**Aalto University
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Corruption as a field of economics: Experimental approach and design

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OBJECTIVES OF THE STUDY

This thesis has three main objectives. To provide a thorough review of the theoretical foundation of corruption in economics, introduce the methodologies and their main results and lastly design an economic corruption experiment addressing mechanics and importance of reciprocity for individuals in comparison to other moral costs of corruption.

THEORETICAL FOUNDATION

Theoretical foundation reviewed in the thesis comprises of both theoretical and practical aspects of corruption. Theoretical part includes definitions and main categories of corruption while the practical part introduces the real world mechanics of corruption and the challenge they pose for development of a unified theory of corruption and anticorruption policies.

METHODOLOGIES

While this thesis introduces all five main approaches to corruption research in economics; perception indices, surveys, observation and lab and field experiments, special emphasis is placed on the latter two that comprise the experimental approaches of corruption research. The experimental approach is shown to have revolutionized an otherwise stagnant field of economics and holds great promise as a research tool for the notoriously difficult research subject of corruption.

EXPERIMENTAL DESIGN

This thesis provides a complete design, motivation and theoretical foundation for an experiment of the corrupting effects of reciprocity in bribery. As reciprocity is identified to be the key mechanic of bribery, this experiment intends to examine and value the effects of reciprocity on individual's decision making as a source of implicit bribery.

KEYWORDS

Corruption, experimental economics, bribery, moral costs, field, laboratory, dictator game, reciprocity, framing.

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1. Introduction

Corruption today is like the dark matter of economics. It is difficult to measure let alone to observe. It is a pervasive force in all economies in the world yet its mechanics have so far been poorly understood and scarcely researched. Corruption is publicly regarded as immensely undesirable and unfair phenomenon and often accredited as one of the leading causes of economic adversity. No-one knows the exact figures of corruption in the world aside from crude estimates due to corruption being difficult to measure let alone to observe.

After two decades of definitional debates scientific community settled on defining corruption as the abuse of public office for the private gain (Farrales 2005). This definition has been since refined further into various sub-types of corruption.

Corruption has been part of economic systems since the dawn of organized civilization, but it has only recently been taken as a serious research subject. The issue of corruption is very complex, veiled in secrecy and highly informal. Often merely observing corruption is not enough, but an observer also needs to know what to look for in order to detect it. Corruption has been poorly explained through application of economic theory beyond the point that people do respond to economic incentives, but there are many unknown factors and mechanics at play. This fact has come up many times in the failures of anti-corruption policies (Persson, Rothstein & Teorell 2012). While these policies might sometimes work, most often than not they remain ineffective or worse, counterproductive and fostering corruption rather than deterring it.

These issues have been reflected in methodologies of corruption research that aims to uncover hard realistic data at cost-effective and replicable methods. The answer for this has come in the form of experimental research that has revolutionized the field for the last decade. A surge in corruption literature testifies to the merits of the new method (Lambsdorff 2012) although it is still at its infancy and remains to be mastered as a method by the research community at large.

In corruption research experiments have targeted mostly bribery. These bribery experiments specifically study the effects of moral costs on decision-making of an individual, as rational choice (on which most economic analysis is based on) often precludes moral costs. This is

usually due to the unquantifiable and highly idiosyncratic nature of moral costs. However it is important to understand the impact and mechanics of these costs. After all, the success of countries categorized as low corruption is usually attributed to the honesty of their officials rather than to a "good system" of catching corruption. An honest person can thus be described as a person with high moral costs.

Reciprocation and trust are two central tenets of bribery. Both are required for continuous bribery to exist. Much of the bribery research focuses on mechanics of reciprocation as either one or multiple round games, but I encourage taking this line of analysis even further and study the effects of reciprocation in isolation from other factors. The effect can be partially quantified by comparing its moral benefit to the moral costs of corruption. This can be conducted under both laboratory and field experiment settings which I will describe later in detail. Benefits of this research can help us explain political corruption and shape policy on lobbying that is considered by leading economists as legalized corruption (Roubini 2011).

