A Comparative Study of Inequality and Corruption

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This article argues that income inequality increases the level of corruption through material and normative mechanisms. The wealthy have both greater motivation and more opportunity to engage in corruption, whereas the poor are more vulnerable to extortion and less able to monitor and hold the rich and powerful accountable as inequality increases. Inequality also adversely affects social norms about corruption and people's beliefs about the legitimacy of rules and institutions, thereby making it easier for them to tolerate corruption as acceptable behavior. This comparative analysis of 129 countries using two-stage least squares methods with a variety of instrumental variables supports the authors' hypotheses using different measures of corruption (the World Bank's Control of Corruption Index and the Transparency International's Corruption Perceptions Index). The explanatory power of inequality is at least as important as conventionally accepted causes of corruption such as economic development. The authors also found a significant interaction effect between inequality and democracy, as well as evidence that inequality affects norms and perceptions about corruption using the World Values Surveys data. Because corruption also contributes to income inequality, societies often fall into vicious circles of inequality and corruption.

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Does income inequality affect corruption? This important question has seldom been addressed by social scientists. Although cross-national statistical studies investigating the causes of corruption have proliferated (Ades and Di Tella 1999; Montinola and Jackman 2002; Paldam 2002; Treisman 2000), sociological theorizing and research on corruption is surprisingly rare. Whereas political scientists and economists have examined corruption primarily in relation to economic development rather than inequality, sociologists who examine inequality have paid scant attention to the problem of corruption. As a consequence, the relationships between inequality and corruption are grossly understudied.

This article makes three sets of contributions to the literature on cross-national variation in corruption. First, it gives a theoretical account of why income inequality increases corruption generally and counterintuitively in democratic political systems. We argue that inequality fosters a norm of corruption as acceptable behavior, that corruption is likely to reinforce or widen existing inequalities, and that vicious circles of inequality-corruption-inequality are thus likely to manifest.

Second, this article shows the explanatory ability of income inequality and the interaction between inequality and democracy tested empirically against competing conventional explanations of corruption. Indeed, to the best of our

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knowledge, this article offers the first systematic cross-country statistical study focused on the causal effect of income inequality on corruption. Also, evidence for the relationship among inequality, perceptions, and norms of corruption is provided, as well as the reverse causation from corruption to inequality.

The third set of contributions is methodological. Previous cross-national studies on causes of corruption have primarily used ordinary least squares (OLS) methods. As a result, these studies did not directly address critical issues of simultaneous causation or measurement error. We have used a range of instrumental variables and two-stage least squares (2SLS) methods to correct substantially for these problems. We also have used a wide array of controls as well as different measures for corruption to test the robustness of our results.

We first briefly review major sets of theoretical explanations and results from previous empirical studies on corruption. In the second section, we advocate much greater attention to inequality, a factor that has received little attention by scholars. We describe the data and methods used to investigate our hypotheses in the third section. In the fourth section, empirical findings and theoretical interpretations from our statistical work are presented. The final section concludes with some research and policy implications.

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EXISTING EXPLANATIONS AND EMPIRICAL FINDINGS

We use a somewhat narrow but widely accepted definition of corruption: abuse of public power (or public office) for private gain. Although we do not see any reasons to exclude corporate embezzlement, fraud in the nonprofit sector, and the like from the definition, there are no available cross-national measures that capture this fuller range of corruption.

Until recently, statistical studies of corruption have been hindered by the lack of reliable quantitative data. As the data on the (perceived) levels of corruption became available for a large number of countries, cross-country statistical research bourgeoned. Although these studies generated a considerable consensus regarding the negative effects of corruption on economic development, undermining the long-advocated functional view of corruption, studies on the causes of corruption did not produce general agreement (Andvig et al. 2000; Lambsdorff 1999). Numerous variables have been suggested as causes of corruption. These variables can be classified into three broad categories: economic, political, and cultural explanations.

Economic factors often are considered the prime causes of corruption. Many studies have found economic development (per capita income), ostensibly through the spread of education, creation of a middle class, and so forth to be the strongest determinant for reducing corruption (Paldam 2002; Treisman 2000). In contrast, Kaufmann and Kraay (2002) argued that causation runs from lower corruption to economic development and not from higher income to less corruption. Ades and Di Tella (1999) and Treisman (2000) found trade openness, presumably through increased economic competition and economic growth, to be associated negatively with corruption to a significant degree, although Torrez (2002) found that its significance depended on the choice of corruption index. Findings have shown that the significance of the relative wages paid to public servants in controlling corruption depend on the measures and specifications used (Evans and Rauch 1999; Rijckeghem and Weder 2001). Countries with larger endowments of natural resources were found to be significantly more corrupt, probably because windfall gains offer greater opportunities for corruption (Ades and Di Tella 1999; Gylfason 2001; Leite and Weidman 1999).

Political explanations of corruption include variables such as democracy, government size, and decentralization. Although democracy (e.g., electoral competition, political rights) theoretically is supposed to provide checks against corruption, empirical studies have found differing results.[1] Treisman (2000) concluded that democracies are significantly less corrupt only after 40 years. Montinola and Jackman (2002) demonstrated that the effect of democracy may be nonlinear, that partial democratization may increase corruption, but that once past a threshold, democracy inhibits corruption. The larger

[1] Rose-Ackerman (1999) argued that elections increase the accountability of politicians, but that they also produce new incentives for corruption because political financing needs increase.

size of government or the greater extent of government intervention was proposed to increase corruption (LaPalombara 1994), yet empirical evidence shows that larger governments are less corrupt (Friedman et al. 2000; La Porta et al. 1999). Moreover, the findings on the effect of decentralization are contradictory (Fisman and Gatti 2002; Treisman 2000).

Cultural and historical explanations of corruption have highlighted the effects of religion, cultural values, colonial heritage, legal traditions, and ethnolinguistic fractionalization. Egalitarian or individualistic religions such as Protestantism may encourage challenges to abuses by officeholders, whereas hierarchical religions such as Catholicism, Eastern Orthodoxy, and Islam may discourage such challenges. Protestantism's link with economic development and democracy offer two additional causal pathways. Many empirical studies have found Protestantism to be associated significantly with less corruption (La Porta et al. 1999; Paldam 2001; Sandholtz and Koetzle 2000; Treisman 2000).

Colonial experience and legal system are closely correlated. La Porta et al. (1999) proposed that legal systems reflect the relative power of the state vis-à-vis property owners. Whereas the British common law system was developed as a defense of property owners against attempts by the sovereign to expropriate property, civil law was developed as a sovereign instrument for state building and economic control. Treisman (2000) further argued that British legal traditions tend to emphasize procedural fairness. He found former British colonies to be significantly less corrupt. Although countries with French legal or socialist origins have higher levels of corruption, legal origins are insignificant when control is used for other factors (La Porta et al. 1999).

Huntington's cultural areas of Western Europe, Latin America, and old Communist countries (Paldam 2002) and Hofstede's cultural values such as power distance, uncertainty avoidance, and masculinity (Husted 1999) also were significant predictors of corruption. Although some scholars have suggested that ethnolinguistic fractionalization would increase corruption (Mauro 1995), its significance disappeared after per capita income and latitude controls were added (La Porta et al. 1999).

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INEQUALITY AND CORRUPTION

The relationship between inequality and corruption was not rigorously theorized or systematically examined in any of the aforementioned studies. Our overall argument is that greater levels of inequality are social structurally conducive to higher levels of corruption through material and normative mechanisms. Thus we should find a direct empirical relationship between inequality and corruption, other factors being equal. In this article, we focus on income inequality.[2]

A central theoretical argument in the literature maintains that corruption is a function of motivations and opportunities (Klitgaard 1988; Rose-Ackerman 1978, 1999). As income inequality increases, the rich have more to lose through fair political, administrative, and judicial processes. With the increased inequality, the rich also have greater resources that can be used to buy influence, both legally and illegally (Glaeser, Scheinkman, and Shleifer 2003). The rich, as a class or as interest groups, can use legal lobbying and political contributions or bribery (grand political corruption) to influence law-making processes. The rich, as interest groups, as firms, or as individuals, may use bribery or connections to influence law-implementing processes (bureaucratic corruption) and to buy favorable interpretations of the law (judicial corruption).

