

CHANGES IN CORRUPTION PERCEPTION: WHAT COMES FIRST?

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ABSTRACT

Corruption, generally defined as the misuse of entrusted power for private benefit, is quite a complex phenomenon and an intricate issue. Corruption has destructive impacts on many aspects of the economy; that is why it can be increasingly seen on national and international agendas of conference meetings and seminars. Nevertheless, no consensus on the exact determinants of corruption has been reached. Most previous studies choose an index as a measure of corruption and estimate the parameters of the models using multiple regression. In this paper, we deviate from this norm and follow Kaufmann, et al.'s suggested method of cross-country and over-time comparisons. Subsequently, in terms of change in the corruption-perception index, we divide countries into 3 groups – (1) countries, which experienced significant improvement, (2) countries, which experienced significant deterioration, (3) countries, which did not experience any significant change. Afterwards, to explain the change, we eliminate structural causes which cannot be changed and proceed with factors that can be influenced by human agency. Using ordered probit, a statistical model for discrete random variables, we try to point out the factors the change of which can lead to a significant change in corruption-perception index. To the best of our knowledge, for the first time, corruption is modeled in such a context. As a result, we find that the improvement of political rights, civil liberties, the change of government and the increase of female labor participation rate are significant to change the level of corruption.

Keywords: Corruption, Economic factors, Political factors, Ordered Probit Model, Probabilistic analysis

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1. INTRODUCTION

In recent years, the presence of corruption has attracted the world's attention making the topic of corruption one of the hottest. Observing the dramatic and destructive consequences of corruption, a growing community of political scientists, economists, policymakers and philosophers have sought to understand its causes. Various studies have resulted in various outcomes once again proving that such broad phenomena are difficult to study.

Numerous papers on the determinants of corruption have used multiple regressions taking one of the corruption perception indexes as the dependent variable and a number of factors as independent variables. One more paper with the same approach and methodology would be superfluous.

Therefore, the present paper deviates from this standard and concentrates on the purpose of finding the factors the change of which result in significant change of the corruption perception index.

The contribution of this paper is threefold. First, for the first time, standard errors are taken into account while making cross-country and over-time comparisons. Second, to our best knowledge, corruption is modeled in such a context for the first time, as well. And third, the methodology employed in this paper allows for further predicting the probabilities of change of corruption index.

The rest of the paper is constructed as follows. Section 2 introduces the concept of corruption and the reasons for becoming a universal topic. Section 3 presents the methods of

measuring corruption and some issues related to its measurement. Section 4 reviews relevant literature on the subject. Section 5 briefly summarizes the problems of empirical studies on corruption. Sections 6, 7 and 8 introduce the central question of the present paper, the novel methodology and data used. Section 9 presents the results and offers some discussion. Section 10 wraps up with a brief conclusion.

2.1 WHAT IS CORRUPTION?

“Corruption is worse than prostitution. The latter might endanger the morals of an individual, the former invariably endangers the morals of the entire country”.

Karl Kraus

Corruption is generally defined as “the abuse of entrusted power for private gain” (*Transparency International, 2003*). Like any other regular market, corruption occurs at the crossroads of different interests. On the one hand, companies and individuals pay bribes to maximize their gains, while on the other hand, public officials and politicians try to maximize their illegal profits, power and wealth.

Thus, corruption occurs at the interface of the public and private sectors (*Rose-Ackerman, S., 1996*). But, of course, there is a crucial distinction between business-to-business, individual-to-business and government corruption. In most cases, the former is either beneficial or self-correcting, whereas the latter is usually disruptive. Business-to-business and individual-to-business bribes are able to grease the wheels of the economy, as they facilitate communication, smooth out the principal-agent relationships. This type of corruption includes a wide variety of types – from free meals to considerably huge payments.

But the more interesting and complex cases occur when transactions are between a private individual or organization and a state official (*Rose-Ackerman, S., 1996*). Such cases do not involve a self-correcting market mechanism and are usually of “negative sum”: the losses of the losers exceed the gains of the winners. That is why there has been a significant and almost exclusive focus on government corruption in economics literature. That is also the reason why

this paper concentrates on government corruption and seeks to understand the driving forces behind it. Henceforth, in this paper we will refer to government corruption as just ‘corruption’.

Corruption is a limp in the walk of human progress (*Shabbir Gh. and Anwar M., 2007*). It is considered to be as old as government itself. It serves as a massive tax on the private sector and hinders economic growth. According to *Nye (1967)*, it is “endemic in all governments”. This phenomenon affects all societies to different degrees, at different times. According to *Glynn, et al. (1997)*, as cited by *Shabbir Gh, and Anwar M. (2007)* “... no region, and hardly any country, has been immune from corruption”. Like a cancer, as argued by *Amundsen (1999)*, corruption strikes almost all parts of the society and destroys the functioning of vital organs.

In the words of *Transparency International*, a non-governmental organization based in Berlin, corruption is “... one of the greatest challenges of the contemporary world. It undermines good government, fundamentally distorts public policy, leads to the misallocation of resources, harms the private sector and private sector development and particularly hurts the poor”. According to *World Bank*, an international financial institution, corruption is “the single greatest obstacle to economic and social development”. The *World Bank (2008)* expected that more than 5% of the world’s GDP each year – which is equal to around USD\$2.6 trillion or nearly 19 times larger than the USD\$134.8 billion globally on official development assistance (ODA) in 2013 were lost due to corruption. Thus, corruption becomes not only a question of morale and ethics, but rather a waste which we simply cannot afford.

In countries with various characteristics – large or small, developed or developing, export-driven or import-driven, corruption has served as reason for governments to fall. In recent years, even dozens of famous politicians (including presidents of countries and prime ministers)

have been discredited and forced out of office. In extreme cases, public outrage against corruption has even been the reason for whole political classes to be replaced.

