Inequality and Corruption

Sanjeev Khagram[i] and You, Jong-Song[ii]
December 9, 2003

Abstract

Sociological theorizing and research on the relationship between inequality and corruption is surprisingly rare given the discipline's long-standing focus on the correlations of inequality with democracy and development, as well as research that demonstrates the associations between corruption, democracy and development. We propose that greater income inequality increases corruption and find that its explanatory power is significant relative to conventionally accepted correlates of corruption such as low levels of economic development and democracy. We argue that the rich will employ corruption as one means to preserve and advance their own status, privileges and interests while the poor will be vulnerable to extortion at higher levels of inequality.

While countries with authoritarian regimes are likely to have greater levels of corruption on average, higher levels of inequality increase the likelihood of corruption in countries with democratic regimes because the wealthy cannot employ oppression to advance their interests in these political systems. Contrary to conventional wisdom, smaller and not larger government is associated with higher levels of corruption because higher inequality through corruption is associated with both lower tax rates as well as lower government transfers and subsidies. We also corroborate the finding that the negative effect of inequality on economic growth can be explained at least in part by its impact on corruption.

**Key words: corruption, inequality, democracy, government size

1. Introduction

The relationships between inequality and corruption have surprisingly received little sociological attention, theoretically or empirically. Most previous social scientific studies on the causes of corruption at the macro-level primarily have focused on the role of factors such as economic development, democracy, federalism, religion, colonial history, legal origin, size of government, wages of public servants, natural resources, and trade openness (LaPalombara, 1994; Ades and Di Tella, 1996 and 1999; Rijckeghem and Weder, 1997; Goel and Nelson, 1998; La Porta et. al., 1999; Lambsdorff, 1999; Leite and Weidmann, 1999; Goldsmith, 1999; Husted, 1999; Treisman, 2000; Wei, 2000; Sandholtz and Koetzle, 2000; Paldam, 2002; Montinola and Jackman, 2002; Fisman and Gatti, 2002; Torrez, 2002; Mohtadi and Roe, 2003). The studies on the consequences of corruption have highlighted the effect on investment, economic growth, democracy, and composition of government expenditure (Mauro, 1995 and 1998; Tanzi and Davoodi, 1997; Wei, 1997; Kaufmann et. al., 1999b; Hall and Jones, 1999).

Indeed, there is scant theoretical exposition even in the more specific literature on corruption about the causal effect of inequality. Scott(1972) argued that with a more equal income distribution, a relatively large middle class will exist that can act to hold elites accountable and, as a consequence, result in lower levels of corruption. More recently, Glaeser et. al. (2003) formulated a model of inequality and institutional subversion. They propose that the operation of legal, political and regulatory institutions can be subverted by the wealthy and the powerful for their own benefit and that inequality in economic and political resources will affect the magnitude of subversion.

Johnston(1989) suggested the theoretical possibility of the reverse direction of causation. For him, corruption tended to be a conservative form of influence, reinforcing or widening already existing inequalities. Thus, corruption produces inequalities in two ways; by facilitating the unequal appropriation of wealth and privilege, and by inhibiting institutional changes that could threaten existing advantages. We find empirical support for this view, although the primary focus of this paper is not on the effect of corruption on inequality.

Although quantitative work that focus on or even highlight the effect of income inequality on corruption is surprisingly rare, two empirical studies (Husted, 1999; Paldam, 2002) included income inequality as an explanatory variable for corruption and tested this hypothesis through OLS regressions. Neither of these studies found a

statistically significant effect. However, as explained below, the failure to find a significant effect was the result of inefficiency and attenuation bias from measurement errors in the inequality and corruption indicators employed in these studies.

There are a couple of studies examining the effect of gender equality on corruption. Swamy et. al. (1999) found that women were less involved in bribery and less likely to condone bribery on the basis of micro-level data, as well as that corruption was less severe where women comprised a larger share of the labor force and where women held a larger share of parliamentary seats from cross-country macro data. Dollar et. al. (2001) also found that a greater representation of women in parliaments was associated with lower levels of corruption. While we only test for income inequality in this paper, we believe that other forms of inequality along gender, ethnic or other cleavage lines, individually and even more so when cumulative in nature, will also increase corruption.

The effect of corruption on inequality, on the other hand, has been directly examined. Gupta et al (1998) conducted a cross-country analysis and found that corruption increased inequality by reducing economic growth, minimizing the progressiveness of the tax system, lowering the level and effectiveness of social spending, and by perpetuating an unequal distribution of asset ownership and unequal access to education.[iii] More recently, Li et. al. (2000) corroborated the finding of a significant effect of corruption on inequality.[iv]

To contribute to further filling this critical gap in the broader sociological and specific corruption literatures, we focus primarily on the effect of inequality on corruption in this paper, although we address questions of reverse causality as well. In countries with greater levels of inequality, we hypothesize that the relatively small number of wealthy people will be motivated to use bribery (particularly grand political corruption) as a potential way to preserve and advance their societal position. In addition, the poor are likely to be subjected to extortion when trying to get access to (most probably) scarce public services (leading to higher levels of petty bureaucratic corruption). Moreover, the poor are less likely to be politically organized in highly unequal societies and thus unable to defend themselves against extortion or monitor the bribe-paying activities of the rich.

In countries with authoritarian regimes, the redistributive demands by the (probably disorganized) poor are likely to be muted or oppressed while the (probably organized) rich will likely have direct political power or easy access to political authorities. As a result, the degree of inequality and corresponding redistributive demands are not likely to have large impact on the levels of corruption in authoritarian regimes. In

democratic regimes, on the other hand, the rich will increasingly resort to corruption as the degree of inequality and subsequent demand for redistribution increases, because the redistributive demands of the poor will be more politically salient to office holders, the rich are less likely to have uncontested control over or access to political authority, and certainly not to authorities with the ability to repress the poor.

To the best of our knowledge, this paper offers the first systematic econometric analysis of the effect of income inequality on corruption. Contrary to (the albeit minimal) previous empirical research, we do find a significant effect of income inequality on corruption. In fact, the 2SLS estimates of the coefficient for inequality as a correlate of corruption are higher than OLS estimates. This suggests that attenuation bias due to measurement error was larger in previous studies than the simultaneity bias due to reverse causation from corruption to inequality.

More surprisingly, the magnitude of the estimated effect of income inequality is comparable to that of per capita income, which has been regarded in the literature as by far the strongest determinant of corruption.(Treisman, 2000; Paldam, 2002). We also find that the effect of inequality on corruption is greater in democracies than in autocracies as per our theoretical expectation. Our results corroborate previous empirical research of the causal effect of corruption on inequality suggesting that many countries may be trapped in vicious cycles of high inequality and high corruption.

Our investigation also yields two additional insights. We find that higher levels of inequality are not associated with higher rates of taxation or redistribution and thus larger government, but in fact tend to be associated with lower rates of taxation and redistribution. Based on this result, we are able to corroborate findings of previous studies that show that corruption, rather than overly burdensome taxation and redistribution, is a main channel through which inequality deters economic growth.

In addition, recent empirical findings show that smaller government size was found to be associated with higher levels of corruption (La Porta et. al, 1999; Friedman et. al, 2000), even though there are theoretical arguments that suggest that larger governments will generate incentives for more bribery, extortion and fraud. We solve this puzzle by demonstrating that inequality simultaneously produces higher levels of corruption and smaller government size.

In the next section, we develop the theoretical foundations of our hypotheses more fully. We describe the data and methods employed in section 3. Empirical findings and theoretical interpretations from our econometric analysis are presented in section 4. The final section reviews the central arguments and results of the paper. We conclude

with some policy implications and suggestions for future research.

2. Theorizing inequality and corruption

Sociological theorizing and empirical research on the relationship between inequality and corruption is surprisingly rare given the discipline's long-standing focus on the correlations of inequality with democracy and development (Moore, 1966, Chase-Dunn 1975, Lipset 1981; Bollen and Jackman, 1985; Gagliani, 1987; Muller, 1988 and 1995; Rueschemeyer, Stephens and Stephens, 1992; Nielsen, 1994; Nielson and Alderson, 1995). This is especially puzzling given that recent research has found associations between corruption, democracy and development (Treisman, 2000; Wei, 2000; Sandholtz and Koetzle, 2000; Paldam, 2002; Montinola and Jackman, 2002; Fisman and Gatti, 2002; Torrez, 2002; Mohtadi and Roe, 2003). Perhaps the general lack of interest by sociologists on the topic of corruption is the main culprit - very few articles focusing on corruption were found in an extensive review of the major sociological journals over the last two decades.

Income inequality is likely to contribute to corruption through a variety of mechanisms. One of the central theoretical arguments in the literature on corruption is that corruption is a function of motivation and opportunity (Rose-Ackerman, 1978; Klitgaard, 1988). In simplest form, our argument is that the rich will both be more motivated and have greater opportunity to engage in corrupt activities as inequality increases. Thus we should be able to see a direct empirical relationship between inequality and corruption.

As many sociological theories would suggest, albeit this is crude simplification, in every society and especially those with greater levels of inequality, the (relatively) wealthy and powerful are likely to attempt to protect, maintain and further their status and advantages (Weber 1948; Marx, 1975; Bourdieu, 1990; Coleman 1990). In order to protect their status and promote their interests, the rich can convert their greater economic resources into political influence through either repression, constructing hegemonic ideas legitimating inequality, legal political activity (such as financing election campaigns or lobbying) to shape public policy in their favor, and/or through corrupt activities.

High levels of inequality (and associated poverty), holding other factors equal, will also likely inhibit the organization and mobilization of the poor and thus their ability to monitor the corrupt activities of the rich (Weber, 1948; Marx, 1975; Smelser, 1962, Oberschall, 1973; McArthy and Zald, 1977 and 1995; Anderson, 1996). In high-

inequality societies, except perhaps those societies at the highest levels of economic development, the poor are more likely to be deprived of basic rights and have more difficulty gaining access to public services such as education and health care than in low inequality countries. Hence, they are more likely to rely on petty bribery or be the targets of bureaucratic blackmail in order to secure basic services to which they are legally entitled.

