

Income Inequality and Asymmetric Responses to Corruption

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*“Corruption has its own motivations, and one has to thoroughly study that phenomenon and eliminate the foundations that allow corruption to exist.”
“But eradicating corruption is not enough to sustain a country.”*

- Eduard Shevardnadze, Former President of Georgia

I. Introduction

In an ideal world, the market will efficiently distribute wealth among the people as they utilize comparative advantage and any distortions in the market could be addressed by the government. However this world is far from ideal and income inequality plagues the globe. One major obstacle to tackling income inequality is corruption. Corruption restricts the government's capacity to address income inequality and alters the economic framework so that those “who have” repeatedly acquire more while those who have less lose more and more.

There is already an abundance of research that shows the detriment of corruption, this paper attempts to better understand the relationship. The first question asked is the relationship between income inequality and corruption asymmetrical? The importance of this question is that it will help us better understand how income inequality is affected by changes in corruption. In particular what happens when corruption improves. There is a general assumption that income inequality worsens when corruption increases, but does it hold true in the opposite direction? The economic model in this paper predicts that the relationship with decreasing corruption will be weaker and decreasing corruption will have a smaller impact on income inequality. Previous research has only examined income inequality through cross sectional analysis, or did not differentiate in the directions of changes in corruption in their analysis. The results showed the relationship to be asymmetric in which there is a significant relationship with increasing corruption and increasing income inequality, but no relationship when corruption decreases.

In attempt to answer why the relationship is asymmetric, an examination at the relationship between corruption and education spending was necessary. In the economic model, one possible reason for asymmetry is the unaddressed long term affects of corruption on income inequality and one possible long term affect is the redistribution of government expenditures away from social programs such as education spending. The hypothesis is that similar to income inequality, corruption would have asymmetric affect on education spending in which increases in corruption will reduce education spending and decreases in corruption will have no affect on education spending. Opposed to the hypothesis, the results showed that there was no significant relationship in the positive or negative direction of changes in corruption. This means changes in education spending cannot solely explain the asymmetry of corruption and income inequality.

This paper is organized into four parts. First is a review of the academic literature about corruption and the relationship between income inequality and corruption. The second part is a description of our economic model, which will explain the theoretic basis for our hypotheses. The next section we will explain our empirical strategy, the data, and the results. The paper concludes with a discussion on possible issues with the research, avenues for future research and policy implications.

II. Literature Review

When looking at income inequality and corruption, it is best to examine the previous literature on how corruption functions in an economic sense and then as to the specific relationship in order to get a better understanding of how to study the relationship. There is a divergence in the research on corruption and whether the impacts are beneficial or detrimental. On one side, they argue that corruption through the use of bribes is a way to circumvent large and inefficient bureaucracies. Therefore corruption is merely a response to market failure

(Nathaniel Leff, 1964, Francis T. Lui, 1985). Moreover, corruption isn't necessarily bad because it will still result in more efficient firms winning out (Francis T. Lui, 1985). For instance if there is a limit to a license, the firm with the highest profits, and therefore the market has shown to be the most efficient will be more able to pay the bribe for the license. Lastly, the bribe can be viewed as payment at a piece rate, most likely resulting in more attentiveness and accommodation on the side of the bureaucrat (Nathaniel Leff, 1964).

On the other hand Mauro (Paolo Mauro, 1995) found that when controlling for a number of sociopolitical and economic variables, then there is strong quantitative evidence of high corruption correlating with low levels of economic growth. Schiefler and Vishny (Andrei Shleifer and Robert W. Vishny, 1993) argue that there are two main explanations. First, there are multiple and independent bureaucratic agencies that would require bribes driving the cost to the firm up, resulting in lower levels of investment. Second, the secrecy nature of bribes distorts the efficient allocation of resources. Secrecy demands money to be allocated away from necessary projects such as health and education and redistributed towards more useless sectors that have more opportunity for obscure transactions. The government is also more likely to encourage monopoly power and entry barriers in order to control the exposure of the corruption. Rose-Ackerman (Susan Rose-Ackerman, 1997) contends that corrupt officials tend to award contracts to those with the lowest associated costs (and therefore the largest profit margin through bribes) encouraging lower quality and inefficient firms. Consequently, there is no way to limit corruption only to economically desirable outcomes.