As inequality increases, most of the population will be relatively poorer,[3] and likely will demand more extensive redistribution through higher levels of progressive taxation (Meltzer and Richard 1981). As the redistributive pressures increase, the rich correspondingly will have greater motivation to use political corruption to lower the tax rates and bureaucratic

[2] Two studies found a significant effect of gender equality on corruption (Dollar, Fisman, and Gatti 2001; Swamy et al. 2001). These studies found that women were less involved in bribery and less likely to condone the practice of taking bribes. They also found that corruption was less severe where women comprised a larger share of the labor force and held a larger share of parliamentary seats.

[3] Higher inequality typically is associated with both greater skewness to the right and a greater gap between the rich and the poor.

corruption to further circumvent the collection of taxes.

Whereas the rich have more motivation and capability to behave corruptly at higher levels of inequality, the non-rich have more to gain from combating corruption. The middle class and the poor generally have cause to monitor, expose, and halt the corruption by the rich and the powerful. However, the poor lack material resources to organize, and a thin middle class is likely to exert less influence in high-inequality societies. High levels of inequality (and associated poverty), with other factors held as equal, are thus likely to inhibit the capacities of middle-class and poor groups to monitor the corrupt activities of the rich and powerful (McCarthy and Zald 1977; Tarrow 1994). Greater equality is likely to entail a larger middle class that can act to protect its interests (Husted 1999).

Moreover, in high-inequality societies, the large numbers of poor are more likely to be deprived of basic public services such as education and health care than in low-inequality countries. Hence, they are more likely to rely on petty corruption or to be the targets of bureaucratic extortion in their efforts to secure basic services. Although the amount of their actual kickback payments may be small because of their limited ability to pay, the poor will perceive corruption levels to be very high and will come to see corruption as an appropriate form of behavior.

Hypothesis 1: Greater income inequality is associated with higher levels of corruption.

However, the impact of income inequality on corruption may differ between more democratic and less democratic countries. In countries with authoritarian regimes, the rich and the powerful can use or promote repression to advance their interests. In democratic countries, however, oppression as a substitute for corruption cannot be used, so the rich must rely on corruption more and more as inequality increases and redistributive pressures grow. Whereas countries with more authoritarian regimes are likely to have higher levels of corruption, on the average, the effect of inequality on corruption may be higher in more democratic countries.

Furthermore, in a highly unequal society with elections, a large number of poor people are likely to sell their votes in exchange for money, gifts, or other favors, whereas the rich and the powerful will buy votes to maintain the status quo of inequality. The poor are likely to be satisfied with small benefits by participating in petty corrupt exchanges and patronage instead of resisting grand corruption by the rich and the powerful, thus allowing them much larger benefits.

Hypothesis 2: The adverse effect of inequality on corruption is larger in more democratic countries.

Human behavior is powerfully determined by values, norms, and perceptions (Dowse and Hughes 1986; March and Olson 1989). Values of integrity may differ across individuals, groups, and societies. Religion may have an impact on values and norms about corruption. However, people across highly corrupt countries with widely different religious traditions, and even those who engage in corruption themselves often are found to dislike corruption, combining excuse with condemnation (Miller, Grødeland, and Koshechkina 2002).

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Tolerance of corruption as acceptable behavior may be explained not only by religious values, but also by perceptions concerning the extent of corruption and associated widespread social networks for corruption. If people are surrounded by corruption or perceive it to be the case, they may have to accept and even participate in corruption despite their values. In surveys, people justify their corrupt behavior by citing its prevalence (Rose-Ackerman 2001). Corrupt transactions often require the involvement of multiple actors, and the consequent networks of corruption will offer more social structural support for participation in corrupt activities (Warburton 2001).

Correspondingly, we argue that income inequality affects perceptions concerning the extent of corruption and habituates norms about corruption. At higher levels of inequality, the rich are likely to believe increasingly that corruption is an acceptable way of preserving and advancing their societal position as this behavior goes unpunished and social networks of corruption expand. Also, people are more likely to consider political institutions and rules in unequal societies as favoring the rich, as unjust, and as lacking legitimacy. More people are likely to circumvent laws and regulations when they are considered illegitimate. Thus, people

will more easily justify their corrupt activities as inequality increases.

Moreover, at higher levels of inequality, most non-rich people are likely to believe that the rich and powerful must be corrupt, and that it is impossible to do well honestly. Hence, they are likely to justify their own corrupt behavior, while finding it difficult to hold the rich and powerful accountable. As the rich and the non-rich engage in corruption, corrupt practices spread, and corrupt networks further expand and deepen. Thus, corruption becomes a norm. As corrupt practices spread and become habituated as "how things are done" in highly unequal societies, the norm of corruption is socialized by subsequent generations.

Hypothesis 3: Perceptions of the extent and norms for acceptability of corruption are higher in more unequal societies.

Corruption tends to reinforce or widen already existing inequalities (Johnston 1989). Corruption contributes to inequality by facilitating the unequal appropriation of wealth and privilege, and by inhibiting institutional changes that could threaten existing advantages. Thus, we expect to see a persistence of corruption with the persistence of inequality, and hence a mutually reinforcing relationship between inequality and corruption.

Hypothesis 4: Higher levels of corruption are associated with higher levels of inequality.

We did not find any statistical examination specifically focused on the effect of income inequality on corruption, although two empirical studies (Husted 1999; Paldam 2002) included income inequality as one of many explanatory variables and tested its effect through OLS regressions. Neither study found a statistically significant effect, but this negative finding probably was the result of inefficiency and attenuation bias from measurement errors in the inequality and corruption indicators used.

The empirical tests conducted by Husted (1999) and Paldam (2002) were far from rigorous, and both authors focused primarily on cultural variables. Husted (1999) used Transparency International's Corruption Perceptions Index (CPI) for 1996 and the income share of the top 10 percent in 1996 from the World Bank's data for a sample of only 36 countries. Paldam (2002) used Transparency International's CPI for 1999 and gini coefficients for different years from the World Bank's data for samples of 85 to 100 countries. The OLS regressions of both authors showed that only per capita income and cultural variables (cultural values for Husted and cultural areas for Paldam) were significant.

Although both studies found inequality to be insignificant, measurement error in the income inequality measures may have caused substantial attenuation bias in their estimates. Both authors used a single measure of corruption and inequality for a single year, making their results particularly vulnerable to charges of spuriousness. Husted's (1999) small sample size further raises the possibility of selection bias.

Both authors used OLS regressions, which cannot address potential biases associated with measurement error, omitted variables, and reverse causation.[4] The relative size of reverse causality may be greater for per capita income, causing it to be relatively overestimated. The measurement error is likely to be far greater for inequality, causing it to be relatively underestimated. Thus, we believe that there is substantial room for more rigorous statistical analysis of the effect that inequality has on corruption.

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The effect of corruption on inequality, in contrast, was more rigorously examined. Gupta, Davoodi, and Alonso-Terme (2002) and Li, Xu, and Zou (2000), using cross-country analysis, found a significant effect of corruption on inequality. Gupta et al. (2002) suggested that corruption increases inequality by perpetuating an unequal distribution of asset ownership and unequal access to education, minimizing the progressiveness of the tax system, lowering the level and effectiveness of social spending, and lowering economic growth.

DATA AND METHODS

Different studies frequently have produced varying results depending on the model specifications, statistical methods, and measures used. We addressed many of these problems in our analysis.

[4] Paldam (2002) stated that the instrumental variables 2SLS method was used for one economic submodel, but the results were not presented.

Income Inequality Measures

We used gini coefficients based on the high-quality income distribution data compiled by Dollar and Kraay (2002). These authors assembled data from four sources including Deininger and Squire (1996) and the UN-WIDER Income Inequality Database.

The gini coefficient ranges from 0 to 1, with a gini of 0 representing perfect equality and a gini of 1 meaning that only one person or household has the total income in the country. Because income-based ginis are substantially higher than expenditure-based ginis, and because differences also exist between gross income-based ginis and net income-based ginis as well as between household-based ginis and person-based ginis, we appropriately adjusted the raw data on the basis of different definitions to make them comparable with household net expenditure-based ginis. Our adjustments for the data were as follows: adjusted gini (GINI) = gini – .0398 income – .0123 gross + .0112 person. The coefficients were based on the regression of gini in relation to these three variables, country dummies, and decade dummies (for details, see our *ASR* appendix online supplement at http://www.asanet.org/journals/asr/2004/toc043.html).