In addition, in a highly unequal society, the poor have incentives to sell their votes in exchange for money, gifts, or other favors, and the rich and the powerful have incentives to buy votes in order to maintain the status quo of inequality. Thus, higher levels of grand and petty, political and bureaucratic corruption are expected in more unequal societies.

From a different perspective, based on the median voter theory, higher levels of inequality might result in higher levels of corruption because higher levels of inequality are likely to increase the size of government and larger government is ostensibly linked to higher levels of corruption. The median voter theory hypothesizes that policy outcomes will be determined by the preferences of the median voter (Hotelling, 1929; Downs, 1957; Black, 1958)

Based on the logic of this theory, Alesina and Rodrik(1994) and Persson and Tabellini(1994) argued that countries with higher levels of inequality would have higher rates of taxation and redistribution because the median voter would prefer greater levels of redistribution and correspondingly higher tax rates as inequality increased. The level of corruption might increase with larger government intervention and size as firms generally and the rich especially attempt to evade taxes, gain access to government largesse and avoid regulations (Krueger, 1974; La Palombara, 1994; Shleifer and Vishny, 1998).

Higher levels of inequality entail a small number of rich people with a large share, and a vast majority of poor people with a small share, of aggregate income and wealth for example. The distribution of income will be more skewed and the gap between the median income and the mean income will be larger as the level of inequality increases. Some examples of income distribution for high-inequality and low-inequality countries are offered in Table 1.

Table 1. Mean income of each quintile (mean income of total population=1)

country	year	Gini	Q1	Q2	Q3	Q4	Q5
Namibia	1993	74.33	0.07	0.14	0.27	0.60	3.91
Gabon	1960	64.00	0.10	0.30	0.35	0.70	3.55
Brazil	1990	63.42	0.11	0.24	0.45	0.85	3.36
Canada	1989	27.41	0.39	0.69	0.95	1.24	1.73
Belgium	1985	26.22	0.43	0.72	0.93	1.18	1.74
Finland	1991	26.11	0.39	0.73	0.99	1.20	1.69
Bulgaria	1975	17.83	0.58	0.80	0.99	1.18	1.45

Source: Dollar and Kraay data set for income distribution (2002)

Namibia's Gini index of income distribution in 1993 was 74.33, and the income shares of poorest quintile to richest quintile were 1.48%, 2.83%, 5.46%, 11.98%, and 78.25%, respectively. The richest 20% of the population earned 78.25% of the total income, and their mean income was 3.91 times the national mean income. The mean income of the third quintile(40 percentile to 60 percentile), which is the upper limit of the median income, was only 0.27 times the national mean income.[v] It is reasonable to expect that the median voter's preferences about redistribution given this level of inequality would be different from those voters with the mean income. Four-fifth's of the population would likely prefer redistribution because their income was less than mean income, while only 20% of the population would oppose redistribution.

In contrast, in Finland the Gini index was 26.11 in 1991, and the mean income of the third quintile was 0.99 times the national mean income. Hence, the median voter's preferences regarding redistribution would be almost identical to those of the voters with the mean income. And the mean incomes of the second and fourth quintile were 0.73 and 1.2 times the national mean income, respectively, and thus not very much different from the national mean. Around 60 per cent of the population would likely have preferences about redistribution that were similar to those with the mean. Only the poorest 20% of the population would demand substantial redistribution, but far less radically than in high-inequality countries.

Higher levels of inequality entail a greater gap between the median voter's preferences for redistribution and those of the rich and thus potentially greater motivation for the rich to engage in corruption. The rich are likely to strongly oppose the median voter's demand for radical redistribution because the potential tax base is very thin and a very small rich minority would bear most of the burden. Policy outcomes are likely to be closer to those preferred by the rich rather than those of the median voter in highly unequal societies as the rich use various means including corruption to advance their interets.[vi] The tax rates in a high-inequality country would

be substantially lower than those preferred by the median voter, and there would likely be further evasion of taxes through corruption. In sum, the greater income inequality, the greater the demand for high rate of taxation, and the more incentives for the rich to corruptly influence the enactment and the administration of tax laws.

In more equal societies, the rich are less likely to be motivated to engage in corrupt activities because their interests are likely to be more aligned or at least not opposed to the median voter. The policy preferences of the median voter are likely to be a mix of extensive social insurance and security programs and a moderate redistribution program with a relatively flat tax system. The rich will not strongly oppose these policies preferred by the median voter, because they will not lose very much from redistribution and will also benefit from social insurance and security. Thus, the effect of inequality on taxation and redistribution is a priori unclear and needs to be empirically examined, because there are conflicting influences of the median voter and of the rich.

In electoral democracies, where the median voter's preferences have considerable political influence because voting is a significant mechanism in the political system, the opportunities for the poor to organize and exercise influence over policy are greater, and political competition exists, corruption should theoretically be lower. Some empirical studies have concluded that only forty or more continuous years of democratic rule contributes to lowering corruption (Triesman, 2000). Others have found an inverted U-shaped relationship in which corruption increases during the initial transition period from authoritarian rule and then gradually decreases as democracy becomes more institutionalized (Montinola and Jackman, 2002; Mohtadi and Roe, 2003).

But in highly unequal democratic regimes, the rich will be motivated and have greater opportunities to practice corruption. The rich will be motivated to influence policy processes through corrupt means because their ability to violently repress demands for radical redistribution will be much lower. The poor will likely be less capable of monitoring the rich in a highly unequal society and thus corruption will be relatively more effective and less costly compared to legal activities.

In authoritarian regimes, the politically powerful are themselves likely to be rich and share the interests of the rich. The rich and the powerful will have the ability to repress popular demands for redistribution as well as any political resistance. Hence, the laws and policies are likely to favor the rich than the poor. The tax rates will not be high, and redistribution will be minimal. So, we expect that the degree of inequality will not much affect the level of corruption in autocracies compared with that in democracies.

3. Data

Both inequality and corruption are difficult to measure. It is very hard to obtain the correct raw data for income distribution.[vii] Moreover, different definitions such as income-based vs. expenditure-based, gross vs. net income, and person vs. household as the recipient unit that are used to calculate Gini coefficients make some adjustment necessary in order to make them comparable.

It is also practically impossible to measure the actual level of corruption within and across countries, and we have to rely on measures of "perceived corruption". Cross-country ratings based on the survey respondents' perceptions or experts' subjective judgments can be biased. Hence, measurement error is a particular concern for our study. Considerable investigation was conducted to obtain the most reliable data and to minimize the problems associated with measurement error.

Measurement error in the dependent variable typically causes inefficiency in the regression analysis.[viii] So measurement error in corruption as a dependent variable may make the standard errors of the coefficients for the explanatory variables large and lose significance. Measurement error in an independent variable makes the coefficient estimate for the variable inconsistent and biased toward zero. So, the attenuation bias due to measurement error for income inequality may make it insignificant, while it could be significant in the absence of measurement error. Moreover, coefficients for other independent variables that are correlated with that variable will also be biased. (Wooldridge, 1999 and 2002)

Both income inequality and (perceived) level of corruption tend to vary much across countries but relatively little over time within countries (Li et. al., 1998).[ix] Hence, much of the variations in the measures for income inequality and corruption within countries over time may be due to measurement error rather then reflecting a true change within countries. And both the levels of inequality and corruption are not likely to change rapidly by any of our major independent variables, and the effects of these variables are likely to take time. So we rely on the cross-country analysis using the average values of a gini coefficient and corruption perception index as well as other indicators for key independent variables such as political rights and per capita income for as long a period of time as the comparable data permits.[x]

1) Income inequality

Deininger and Squire(1996) contributed to a substantial improvement in assembling high quality cross-country data on income inequality.[xi] Subsequently, the UN-WIDER Income Inequality Database substantially extended their dataset. Dollar and

Kraay(2002) compiled the data from four sources including UN-WIDER, Deininger and Squire(1996), Chen and Ravallion(2000), and Lundberg and Squire(2000). Their dataset includes 953 observations covering 137 countries over the period of 1950-1999.

We will mainly use the Dollar and Kraay data (2002) and the Deininger and Squire data (1996) as a robustness check. For the Deininger and Squire(D&S) data, we made crude adjustments following their advice by adding 6.6 to expenditure-based Gini.[xii] For Dollar and Kraay(D&K) data, we made finer adjustments such that "adjusted gini = gini – 3.98 income –1.23 gross + 1.12 person", based on the regression of gini on these variables and country dummies and decade dummies.[xiii] The average of the adjusted gini for the entire available period (1950-99 for D&K, and 1947-1996 for D&S) will be used as an indicator for an independent variable,[xiv] and the average values for the period of 1990s will be used as an indicator for a dependent variable.[xv]

2) Corruption:

The main indicators for corruption used in this analysis is Transparency International (TI)'s Corruption Perception Index (CPI) for the years from 1996 to 2002, and the World Bank's Control of Corruption Index(CCI) (Kaufmann et. al., 2003) for the years 1996, 1998, 2000, and 2002. The two data sets are regarded as the most reliable for the purpose of cross-country comparison and together cover a large number of countries. We have CPI for 1996-2002 for 109 countries, and CCI 1996-2002 for 195 countries.

TI's CPI is calculated based on a three-year moving average of standardized scores of various sources of data. (Lambsdorff, 2003) The World Bank's CCI are also based on various sources of data, but more weight is given to those data that are more highly correlated with the resulting aggregate index. (Kaufmann et. al., 2003)[xvi] TI's CPI ranges from zero to ten. A score of 10 represents a totally honest country, while a score of 0 indicates a completely corrupt country. The CCI is a standardized score with the mean of zero and the standard deviation of 1.

We also use the CPI for 1980-1985 and 1988-92 constructed by Lambsdorff and provided by TI. The average of CPI and CCI for 1996-2002 will be used as a dependent variable, while as an independent variable CPI 1980-85 and CPI 1988-92 will be mainly used.[xvii]

3) Other Variables:

In addition to inequality and corruption, we include several independent variables that might be significantly associated with corruption or inequality. We use three

measures of government size and intervention. They are government consumption expenditures as a percentage of GDP (average for 1975-95) as a proxy of the size of government, total government transfers and subsidies as a percentage of GDP (average for 1975-95) as a proxy of the size of redistribution by government, and top marginal tax rate in 1994 as a proxy of government intervention in economic activities.