All the above arguments were of strong persuasion and presented a multitude of evidence. The research that ensued tried to explain the discrepancies in the literature in which countries with high levels of corruption have both high and low levels of economic growth. First, Lui and

Leff's research has treated rigid bureaucracies and anti-business regulations as given in the corrupt countries, however there is an incentive scheme for the corrupt officials to create anti-business regulation in order to force the firms to engage in corruption (Shaomin Li, 2010). With this perspective, the firms are not inducing the corruption, but instead the government is creating the environment that makes corruption necessary. Therefore it is important to take into account the diverse ways in which corruption occurs. Along a similar vein, Wedeman (Andrew Wedeman, 1997) distinguished different types of corruption order to explain the variation in the relationship between economic growth and corruption,

Looting, which corresponds to Stanislaw Andreski's notion of "kleptocracy" or what Robin Theobald terms "uninhibited plundering," involves the systematic theft of public funds and property, as well as the extraction of bribes by public officials. Rent-scraping involves the conscious manipulation of macroeconomic parameters in a way that produces rents and the scraping off of these rents by public officials. Thus, for example, rent-scraping might involve the erection of a state-owned monopoly and diversion of its profits into the pockets of corrupt officials. Dividend-collecting, while it may involve a certain amount of rent scraping, is characterized by transfers of a percentage of the profits earned by privately owned enterprises to government officials in return for policies and services that allow these enterprises to earn profits.(Andrew Wedeman, 1997)

He argued that in countries with high levels of corruption, looting might be more prominent for those with low growth rates, while dividend collecting might explain the high growth rates with the same reasoning of Lui in which the payment is a way to get around inefficient bureaucracies. Li (Shaomin Li, 2010) tries to quantitatively test this by using the level of trust in society to distinguish between the different types of corruption. He found that countries with high levels of trust tended to have less predatory effects from corruption (arguing that trust made corruption less bad, but not necessarily more economically efficient). The logic of this is that in societies with lower levels of trust, officials are going to be more selective in the bribes they take. This means they place more value on the trustworthiness of the briber rather than who can provide the highest payment which would be able to better promote more efficiency. The impact of this paper was not to excuse corruption in countries with high levels of trust, Li argues that they are

still less efficient than without corruption, but instead to point out the variety of ways corruption functions in the government and economy which makes it so difficult to clean out.

Why is this research on economic growth important when looking at the relationship between income equality and corruption? Economic growth, like income inequality, is just another consequence of corruption. The abundance of literature on the relationship between economic growth and corruption helps us understand how corruption functions. The crucial information to take away is how the effects of corruption differ depending on the different types of corruption. Moreover it is very difficult to differentiate the types of corruption in large quantities studies but Li was able to use trust to distinguish the efficiency of corruption.

As for the specific relationship between income inequality and corruption, Gupta et al. found that worsening of a country's corruption index by 2.5 points on a scale of ten corresponds to an increase in the gini coefficient (worsening inequality) of about 4 points (Sanjeev Gupta et al., 2002a). Chetwynd et al. (Eric Chetwynd et al., 2003) separates the arguments for why this occurs into two models. The economic model argues that "corruption tends to distort the allocation of economic benefits favoring the haves over the have-nots and leading a less equitable income distribution." More simply put, Chetwynd observes that with those with lower income, a higher proportion of income has to be paid for the bribes. Rose-Ackerman illustrates this with an example of government monopoly over scarce resources.

In India and Pakistan, corruption in irrigation systems means that those at the bottom of the system may obtain much less water than they need even for subsistence farming. Some ditches run dry before the end of the system is reached. Programs that directly aid the poor will be less effective if payoffs are needed to qualify for the service. If applicants pay for a favorable place in line for admission to public housing, the most needy will suffer. (Susan Rose-Ackerman, 1997)
This explains why intuitively corruption disproportionately hurts the poor.

Using the notion of categorizing types of corruption instead of analyzing corruption as a generic process, similar to the conclusions made earlier, Hellman et al. (Joel S. Hellman et al.,

2003) studied how the changing relationship between the firm and government affect income inequality. They organized corruption into state capture, state influence, and administrative corruption. They defined state capture as “shaping the formation of the basic rules of the game through illicit and non-transparent private payments to public officials.” Whereas state influence is similar to state capture except it describes a firm’s capacity to shape the rules of the game not through payment but through other factors such as size, ownership, and repeated interactions with the state. This differs from what they call administrative corruption which they define as “private payments to public officials to distort the prescribed implementation of official rules and policies.” They concluded that state capture exists in most transition economies in which this capture economy just encourages more state capture from new firms resulting in a downward spiral detrimental to income inequality and the development of a functional market economy.