Because the effect of inequality on corruption is likely to be long term, it is better to use averages over a longer period than data for a single year. The average value of the adjusted gini (GINI) for the period of 1971–1996, available for 129 countries, was used as an independent variable when perceived corruption for the period 1996–2002 was the dependent variable. The average value for the period of the 1990s, available for 114 countries, was used as a dependent variable when we examined the reverse causation from corruption to inequality.

Also, by extending the period, we also could minimize measurement error. Analysis of variance (ANOVA) showed that variation within countries over time explained only 2.1% of the total variation, whereas variation between countries explained 91.3% of the total variation.[5] A substantial part of the variation in inequality within countries across time was likely to result from measurement error, and averaging helped to reduce it.[6]

Corruption Measures

The main indicators for corruption were the World Bank Institute's Control of Corruption Index (CCI) and the Transparency International's Corruption Perceptions Index (CPI). The two data sets are regarded as the most reliable for cross-national comparisons and cover a large number of countries. We also used the Political Risk Service's International Country Risk Guide (ICRG) index of corruption for a robustness check.[7] These indices represent the perceived level of integrity or freedom from corruption because a higher number indicates a lower level of corruption. The CCI is a standardized score, with a mean of zero and a standard deviation of one (Kaufmann, Kraay, and Mastruzzi 2003). The CPI ranges from 0 to 10 (Lambsdorff forthcoming), and the ICRG index ranges from 0 to 6.

We used the average values of these indices for corruption during the period 1996–2002 as a dependent variable. The CCI for 1996–2002 (average for 1996, 1998, 2000, and 2002) was available for 195 countries, including all the 129 countries for which we had the GINI 1971–1996 data. The CPI for 1996–2002 (average for 1996–2002) was available for 109 countries. As an independent variable, the CCI for 1996–1998 (average for 1996 and 1998) and the CPI for 1996–1999 (average for 1996–1999) was used with the dependent variable of inequality for the period of the 1990s.

The World Bank Institute's CCI and the Transparency International's CPI are based on various sources of survey data, whereas the Political Risk Service's ICRG index of corruption is assessed by its country experts. The surveys that provide the basis of the CCI and the

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[5] Li, Squire, and Zou (1998) also showed that 92% of the variance in Deininger and Squire (1996) data on gini coefficients for 112 countries for the years 1947 to 1994 is cross-country variance, whereas only 1% is over-time variance. This is evidence for the persistence of income inequality across countries over time.

[6] Assuming that measurement error has a normal distribution with a mean of zero and a variance of σ^2, averaging of N observations will reduce the variance to σ^2/N.

[7] Although the ICRG index of corruption is widely used by scholars, Lambsdorff (forthcoming) warned against its reliability, noting that it measures "political risks" rather than the degrees of corruption.

CPI mostly reflect the opinions of international business people and country experts. The various sources differently measure the perceived level of overall corruption, from the frequency of additional payments to get things done to the effects of corruption on the business environment to grand corruption. The CCI gives more weight to data that are more highly correlated with the resulting aggregate index (Kaufmann et al. 2003).

Our corruption data had some limitations. Measures for various kinds of corruption are not provided by the CCI, CPI, or ICRG. Hence it is impossible to test whether inequality affected particular types of corruption. Moreover, cross-country ratings based on the perceptions of survey respondents(mainly international business people) or the subjective judgments of experts are not only imprecise, but also can be biased. Thus, measurement error and systemic bias is a particular concern. Some critics raise the specific possibility that rich countries are favored by equating richness with cleanness (Kaufmann et al. 2003).

Yet, country corruption indices based on the judgments of experts and international business people are highly correlated with domestic public perceptions.[8] Moreover, it is practically impossible to measure the actual levels of corruption across countries. We minimized the estimation inefficiency resulting from measurement error by using averaged data for several years (from 1996 to 2002) instead of data for a single year. We further reduced the possibility of reaching spurious conclusions by using three different measures of corruption.

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Perceptions and Norms

As the measure for perceptions and norms about corruption, we used the World Values Surveys, conducted between 1995 and 1997 in 50 countries (Inglehart et al. 2003). The following four questions were relevant:

Question 1. Generally speaking, would you say (1) that this country is run by a few big interests looking out for themselves, or (0) that it is run for the benefit of all the people?

Question 2. How widespread do you think bribe taking and corruption are in this country? (1) Almost no public officials, (2) a few public officials, (3) most public officials, or (4) almost all public officials are engaged in it.

Questions 3 and 4. Tell whether you think each of the following statements (10) can always be justified, (1) never justified, or (2–9) something in between.

Question 3. Cheating on taxes if you have a chance?

Question 4. Accepting a bribe in the course of one's duties?

Control Variables

We included several economic, political, and cultural variables identified as significant by previous studies:

Economic development. The natural log of gross domestic product (GDP) per capita, averaged for 1971–1996, were calculated from the World Bank's World Development Indicators. Missing values were supplemented using the La Porta et al. (1999) and Treisman (2000) data set.

Trade openness. The natural log of percentage imports plus exports over GDP, averaged for 1971–1996, were calculated from the World Development Indicators. Missing values were supplemented using the La Porta et al. (1999), Treisman (2000), and Rodrik, Subramanian, and Trebbi (2002) data set.

Natural resource abundance. The share of fuel, ore, and metal exports from the total merchandise exports, averaged for 1971–1996, were calculated from the World Development Indicators.

Democracy. The political rights score, averaged for 1972–1996, were calculated from the Freedom House.[9] The political rights score reflects that (1) there are free and fair elections, (2) those elected rule, (3) there are competitive parties or other competitive political groups, (4) the opposition has an important role and

[8] The perceptions of the domestic public concerning the extent of corruption (World Values Survey, 1995–97) have a correlation coefficient of .85 with the CCI and .86 with the CPI.3

[9] The Freedom House's civil liberties score or combined score of freedom rating is not used because the checklist for civil liberties has included extreme corruption and government indifference in its 14 elements since 1984.

power, and (5) the entities have self-determination or a high degree of autonomy. The original scores were converted such that a higher score represents more freedom. For countries that became independent after the collapse of the Soviet Union and other former communist regimes, the political rights score for the former regimes was applied for the period before independence.

Federalism. The sum of the following five indicators of federalism, averaged for 1975–1996, were calculated from the World Bank's Database of Political Institution (Keefer 2002): (1) the existence of autonomous regions; (2) whether municipal governments were locally elected; (3) whether state/province governments were locally elected; (4) whether the state/provinces had authority over taxing, spending, or legislating; and (5) whether the constituencies of the senators were the states/provinces.

Religion. The percentages of Protestants, Catholics, and Muslims in 1980 were determined from La Porta et al. (1999).

Legal origins. English Common Law (reference category), French Commercial Code, Socialist/Communist Laws, German Commercial Code, and Scandinavian Commercial Code were determined from La Porta et al. (1999).

Ethnolinguistic fractionalization. The average value of ethnic fractionalization and linguistic fractionalization was determined from Alesina et al. (2003).

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Instrumental Variables

To address the potential issue of simultaneous causation and the problem of measurement error, we used instrumental variables. On the one hand, because corruption also is likely to increase inequality, OLS may overestimate the coefficient for inequality. On the other hand, measurement error in inequality may cause attenuation bias. Omitted-variables bias can be either positive or negative.

Following Leigh (2003), we used "mature cohort size" relative to adult population as an instrumental variable for inequality. Higgins and Williamson (1999) theorized the effect of cohort size on inequality. Because "fat cohorts" tend to get low rewards, when these fat cohorts lie at the top of the age-earnings curve, earnings inequality is reduced. When the fat cohorts are old or young adults, earnings inequality is augmented. They show that the relative size of the cohort 40 to 59 years of age is a powerful predictor of inequality, both across countries and within the United States.