2.2 TOPICALITY OF CORRUPTION AND THE REASONS

All countries, notwithstanding differences in law systems and income levels, are affected by corruption. Recent cases of major corruption scandals include cases of France, Germany, Greece, etc. The ELF scandal proved that corruption was existent in the management of the French state-owned enterprise. And what is more, a corruption charge against President Chirac was not courted because he had protection by immunity as the head of the state. Furthermore, in Germany, the CDU and Helmut Kohl, the former Chancellor, were fined for accepting illegal campaign funding. Greek politicians have constantly referred to corruption and tax evasion as “a national sport”. Other cases of major corruption scandals include cases of Italy, Mexico, Japan, South Korea, United States, Portugal, etc. The former Prime Minister of Italy, Silvio Berlusconi, has been accused of corruption several times, was convicted of tax fraud in 2013 and was found guilty of bribing a senator in 2015 (*Greek Reporter, 2016*). Even Nordic countries, which always rank among the least corrupt countries in the world, are also not completely guaranteed against cases of corruption. Swedish and Norwegian managers of state-owned companies have been involved in bribe taking.

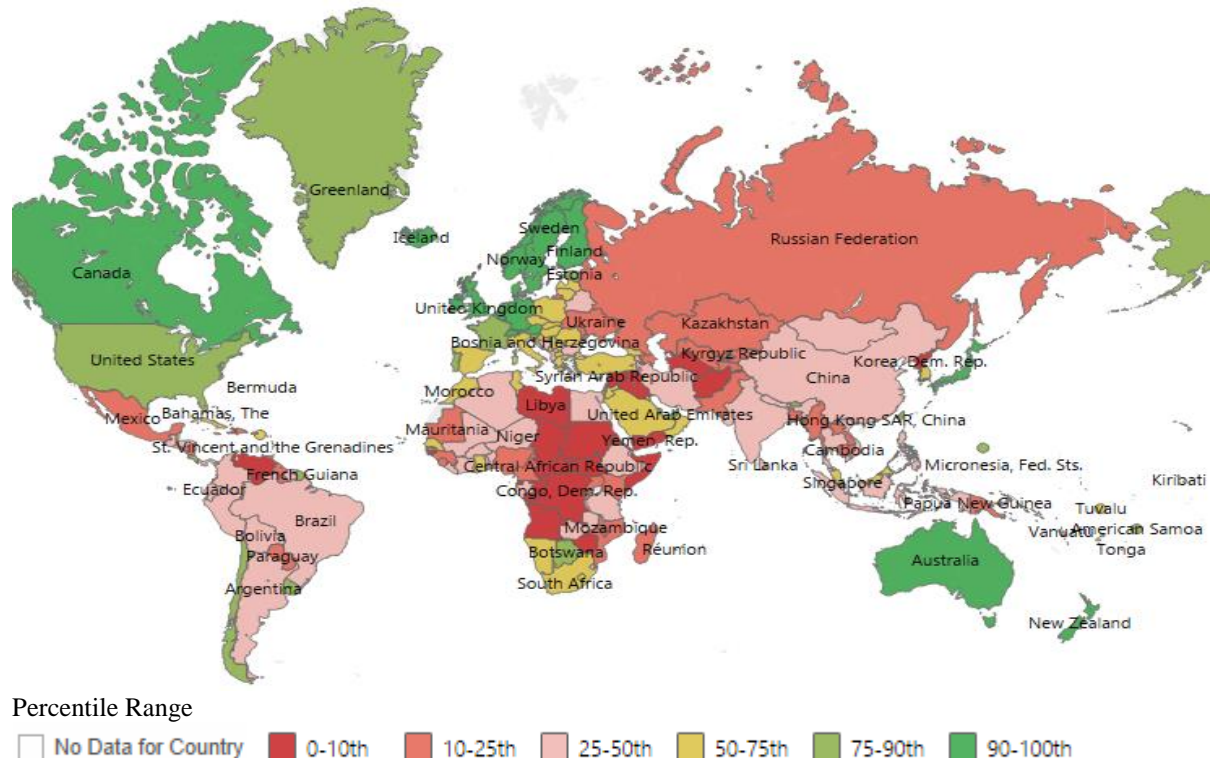
These scandals bring the corruption problem on the agenda of major international institutions like International Monetary Fund (IMF), World Bank (WB), World Trade Organization (WTO), Transparency International (TI) and Organization for Economic Cooperation and Development (OECD), Global Witness (GW).

However, different countries experience different levels of corruption. In some countries, no transaction is confirmed without involving corrupted practices, while in other countries corrupted practices are rarely observed and are hardly tolerated. Table 1 lists the top most and least corrupt countries. Figure 1 demonstrates corruption levels worldwide using the WGI – Control of Corruption index for the year 2015.

Table 1: Most and Least Corrupt Countries, 2015
Source: WGI – CC index, Kaufmann et al.

Control of Corruption index: WGI (2015)	
Most Corrupt	Least Corrupt
New Zealand	Angola
Finland	Guinea-Bissau
Norway	Yemen, Rep.
Sweden	Sudan
Denmark	Syria

Figure 1: Levels of Corruption Worldwide, 2015



Source: Kaufmann D., Kraay A. and Mastruzzi M. (2010), The World Governance Indicators

During the 20th century corruption gained considerable attention in academic research and became “... a meeting place for researchers belonging to various disciplines of the social sciences and history” (*Andvig, 1991*). Due to being a relevant topic in various fields, such as psychology, sociology, law, anthropology, etc. there have been notable scholarly studies on corruption. And in recent years, due to the new developments in measurement techniques, a growing academia of political scientists and economists have sought to understand why some countries are so good at keeping corruption at low levels, while others fail to do so.

It is easy to notice that nowadays the degree of attention paid to corruption is unprecedented and this is nothing extraordinary. However, as there are no reliable statistics, it is impossible to find the definitive answer to why this is the case. Yet, the following two scenarios are possible. First, corruption is a more popular topic nowadays because it is more widespread now than in the past. Second, it is just that we now pay more attention to this phenomenon which has always existed. In this paper, we put forward several arguments in favor of the second scenario.

First, in recent years, there has been a significant increase in the number of democratic governments with free and active media. And as a consequence, there has been created an environment where discussion of corruption is no longer forbidden and instead, is even highly encouraged.

Second, as the severity of corruption is quite different between the donors and the recipients of foreign aid, donors pay more attention to corruption and in many cases require governments to reduce corruption before funding them.

Third, along with increase in globalization, the number of international contracts is also on the rise. Thus, this has led to surge in the international attention paid to corruption.

Fourth, it would be inappropriate and ungrateful to disregard the role of non-governmental organizations, such as Transparency International and the World Bank. Their goals include making people aware of the problems caused by corruption and creating anti-corruption movements all over the world.