The second model is the governance model in which Chetwynd argues that corruption reduces the government’s capacity through weakened political institutions and lowered quality of government services to address issues such as income inequality. This occurs through several means. First, corruption results in tax evasion which leads to a bias in the tax system. The basic concept behind taxes is to redistribute the wealth from the rich to the poor in order to address income inequality. However with corruption, the rich are able to evade taxes meaning the progressivity of taxes is diminished and income inequality persists.

Another means was studied by Burnside and Dollar (Craig Burnside and David Dollar, 1999) where they researched the impact economic management had on the effectiveness of aid. They found that in developing countries with weak economic management (poor property rights, high corruption, closed trade regimes, and macroeconomic instability) there is no correlation between aid and economic growth or aid and infant mortality. But in developing countries with stronger

economic management they found that there are correlations between aid and economic growth, and aid and infant mortality. Consequently, if the governments have the capacity for strong economic management, aid will be more impactful and the poor would not suffer so severely.

Finally, there have been multiple studies looking into how corruption has affected government spending composition. They have found that countries with low levels of corruption tend to allocate more of the government budget towards social programs such as education, while countries with high levels of corruption tend to allocate less toward social programs and instead direct more spending to high technology monopolistic sectors such as military contracting where there are more opportunities for corruption (Sanjeev Gupta et al., 2002b, Paolo Mauro, 1998).

This paper expands on Mauro's research on the composition of government spending and corruption. He shows that corruption tends to take money away from social spending, but if corruption starts to improve will the money be reallocated back to these sectors? This paper will test this by first seeing if there is an asymmetric relationship between changes in corruption and changes in income inequality. If there is an asymmetric relationship then improvements in corruption might not have as strong a positive effect as the negative effect from worsening corruption. One way in which this might occur is through a lack of redistribution of budgetary funding back to social programs such as education and health. Therefore the next test will be to see when corruption improves if more of the government spending is distributed to social programs such as education and health. In particular, this paper will try to take into account the unpredictable and various ways corruption occurs by looking at changes in corruption. Because Li showed that corruption can be categorized by the general level of trust in a country, and have different consequences, there needs to be a way to account for that. By using the percent change

in corruption and the percent change for the dependent variables, the variations across countries, like the types of corruption, will be controlled for.

III. Economic Model

Why would there be an asymmetric relationship between income inequality and corruption? A budget constraint model shows how corruption affects income inequality. Because dividend-collecting and looting occur for different motives and have different consequences, they are examined separately. Figure 1a looks at the budget constraint model of dividend collecting. This model assumes that the citizen or firm has a fixed budget in which they can either spend on the production of goods or as bribes to government officials in exchange for favorable policies or services that will help them earn profits.

Movement along the indifference curve depends on the risk and payoff of corruption. For instance, if there is strong enforcement of the law, then there is a higher risk in engaging in corruption (Susan Rose-Ackerman, 1999). Lipset and Lenz show that in a society in which achievement is a highly emphasized cultural goal, there is pressure to reach that objective and if they do not have the means and opportunities to do so, they will break the norms and engage in corruption (Seymour Martin Lipset and Gabriel Salman Lenz, 2000). As a result, in societies that highly value achievement, there is a higher payoff in engaging in corruption over societies who do not as strongly value achievement.

When corruption increases, there will be more spending on bribes (as long as the profit derived from the bribe is higher than the cost of the bribe), and less spending on production. The bribes pay for a distortion in the market which helps the firm with factor access and cost, product regulation, and competition. The bribes might result in exclusive access to factors of production which will encourage a monopolistic market, giving the firm the power of price setting which

will hurt the poor. The bribes might also result in changes in regulation, for instance, deregulating working standards in order to make labor costs cheaper which will hurt the poor working class. In general, the bribes pay for an increase in profits, but not in an efficiency enhancing mean, therefore, hurting all of those who are not a part of the profit expanding the gap between rich and poor. Therefore increased corruption means increased income inequality, however when there is decreased corruption the only expectation is less bribes but not necessarily changes in regulation to correct the distortion in the market caused by previous corruption. Therefore there is a possibility of corruption having an asymmetric affect on income inequality.

In Figure 1b we look at the budget constraints of looting. We are assuming the government has a fixed budget, in which more money spent on looting through misappropriation results in less resources available to spend on legitimate government expenditures such as health and education programs or military and infrastructure spending. On the most basic level it makes sense that more corruption means more spending on the misappropriation of resources which means less resources for legitimate government spending, which means less resource for the poor because the government is less able to help them.