We use average values of Freedom House's political rights score for 1972-1995 as a proxy for degree of democracy (for which original scores are converted such that a higher score represents more freedom) , log of per capita GNP for 1970-95 as a proxy for the level of economic development, natural resource abundance as measured by the share of exports of primary products in GNP in 1970, trade openness as the log of the ratio of imports plus exports to GDP for 1950-98, percentage of Protestant population in 1980, and the five legal origin dummies. The description of the sources of the data for these variables is presented in the appendix (Table A1).

4) Instruments:

Although our primary task is to identify the causal effect of income inequality on corruption, corruption is likely to have a significant effect on inequality. (Gupta et. al., 1998; Li et. al., 2000) In order to address the potential issue of simultaneous causation as well as the problem of measurement error, we employed a range of instruments. Since other variables such as democracy, economic development, and trade openness might also be affected by corruption, we selected instruments for four variables.

Thus, at least four instrumental variables were required to employ IV 2SLS regression methods. But a fifth instrument was required in order to conduct the over-identification test to check for possible correlation between the first four instruments and the error term of the regression.[xviii] Numerous possible candidates for instruments were identified and examined.[xix] We utilized the following five: distance from the equator, ethno-linguistic fractionalization, constructed openness, number of frost days, and a malaria index to instrument income inequality, democracy, per capita income, and trade openness. They sufficiently satisfy the first stage requirement, and the over-identification tests do not reject the hypothesis that the second stage exclusion restriction is satisfied.[xx]

4. Results

1) The effect of income inequality on corruption:

Table 2 presents the OLS and IV 2SLS estimates of the effects of inequality and other independent variables on the level of (perceived) corruption. The OLS estimates

of the coefficient for income inequality (using the average Gini measure for 1950-99) are significant or insignificant depending on the specification when CPI 96-02 is used as the dependent variable, but always significant when CCI 96-02 is used as the dependent variable.

The 2SLS estimates are statistically significant and much larger in magnitude than OLS estimates whether CCI or CPI is used as the measure for the dependent variable. This suggests that in the OLS regressions, the attenuation bias due to measurement error in inequality was much larger than the simultaneity bias due to reverse causality. Columns 4 and 9 show that a one-standard-deviation improvement in income inequality (10.8 reduction in Gini coefficient) is associated with the improvement of CPI by 1.12 points in a ten point scale (0.25 standard deviation improvement in CPI), and of CCI by 0.69 points (0.72 standard deviation increase in CCI).[xxi]

The 2SLS estimates of the coefficients of economic development and democracy variables (using per capita income and political rights as measures) lose significance and become generally smaller than OLS estimates, while the coefficient for income inequality greatly increases. According to columns 4 and 9, a one-standard-deviation increase in per capita income is associated with a 1.14 point improvement in CPI and 0.49 point improvement in CCI, although it is not statistically significant.

Table 2. Determinants of Corruption : OLS and 2SLS estimates

	CPI (96-02) used as the dependent variable					CCI (96-02) used as the dependent variable				
	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS	(5) OLS	(6)OLS	(7) 2SLS	(8) OLS	(9) 2SLS	(10)OLS
Gini	-0.0167	-0.0724*	-0.0328***	-0.1037**	-0.0269**	-0.0147***	-0.0393**	-0.0193***	-0.0636***	-0.0188***
(1950-99)	(-1.46)	(-1.65)	(-2.81)	(-2.02)	(-2.27)	(-3.45)	(-2.36)	(-3.98)	(-2.54)	(-3.37)
log GNP per capita	0.7958***	0.5405	1.0003***	0.8145	0.9321***	0.3143***	0.2622	0.3493***	0.3536	0.3060***
(1970-95)	(5.56)	(1.00)	(5.56)	(1.66)	(5.02)	(5.78)	(1.17)	(4.85)	(1.59)	(3.99)
political rights	0.4076***	0.3891	0.1074	0.1018	0.7143**	0.2148***	0.1899	0.1337**	0.0316	0.4736***
(1972-95)	(4.26)	(1.04)	(0.70)	(0.25)	(2.32)	(5.54)	(1.14)	(2.15)	(0.18)	(3.16)
Gini*(pol rights-3.8517)					-0.0149**					-0.0082**
					(-2.29)					(-2.44)
log openness	0.3888	0.4211	0.4300*	0.3863	0.4517**	0.0313	0.1880	0.0872	0.2295	0.1004
(1950-98)	(1.58)	(1.21)	(1.89)	(1.07)	(1.96)	(0.30)	(1.17)	(0.84)	(1.16)	(0.95)
percentage Protestant	2.5496***	2.8868***	1.9617**	3.5001**	2.005**	0.7701***	0.8346***	0.4320	1.2910*	0.0049
(1980)	(4.73)	(3.91)	(2.40)	(2.10)	(2.49)	(3.29)	(2.83)	(1.17)	(1.91)	(1.31)
legor_French			-0.5653**	-0.3292	-0.5130*			-0.1507	-0.0933	-0.1341
			(-1.99)	(-0.85)	(-1.77)			(-1.17)	(-0.5)	(-1.03)
legor_socialist			-1.7664***	-1.7194	-1.3415**			-0.6131**	-0.9492*	-0.4120
			(-3.18)	(-1.49)	(-2.19)			(-2.43)	(-1.82)	(-1.52)
legor_German			-0.6971	-1.2513**	-0.7435*			0.0040	-0.5099*	-0.0663
			(-1.53)	(-2.07)	(-1.82)			(0.02)	(-1.72)	(-0.37)
legor_Scandinavian			0.0142	-1.5252	-0.1426			0.3318	-0.7505	0.1784
			(0.02)	(-1.20)	(-0.22)			(1.15)	(-1.37)	(0.69)
_constant	-4.3628	-0.2606	-3.4708	0.7143	-5.7718	-2.6841	-1.7722	-2.4546	-0.8311	-3.5913
	(-2.73)	(-0.07)	(-2.44)	(0.19)	(-3.73)	(-4.60)	(-1.28)	(-4.66)	(-0.53)	(-6.16)
# of observations	100	84	95	83	95	128	105	122	103	122
adjusted R^2	0.7739	0.7548	0.8049	0.7499	0.8140	0.7525	0.7564	0.7768	0.6921	0.7920
over-id test P-value		0.9305		0.9999			0.8007		0.9961	

Each cell shows regression coefficient and t-statistic.
*, **, and *** indicates significance at 10%, 5%, and 1%, respectively. The significance level is not marked for the constants.
In 2SLS, instrumented variables are Gini, log GNP per capita, political rights, and log openness, and instruments are ethnolinguistic fractionalization, distance from the equator, constructed openness, number of frost days, and malaria index. P-value for over-identification test is presented for each 2SLS estimation.

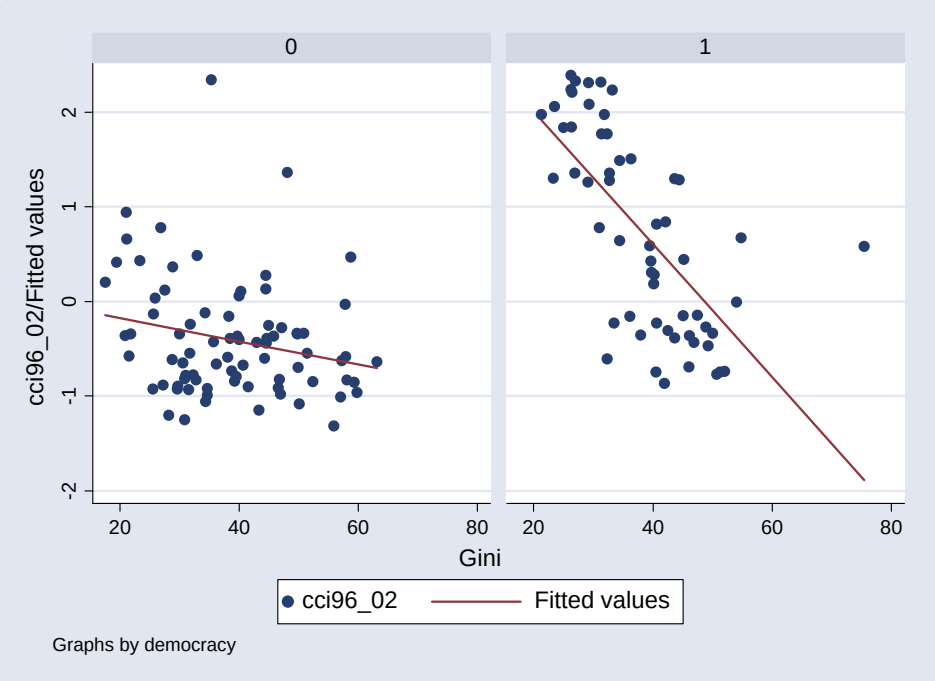
It is surprising that the magnitude of the direct effect of per capita income is not greater than that of inequality, and not significant, considering that the level of economic development proxied by per capita income has been regarded as by far the most significant determinant of corruption in previous studies.(Treisman, 2000; Andvig et. al., 2000; Paldam, 2002) This suggests that OLS estimates of per capita income have been doubly overestimated: first, due to reverse causation, and second, relative overestimation due to measurement error in inequality.[xxii] A similar point can be made with respect to the variable of democracy.

The results clearly support the hypothesis that inequality causes corruption. However, these results should not be interpreted as evidence that economic development and democracy are not a significant determinants of corruption. Since the three variables (inequality, democracy, and economic development) are closely correlated, the regression results are always very sensitive. Future research should take into account both the indirect effect as well as direct effects of these variables. For example, the total effect of inequality on corruption is the sum of its direct effect and indirect effects through its effects on democracy and economic development, and hence will be larger than its direct effect. The same applies to democracy and economic development as well.

Another important point to note is that corruption can be a main channel through which income inequality adversely affects economic growth, because corruption is known to be harmful for economic growth (Mauro, 1995; Tanzi and Davoodi, 1997).

