of the forms corruption will take, and the pervasiveness with which it will manifest itself, are dependent on country-specific conditions, making encompassing policy prescriptions for anti-corruption efforts difficult and perhaps fundamentally misguided. However, by adding further evidence to the relationship between income inequality and corruption this study may offer insight into how certain forms of corruption may come about, as well as a possible explanation for why certain factors previously thought to underlie corruption, and which have inspired anti-corruption measures, have not been supported by empirical research. The results of this study also suggest the possible long-term economic consequences of pronounced income inequality.

The main finding of this study was a robust positive association between income inequality and corruption. The study used more recent data from the last decade, and built upon the models of previous studies with a greater array of variables. The growing evidence of the relationship between income inequality and corruption supports theories made by previous research: in societies where a small economic elite emerges, the pressure to retain their status and wealth may impel this elite to use their superior position to purchase influence, often illegally (Khagram and You, 2005, Gupta et al., 2002).

The relationship also may provide an explanation for why previous studies of corruption found higher levels of corruption associated with smaller government size, rather than vice versa (Friedman, 2000, La Porta, 1999). Rather than a swollen public sector staffed by bribe-seeking officials, corruption may in part arise from elites from the private sector aggressively attempting

to safeguard their interests. This would suggest that minimizing the public sector is not necessarily the best basis for anti-corruption reform (You and Khagram, 2005).

Other measures frequently proposed to curb corruption have been the promotion of civil society and media development (Brunetti and Weder, 2001). The results of this study found no statistically significant association between either of these two factors and corruption level. This should in no way suggest the downplaying of the importance of efforts in these areas. It may nonetheless be the case that larger factors may play a part in corruption at the national level, and that anti-corruption campaigns could profit from a greater diversity of emphases.

The failure to find significant statistical associations between cultural and attitudinal variables taken from responses to the World Values Survey is tentatively encouraging. Given the ingrained and largely irreversible nature of such factors, they are typically considered to lie beyond the reach of conceivable reforms, and their possible lack of influence suggests measures can be taken to combat corruption in countries where it is relatively entrenched (Lambsdorff, 2005).

The possible relationship between income inequality and corruption suggests that measures to counteract the influence wielded by wealthy elites over the state could bring positive results. One of the more salient avenues for this influence is in the form of financial contributions and ties to political actors, and to political parties in particular. The results of this study suggest that implementing greater regulation on the requisite degree of transparency and openness of such ties may serve to curtail corruption, and perhaps to a greater extent that comparable regulations on the kind or size of the contributions themselves.

Lastly, the study's findings point to the possible long-term economic consequences of income inequality. Keeping in mind the figures cited at the outset of this study on the sheer size

of the losses associated with corruption globally, over and above its harm to institutions and political stability, any evidence that it may in part be associated with income inequality calls for the possible consideration of redistributive measures. Whether such measures themselves have associations with corruption levels, as suggested by Andres and Ramlogan-Dobson (2011), should be investigated. In addition, other forms of inequality, including inequality in terms of education, gender, ethnicity and political participation, could also be topics for further study.

Appendix 1: Pairwise correlations between primary independent variables

	lGini	lGDP	lTrade	NatRres.	Democ.	Soc_Leg	Prot. %
lGini	1						
lGDP	0.54	1					
lTrade	0.13	0.24	1				
NatRes	0.08	0.18	0.07	1			
Democ.	0.29	0.62	0.08	0.36	1		
Soc_Leg	0.37	0.06	0.24	0.03	0.17	1	
Prot. %	0.17	0.33	0.07	0.04	0.33	0.20	1

Appendix 2: Results of Diagnostic Tests

OLS Estimations

Model	Heteroscedasticity (White Test)	Linktest		Ovtest – p-value (Ramsey's RESET)
		hat (p-value)	hat_sq (p-value)	
OLS (1)	✓	**0.000**	**0.539**	**0.014**
OLS (2)	✓	**0.000**	**0.779**	**0.014**
OLS (3)	✓	**0.000**	**0.614**	**0.011**
OLS (4)	✓	**0.002**	**0.803**	**0.038**
OLS (5)	✓	**0.003**	**0.612**	**0.251**
OLS (6)	✓	**0.006**	**0.403**	**0.027**
OLS (7)	✓	**0.004**	**0.681**	**0.086**
OLS (8)	✓	**0.002**	**0.809**	**0.052**
OLS (9)	✓	**0.003**	**0.421**	**0.067**
OLS (10)	✓	**0.000**	**0.625**	**0.016**
OLS (11)	✓	**0.000**	**0.630**	**0.016**
OLS (12)	✓	**0.000**	**0.618**	**0.016**

✓ - test shows no problem
X – test shows problem

2SLS Regressions

Model	First stage regression t-statistic value for "mature" (critical threshold = approx. 3.2)
IV (1)	4.47
IV (2)	4.35
IV (3)	4.32

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