Hines argues that corruption, in the form of looting, is easier done in high technology sectors with oligopolistic firms (James R. Hines, 1995). Building upon Hines, Mauro shows that defense spending tends to be more susceptible to corruption whereas education tends to be less susceptible. Moreover he found that in countries with higher levels of corruption there tends to be less spending on education and more on defense. He concluded that corruption created an incentive to redirect government spending from education and other government programs beneficial to the poor towards high technology oligopolistic sectors to facilitate corruption (Paolo

Mauro, 1998). As a result, when there is corruption, not only is money taken away from legitimate government expenditures, but there is also an unwarranted redistribution of resources away from government programs that help address income inequality.

However, it cannot be assumed that this same incentive scheme holds in the opposite direction. When corruption improves, is there a necessary reduction in income inequality and increase in education spending? On one hand it can be assumed that fewer resources will be spent on the misappropriation of resources through looting. But on the other hand, there is no incentive scheme that requires the resources that were allocated to high technology oligopolistic sectors like defense move back towards social programs such as health and education that alleviate income inequality. Consequently, the budget constraint model shows that less corruption will result in more resources for government expenditures, but there is no requirement that the money be relocated to those programs that were hurt by corruption.

In conclusion, with both dividend collecting and looting, a budget constraint model shows how increased corruption worsens income inequality, but the model is unable to create the same association with improving corruption. Moreover there is reason to believe that the incentives that worsen income inequality when there is corruption do not exist when corruption improves; therefore there is a basis to believe that the relationship is asymmetrical.

IV. Empirical Strategy

The data source on corruption is from Transparency International's (TI) Corruption Perception Index (CPI) for the years 1998 to 2009. One of the major drawbacks to studying corruption is the unreliability of the data. It is very difficult to record the level of corruption because corruption is secretive and hidden in nature. Consequently, the research depends on the perceptions of corruption which are not necessarily very representative of the prevalence of

corruption but rather the ability to hide corruption. Transparency International tries to address this issue by utilizing multiple sources and surveys for the perception of corruption in order to more fully understand the prevalence of corruption. Moreover, as a third party, non-profit organization, Transparency International is an unbiased source for reporting corruption compared to countries self-reporting. Although in 2009, TI published the CPI on 180 countries, in 1998 they only published on 85 countries. As an analysis on corruption changes over time, it is imperative that there is sufficient data for the present as well as for the past.

Income inequality was measured as the poorest quintile share in national income as a percentage. The data was from the United Nation's reported Millennium Development Indicator. However, the UN depends on the reports of individual governments to the international statistics system (the UN Statistics division). This means there will be a self-selecting process for available data to reflect countries that have the resources and capacity to calculate poorest quintile share in national income and want the international community to know their poorest quintile share in national income. Therefore there might be a bias in the data toward countries with strong and affluent government and lower income inequality. Moreover there was a very limited amount of data for income inequality with some countries not reporting any of their statistics on income inequality while others were only able to report one to a couple years.

As for the data on education spending, the World Bank data catalogue provides the data for public spending on education as a percentage of government expenditure. Fortunately there were less gaps in the data compared the data on income inequality, but still a significant lack thereof.

At first, the strategy was to use panel data in order to see the affects of corruption over time and across countries. Regressing with panel data would have been particularly useful

because it holds factors that are stable over time but vary from country to country constant. Therefore the regression would not have been polluted by country specific factors that cause income inequality or affect government expenditure. However the data was so unbalanced it became impractical to treat the data as panel data (more in depth description of the data later). Therefore by creating a model that reaps the benefits of using panel data, but could be calculated like a cross-sectional data regression the issue of unbalanced data was resolved.

When calculating the percentage change for all of the variables, the new variables imitated a regression with panel data. To find the new variables, this equation was used:

$$\% \Delta \text{ of } x = \frac{(x_{year2} - x_{year1})}{x_{year1}}$$

However there was very little available data for one country for at least two consecutive years. Most of the data had multiple entries for each country but with gaps between the years but random and unequal gaps. Therefore taking the yearly average of the percentage changes in the variables, the adjusted data accounted for the differing lengths in time between the reported data.

$$\text{yearly average } \% \Delta \text{ of } x = \frac{\% \Delta \text{ of } x}{year2 - year1}$$

After doing all the calculations, there were two extreme outliers. In Bangladesh, the CPI score jumped from 0.4 to 1.2 from 2002 to 2003 resulting in a yearly average percent change in CPI score of 2.0 or 200% in which the remaining data remained below 1.0. Second is France in which from 2000 to 2001 spending on education as a share of total government expenditures increased from 11.01% to 71.1%, a yearly average percent change of 5.47 or 547%. For all other countries, the yearly average percent change in education spending did not exceed 1.0. As a result, the two data points were removed from the regression analysis and statistical summaries.

