



EKONOMIHÖGSKOLAN

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Corruption and Democracy

An empirical investigation using panel data

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Abstract

The assumption of positive effects of democratic reform has come to underlie much of the West's policy recommendations for developing countries. However, following democratization, many countries have experienced upsurges in corruption levels, undermining the democratic process.

This thesis explores the possibility of a nonlinear link between democracy and corruption. If democratization and reductions in corruption levels are in fact incompatible at early stages of political liberalization, policy needs to be adjusted to take this into consideration. Based on cross-section and panel data, regression analysis is performed with perceived levels of corruption as the dependent variable. For robustness testing, separate measures of democracy and corruption are used. The results mostly support the theory of a nonlinear relationship between democracy and corruption. The findings also indicate that higher levels of income and economic freedom correspond to lower perceived levels of corruption, while ethno-linguistic fractionalization and unemployment increases levels of perceived corruption.

Keywords: *Economics, Corruption, Democracy, Development, Regression analysis.*

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List of Abbreviations

2SLS	Two-stage Least Squares
CCI	Control of Corruption Indicator
CPI	Corruption Perceptions Index
EIU	Economist Intelligence Unit
FH	Freedom House
ICRG	International Country Risk Guide
OLS	Ordinary Least Squares
PLS	Panel Least Squares
QoG	Quality of Government
TI	Transparency International
VDI	Vanharen's democratization index
WB	World Bank

1. Introduction

For the 1.4 billion of the world's population living in poverty (Chen & Ravallion, 2008), opportunities to accept a bit of extra cash in order to provide a contract or a favour are evidently tempting. When trying to survive on less than \$1.25 dollars a day, a small increase in the daily wage is what could enable you to eat that day. Even when the extra money from a bribe is not a condition for survival, corruption seems to be an appealing option also among well off citizens of high societal status. If an excess of bureaucracy adds months to the time of setting up your business, paying to get in the fast lane could save you an immense amount of time and money. The cumbersome bureaucratic processes enhanced by permit-dispensing officials are already in place, and the only option in order to avoid severe delays may be to pay the person asking for a bribe. Cutting red tape and informal gift-giving are not necessarily viewed as immoral or corrupt in many countries; it is a way of doing business.

When former Soviet Union members embarked on the transition towards democracy, many of them experienced an upsurge in corruption levels. The political and economic liberalization and privatization of many state-owned enterprises led to a "capture" economy, where lucrative businesses were sold by public officials to private firms (Hellman et al, 2003). Other democratizing countries such as Nigeria have even experienced a reversal of the political liberalization process and gone back to autocracy, greatly due to the rampant corruption which undermined the democratic process (Montinola & Jackman, 2000). The combination of a new system without fully developed checks and balances and the opportunistic ways of rent seekers seems to be a damaging match.

The incidence of corruption has sometimes been suggested to be part of culture, stemming from social norms that emphasize gift-giving and loyalty to family or clan, rather than rule of law. The rampant corruption in for example Russia could then, according to this logic, be explained by long-term traditions of providing favours for your nearest of kin. Is this a reasonable explanation? Have bribers and bribe takers in the corruption ridden Philippines a different normative heritage than people in corruption free New Zealand? Or is it the already corrupt system that creates incentives for people to act in ways that makes the system even more detrimental? No matter the reason why corrupt acts are committed, they have most probably effects on economic welfare in any country.

1.1 Background

The impacts of corruption has been widely studied by economists as its prevalence has been suggested to adversely affect a country's development potential by hampering growth and investments, as well as increasing inequality, and misallocating resources (see e.g. Murphy et. al, 1993; Mauro, 1995; Keefer & Knack, 1997; Del Monte & Papagni, 2001). The topic of governance and what catalysts corruption has especially received interest since the 1990's and prominent contributions to the subject have been made by e.g. Mauro (1995) and Treisman (2000).

A contrasting theoretical view on the effects of corruption on growth (see e.g. Leff, 1964; Huntington, 1968; Bardhan, 1997), is that corruption may be beneficial to economic growth and development. The suggested reasons are that corruption enables individuals to speed up cumbersome bureaucracy via "speed money", and that the ability for government officials to levy bribes creates incentives for them to work harder. Huntington (1968:68) states that "a society which is relatively uncorrupt (...) may find a certain amount of corruption a welcome lubricant easing the path to modernization". Bardhan (1997) proposes a Coasean bargaining process where a corrupt bureaucrat and a private agent can negotiate their way to an efficient outcome. Competitive bidding amongst firms for government contracts ensures efficiency since only the lowest-cost firm can afford the largest bribe. However, the issue is more complex than expressed in this simplified view since corrupt officials may, instead of speeding up, actually delay processes in order to attract more bribes. Also, corruption contracts are not enforceable in court which makes any agreement uncertain, and corruption may be decentralized making corrupt officials "overgraze in the commons" by creating artificial regulations and imposing too many bribes (Bardhan, 1997). The good-for-growth view is rejected by Mauro (1995) who finds that corruption lowers investment and impedes economic growth. Hence, a basic assumption made in this thesis is that corruption reduces investments and impedes growth and development.

Most studies indicate that well-functioning institutions and good governance affect growth positively. As an example, Burnside & Dollar (2000) find that aid has a positive effect on growth in developing countries with good policies, but has little or no effect on growth in the presence of bad policies. According to Kosack (2003), aid does not affect quality of life in autocracies, but is effective in improving the wellbeing of citizens in a country when combined with democracy. This since autocratic governments aim to maximize the welfare of the ruling elite, thus making aid fungible, while democratic governments seek to improve the

standards of living for the citizens with the lowest incomes. However, whether democracy has a positive effect on economic growth is subject to some ambiguity in empirical studies. Sirowy & Inkeles (1990) present an overview on the different findings regarding the relationship between democracy and economic growth. The two are seen as competing concerns (by e.g. De Schweinitz, 1964; Chirot, 1977); in this view an authoritarian regime that suppresses demands for redistribution and basic civil and political rights is the only possible strategy for growth in developing countries. According to Barro (1999), countries that democratize without pre-existing economic prosperity tend to go back to autocracy. As democracies spend more on social programs they often accumulate more debt and wrestle with political instability (Kosack, 2003); hardships that reduce growth. An autocratic government can, in theory, devote resources to activities aimed at increasing growth, like increasing savings rates, increasing economic efficiency etc. Evidence for this seems to be in the rapid growth of some Asian countries which exhibit low levels of political freedom along with high levels of economic growth, suggesting that there need not necessarily be a link between democracy and development. Advocates of the view of democracy as growth promoting (e.g. Scully, 1988) point to the fact that redistributive policy of democracies enhances growth via broadened markets and economic expansion. Democracies are also more attuned to the demands of their citizens, and citizens can be assumed to want growth for their country. Full democracies provide education for a larger percentage of their school aged population (Kosack, 2003; Keefer, 2005), thus generating more human capital which enhances growth. The protection of civil liberties and the social safety nets in democracies should motivate citizens to work and save. There are also studies that are inconclusive about the relationship between any political system and growth (Helliwell, 1994; Barro, 1999).

The uncertain results of these empirical investigations are somewhat worrying as the assumption of a relationship between democratic reform and economic growth has come to underlie much of the West's policy recommendations for developing countries (Sirowy & Inkeles, 1990). As conditional aid is often granted with demands for transparency in public spending, sound macroeconomic policies, functioning institutions and a general democratic political system, the economic welfare of a developing country is affected not only by the direct economic consequences of democracy, but by the conditionality of Western economic assistance. In addition to a democratic system, for a developing country to be eligible for aid, it often needs sufficient checks on corruption. If democratization and reductions in corruption levels are in fact incompatible at early stages of political liberalization as suggested by some

authors (e.g. Montinola & Jackman, 2002; Mohtadi & Roe, 2003; Sung, 2004; Rock, 2007), policy needs to be adjusted to take this into consideration.

1.2 Purpose

The purpose of this paper is to answer the question '*Does democracy in a country affect the level of corruption?*' In particular, '*How is the level of corruption in a transition economy affected by the shift towards a democratic rule?*' '*Does the age of democratic institutions affect levels of corruption?*' The issue has been studied but conclusions are fragmented. The studies that find a constant negative relationship between the two factors find the relationship to be of weak significance, and often find that other factors have greater impact on corruption. As the previous research is scattered and as newer and more updated data are available, the aim of this study is to add some more evidence to the literature. An important contribution of this study the use of a panel data set; many of the studies done on the subject are with cross-section data. The main purpose of the paper is to explore the possibility of a nonlinear link between democracy and corruption.

1.3 Thesis outline

The paper investigates the relationship between democracy and corruption using cross-section and panel data from various sources. A quantitative, deductive approach is used which employs measures of perceptions of corruption, democracy measures and measures of the age of democracy, as well as a number of other factors such as economic freedom and social conditions. The paper is structured as follows.

After the introductory section, section 2 of the paper defines the two most important variables in the study; corruption and democracy. Section 3 explains the theoretical relationship between the two and the reasons for why a nonlinear relationship is probable. Section 4 reviews the previous research that has been done in the field and part 5 describes the data used for the analysis. Part 6 through 7 describes the empirical analysis performed. Section 8 summarizes and concludes the paper.

2. Definitions

This section provides definitions of and a discussion regarding the two main factors in the study; democracy and corruption.

2.1 Corruption

An issue with the study of corruption is the plethora of definitions available in the literature; there seems to be a lack of a general agreement on what constitutes corruption. One of the main problems with the definition of corruption is that it has sometimes been suggested to be a cultural attribute, entwined in the normative heritage of some nationalities. As cultures may tolerate corruption in varying degrees (Sandholtz and Koetzle, 2000), what is an acceptable tradition in one country may be perceived as corruption in a country with a different set of norms. The issue is then to create a definition that carries across cultures.

Another concern when defining corruption is that the term is closely connected with morality, and that corruption often is viewed as something intrinsically debauched. This need not be the case; in a country such as North Korea, corruption can be considered a way to gain contact with the outside world via officials breaking regulations on imports and bringing in items such as DVDs, newspapers and books. An example used in Bardhan (1997) when bribery may be considered means that justifies an end is when someone bribes a policeman not to torture a suspect. Neither are all corrupt transactions illegal; paying a tip to get good service at a restaurant or to get past a line at a nightclub are actions within the bounds of legality, and fine lines are drawn between gift giving and bribery. Also, as laws on corruption vary from country to country and over time, the inclusion of illegal in a definition of corruption causes problems. Legality would exclude actions that are not illegal, but widely accepted as improper. Rothstein (2011) suggests a definition based on a specific norm, namely impartiality, by which is meant equal treatment of people irrespective of personal relationships in the use of public power.

Aid agencies and Western countries are sometimes accused of imposing their moral views on developing countries, creating a gap between formal and informal institutions. The imposition of a Western standard of corruption when measuring perceived levels may yield results that do not reflect actual levels of corruption, and it may not be applicable in developing countries. However, Rothstein (2011) points out some examples like Hong Kong and Singapore where corruption is considerably lower than in neighbouring countries with a similar cultural heritage. According to Sandholtz & Koetzle (2000), using a standard (Western) definition of

corruption may not have much adverse consequences since the higher-level establishment in most developing countries are familiar with the standards and already apply them to their own countries.

A definition of corruption provided by LaFree and Morris (2004) is:

“an abuse of public office that violates formal and informal norms, that brings direct or indirect gain to a public official, and provides a third party with services or resources that would otherwise be more difficult or impossible to obtain.” (p. 602-3)

Another description of corruption by the United Nations Development Program is:

“the misuse of public power, office or authority for private benefit – through bribery, extortion, influence peddling, nepotism, fraud, speed money or embezzlement” (Quah, 2009:16)

As can be seen from these examples, at the heart of most definitions of corruption is the misuse of authority. Treisman (2000) claims that most corrupt activities involve a deal between an official and a private agent. The official can use state intervention such as regulations or taxation to give the private partner an advantage in the market. According to Huntington (1968) corruption is the behaviour of public officials which deviates from accepted norms in order to serve private ends. The examples all involve, not only improper behaviour by public officials, but also by “private employees” and “independent agents”. LaFree and Morris (2004) identify four key elements commonly observed in the discussion of a definition for corruption: the involvement of public officials that occupy positions of trust or authority, the acts of the corrupt agent in their official duties, that the corrupt officials must receive private gains from their actions, and the requirement that some third party benefit directly from the actions taken by the corrupt public official.

I choose to limit the definition of corruption to public misuse of authority, as is common practice in the literature of corruption studies. According to Sandholtz & Koetzle (2000), private corruption occurs when people exploit their organizational position for personal gain, while public corruption has more direct effects for society, as the misuse of public resources brings with it problems of governance, political authority, legitimacy and democracy. Since the latter is the subject of interest in this paper, I leave private corruption as a separate area of study. For short I will use the World Bank definition of corruption; the misuse of public office for private gain as this basically captures the aspects of interest. This definition involves

forms of corruption that do not necessarily involve payment of bribes, but corruption at all levels of government and bureaucracy.

2.2 Democracy

Democracy is an elusive concept and a general consensus of what is regarded democracy seems to be lacking. Most people today would probably agree that, at a minimum, the basic attributes of a democracy include the protection of human rights, the existence of free elections and a government based on majority rule as well as the consent of the governed (Kekic, 2007). Although democracy and freedom are sometimes used as synonyms, they are not; democracy can rather be viewed as a system that institutionalize and ultimately protects freedom. The notion of a dichotomy – a state is either a democracy or it is not – is shared by some observers, but most measures of democracy today allows for continuation in the concept, where a country can be democratic to a varying degree (Kekic, 2007).

One of the main differences between an autocracy and a democracy is that politicians in the former do not have to worry about being re-elected. The possibility of being removed from office in the next period provides checks and balances on politicians abusing their positions of power. The basic limit to corruption and misuse of office for a dictator is public riot and being overthrown by force. According to Tullock (2002), more than half of the world's population lived in autocracies in 2002. "Authoritarian regime" in Western political debates is often used as a negative term for some dissimilar kinds of political systems which share common characteristics; measures of autocracy use more neutral definitions and focus on the presence of a distinctive set of political characteristics (Quality of Government data set, 2011). Full autocracies are those which lack competitive political participation and where the ruling party or leader is chosen by a political elite, as well as neglect protection of civil liberties.

Key elements of a liberal democracy according to Sung (2004) are defense of civil liberties, free elections, dispersion of power, independent courts and freedom of speech. Tullock (2002) simply uses the word 'democratic' to define a government in which officials, or the highest ranking among officials, are elected by a large group of people. Bollen (1980: 372) defines political democracy a little narrower, as

"the extent to which the political power of the elite is minimized and that of the nonelite is maximized."

This distinction is shared by many of those who study democracy (e.g. Dahl, 1971; Frey & Al-Roumi, 1999). The definition views political rights and civil liberties as the degree to which political power is distributed to nonelites. As the distribution of political power differs from nation to nation, these differences that help identify how democratic a nation is.