Of course, one can come up with a number of effective arguments in favor of the first scenario. But, taking into account the fact that this phenomenon is encountered in many ancient pieces of writings (e.g. “Arthashastra” by Kautilya, the prime minister of an Indian king (2000 years ago), “Inferno” by Dante (700 years ago), “Hamlet” and “Richard III” by Shakespeare (400 years ago)), we proceed believing that the popularity of the topic of corruption is rather a matter of increased attention (*Vito Tanzi, 1998*).

Incidents like the financial crisis of Greece are drastic reminders of where corruption can lead to. The consequences of corruption are rather broad – they range from decrease in investment to misallocation of resources and increased poverty. Among the startling consequences is the fact that corruption is blamed for the deaths of 3.6 million people every year (*BBC, 2014*). The costs of corruption are difficult to calculate, in part because of the secrecy involved and because the distortions caused are hard to measure as well. But some effects seem to be beyond doubt. Below, in Table 2, we have compiled a short summary of the consequences of corruption.

Table 2: Consequences of Corruption

Consequences of Corruption	
Delayed economic growth	Inflation
Lack of economic development	Poor health and hygiene
Unequal income distribution and poverty	Pollution
Increased crime rate	Decrease in foreign investment

Thus, as corruption can have pernicious consequences on various aspects of life, it is essential to understand the determinants of corruption. Only after having enough information about the causes of corruption, we can proceed to the development of policies to address this phenomenon.

3.2 MEASURES OF CORRUPTION

“Measurement is the first step that leads to control and eventually to improvement. If you can’t measure something, you can’t understand it. If you can’t understand it, you can’t control it. If you can’t control it, you can’t improve it”.

James Harrington

During the last decades, the increased attention towards corruption has resulted in several attempts to measure corruption levels in various countries. A number of organizations have come up with various methodologies to measure it and based on their collected data have constructed some indexes. These indexes are constructed based on two general forms of data sources: poll-based data (primary source) and poll-of-polls-based data (secondary source). Meanwhile, there are also two basic approaches to measure corruption at the macro level: namely (1) general or target-group perception and (2) incidence of corruptive activities (also referred to as proxy method) (*Seldadyo, H. and Haan, J., 2006*). The first type of approach is aimed to quantify the feeling of the public or a specific group of respondents regarding the level of corruption. Thus, this kind of measures are indirect measures of the actual level of corruption. The incidence-based approach is based on surveys among those who potentially bribe and those whom bribes are offered (*Seldadyo, H. and Haan, J., 2006*).

It is fundamentally difficult to obtain hard evidence of corruption because of the essence of the phenomenon. Most corruption activities go unreported leaving no paper trail, thus it is quite acceptable to use perception-based indexes. The most popular survey-based measures of corruption are the Corruption Perception Index (CPI) produced by the Transparency International (TI) and the Worldwide Governance Indicators (WGI) – Control of Corruption index produced by a team led by Daniel Kaufmann at the World Bank (WB) (*Details about the datasets are available at <http://www.transparency.org/> and <http://www.govindicators.org/>).*

3.3 CORRUPTION PERCEPTION INDEX

The Transparency International has been producing its index of corruption since 1995. The index is derived by aggregating 13 different perception surveys. For the 1995 and the historical data (1980-1985, 1988-1992), the index was constructed by taking sample averages after transforming the various different scales – drawn from different data sources – into the scale of 0-10. The normal standardization technique was introduced in 1996 but stopped in 2001. The matching percentile technique and the beta-transformation were introduced in 2002. The index underwent methodological changes again in 2010. As a consequence, the CPI is not a consistent time-series. In Lamsdorff's words, "... year-to-year changes may not only result from a changing performance of a country ... changes can result from the different methodologies... not necessarily from actual changes" (*Lambsdorff, 2000*).

3.4 WORLDWIDE GOVERNANCE INDICATORS (WGI)

The Worldwide Governance Indicators (WGI) are a long-standing research project which is aimed to develop cross country indicators of governance. The WGI consist of 6 composite indicators of broad dimensions of governance covering 200 countries since 1996, one of which is Control of Corruption. It captures the extent to which public power is exercised for private gain. The Control of Corruption indicator is constructed based on the data from a wide variety of sources. Then, a statistical methodology known as Unobserved Components Model is applied to (i) to standardize the data from these very diverse sources into comparable units, (ii) construct an aggregate indicator of governance as a weighted average of the underlying source variables, and (iii) construct margins of error that reflect the unavoidable imprecision in measuring governance.

3.5 COMPARISON AND CONTRAST BETWEEN CPI AND WGI

Thus, both indexes aggregate information from a number of sources that include country risk ratings produced by business consultancies, surveys of international or domestic business people, and polls of country inhabitants. Both indexes are constructed by averaging different sources to reduce measurement error (though they use different methods for averaging). However, there are some distinct differences between these indexes. First, the World Bank teams includes all countries for which one component rating is available, TI only includes countries for which three ratings are available, thus increasing precision of the index at the cost of narrowing down the country coverage. Second, in contrast to the CPI, the WGI attempts to improve on statistical uncertainty. While the CPI lists the number of sources and the range and standard deviation among sources, the WGI computes a standard error as an indicator of uncertainty

accompanying each point estimate. Additionally, in 2008 the CPI was calculated from a small set of data from 11 different organizations. The WGI Control of Corruption indicator used these 11 data sources from the CPI, as well as 14 others not used in the CPI, particularly 4 cross-country surveys of firms, 7 commercial risk-rating agencies, 3 cross-country surveys of individuals.

In spite of their similarities and differences regarding methodologies and sources, these two indexes are extremely highly correlated. In 2002 the correlation between them was 0.96, and in 2004 it was 0.98 (*Treisman, D., 2007*).

3.6 HOW GOOD ARE THE DATA?

Though both the CPI and the WGI are commonly used in the research, they are not unproblematic and accordingly have received enough criticism. Many scientists have constantly mentioned the following issues.

First, both indexes are perception-based. Thus, they may reflect many other things besides the phenomenon itself. Cross-national differences in the indexes of corruption may reflect differences in the cultural values, the encouraged level of cynicism, the feeling of freedom to express opinion (*Treisman, D., 2007*).