Indeed, mature cohort size (ratio of the population 40 to 59 years old to the population 15 to 69 years old, averaged for 1971–1996, calculated from the United Nations (2000) population data) is a powerful predictor of inequality (see Table A3 on our *ASR* appendix online supplement). It is reasonable to believe that this indicator will not directly influence or be influenced by the level of corruption other than through its effect on inequality, when control is used for other variables.[10] The high correlation ($r = -.72$) between the instrument (mature cohort size) and the endogenous variable (inequality) as well as the presumably very weak correlation, if any, between the instrument and the error term of the regression likely minimizes the bias for the 2SLS estimator.

We also considered the endogeneity of other variables. Economic development, trade openness, and democracy also may be influenced by corruption. Democracy (political rights score) also is likely to suffer from a large measurement error, whereas economic development (per capita income) and trade openness (exports plus imports over GDP) are likely to be more precisely measured.

To obtain an unbiased estimate for the inequality coefficient, we had only to control for other variables that may have been correlated with mature cohort size. We did not need instruments for other endogenous variables. However, we attempted to instrument other endogenous variables as well to get better unbiased estimates for them and to compare the results based on different sets of instruments as robustness checks. We used reasonably good instruments

[10] Doubt about the authors' instrument could be raised by arguing that the mature cohort (individuals 40 to 59 years of age) may have more opportunity for corruption and be more prone to corruption. However, the World Values Surveys data show that the mature cohort is slightly less but not significantly likely to justify bribe taking, and that their perceptions about corruption are similar to those of the remaining population (Table 4).

for economic development and trade openness, but were unable to find a suitable one for democracy.

Following Treisman (2000), we used distance from the equator (absolute value of latitude) as an instrumental variable for economic development (per capita income). Latitude is known to be associated significantly with levels of economic development, probably through the uneven distribution of climates (tropical vs temperate climates) and diseases (Gallup, Sachs and Mellinger 1999; McArthur and Sachs 2001). Because there is no reason why latitude is directly correlated with corruption, latitude is a potentially useful instrument for economic development.[11]

Gallup and Sachs (2000) demonstrated that malaria prevalence is a strong determinant of economic development, but that malaria is very geographically specific and little affected by economic development. They presented evidence showing that the ecologic conditions supporting the more efficient malaria mosquito vectors primarily determine the distribution and intensity of the disease.[12] Therefore, we used the index of malaria prevalence (the fraction of land area subject to malaria times the fraction of falciparum malaria cases, averaged for 1966 and 1994; from Gallup and Sachs 2000) as another instrument for economic development.

We confirmed that both latitude (absolute value) and malaria prevalence have very strong predictive power (Table A3 on our *ASR* appendix online supplement). The simple correlation between latitude and per capita income is .54, and that between the malaria index and per capita income is –.63. Together, they are highly significant for economic development, with other covariates held as equal. Although the exact causal relationship between geography and economic development still is being debated, these two variables were reasonably good instruments for our purposes.[13]

As an instrument for trade openness, we used "constructed openness" (natural logarithm of predicted trade shares from a bilateral trade equation with "pure" geography variables, computed by Rodrik et al. 2004), following Frankel and Romer (1999). Because geography should not inherently be correlated with corruption, this is a valid instrument.

Our instruments satisfied the required statistical properties very well. The F statistics for the null hypothesis that the instruments are partially uncorrelated (when control is used for exogenous variables) with inequality, per capita income, and openness were sufficiently high (all greater than 10), and the values of R^2 were sufficiently large (between 0.42 and 0.73; Table A3 on our *ASR* appendix online supplement). We also conducted overidentification tests whenever possible. The reported p values for the overidentification tests generally were sufficiently large for not rejecting the null hypothesis that our instruments were uncorrelated with the error term of the corruption equation (also see Tables A7–A9 on our *ASR* appendix online supplement).

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RESULTS AND INTERPRETATIONS

First, we demonstrate the utility of using multiple measures for (freedom from) corruption and data averaged over many years for corruption and inequality. We then report and interpret our results.

The Use of Averaged Data and Different Measures of Corruption

Table 1 presents the OLS regression results, in which single-year data and averaged data were

[11] Acemoglu, Johnson, and Robinson (2001) and Rodrik, Subramanian, and Trebbi (2002) argued that quality of institutions, not geography, determines the levels of economic development. McArthur and Sachs (2001) argued that both geography and institutions matter.

[12] Acemoglu et al. (2001) argued that malaria prevalence is endogenous, and that it is the poorer countries with worse institutions that have been unable to eradicate malaria. It is beyond the scope of this article to examine the conflicting arguments about the prevalence of malaria.

[13] Even if the possibility that latitude or malaria prevalence is correlated with the error term of the regression (i.e., Corr[z,u] $\neq 0$) is considered, it is not likely to be large. Because Corr(z,x) is substantially large and the authors suspect that Corr(x,u) is quite large, the IV estimator is likely to be better unbiased than the OLS estimator. The endogenous variable (per capita income) is denoted by X, the instrumental variables (latitude and malaria index) by z, and the error term of the corruption regression by u (Wooldridge 2002).

Table 1. OLS Regression Results for Single-year versus Averaged Data

Dependent Variable	CPI 98 Data		CPI 96–02 Data		CCI 98 Data		CCI 96–02 Data	
Independent Variables	1995	Average	1995	Average	1995	Average	1995	Average
Gini								
b	–0.558	–1.593	–1.377	–2.210*	–1.023*	–1.642***	–0.916 *	–1.500 ***
(SE)	(1.363)	(1.540)	(1.039)	(1.120)	(0.467)	(0.463)	(0.447)	(0.439)
B	–0.028	–0.077	–0.071	–0.108	–0.113	–0.172	–0.107	–0.167
ln GDPpc								
b	0.953***	0.736***	0.867***	0.659***	0.403***	0.313***	0.376***	0.287***
(SE)	(0.150)	(0.197)	(0.120)	(0.154)	(0.049)	(0.062)	(0.047)	(0.060)
B	0.641	0.461	0.629	0.442	0.632	0.451	0.623	0.438
Political Rights								
b	0.041	0.301*	0.097	0.336**	0.067*	0.176***	0.078**	0.174***
(SE)	(0.089)	(0.137)	(0.069)	(0.104)	(0.028)	(0.043)	(0.027)	(0.040)
B	0.033	0.236	0.081	0.278	0.127	0.315	0.157	0.332
ln Openness								
b	0.310	0.696*	0.210	0.603*	–0.081	0.029	–0.025	0.088
(SE)	(0.228)	(0.284)	(0.203)	(0.255)	(0.096)	(0.114)	(0.083)	(0.100)
B	0.068	0.159	0.047	0.143	–0.039	0.015	–0.013	0.047
% Protestant 1980								
b	3.356***	2.893***	3.067***	2.795***	1.129***	0.945***	0.946***	0.822***
(SE)	(0.562)	(0.583)	(0.496)	(0.512)	(0.233)	(0.238)	(0.227)	(0.233)
B	0.349	0.283	0.308	0.265	0.238	0.185	0.211	0.171
Constant								
b	–4.735**	–5.064**	–3.546*	–4.019**	–2.651***	–2.530***	–2.791***	–2.638***
(SE)	(1.570)	(1.898)	(1.362)	(1.509)	(0.606)	(0.626)	(0.536)	(0.562)
N	72	83	91	102	109	128	109	129
R^2	0.753	0.752	0.779	0.768	0.775	0.748	0.769	0.749

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Note: For Gini, ln GDP pc, and ln Opennes, averaged data are for the period of 1971–1996, and for Political Rights it is for 1972–1996. For percentage Protestant, there is no averaged data. Throughout the tables, heterokedasticity-robust standard errors are presented in parentheses, and standardized coefficients (B) are given together with regression coefficients. The levels of statistical significance are denoted as follows, unless indicated otherwise. CCI = Control of Corruption Index; CPI = Corruption Perceptions Index; GDP = gross domestic product; OLS = ordinary least squares; pc = per capita.
* $p < .05$, ** $p < .01$, *** $p < .001$

used for the dependent and independent variables. Transparency International's CPI and World Bank Institute's CCI for 1998 or the average for 1996–2002 was used in each regression as the measure of corruption, the dependent variable in this analysis. Inequality (GINI), per capita income (natural log of GDP per capita), the political rights score, and trade openness (natural log of percentage imports plus exports over GDP) for 1995 or their average values for 1971–1996 (1972–1996 for political rights)[14] were used as explanatory variables, with control used for the percentage Protestants in 1980.