Dahl (1971) focuses on two dimensions of democracy— public contestation and inclusiveness. For a country to be classified as a full democracy, there are eight institutional factors that need to be fulfilled: freedom of organization, freedom of expression, the right to vote, equal weight to each persons vote, broad access to compete for public office, that the orders of elected officials are executed, availability of information of alternatives in elections and the dependence of public policies on citizens' preferences. Dahl (1971) theorizes that these conditions can be quantified, and uses the term polyarchy to describe a government that scores high on all of the factors. According to Kekic (2007) the Dahl polyarchy is what constitutes a “thin” or minimal democracy.

A definition of democracy provided by Vanhanen (2000:252) is

“a political system in which ideologically and socially different groups are legally entitled to compete for political power, and in which institutional power-holders are elected by the people and are responsible to the people”

This definition is compatible with Dahl's two dimensions of democracy as it emphasizes the competition aspect of elections and involves mass participation, as well as with the Tullock definition where a large group of people elect their leaders. The condition of having free and fair competitive elections seems to be a vital component for all definitions of democracy. Civil liberties and basic human rights such as freedom of speech, expression and the press, freedom of religion etc. also seems to be basic requirements of what is often called a “liberal democracy”. Most measures also include aspects of the quality of government.

An issue in the study of democracy is its multidimensionality. Competitive elections should for example increase accountability to citizens and opposing parties should put pressure on the government to satisfy the demands of the population; however, according to Keefer (2005) this is not true for young democracies. Democracy may allow minority groups to enter the political process and voice their needs and opinions, but this may in turn cause civil unrest. The increased transparency and the protection of freedom of speech and freedom of press of a democracy should expose and deter corrupt activity, but newspapers are controlled

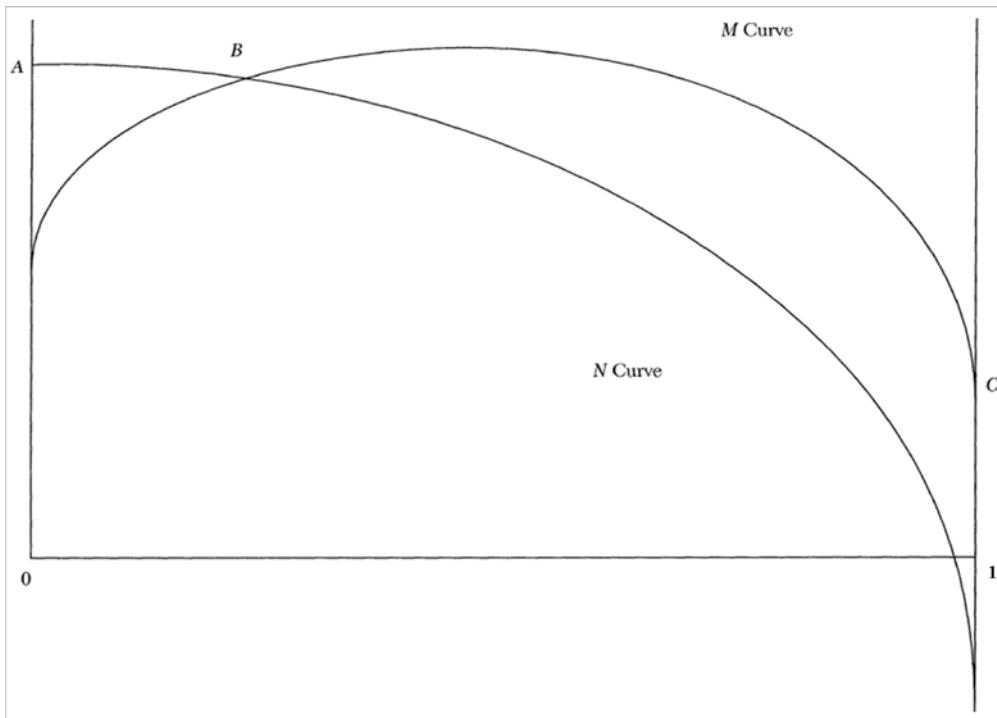
by private agents who can be influenced. It should be more difficult for an elite to dominate all decision-making in a democracy, but the openness and equality which are central aspects of democracy (Sandholtz & Koetzle, 2000), may as well induce unscrupulous politicians to abuse the system with vote-buying. The crucial question for the purpose of this paper is then which aspects of democracy are relevant in the study of corruption. Rock (2007: 2) speculates in whether it is “electoral competition, rule of law, effective governance, or the behavior, attitudes and norms of political actors” that matters the most. The mere fact that a country has elections and political checks and balances seems to guarantee little in terms of government performance. The two factor of democracy that, according to Keefer (2005) are the most relevant when it comes to explaining governance are the age of the democracy, and the ability of the democracy to make credible promises to voters. Many authors stress the importance of good governance for democracy to be effective. Some claim that electoral competition is the main thing curbing corruption since it increases competition between politicians (Saha et al, 2009).

The definition of democracy used in this paper is the one by Vanhanen (2000) which is an electoral definition of democracy that focuses on dispersion of power, and election and voting participation. This since voting is an important aspect of an inclusive democracy, as well as the freedom to vote for whoever you chose and electoral competition. The definition has the advantage of being continuous; a country can be democratic to a varying degree, and the advantage of being a minimal concept of democracy which is presumably easier to measure than an expanded definition. The definition also goes with the Dahl dimensions of democracy – public contestation and inclusiveness – which is a widely used way of defining democracy.

3. Theoretical framework

Corruption is often studied on a principal-agent basis, where individuals act according to their incentives. A view proposed in Bardhan (1997) and Rothstein (2011) is corruption as a “social trap” where the incidence of corruption has multiple equilibria, and the move from one equilibrium to another needs collective action. The multiple equilibria are demonstrated in this so called Schelling diagram:

Figure 1.



Source: Bardhan (1997).

where the x-axis displays the share of officials that are corrupt and the y-axis displays the expected benefits of being corrupt. The N curve reflects the benefits to an agent who is not corrupt, and the M curve represents the benefits to a corrupt agent. The equilibria are frequency-dependent, and the costs and benefits for officials engaging in corrupt acts depend crucially on the number of people expected to be corrupt. Rational individuals weigh the costs and benefits of engaging in corruption, and benefits of an honest official are higher than of a corrupt official, when very few officials are corrupt. To the right of point B the number of corrupt officials will increase until at point C, everyone is corrupt (Bardhan, 1997). According to Rothstein (2011), ordinary people in very corrupt systems do not take responsibility for

their corrupt actions, but blame "the system" for making them act in a certain way. Benefits of corruption include favours that bureaucrats might be able to hand out, and cutting red tape i.e. speeding up bureaucratic processes. Costs include the probability of detection and punishment, as well as the cost of being exposed as a dishonest politician. Different levels of impatience – discount rates –, different degrees of risk-aversion and the wage rate induce some to offer/accept bribes (Bardhan, 1997; Billger & Goel, 2009). A rational-bureaucratic public administrative organization with meritocratic recruitment and predictable long-term career awards for officials are suggested channels via which corruption can be reduced (Evan & Rauch, 1999). Discount rates are lower in wealthier nations making them less plagued with corruption (Billger & Goel, 2009). Also, the social stigma facing a corrupt official is different depending on the prevailing norms in a society (Treisman 2000). An urban population should increase discount rates due to greater opportunities for interaction between bribe giver and taker. However, corrupt activity should be easier to monitor if the population is concentrated (Billger & Goel, 2009), thus the effects of urbanization is ambiguous.

3.1 A linear approach

According to Treisman (2000), more politically open societies should exhibit less corruption since freedom of association and of the press put pressure on crony practices and expose abuse of public finances. Competing parties, due to their desire to be elected, have incentives to discover and expose misuse of office. The probability of officials to get caught, punished and exposed as dishonest should increase with democracy since free press, free speech and protection of civil liberties allows for more transparency (Treisman, 2000). If an effect of democratization is a higher degree of political stability, the time horizon of officials will be extended and discount rates reduced, and the increased cost of offering/accepting bribes should lower corruption. As greater democratic accomplishment leads to higher wages (Rodrik, 1999) this should reduce corruption via reductions in the incentives for officials to accept bribes (Sandholtz & Koetzle, 2000; Montinola & Jackman, 2002). Also, as democracy makes corrupt officials accountable to voters (Keefer, 2005) and voters presumably prefer less corruption over more, the increased ability for the public to voice their opinion should lower corruption levels as well. Another reason suggested by Saha et al (2009) for why democracy should reduce corruption is because it brings competition among officials, and the lack of competition is what fosters corruption.

3.2 A nonlinear approach

Why then, in spite of the theoretical reasons against it, are there obvious cases where political liberalization has led to an increase in corruption rather than a decrease? Many young democracies in Southeast Asia, Latin America and former members of the Soviet Union, e.g. the Philippines, Argentina and Russia have been hit by several corruption scandals (Sung, 2004). In India, which has been a federal democracy with popularly elected state governments since independence in 1947 and with a relatively free and independent press (Besley and Burgess, 2002), “corruption (...) is a way of life and both grand and petty forms of corruption are pervasive” (Quah, 2008:242). Studies that do find a constant negative relationship between democracy and corruption seem to be in contrast with the evidence from these countries. Is this effect merely due to increased revelation and reporting of corrupt practices induced by a freer press and more transparency in public spending? If not, what does this imply for the future of democracy?

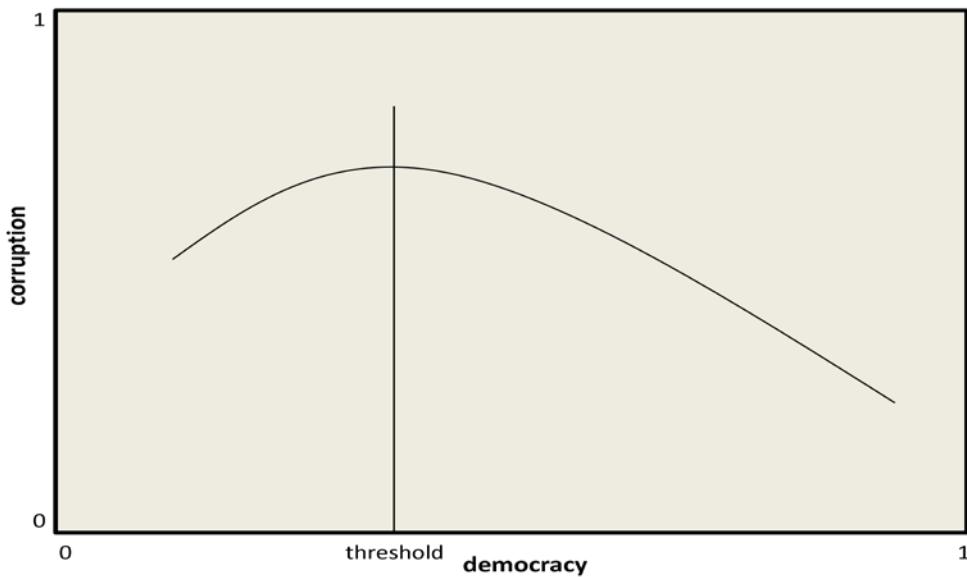
Democracy and democratization is according to Rock (2007) a nonlinear phenomenon by nature due to the complexity in meeting public demands, deciding on how to allocate means, and constructing functioning institutions to handle the preferences of citizens allowed to vote. Huntington (1968) views corruption as a consequence of the rapid modernization of underdeveloped societies, which introduces normative confusion and increases possibilities to influence public choice. With democracy, as people mobilize into new roles and a larger and more diversified society is created, the original community and foundations of trust of the extended family is lost. Transactions can no longer be made based on trust, but have to be made based on contracts and laws which may not yet be fully developed. In the interim time, while stable institutions develop, a gap opens with opportunities for officials to engage in corrupt activities. Also, democracy enables writing of new laws and constitutions, and contributes to corruption by creating new sources of wealth and power (Huntington, 1968). The extent to which the new laws are enforced, the extent to which laws are accepted by the general public and the profit that can be made from breaking them also affect the level of corruption (Huntington, 1968; Tavares, 2007). In this view, corruption is a transitional phenomenon due to a lack of a liberal culture and effective institutions that support bureaucratic practices (Sung, 2004). A source of confusion in the transition from autocracy to a democratic rule is the change in basic values (Huntington, 1968), particularly the acceptance of achievement-based norms. When the new views take hold, traditional norms of providing favours for your nearest kin become unacceptable and corrupt. This tends to undermine the

legitimacy of *all* values, and the conflict between modern and traditional norms introduces opportunities for individuals to act in ways justified by neither. For example, officials in an autocratic society may feel obligated to provide rewards and employment to their family, which is unacceptable in a democracy. With the emergence of a meritocratic system, these officials may find it necessary to grab as much as possible, as fast as possible.

In addition to the mobilization into new roles and the loss of foundations of trust, the reason why young democracies and countries in mid stages of democratization exhibit higher levels of corruption is the behaviour of rent seekers whose actions divert assets from the provision of public goods (Mohtadi & Roe, 2003). The insufficient checks and balances provided in young democracies ensure that bureaucrats can easily create artificial regulations, and the opportunities for imposing bribes stimulate the entry of more rent seekers (Bardhan, 1997). The lack of checks and balances is an important reason for why one should expect to find higher levels of corruption in young democracies: if punishment of politicians depends on the actions of politicians themselves, the threat of punishment is not credible. Since corrupt officials can act as monopolistic competitors, democracy increases their number and aggregate rents go up initially in the democratic transition (Mohtadi & Roe, 2003). The process of entry proceeds up to a point, as with more players entering the game of corruption, rents per rent seeker is reduced, and the increased transparency of democratization increases costs for rent seekers engaging in corrupt practices. After the threshold, the level of corruption starts to decline. Consequently, rent seeking follows an inverted U-shape in democracies due to, among other things, the overgrazing tendencies of corrupt officials, displayed in Figure 2:

Figure 2

Theoretical relationship between corruption and democracy



Political liberalization also increases political activity of diverse social and economic groups in a society. In an autocracy, the different groupings pose less of a problem for integration due to the lower level of political participation (Huntington 1968). The democratic society will either assimilate the diverse groups, or they become a source of animosity to the political system resulting in political instability. This incidence of political instability increases the discount rate of officials and increases incentives for corruption. Societies that have built institutions to handle large scale political participation, presumably long-term democracies, are more stable and should thus exhibit lower levels of corruption. Corruption should also, based on this reasoning, be lower in culturally less diverse societies.

Treisman (2000) argues that in order for democracy to fight corruption the political liberalization needs to be accompanied by economic liberalization, otherwise the levels of corruption may rise with increased democracy. The lack of economic freedoms such as business freedom, freedom to trade, and investment freedom in politically liberalized countries may be a reason for why we expect to find an inverted U-shape pattern in the data.

4. Previous research

This section reviews previous studies of corruption and democracy, and summarizes some of the findings.

4.1 A negative effect of democracy on corruption

There is a lack of a general consensus when comparing the results of different studies of the relationship between democracy and corruption. Billger & Goel (2009) claim that there are two key reasons for the discrepancy: the inability to measure actual corruption and the problems of quantifying the effects of institutions that may have significant impact on corruption. They find however, using quantile and OLS regressions, that political competition is more successful in nations with greater political freedom, which they hypothesize is due to the fact that a free press is more likely to exist in such nations. Thus, as democratic institutions take hold in the most corrupt nations they experience a decrease in corruption.