Next two regression equations were set up

$$y_a = \beta_{ao} + \beta_{a1}x + \mu_a \quad (1)$$

$$y_b = \beta_{bo} + \beta_{b1}x + \mu_b \quad (2)$$

in which, y_a is the yearly average percent change in poorest quintile share in national income, y_b is the yearly average percent change in public spending on education as a share of government expenditure, and x is the yearly average percent change in CPI score.

In order to test the asymmetry of the relationship between corruption and income inequality equation (1) is used and performed two regressions. By splitting the data by the direction of change in the CPI scores, the improvements and deterioration in corruption and how they affect income inequality can be compared. The first regression is for negative yearly average percent change in CPI score on yearly average percent change in poorest quintile share in national income. The coefficient is 0.502 which means if the yearly average percent change in CPI score worsens by 1 percent, then the yearly average percent change in the poorest quintile's share in national income would decrease by 0.5 percent. Moreover the result is statistically significant at the 5% level. Then regressing positive yearly average percent change in CPI score on yearly average percent change in poorest quintile share in national income the results showed that the relationship is not statistically significant and the slope is much more level indicating that the effect of change in corruption was less influential (see Figure 2).

These findings matched the expectations from the economic model. When corruption worsens, it makes a strong and noticeable impact on income inequality. But when corruption starts to alleviate, there is not a strong or consistent impact on income inequality across the counties. This means that some countries with decreasing corruption have taken upon themselves to reform the long term negative impacts of corruption that influence income inequality, while there are also other countries, even with decreasing corruption, which do not correct the long

term impacts corruption has on income inequality. However these results need to be taken with some restraint. When looking at the summary statistics of yearly average percent change in poorest quintile share in national income sorted by the direction of change in CPI score (table 1b) the means of change in lowest quintiles share of income are both positive for the negative and positive changes in CPI scores. Furthermore, the ranges are very similar. This would imply that on average income inequality is improving for both positive and negative change in CPI scores.

Next we attempted to explain why there wasn't a relationship between income inequality and corruption growth in the positive direction by seeing how government expenditure changed specifically when corruption decreased. For a preliminary examination, we divided the data on changes in CPI and changes in education spending by the direction of change in corruption (table 2b). In the positive direction, the average change in education spending was negative while in the negative direction, the average change in education spending was positive. But the standard deviations were fairly large so the initial implications should be taken lightly. For a more in depth investigation of decreasing corruption, we separated the data on changes in education spending into quintiles of the positive average yearly change in CPI score and then looked at the data summary for the average yearly change in share of government spending on education for each quintile (table 2c). We saw that there was no distinct linear trend in which both the lowest and highest change in CPI quintile had a positive average of change in share of government spending on education while the middle three quintile had a negative average of change in share of government spending on education.

Using equation (2) we regressed yearly average percent change in CPI score, on yearly average percent change in public spending on education as a share of government expenditure. The result was a relatively strong influence in the negative direction which means a reduction in

corruption would result in a lower share of the government expenditure being directed towards education, opposite of the original hypothesis. We then split the regression analysis by the direction of change in corruption. In both tests, neither coefficient was statistically significant, and still in a negative direction. In the end it was very difficult to make any conclusions on how corruption affects education in any direction.

v. Conclusion and Directions for Further Research

This paper has show that the relationship between corruption and income inequality is asymmetrical in which there is a strong relationship between corruption and income inequality when corruption is increasing, but there is a lack of relationship when corruption is decreasing. However, we cannot attribute it necessarily to education spending because of the lack of any statistical significance. One possible improvement in this study would be to expand the regression analysis concerning government expenditure. Although when regressing education alone there is no distinct relationship, by analyzing the affect of corruption on education, health and military spending, the additional data could provide a more complete picture of how corruption affects government expenditure. Another valuable step in future research would be to try and develop even more extensive and complete data, and if not possible, then to at least go through the data and identify possible biases. One bias that needs to be addressed when looking at the relationship between income inequality and corruption is what steps the government is taking to address income inequality (political campaigns, new programs, outside funding, etc)