In this thesis I intend to provide an exhaustive account of effects and mechanics of corruption as well as their theoretical and even historical context. Understanding the complexity involving the topic of corruption is necessary in creation of meaningful research. To this end I will also be introducing the colorful methodology of the subject, but will focus my literature review on experimental research of bribery and reciprocity. In order to promote experimental research methodology in corruption and showcase it, I will be designing two experiments of which one is conducted under lab condition while the other is a field experiment where subjects are unaware of the experiment. These experiments are intended to pit moral costs of corruption against the moral benefits of reciprocity. The thesis contains detailed instructions and material for both experiments as well as guidance for conducting and analyzing their results.

The thesis can be regarded to consist of two sections: theoretical and experimental. The theoretical sections includes the first three chapters. In chapter one of the thesis I will focus on definition, effects and theoretical aspects of corruption with intent to provide an exhaustive description of what is meant by corruption in economics, what are its effects and how does it work in real life. Chapter two introduces the existing research methodology, its purposes and main lines of research. I will also discuss the efficacy and merits of each

method. In the third chapter I will go over the existing literature on experimental corruption research of bribery and its various lines of research.

The experimental section comprises of chapter four through six. I begin it in chapter four with a theoretical discussion of the experimental design, addressing certain research challenges and laying out my hypothesis of moral benefits of reciprocity. Chapter five will discuss experimental theory from which experiments were derived and address methodological concerns of experiments in general. It will also contain specific experiment instructions for laboratory and field experiments respectively. In chapter six I propose an analysis guide for the experiments as well as my hypotheses regarding the results of the experiments. Lastly, chapter seven summarizes both parts and provides my conclusions regarding these types of experiments as research tools for corruption in economics.

1.1. Definition of Corruption

I find it important to being this paper with a short discussion on how corruption in economics is defined and the reasons behind it. Unlike most economic topics like unemployment or interest rates, corruption can be interpreted in many ways. Thus in order to conduct and interpret research in any meaningful way it is necessary to begin by defining precisely what corruption in economics is and what it is not. I will start with a general discussion on corruption as a topic of public and economic interest and finally, I distill it into a formal definition and categorizations used in modern economics.

Corruption is a relatively new economic variable in terms of general and academic interest. Until 1990s corruption did not receive widespread attention on a macroeconomic level in the public or academic circles. The first notable economic inquiry into the matter came in the form of a paper "The Economics of Corruption" by Rose-Ackerman (1974). It was a combination of applied microeconomic methods and principles of Industrial Organization to devise contracting procedures that would reduce criminal incentives of corruption. However economists were not inspired by this new field of interest both because of high methodological challenges as well as a relatively low public interest compared to other important economic variables of the day such as inflation and exchange rates. With the

liberalization of trade and the replacement of communist regimes with capitalism, interest towards corruption begun to rise, both because the problem became more visible and development of new research methods namely behavioral economics.

Nowadays corruption is widely known phenomenon and the public view on corruption is generally negative. But even though corruption is pervasive and significant around the world (Shleifer & Vishny 1993), attitudes towards corruption are affected heavily by cultural bias and vary across countries (Paldam 2002). In some countries corruption is regarded as a highly criminal activity while in others, usually where corruption is more prevalent, it is tolerated and even regarded as a part of life. However, in general the attitude towards corruption is without exception always negative, with only the degree tolerance changing.

Another interesting aspect of corruption is that it has considerably evolved over time. Compared to a usual economic variable like the unemployment, activities regarded as corrupt have changed and still change almost on annual basis. Legislation aimed at preventing corruption is constantly evolving to encompass more and new activities (eg: legislation on campaign donations in recent years), but the world is adapting to circumvent these laws as well (eg: lobbying industry).