For the same dependent variable (measure of corruption), the estimated coefficients for inequality and political rights always become larger in magnitude and more significant, whereas those for per capita income always decrease when averaged data of the independent variables are used instead of single-year data. For CPI 1998, the magnitude of the estimated standardized coefficients for inequality increased from .03 to .08, and that for political rights increased from .03 to .24, whereas the estimate for per capita income decreased from .64 to .46 as we switched the independent variable measures from single-year to averaged

[14] Note that Freedom House began to publish country ratings in 1972.

data. This result suggests that OLS estimates for single-year data are biased upward for per capita income, and toward zero for inequality and political rights, because the latter two contain larger measurement error.

Table 1 also shows that the estimated coefficients for inequality and other explanatory variables vary depending on whether CPI or CCI is used as the dependent variable. Inequality is insignificant when the single-year CPI is used, whereas it is significant when either the single-year or averaged CCI is used. This suggests that measurement errors in CPI or CCI or both are correlated with inequality and other independent variables. Thus the measures of (freedom from) corruption contain substantial error and also may be systemically biased.

When the averaged data are used for both the dependent and independent variables, however, inequality is significant regardless of the corruption measure, with control used for per capita income, political rights, trade openness, and Protestantism. The standardized coefficients for inequality (GINI 1971–1996) are –.11 for CPI 1996–2002 and –.17 for CCI 1996–2002. Thus, averaging helps to reduce measurement errors, although it may not solve the problem of systemic bias in corruption measures.

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The Influence of Inequality on Corruption

We tested our hypotheses with a sample of 129 countries for which both GINI 1971–1996 and CCI 1996–2002 were available. For robustness checks, we compared the regression results for CCI with those based on different measures of corruption (CPI and ICRG average for 1996–2002).[15] The tables of the results for the CPI and ICRG index of corruption are presented in the Appendix on our *ASR* appendix online supplement.

Table 2 presents the OLS regression results of various specifications for a sample of 129 countries. The measures of the four key explanatory variables (inequality, per capita income, political rights, and openness) all are averaged for the period 1971(1972) to 1996.

A striking contrast is evident between the bivariate regression (OLS 1) and the simplest multiple regression (OLS 2). The simple correlation between inequality (GINI) and control of corruption (CCI) is –.39 and highly significant. However, after the inclusion of per capita income, inequality is insignificant, with the standardized coefficient of –.06, whereas per capita income is highly significant, with the standardized coefficient of .79. Is it economic development and not inequality that matters for corruption?

However, the situation is reversed as more controls are introduced. Including either democracy (political rights) or socialist legal origin contributes to a magnification of the coefficient for inequality (from –.06 to –.13 or –.23) and to a decrease of that for per capita income (OLS 3 and 4). We see that democracy is highly correlated positively with both per capita income and (freedom from) corruption, and somewhat negatively correlated with inequality (see Table A2, on our *ASR* appendix online supplement). Hence, omission of this variable causes substantial upward bias for per capita income and some attenuation bias for inequality.

Countries with socialist legal origins have a significantly more equal distribution of income than others, but are significantly more corrupt on the average (Table A4 on our *ASR* appendix online supplement). The omitted-variables bias from a lack of control for legal origins considerably reduces the magnitude of the coefficient for inequality. The results from running the same regression as OLS 2 separately for countries with a socialist and those with a nonsocialist legal origin demonstrate that greater inequality is significantly associated with higher corruption within both sets of countries (Table A5 on our *ASR* appendix online supplement). Thus, failure to consider different conditions between socialist and nonsocialist legal origins obscures the effect of inequality on corruption.

The OLS 5 controls for openness, Protestantism, legal origins, federalism, ethnoliguistic fractionalization, and natural resource abundance, as well as for per capita

[15] The number of countries covered varies depending on the corruption measure used. The current sample included 102 countries for CPI and 110 countries for ICRD. Running the regressions for CCI with the sample of 102 countries or 110 countries produced estimates similar to those for the sample of 129 countries.

Table 2. OLS Regression Results for Control of Corruption (CCI 96–02) for Various Models

	OLS Models							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gini 71–96								
b	3.528***	–0.569	–1.171*	–2.072***	–2.964***	–2.114***	2.146***	1.869***
(SE)	(0.782)	(0.527)	(0.460)	(0.624)	(0.684)	(0.514)	(0.582)	–0.585
B	–0.392	–0.063	–0.130	–0.230	–0.304	–0.230	–0.240	–0.210
ln GDPpc 71–96								
b	—	0.513***	0.329***	0.454***	0.337***	0.320***	0.284***	0.301***
(SE)		(0.039)	(0.057)	(0.038)	(0.074)	(0.068)	(0.068)	(0.068)
B	—	0.785	0.503	0.695	0.518	0.490	0.430	0.460
Political Rights 72–96								
b	—	—	0.188***	—	–0.004	0.035	0.347**	–0.012
(SE)			(0.041)		(0.064)	(0.052)	(0.122)	(0.235)
B	—	—	0.358	—	–0.007	0.070	0.660	–0.020
Political Rights Squared								
b	—	—	—	—	—	—	—	0.034*
(SE)								(0.017)
B	—	—	—	—	—	—	—	0.570
Gini* (PoliticalRights – 4)								
b	—	—	—	—	—	—	–0.774**	–0.606*
(SE)							(0.301)	(0.316)
B	—	—	—	—	—	—	–0.550	–0.430
Socialist Legal Origin								
b	—	—	—	–0.721***	–0.937***	–0.786***	–0.610**	–0.686***
(SE)				(0.134)	(0.265)	(0.203)	(0.206)	(0.206)
B	—	—	—	–0.290				
Other Controls	No	No	No	No	Yes	Yes	Yes	Yes
N	129	129	129	129	114	129	129	129
R^2	0.153	0.662	0.722	0.723	0.793	0.791	0.808	0.814

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Note: OLS 5 through 8 have additional controls such as trade openness, percentage Protestant population, French, German, and Scandinavian legal origins (British legal origin as reference category), ethnolinguistic fractionalization, natural resource abundance, and federalism. The coefficients for these control variables are not reported, but those for OLS 6 are reported in Table 3. OLS 5 is based on listwise deletion, while OLS 6 through 8 are based on multiple imputation of missing data. GDP = gross domestic product; OLS = ordinary least squares.
* $p < .05$, ** $p < .01$, *** $p < .001$

income and political rights.[16] Because 15 countries had missing values for either natural resource abundance or federalism, OLS 5 covered 114 countries only. To use the available information as fully as possible and to maintain the sample of 129 countries, we used the method of multiple imputation for the missing data in OLS 6 (Allison 2002; King et al. 2001).[17]

As OLS regressions 5 and 6 show, the coefficients for inequality all are statistically significant at the 1 percent level, and their magnitude is substantial. A one standard deviation reduction in income inequality (0.11 decrease in GINI) is associated with 0.30 (OLS 5) or 0.23 (OLS 6) standard deviation improvement in corruption, as measured by CCI. Because we controlled for the most significant variables in previous studies, omitted-variables bias is not a great concern. These estimates are arguably the best that can be obtained by using OLS regression methods.

[16] Neither the percentage of Catholics nor the percentage of Muslims was significant. These variables were dropped in the reported regressions.

[17] King et al.'s software *Amelia* (available at: http://GKing.Harvard.Edu) was used for multiple imputation. The same regressions were run for the five imputed data sets, and the results were combined to produce a single set of estimates for each regression.

Running the same regressions using CPI and ICRG measures of corruption as the dependent variable produces similar results. Inequality is significant for CPI and ICRG at the 1 or 5 percent level using the same controls as for OLS 5 and 6. A one standard deviation reduction in income inequality is associated with about a 0.21 or 0.26 standard deviation improvement in CPI (or ICRG) (Table A6, OLS 2 and 6; on our *ASR* appendix online supplement).