Shen & Williamson (2005) also find that democracy has a negative effect on corruption when using a latent mediating variable method in measuring the effects. Chowdhury (2004) tests the influence of press freedom and democracy on corruption. The author finds that press freedom combats corruption by bringing public corruption cases to voters while democracy punishes corrupt politicians by overthrowing them from public offices. Thus, politicians work to satisfy voters by reducing corruption, and increased democracy leads to less corruption. However, the study does not take into account endogeneity issues and acknowledges that there may be a considerable time lag. The results are nonetheless consistent with the findings of Besley & Burgess (2002) who confirm the role of both democracy and press freedom on public policy in India.

Xin & Rudel (2004) tests the effect of institutionalized democracy in combination with a strong judicial system and parliamentary democracy and find that these factors are associated with lower levels of bureaucratic corruption. They also find that democracy seems to be more efficient than cultural constraints in controlling corruption, and that the effect seems to be independent of the cultural context in which it is rooted, thus democracy is functional in combating corruption in any environment.

4.2 A nonlinear relationship between democracy and corruption

Sung (2004) claims that the reason for the ambiguity of the results concerning democracy and corruption stems from the differences in sampling and analytical methods. Linearization, which is employed in many studies, is according to the author, not appropriate in the analysis

due to the complicated relationship between political freedom and corruption. The reason why many empirical studies have found little or no evidence of democratic impact on corruption is due to the linear models they use. By comparing the results from a quadratic and a cubic model with those from a linear one he finds the best explanatory power in the cubic model, and concludes that even though democratization generally, and eventually, decreases corruption, temporary upsurges of government corruption are to be expected in the early stages of the process of political liberalization. However, as Sung fails to control for income per capita, a factor many authors find decisive to the level of corruption, the robustness of his results are difficult to judge.

Tavares (2007) finds that corruption in countries after the demise of authoritarian regimes and in the rise of democracy seems to follow an inverted U-shaped pattern where young democracies have yet to develop sufficient checks and balances. This is not, according to Tavares (2007) merely the result of a freer press that publishes corrupt acts of officials to a greater extent, but the pursuit of governments to bring down corruption. Treisman (2000) and Keefer (2005) find that the longer a country has been a democracy, the lower the perceived level of corruption.

According to a study by Rock (2007:4) “the impact of democracy on corruption depends on how quickly newly democratic governments can build the institutions of trust, transparency and accountability” that will prevent rent seeking following the end of autocracy and in the development towards more egalitarian political systems. Using, among other data, case evidence from Indonesia and Thailand he finds an inverted U-shaped pattern in corruption levels following democratization and he establishes a threshold after which corruption starts to decline.

Keefer (2005) finds systematic performance differences between younger and older democracies. He observes that among other things, younger democracies are more corrupt, exhibit less rule of law and have lower levels of bureaucratic quality than older democracies. This is, according to the author, due to the fact that young democracies are less able to make credible promises to voters before elections, and hence are more likely to rely on patron relationships. Politicians will, upon taking office, underprovide public goods and navigate funds towards narrow groups in society on which they depend for re-election. As a result, countries that democratize are more likely to face increased corruption than established

democracies. The effect of democratic age in the study remains significant even when controlling for the possibility that voters have less information in young democracies, that young democracies exhibit more polarized societies, and that there are systematic differences in political and electoral institutions in young democracies. However, a theoretical reason is proposed by Montinola & Jackman (2002) for why the fact that young democracies are less able to make credible promises to voters should *reduce* rent seeking. Their argument is that incentives to bribe officials are smaller due to the possible turnover of politicians in democracies. The bribe taker cannot guarantee that the particular legislation or regulation will go through, which minimizes the size of bribes that rent seekers are willing to pay.

Mohtadi and Roe (2003) provide theoretical reasons for an inverted U-curve, and find fairly robust evidence, with many of the young democracies of Asia, Latin America and the Middle East corresponding to high levels of corruption. Montinola & Jackman (2002), using data from the beginning of the 1980's, confirm a nonlinear relationship between political competition and the level of corruption. They find that corruption typically is lower in dictatorships than in countries which have partially democratized. Beyond the intermediate level of political competitiveness, more competitive regimes exhibit lower levels of corruption in their study. The authors suggest that this is due to the fact that the corruption-inhibiting political competitiveness and transparency comes into play beyond a certain point as democracies become fully competitive.

In his study of the determinants of corruption Treisman (2000) find that the current degree of democracy in a country is insignificant in controlling corruption, though long exposure to democracy results in lower corruption levels. More than 40 consecutive years of democracy for most countries, and 20 consecutive years for some were necessary to reduce corruption by one point on a 10-point scale. Countries in the study that had been democracies for less than this time did not derive any significant corruption reduction from being democracies.

4.3 An inconclusive relationship between democracy & corruption

Saha et al (2009) explore the relationship between economic freedom, democracy and corruption and find that democracy increases corruption when economic liberalization is low. They claim that democratization in a country with existing economic freedom will accelerate the process of combating corruption: with the example of China they show that corruption went down from 7.8 in 1995, on a 10-point scale where 10 is the most corrupt, to 6.6 in 2004. However, if democracy already exists in a country then, according to the study, economic

liberalization will increase corruption at the early stages of transformation. This is in line with the findings of the Treisman (2000) study which also finds that in order for democracy to fight corruption the political liberalization needs to be accompanied by an economic liberalization.

Giavazzi & Tabellini (2007) use a difference-in-difference approach to study the effects of economic and political reform. They find that countries that first liberalize their economies and open up to trade, and later become democracies do much better than the countries that pursue democracy first, then economic liberalization. They find that economic liberalization is good for growth and investment, while democratization only has small positive effects on growth, thus the economic prosperity of liberalization becomes a stepping stone for successful political reform. Hence, economic, not political liberalization had the greatest impact on corruption. Tavares (2007), on the other hand, finds that democratizing has a greater effect on lowering corruption than economic liberalization.

Ades & Di Tella (1999) use the Gastil index of political rights, which ranks countries according to a checklist of political rights, to explore their effects on corruption and other factors. They find that countries with lower levels of political rights – while expected to have higher levels of corruption – have lower levels of corruption. The effect is only barely significant, and throughout their paper the authors find no beneficial effects of political rights on corruption, a discovery they claim deserves further scrutiny.

Sandholtz & Koetzle (2000) find that openness to trade influences the level of corruption in a country. They claim however, that this reduction depends on the prevailing norms rather than the structure of incentives facing individuals and firms. Their study presents results where democratic norms and values produce lower levels of corruption for any given opportunist structure. However, openness and political competition will not reduce corruption unless existing social norms condemn it. That is, the gap between formal and informal institutions matter and that corruption is tolerated to a higher degree in different societies. This has, according to the authors, policy implications since laws designed to eliminate corruption are nearly universal.

4.4 Summary previous findings

The relationship between democracy and corruption has been studied since the 1960's; some of the early pioneers were Leff (1964) and Huntington (1968), however, the majority of the studies are done since the 1990's when the subject of corruption gained renewed interest. A general consensus seems to be lacking; a few of the empirical studies find a linear relationship between democracy and corruption, while others have found that it is not linear and yet others that democracy has little or no effect on corruption and that other factors are more significant in lowering corruption levels. The results of some of the studies are summarized in Table 1.

Table 1

<i>Study</i>	<i>Sample</i>	<i>Dependent Variable</i>	<i>Independent Variables</i>	<i>Method</i>	<i>Results</i>
Billger & Goel (2009)	99 countries 2001-2003	Corruption Perceptions Index	Economic prosperity, democracy, economic freedom, government size, urbanization	OLS and Quantile regression	Democratic institutions reduce corruption.
Montinola & Jackman (2002)	66 countries 1980-1983	Business International Index of Corruption	Democracy, size of government, OPEC membership, GDP per capita	OLS	Democracy increases, then decreases corruption.
Sung (2004)	103 countries 1995-2000	Corruption Perceptions Index	Democracy, purchasing power parity, unemployment and inflation	PLS	Democracy gives rise to temporary upsurges of corruption.
Giavazzi & Tabellini (2007)	140 countries 1960-2000	ICRG Index of Corruption	Economic and political liberalization	Difference-in-difference estimation	Economic liberalization reduces corruption more than democracy.

5. Data

The analysis in the following sections is motivated by the theoretical and case literature described in sectors 3 and 4. Data is mostly collected from the Quality of Government Institute at the University of Gothenburg which provides assembled data from a number of sources.¹ The original sources are reported in Appendix B. As corruption and democracy have few tangible effects and are notoriously hard to measure, the limited data availability was taken into account. The data for the cross-section data analysis are from the year 2002, and the years of the observations for the panel data analysis are from 1995 to 2005 since eleven years are estimated to be long enough for any biases regarding corruption perceptions to dissipate, and since going further in time and using data from 2005 and forward would reduce the sample too much.

5.1 Index of corruption

Data on corruption is from the Transparency International's (TI) Corruption Perceptions Index (CPI), which ranks countries according to perceptions of corruption in the public sector. The CPI has scores for 156 countries in 1995 to 2005, with the number of sources ranging from seven in 1995 to 16 in 2005. The cross-section data set provides measures of the CPI for the years 2000-2009 (varies by country). The aggregate measure constitutes a “poll of polls” combining the results from different surveys, assessments and business opinion carried out by independent institutions such as the World Bank, Freedom House and Economist Intelligence Unit (Transparency International, 2010). The survey respondents range from transnational businesspersons and consultants to chambers of commerce and local populations. The central advantages of this index are that it makes it possible to compare corruption over time and over countries (Sandholtz & Koetzle, 2000), and that it employs the definition of corruption (the misuse of public power for private gain) described in section 2.1. Another advantage of the CPI is that it averages and standardizes a number of surveys. The average automatically reduces the influence of individual ratings. The questions asked in the surveys are comparable over time and include inquiries about ‘improper practices in the public sphere’, ‘level of corruption’ and ‘estimated losses caused by corruption’ (Treisman, 2000). Another advantage of index is that the TI surveys and ratings are highly correlated among themselves even with different methodologies, inputs and decades (Treisman, 2000). The CPI index also exhibits high correlation with a second corruption index I have used to check the robustness of the findings, which adds to its validity. The results are presented in Table 2. The CPI index ranges

¹ More information on the data can be found from <http://www.qog.pol.gu.se/>

from 0 to 10 with 10 representing the cleanest governments and 0 the most corrupt. The index has been rescaled to make it easier to interpret the signs of the estimates in the analysis.²

Table 2

Correlation coefficients between different indices of corruption		
	CPI (1995-2005)	CCI (1995-2005)
CPI (1995-2005)	1.0000	0.9672
CCI (1995-2005)		1.0000

Following Rock (2007) among others, the index used to test the robustness of the results from the CPI index is the Control of Corruption Indicator (CCI) from the World Bank Governance Indicators constructed by Kaufmann et al (2009). This index also measures perceptions of corruption, defined as the use of public power for private gain. The specific components of corruption range from areas such as the effects of corruption on the business environment, to the tendencies of elites to use the state for private gain. The indicator is based on individual variables measuring perceptions of governance, drawn from 31 separate data sources constructed by 25 different organizations of governance (Quality of Government data set, 2011). The estimate is normally distributed with a mean of zero and a standard deviation of one. This implies that scores lie between -2.5 and 2.5, with higher scores corresponding to better outcomes. The index has been rescaled to ease the interpretation of the coefficients.³

5.2 Index of democracy

Data frequently used for hypothesis testing regarding democracy are from Freedom House (FH) which has the advantage of being available for a large number of countries over a long time period. A problem however, when using the FH index in combination with the Corruption Perceptions Index is that both indices are included with assessments of the degree of corruption. In some aspects this implicates that using the FH index as an independent variable in a regression on corruption is the same as regressing corruption on itself (Rock, 2007).

The Polity IV data set which codes the authority characteristics of states in the world offers a more unbiased alternative (Rock, 2007). The index for polity is one of the most used measures

² The CPI index is transformed by multiplying each value by -1. Hence the value -10 corresponds to the cleanest governments and 0 to the most corrupt

³ The Kaufmann index is transformed by multiplying each value by -1. Hence the value lowest value corresponds to the cleanest governments and the highest to the most corrupt.

for studying regime change and the effects of different regime types (Marshall & Jagers, 2009). The Polity IV data set covers all major, independent states in the world (currently 163 countries) over the period 1800-2009. The index measures specific qualities of democratic and autocratic authority in governing institutions. This allows it to span from fully institutionalized autocracies through mixed authority regimes to fully institutionalized democracies. When compiling the measure, the concept of democracy is viewed as three essential, interdependent elements: the presence of institutions through which citizens can express preferences about policies and leaders, the existence of constraints on the exercise of power by decision-makers, and the guarantee of civil liberties to all citizens in their daily lives and in acts of political participation (Marshall & Jagers, 2009). The key aspects of democracy in the Polity IV definition go well with the characteristics of democracy defined in section 2.2. Features of democracy such as the rule of law, freedom of the press etc, are means to, or specific manifestations of, the three essential components. The democratic score ranges from 0 to 10, and the combined polity measure which is gained by subtracting the autocratic score – which also ranges from 0 to 10 - from the democratic score ranges from -10 to +10 where -10 is the least democratic regime (hereditary monarchy) and 10 the most democratic (consolidated democracy). For the purpose of the study only the democracy score is used.

To test the robustness of the findings of the Polity IV measure of democracy, an additional measure is employed. Vanhanen's democratization index (VDI) uses the dimensions theorized by Dahl discussed in section 2.2 to measure democracy; public contestation and right to participate. Public contestation or competition is measured as the percentage of votes not cast for the largest party. It ranges from 0 (only one party received 100 percent of votes) to 100 (each voter cast a vote for a distinct party). Right to participate is measured as the percentage of the population who actually voted in the election. The percentages of the two components are multiplied and divided by 100 to form a democratization index that varies from 0 (no democracy) to 100 (full democracy), although empirically the largest value is 49 (Quality of Government data set, 2011). Vanhanen's democratization index is perhaps the most objective measure of democracy as it combines competition and participation, two basic dimensions of democracy. In contrast, the degree of participation is not taken into account in the Polity IV index, but instead focuses on the competitiveness of executive recruitment and elections (Vanharen, 2005).

A third measure of democracy is used to test the findings of the Polity IV index. The Economist Intelligence Unit's (EIU) democracy index is based on experts' assessments and, where available, public opinion surveys. The index ranges from 0 to 10 and the ratings for 60 indicators are grouped into the five categories: electoral process and pluralism, civil liberties, the functioning of government, political participation, and political culture. The index is available for cross-section data in the year 2006 for 165 independent states and two territories (Kekic, 2007). Table 3 displays the correlation coefficients between the different indices. Subjective judgments play a greater role in the Economist Intelligence Unit's ratings as well as the Polity IV index than in the Vanhanen's democratization index.