So what is meant by corruption? One way to describe corruption is to call it a tax (Shleifer & Vishny 1993). In its essence, corruption is a trade of public resources for a private gain. Public officials who are the keepers of public resources have an economic incentive to participate in a trade that would convert resources that are public into gains that are private ie: their own. Shleifer & Vishny (1993) note that in most cases goods sold by government officials are not pursued for their own sake, but enable the private agents to pursue an economic activity they couldn't pursue otherwise. These goods can be licenses, passports, permits or any other sort of document needed to comply with legislation that restricts private economic activity. To discourage this sort of opportunism by the officials, there usually exists a number of measures and sanctions that monitor and protect public resources against such misuse. The only problem is that they are far from perfect or effective to detect corruption leaving many opportunities for abuse.

Technical definitions

Formally corruption in economics is defined as the abuse of public office for private gain (Armantier & Boly 2011, Shleifer & Vishny 1993, Aidt 2003). Shleifer & Vishny (1993) define abuse as a sale of government goods which can be material or immaterial. In such cases the official is charging personally for the goods or services that are officially owned by the state.

Technically corruption is a two part process that involves the reception of a benefit and the return of one from public resources. The benefit can be material or immaterial and need not be purely private, but it must have a private element to it. The nature of the private gain is such that it can be an indirect benefit resulting from a public benefit received from the bribe. An example of this can be a drug dealer providing narcotics detective information about his competitors in exchange for protection from the law. The public benefits from less drug dealers on the streets, albeit temporarily, but the detective benefits through his career by receiving promotions or bonuses for seemingly good work.

Strictly defined, corruption can be regarded as a negative (undesirable) reciprocity where the welfare of the few is increased at the expense of the many. Reciprocal relations are at the heart of corruption as bribes (or gifts disguised as bribes) do not bind the receiver to deliver any favors. In the absence of binding or enforceable contracts corrupt dealings revolve around the mechanics of reciprocity.

As previously defined, corruption is an act where an individual wielding the power of a public office uses it for personal gain (Jain 2001). From this definition we can further derive the conditions that are necessary for corruption to exist. Aidt (2003) has outlined three prerequisite conditions:

1. Discretionary power: the relevant public official must possess the authority to design or administer regulations and policies in a discretionary manner. In other words, a public official must have some amount of arbitrary control over public resources.
2. Economic rents: the discretionary power must allow extraction of (existing) rents or creation of rents that can be extracted. This is the private agent's incentive to enter into a corrupt agreement.
3. Weak institutions: the incentives embodied in political, administrative and legal institutions must be such that officials are left with an incentive to exploit their

discretionary power to extract or create rents. The official's reward system must be flawed in such way that it is advantageous to him to engage in corruption.

From a theoretical point of view it is necessary to distinguish various approaches to corruption in terms of assumptions that govern microeconomic models. Most models and economic policies following them have been based on a principal-agent framework (Shleifer & Vishny 1993) however an approach based on incorrect assumptions can lead to a breakdown of the model in practice (Persson et al. 2012).

Categories of corruption

While we have now provided a concise general definition of corruption used in economics it is highly useful to clarify it a bit further. From the point of view of model building and theory, the definition of corruption is not as simple as its formal definition. Since corruption involves assumptions about multiple parties of interest, corruption can be categorized differently depending on these underlying assumptions. Olken (2005) provides a very popular broader categorization of corruption by dividing corruption into "grassroots" and "high level".

Grassroots corruption involves small scale corruption, yet such that can be highly widespread. This sort of corruption occurs with low level officials and each transaction is small in terms of government budget. An example of this could be bribing a traffic police officer to avoid legal consequences for drunk driving. Grassroots corruption is usually more visible and known as it occurs more often. It enjoys higher levels of tolerance due to each case being basically innocuous in the grand scheme of things. Because of these factors it is also the harder one to uproot as a large number of people are involved in it.

High level corruption occurs in the highest echelons of governmental power and is rarer, but is larger in scale. An example of high level corruption would be awarding a multimillion infrastructure contract to a private developer without a competitive bidding process. High level corruption is much harder to detect since parties privy to it are few in number and take great precautions to keep the activity hidden from public view. The greater needs for secrecy is motivated by a threat of a major scandal were it to become public knowledge and likely carry heavy penalties to all parties involved.