This finding is radically different from that of Husted (1999) and Paldam (2002). Their use of a single-year CPI and a single-year measure of inequality probably produced biased results from attenuation bias attributable to measurement error in inequality, inefficiency attributable to measurement error in CPI, and perhaps omitted-variables bias and additional bias attributable to systemic bias in CPI.[18]

We also see that the standardized coefficients for per capita income are the largest and highly significant, as previous studies have consistently found. Democracy (political rights) is significant without control for legal origins (Table 1 and Table 2, OLS 3), but generally insignificant with control for legal origins and other variables (Table 2, OLS 5 and 6). However, when a quadratic term of political rights is included, it is significant (OLS 8), consistent with the finding of democracy's nonlinear effect by Montinola and Jackman (2002). Trade openness generally is insignificant for CCI, but strongly significant for CPI and ICRG (Table A6 on our *ASR* appendix online supplement).

We see that Protestantism is significantly associated with freedom from corruption, irrespective of choice of corruption measure, as previous studies have found. Ethnolinguistic fractionalization is significantly associated with higher levels of corruption for CCI, but not for CPI and ICRG (Table A6 on our *ASR* appendix online supplement). Federalism and natural resource abundance are not significant.

The Interaction Effect of Inequality and Democracy

Figure 1 shows that control of corruption (CCI 1996–2002) and income inequality (GINI 1971–1996) are highly correlated negatively with each other for more democratic countries with a mean political rights score (1972–1996) of 4 or more, but the correlation is weak for less democratic countries with a score less than 4. This is consistent with our hypothesis that the effect of inequality on corruption is greater in more democratic countries.

To test this hypothesis more rigorously, we included an interaction term of inequality (GINI) and democracy (difference from the mean political rights score of 4). Table 2 shows that the estimated coefficient for the interaction term is highly significant and large in OLS 7. A one standard deviation improvement in inequality (0.11 reduction in GINI) is associated with –2.146*(–0.11) = 0.24 points, or a 0.24 standard deviation improvement in control of corruption (CCI) at the mean political rights score of 4. But it increases in magnitude to (–2.146–0.774*3)*(–0.11) = 0.49 points, or 0.49 standard deviation of CCI at the maximum political rights score of 7, whereas it decreases as the country's political rights score declines.

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The interaction term still is significant with the inclusion of a quadratic term of democracy (OLS 8). Thus the adverse effect of inequality on corruption is higher in more democratic countries, even when the nonlinear effect of democracy is taken into account. The interaction term also is highly significant for CPI and ICRG (Table A6 on our *ASR* appendix online supplement).

Separate regressions also yield a highly significant and large coefficient estimate of inequality for the sample of more democratic countries, whereas the estimated coefficient for inequality is insignificant and small for the sample of less democratic countries (Table A8 on our *ASR* appendix online supplement). These results support our hypothesis that the effect of inequality on corruption is greater in more democratic countries.

The Causal Effect of Inequality on Corruption

We established that a significant partial correlation between inequality and corruption exists, with control used for many other plausible variables. We next used instrumental variables (IV) to provide better evidence of a causal influence

[18] It is possible that CCI does and CPI does not have systemic bias.

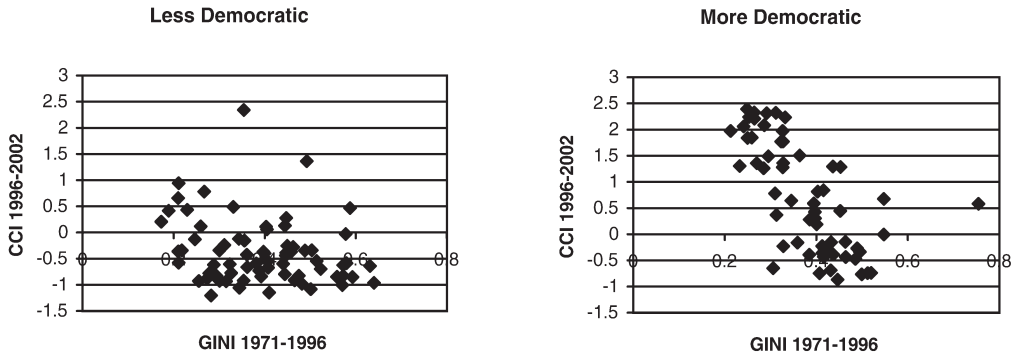

Figure 1. Inequality and Control of Corruption in Less and More Democratic Countries.
Note: Less Democratic = Political Rights (1972–1996) < 4. More Democratic = Political Rights (1972–1996) ≥ 4.

from inequality to corruption and to obtain even better unbiased estimates for the effect of inequality on corruption.

We began from the simplest IV regressions, in which only inequality (GINI) is instrumented:

$$CCI_i = \beta_0 + \beta_1 \, GINIi + (\beta_2 \, X_i) + \varepsilon_i$$

$$GINI_i = \gamma_0 + \gamma_1 \, Mature_i + (\gamma_2 \, X_i) + \eta_i,$$

where X denotes covariates, and ε is the random error term.

The OLS estimates for β_1 can be biased because of omitted variables, measurement error in inequality, and reverse causality from corruption to inequality. A good instrumental variable can cure all these potential biases. We instrumented inequality with mature cohort size. If mature cohort size was not correlated with any other independent variables, we did not need to control for other variables.

However, mature cohort size was correlated with both per capita income and political rights. Hence, we present IV estimation both with and without controls to compare the results with those of OLS regressions. To make the results comparable with those of OLS for the same sample of 129 countries, we present the IV regression results based on the multiple imputation of missing data together.

The instrumental-variables two-stage least-squares (IV 2SLS) estimated coefficients for inequality in Table 3 are much larger than their corresponding OLS estimates in Table 2, both with and without controls. Without controls, the magnitude of the standardized coefficient for inequality increases from 0.39 to 0.82 (OLS 1 vs IV 1). With the same set of controls as for OLS 6, the standardized coefficient for inequality increases from 0.23 to 0.63 or 0.73 (IV 2 with list-wise deletion, or IV 3 with multiple imputation), and it is significant at the 1 percent level. This probably is our best estimate of the causal effect that inequality has on corruption.

The standardized coefficient for per capita income is smaller than that for inequality in IV 2 and 3. Trade openness is significant only in IV 3. To obtain better estimates for per capita income, trade openness, and inequality, we instrumented these three endogenous variables with the four instruments of mature cohort size, latitude, malaria index, and constructed openness in IV 4 and 5. We also introduced the same set of controls as for OLS 6, and used multiple imputation for the missing data in IV 5. The estimated standardized coefficient for inequality, with control used for other factors, is –.81 (IV 4 and 5), which is much larger in magnitude than its OLS counterpart of –.23. However, the standardized coefficient for per capita income is .31 or .29, which is much smaller than its OLS counterpart of .49 (OLS 6). Inequality is significant at the 1 percent level, but per capita income and trade openness are not significant.

In summary, the various IV 2SLS regressions give substantial evidence that inequality has a significant and large causal effect on corruption. A one standard deviation reduction in inequality causes about a two-thirds standard deviation improvement in freedom from corruption (CCI), other factors being equal (IV 2, IV 3). The use of instrumental variables consistently increases the magnitude of the coefficient for inequality and decreases that for per

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Table 3. IV 2SLS Regression Results for CCI (1996–2002), Compared with OLS (6)