Table 3

Correlation coefficients between different indices of democracy

	Polity IV (1995-2005)	VDI (1995-2005)
Polity IV (2006)		VDI (2006)
Polity IV (1995-2005)	1.0000	0.8263
VDI (1995-2005)		1.0000
EIU (2006)		1.0000

5.3 Limitations indices

A major obstacle in studies of corruption has been the lack of a general standard of corruption, and lack of cross-national data (Sandholtz & Koetzle, 2000). The reason for the lack of numerical data over long time-spans on corrupt activities can be found in the very nature of corrupt actions; they take place in secret and are meant to stay off the radar, making them hard to measure (Sandholtz & Koetzle, 2000). The Corruption Perceptions Index makes an attempt to quantify the way experts and locals view corruption in their country. The subjectivity of the measure however, causes problems; what is viewed as improper or corrupt in one society may differ from the views of another. Nonetheless, as previously argued, the consequences of applying a standard measure of corruption are probably minimal as Western standards are already applied in most countries. Other problems with the subjective index is that a recent corruption scandal in a country may cause people to perceive the level of corruption as higher than it actually is, and year-to-year shifts in a country's score can result from changing methodology and different samples rather than changes in perceptions of corruption. Even though the different indices for corruption have high correlation, this may

reflect a commonly shared bias. This is a possibility that cannot be ruled out, but if it is bias causing the high correlation the bias is extremely widely shared (Treisman, 2000). Over time, perceptions have proven to be a reliable estimate of corruption (Transparency International, 2010). As the perceived level of corruption is what influences investment bankers, as well as private firms when deciding whether or not to invest in a country, the perceived levels of corruption are an indicator of actual corruption levels. Countries with higher CPI ratings correspond to lower levels of investment and growth according to Treisman (2000), indicating that they are reflecting some actual level of corruption. The respondents of the surveys are experts who are expected to overlook recent, public cases of corruption. The TI index goes to great length to ensure that respondents have clear guidelines of the definition, form and scale of corruption they are describing. A long enough time-span of the index will eliminate the revelation bias. It can be argued that even if the subjective measure can only be used as a proxy for actual corruption in absolute terms, it is likely to provide a ranking of nations that corresponds to one that could be obtained by using an objective measure, if there was such a measure (Shen & Williamson, 2005). An index compiled by an independent organization such as the TI is thus preferable to many other indices. Caution is yet advised when interpreting the results from the Corruption Perceptions Index.

The Economist Intelligence Unit's index of democracy is only available for cross-section data, thus it is more limited for research purposes. The EIU and the Polity IV indices have the same problem as the CPI: they are based on the opinion of experts and public surveys which could make them subject to perception biases. The move from 6 to 7 for one person when trying to estimate an aspect of democracy may not be the same as a move from 7 to 8. The move from a 6 to a 7 for one person may not be the same as the move from a 6 to a 7 for another person. It is however probable also in this case, that the ranking of countries provides a useful measure. The institutes collecting information about democracy have long-term experience doing so, and go to great length in ensuring that the questions asked are properly understood. Although the Vanhanen index does not suffer from the same problems of rater bias due to its objectivity, it has the limitation of being a rather thin concept which perhaps does not capture important aspects of democracy imperative to deter corruption. Another issue is that the three indices can be viewed as measuring different things; while the Vanhanen simply focuses on competition and participation, the Polity IV index include civil liberties and constraints on power, which is not captured by the Vanhanen index. The EIU index includes a measure of political culture, an aspect left out by the other indices. Thus the results using the

different indices may not always be directly comparable. They are however, as can be seen from Table 3, highly correlated, which indicates that they all capture some important, similar, aspects of democracy.

6. Empirical Model and Method

6.1 Approach

To explore the question of research in this paper a quantitative, deductive approach is used. In deductive theory the existing information within the field of study determines what data should be collected, interpreted and related to theory. The main purpose of the quantitative theory is to depict reality and explain causalities; a method which is based on a deductive approach. This method choice thus aligns with the purpose of the study since I am performing an empirical analysis focusing on larger samples. Cross-section and panel data collected for a number of countries over a time span of eleven years is used to test hypotheses and theories in order to draw generalizable conclusions. The paper uses theories on corruption and democracy to describe the relationship and the implications of changes in polity on corruption. Many factors are expected to affect corruption in ways unrelated to the prevailing political system in a country; these variables are described in section 6.2.

The econometric method employed is a specific-to-general approach, where a very simple model is estimated as the starting point. The model is subsequently restricted by adding further variables (Verbeek, 2008). The advantage of such a method is that it allows the researcher to add extra layer of complexity by further adding variables that are likely to affect the dependent variable (Kennedy, 2008). The disadvantage is that the method is sensitive to data-mining problem, i.e. the risk of drawing the wrong conclusions when a sequence of tests is performed. As both panel data and cross-section data are available, I choose to use both in similar models.

6.2 Econometric Concerns

Econometric problems that may arise are endogeneity issues, which are caused by for example reverse causality, measurement errors or omitted variables. Many factors may not just cause corruption; corruption may be causing them. Democracy may cause or reduce corruption, but corrupt officials may themselves restrict democratic policies aimed at increasing accountability and transparency, which causes endogeneity. As GDP per capita is used as a control variable the same problems arise; economic development may be reducing

corruption, but corruption itself impedes development. Endogeneity could also arise from omitted variables that are not observed in the data. Omitted variable bias occurs when a relevant explanatory variable that is correlated with the included regressors is left out of the model, or when there are unobservable omitted factors in the model that are correlated with the explanatory variables (Verbeek, 2008). To allow for the possibility of omitted variables, specific region dummies for eight regions are used to capture effects not stemming from the included explanatory variables. To handle the reverse causality problem in the cross-section analysis, an instrumental variables or a two-stage least square (2SLS) method approach is used where an instrument for the endogenous regressor is applied. The problem with the instrumental variables approach is to find a good instrument. For an instrument to be an efficient and unbiased estimator it needs to be highly correlated with the endogenous regressor (independent variables) it replaces and should not directly affect the dependant variable (Verbeek, 2008). Possible instrumental variables that can be used for democracy as suggested by Chowdhury (2004) are the share of the population in a country that speaks any major European language and the distance from the equator. Rock (2007) uses the latitude of a country's capital and the share of the population that is Protestant. The inclusion of Protestant population as an instrument seems odd since, as Sandholtz & Koetzle (2009) points out, the Protestant religion emphasizes personal accountability and rectitude which would be expected to reduce corruption, making the variable directly correlated with corruption.

Cross-section data sets often suffer from problems of heteroskedasticity in the regression analysis since individuals or countries included are of different sizes or income levels resulting in unequal variance (Verbeek, 2008). Thus, when the assumption that the variance of the error term is constant for all is violated the model exhibits heteroskedasticity. This implies that the least squares estimator is unbiased and consistent, but not efficient since the standard errors are incorrect. To allow for unknown heteroskedasticity in the model, White cross-section standard errors & covariance are used on all equations. White cross-section standard errors reduce the sensitivity of inference to incorrect assumptions made about the variance of the error term (Kennedy, 2008), and the new estimator is robust to cross-equation (contemporaneous) correlation and heteroskedasticity.

Autocorrelation is often a problem in time-series data and arises when the assumption of no correlation between the error terms is violated. This makes the least squares estimator unbiased but inconsistent. Correlated errors tend to make the model look better than it actually

is by inflating the R^2 value, lower the standard errors and thereby giving too high significance to the estimator. To allow for autocorrelation in the panel model, lagged variables for democracy, income per capita, economic freedom and government consumption are used. As the effects of for example democratization on corruption takes time, the lagged variables also allow for these effects, as well as controlling for the problems of reverse causality previously discussed. The fact that there may still be autocorrelation in the model has to be taken into account in the analysis.

6.3 Explanatory Variables

Corruption is affected by a number of variables (see e.g. Treisman, 2000; Chowdhury, 2004; Bohara et al, 2004; Shen & Williamson, 2005; Goel & Nelson, 2005); needless to say it is impossible to control for every potential factor affecting corruption, but as many as possible are controlled for in this study. Differing economic and social conditions should have impacts on corruption that cannot be explained by the mere presence of democracy. It is for example likely that countries which initially exhibit high levels of corruption respond differently to democratization than do countries which are relatively free of corruption, and that high income levels have effects on corruption. There is a risk of controlling for too many factors simultaneously; the data may not have enough variation to distinguish clearly between the factors (Treisman, 2000). When choosing whether to include or not include a control variable, there is a trade-off between drawing no conclusions and drawing invalid conclusions. I will opt for the first option as the risk of drawing the wrong conclusions calls in to question the validity of the results of the study. Much of the data on control variables are from the World Development Indicators provided by the World Bank.

Variables that are usually controlled for in the study of corruption are *economic freedom*, *government size* and *economic prosperity* as they most likely have effects on corruption levels.

Economic freedom matters for corruption as greater opportunities for economic gain through a freer market reduces incentives to be corrupt. A great deal of intervention in markets also create more opportunities for rent seeking; if governments can intervene in the market and do so to a great extent, there are often individuals who are willing to offer bribes in order to be able to avoid the regulations (Shen & Williamson, 2005). The same reasoning is applicable to the size of government; Goel & Nelson (2005) and Montinola & Jackman (2002) hypothesize that a larger government should lead to more corruption since larger public sectors are

connected with regulation and market intervention. In line with the rationale behind the neoliberal paradigm influencing reforms in many market economies; as intervention distorts competition it introduces opportunities for rent seeking, crowds out the private sector and limits economic activity. There may be endogeneity problems in this assumption; corrupt officials may themselves increase the size of the state in order to extract more rents. The argument that a larger government should lead to more corruption need not be telling the whole truth; a larger government can also be associated with stronger checks and balances (Billger & Goel, 2009). Perhaps a large government does not cause corruption, but an inefficient government does, thus should be controlled for. According to Rock (2007), trust in democracy and a reduction in corruption levels depend strongly on the governments' ability to deliver on their promise of decent and honest governance, which implies that government efficiency is important in controlling corruption. Data availability, however, limits the possibility to control for government efficiency thus government consumption expenditures as a share of GDP is used as a proxy.

Economic prosperity should be negatively related to corruption since discount rates are lower in wealthier nations, and since economic development reflects higher wages, two factors each of which raises the odds that corruption will decrease. Wealth might also be a proxy for literacy which results in lower levels of corruption according to Billger & Goel (2009). Also, because there are more resources available, the government should better be able to satisfy the demands of their citizens. The level of economic development is measured in terms of the natural logarithm of PPP-adjusted GDP per capita from the World Bank Development Indicators. The logarithmic transformation is necessary due to the skewness of the original variable, and since the effect of wealth on corruption exhibits declining returns with increasing development. The marginal value of money is larger in poor countries, thus where incomes are low, economic insecurity and poverty will create incentives for bribery, since even a small increase in a daily wage will make a large difference. Treisman (2000) also argues that income per capita is a good proxy for a number of other aspects, for examples education, literacy and higher government wages which all should have a sobering effect on corruption since they increase the risk of detection and decrease incentives for corruption. Figure 3 displays PPP-adjusted GDP per capita for 2002.

Figure 3

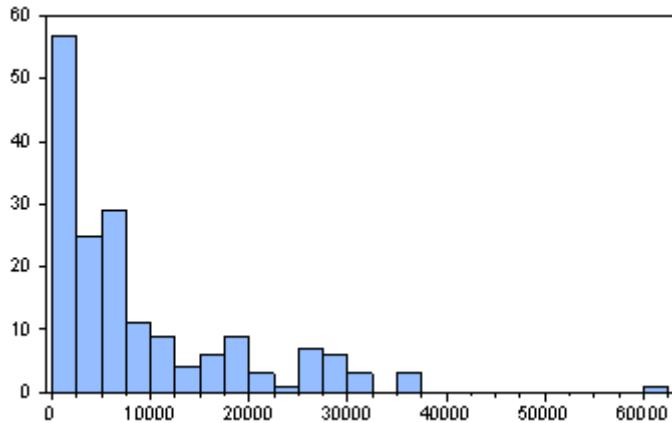
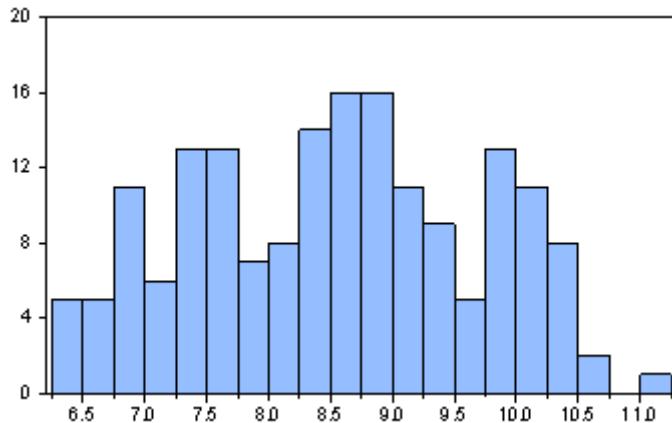


Figure 4 displays PPP-adjusted GDP per capita for 2002 after the logarithmic transformation:

Figure 4



Sung (2004) suggests using some factors to control for the potential disturbances in corruption levels caused by adverse economic conditions, such as the unemployment rate and the inflation rate. Saha et al (2009) use four socio-economic variables to capture their effects on corruption: real GDP per capita, unemployment rate, Gini index and the adult literacy rate. I chose to use the *unemployment rate* as a higher rate of unemployment should increase incentives to offer/accept bribes and the *Gini coefficient* to control for economic inequality. The Gini coefficient is calculated as:

$$G = \frac{1}{2n^2\mu} \sum_{j=1}^m \sum_{k=1}^m n_j n_k |y_j - y_k| \quad (1)$$

where n is population, y is income; there are m are distinct incomes, and in each income class j , the number of individuals earning that income is denoted n_j . The index takes the difference between all pair of incomes and totals the differences. μ is the average, and the coefficient is

normalized by dividing by population squared (Ray, 1998). A higher value for the Gini coefficient implies higher levels of income inequality.

Montinola and Jackman (2002) suggest that *regional differences* may have effects on corruption. It has been suggested that some Mediterranean states are culturally more corrupt due to a long-term combination of weak but far-reaching states (Montinola and Jackman, 2002); a condition that has later been exported to South America. In order to test this possibility, region dummy variables are used for Eastern Europe, Latin America, North Africa & the Middle East, Sub-Saharan Africa, East Asia, South-East Asia and the Caribbean. The dummy variables for Western Europe & North America, and the Pacific are left out, thus they act as a control group to which the other regions are compared.

A larger share of the population living in cities should increase discount rates due to greater opportunities for interaction between bribe giver and taker. However, corrupt activity should be easier to monitor if the population is concentrated (Billger & Goel, 2009), thus the effects of urbanization is ambiguous. *Urban population* is used as control variable to test the effects.

Religion, colonial heritage, the degree of ethno-linguistic fractionalization and whether a country has a common law system are used by Treisman (2000) to test their influence on corruption. *Ethno-linguistic fractionalization* is included as a control variable since it should be highly correlated with corruption according to Mauro (1995). This since bureaucrats are likely to favour their closest kin, and members of their ethnic group. The index is measured as:

$$\text{ELF} = 1 - \sum_{i=1}^I \left(\frac{n_i}{N} \right)^2, \quad i = 1, \dots, I, \quad (2)$$

where n_i is the number of people in the i th group, N is total population and I is the number of ethno-linguistic groups in the country. The higher the value for ELF, the more probable is it that two randomly selected persons from a given country will not belong to the same ethno-linguistic group (Mauro, 1995).