Another possible development for this research would be to make the test on changes on income inequality and corruption more robust. Although we eliminated the impacts of country specific factors by calculating the average percent changes for the two variables, that still does not account for outside changing factors that influence changes in income inequality. However

because the impact of corruption and income inequality usually is an indirect process, adding variables that influence income inequality might also be influenced by corruption resulting in imperfect multicollinearity. These factors can include but not limited to changes in aid, changes in the spending on programs that alleviate poverty, and changes in the tax code. In 1955 Simon Kuznets looked into possible explanations for changes in income inequality. He theorized that the changes in demographics, relativity of individual freedoms and the initial levels of income distribution play an important role. For instance, those who are newly entering the local job market – the young and immigrants – they tend to more heavily enter on the lower end of the income distribution scale. This means that the amount of lower income earners will increase more with the new entries in the market proportional to the changes in the higher income earning bracket. Relativity of individual freedom and initial income distribution work together in that lower income earners are more driven to raise their income levels while those with initial higher levels of income are less driven. Therefore, “long unbroken sequence of connection with rising industries and hence with major sources of continued large property incomes is exceedingly rare...the successful great entrepreneurs of today are rarely sons of the great and successful entrepreneurs of yesterday” (Kuznets Simon, 1955).

This research leads to one major policy implication: the symptoms of corruption – like income inequality – do not fade when corruption lessens. Therefore we need to attack the symptoms of corruption as well as the sources of corruption. One way to attack the symptoms of corruption would simply be to acknowledge what long term harmful policies and detrimental impacts corruption has left behind and reverse them. Many reform propositions are forward looking in the sense that they attempt to change how policy and enforcement proceeds in the future but doesn't address what harm it has created in the past. Therefore, in some instances,

addressing the lack of impact on income inequality may be as easy acknowledging harmful policies and reverse them. This can include opening up previously closed markets to completion, or repeal regulation that hurts the consumers or workers. But in other instances, identifying the specific impacts of the corruption may be more difficult, like the impact on government expenditures.

This paper has treated corruption as given in the analysis on its affect on income inequality. However corruption can change and be manipulated through policy reform and anti-corruption campaigns. Although there is no relationship between diminishing corruption and lowered income inequality, there is a definite relationship between increased corruption and a rise in income inequality. The implication is that there may not be a strong incentive to reduce corruption as for its impact on income inequality but there is an incentive not to let corruption rise. The research on effective reformation against corruption is diverse and complex. But within most of the literature there is always some reservation on using the research as a basis for policy formation. In some instances, there might be an issue of endogeneity. For example, Van Rijckeghem and Weder found that raising public sector salaries relative to manufacturing wages will result in lower levels of corruption (Caroline Van Rijckeghem and Beatrice Weder, 2001). But they cannot necessarily claim this as a policy proposal because perhaps high level corruptions actually cause lower levels of income because there is an expectation of corruption as a proportion of the income (Johann Graf Lambsdorff, 2007). Another problem is some of the literature on corruption reform cannot be conquered by mere policy changes. Lambsdorf (2007) comments on the research that found more independent judiciaries result in lower levels of corruption, “it requires more than just changing laws. It is rather the de facto independence that seems to be at play.” Along a similar vein, Treisman (2000) found that corruption decreases

depending on the degree of democracy. But the impact is only significant after long and consistent exposure to democracy. In conclusion, previous research is able to supply a foundation for policy implications but it is very difficult to compose a series of sturdy reforms that are guaranteed to combat corruption.

This paper emphasizes that even if a state wins the battle against corruption, it has yet to win the war against income inequality. The state cannot depend on the market to quickly correct the detrimental impacts of corruption on income inequality. The state must take the initiative and implement policies to address income inequality above and beyond any campaign against corruption.

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VII. Appendix 1: Tables

Table 1a: Summary Statistics for Income Inequality and Corruption Perception Index Score*

Variable	<i>n</i>	Mean	Standard Deviation	Minimum	Maximum
Average Yearly Percent Change in Lowest Quintile share of Total Income	140	0.0185606	0.079428	-0.2	0.365837
Average Yearly Percent Change in CPI (negative)	60	-0.042767	0.0398842	-0.166667	-0.002809
Average Yearly Percent Change in CPI (positive)**	80	0.0474823	0.0674772	0	0.3703704

* positive changes in CPI means improving corruption and negative changes in CPI means worsening corruption

** no changes in CPI is included in the positive group

Table 1b: Summary Statistics for Income Inequality Sorted by the direction* of Change in Corruption

Variable	<i>n</i>	Mean	Standard Deviation	Minimum	Maximum
Average Yearly Percent Change in Lowest Quintile share of Total Income for Negative Changes in CPI	60	0.014486	0.0703265	-0.097561	0.3658537
Average Yearly Percent Change in Lowest Quintile share of Total Income for Positive Changes in CPI**	80	0.0216166	0.0859333	-0.2	0.3243243