Due to the secretive nature of high level corruption, developed countries appear less corrupt since they have significantly lower levels of grassroots corruption compared to developing countries. However since high level corruption is hard to measure developed countries appear disproportionally incorrupt in statistics. (Olken & Pande 2011)

The importance of assumptions is visible even clearer in various analytical approaches that can be taken regarding corruption. Success of a model or theory of corruption is heavily dependent on whether the mechanics of the real world match their approach. As I shall cover in chapter 1.5, history has shown that anti-corruption policies based on models employing incorrect approaches have badly backfired often fostering instead of diminishing corruption (Loewenstein et al. 2011)

While there exists various categorizations regarding these analytical approaches (Alam 1989 or Rose-Ackermann 1999) I shall use categories as outlined by Aidt (2003) to illustrate the importance of correct underlying assumptions of for theory development and model building of corruption under research.

Aidt (2003) divides these approaches into four main categories that have critical distinctions in terms of underlying assumptions for models.

1. Efficient Corruption
2. Corruption with a benevolent principal
3. Corruption with a non-benevolent principal
4. Self-reinforcing corruption

These approaches may overlap somewhat, but the important distinction between them is the degree of benevolence of the government official in charge of implementing policies and the designing institutions (the principal) and the role of institutions against their history as a determinant of corruption levels.

Efficient corruption

Efficient corruption is actually the only positive form of corruption. It facilitates trade between agents and creates business that would otherwise not exist. It increases allocative efficiency by allowing agents in the private sector to correct pre-existing government policy failures. Efficiency enhancing corruption has been studied extensively in economics and its

main positive effects are that it can be regarded as a correction mechanism for misguided government policies and red tape and viewed as rational market response of pre-existing government failures (Aidt 2003).

Corruption with a benevolent principal

Corruption with a benevolent principal has been a very common analytical approach that has dominated much of the economic research on corruption in the past. It assumes that the principal that is delegating the decision making power to an agent (government official) is inherently benevolent and strives only to minimize corruption. In this case the level of corruption depends on optimization of costs and benefits of institutions. The appeal of this approach for economists is clear as standard microeconomic tools can be readily applied here.

Corruption with a non-benevolent principal:

In the case of a non-benevolent principal the restriction of the principle being immune to corruption is relaxed. Corruption in this case arises because non-benevolent government principals design ineffective policies on purpose in order to help extract rents from the private sector. This reflects a much more realistic picture as benefits of corruption always exist and someone always stands to benefit in the end. The level of corruption under this approach is dependent on the incentives embodied in existing institution, ie: the range of authority of the principals, how far can they modify a policy?

Self-reinforcing corruption

Self-reinforcing corruption comes into question when the corruption levels are already high and the payoff from corruption is dependent on the prevalence of corruption due to strategic complementarity. One example is that a higher prevalence of corruption lessens the risk of getting caught and increases the incentives to get in on the action, both for those who are doing the actual corruption as well as those who are supposed to police corruption. In practice this means that the level of corruption is usually dependent on existing institutional culture, history and customs.

Corruption, like any other crime, can also be a murky concept from the point of view of the parties taking part in the process. Most of the time the corrupt official doesn't feel he is

doing anything wrong and in some cultures helping relatives is outright expected. This is a little double standard view because on a larger scale nepotism is condemned yet many people condemn those who do not help their kin.

1.2. A brief history of corruption

To get a better understanding of the complex nature of corruption I will demonstrate its inter-temporal nature by describing its evolution throughout history. Corruption has and still is an ever changing subject that mutates and evolves along with society and culture. I'm also a firm believer in the idea that the best place to begin a study for anything is to study our past first for history often yields surprising insights and corruption is no exception in this regard.

As time passed the views on what is considered "corrupt" have become more strict and tight. Indeed there are many practices in recent history that would be considered as open corruption in today's standards like political campaign financing.

In this chapter I will go over the history of corruption starting all the way from the ancient times for as long as there has been a state and public office there has existed corruption.