As the consolidation of democracy and the change in norms, beliefs and attitudes takes time, what matters for democracy to be able to reduce corruption is the extent to which democratic institutions are well grounded and elites, organizations and the public trust the democratic process (Rock, 2007). Thus, some dimension of the *durability* of democracy should be included in the analysis; the Polity IV data set provides data on durability of the regime of a

country but does not separate democracies from autocracies. The cross-section data set contains information about the number of consecutive years of democracy, thus the durability effect is tested only in the cross-section regressions.

See Appendix B for further information about the variables.

6.4 Descriptive analysis

Figure 5

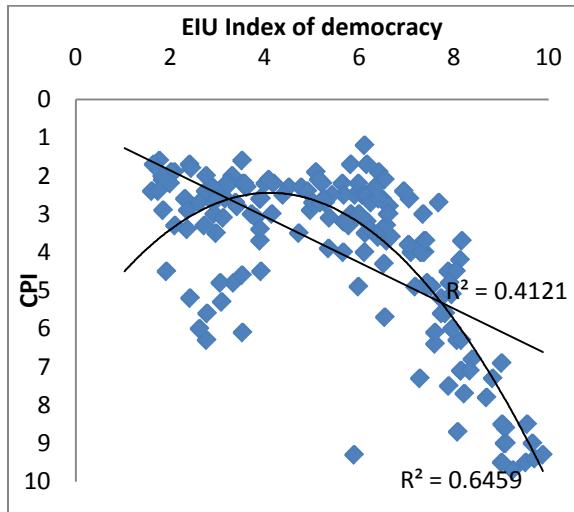
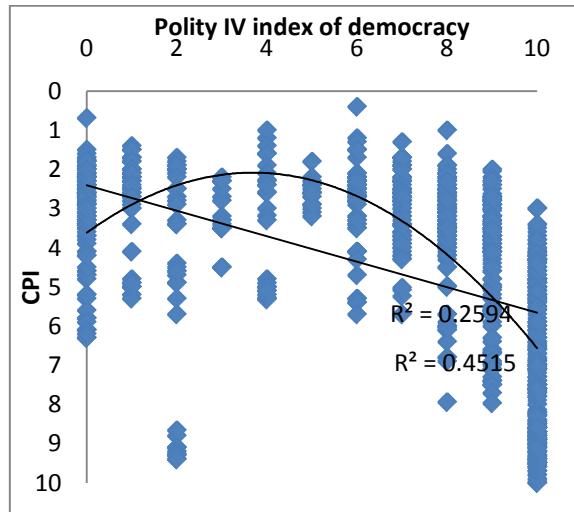


Figure 6



Using cross-section data for the CPI index and the EIU index of democracy to plot the relationship between democracy and corruption indicates that the assumption of an inverted U-shaped relationship may have some validity.⁴ The linear model accounts for 41 percent of the variation in political corruption and there is a negative effect of democracy. The nonlinear approach improves the explanatory power of the model raising the R^2 value to 0.6459, thus the inclusion of the second-order polynomial term enhances the models goodness of fit by 57 percent. Figure 6 uses panel data from 1995 to 2005 to plot the relationship between the CPI index and democracy using the Polity IV index, and the yielded results are similar, though with less explanatory power. The scatter plot alone tells us nothing about causality and there may be errors in the model and biases caused by endogeneity etc, thus further analysis is necessary.

⁴ The data is for 165 countries in 2002-2006.

6.5 Cross-section data

Cross-section data from the QoG data set is available for the year 2002, or when observations are missing, the closest year available. The countries included in the sample are reported in Appendix A.

6.5.1 Model

In order to test the relationship between corruption and democracy a set of multivariate models are estimated with the rescaled CPI as the dependent variable. The first set of equations regress the Polity IV index of democracy along with other explanatory variables on CPI, and the second set of equations regress durability of democracy along with other explanatory variables on CPI.

Corruption = f(democracy, democracy², economic prosperity, economic freedom, government consumption, ethno-linguistic fractionalization, urbanization, unemployment, Gini)

$$\text{CPI}_i = \beta_0 + \beta_1 \text{DEM}_i + \beta_2 \text{DEM}^2_i + \beta_3 \text{LGDP}_i + \beta_4 \text{EF}_i + \beta_5 \text{GC}_i + \beta_6 \text{ELF}_i + \beta_7 \text{URB}_i + \beta_8 \text{UNEMP}_i + \beta_9 \text{GINI}_i + \text{region dummies} + \varepsilon_i \quad (3)$$

Corruption = f(durability, durability², economic prosperity, economic freedom, government consumption, ethno-linguistic fractionalization, urbanization, unemployment, Gini)

$$\text{CPI}_i = \beta_0 + \beta_1 \text{DUR}_i + \beta_2 \text{DUR}^2_i + \beta_3 \text{LGDP}_i + \beta_4 \text{EF}_i + \beta_5 \text{GC}_i + \beta_6 \text{ELF}_i + \beta_7 \text{URB}_i + \beta_8 \text{UNEMP}_i + \beta_9 \text{GINI}_i + \text{region dummies} + \varepsilon_i \quad (4)$$

6.5.2 Results

Table 4 and Table 5 report the results of the cross-section regressions. Region dummies are included to control for effects which may stem from an omitted variable affecting corruption and democracy. Dummies for Western Europe and North America, and The Pacific have been left out thus they act as a control group. Appendix B reports descriptive statistics for the variables.⁵

⁵ As the sample size is restricted to 97 observations in equations 5 and 6 in Table 4 and Table 5, the first four equations are tested again for each model, with the restricted sample. The only difference in the results is that the ELF coefficient is significantly reducing corruption on a 5 percent significance level in equation 4 in Table 4.

Table 4

Ordinary Least Squares regression analysis with White robust standard errors and covariance, dependent variable: CPI

	1	2	3	4	5	6*	2SLS**
C	-3.53***	7.93***	7.81***	9.31***	9.32***	7.21***	4.45
DEM	0.81***	0.28**	0.28**	0.29**	0.19	0.19	0.85
	(0.11)	(0.11)	(0.11)	(0.12)	(0.16)	(0.14)	(1.63)
DEM^2	-0.11***	-0.03**	-0.03**	-0.03**	-0.01	-0.02	-0.08
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
LGDP		-0.82***	-0.8***	-0.82***	-0.98***	-0.79***	-0.43
		(0.14)	(0.19)	(0.23)	(0.19)	(0.21)	(0.41)
EF		-0.06***	-0.06***	-0.08***	-0.08***	-0.07***	-0.06
		(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.05)
GC		-0.08***	-0.08***	-0.09***	-0.11***	-0.07***	-0.05**
		(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
URB			0.001	0.003	0.005	-0.02**	-0.03
			(0.01)	(0.01)	(0.01)	(0.01)	(0.03)
ELF				-0.37	-0.75**	0.45	0.27
				(0.39)	(0.37)	(0.51)	(1.2)
UNEMP					0.04***	0.04***	0.04
					(0.02)	(0.02)	(0.05)
GINI					0.03**	0.01	-0.01
					(0.01)	(0.01)	(0.03)
Eastern Europe						1.19**	1.01
						(0.49)	(1.8)
Latin America						1.64***	1.67**
						(0.51)	(0.71)
North Africa & the Middle East						1.05**	1.16
						(0.42)	(1.96)
Sub-Saharan Africa						-0.13	-0.18
						(0.58)	(0.77)
East Asia						1.24**	1.38*
						(0.60)	(0.81)
South-East Asia						0.54	0.3
						(0.55)	(1.73)
South Asia						0.19	0.06
						(0.61)	(0.83)
The Caribbean						0.71	0.53
						(0.65)	(1.56)
N	159	139	139	109	97	97	95
R2	0.45	0.71	0.71	0.76	0.82	0.86	0.82

Significance levels: * p<.10; ** p<.05; *** p<.01

* Dummies for Western Europe & North America, and The Pacific have been left out.

** For the 2SLS latitude and linguistic fractionalization are used as instruments.

NOTE: Coefficients and standard errors (between parentheses) are reported.

The results from the regressions indicate that the predicted relationship between democracy and corruption perceptions may have some validity; the sign for democracy is positive and significant in the first four equations implying that democracy increases perceptions of corruption when democracy levels are low. The polynomial term is significant in the first four equations, indicating that after a certain level, democracy has a negative impact on corruption. This is in accordance with the theory of a nonlinear relationship presented in section 3. The lack of significance for the democracy coefficients in equations 5 and 6 is puzzling as this indicates that democracy has no effect on corruption perceptions. The result may be due to the fact democracy needs time to affect corruption. This is corrected for in the panel data analysis by lagging the democracy variables. The robustness of the results is also tested in the sensitivity analysis.

GDP per capita and economic freedom are significantly reducing corruption in all cases except in the 2SLS regression, in line with theory that that richer countries with greater freedom to trade, do business, invest etc. exhibit lower levels of corruption. The β -value for GDP per capita is as much as -0.98 in equation 5 indicating that a one percent increase in GDP per capita decreases corruption by 0.98. The effect of economic freedom is smaller; between -0.064 and -0.081 but still significant. This supports the theory that discount rates are lower and wages are higher in wealthier nations, and that less intervention in markets offers fewer opportunities for rent seeking.

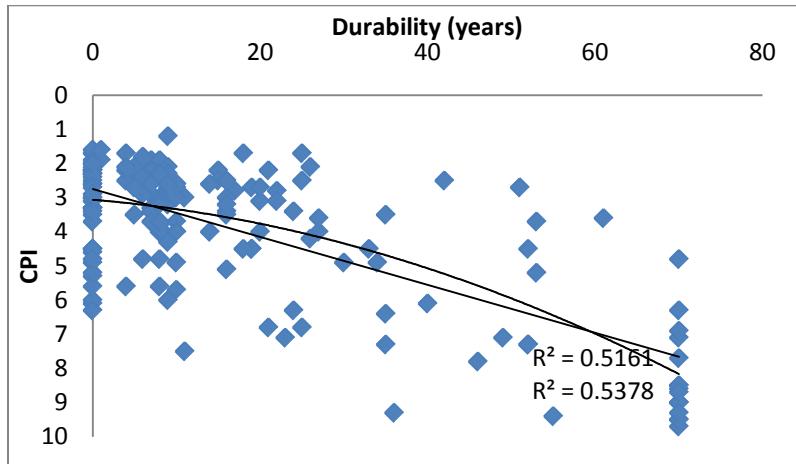
Surprisingly, the sign for government consumption is negative and significant in all cases, indicating that a larger government is associated with less perceived corruption. The size of government may be a sign of stronger checks and balances rather than increased opportunities for corruption associated with cumbersome bureaucracy. The notion that a larger government reduces corruption goes against some literature on the subject (e.g. Tavares, 2007; Shen & Williamson, 2005). The effect can be due to the fact that developed countries such as the Nordic ones have large governments and low levels of corruption (Rothstein, 2011), which outweighs the effects of government intervention in market increasing corruption. It could also be due to problems of measurement of the size of government; it might be incorrect to use of government consumption as a proxy as it does not necessarily reflect efficiency. Government consumption could be aimed at corruption reducing policies thus increased consumption would be expected to reduce corruption. Big governments may sometimes be necessary to enforce the rule of law and foster social development (Shen & Williamson,

2005). High levels of government spending could also be connected with higher wage levels for officials, a factor that should decrease incentives for corruption (Montinola & Jackman, 2002).

The effect of urbanization is ambiguous: the coefficient changes signs and is only significant in equation 6, indicating that urbanization lowers corruption when controlling for region effects. The ambiguity is perhaps not surprising as it has been stated that urbanization has opposing effects: the increased interaction associated with urbanization gives rise to greater opportunities for rent seeking but the ability to control corruption is also enhanced with a more concentrated population. Billger & Goel (2009) also suggest that bribe givers and takers are deterred from corruption by peer pressure in urban areas. Unemployment and the Gini coefficient are significant and seems to increase perceptions of corruption as expected, reflecting that adverse economic conditions increase incentives for corruption. The inclusion of a region dummies indicate that Eastern Europe, Latin America, North Africa & the Middle East, and East Asia all have significantly higher levels of corruption than the control groups which are Western Europe & North America, and the Pacific. When controlling for the other variables the coefficients are significant except in the 2SLS case where only the coefficient for Eastern Europe is significant. Whether this is due to fundamental regional or cultural differences is difficult to judge; the effect could for example be due to an omitted variable. Other studies have found that regional differences are in fact negligible (eg. Montinola & Jackman, 2002; Treisman, 2000).

The effect of durability – the number of consecutive years of democracy – is showing a slightly different relationship than the degree of democracy measured by the Polity IV index. When estimating a non-linear model, the durability variable is never significantly increasing corruption initially except in one equation. The polynomial term is significantly reducing democracy in all equations. The nonlinear relationship is not obvious in this case; a scatter plot of the two variables hints towards a linear, negative effect of democracy on corruption, as can be seen in Figure 7:

Figure 7



The estimated model is therefore a linear one, which takes the form:

Corruption = f(durability, economic prosperity, economic freedom, government consumption, ethno-linguistic fractionalization, urbanization, unemployment, Gini)

$$\begin{aligned} \text{CPI}_i = & \beta_0 + \beta_1 \text{DUR}_i + \beta_2 \text{LGDP}_i + \beta_3 \text{EF}_i + \beta_4 \text{GC}_i + \beta_5 \text{ELF}_i + \beta_6 \text{URB}_i \\ & + \beta_7 \text{UNEMP}_i + \beta_8 \text{GINI}_i + \text{region dummies} + \varepsilon_i \end{aligned} \quad (5)$$

Table 5 reports the results.

Table 5

Ordinary Least Squares regression analysis with White robust standard errors and covariance, dependent variable: CPI

	1	2	3	4	5	6*	2SLS**
C	-2.75***	6.92***	6.72***	7.81***	7.03***	6.49***	-5.10
DUR	-0.07*** (0.01)	-0.03*** (0.01)	-0.03*** (0.01)	-0.03*** (0.01)	-0.02** (0.01)	-0.01 (0.01)	-0.13 (0.15)
LGDP		-0.75*** (0.11)	-0.71*** (0.15)	-0.72*** (0.19)	-0.73*** (0.18)	-0.67*** (0.23)	1.03 (2.27)
EF		-0.05*** (0.01)	-0.05*** (0.01)	-0.06*** (0.02)	-0.07*** (0.02)	-0.06*** (0.02)	-0.05 (0.03)
GC		-0.08*** (0.02)	-0.08*** (0.02)	-0.08*** (0.02)	-0.1*** (0.02)	-0.07*** (0.02)	-0.04 (0.06)
URB			0.003 (0.01)	0.003 (0.01)	0.004 (0.01)	-0.02** (0.01)	-0.02 (0.02)
ELF				-0.11 (0.37)	-0.45 (0.36)	0.61 (0.48)	0.59 (1.16)
UNEMP					0.04** (0.02)	0.04** (0.02)	-0.02 (0.09)
GINI					0.03** (0.01)	0.01 (0.01)	-0.01 (0.04)
Eastern Europe						0.95** (0.42)	-1.52 (3.61)
Latin America						1.48*** (0.48)	1.56 (1.03)
North Africa & the Middle East						0.65* (0.38)	-0.77 (2.23)
Sub-Saharan Africa						-0.29 (0.55)	0.26 (1.2)
East Asia						0.92 (0.55)	-1.11 (3.15)
South-East Asia						0.16 (0.55)	-1.4 (2.56)
South Asia						0.18 (0.64)	1.43 (1.96)
The Caribbean						0.37 (0.55)	-0.53 (1.78)
N	169	147	147	116	102	102	100
R2	0.52	0.77	0.77	0.80	0.84	0.87	0.51

Significance levels: * p<.10; ** p<.05; *** p<.01

* Dummies for Western Europe & North America, and The Pacific have been left out.