	IV (1)	IV (2)	IV (3)	IV (4)	IV (5)	OLS (6)
Gini 71–96						
b	–7.419***	–6.163*	–6.613*	–8.186**	–7.334***	–2.114***
(SE)	(1.316)	(2.415)	(2.721)	(2.954)	(2.508)	(0.514)
B	–0.820	–0.633	–0.730	–0.806	–0.810	–0.230
ln GDPpc 71–96						
b	—	0.293***	0.210*	0.197	0.187	0.320***
(SE)		(0.081)	(0.098)	(0.185)	(0.188)	(0.068)
B	—	0.450	0.320	0.307	0.290	0.490
ln Open 71–96						
b	—	0.181	0.267	0.269	0.133	0.182
(SE)		(0.129)	(0.139)	(0.280)	(0.247)	(0.108)
B	—	0.093	0.140	0.123	0.070	0.100
Political Rights 72–96						
b	—	–0.026	0.003	0.007	0.020	0.035
(SE)		(0.071)	(0.064)	(0.097)	(0.089)	(0.052)
B	—	–0.048	0.010	0.013	0.040	0.070
% Protestant 80						
b	—	0.888*	1.415*	1.109	1.622*	0.609
(SE)		(0.433)	(0.640)	(0.574)	(0.669)	(0.356)
B	—	0.188	0.290	0.227	0.340	0.130
French Legal Origin						
b	—	–0.135	–0.135	–0.034	–0.122	–0.219
(SE)		(0.163)	(0.149)	(0.229)	(0.194)	(0.115)
B	—	–0.067	–0.070	–0.016	–0.060	–0.110
Socialist Legal Origin						
b	—	–1.399**	–1.386**	–1.464**	–1.407***	–0.786***
(SE)		(0.461)	(0.438)	(0.526)	(0.388)	(0.203)
B	—	–0.534	–0.560	–0.427	–0.570	–0.320
German Legal Origin						
b	—	–0.357	–0.436	–0.336	–0.473	–0.184
(SE)		(0.273)	(0.269)	(0.300)	(0.292)	(0.207)
B	—	–0.073	–0.090	–0.071	–0.100	–0.040
Scandinavian Legal Origin						
b	—	–0.244	–0.679	–0.421	–0.898	0.149
(SE)		(0.420)	(0.594)	(0.489)	(0.550)	(0.314)
B	—	–0.045	–0.120	–0.080	–0.160	0.030
British Legal Origin (reference category)						
Ethnoling. frac.						
b	—	–0.132	–0.337	0.098	–0.340	–0.385
(SE)		(0.347)	(0.293)	(0.426)	(0.322)	(0.212)
B	—	–0.033	–0.080	0.025	–0.080	–0.090
Natural resource abundance						
b	—	–0.206	–0.152	–0.211	–0.127	–0.248
(SE)		(0.203)	(0.204)	(0.211)	(0.193)	(0.198)
B	—	–0.071	–0.050	–0.073	–0.040	–0.080
Federal						
b	—	0.025	0.022	0.014	–0.005	0.034
(SE)		(0.043)	(0.044)	(0.062)	(0.055)	(0.042)
B	—	0.043	0.040	0.024	–0.010	0.060
Constant						
b	2.974***	–0.097	0.305	0.824	1.259	–2.037***
(SE)	(0.538)	(1.268)	(1.553)	(1.792)	(1.725)	(0.525)
N	127	114	129	98	129	129
p (overidentification test)	—	—	—	0.284	0.763	—

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Note: IV regressions 1 through 3 instrumented Gini (1971–96) with Mature cohort size (1971–96). IV regressions 4 and 5 instrumented Gini (71–96), ln GDPpc (71–96), and ln Open (71–96) with Mature cohort size, Latitude, Malaria index, and Constructed openness. IV regressions 3 and 5 and OLS 6 are based on multiple imputation of missing data. Ethnoling. frac. = ethnolinguistic fractionalization; GDP = gross domestic product; OLS = ordinary least squares; pc = per capita.

* $p < .05$, ** $p < .01$, *** $p < .001$

capita income. Although each of our instruments may not be perfect, all of them are not likely to be wrong in the same direction.[19] Thus, the weight of the evidence supports our hypotheses that inequality increases corruption, and that large measurement error for inequality causes substantial attenuation bias in OLS.[20]

Instrumental variables 2SLS results using other measures of corruption also are consistent with our hypotheses. These estimates for inequality are always larger than corresponding OLS estimates, regardless of the corruption measure being used, whereas those for per capita income are smaller than OLS estimates. We also find that the IV 2SLS estimates for inequality and per capita income differ depending on the choice of corruption measures. The estimated standardized coefficient for inequality is smallest for CPI: –.26 when only inequality is instrumented and –.33 when three endogenous variables are instrumented (Table A7, IV 2 and 4; on our *ASR* appendix online supplement). However, it still is statistically significant and larger in magnitude than its corresponding OLS estimate of –.21 (Table A6, OLS 2; on our *ASR* appendix online supplement). Instrumental variable regressions of ICRG also produced a larger standardized coefficient for inequality of –.43 (with inequality only instrumented; Table A7, IV 6, on our *ASR* appendix online supplement) or –.57 (with three variables instrumented; Table A7, IV 8, on our *ASR* appendix online supplement) than their OLS counterpart of –.26 (Table A6, OLS 6, on our *ASR* appendix online supplement).

A substantial part of the difference between these estimates was attributable to the difference in the sample because CPI and ICRG were available for a smaller number of countries, but we cannot rule out the possibility of systemic bias in corruption measures. For example, if we run the IV 2 in Table 3 for the same sample of 91 countries for which both CPI and CCI are available, the standardized coefficients for inequality are –.38 for CCI and –.26 for CPI. Thus, the difference in the estimates is not as large as it seemed.

By using CCI as our corruption measure, the sample size was increased and selection bias was minimized. Previous studies often were based on relatively fewer countries, which raises the question of external validity. Although we cannot produce a single, reliable estimate of the causal effect that inequality has on corruption, we can confirm the existence of a statistically significant and substantively important causal effect running from inequality to corruption.

Further Robustness Checks

We conducted multiple robustness checks in addition to the use of different corruption measures. First, we ran OLS and IV regressions separately for high- and low-income countries (Table A9 on our *ASR* appendix online supplement). Both OLS and IV regressions produced significant coefficients for inequality for the sample of high-income countries, but insignificant coefficients for the low-income countries. Given the high correlation between per capita income and political rights, this is understandable. However, it raises the possibility that an interaction effect between inequality and per capita income exists, and that our results were biased from omission of this variable. When we included both interaction terms, the interaction of inequality with democracy outweighed that with economic development, and only the former was significant (Table A10 on our *ASR* appendix online supplement).

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Second, we ran OLS and IV regressions, with control for region dummies (Table A11 on our *ASR* appendix online supplement). Because high levels of inequality in sub-Saharan Africa and Latin America may account for higher levels of corruption in these countries, region dummies may weaken the effect of inequality. However, inequality generally was significant even within regions. All these tests demonstrate that our findings are robust.

Norms and Perceptions of Corruption

Now that we have found substantial empirical support for a causal relationship from inequality to corruption, it is important to test empirically our hypothesis concerning the effect of inequality on norms and perceptions of corruption, using the World Values Surveys data.

[19] If the instruments are all wrong in the same way, they can pass the overidentification test.

[20] Also, the magnitude of reverse causality from corruption to economic development is perhaps larger than that from corruption to inequality, which will cause further upward bias for per capita income.

Table 4. Predictors of Norms and Perceptions about Corruption (OLS Estimates)

Dependent Variable	Bribe Justified B	Cheat Tax Justified B	Run by Big Interests B	Perceived Corruption B
Country-level Variables				
Gini 71–96	0.152***	0.067***	0.116***	0.068***
Political Rights 72–96	–0.080***	–0.038**	0.070***	–0.051***
ln GDPpc 71–96	0.060***	0.150***	–0.065***	–0.209***
ln Open 71–96	0.035***	0.083***	0.042***	–0.071***
French legal origin	0.024**	0.026**	–0.019	0.091***
Socialist legal origin	0.052***	0.184***	0.202***	0.227***
German legal origin	0.017**	–0.006	0.038***	0.046***
Scandinavian legal origin	0.031***	0.034***	–0.076***	–0.046***
Individual-level Variables				
Mature (age 40–59 yr)	–0.035***	–0.041***	–0.013*	–0.001
Education	0.036***	0.052***	0.043***	–0.016**
Income	0.001	0.009	0.048***	0.037***
Subjective class	0.008	0.016**	–0.077***	–0.079***
Unemployed	0.043***	0.036***	0.007	0.029***
Female	–0.041***	–0.058***	0.028***	0.018***
Catholic	–0.019**	–0.041***	–0.072***	–0.039***
Protestant	–0.019**	–0.042***	–0.034***	–0.004
Muslim	–0.007*	–0.009*	0.020***	–0.021***
Respondents (n)	41476	41049	36530	40005
Countries (n)	31	31	31	31
R^2	0.032	0.076	0.077	0.146

Note: Micro data are from World Values Surveys and European Values Surveys (1995–97). "Bribe justified" and "Cheating taxes justified" take the values of one to ten, "Run by big interests" zero or one, and "Perceived extent of corruption" from one to four. GDP = gross domestic product; OLS = ordinary least squares; pc = per capita.
* $p < .05$, ** $p < .01$, *** $p < .001$

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The sample covers more than 36,000 individuals in 31 countries.