2) Interaction effects between income inequality and political rights:

Figure 1. Corruption and inequality in democracies and autocracies



democracy = 0 for political rights (1972-95) <= 4
democracy = 1 for political rights (1972-95) > 4

Figure 1 plots CCI on the y-axis and Gini on the x-axis separately for autocracies and democracies. The slope of the fitted line is relatively flat and the residual variations from the fitted line are large for authoritarian regimes, where the average political rights score for the period of 1972-95 is not greater than four in a seven point scale. But the slope of the fitted line is very steep and the residual variations are relatively small in democracies. This supports our theoretical argument that the effect of inequality on corruption will be greater in democracies than in autocracies.

Columns 5 and 10 in table 1 also show that the coefficient for the interaction term between inequality and democracy (correctly speaking, the difference from the mean of the political rights score of 3.852) is significant, whether CPI or CCI is used as the

dependent variable. The estimated effect of Gini on CPI from column 5 based on OLS regression is much smaller than that from column 4 based on 2SLS estimates, probably because of attenuation bias due to measurement error in the Gini indicator. Hence, the real effects will be substantially larger than those calculated based on column 5.[xxiii]

Column 5 can be interpreted as "CPI = -0.0269 Gini + 0.7143 pright –0.0149 Gini*(pright-3.852) + ---." Hence, the effect of a one-standard-deviation improvement in Gini (10.8 reduction) on CPI is –0.0269*10.8 = -0.291 points at the mean value of political rights score(3.852), but it increases in magnitude to (–0.0269-0.0149)* 10.8 = -0.452 points if the political rights score is 4.852, and to (–0.0269-0.0149*3)*10.8= -0.775 points if the political rights score is 6.852, while it decreases in magnitude as the country's political rights score decreases.

3) Two-way causality between inequality and corruption:

The results establish two-way causality between inequality and corruption. Although we did not intend to obtain unbiased estimates of the effect on inequality of corruption, our OLS regressions generally confirmed findings of previous research.(Gupta et. al., 1998; Li et.al., 2000) The estimated coefficients for corruption variables were generally significant.(See Appendix, Table A3) And we also confirmed the non-linear relationship that Li et. al.(2000) identified.

Inequality (using D&K's and D&S's average adjusted Gini measure for 1990s) is the highest for CPI (for 1988-92; mean = 5.3, standard deviation = 2.7, minimum 0, maximum 9.3) of 3.5(for D&K's Gini) or 3.3(for D&S's Gini), other things being equal.(Appendix: Table A3, columns 4 and 9) Thus, within the range of very high levels of corruption (CPI of less than 3.3), improvements in corruption are not associated with improvements in inequality. In addition, we found a significant interaction effect between corruption and democracy.(Table A3, columns 5 and 10) The effect of corruption on inequality was higher in democracies than in autocracies.[xxiv]

Thus, a two-way simultaneous causation between inequality and corruption seems to exist. Higher inequality causes higher levels of corruption, and higher levels of corruption intensify inequality. As a result, many countries are likely to be trapped in a vicious cycle of high inequality and high corruption. And this mutually reinforcing relationship between inequality and corruption possibly explains why a persistence of income inequality instead of convergence in income inequality is found across countries over time.

4) Government size, corruption, and inequality:

Figure 2: Government size, corruption, and inequality in democracies and autocracies

Figure 2 plots the standardized values of government transfers & subsidies over GDP, top marginal tax rate, and corruption (CCI 96-02) on the y-axis and Gini on the x-axis separately for autocracies (left part; the average political rights score is not greater than four in a seven point scale) and democracies. It demonstrates the close correlations between these two measures of government size, corruption, and inequality, in particular in democracies. Higher levels of taxation and redistribution are correlated with lower levels of corruption and lower levels of inequality contrary to what median voter logic should imply. In autocracies, only government transfers & subsidies show considerable correlation with inequality, albeit still less strong than in democracies.

Table 3 presents the OLS estimates of the effects of various measures of government size on corruption. The sign of the coefficient for any measure of government size is not negative, contrary to the prediction of much theorizing in the corruption literature. Higher government consumption or transfers & subsidies as well as the higher tax rates are not associated with higher levels of corruption. In particular, the larger ratio of government consumption and transfers & subsidies to GDP tend to be associated with lower levels of corruption.

Table 3. The effect of government size on corruption

	CPI (96-02) used as the dependent variable					CCI (96-02) used as the dependent variable				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
gov_cons/GDP	0.0366	0.1430				0.0132	0.0677*			
(1975-95)	(1.39)	(1.64)				(0.93)	(1.69)			
gov_cons/GDP squared		-0.0030					-0.0016*			
		(-1.48)					(-1.73)			
transfer&subsidy/GDP			0.0322	0.1417**				0.0265*	0.0685*	
(1975-95)			(1.03)	(2.03)				(1.78)	(1.94)	
trans&sub/GDP squared				-0.0041*					-0.0016	
				(-1.81)					(-1.5)	
top marginal tax rate					0.0075					0.0000
(1994)					(0.7)					(0)
Gini	-0.0191	-0.0190	-0.0150	-0.0176	-0.0154	-0.0259***	-0.0254***	-0.0245***	-0.0253***	-0.0214**
(1950-99)	(-1.25)	(-1.22)	(-0.85)	(-1.04)	(-0.93)	(-4.22)	(-4.09)	(-3.39)	(-3.6)	(-2.52)
log GNP per capita	1.2307***	1.229***	1.1790***	1.0852***	1.2471***	0.4056***	0.4022***	0.3750***	0.3421***	0.5112***
(1970-95)	(6.52)	(6.51)	(6.83)	(5.91)	(6.29)	(4.31)	(4.22)	(3.68)	(3.08)	(5.13)
political rights	0.0671	0.0606	0.0286	0.0393	0.1052	0.1042	0.1057	0.0448	0.0458	0.0991
(1972-95)	(0.45)	(0.41)	(0.18)	(0.26)	(0.63)	(1.42)	(1.42)	(0.58)	(0.6)	(1.23)
log openness	0.5448**	0.5175**	0.6013***	0.7205***	0.6056***	0.1419	0.1292	0.1750	0.2241*	0.1949
(1950-98)	(2.46)	(2.26)	(2.74)	(3.14)	(2.82)	(1.03)	(0.91)	(1.38)	(1.73)	(1.69)
percentage Protestant	0.0127	0.9648	0.0117	1.2745	0.0136	0.0048	0.3239	0.0038	0.4359	0.0016
(1980)	(1.2)	(0.86)	(1.2)	(1.28)	(1.26)	(1.08)	(0.68)	(0.81)	(0.90)	(0.31)
legor_French	-0.7702***	-0.8028***	-0.9190***	-0.7973***	-0.8875***	-0.2166	-0.2391*	-0.2757**	-0.2284	-0.3409**
	(-2.8)	(-2.85)	(-3.18)	(-2.69)	(-3.08)	(-1.65)	(-1.77)	(-1.99)	(-1.59)	(-2.41)
legor_Socialist	-1.3370**	-1.3012**	-2.007***	-1.9461***	-1.2519**	-0.5954	-0.5630	-1.1305***	-1.1080***	-0.4775*
	(-2.24)	(-2.12)	(-2.76)	(-2.68)	(-2.38)	(-1.60)	(-1.46)	(-3.09)	(-3.00)	(-1.81)
legor_German	-0.8762*	-0.8619*	-0.9409**	-0.8453**	-1.0563**	-0.1774	-0.1688	-0.1945	-0.1609	-0.3234*
	(-1.93)	(-1.9)	(-2.34)	(-2.14)	(-2.54)	(-0.80)	(-0.76)	(-0.93)	(-0.78)	(-1.80)
legor_Scandinavian	-0.0812	0.1857	-0.0201	0.1802	-0.0917	-0.0086	0.1308	-0.0466	0.0196	0.1458
	(-0.09)	(0.21)	(-0.03)	(0.22)	(-0.11)	(-0.03)	(0.36)	(-0.14)	(0.06)	(0.39)
_constant	-6.4073	-7.0634	-5.8525	-6.0656	-6.8146	-2.8415	-3.1980	-2.4954	-2.6034	-3.7285
	(-5.1)	(-5.14)	(-3.64)	(-3.57)	(-4.44)	(-4.83)	(-4.98)	(-3.24)	(-3.4)	(-4.39)
# of observations	76	76	73	73	70	88	88	81	81	73
R-squared	0.8529	0.8551	0.8438	0.8517	0.8490	0.8242	0.8269	0.8287	0.8341	0.8323

The base case for legal origin is English Common Law (legor_UK).

A quadratic term of these three measures of government size was included in order to check possible non-linear relationships. The quadratic terms of government consumption and transfers & subsidies were weakly significant. From column 7, for example, we see that the lowest level of corruption (CCI for 1996-2002) is obtained when the government consumption is 21.8% (23.9% according to column 2). Corruption decreases as government consumption (mean=15%, standard deviation=4.95%, minimum=6.7%, maximum=33.8%) increases up to that point, but corruption increases as government consumption increases beyond that point, other things being equal. However, the inflection point is between one and one-half and two-standard deviations above the mean. An increase in government consumption from 5% to 10% is associated with about 0.25 point increase in CPI, while the same amount of increase from 25% to 30% is associated with negligible 0.05 point decrease in CPI. For government transfers & subsidies (mean=8.9%, standard deviation=7.8%, minimum=0.1%, maximum=29%), the inflection point is 17.3% according to column 4, and 21.5% according to column 9. Both are far beyond the mean.

Thus, the non-liner relationships between these measures of government size and corruption indicate that smaller government size is associated with higher levels of corruption and the degree of correlation is increasingly higher for smaller governments. But for large governments, the effect of government size on corruption is negligible or very weakly associated with corruption. Only the largest sizes of government seem to increase corruption.

Not surprisingly, the size of government in terms of taxation and redistribution programs seems to affect inequality.(See Appendix, Table A4.) Both higher ratio of transfers & subsidies to GDP and higher top marginal tax rate are significantly associated with lower levels of inequality, while government consumption does not have a significant effect on inequality.