* postive changes in CPI means improving corruption and negative changes in CPI meanss worsening corruption

** no changes in CPI is included in the positive group

Table 1c: Regression models of A changes in CPI Score on Changes in Income Inequality

Variable	Model 1	Model 2
Average Yearly Percent Change in CPI (negative)	0.5017616** (0.2219561)	
Average Yearly Percent Change in CPI (positive)		0.0236474 (0.1441724)
Constant	0.0359448*** (0.0129293)	0.0204938* (0.0118457)

*statistically significant at the 10% level

**statistically significant at the 5% level

***statistically significant at the 1% level

Table 2a: Summary Statistics for Changes in CPI score and Public Education Spending*

Variable	<i>n</i>	Mean	Standard Deviation	Minimum	Maximum
Average Yearly Percent Change in CPI score	64	0.005186	0.0859351	-0.4230769	0.5294118
Average Yearly Percent Change in Education Spending	64	0.0034715	0.1265531	-0.8410541	0.8506381

*government spending measured as a percentage of total government expenditures

Table2b: Summary Statistics for Changes in CPI score and Public Education Spending*
Seperated by Direction of Change in Corruption**

Variable	<i>n</i>	Mean	Standard Deviation	Minimum	Maximum
Average Yearly Percent Change in CPI score (positive)	26 7	0.0749256	0.0690651	0.0048309	0.5294118
Average Yearly Percent Change in CPI score (negative)	26 8	-0.062146	0.0605173	-0.4230769	-0.0092593
Average Yearly Percent Change in Education Spending (positive)	26 7	-0.006839	0.1185131	-0.8410541	0.44781
Average Yearly Percent Change in Education Spending (negative)	26 8	0.0093961	0.1250419	-0.4564473	0.8506381

*government spending measured as a percentage of total government expenditures

** no changes in corruption not included in analysis

Table 2c: Summary Statistics for Changes in Education Spending sorted by quintiles of Positive Changes in CPI score

Quintiles of Positive changes in CPI score	<i>n</i>	Mean	Standard Deviation	Minimum	Maximum
First Quintile	53	0.001382	0.0619606	-0.129654	0.27942
Second Quintile	57	-0.0122	0.0946715	-0.2500082	0.274731
Third Quintile	51	-0.013955	0.1298534	-0.4092136	0.3802569
Fourth Quintile	50	-0.015497	0.1523291	-0.8410541	0.3200181
Fifth Quintile	56	0.0050476	0.1371764	-0.3303971	0.44781

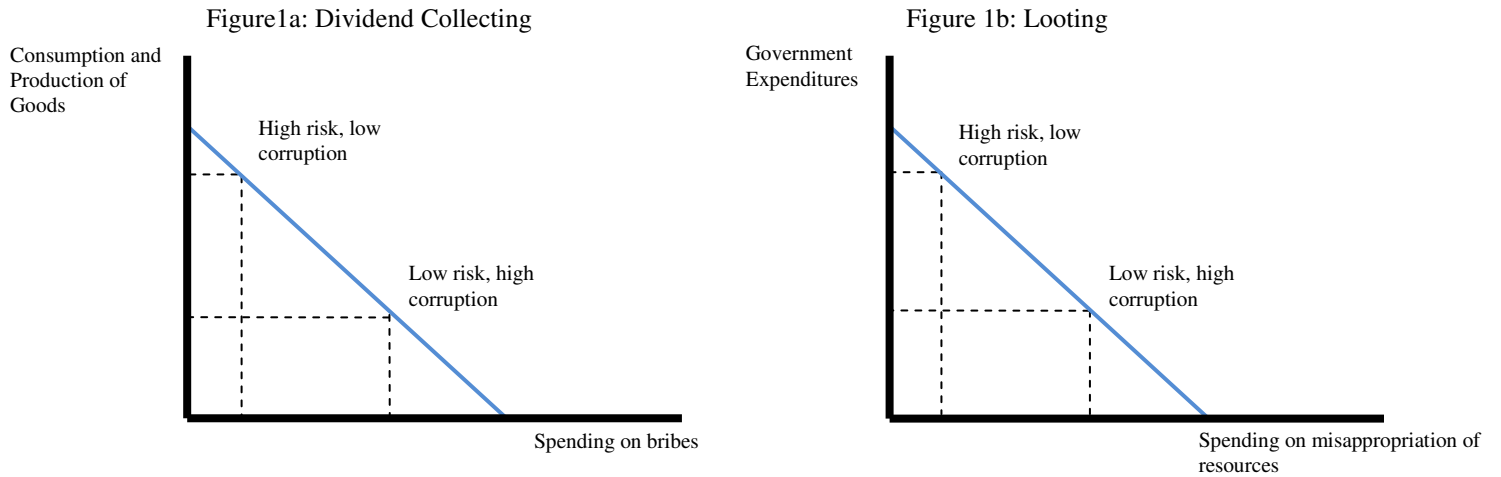
Regression models of A changes in CPI Score on Changes in Income Inequality