Second, even if the respondents were asked the same questions regarding corruption, the interpretations would vary significantly because of the difference in cultural contexts. Something that might be accepted as a norm in one country, can become a source of scandal and disgrace in another. In this case, it becomes a matter of perceiving the ‘seriousness’ of such activities and responding to questions accordingly.

Last but not least, it would be wrong to ignore the fact that the choice of respondents also carries a potential influence on the perception-based indexes. In other words, different participants can give significantly different opinions about a country under review. The opinions can represent the narrow interests of some specific groups. A potential bias can be a consequence of including unrepresentative respondents, for example, the elite among business people who have benefitted from corruption and cronyism and, subsequently, are unlikely to report it. In the same way, the samples can exclude respondents who failed in the marketplace or were deterred from entering the market by pervasive corruption. Thus, because of not having homogenous samples, the indicators may not be robust.

But in fact this criticism can be true for individual surveys and not for aggregate indexes such as WGI or CPI. *Kaufmann, et al. (2007)*, for example, use a wide range of sources of data collected from various agents. Thus, the problem of carrying such a bias is more or less solved.

Being aware of these issues concerning such indexes, researchers have come up with several creative solutions. For instance, *Di Tella and Schargrodsky (2003)* have used the prices paid by hospitals in Buenos Aires for homogeneous inputs such as syringes or hydrogen peroxide as an indicator of corruption. Another example is *Golden and Picci's (2005)* index of corruption based on the gap between the existing stocks of public infrastructure and past flow of infrastructure spending across the regions in Italy (*Rose-Ackerman, 1996*). Apparently, this kind of approaches cannot be extended cross-nationally and their usage can be very limited.

So, despite all the criticisms against the CPI and the WGI, there can be no doubt that it is due to these indexes that there has been an explosion in the number of empirical studies about corruption.

4 LITERATURE REVIEW

For many years, scholars have invested much effort to identify empirical regularities between corruption and a variety of both economic and non-economic determinants. Nevertheless, no consensus has been reached regarding the exact determinants of corruption. There is no consensus on the directions of the relationships as well. Moreover, it was observed that some variables, which are highly intertwined with corruption, might just as well be the cause. Hence, as argued by *Lamsdorff (1999)* some indicators and corruption are sometimes two sides of the same coin. So, the question whether corruption causes other variables or is itself the consequence of certain characteristics, is still open to question.

Seldadyo & Haan (2006) categorize the causes of corruption into four classes, namely (1) economic and demographic determinants, (2) political institutions, (3) judicial and bureaucracy environment, and (4) geography and culture. Leaving the moralist literature aside, in this paper we break down this classify the determinants of corruption into the following groups: (1) economic, (2) political and legal, (3) social and cultural, (4) demographic and geographical.

4.1 ECONOMIC DETERMINANTS

There are a number of economic factors that have been found to serve as significant causes of corruption in previous findings. The following part summarizes fundamental findings for this category of determinants.

(1) *Economic development*: Generally, this is one of the most widely discussed variables. In the words of *Salih (2013)*, if we consider corruption as an inferior good, we expect to see a negative relationship between income and corruption.

In most cases, GDP per capita is used as a proxy indicator of income. Many authors including *Kunicova and Rose-Ackerman (2005)*, *Ades and Di Tella (1999)*, *Persson, et al (2003)*, *Tavares (2003)* and *Treisman (2000)* find a negative relationship between corruption and income. The effect of economic development is so strong that its inclusion or exclusion normally increases or reduces explanatory power of relevant regressions (*Sebastian Freille, 2007*). *Braun and di Tella (2004)*, *Ali and Isse (2003)*, *Frechette (2001)* deviating from previous result find a positive relationship between income and corruption. According to *Braun and Di Tella (2004)*, the reason why corruption increases when income increases can be the pro-cyclical nature of corruption – that is, the decrease of moral standards during booms, when “... greed becomes the dominant force for economic decisions”. *Serra (2006)* doing a sensitivity analysis on determinants of corruption find that out of 28 variables country’s level of development is among the 5 variables highly related to the perceived level of corruption.

(2) *Income distribution*: Income distribution proxied by Gini coefficient in estimation is also a commonly studied cause of corruption. *Paldam (2002)* and *Amanullah and Eatgaz (2007)* find that income inequality explains some variation in corruption. According to *Paldam (2002)*, “A skew income distribution may increase the temptation to make illicit gains”. However, *Braun et al. (2004)* and *Park (2003)* find no significant relationship between corruption and inequality.

(3) *Government size*: This factor is commonly believed to be a source of corruption. Theoretically, it is argued that with large governments, bribes to public servants might increase relative to firms’ revenues (*Lambsdorff, 2000*). *Ali and Isse*

establish positive relationship, while *Fisman and Gatti (2002)* and *Bongalia et al. (2001)* report the opposite. Moreover, the direction of causality is not straightforward in this case as well and is frequently discussed.

(4) *Foreign aid*: Again, we observe conflicting theoretical views and empirical supporting regarding the effect of foreign aid on corruption. But generally, it is observed that aid recipient countries are characterized by higher corruption levels, while donor countries are characterized by lower corruption levels. *Ali and Isse* find a positive relationship, while *Tavares* finds a negative relationship. Decision makers have a lot of discretion regarding transferred resources in the absence of accountability. Thus, there is assumed to be a negative relationship between foreign aid and corruption. At the same time, *Audrey-Rose Menard (2008)* reports that there is no causality between aid and corruption performing Granger-causality tests on a dataset of 71 developing countries over the period 1996-2009.

(5) *Foreign direct investment*: Enjoying high foreign direct investment and being stable and safe go hand in hand. Thus, these countries have low levels of perceived corruption. On the other hand, when a country has low level of foreign direct investment, it implies low level of trust. Therefore,

(6) *Trade openness and share of import in GDP*: There seems to be a consensus among authors on the negative relationship between corruption and trade openness/share of import in GDP. It is theoretically argued that high import share is associated with low tariff and non-tariff import restrictions. In contrast, if there are such restrictions, this creates a room to bribe. And empirical result support this hypothesis (*Persson et al., 2003; Frechette, 2006; Ades and Di Tella, 1999*).