Table 4. The effects of corruption and inequality on government size

Dependent variable:	Gov't consumption/GDP(75-95)			Transfers&subsidies/GDP(75-95)			Top marginal tax rate (1994)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CPI (80-85)	0.0506	0.0772	0.0717	0.8005*	0.3967	0.1480			
	(0.13)	(0.17)	(0.15)	(1.84)	(0.79)	(0.3)			
CPI (88-92)							1.7890	1.4278	0.7329
							(1.28)	(1.06)	(0.59)
Gini	-0.0498	0.0279	-0.0538	-0.1980	-1.4153**	-0.0624	-0.3033	-3.4058**	-0.0019
(1950-99)	(-0.61)	(0.04)	(-0.5)	(-1.63)	(-2.28)	(-0.51)	(-1.48)	(-2.26)	(-0.01)
Gini squared		-0.0010			0.0149**			0.0379**	
		(-0.12)						(2.11)	
Gini*(pol rights-3.85)			0.5704			-17.604***			-47.024***
			(0.07)			(-2.65)			(-2.84)
log GNP per capita	2.9968**	2.9617**	2.9783**	1.5993	2.0418	2.2954*	3.5020	3.0058	3.3114
(1970-95)	(2.23)	(2.35)	(2.39)	(1.33)	(1.64)	(1.85)	(0.89)	(0.85)	(0.96)
political rights	-1.1150	-1.1133	-1.3335	1.3640	1.3772	8.1083***	-3.9677	-3.6336	14.2873**
(1972-95)	(-1.12)	(-1.11)	(-0.36)	(1.23)	(1.27)	(3.1)	(-1.35)	(-1.34)	(2.10)
log openness	2.8688**	2.8795**	2.8918**	2.1296*	1.9239*	1.4839	-1.3531	-2.3426	-3.6844
(1950-98)	(2.27)	(2.21)	(2.04)	(1.82)	(1.83)	(1.31)	(-0.34)	(-0.64)	(-1.06)
percentage Protestant	-5.7189	-5.6149	-5.6252	-1.8249	-3.3605	-4.7542	-14.2097	-18.0757	-20.8997*
(1980)	(-0.94)	(-0.95)	(-0.98)	(-0.4)	(-0.77)	(-1.02)	(-1.13)	(-1.5)	(-1.79)
legor_French	-3.2013	-3.2021	-3.2012	3.9043**	3.9279**	3.9965**	2.2919	2.7094	2.7754
	(-1.49)	(-1.47)	(-1.48)	(2.41)	(2.49)	(2.58)	(0.52)	(0.65)	(0.70)
legor_Socialist	-10.210***	-9.9174***	-10.343**	15.2358**	10.674*	19.663***	-7.7511	-16.029**	8.1238
	(-3.25)	(-3.57)	(-2.3)	(2.46)	(1.7)	(3.22)	(-1.16)	(-2.07)	(1.01)
legor_German	-6.5119**	-6.4688***	-6.5095**	-2.2649	-2.9019	-2.2936	1.7102	1.2510	2.6539
	(-2.59)	(-2.64)	(-2.56)	(-0.88)	(-1.19)	(-1.00)	(0.26)	(0.21)	(0.48)
legor_Scandinavian	5.3042	5.2501	5.2444	5.2456	6.0659	7.1248*	16.966*	20.036**	22.744**
	(1.57)	(1.56)	(1.57)	(1.3)	(1.58)	(1.88)	(1.8)	(2.24)	(2.55)
_constant	-9.2859	-10.6941	-8.2973	-15.0801	7.7899	-47.4623	42.5416	110.0950	-28.3673
	(-0.98)	(-0.66)	(-0.57)	(-1.23)	(0.45)	(-2.82)	(1.48)	(2.79)	(-0.84)
# of observations	49	49	49	46	46	46	46	46	46
R-squared	0.5978	0.5980	0.5979	0.7689	0.7872	0.7952	0.3774	0.4418	0.4873

Table 4 shows that higher inequality is significantly associated with lower levels of transfers & subsidies (columns 4-6) and lower top marginal tax rates (columns 7-9), although it is not significant for government consumption (columns 1-3). We also find that quadratic term of Gini is significant. The significance of the quadratic term

indicates a non-linear relationship, but the inflection points are 49.2% for transfers & subsidies and 47.5% for top marginal tax rate. They are around one standard deviation above the mean Gini. Hence, higher inequality is associated with smaller government size in terms of transfers&subsidies and top marginal tax rate up to one standard deviation above the mean level of inequality. Within this range of inequality, the more equal the income distribution is, the increasingly larger the government size is found to be, contrary to Alesina and Rodrik(1994)'s and Persson and Tabellini(1994)'s prediction based on median voter theorem. Only the highest levels of inequality are found to be slightly associated with larger size of government.

We again find a significant interaction effect between inequality and democracy on transfers & subsidies and top marginal tax rate. The effect of inequality is increasingly higher in countries with more political freedoms. This is a reconfirmation of the closer association of lower inequality and larger government size in democracies found in figure 2.

Table 4 tells that corruption is generally insignificant for various measures of government size. For government consumption, corruption is not significant at all (columns 1-3). For transfers&subsidies, the estimated coefficients for the corruption measure (CPI 80-85) are somewhat significant when the square term of gini or interaction term is not included (column 4), but insignificant and smaller with either of them (columns 5 and 6). For the top marginal tax rate, the estimated coefficients for corruption (CPI 88-92) are not significant for all three specifications (columns 7-9). Experiments with the square term of corruption variables and their interaction term with democracy did not generate any significant results.

A hypothesis derived in a previous section of this paper from the median voter theory was that inequality might generate corruption through higher rates of taxation and larger government programs for redistribution. It has been suggested that the overall size of the government budget relative to GDP may be positively correlated with the level of corruption. La Palombara(1994) showed the empirical evidence for this relationship with a sample of countries in which Scandinavian countries were regarded as the exceptions.(Lambsdorff, 1999) But recent empirical studies, like the results above, found that larger government size was correlated with lower levels of corruption (La Porta et. al, 1999; Friedman et. al., 2000). Friedman et. al.(2000) interpreted the correlation as that corrupt governments become small governments because firms go underground to avoid corruption and only clean governments can sustain high tax rates.

This explanation might be part of the story, but it seems that the simultaneous effect of inequality on both corruption and government size better helps solve this puzzle. If it

is corruption and not inequality that makes government small because firms hide in the unofficial economy to avoid corruption, then corruption should have a significant effect on government size controlling for the effect of inequality. If it is inequality that simultaneously affects corruption and government size, then inequality should have a significant effect on government size controlling for the effect of corruption. The results reported in this paper give evidence to the latter explanation. Corruption is correlated with the size of government, but its independent effect seems to be weak and insignificant unlike Friedman et. al.(2000) suggested. Much of the correlation between corruption and government size seems to be due to the simultaneous effect of inequality on them.

5. Conclusions and implications

Most of the corruption literature has focused on its efficiency aspect and neglected the dimension of equity. The earlier debate on the functionality of corruption was about its effect on efficiency, or potential contribution to economic development (Leff, 1964; Nye, 1967; Huntington 1968; Myrdal, 1968; Murphy et. al., 1993). Recent empirical studies have established the mutual relationship between corruption and inefficiency concluding that corruption is harmful for economic growth, and increasing economic development is the single most important cause of decreasing corruption.

This paper demonstrates that income inequality is a significant and no less important determinant of corruption than economic development (and thus many other variables for that matter). The effects of inequality are greater in democratic regimes compared with authoritarian regimes. In addition, corruption and inequality affect each other, giving rise to the possibility of vicious and virtuous cycles.

Our findings also contribute to the understanding of two additional important subjects. First, corruption is an important channel through which inequality adversely affects economic growth. Inequality increases corruption, which in turn deters production investment and economic growth. The negative effect of inequality on economic growth can be better explained by its impact on corruption than by inefficient tax and redistribution based on median voter preferences. Although both Alesina and Rodrik(1994) as well as Persson and Tabellini(1994) argued that the adverse effect of inequality on economic growth is due to high rates of taxation and redistribution, the results herein suggest an alternative explanation via corruption as a main mechanism.

Secondly, higher levels of corruption and smaller sizes of government are correlated because both are simultaneously affected by inequality. Higher inequality is associated with lower tax rates and lower transfers and subsidies contrary to the conventional

theoretical expectation of the median voter theorem. Thus, the puzzling correlation between larger government size and less corruption is also explained by the simultaneous effect of inequality on them. Smaller government is associated with higher corruption because of the simultaneous effect of income inequality on them.

Our study stresses the need for considering motivations and incentives for the rich to engage in corruption. The corruption literature in the last decades has almost exclusively focused on the corrupt incentives and rent-seeking behavior of public officials (Banfield, 1975; Klitgaard, 1988; Shleifer and Vishny, 1998), often ignoring or unaware of the fact that the same incentives and opportunity structures that are explained by principal-agent-client model of corruption are present in the private sector as well.

When the incentives for corruption are exclusively associated with the public sector, the remedy for corruption is simple: to minimize the government. The advocacy of a "night watchman state" as the primary solution to the problem of corruption is based on this idea, because it is assumed that corruption arises mainly from government failure due to excessive intervention. But if corruption is the result of the rich attempting to preserve and advance their position, and higher government size is associated with less corruption, minimizing the state is not necessarily the appropriate policy response.

The experience of the Eastern European countries in transition to capitalist economies revealed that massive privatization produced enormous corruption, not because of excessive government intervention but because of the self-interested motivation and opportunities offered to private actors to engage in state capture. (Black et. al., 2000; Hellman et. al., 2000) This analysis also potentially helps explain why Scandinavian countries that have largest sizes of government are perceived to be least corrupt. The relatively equal distribution of income (along with durable democracies and high levels of economic development) rather than Scandinavian legal origin probably explains it. (Tables 2 and 3)[xxv]

Thus, these findings call for future research on the incentives and opportunity structures of the rich, private interests and private agents. More in-depth study on the optimal size of government will be needed, and the relationship between government size and intervention and corruption needs to be further studied. What kinds of government intervention are more or less prone to corruption as well as what kinds of government intervention are necessary or desirable to control corruption may be fruitful avenues for research. Although much of corruption literature has stressed the need to minimize government regulations and discretion of public officials, it may be the kinds of regulation and discretion that is more relevant for controlling corruption.