** For the 2SLS latitude and linguistic fractionalization are used as instruments.

NOTE: Coefficients and standard errors (between parentheses) are reported.

The durability coefficient significantly reduces corruption perceptions, except in equation 6 and in the 2SLS case. This goes against previous findings such as those of Treisman (2000) who sets the threshold to 20 years of consecutive democracy after which democracy starts to reduce corruption. In these regressions, democracy reduces perceptions of corruption, but does not significantly increase corruption initially. This can be interpreted as that democratic years reduces corruption, and that other, vital aspects of democracy is causing the nonlinearity in controlling corruption. As democracy is measured by the Polity IV index in Table 5 and the index contains measures of institutions through which citizens can express opinions about their leaders, constraint of power by the executives and civil liberties the partial development of these thing may be what causes the increased initial rent seeking in Table 5.

The 2SLS analysis is mostly showing the same signs for the coefficients as the OLS regressions, and a few of the coefficients are larger indicating that the OLS estimations may be underrated; however, very few of the coefficients are significant. The included instruments for democracy and its square are the latitude of a countries capital, and linguistic fractionalization.⁶ The poor significance could be interpreted as a lack of an actual relationship between any of the variables and corruption, or a weak correlation between the instruments and the endogenous variable. As the first option goes against theory, the second option seems the most plausible, and less weight is put on the results of the 2SLS regressions.

6.6 Panel data

Panel data available from the QoG data set is a cross-section time-series data set with global coverage spanning the time period 1946–2010. As mentioned, the time-series chosen for the study is 1995–2005.

Using panel data allows the researcher to draw more accurate conclusions since the data varies over two dimensions (time and country) rather than, as for cross-section data, only over one dimension (country). A model using panel data can be expressed as:

$$y_{it} = \beta_0 + X'_{it}\beta + \varepsilon_{it}, \quad (6)$$

where X' is a vector of explanatory variables, $i=1,\dots, N$ index individuals (countries), and $t=1,\dots,T$ index time periods (years) (Verbeek, 2008). The existence of repeated observations of the same units over time allows the researcher to estimate more realistic models than with a

⁶ As a redundant variables test indicates that ethno-linguistic fractionalization is redundant, it is assumed that linguistic fractionalization is uncorrelated with corruption.

single time series or cross-section series. Since the explanatory variables vary over two dimensions in panel data sets and since the sets typically have more observations than cross-section or time-series data sets, thus greater variability, estimates based on panel data are often more correct than estimates based on other sources (Verbeek, 2008) Panel data also offer the possibility to use lagged variables.

When estimating a panel model with fixed effects, which includes a dummy variable for each country in the study in order to capture individual effects, the results are very poor. As the main variables, corruption and democracy, do not change much over time for some countries, the fixed effects model only capture the effects for those countries whose corruption and democracy indicators change over the time period. Thus, following e.g. Rock (2007), a random effects model is used where region dummies and year dummies are included in order to capture random effects.

6.6.1 Model

In order to test the relationship between corruption and democracy a set of multivariate models are analyzed with the rescaled CPI index as the dependent variable. A similar model to the one used in the cross-section regressions is estimated.

Corruption = f(democracy, democracy², economic prosperity, economic freedom, government consumption, ethno-linguistic fractionalization, urbanization, unemployment, Gini)

$$\begin{aligned} \text{CPI}_{it} = & \beta_0 + \beta_1 \text{DEM}(-3)_{it} + \beta_2 \text{DEM}(-3)^2_{it} + \beta_3 \text{LGDP}(-3)_{it} + \beta_4 \text{EF}(-3)_{it} \\ & + \beta_5 \text{GC}(-3)_{it} + \beta_6 \text{ELF}_{it} + \beta_7 \text{URB}_{it} + \beta_8 \text{UNEMP}_{it} + \beta_9 \text{GINI}_{it} \\ & + \text{region dummies} + \varepsilon_{it} \end{aligned} \quad (7)$$

6.6.2 Results

Appendix B reports descriptive statistics for the variables and Table 6 reports the results of the panel regression of the Polity IV index of democracy. Democracy, democracy², GDP per capita, economic freedom and government consumption have been lagged three years to avoid reverse causality and autocorrelation. Region dummies are included to control for period effects which may stem from the incidence of an omitted variable which is time invariant and affects corruption and democracy. Year dummies for 1998 to 2003 are included in equations 6 and 7 to control for random effects; year coefficients are not reported.⁷

⁷ As the sample size is restricted to 83 countries in equations 5 and 6, the first four equations are estimated with the restricted sample. The only difference between the estimations is that urban population is significant on the 1 percent level in equations 3 and 4.

Table 6

Panel Least Squares regression analysis with White robust standard errors and covariance, dependent variable: CPI

	1	2	3	4	5*	6*	7*
C	-3.46***	7.46***	7.49***	8.22***	5.48***	5.64***	4.27***
DEM(-3)	0.69*** (0.08)	0.45*** (0.04)	0.45*** (0.04)	0.45*** (0.04)	0.31*** (0.04)	0.31*** (0.04)	0.35*** (0.10)
DEM(-3)^2	-0.10*** (0.01)	-0.05*** (0.00)	-0.05*** (0.00)	-0.05*** (0.00)	-0.02*** (0.00)	-0.02*** (0.00)	-0.03*** (0.01)
LGDP(-3)		-0.75*** (0.06)	-0.76*** (0.06)	-0.85*** (0.08)	-0.71*** (0.11)	-0.71*** (0.11)	-0.5 (0.32)
EF(-3)		-0.07*** (0.00)	-0.07*** (0.00)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
GC(-3)		-0.09*** (0.01)	-0.09*** (0.01)	-0.12*** (0.01)	-0.09*** (0.01)	-0.09*** (0.01)	-0.08*** (0.03)
URB		0.00 (0.001)	0.002 (0.002)	-0.02*** (0.00)	-0.02*** (0.00)	-0.02*** (0.00)	-0.03*** (0.01)
ELF			-0.24** (0.01)	1.66*** (0.18)	1.68*** (0.17)	2.23** (0.93)	
UNEMP				0.07*** (0.01)	0.07*** (0.01)	0.1*** (0.02)	
GINI						0.02 (0.04)	
Eastern Europe				1.62*** (0.08)	1.62*** (0.08)	1.01*** (0.19)	
Latin America				1.9*** (0.13)	1.89*** (0.13)	1.41 (1.35)	
North Africa & the Middle East				1.53*** (0.10)	1.5*** (0.09)	0.98* (0.58)	
Sub-Saharan Africa				-0.76*** (0.16)	-0.78*** (0.16)	-1.67 (1.16)	
East Asia				1.91*** (0.12)	1.89*** (0.12)	2.5*** (0.40)	
South-East Asia				0.69*** (0.09)	0.67*** (0.09)	0.36 (0.63)	
South Asia				-0.1 (0.22)	-0.15 (0.22)	-1.04** (0.52)	
The Caribbean				0.9*** (0.25)	0.87*** (0.25)	0.8 (0.85)	
Periods	7	7	7	7	7	7	7
Cross-sections	134	124	124	98	83	83	56
N	705	662	662	554	436	436	111
R2	0.44	0.7	0.7	0.71	0.84	0.84	0.80

Significance levels: * p<.10; ** p<.05; *** p<.01

* Dummies for Western Europe & North America, and The Pacific have been left out.

NOTE: Coefficients and standard errors (between parentheses) are reported.

The findings of the panel regressions confirm most of the results of the cross-section regressions; the coefficients for democracy, democracy squared, GDP per capita, economic freedom, government consumption, urbanization and unemployment are of approximately the same magnitude, some of them somewhat larger for the panel data set. The coefficient for democracy is significant in all cases and has the correct sign, thus it cannot be rejected on any traditional significance level that democratization initially has a positive effect on perceptions of corruption. Democracy also seems to follow the path in the second step described in theory, reducing corruption but only after certain level of democracy, reflecting that corrupt officials have extracted too many rents, and that democratic institutions providing checks and balances which expose and penalize corrupt acts have had a chance to develop. The coefficient for democracy lies between 0.31 and 0.69 and the democracy squared coefficient lies between -0.02 and -0.1 indicating that corruption increases quite drastically initially, and declines more slowly after the turning point. Thus, the process of reducing corruption when stable democratic institutions are in place takes longer than the increase of corruption stemming from democratization. This is in line with findings of e.g. Treisman (2000) who find that the process by which democracy destabilizes the foundations of corruption is excruciatingly slow. The reason for why we are observing a significant effect of this in all the equation as opposed to some insignificant equations in the cross-section analysis may be the inclusion of lagged variables: enough time is needed for democracy to be able to affect corruption. Noteworthy is that there still may be autocorrelation in the model, which implicates that the significance of the estimated may be overrated.

GDP per capita is in almost all cases significantly reducing corruption by as much as 0.85 in equation 4; only in equation 7 is the coefficient insignificant. This goes well with the argument that the marginal value of money is higher in poorer societies. The fact that greater economic freedom seems to lower perceptions of corruption - the variable is significant in all the equations - indicates some validity for the theoretical argument that greater opportunities for economic gain through a freer market reduce incentives for corruption. The increased involvement in international trade may have a sobering effect on corruption via the increased competition and the increased pressure from foreign companies for governments to keep check on corruption. The fewer trade barriers such as import and export permits creates fewer opportunities for bureaucracy and corruption, and Western norms of corruption can easier find its way into the country. Findings from the panel regressions also confirm the sobering effect on corruption caused by government consumption. It is however, theoretically doubtful to

conclude, based on the findings of the study, that a larger government always reduces corruption. The optimal size of government is likely to differ from nation to nation. Government consumption aimed largely at reducing corruption is most probably beneficial, but large scale government intervention with heavy regulation may be harmful to some economies.

Ethno-linguistic fractionalization is significantly reducing perceptions of corruption in equation 4, and significantly increasing corruption in equations 6 and 7 which is ambiguous. The findings of equation 4 go against the argument proposed regarding political liberalization; it increases political activity of diverse social and economic groups in a society. The increased activity of the diverse groups may become a source of animosity to the political system resulting in political instability unless they are integrated in the democratic society. As the rest of the equations support this argument - the inclusion of year and region dummies also improves the fit of the model indicating that they have better explanatory power - it is hard to draw any conclusions about ethno- linguistic fractionalization; it seems to follow theory but only in the restricted models. Unemployment increases perceptions of corruption as expected.

All region dummies except Sub-Saharan Africa and South-East Asia seem to experience significantly higher corruption relative to the control group. Again, whether this is due to fundamental regional or cultural differences is hard to tell without further analysis; the differences could for example be due to an omitted variable captured by the region dummies. As the inclusion of the Gini coefficient greatly reduces the sample size, the variable has been left out of equations 5 and 6, and is included in equation 7. It has no significant effect on corruption perceptions, but as its inclusion reduces the sample size, it reduces significance for many other variables. For example, GDP per capita is no longer significantly reducing corruption, neither are some of the region dummies.

7. Sensitivity analysis

The following section tests the robustness of the previous findings with an added variables analysis and a replacement analysis.

7.1 Added variables analysis

As several other variables could possibly influence corruption, their significance is tested in the added variables analysis to see if their inclusion reduces the significance of democracy.

As previously argued by Treisman (2000), in order for democracy to fight corruption, the political liberalization may need to be accompanied by economic liberalization. This since a high degree of economic freedom may be relatively pointless in a tyranny, and since a high degree of democracy is not as powerful without economic freedom. Also, as political freedom and economic freedom can be hard to disentangle, following Saha et al (2009), an interaction effect of the two are used, i.e. *democracy times economic freedom*.

Trade openness should have similar effects to those of economic freedom: an economy open to trade should exhibit lower corruption due to fewer trade barriers and less bureaucracy, and the openness puts pressure on governments to control it in order to attract foreign investments. There may also be endogeneity issues; corrupt officials may oppose openness and create barriers in order to attract rents.

Montinola & Jackman (2002) include a dummy variable in their study to distinguishing countries in the OPEC association from others due to the heavy influence of governments in national economic issues in OPEC countries. As the state owns the oil sources, and the oil resources are the main export, the revenues from this source shelter officials from having to make tradeoffs between the demands of the public and personal objectives. Treisman (2000) hypothesize that countries with higher fuel exports as a share of total exports have higher corruption simply because there are more rents available, and therefore more opportunities for corruption. The centralization of economic power that accompanies countries with large oil reserves may also reduce democratic stability and increase corruption (Treisman, 2000). Thus, the log of *fuel exports* is tried for significance.

Country *land area* and *population* affects demand for public infrastructure (Keefer, 2005). Demand for infrastructure should be greater in large, sparsely populated countries, and the larger pressure on politicians to provide this should reduce corruption. Countries with a large share of young people should exhibit greater demand for public services such as education,

thereby reducing corruption according to the same logic. The log of total population is thus used as a control variable following Tavares (2007), as well as the log of total land area. With an aging population, the demand for social services such as retirement homes should increase; again putting pressure on politicians. The share of the population between the ages 15 and 64 is used to control for a particularly young or ageing population, denoted *age*.

As previously argued, *Protestantism* should be correlated with lower levels of corruption as the Protestant religion emphasizes personal accountability and rectitude. Treisman (2000) also suggest that Protestantism have positive effects on growth, and can be affecting corruption negatively via this channel. The share of population that is Protestant is used to test its effect on corruption. Finally, *freedom of the press* seems to be an important factor controlling corruption, the theoretical reasons being that a free press exposes corrupt activity and brings it to the publics' attention. Freedom of the press is thus used as a control variable, and the value is rescaled so that higher values indicate a freer press.⁸

Table 9 presents the variables and their sources.