(7) *Economic freedom*: In societies, where economic freedom is high, individuals feel free to work, produce, consume and invest as they wish, while governments allow labor, capital and goods to move freely. So, naturally, countries enjoying high economic freedom are also perceived to have less corruption (*Gurgur and Shah, 2005; Treisman 2000*).

4.2 DEMOGRAPHIC AND GEOGRAPHICAL DETERMINANTS

(8) *Human capital*: In many empirical studies, scholars have tried to establish a relationship between human capital (which is proxied by schooling) and corruption. Authors seem to agree on the statement that educated people are better at judging government performance and controlling corruption levels (*Ali and Isse, 2003*). Only *Frechette (2001)* deviates finding a counter-intuitive evidence on the positive relationship between corruption and the level of human capital.

(9) *Female labor force participation*: It turns out that different genders have different influences on the level of corruption. *Swamy et al. (2001)* provide four arguments to explain this. First, “women are brought up to be more honest or more risk averse than men”. Second, women may feel the responsibility to practice honesty, as they are more involved in raising children. Thus, to have honest children with good values they stay away from corruption. Third, women may be more inclined to follow rules, than men may be, because the latter can usually try to break them showing their strength and independence. Finally, women may exercise self-control better, and thus they may engage in criminal behavior less.

(10) *Population size*: The views about the effect of this variable are also mixed. *Tavares (2003)* reports that there is a negative relationship between population growth and corruption, while *Knack and Aztar (2003)*, *Treisman (1997)* suggest that corruption increases when population grow. At the same time, they provide a clear warning against their finding showing that the correlation between population size and corruption is a consequence of sample selection problems.

(11) *Latitude*: However surprising it might seem, distance from the equator is also correlated with corruption. *La Porta et al. (1999)* find that countries which are located far from the equator, have lower corruption. His explanation ties this with colonial influence. Similarly, trade distance and corruption are shown to be correlated by *Ades and Di Tella (1999)* as well. They argue that being located far from exporting countries creates a fertile land for corruption to rise.

(12) *Natural resources*: It turns out that sometimes even ‘good things’ are a source of corruption. In their cross-country studies, *Tavares (2003)* and *Bonaglia et al. (2001)* have reported a positive relationship between the amount of natural resources (especially oil, fuel) and corruption. *Tornell and Lane (1998)* argue that this nexus is because of the rents-related corruption that arises in case of rich natural endowments.

4.3 POLITICAL AND LEGAL DETERMINANTS

(13) *Political stability*: Using a cross-country dataset *Campante et al. (2007)* find that there is a U-shaped relationship between political stability and corruption.

He backs up this finding by arguing that the willingness to engage in corrupt activities is higher in case of less stable government incumbents, while more stable government incumbents are usually offered higher bribes. Furthermore, *Campante et al. (2007)* indicate that the turning point of this relationship is eight years. That means that if the incumbent government continues its governance for more than eight years, it would also increase the level of corruption.

(14) *Political freedom*: Perhaps this is one of the rare determinants of where most authors we have come across have agreed on a negative nexus between political freedom and corruption. More political freedom is expected to reduce corruption, as it ensures political competition and checks and balances mechanisms (*Seldadyo & Haan, 2006*). This theoretical relationship is also established empirically by numerous studies (*Kunicova and Rose-Ackerman, 2005, Gurgur and Shah, 2005, Braun and Di Tella, 2004, Frechette, 2006, Swamy et al., 2001*). Usually, political freedom is effectively proxied by press freedom. Hence, a free press appears to be a solid deterrent to corruption.

(15) *Electoral rules*: In their study *Persson, et al. (2003)* report that smaller voting districts and thus few representatives being elected in each district are a source of corruption. They argue that it is because they impede the entry of new candidates. More effort is needed for a candidate or a political party to adapt to local requirements and needs in case of small voting districts. Consequently, there are few candidates and the levels of competition and accountability are low. Actually, this is a fertile ground for corruption to raise its ugly head. In contrast, in large districts there

are barely any barriers to entry for new parties, thus due to higher competition the level of corruption is low.

(16) *Decentralization*: Neither theory nor empirical studies show a clear-cut answer to the question whether decentralization is a cause of corruption or not. *Ali and Isse (2003)* argue that decentralized government reduces corruption, while *Fisman and Gatti (2002)* find a negative relationship.

(17) *Quality of judicial system*: There can be no doubt that having a strong judicial system is an effective way to combat corruption. Thus, judicial system is also among the few determinants upon which there seems to be a consensus. *Ali and Isse (2003)* and *Park (2003)* have reported the expected negative relationship in their empirical studies. Frequently used proxy for the quality of judicial system is the rule of law index of *Kaufmann et al. (1999)*, which measures the effectiveness and predictability of the judiciary and the enforceability of contracts.

(18) *Quality of bureaucracy*: *Gurgur and Shah (2005)* and *van Rijckeghem and Weder (1997)* report that countries, which enjoy high quality bureaucracy, also have lower levels of corruption.

(19) *Wage levels*: *Van Rijckeghem and Weder (2001)* test the link between the level of public sector salaries and corruption and find a negative relationship. Generally, in most developing countries where wages are low, civil servants try to supplement their incomes illicitly through corruption. At the same time, high salaries can be viewed as premiums, which will be lost if a public servant is caught and fired. Thus, a simple cost-analysis would suggest that higher wages would provide an

incentive to restrain from corruption. But other authors have reached ambiguous conclusions regarding this nexus (*Swamy, et al. 2001, Treisman, 2000*).

(20) *Other factors:* According to some authors, presidential system also encourages corruption (*Kunicova and Rose-Ackerman, 2005; Lederman, et al., 2005, Chang and Golden, 2007*). They argue that the reason is that under such systems the presidents have extensive legislative and non-legislative powers, which creates favorable conditions for corruption to arise. *Chang and Golden (2007)* also report that the number of political parties is also a determinant of corruption. When the number of political parties is high, public is less efficient at monitoring the behavior of politicians. Hence, with more political parties corruption is more widespread.

4.4 SOCIAL AND CULTURAL DETERMINANTS

(21) *Religion:* In their study *Treisman (2000)* and *Chang and Golden (2004)* report that lower levels of corruption are typical to countries with many Protestants. The explanation goes as follows: Protestant religion and traditions are associated with an egalitarian community, rather than with hierarchical societies. Thus, it is intuitive to expect lower corruption in such societies.