Sociological examination of the relationships between other kinds of inequality and corruption, including inequality in wealth, education, political participation, and social opportunities as well as gender and ethnic inequality would also be interesting. Correspondingly, we may need new extensive studies on the causes of anti-corruption. Previous studies, notably Treisman(2000), emphasized the role of economic development as well as religious and colonial traditions in determining levels of corruption. The only way out corruption seemed to be economic development, but corruption is known to hinder economic development. Thus, corruption seemed to be a destiny.

However, this study identified the significant relationship between income inequality and corruption. Inequality also shapes and is shaped by democracy and economic development in powerful ways. Thus, the effects of democracy and economic development on corruption as well as the mutually reinforcing effects between inequality, democracy, and economic development require more extensive and intensive sociological examination. Indeed, corruption might not be a destiny after all.

Appendix

Table A1. Summary statistics of variables and their data sources

Variable	Obs	Mean	Std. Dev.	Min	Max	Data sources and description
Gini (50-99)	137	38.6598	10.8368	17.5807	75.45	Dollar and Kraay(2002); adjusted such that Gini=gini-3.98 income-1.23 gross+1.12 person
Gini_D&S(47-96)	114	42.7838	11.0042	20.495	68.6	Deininger and Squire(1996); adjusted such that Gini_D&S = gini + 6.6 expenditure-based
CPI (96-02)	109	4.4516	2.2994	1.2967	9.7243	Transparency International; Higher number represents less corruption.
CCI (96-02)	195	0.0184	0.9512	-1.5632	2.3905	Kaufmann et. al.(2003); Higher number represents less corruption.
CPI (80-85)	54	5.2983	2.7034	0.2	8.41	Lambsdorff, TI; Higher number represents less corruption.
CPI (88-92)	54	5.2752	2.7067	0	9.3	Lambsdorff, TI; Higher number represents less corruption.
gov_cons/GDP(75-95)	103	14.9701	4.9497	6.68	33.8	Gwartney et. al.(1996); re-provided by LaPorta et. al.(1999)
trans&sub/GDP(75-95)	89	8.8690	7.8332	0.1	29	Gwartney et. al.(1996); re-provided by LaPorta et. al.(1999)
top marginal tax rate(94)	82	41.3902	12.2812	0	66	Gwartney et. al.(1996); re-provided by LaPorta et. al.(1999)
political rights (72-95)	189	3.8517	1.7771	1.31579	7	Freedom House ; converted such that higher number represents more freedom
log GNP per cap(70-95)	166	7.2261	1.3988	4.6471	10.1516	World Development Indicators: provided by La Porta et. al.(1999)
log openness(50-98)	170	4.1240	0.5894	2.5534	5.7798	Rodrik et. al.(2002); openess as the ratio of imports plus exports to GDP
percentage Protestant(80)	172	0.1191	0.2066	0	0.978	La Porta et. al.(1999)
natural resource abundance(70)	115	0.1590	0.1619	0.0064	0.8856	Sachs and Warner(1997); share of exports of primary products in GNP in 1970
legor_UK	186	0.3441	0.4764	0	1	English Common Law; La Porta et. al. (1999)
legor_French	186	0.4462	0.4984	0	1	French Commercial Code; La Porta et. al. (1999)
legor_Socialist	186	0.1559	0.3638	0	1	Socialist/Communist laws; La Porta et. al. (1999)
legor_German	186	0.0269	0.1622	0	1	German Commercial Code; La Porta et. al. (1999)
legor_Scandinavian	186	0.0269	0.1622	0	1	Scandinavian Commercial Code; La Porta et. al. (1999)
ethonolinguistic fractionalization	142	0.3498	0.3028	0	1	La Porta et. al.(1999); average value of five different indices of ethnolinguistic fractionalization
distance from equator	195	24.9487	16.5722	0	64	Dollar and Kraay(2002); re-provided by Rodrik et. al.(2002)
constructed openness	161	3.0072	0.8057	0.833	5.639	Rodrik et. al.(2002); log of predicted trade shares computed with pure geography variables
number of frost days	171	8.6168	10.2483	0	29.7972	CID, Harvard University(2002) from Masters and McMillan(2001); per month in winter
malaria index(94)	149	0.2895	0.4104	0	1	Gallup and Sachs(1998); re-provided by Rodrik et.al.(2002)

Table A2. Pairwise correlation coefficients between key variables

	Gini	Gini_D&S	CPI(96-02)	CCI(96-02)	CPI(80-85)	CPI(88-92)	gov_cons	trans&sub	toptaxrate	pol rights	ln GNPpc	ln Open	Prostestant
Gini (50-99)	1												
Gini_D&S(47-96)	0.9571	1											
CPI (96-02)	-0.3548	-0.4147	1										
CCI (96-02)	-0.3743	-0.4492	0.9791	1									
CPI (80-85)	-0.2844	-0.2729	0.8682	0.7996	1								
CPI (88-92)	-0.3802	-0.4016	0.9392	0.8520	0.9299	1							
gov_cons/GDP(75-95)	-0.1933	-0.0789	0.4704	0.3796	0.5025	0.5161	1						
trans&sub/GDP(75-95)	-0.6537	-0.6703	0.6170	0.6773	0.4904	0.6095	0.3831	1					
top marginal tax rate(94)	-0.3162	-0.3168	0.3533	0.2545	0.4805	0.4496	0.3324	0.4183	1				
political rights (72-95)	-0.1129	-0.2674	0.7125	0.6831	0.6284	0.6175	0.2228	0.5389	0.0801	1			
log GNP per cap(70-95)	-0.4437	-0.4793	0.8207	0.7794	0.7794	0.7828	0.3566	0.6869	0.3262	0.5746	1		
log openness(50-98)	-0.0613	0.0166	0.2198	0.1643	0.2531	0.2883	0.3213	0.0405	-0.0512	0.0228	0.2435	1	
percentage Protestant(80)	0.0374	-0.0798	0.5534	0.4172	0.4773	0.5639	0.3520	0.3069	0.2480	0.4148	0.2678	0.1100	1

Table A3. Determinants of Income Inequality (OLS estimates)

	Gini_D&K(1990s) used as the dependent variable					Gini_D&S(90s) used as the dependent variable				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CPI (88-92)	-1.5886	-1.1259	-0.9984	4.619652	-0.007661	-1.4194	-1.7037	-1.1270	4.757276	-0.3307
	-3.79	-1.29	-1.05	2.15	-0.01	-3.26	-1.71	-0.89	2.01	-0.32
CPI squared				-0.65509					-0.71935	
				-2.87					-2.67	
CPI*(pol rights-3.85)					-1.2892***					-1.4321***
					-3.89					-4.64
nat-resource abundance	44.3562	71.2704	56.6432	41.96528	41.619***	60.4802	79.5861	71.8631	58.6035	55.221**
(1970)	3.1	3.7	3.03	2.1	2.61	2.95	3.31	2.2	1.71	2.31
log openness		-7.0810	-7.6025	-4.687442	-4.9688		-4.6902	-6.3859	-2.42619	-1.8498
(1950-98)		-2.29	-2.19	-1.33	-1.59		-1.6	-1.34	-0.48	-0.44
log GNP per capita		1.9191	2.9301	1.496279	2.3537		3.8167	3.8988	2.677447	3.5825
(1970-95)		1	1.2	0.53	0.88		1.6	1.41	0.9	1.27
political rights		-2.3874	-4.0814	-2.35338	3.0051		-3.2322	-4.2769	-2.54483	3.5128
(1972-95)		-1.56	-2.17	-1.23	1.12		-1.87	-2.14	-1.3	1.44
percentage Protestant			11.6069	28.96036	23.455***			1.2599	22.56765	15.6213
(1980)			1.14	2.56	2.93			0.07	1.21	1.15
legor_French			1.4205	-0.343861	-0.6079			0.3024	-2.1462	-3.2281
			0.45	-0.12	-0.25			0.07	-0.56	-1.05
legor_Socialist			-12.3307	-11.65981	-12.006**			-14.4017	-12.5529	-12.411**
			-1.84	-1.79	-2.38			-1.79	-1.55	-2.04
legor_German			-6.8774	-9.29587	-8.1660**			-2.7889	-0.05874	0.3238
			-1.97	-2.02	-2.15			-0.49	-0.01	0.06
legor_Scandinavian			-11.4627	-19.60145	-17.459***			-4.2624	-14.7478	-12.3663
			-1.49	-2.43	-2.74			-0.36	-1.15	-1.27
_constant	41.0187	58.9049	61.4235	47.13238	28.1474	42.8192	45.8819	55.2361	35.96562	12.1688
	12.87	5.12	4.38	2.96	1.7	12.01	3.68	3.16	1.91	0.67
# of observations	43	42	41	41	41	34	33	33	33	33
R-squared	0.3717	0.4988	0.5781	0.6572	0.6912	0.406	0.5332	0.5816	0.6793	0.7336

Table A4. The effect of government size on inequality

	Gini_D&K(1990s) used as the dependent variable					
	(1)	(2)	(3)	(4)	(5)	(6)
gov_cons/GDP	0.098			0.518*		
(1975-95)	0.58			1.69		
transfer&subsidy/GDP		-0.484***			-0.360	
(1975-95)		-2.78			-1.37	
top marginal tax rate			-0.212*			-0.210
(1994)			-1.88			-1.47
nat-resource abundance	0.165	0.165*	0.113	0.727***	0.513***	0.424**
(1970)	1.53	1.83	1.04	3.59	3	2.33
CPI (88-92)				-0.015	-0.001	-0.006
				-1.44	-0.06	-0.51
log GNP per capita	-0.018	0.001	-0.009	0.024	0.017	0.025
(1970-95)	-1.3	0.04	-0.57	0.91	0.64	1.1
political rights	-0.018*	-0.021**	-0.026**	-0.035*	-0.037*	-0.038*
(1972-95)	-1.69	-1.98	-2.18	-1.73	-1.96	-1.67
log openness	-0.013	-0.030	-0.024	-0.103***	-0.076**	-0.075**
(1950-98)	-0.6	-1.6	-1.18	-2.95	-2.29	-2.31
percentage Protestant	0.136**	0.001	0.001	0.001	0.001	0.001
(1980)	1.99	1.43	1.29	1.49	0.75	0.87
legor_French	0.029	0.011	0.024	0.031	0.005	0.011
	1.3	0.51	1.02	0.92	0.19	0.38
legor_Socialist	(dropped)	(dropped)	(dropped)	(dropped)	(dropped)	(dropped)
legor_German	-0.049*	-0.090***	-0.042	-0.029	-0.080**	-0.054
	-1.7	-3.56	-1.55	-0.57	-2.18	-1.53
legor_Scandinavian	-0.158***	-0.090*	-0.101	-0.134*	-0.065	-0.085
	-2.71	-1.64	-1.53	-1.82	-1.01	-1.02
_constant	0.603	0.626	0.742	0.645	0.708	0.724
	6.37	6.05	7.6	4.59	4.04	4.67
# of observations	68	62	58	40	37	38
R-squared	0.480	0.605	0.561	0.602	0.687	0.617

References

Ades, Alberto, and Rafael Di Tella (1999) "Rents, Competition and Corruption." *American Economic Review* 89(4): 982-994.