Variable	Model 1	Model 2	Model 3
Average Yearly Percent Change in CPI	-0.0971839* (0.0579044)		
Average Yearly Percent Change in CPI (negative)		-0.1446895 (0.126377)	
Average Yearly Percent Change in CPI (positive)			-0.0129943 (0.1054076)
Constant	0.0039755 (0.0049812)	.0004043 (0.0109524)	-0.0058653 (-0.0107319)

*statistically significant at the 10% level

VIII. Appendix 2: Figures

Figure 1



The budget constraint lines are linear because \$1 for bribes or kickbacks is equal to \$1 for expenditures or consumption.

Figure 2

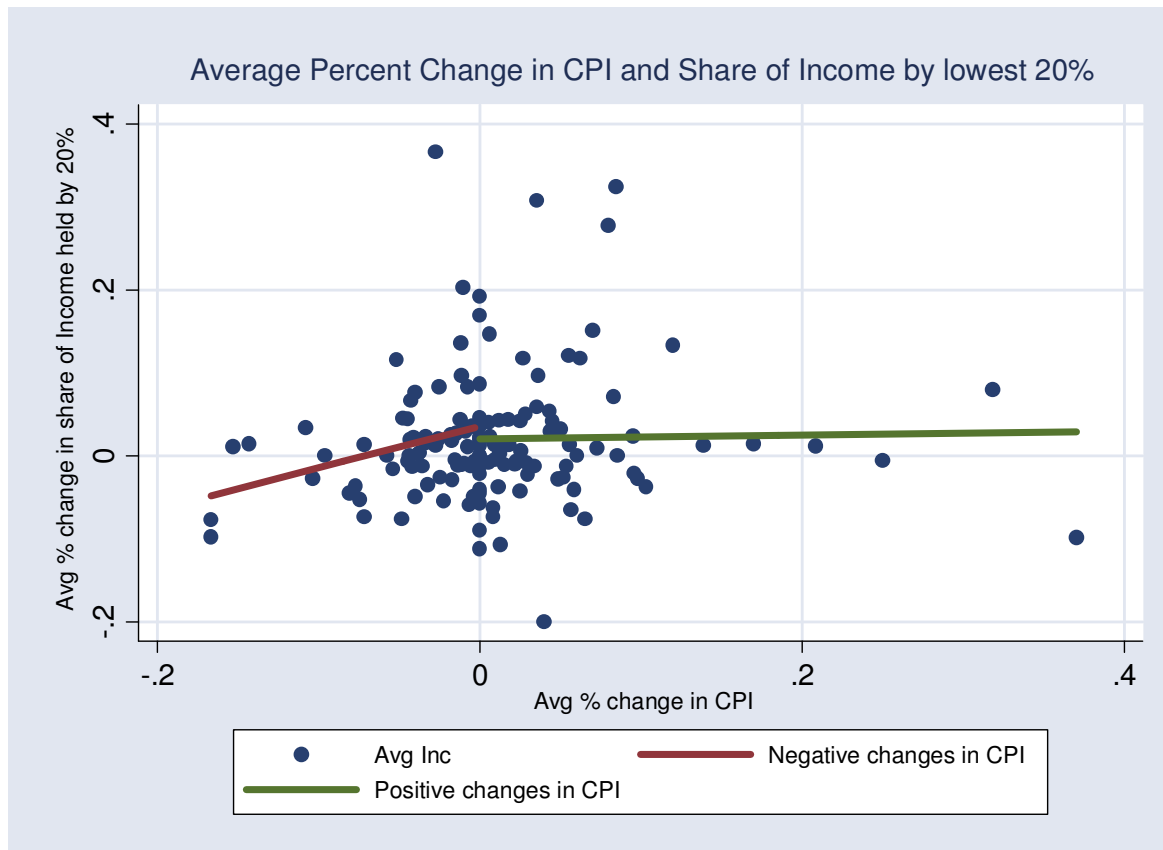


Figure 3