As the OLS regression results in Table 4 show, people in countries with higher inequality are more likely to perceive that the society is run by a few big interests, and that most public officials are corrupt. The people in these countries also tend to justify bribe taking and cheating on taxes as acceptable behavior, when individual characteristics such as income, education, and other macro factors are held constant. This evidence supports our hypothesis that income inequality affects people's perceptions concerning the extent of corruption and habituates norms about corruption.

Interestingly, individuals in countries with higher per capita income are more likely to justify bribe taking and cheating on taxes, but their perceived extent of corruption is lower on the average. Individual income has no effect on the norms. Individuals in more democratic countries are less likely to justify bribe taking, whereas people in countries with a socialist origin are more likely to justify bribe taking and tend to perceive that more public officials are corrupt. However, religion has little impact on the norms and perceptions about corruption.[21]

Although women are slightly less likely to justify bribe taking and cheating on taxes than men, consistent with the finding of Swamy et al. (1999), the gender difference was negligibly small. People ages 40 to 59 years (mature cohort) were slightly (almost negligibly) less likely to justify bribe taking or cheating on taxes, and showed no difference with other people in the perceived extent of corruption.

The Effect of Corruption on Inequality

Our OLS regressions confirm that corruption is significantly associated with income inequality, consistent with the previous findings (Gupta et al. 2002; Li et al. 2000). We regressed inequal-

[21] Standardized coefficients less than 0.05 are regarded as negligible.

ity (average adjusted Gini for the 1990s) on two measures of perceived freedom from corruption (CCI average for 1996 and 1998, and CPI average for 1996–1999).

Table 5 indicates that the OLS-estimated coefficients for CCI 1996–1998 are large and significant at the 1 percent level. A one standard deviation increase in CCI is associated with a .44 standard deviation reduction in inequality for a sample of 114 countries, with control used for per capita income, political rights, trade openness, Protestantism, legal origins, ethnolinguistic fractionalization, natural resource abundance, and federalism (OLS 3). Similarly, a one standard deviation increase in CPI is associated with a .31 standard deviation reduction in inequality, with the same controls used for a sample of 77 countries (Table A12 on our *ASR* appendix online supplement).

However, these estimates may be biased because of reverse causation as well as measurement error in corruption. Although we experimented with various sets of instruments for corruption, we were not able to find a good candidate (see our *ASR* appendix online supplement). Thus, our results are inconclusive about the causal effect of corruption on inequality. The coefficient for corruption may have been overestimated because of reverse causation, but it also may have been underestimated because of measurement error in corruption. Because these two sources of bias are likely to cancel out rather than magnify, we suspect that the effect of corruption on inequality is in fact significant.

Thus, there is evidence of reciprocal causation between inequality and corruption. Greater inequality causes higher levels of corruption, and higher levels of corruption intensify inequality. As a result, many societies are likely to be trapped in vicious circles of inequality and corruption. This mutually reinforcing relationship possibly explains why income inequality persists within countries over time.

CONCLUSIONS AND IMPLICATIONS

In summary, income inequality is likely to be a significant and no less important determinant of corruption than economic development (and thus many other variables, for that matter). The effect of inequality is likely to be greater in more democratic countries. There also is evidence suggesting that inequality fosters per-

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Table 5. OLS Regressions of Inequality (GINI 1990s)

	Models		
	OLS 1 B	OLS 2 B	OLS 3 B
CCI 96–98	–0.431***	–0.458***	–0.443***
ln GDPpc 71–96	–0.057	0.037	–0.049
Political Rights 72–96	–0.137	–0.142	–0.147
ln Open 71–96	0.044	0.013	0.042
% Protestant 80	0.402**	0.292**	0.407**
French Legal Origin	0.009	0.065	0.006
Socialist Legal Origin	–0.540***	–0.563***	–0.550***
German Legal Origin	–0.141***	–0.119*	–0.148***
Scandinavian Origin	–0.311**	–0.250**	–0.316**
British Legal Origin (reference category)			
Ethnolinguistic fraction	—	0.077	–0.016
Natural resource abundance	—	–0.032	–0.034
Federal	—	0.011	0.004
N	114	102	114
R^2	0.521	0.581	0.523

Note: Gini index (1990s), the dependent variable, ranges from 0 and 100. OLS 2 takes the method of listwise deletion. OLS 3 uses the whole sample of countries, for which both GINI (1990s) and CCI (96–98) are available, employing the multiple imputation for missing data. CCI = Control of Corruption Index; GDP = gross domestic product; OLS = ordinary least squares; pc = per capita.
* $p < .05$, ** $p < .01$, *** $p < .001$

ceptions of widespread corruption and correspondingly habituates norms of corruption as "the way things are done."

Corruption also is likely to reproduce and accentuate existing inequalities. Countries may thus be trapped in vicious circles of inequality and corruption, or liberated in virtuous circles of equality and integrity (freedom from corruption).

This study identified the likely significant relationship between income inequality and corruption. Further investigation of the relationships between other kinds of inequality (in wealth, education, political participation, and social opportunities as well as gender and ethnic inequality) and corruption may be revealing as well. Our analysis also suggests that currently available cross-country measures of (perceived) corruption may have systemic and ideological bias. More work is needed to minimize both bias and measurement error.

Our findings may contribute to an understanding of three additional important subjects. First, corruption is likely to be an important channel through which inequality adversely affects economic growth. Inequality increases corruption, which in turn deters investment and growth. Although Alesina and Rodrik (1994) and Persson and Tabellini (1994) argued that the adverse effect of inequality on economic growth is attributable to high rates of taxation and redistribution, our results suggest an alternative explanation, with corruption as a causal pathway.

Second, our findings may help to explain why higher levels of market income inequality are not associated with higher levels of redistribution, contrary to the prediction of the median voter theorem (Iversen and Soskice 2002; Meltzer and Richard 1981). Inequality increases corruption, especially in democracies, and corruption produces policy outcomes closer to those preferred by the rich than those favored by the median voter. Hence, taxation and redistribution in high-inequality societies will be lower than predicted by the median voter theorem. Thus, inequality tends to persist without convergence across countries over time.

Third, the significant effect of inequality on corruption also may help to explain why larger government size is not associated with a higher level of corruption. One recent puzzling empirical finding was that smaller, not larger, government size was associated with higher levels of corruption (Friedman et al. 2000; La Porta et al. 1999), contradicting previous studies. Extensive redistribution can both increase government size and lower corruption if it effectively reduces inequality.

The corruption literature in recent decades has tended to focus on the corrupt and rent-seeking behavior of public officials. When corruption is exclusively associated with the public sector, the remedy is simple: if you want to cut corruption, cut government (Becker 1995). But if corruption is the result of the rich attempting to preserve and advance their position, and if larger government size can be associated with less corruption, minimizing the state is not necessarily the appropriate policy response.

Our study thus stresses the need for considering the motivations and opportunities for the rich and the private sector to engage in corruption (Glaeser et al. 2003; Hellman, Jones, and Kaufmann 2000). The experience of massive privatization accompanied by enormous corruption in Eastern European countries offers further evidence (Black, Kraakman, and Tarassova 2000; Hellman et al. 2000). We also note that the skyrocketing CEO compensation in the United States, which was supposed to align the interests of CEOs with those of shareholders, not only increased income inequality, but also stimulated corporate corruption, as the recent scandals demonstrate.

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The relationships of government size, quality, and intervention with corruption need to be studied further. Studies investigating what kinds of government intervention are more or less prone to different types of corruption and what kinds of government action are necessary to control corruption may be fruitful. Although much of literature has stressed the need to minimize government regulations and the discretion of public officials, it may be the kinds rather than the quantities of regulation and discretion that are more relevant for controlling corruption.

Previous studies emphasized the role of economic development and religious and colonial traditions in determining levels of corruption. Given the persistence of cultures, one way out of corruption has seemed to be economic development, but corruption is known to hinder economic development. Thus, corruption has seemed to be destiny.

However, redistribution may turn vicious circles into virtuous circles. Democracy (or political equality) is not sufficient to curb corruption without economic equality, and democratization in highly unequal societies may even generate increased corruption in the short run. One task of politics and public action is to shape institutions and social conditions so that people behave honestly because they believe that the basic structure of their society is just (Elster 1987). Corruption may not be destiny after all.

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