Alam, M.S. (1995): "A theory of limits on corruption and some applications", *Kyklos*, 48: 419-35.

Alesina, A. and D. Rodrik (1994):"Distributive politics and economic growth", *The Quarterly Journal of Economics*, 109: 465-90.

Andersen, Cynthia D. (1996); "Understanding the Inequality Problematic: From Scholarly Rhetoric to Theoretical Reconstruction," *Gender and Society*, 10: 729-46.

Andvig, J. C., O. Fjeldstad, I. Amundsen, T. Sissener, and T. Soreide (2000): "Research on corruption: A policy oriented survey", *Chr. Michelsen Institute (CMI) & Norwegian Institute of International Affairs (NUPI)*

Atkinson, A. B.(1997): "Bringing income distribution in from the cold", *The Economic Journal*, 107 (March): 297-321.

Banfield, E. C. (1975): "Corruption as a feature of governmental organization", Journal of Law and Economics, XVIII (3): 587-605.

Bardhan, P. (1997): "Corruption and development: A review of issues", *Journal of Economic Literature*, 35(3): 1320-1346.

Black, Bernard, R. Kraakman and A. Tarassova (2000): "Russian privatization and corporate governance: What went wrong?", *Stanford Law Review*, vol. 52: 1731-1808.

Black, D.(1958): *The Theory of Committees and Elections*, Cambridge: Cambridge University Press.

Bollen, Kenneth and Robert W. Jackman (1985); "Political Democracy and the Size Distribution of Income," *American Sociological Review*, 50: 438-57..

Broadman, H.G. and Recanatani, F. (2000): "Seeds of corruption. Do market institutions matter?" *World Bank Policy Research Working Paper* No. 2368.

Chase-Dunn, Christopher (1975): "The Effects of International Economic Dependence on Development and Inequality: A Cross-National Study," *American Sociological Review*, 40: 720-738.

Chong, A. and C. Calderon (2000b): "Institutional quality and income distribution", *Economic Development and Cultural Change*, 48:4, pp.761-786

Deininger, Klaus and L. Squire (1996): "A new data set measuring income inequality", *The World Bank Economic Review*, 10(3): 565-591.

Dollar, David., R. Fisman, and R. Gatti (2001): "Are women really the 'fairer sex'? Corruption and women in government", *Journal of Economic Behavior and Organization*, vol. 46: 423-429.

Dollar, David and A. Kraay (2002): "Growth is good for the poor", World Bank, www.worldbank.org/research/growth; forthcoming: *Journal of Economic Growth*.

Downs, Anthony (1957): *An Economic Theory of Democracy*, New York: Harper.

Fisman, R. and R. Gatti (2002): "Decentralization and corruption: evidence across countries", *Journal of Public Economics* 83, pp. 325-345.

Friedman, Eric, S. Johnson, D. Kaufmann, and P. Zoido-Lobaton (2000): "Dodging the grabbing hand: The determinants of unofficial activity in 69 countries", *Journal of Public Economics*, 76: 459- 493.

Gagliani, Giorgio (1987), "Income Inequality and Economic Development," *Annual Review of Sociology*, 13: 313-334.

Glaeser, E., J. Scheinkman, and A. Shleifer (2003): "The injustice of inequality", *Journal of Monetary Economics* 50, pp.199-222.

Goel, R.K. and M. A. Nelson (1998): "Corruption and the government size: A disaggregated analysis", *Public Choice*, pp.107- 120.

Goldsmith, Arthur A. (1999): "Slapping the grasping hand: Correlates of poltcal corruption in emerging markets", *American Journal of Economics and Sociology*, vol. 58, no. 4, pp. 866-883.

Gupta, S., Davoodi, and Alonso-Terme (1998), "Does corruption affect income inequality and poverty?", *IMF working paper* , No. 98/76.

Hall, R. and C. Jones (1999): "Why do some countries produce so much more output per worker than others", *Quarterly Journal of Economics*, 64, 83-116

Hotelling, Harold (1929）:"Stability in competition,"*Economic Journal*, 39(March)：41-57.

Huntington, Samuel P. (1968): "Modernization and corruption", in *Political order in Changing Societies*, Samuel P. Huntington, New Haven, Connecticut: Yale University Press. pp. 59–71.

Husted, B. (1999): "Wealth, culture, and corruption", *Journal of International Business Studies*, 30: 339-60.

Johnston, Michael (1989): "Corruption, inequality, and change", in Ward, P. ed., *Corruption, Development and Inequality*, London and New York: Routledge

Kaufmann, D, A. Kray and P. Zoido-Lobaton (1999a): "Aggregating governance indicators", *World Bank Policy Research Paper*, no. 2195. Washington DC: World Bank.

Kaufmann, D., A. Kraay and P. Zoido-Lobaton (1999b): "Governance matters", *World Bank Policy Research Paper*, no. 2196. Washington DC: World Bank.

Kaufmann, D., A. Kraay and M. Mastruzzi (2003): "Governance matters III: Governance indicators for 1996-2002", *Draft*, World Bank, www. worldbank.org/wbi/governance/govdata2002.

Klitgaard, Robert (1988): *Controlling Corruption*, Berkeley: University of California Press.

Krueger, Anne O. (1974): "The political economy of the rent-seeking society", *American Economic Review*, 64(3): 291-303.

Lambsdorff, Johann Graf (1999): "Corruption in empirical research – a review", *Transparency International Working Paper*, Berlin.

Lambsdorff, Johann Graf (2003): "Measuring corruption – The validity and precision of subjective indicators", *JEL*: C4, P16, K4

La Palombara, J. (1994): "Structural and institutional aspects of corruption", Social Research, LXI, 3:350.

La Porta, R., F. Lopez-de-Silanes, A. Schleifer and R.W. Vishny (1999): "The quality of government." *Journal of Law, Economics and Organization*, vol. 15, no. 1, pp. 222-279.

Leff, Nathaniel H. (1964): "Economic development through bureaucratic corruption", *American Behavioral Scientist*, 8/3 (November), pp. 8–14.

Leite, C. and J. Weidmann (1999): "Does mother nature corrupt? Natural resources, corruption, and economic growth." *International Monetary Fund Working Paper*, 99/85 (July).

Li, Hongyi, L. Squire, and H. Zou (1998): "Explaining international and intertemporal variations in income inequality", *The Economic Journal*, 108 (January): 26-43.

Li, Hongyi, L.C. Xu, and H. Zou (2000): "Corruption, income distribution, and growth", *Economics and Politics*, 12:2, 155-182.

Lijphart, Arend (1997): "Unequal participation: Democracy's unresolved dilemma", *American Political Science Review*, 91, pp.1-14.

Lipset, Seymour Martin (1981): *Political Man: The Social Basis of Politics*, Baltimore: The Johns Hopkins University Press.

Mauro, Paolo (1995): "Corruption and growth", *Quarterly Journal of Economics*, 110 (August): 681–712.

Mauro, Paolo (1998): "Corruption and the composition of government expenditure", *Journal of Public Economics* 69, 263-279.

Milanovic, Branko and S. Yitzhaki (200?): "Decomposing world income distribution: Does the world have a middle class?", *The World Bank working paper*.

Mohtadi, H. and T. Roe (2003): "Democracy, rent seeking, public spending and growth", *Journal of Public Economics* 87, pp.445-466.

Montinola, G. and R. Jackman (2002): "Sources of corruption: A cross-country study", *British Journal of Political Science* 32, pp.147-170.

Moore Jr., Barrington (1966), *The Social Origins of Dictatorship and Democracy*, Boston: Beacon.

Mueller, Edward N. (1988), "Democracy, Economic Development, and Income Inequality," *American Sociological Revie*, 53: 50-68.

Mueller, Edward N. (1995), "Economic Determinants of Democracy," *American Sociological Review*, 60: 966-982).

Myrdal, Gunnar (1968): "Corruption-Its causes and effects", in *Asian Drama: An Inquiry into the Poverty of Nations*, vol. II. New York: Twentieth Century, pp. 937-51.

Nye, Joseph. S. (1967): "Corruption and political development: A cost-benefit analysis", *American Political Science Review*, LXI (2): 417-27.

Nielson, Francois (1994): "Income Inequality and Industrial Development," *American Sociological Review*, 59: 654-677.

Nielson, Francois and Arthur S. Alderson (1995): "Income Inequality, Development and Dualism: Results from and Unbalanced Cross-National Panel," *American Sociological Review*, 60: 674-701.

Paldam, M. (2002): "The cross-country pattern of corruption: Economics, culture and the seesaw dynamics", *European Journal of Plitical Economy*, Vol. 18, no. 2, 215-240

Persson, Torsten and G. Tabellini (1994): "Is inequality harmful for growth?", *American Economic Review*, 84(3): 600-621.

Rijckeghem, Caroline Van and Beatrice Weder (1997): "Corruption and the rate of temptation: Do low wages in the civil service cause corruption?", *Working Paper* WP 97/73, International Monetary Fund, Washington D.C.