7.1.1 Model

The model used is similar to the models used for the cross-section and panel data analyses, but with several variables added to estimate their effect on corruption. The variables are tested by themselves, as well as all together.

$$\begin{aligned} \text{CPI}_{it} = & \beta_0 + \beta_1 \text{DEM}(-3)_{it} + \beta_2 \text{DEM}(-3)^2_{it} + \beta_3 \text{LGDP}(-3)_{it} + \beta_4 \text{EF}(-3)_{it} \\ & + \beta_5 \text{GC}(-3)_{it} + \beta_6 \text{URB}_{it} + \beta_7 \text{UNEMP}_{it} + \beta_8 \text{GINI}_{it} + \beta_9 \text{DEM} * \text{EF}_{it} \\ & + \beta_{10} \text{OTT}_{it} + \beta_{11} \text{LFUEL}_{it} + \beta_{12} \text{LAREA}_{it} + \beta_{13} \text{LPOP}_{it} + \beta_{14} \text{AGE}_{it} \\ & + \beta_{14} \text{FOP}_{it} + \beta_{15} \text{PROT}_{it} + \text{region dummies} + \text{year dummies} + \varepsilon_{it} \quad (8) \end{aligned}$$

7.1.2 Results

The results from the added variables analysis are displayed in Table 7. In the equations all the variables from the previous analysis are included, that is democracy, democracy2, GDP per capita, economic freedom, government consumption, ethno-linguistic fractionalization, urbanization, unemployment, Gini, as well as region and year dummies. Their coefficients are not reported. As the restricted sample is used the low significance of some of the variables may be explained by the lack of variance.

⁸ The values for freedom of the press are multiplied by -1 so that -100 corresponds to the least free press and 0 corresponds to the most free press.

Table 7
Panel Least Squares regression analysis with White robust standard errors and covariance, dependent variable: CPI

	1	2	3	4	5	6	7	8
DEM(-3)	0.5*** (0.09)	0.33*** (0.12)	0.42*** (0.08)	0.34*** (0.12)	0.33*** (0.09)	0.33*** (0.09)	0.39*** (0.15)	0.56*** (0.11)
DEM(-3)^2	-0.03*** (0.01)	-0.03** (0.01)	-0.03*** (0.01)	-0.03** (0.01)	-0.03*** (0.01)	-0.02** (0.01)	-0.03** (0.01)	-0.03** (0.01)
EF(-3)	-0.04** (0.02)						-0.01 (0.01)	
DEM*EF	-0.004*** (0.001)						-0.004*** (0.001)	
OTT		-0.004* (0.003)					0.003* (0.002)	
LFUEL			0.15*** (0.05)				0.09*** (0.03)	
LAREA				-0.11 (0.23)			0.12 (0.16)	
LPOP					0.49* (0.28)		0.27 (0.17)	
AGE						-0.03 (0.05)	-0.08 (0.06)	
FOP							-0.03*** (0.01)	0.01 (0.01)
PROT							-0.03*** (0.003)	-0.03*** (0.003)
Periods	7	7	7	7	7	7	7	7
Cross-sections	56	56	56	56	56	56	56	56
N	111	111	111	111	111	111	111	111
R2	0.82	0.81	0.81	0.83	0.8	0.82	0.84	0.89

Significance levels: * p<.10; ** p<.05; *** p<.01

NOTE: Coefficients and standard errors (between parentheses) are reported.

The interaction effect of democracy and economic freedom significantly reduces corruption perceptions in equation 1, and the effect remains in equation 8. The small but negative and significant coefficients indicate that decreases in corruption levels which are due to democracy are stronger in countries with high economic freedom, which is in line with the findings of Saha et al (2009). Openness to trade (OTT) significantly reduces corruption in equation 2 but increases corruption in equation 8, which is counterintuitive. The effect is only significant on the 10 percent significance level however, and could be due to the fact that the economic freedom index, which includes trade freedom as a component, appears twice; on its

own and in the interaction with democracy, thus openness to trade may already be controlled for. The explanation could also be that the theoretical argument is wrong: perhaps a more open economy increases opportunities for rent seeking. This however, goes against the findings of a great deal of the literature (e.g. Giavazzi & Tabellini, 2005; Tavares, 2007), thus the first explanation seems more plausible. Countries that have their fuel export (LFUEL) comprise a large share of total exports experience higher perceptions of corruption: though the effect is reduced in equation 8 the β -value is 0.15 in equation 3 implying that corruption is expected increase by 0.15 for each unit increase in fuel exports.

As a larger population (LPOP) seems to increase corruption, the theory that demand for infrastructure in large, sparsely populated countries reduces corruption may have some validity. However, as the coefficient for area (LAREA) is insignificant in both equations this hypothesis cannot be confirmed. Another, perhaps more plausible, explanation for why the larger population seems to be affecting corruption positively is that the effect goes through the economic prosperity channel; a larger population may impede economic development which increases corruption. The age (AGE) variable is never significant, thus no conclusion can be drawn regarding the age of the population and its consequences for corruption.

Freedom of the press (FOP) is significant in reducing corruption in equation 6, and the effect vanishes when the other variables enters the equation. As freedom of the press is one of the most crucial aspects in control of corruption according to some authors the effect should be expected to remain; however, with as many control variables included as in equation 8 this could render many others insignificant. The coefficient for Protestant religion (PROT) is highly significant in reducing corruption perceptions, which could be due to its own effect or through the democracy channel; Protestant countries are often long-standing democracies which have had time to develop stable democratic institutions (Treisman, 2000). Interestingly, the significance of the Sub-Saharan African coefficient, which in equation 5 indicates that being located in Sub-Saharan Africa yields lower corruption levels (not reported), disappears when Protestant religion enters the equation. This can be due to the relatively large number of Protestant countries in Africa (Treisman, 2000).

Noteworthy is that the democracy and its square have the correct signs and are significant in all the equations on at least a 5 percent significance level. This indicates that democracy is likely to affect corruption in the predicted way, even when controlling for several other factor that affect corruption. Again, as there may still be autocorrelation still in the model, the strong

significance could be overrated. An opposing effect that may be reducing the significance is the restricted sample; as there are many variables included the small sample may not contain enough variation to distinguish clearly between variables.

7.2 Replacement analysis

Different indices of corruption and democracy are used to test the robustness of the findings of the empirical analysis. The results from the least squares regressions are reported in Appendix C. The coefficients for the year dummies included in equations 6 and 7 in Table 10 are not reported.

The results using the Economist Intelligence Units index of corruption in the cross-section regressions reinforces the findings of the Polity IV index, with larger coefficients for democracy and its square; the R²-values are higher than for Polity IV analysis. This could be due to the fact that the EIU index is perhaps more comprehensive as it measures several dimensions of democracy; electoral process and pluralism, civil liberties, functioning government, political participation and political culture are all taken into account in the index. This may yield a more complete measure of democracy. The only significant region dummy is that for Latin America, which is in line with many other studies that find that region effects are mostly negligible. The replacement of the CPI with the Kaufmann Indicator of Control of Corruption also confirms previous findings with stronger significance but slightly smaller coefficients: the results for democracy and its squares are significant in all equations even when dummies for region enter the equation and all the coefficients have the predicted signs. The findings for durability of democracy also confirm the results from the previous analysis; democratic years significantly reduce corruption perceptions except in equation 6b in Table 9.

The results of the panel data replacement analysis with the Vanhanen index of democratization confirms the results of the Polity IV analysis in the first two equations, however, the coefficients for democracy squared is 0 in equations 5 to 7, and the coefficient for democracy changes signs in equation 7, however it is not significant. This indicates that democracy may not be following a curvilinear relationship when measured by the VDI; the findings rather indicate that democracy increases corruption but not reducing it after a certain level. As the Vanhanen index is the most objective, and the thinnest index of democracy this could be a reason for the discrepancy; the components of the index may not reflect aspects of democracy which have nonlinear, or a negative effects on corruption. As the measure only includes public contestation or competition measured as the percentage of votes not cast for

the largest party and right to participate measured as the percentage of the population who actually voted in the election it may be, as in the case of democratic years, lacking certain aspect of democracy that are important in control of corruption.

Using the Control of Corruption Indicator from Kaufmann et al (2009) as a dependent variable instead of the Corruption Perceptions Index confirms previous findings, with higher explanatory power for the model and slightly smaller coefficients for democracy and its square. The coefficient for GDP per capita is significant in all equations, which was not the case for the CPI regressions.

Thus, the findings of the replacement analysis mostly reinforce the previous findings, except for the findings of the Vanhanen index. The lack of significance for the democracy variable in the findings of the VDI may be due to the fact that the two aspects considered in the measure do not reflect the most significant aspects democracy in corruption control. Though, according to some authors, one of the most essential features of democracy is universal suffrage, Bollen (1980), neglects this aspect almost completely, based on the argument that voter participation is only somewhat related to democracy and is often used as a symbol for democracy in nondemocratic countries. This could be a reason for why democracy measured as voter participation and public contestation does not seem to reduce corruption perceptions.

8. Discussion and Conclusion

The persistent state of corruption plaguing some countries deterring their economic development has been subject to much debate, gaining renewed interest in the late 20th century. Despite being subject to scrutiny for almost two decades, there seems to be few conclusions to be drawn regarding the causes of corruption, and even fewer remedies to be prescribed. As the neoliberal paradigm advocates market led development and a politically free society, this view has been adopted by many developing countries. However, as the democratization process in a number of post-communist states has led to an increase in corruption levels, and since some attempts to democratize have failed due to rampant corruption, some ambiguity regarding the effects of democracy on corruption remains.

This paper theoretically and empirically assesses the impact of democracy on the prevalence of corruption for the period 1995 to 2005, and specifically for the year 2002. Definitions of corruption and democracy are established that are portable across cultures and nations to clarify the results. As corruption is a complicated area of study due to all the likely variables affecting its incidence, as well as being hard to observe directly due to its nature of secrecy, perceptions of corruption are used as the dependent variable, and a great deal of control variables are used in the regressions. Measures of democracy are used which are also sometimes based on subjective measures.

The paper finds that, in most cases democracy affects corruption in a nonlinear way, and that corruption is higher in partially democratized countries than in autocracies. Only in one of the alternative index analyses, and when testing durability of democracy defined as the number of consecutive years of democracy, does the effect disappear. Though none of the estimates should be ascribed too much precision, the findings of an inverted U-shape should contribute to the debate of whether donors should attach demands of corruption reduction to aid while promoting democratization in developing countries. Different corruption fighting policies may be advisable for countries in different stages in their transition towards democracy; as upsurges in corruption levels seem to follow democratization in some countries but not in others, policies cannot be universal. Democracy can be prescribed as a cure for corruption only in the right environment, e.g. when levels of economic freedom are high as indicated by the interaction effect of democracy and economic freedom in the sensitivity analysis. If countries in the transition towards a more democratic political system have an initial democracy score beyond the critical point, they can be expected to experience an immediate decrease in corruption levels following increased democracy. However, the countries scoring

badly on the democracy scale can be expected to suffer from increased corruption early in the stages of political reform due to the lack of checks and balances on corrupt officials, and due to rent seekers abusing the openness of the democratic system. Economic prosperity and economic freedom lowers corruption levels, and unemployment and ethno-linguistic fractionalization mostly increases corruption. Size of government can be a cure for corruption in some countries but not in others; this issue needs to be explored further. The effect of economic inequality and urbanization is uncertain.

As the data indicates a nonlinear relationship between democracy and corruption, the most important aspects of democracy in controlling corruption need to be pinpointed and encouraged so that the initial peak of corruption can be avoided. For example, the free and fair elections of a democracy need to be accompanied by a functioning government committed to solving the problem of corruption. If the decisions of the policy makers elected by the public are not followed, democracy becomes a meaningless concept. In accordance with the theory of multiple equilibria, the important thing in reducing corruption is not to spread the norms of what is right and what is wrong; most people already know this. The important thing is to change peoples beliefs of what other agents do; that they will not succumb to corruption (Rothstein, 2011).

8.1 Suggestions for future research

For future research, it is important to investigate which aspects of democracy are important in controlling corruption. Another subject of interest is the costs of corruption/threat of punishment; how do penalties such as jail time affect the incidence of corruption? The combination of democracy and economic liberalization deserves further scrutiny; is economic liberalization a condition for democracy to be effective in reducing corruption under all circumstances? Another aspect of corruption worth studying is “private” corruption which occurs when people exploit their organizational position for personal gain; is its incidence reacting differently to democracy than public corruption? Other aspects of what fosters corruption should also be investigated, such as the importance of culture, juridical system, colonial origin, political stability etc. as many factors not included in this study may affect corruption.

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Appendix A.

Country by Region.

East Asia	Bulgaria	Nicaragua	Comoros	The Caribbean
China	Croatia	Panama	Congo	Barbados
Japan	Czech Republic	Paraguay	Congo, Dem. Rep.	Belize
Korea, S	Estonia	Peru	Cote d'Ivoire	Grenada
Mongolia	Georgia	Uruguay	Djibouti	Guyana
Taiwan	Hungary	Venezuela	Equatorial Guinea	Jamaica
South Asia	Kazakhstan	North Africa & the Middle East	Eritrea	St Lucia
Afghanistan	Kyrgyzstan	Algeria	Ethiopia	Suriname
Bangladesh	Latvia	Bahrain	Gabon	Trinidad and Tobago
Bhutan	Lithuania	Cyprus	Gambia	Western Europe & North America
India	Macedonia	Egypt	Ghana	Australia
Maldives	Moldova	Iran	Guinea	Austria
Nepal	Poland	Iraq	Guinea-Bissau	Belgium
Pakistan	Romania	Israel	Kenya	Canada
Sri Lanka	Russia	Jordan	Lesotho	Denmark
South-East Asia	Serbia & Montenegro	Kuwait	Liberia	Finland
Cambodia	Slovakia	Lebanon	Madagascar	France
Indonesia	Slovenia	Libya	Malawi	Germany
Laos	Tajikistan	Morocco	Mali	Greece
Malaysia	Turkmenistan	Oman	Mauritania	Iceland
Myanmar	Ukraine	Qatar	Mauritius	Ireland
Philippines	Uzbekistan	Saudi Arabia	Mozambique	Italy
Singapore	Latin America	Syria	Namibia	Luxembourg
Thailand	Argentina	Tunisia	Niger	Malta
Vietnam	Bolivia	Turkey	Nigeria	Netherlands
The Pacific	Brazil	United Arab Emirates	Rwanda	New Zealand
Fiji	Chile	Yemen	Senegal	Norway
Papua New Guinea	Colombia	Sub-Saharan Africa		Portugal
Samoa	Costa Rica	Angola	Sierra Leone	Spain
Solomon Islands	Cuba	Benin	South Africa	Sweden
Vanuatu	Dominican Rep.	Botswana	Sudan	Switzerland
Eastern Europe	Ecuador	Burkina Faso	Swaziland	United Kingdom
Albania	El Salvador	Burundi	Tanzania	United States
Armenia	Guatemala	Cameroon	Togo	
Azerbaijan	Haiti	Cape Verde	Uganda	
Belarus	Honduras	Central African Rep.	Zambia	
Bosnia & Herzegovina	Mexico	Rep. Chad	Zimbabwe	

Appendix B.