(22) *Ethno-linguistic homogeneity:* In many studies we can see a negative relationship between ethno-linguistic homogeneity and corruption. In *Ali's and Isse's (2003)* words, in ethnically diverse (aka, heterogeneous) societies, a civil servant act sequentially: first, to his close kin, to his ethnic group and then maybe to his country.

As a result, in a heterogeneous and fragmented community, equal and fair treatment among all members is less probable.

(23) *Cultural values*: In their extensive and intensive study, *Seleim and Bontis (2009)* test the link between a number of cultural values and corruption. Their findings suggest, for example, that human-oriented values (tolerance of mistakes, friendliness, sensitivity, etc.) and high individual collectivism (strong ties within small groups such as family, friends) encourage corrupted practices. Of course, culture can only explain a certain fraction of corruption and there surely remains sufficient room for improvements of a country's integrity.

5 EMPIRICAL ISSUES

There is an absence of a theory-based consensus on which we can base empirical research about the causes of corruption (*Alt and Lassen, 2003*). And naturally, this leads to several problems.

- First, there is no agreement about the choice of variables that can be included in econometric models as the 'true' determinants are still unknown. One has to try different combinations of a number of variables to investigate the effect.
- Second, there may be a simultaneity (causality) problem – corruption may have an effect on some variables but is, at the same time, likely to be the consequence of them. One of the best-known feedback relationships is the corruption-income relationship. An increase in income may reduce corruption, while a lower level of income may lead to an improvement in income. The same applies to many other variables, like trade openness,

government size, political stability, etc. So, it is rather difficult to derive clear arguments with respect to causality.

- Third, the significance of a certain variable can depend solely on the type of the model. One variable can be significant in a particular model, and insignificant in the other one once other variables are taken into account. To examine the issue of uncertainty various techniques, such as the Extreme Bounds Analysis (EBA) (*Leamer, 1983; Sala-i-Martin, 1997*), the Bayesian Model Averaging (BAM) (*Chatifield, 1995*) have been used.
- Fourth, there can be a multi-collinearity problem – that is, the influence of a particular variable may depend on the choice of the other determinants taken into account. We can safely evaluate the effect of one determinant on corruption only if that particular determinant is orthogonal to all other variables used in the model.
- Finally, most empirical models of corruption usually assume the existence of a direct link between corruption and its determinants. But in fact variables can have indirect and interaction effects on the corruption. That is, a variable can affect corruption through its effect on another variable that, in its turn, has an influence on corruption. Similarly, some variables can have a combined effect on corruption. So, structural models or interaction terms can be useful in this case.

6 CENTRAL QUESTION

The main objective of this study is to find out which factors have a significant influence on the change of corruption perception index. To the author's best knowledge, there has been a number of studies on the causes of corruption, but none of the studies has investigated the factors change of which are able to affect the level of corruption. We find studying corruption from this perspective particularly valuable and important, because corruption is a hot topic that has destructive effects on the economy and many governments are up to fighting against this evil by taking steps to lower the levels as much as possible. This growing recognition has stimulated demand for monitoring this.

7 METHODOLOGY

Being a very sensitive area of research, studying corruption requires a thorough approach. This paper deviates from existing empirical literature on corruption in the following significant way. Most papers on the determinants of corruption have employed multiple regression using an index as a dependent variables. In this paper, we deviate from this norm in a significant and valuable way. To the best of our knowledge, corruption is modeled in the context of discriminant analysis with three groups of countries for the first time.

We construct our dependent variable in a way that it takes on some discrete values – indicating 3 country groups – namely, countries, where corruption has increased, countries, where corruption has decreased, and countries, where there was no significant change of corruption. Taking into account the fact that corruption is not resilient and does not change easily from year to year we take the following time framework - we consider the change in the level of

corruption perception from year 2002 to year 2015. After an intensive and extensive research, we have decided to exploit the WGI – Control of Corruption index in our paper for the following reasons:

- First, there has not been any methodological change in the construction of this index. Therefore, unlike CPI, we are able to use this index when making comparisons over time.
- Second, authors of the index report that wherever possible they make changes consistently for all years in the historical data when they observe small changes in the set of sources on which the WGI scores are based. Thus, the index allows for maximum over-time comparability.
- Third, corruption, being a difficult thing to measure, has some intrinsic issues regarding unavoidable uncertainty of the estimates. To solve this issue, authors report the aggregate WGI measures in 2 ways: the standard normal units of the governance indicator (which runs from -2.5 to 2.5 with higher values indicating better governance, and thus less corruption) and the margins of error (which reflect the reality that available data are just imperfect proxies for the concept they are trying to measure). Through the use of margins of error, it is possible to capture the range of likely values for each country. Virtually, no other corruption index is reported with the margins of error. Thus, the key strength of the WGI is the explicit representation of this imprecision which allows to make comparisons between countries and over time.

In this paper, we follow *Kaufmann et al.'s (2009)* suggested method of making cross-country and over-time comparisons taking into consideration the confidence intervals.

Step 1: Transforming point estimates into intervals

Given yearly estimates and corresponding standard errors we convert the point estimates into 70% confidence intervals by the following formula.

$$\bar{x} \pm t \frac{s}{\sqrt{n}}$$

For illustrative purposes, we have chosen 3 countries (Armenia, China and Greece) for which we show how the calculations, transformations and comparisons are done. The intervals vary across countries, because different countries are covered by a different numbers of sources with different levels of precision. The table below is an outcome of an interval construction for those 3 countries.