Rodrik, D., A. Subramanian, and F. Trebbi (2002): "Institutions rule: The primacy of institutions over geography and integration in economic development", draft.

Rose-Ackerman, Rose (1978): *Corruption. A Study in Political Economy*, London/New York: Academic Press.

Rueschemeyer, Dietrich, Eveylne Huber Stephens and John D. Stephens (1992), *Capitalist Development and Democracy*, Chicago: University of Chicago Press, 1992.

Sandholtz, W. and W. Koetzle (2000): "Accounting for corruption: Economic structure, democracy, and trade", *International Studies Quarterly*, vol. 44, no. 1, 31-50.

Scott, James (1972): *Comparative political corruption*. Englewood Cliffs, NJ: Prentice-Hall.

Sen, Amartya (1992): *Inequality Reexamined*, New York: Russell Sage Foundation; Cambridge, MA: Harvard Univerity Press

Shleifer, Andrei (1998): "State versus private ownership", *Journal of Economic Perspectives*, 12(4): 133-150.

Shleifer, Andrei and R. W. Vishny (1998): *The Grabbing Hand: Government Pathologies and Their Cures*, Cambridge, MA: Harvard University Press.

Swamy, A., S. Knack, Y. Lee, and O. Azfar (1999), "Gender and corruption", Draft Paper, *IRIS Center, University of Maryland.*

Tanzi, Vito and Hamid Davoodi (1997): "Corruption, public investment, and growth", *IMF Working Paper* 97/139. Washington D.C.

Torrez, Jimmy (2002): "The effect of openness on corruption", *Journal of International Trade and Economic Development* 11:4, 387-403.

Treisman, Daniel (2000): "The causes of corruption: a cross national study", *Journal of Public Economics*, vol. 76, pp. 399-457

Verba, Sidney, K. Schlozman, and H. Brady (1995): *Voice and Equality: Civic Voluntarism in American Politics*, Harvard University Press: Cambridge, MA

Wei, Shang-Jin (1997): "How taxing is corruption on international investors?", *NBER Working Paper* 6030, Cambridge, MA.

Wei, Shang-Jin (2000): "Natural openness and good government", *NBER Working Paper* 7765 (June).

Wooldridge, Jeffrey M. (1999): *Introductory Econometrics: A Modern Approach*, Cincinnati, OH: South-Western.

Wooldridge, Jeffrey M. (2002): *Econometric Analysis of Cross Section and Panel Data*, The MIT Press.

---

[i] Assistant Professor of Public Policy, John F. Kennedy School of Government, Harvard University

[ii] PhD candidate in public policy, Graduate School of Arts and Sciences, Harvard University

[iii] Gupta et. al.(1998)'s results indicate that a worsening in the corruption index of a country by one standard deviation increases the Gini coefficient by 5.4 points.

[iv] Li et. al.(2000)'s estimates are similar to Gupta et. al.'s. One-standard-deviation increase in corruption raises the Gini by roughly by five points, according to them. They also argue that corruption affects income distribution in an inverted U-shaped way; inequality in countries with an intermediate level of corruption is higher than that in countries with little or rampant corruption.

[v] If the income distribution within the third quintile were perfectly equal, the national median income would be 0.27 times the national mean income. In reality, the national median income will be less than that, because income distribution within the quintile will be skewed too.

[vi] Widespread practices of vote-buying and vote-selling in high-inequality societies may destroy the very foundation of median voter theorem.

[vii] High quality data should be based on household surveys rather than estimates drawn from national accounts statistics, have comprehensive coverage of all sources of income or uses of expenditure, and be representative of the population at the national level. (Deininger and Squire, 1996)

[viii] If measurement error in the dependent variable is systematically related to one or more of the explanatory variables, OLS estimates will be biased. If the measurement error of the dependent variables is not correlated with explanatory variables and has the normal distribution, the consistency and unbiasedness of the estimates of coefficients will be maintained. However, as the variance of the error gets large, the standard errors of the coefficients will become large and hence many explanatory variables may lose significance. (Wooldridge, 1999 and 2002)

[ix] Li, Squire, and Zou(1998) found that income inequality was relatively stable within countries and that it varied significantly among countries. The measurement of perceived corruption since early 1980s also shows similar phenomena.

[x] We recognize that between estimators based on cross-section analysis can be biased because country-specific effects may be correlated with some explanatory variables and that they may be also inefficient because standard errors of the coefficients will be larger than when country-specific fixed effects are controlled through differencing of the data. However, differencing of the data using fixed effects model is likely to do more harm than eliminate the country specific effects, because large part of the variations may come from measurement error. (Wooldridge, 1999 and 2002)

[xi] Deininger and Squire(1996)'s high quality data have 693 observations for 114 countries for the period of 1947 to 1996.

[xii] For the Deininger and Squire(D&S) data , the result of our regression of 'gini' on 'expenditure' 'net'

'person' and country dummies and two-period (before and since 1980) dummy was "gini = -6.63 expenditure –0.95 net –1.07 person + 0.23 since1980 + 38.30" (countries absorbed). Only the coefficient for expenditure was statistically significant with the t-statistic of 3.8. Thus, we have confirmed the suggested adjustment is reasonable.

[xiii] For Dollar and Kraay(D&K) data, our adjustment is different from theirs. They adjusted by subtracting 4.046 from gross-income-based gini, based on the regression of gini on gross, expenditure, person, and six regional dummies. We used country dummies instead of regional dummies and added decade dummies to control for country-specific fixed effects and time effects. And our result shows that there are significant differences between income-based and expenditure-based ginis but the differences between gross and net income as well as between person-based and household-based ginis are not significant. We use coefficients for all the three definitions irrespective of statistical significance, because this will produce the most unbiased adjustment. Our adjustment is basically consistent with Deininger and Squire(1996). Milanovic and Yitzhaki(2001) also argued that in many cases, particularly for poorer countries where direct taxes were nominal, there were practically no differences between net and gross income. Our adjusted gini and D&K's adjusted gini showed the correlation coefficient of 0.987.

[xiv] Since the average value of Freedom House's political rights score for 1972-95 and the log of GNP per capita for 1970-95 appear as independent variables, we also use the average gini for 1970-95 as a robustness check. The Freedom House data is not available for the years before 1972. The results of the regressions that used the average gini for 1970-95 are very similar to those that used the average gini for the whole period of 1950-99. They are not reported in this paper, but available upon request.

[xv] When inequality is the dependent variable, it does not make sense to use the measure of inequality for the period that precedes the period for which explanatory variables were measured. Hence, we use the measure on inequality for the period of 1990s when it is treated as the dependent variable.

[xvi] Lambsdorff (2003) argues that Kaufmann et. al.'s weighting might be misleading. Kaufmann et. al.'s data has a merit of covering a larger number of countries than TI's CPI.

[xvii] When corruption is the dependent variable, the measure of corruption should not be for the period that precedes the period for explanatory variables were measured, and hence we use corruption measures for the period of 1996-2002. When corruption is an independent variable, however, the period for the measure of corruption should not be later than the period for which the dependent variable was measured, and hence we use corruption measures for earlier period. In addition to CPI 1980-85 and CPI 1988-92, we also use BI index of corruption for 1980-83, and ICRG index of corruption for 1982-95 as a robustness check. Because the corruption data for earlier period are less reliable and the use of a particular data may lead to a biased estimation, while the use of other data might have produced quite different results. The corruption index for 1980-1983 made by Business International (BI has been taken over by the Economist Intelligence Unit.) was first used by Mauro(1995), and Political Risk Service (PRS)'s ICRG (International Country Risk Guide) index of corruption has been widely used among scholars. The popular use of PRS's ICRG index of corruption was criticized by Lamsdorff (2003). He argued that this index did not determine a country's level of corruption but the "political risk" involved in corruption, citing a letter from Tom Sealy, the ICRG-editor.

[xviii] Since it is very hard to a priori determine that our selected instruments are not correlated with error term of the regression, especially considering that we instrument four variables, it is best to have more than four instruments so that we may conduct over-identification test to check if they are correlated with the error term. Hence we chose five instrumental variables to instrument four possibly endogenous variables.

[xix] Both Gupta et. al. and Li at. al. used instruments to address the issue of reverse causality. However, the validity of their instruments is somewhat doubtful. Gupta. et. al. used fraction of English-speaking population, distance from the equator, and ethno-linguistic fractionalization as instruments for corruption. However, distance from the equator is found to be strongly correlated with inequality, and we successfully use distance from the equator as an instrument for inequality. Li et. al.'s instruments for corruption and its interaction terms were Mauro(1995) corruption measure, its polynomials, and this measure's corresponding interaction terms. Their instruments will be valid as instruments for addressing the problem of measurement error but not as a solution for reverse causation, because they will be correlated with the dependent variable independently from their correlation with the variables instrumented.

[xx] In the first stage regressions, the F-statistics were 14.2 for inequality, 11.3 for political rights, 26.1 for per capita income, and 24.4 for openness. We report the P-values for the over-id tests for all IV 2SLS estimates, which are all large enough for our purpose.

[xxi] The estimated effect of inequality on corruption is substantially different depending on whether CPI or CCI is used as the dependent variable. This suggests that measurement errors in corruption variables are systematically correlated with inequality or other independent variable(s) that is(are) correlated with inequality.

[xxii] Measurement error in inequality causes its coefficient biased toward zero, and at the same time estimates for other variables like per capita income that are correlated with both corruption and inequality can be biased too.

[xxiii] We could not conduct IV 2SLS with the interaction term, because it would make the standard errors of the coefficients very large to include lots of interaction terms between instruments.

[xxiv] The interaction effect between corruption and democracy on inequality estimated here might partly reflect the reverse causality; i.e., the interaction effect between inequality and democracy on corruption.

[xxv] Scandinavian legal origin has no significant effect on corruption, once inequality and other main variables are controlled for. The coefficients for Scandinavian legal origin in corruption regressions are much larger when inequality is not included than when it is included as an explanatory variable. This tells the low level of corruption in Scandinavian countries is better explained by their low level of inequality rather than their region-specific characteristics.