Data: Definitions and sources.*

Variable	Definition	Source
CPI	The corruption perception index measures the perceived level of corruption in the public sector. The index constitutes a “poll of polls” combining the results from different surveys. Ranges from 0 to 10.	Transparency International
DEM	The Polity IV index of institutionalized democracy measures the degree to which civil liberties to all citizens are guaranteed, the existence of institutionalized constraints on the exercise of power by the executive and the presence of institutions and procedures through which citizens can express effective preferences about alternative policies and leaders. Ranges from 0 to 10.	Systemicpeace.org
DUR	The number of consecutive year of democracy (cross-section only).	Treisman (2007)
LGDP	The log of PPP-adjusted GDP per capita in 2005 USD.	World Bank
EF	Index of economic freedom measured using 10 specific freedoms. ⁹ Each of the freedoms are weighted equally and turned into an index ranging from 0 to 100, where 100 represent the maximum.	Heritage Foundation
GC	Government consumption expenditure as a percentage share of GDP.	Heston et al (2009)
URB	Urban population measured as the percentage share of total population living in urban areas.	World Bank
ELF	Average ethno-linguistic fractionalization. Measures the degree of ethnic and linguistic multiplicity in a country. Ranges from 0 to 1.	Easterly & Levine (1997)
UNEMP	Unemployment measured as the percentage share of the labor force that is without work but available for and seeking employment.	World Bank
GINI	Gini measure of economic inequality, where greater values represent greater inequality. Ranges from 0 to 100.	World Bank
OTT	Openness to trade defined as total trade (exports plus imports) as a percentage share of GDP in constant prices, with a reference year of 2005.	Heston et al (2009)
LFUEL	The log of fuel exports as a percentage share of merchandise exports. ¹⁰	World Bank
LAREA	The log of a country’s total area in square kilometres.	World Bank
LPOP	The log of the total population.	World Bank
AGE	Population ages 15-64 as a percentage share of total population	World Bank
FOP	Freedom of the press measured by four ratings: laws and regulations, political pressures and controls, economic influences and repressive actions. Ranges from 0 to 100.	Freedom House
PROT	Protestants as percentage share of population in 1980.	La Porta et al (1999)
LF	Linguistic fractionalization, measured as the degree of linguistic multiplicity in a country. Ranges from 0 to 1.	Alesina et al (2003)
LAT	The latitude of a country’s capital city divided by 90 to take values between 0 and 1.	La Porta et al (1999)
YEAR	Year from 1995 to 2005	
REGION	Dummy for regions: Eastern Europe and post Soviet Union (including Central Asia), North Africa & the Middle East (including Israel, Turkey & Cyprus), Latin America (including Cuba, Haiti & the Dominican Republic), Sub-Saharan Africa, Western Europe and North America (including Australia & New Zealand), East Asia (including Japan & Mongolia), South-East Asia, South Asia, The Pacific (excluding Australia & New Zealand), The Caribbean (including Belize, Guyana & Suriname, but excluding Cuba, Haiti & the Dominican Republic).	Teorell & Hadenius (2005)

* Definitions and data are collected from the QoG data set.

⁹ The freedoms are business freedom, trade freedom, fiscal freedom, freedom from government, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption and labor freedom. To avoid the circular relationship of freedom from corruption the component has been removed from the index.

¹⁰ Merchandise exports are defined as the value of goods provided to the rest of the world in current US dollars.

Descriptive statistics.

Cross-section data descriptive statistics

<i>Variable</i>	<i>Mean</i>	<i>Median</i>	<i>Max</i>	<i>Min</i>	<i>St. dev</i>
CPI	-3.99	-3.3	-1.2	-9.7	2.08
CCI	0.05	0.3	1.7	-2.45	0.99
DEM	5.39	6	10	0	3.87
EIU	5.51	5.82	9.88	1.03	2.27
DUR	18.06	9	70	0	21.49
GDP	10184	5326	63687	226	12311
EF	60.61	60.61	88.15	5	10.96
GC	16.41	16.18	41.1	5	6.12
URB	53.24	54.92	100	8.78	23.44
ELF	0.34	0.26	1	0	0.3
UNEMP	9.65	8.4	33	0.6	7.34
GINI	40.79	39.69	64.34	24.7	9.18
LAT	0.28	0.24	0.72	0	0.19
LF	0.39	0.37	0.92	0	0.28

Panel data descriptive statistics

<i>Variable</i>	<i>Mean</i>	<i>Median</i>	<i>Max</i>	<i>Min</i>	<i>St. dev.</i>
CPI	-4.58	-3.70	-0.4	-10	2.38
CCI	0.04	0	2.22	-2.53	0.79
DEM	5.17	6	10	0	3.95
VAN	15.5	13.9	45.6	0	12.4
GDP	9813	4764	68217	151	11849
EF	59.56	60.52	89.7	3.33	12.29
GC	16.21	15.54	83.16	2.74	6.61
URB	52.04	52.94	100	7.2	23.07
ELF	0.35	0.27	1	0	0.3
UNEMP	9.3	8.2	39.3	0.6	6.09
GINI	41.64	40.42	64.34	16.83	9.67
OTT	87.05	79.08	446.06	1.97	46.25
FUEL	15.08	2.7	99.66	0	26.57
AREA	728635	144000	17098240	180	1964403
POP	32973572	6782620	1303720000	40130	122887059
AGE	60.57	61.3	80.78	47.72	6.57
FOP	-46.43	-46	0	-100	24.86
PROT	13.32	2.3	97.8	0	21.41

Appendix C

Table 8

Replacement analysis.

Ordinary Least squares regression analysis with White robust standard errors and covariance, dependent variable CPI

	1	2	5	6*	2SLS**
C	-6.1***	3.2**	2.58	3.13	3.38
EIU	1.78***	1.28***	1.84***	1.52***	2.46
	(0.23)	(0.21)	(0.26)	(0.32)	(5.96)
EIU^2	-0.22***	-0.14***	-0.17***	-0.14***	-0.19
	(0.02)	(0.02)	(0.03)	(0.03)	(0.30)
LGDP		-0.61***	-0.61***	-0.55***	-0.75
		(0.13)	(0.16)	(0.02)	(1.44)
EF		-0.05***	-0.08***	-0.07***	-0.11
		(0.02)	(0.02)	(0.02)	(0.19)
GC		-0.07***	-0.07***	-0.06***	-0.07
		(0.02)	(0.02)	(0.02)	(0.09)
URB			-0.01	-0.02**	-0.02
			(0.01)	(0.01)	(0.02)
ELF			-0.75**	0.08	-0.41
			(0.33)	(0.48)	(2.13)
UNEMP		0.02*	0.03*	0.03	
		(0.02)	(0.02)	(0.05)	
GINI		0.01	0.00	0.00	
		(0.01)	(0.01)	(0.03)	
Eastern Europe			0.39	-0.12	
			(0.43)	(3.33)	
Latin America			1.07**	0.79	
			(0.48)	(1.86)	
North Africa & the Middle East			0.16	0.71	
			(0.43)	(3.27)	
Sub-Saharan Africa			-0.36	-0.12	
			(0.57)	(0.71)	
East Asia			0.53	0.57	
			(0.59)	(0.74)	
South-East Asia			-0.11	0.27	
			(0.55)	(2.17)	
South Asia			-0.22	-0.43	
			(0.60)	(1.85)	
The Caribbean			0.08	-0.3	
			(0.53)	(2.83)	
N	163	145	101	101	99
R2	0.65	0.79	0.88	0.90	0.86

Significance levels: * p<.10; ** p<.05; *** p<.01

* Dummies for Western Europe & North America, and The Pacific have been left out.

** For the 2SLS latitude and linguistic fractionalization are used as instruments.

NOTE: Coefficients and standard errors (between parentheses) are reported.

Table 9
Least squares regression analysis with White robust standard errors and covariance, dependent variable CCI

	1	2	5	6*	2SLS**		1b	2b	5b	6b*	2SLSb**
C	0.34***	5.52***	5.15***	4.23***	3.5	C	0.65***	5.64***	4.66***	4.51	1.96
DEM	0.40*** (0.05)	0.18*** (0.05)	0.12* (0.06)	0.12** (0.06)	-0.2 (0.73)	DUR	-0.03*** (0.003)	-0.01*** (0.003)	-0.01** (0.003)	0.004 (0.004)	-0.03 (0.05)
DEM^2	-0.05*** (0.01)	-0.02*** (0.01)	-0.01* (0.01)	-0.01** (0.01)	0.00 (0.05)						
LGDP		-0.33*** (0.08)	-0.33*** (0.09)	-0.23*** (0.08)	-0.14 (0.21)	LGDP		-0.35*** (0.05)	-0.27*** (0.08)	-0.26*** (0.09)	0.12 (0.82)
EF		-0.04*** (0.01)	-0.04*** (0.01)	-0.04*** (0.01)	-0.02 (0.03)	EF		-0.03*** (0.01)	-0.04*** (0.01)	-0.04*** (0.01)	-0.03** (0.01)
GC		-0.04*** (0.01)	-0.05*** (0.01)	-0.03*** (0.01)	-0.03* (0.02)	GC		-0.04*** (0.01)	-0.05*** (0.01)	-0.04*** (0.01)	-0.03 (0.02)
URB			-0.002 (0.00)	-0.01** (0.00)	0.00 (0.01)	URB			0.002 (0.003)	-0.01*** (0.00)	-0.01* (0.00)
ELF			-0.09 (0.19)	0.51** (0.21)	0.84 (0.60)	ELF			0.02 (0.17)	0.51*** (0.19)	0.55* (0.28)
UNEMP			0.02** (0.01)	0.01** (0.01)	0.00 (0.02)	UNEMP			0.01* (0.01)	0.01** (0.01)	0 (0.03)
GINI			0.02*** (0.01)	0.01 (0.01)	0.01 (0.02)	GINI			0.02*** (0.00)	0.01* (0.01)	0.01 (0.01)
Eastern Europe				0.52** (0.21)	0.94 (0.82)	Eastern Europe				0.38 (0.24)	-0.17 (1.23)
Latin America				0.78*** (0.21)	0.86** (0.38)	Latin America				0.68*** (0.21)	0.68** (0.29)
North Africa & the Middle East				0.54*** (0.16)	0.02 (0.88)	North Africa & the Middle East				0.4** (0.19)	0.07 (0.74)
Sub-Saharan Africa				-0.06 (0.22)	-0.21 (0.43)	Sub-Saharan Africa				-0.14 (0.24)	-0.05 (0.36)
East Asia				0.59*** (0.14)	0.45 (0.50)	East Asia				0.43* (0.23)	-0.02 (1.01)
South-East Asia				0.24 (0.23)	-0.25 (0.76)	South-East Asia				0.14 (0.22)	-0.21 (0.82)
South Asia				-0.01 (0.28)	-0.16 (0.56)	South Asia				-0.05 (0.27)	0.21 (0.66)
The Caribbean				0.61** (0.25)	0.94 (0.69)	The Caribbean				0.25 (0.21)	-0.02 (0.65)
N	160	139	97	97	95	N	172	148	103	103	101
R2	0.49	0.75	0.84	0.89	0.72	R2	0.48	0.77	0.86	0.89	0.81

Significance levels: * p<.10; ** p<.05; *** p<.01

* Dummies for Western Europe & North America, and The Pacific have been left out.

** For the 2SLS latitude and linguistic fractionalization are used as instruments.

NOTE: Coefficients and standard errors (between parentheses) are reported.

Table 10

Panel least squares regression analysis with White robust standard errors and covariance, dependent variable CPI (year dummies not reported in equations 6 and 7)

	1	2	5*	6*	7*
C	-3.21***	7.97***	5.47***	5.73***	2.75*
VAN(-3)	0.04*** (0.01)	0.09*** (0.00)	0.03*** (0.01)	0.03*** (0.01)	-0.05 (0.05)
VAN(-3)^2	-0.004*** (0.00)	-0.003*** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
LGDP(-3)		-0.82*** (0.08)	-0.74*** (0.11)	-0.75*** (0.11)	-0.43 (0.31)
EF(-3)		-0.07*** (0.00)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
GC(-3)		-0.08*** (0.01)	-0.09*** (0.01)	-0.09*** (0.01)	-0.07*** (0.02)
URB			-0.03*** (0.00)	-0.03*** (0.00)	-0.03*** (0.01)
ELF			1.57*** (0.22)	1.58*** (0.22)	2.45*** (0.89)
UNEMP			0.08*** (0.01)	0.08*** (0.01)	0.09*** (0.02)
GINI					0.05 (0.04)
Eastern Europe			1.81*** (0.06)	1.82*** (0.06)	1.8*** (0.28)
Latin America			2.46*** (0.12)	2.46*** (0.12)	1.69* (0.98)
North Africa & the Middle East			1.81*** (0.11)	1.78*** (0.11)	1.13* (0.62)
Sub-Saharan Africa			-0.24** (0.11)	-0.24** (0.11)	-1.59 (0.98)
East Asia			2.17*** (0.16)	2.17*** (0.16)	3.54*** (0.34)
South-East Asia			1.21*** (0.13)	1.22*** (0.12)	0.59 (0.37)
South Asia			0.36** (0.15)	0.3** (0.14)	-0.65** (0.32)
The Caribbean			1.26*** (0.24)	1.21*** (0.23)	1.18*** (0.42)
Periods	7	7	7	7	7
Cross-sections	145	130	88	88	56
N	737	684	454	454	111
R2	0.43	0.71	0.84	0.85	0.80

Significance levels: * p<.10; ** p<.05; *** p<.01

* Dummies for Western Europe & North America, and The Pacific have been left out.

NOTE: Coefficients and standard errors (between parentheses) are reported.

Table 11

Panel least squares regression analysis with White robust standard errors and covariance, dependent variable CCI

	1	2	5*	6*
C	0.43***	4.48***	4.29***	3.71***
DEM(-3)	0.32*** (0.02)	0.18*** (0.01)	0.16*** (0.03)	0.24*** (0.05)
DEM(-3)^2	-0.05*** (0.00)	-0.02*** (0.00)	-0.02*** (0.00)	-0.03*** (0.01)
LGDP(-3)		-0.29*** (0.01)	-0.36*** (0.02)	-0.24** (0.11)
EF(-3)		-0.02*** (0.00)	-0.02*** (0.00)	-0.02*** (0.00)
GC(-3)		-0.03*** (0.00)	-0.03*** (0.00)	-0.03*** (0.00)
URB			-0.01*** (0.00)	-0.02*** (0.00)
ELF			0.81*** (0.05)	1.16*** (0.38)
UNEMP			0.02*** (0.00)	0.04*** (0.01)
GINI			0 (0.01)	
Eastern Europe			0.51*** (0.03)	0.31** (0.14)
Latin America			0.86*** (0.05)	0.75* (0.41)
North Africa & the Middle East			0.62*** (0.01)	0.5 (0.34)
Sub-Saharan Africa			-0.4*** (0.09)	-0.9*** (0.28)
East Asia			0.68*** (0.06)	0.69*** (0.17)
South-East Asia			0.21*** (0.06)	0.06 (0.23)
South Asia			-0.11 (0.11)	-0.34* (0.20)
The Caribbean			0.65*** (0.10)	0.96*** (0.24)
Periods	5	5	5	5
Cross-sections	156	141	87	56
N	758	651	349	97
R2	0.50	0.75	0.87	0.84

Significance levels: * p<.10; ** p<.05; *** p<.01

* Dummies for Western Europe & North America, and The Pacific have been left out.

NOTE: Coefficients and standard errors (between parentheses) are reported.