Table 3: Point Estimates and Intervals

		Confidence Level 70%							
		t=1.036							
		2002				2015			
Country	Code	Estimate	StdErr	LCL	UCL	Estimate	StdErr	LCL	UCL
Armenia	ARM	-0.65	0.23	-0.89	-0.41	-0.45	0.14	-0.60	-0.30
China	CHN	-0.65	0.16	-0.81	-0.49	-0.27	0.13	-0.40	-0.14
Greece	GRC	0.44	0.18	0.26	0.62	-0.13	0.15	-0.28	0.02

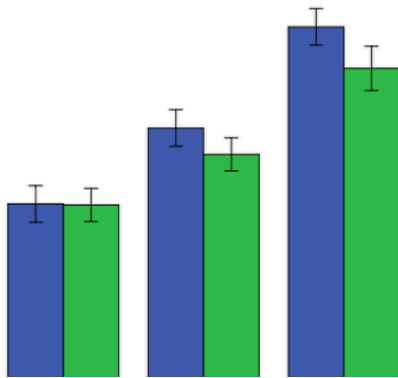
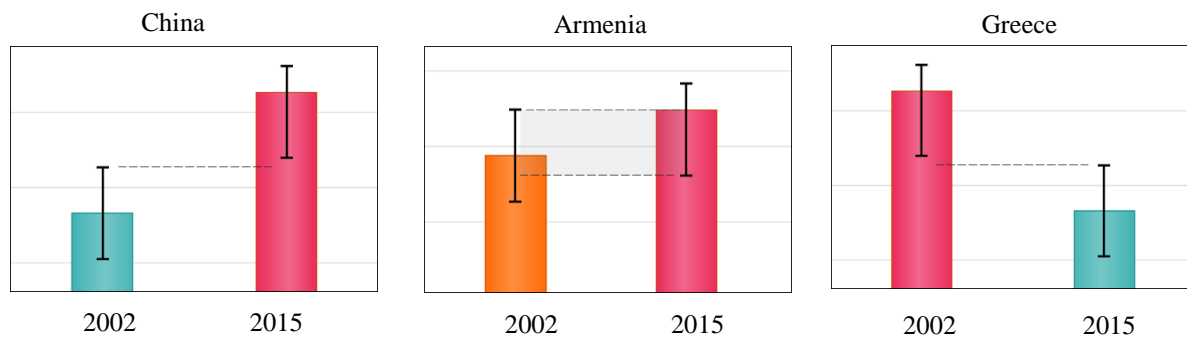


Figure 2: Point Estimates and Intervals

Step 2: Comparing the intervals

Again, as suggested by the authors of the index, a useful and conservative rule of thumb is that when these intervals overlap for two countries, or for two points in time, then the estimated differences in governance are too small to be considered statistically significant (*Kaufmann, et al. 2009*). To continue our illustrative example with the 3 countries, below is the depiction of interval comparison.

Figure 3: Overlapping and Not Overlapping Intervals



It is obvious that, China improved significantly on the corruption level, Greece deteriorated significantly on the corruption level, and Armenia did not undergo any significant change during the period.

Implementing this step across all the countries in our dataset, we find that in 27 countries the Control of Corruption has improved significantly, while deteriorations took place in 32 countries. Yet, in the remaining 134 countries there were no sharp changes. Thus, we divide the countries used in this study into the following 3 groups:

- countries, where corruption has decreased significantly
- countries, where corruption has increased significantly
- countries, that did not experience a significant change

Below you can see the table summarizing the success set against the deteriorations in the Control of Corruption.

Figure 4: Frequencies

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WGI	Freq.	Percent	Cum.
-1	32	16.58	16.58
0	134	69.43	86.01
1	27	13.99	100.00
Total	193	100.00	

Figure 5: Grouped Countries

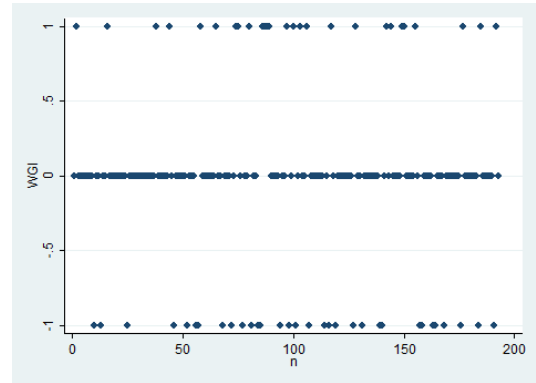


Table 4: Country Groups

Significant Changes in Control of Corruption (2002-2015)			
Deteriorations	32 countries	AUSTRIA ERITREA GREECE ITALY KUWAIT LIBYA MADAGASCAR MAURITANIA MEXICO OMAN SPAIN SYRIAN ARAB REPUBLIC TUNISIA UNITED STATES BAHRAIN BRAZIL HUNGARY	LEBANON NICARAGUA PUERTO RICO SOUTH AFRICA SUDAN YEMEN, REP. CUBA DOMINICAN REPUBLIC EQUATORIAL GUINEA GUINEA-BISSAU IRAN, ISLAMIC REP. ISRAEL MONGOLIA PORTUGAL SURINAME
Improvements	27 countries	ESTONIA GEORGIA INDONESIA JAPAN LATVIA LITHUANIA MACEDONIA, FYR MICRONESIA, FED. STS. RWANDA SERBIA TURKEY URUGUAY ZAMBIA	CHINA SOLOMON ISLANDS ALBANIA BELARUS CÔTE D'IVOIRE HAITI HONDURAS JAMAICA JORDAN KAZAKHSTAN LIBERIA NIGER ROMANIA SEYCHELLES

Step 3: Assigning numbers to these groups

Afterwards, there was need to assign numbers to the 3 groups of countries in order to differentiate between them. For the sake of simplicity and easiness to grasp the intuition, we assigned 1 to countries which significantly improved their level of corruption, 0 to countries which did not experience a significant change, and -1 to countries which deteriorated their level of corruption. Thus, by this step we have actually converted the continuous variable Control of Corruption into a discrete variable, which takes the following limited set of values - -1, 0, 1.

Step 4: Choosing the type of the model

As a result, we are left with 3 discrete numbers as our dependent variable.

$$y_i = \begin{cases} 1, & \text{if there is a significant improvement} \\ 0, & \text{if there is no significant change} \\ -1, & \text{if there is a significant deterioration} \end{cases}$$

The outcomes are mutually exclusive and collectively exhaustive.

This treatment of our index has the following advantages.

- First, in this way we are able to find factors changes of which affect the level of corruption in subsequent periods.
- Second, it gives the opportunity to estimate the probability of a change in corruption for each country included.
- Third, the Ordinary Least Squares (OLS) estimation technique is not very appropriate when the dependent variable is a limited discrete variable, because the error term suffers from the problem of heteroscedasticity. As a consequence, the OLS estimates of the unknown parameters will not be efficient, meaning that the variance of error term will not be minimized.

8 DATA

INDEPENDENT VARIABLES – DATA

In this study, we exploit three types of independent variables.

$$y_i^* = \beta_1 \Delta X_i + \beta_2 \bar{X}_i + \beta_3 X_i + e$$

where ΔX_i and X_i are vectors

ΔX_i – change or percentage change in the independent variable

\bar{X}_i – average value of the independent variable

X_i – dummy variable

Following the literature, we have taken out some commonly investigated variables and have finally come up with this list.

GDP PPP: This variable is calculated based on data obtained from the World Bank statistics.

Aid: This variable shows the net official development assistance received divided by GDP.

Again, data are obtained from the World Bank statistics.

Economic Openness (Trade): This is proxied by Trade Openness. It is measured by sum of imports and exports divided by GDP. Imports, exports and GDP are obtained from the World Bank statistics.

Economic Freedom. This variable is produced by Heritage Foundation. It is measured based on 12 quantitative and qualitative factors from the following categories: Rule of Law, Government Size, Regulatory Efficiency, Open Markets.

Female Labor Force Participation: It is measured as a percentage of the total labor showing the extent to which women are active in the labor force. Labor force comprises people ages 15 and

older who meet the International Labor Organization's definition of the economically active population.

Government Change: This dummy variable shows whether there was a government change (meaning party change if there is a parliamentary system or change of the presidential position party if there is a presidential system). The data are obtained from Quality of Government dataset.

Fraud: The data obtained from the Database of Political Institutions measures whether vote fraud or candidate intimidation were serious enough to affect the outcome of elections.

Political Rights: The variable measures the level of participation of citizens in the establishment or administration of government. Data is downloaded from Freedom House.

Civil Liberties: The data is obtained from the Freedom House. It is a popular proxy for freedom measuring the extent to which people have guarantees and freedoms that the government cannot abridge.

In our study, we have eliminated structural causes which cannot be changed either over time or over short periods, such as geographical factors, cultural values, the age of democracy, etc. We have chosen the above-mentioned variables because they are effected by human agency. Hence, we try to find the factors the change of which are significant enough to affect country's corruption levels.

Whenever possible, the independent variables are taken as either the averages or the average growths of 1996-2002 figures.

Therefore, this study is a quantitative research, and its contribution is primarily methodological. In this paper we employ cross sectional data for 193 countries for the period 1996-2002 for our independent variables and 2002 vs 2015 for our dependent variable. The aim of taking 2 subsequent periods is as follows:

1. A change in corruption perception is a process that takes long time, so we look for causes of change before the actual change.
2. In this way, we also solve the problem of endogeneity to some extent – our estimated model will no longer suffer from reverse causality problem.

This paper deviates from the existing empirical literature on corruption by implementing an ordered probit regression. To the best of our knowledge, for the first time, corruption is modeled in such a context following Kaufmann's method of comparison over time and across countries. We have constructed our dependent variable and have made calculations and adjustments on our independent variables in such a way that we can use this type of a model. Since the dependent variable takes only 3 discrete values (-1, 0, 1) which have ordered sequence, the ordered probit F will show the standard normal cdf. The explanatory variables used in in this study can predict probabilities of corruption change.

9 ESTIMATION AND RESULTS

We have used an ordered probit regression estimation technique to estimate the parameters of the model presented in the following equation.

$$y_i^* = \beta_1 Fem_i + \beta_2 EF_i + \beta_3 PR_i + \beta_4 CL_i + \beta_5 PPP_i + \beta_6 Aid_i + \beta_7 Trade_i + \beta_8 Gov + \beta_9 Fraud + e$$

The variables have been tried in several combinations. We report here 2 versions of the model with different specifications.

Table 5: Regression Outputs

	(1)	(2)
	Model A	Model B
PPP1	-0.0000895* (0.039)	-0.0000129+ (0.068)
Aid1	-0.0246 (0.374)	
Trade1	-0.00198 (0.484)	
EF1	0.0218 (0.254)	
Fem3	-0.448** (0.005)	-0.361** (0.001)
CL1	-0.517* (0.042)	-0.276+ (0.076)
PR1	0.419* (0.033)	0.218+ (0.076)
Gov	0.463+ (0.088)	
Fraud	0.116 (0.777)	
cut1		
_cons	-1.073 (0.489)	-1.607** (0.000)
cut2		
_cons	1.246 (0.422)	0.596* (0.028)
N	91	172
pseudo R-sq	0.140	0.080

p-values in parentheses

+ p<0.1, * p<0.05, ** p<0.01

In the estimated model titled “Model A”, we see that the average level of GDP PPP, the changes in Political Rights and Civil Liberties are significant at 5% significance level, the Government Change is significant at 10% significance level, while the change in Female Labor Force Participation is significant at 1% significance level. Since the F statistics in the model is statistically significant at the 5% significance level, the model’s goodness of fit is significant. However, the interpretation of R squared is not similar interpretation in case of OLS.

After dropping the variables, which we failed to we have rerun the regression. Though government change was significant in Model A, we eliminated it in the second model because of the fact that we had fewer data. The results are presented in Table 5 under the title “Model B”. The average level of GDP PPP, the improvement of Political Rights and Civil Liberties are still significant but now at 10% significance level, whereas the increase in Female Labor Force Participation is significant at 1% significance level.

10 CONCLUSION

Because of the many negative consequences of corruption, there is no shortage of reasons to study the causes and to take preventive and corrective actions to fight against it. In recent years, there has been a wave of empirical studies on the determinants of corruption.

This study has resulted in the following useful conclusion. The issue of corruption is a symptom of deep-rooted and fundamental political and institutional weaknesses and shortcomings in a country. To design and implement effective measures to fight against corruption, policymakers should thoroughly investigate the underlying causes instead of the symptoms.

Certain emphasis should be put on tackling the root causes. Particularly, institutional weakness are closely linked to the level of corruption. Principally, corruption is reduced by improving nation's political rights and civil liberties. Additionally, females also play an important role in determining the level of corruption. More women, more discipline and morale, less corruption. Another important inference that can be made from this paper is that the best hope to overcome corruption is the change of the government. However, there can be no doubt that the efforts to fight against corruption should be implemented at a number of levels.

This study opens the door to further developments. Specifically, this study can be extended examining the odds ratio, paying close attention to probabilities and marginal effects.

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