Despite the evolving views and forms of corruption, it has been recognized and documented for over 2000 years. One of the oldest and well documented articles include The Arthashastra, an ancient Indian treatise on statecraft dated around 400 B.C. and written by a man named Kautilya, an advisor and tutor to an Indian emperor Chandragupta Maurya. The ancient book discusses corruption and its prevention in one of its chapters and characterizes corruption as inevitable. Kautilya writes that officials find it "impossible not to eat up a small bit of the King's revenue" and continues on to list forty ways of embezzlement by a government servant. He stresses that the King must take necessary steps to ensure the safety of the merchants and protect the trade from corrupt government officials. The text was highly influential and famous until the 12th century when it was lost and recovered only in 1904, its first English translation appearing in 1915. It is interesting to note that Kautilya

considers corruption as an innate part of any government official. The experiment that I derive and later describe in this thesis will partly attempt to confirm this observation.

More great examples of the prevalence and destructiveness of corruption in ancient times are seen in the histories of Rome and Greece. The key factor of the decline and subsequent fall of Roman civilization was the steady loss of focus and control over the government as its high ranking bureaucrats and military leaders abused it for private gain - the very definition of corruption (MacMullen 1988). According to MacMullen's research corruption spread through Rome like cancer eventually crippling the empire with its sheer scale and long-term global effects. Rome's fate is a chilling example of how a powerful and politically developed society can destroy itself from within through decadence in the form of corruption. Fates of contemporary Greek societies of Athens and Sparta that were the vanguard states to define civil liberties are similar to Rome's. Wilson (1989), attributes the growth of corruption to emergence of new social forces born out of booming commerce and increasing imperialism. The existing institutions were unable to adapt to growing change and new challenges even though attempts were made. For instance in Athens there was formed the famous Council of Areopagus which had reporting corruption as one of its primary duties. Unfortunately these efforts were not enough and most policies ended up being corrupted and used against the very corruption they were meant to safeguard from (Wilson 1989).

The message of ancient Mediterranean history is clear; as economies grow the corruption practices evolve and can lead to great social disaster if ignored. It also spells unequivocally that corruption is not just a modern phenomenon and that much could be learned from the study of the past as not much has changed in corruption's highly detrimental effect on societies during the last two millennia.

Aidt (2003) mentions the sale of parliamentary seats in so called "rotten boroughs" in England before the Reform Act of 1832 and "machine politics" in immigrant cities in the US at the beginning of the 19th century as two concrete historical examples of open political corruption although they weren't regarded as such in their time.

Park (1997), describes in his paper how corruption and failed attempts at economic reform were one of the main reasons for the downfall of Qing dynasty in the early 20th century. According to Park some of the eighteenth-century Chinese governors felt so strongly about

government corruption that they called it as one of the greatest issues to plague the Qing state and society. Still, the corruption took the empire to its seemingly inevitable end. However, even after the form of governing was completely reformed, corruption remains in China very much as a concern even today.

History seemed to repeat itself a little less than a century later this time in the neighboring Soviet Union. For the western world Soviet Union is perhaps the most evident example of an empire crumbling because of corruption. The modern Russia hasn't seemed to change much since Soviet Union as there are extensive reports of rampant corruption that continue to plague their society (Levin & Satarov 2000).

As the world moves closer towards globalization and larger federations, the western world has slowly woken up to the fact that corruption poses a major threat for social and economic development. Based on a 2014 report on the European Commission website, the corruption in the EU is costing taxpayers 120 billion EUR annually.

Academic interest in Corruption

In terms of academic interest and comparative approach, corruption was "discovered" in the late half of the 20th century. Specifically there has been two periods of heavy academic research that can be identified since that time. Curiously, the interest seemed to be fuelled mainly by democratization and developmental interests rather than outright necessity. (Farrales 2005)

The first wave of academic interest began in 1950s and went on to early 1970s stemming from the heels of decolonization and the height of modernization theory (Farrales 2005). However, the focus of the literature was mostly on developed countries and corruption was more considered as a "problem of the third world". Additionally there existed cynicism towards political corruption as corruption was more seen to be linked to material gains rather than vote and political power.

Great definitional debates raged on as Moralists debated against Revisionists over the proper definition of corruption. The former viewed corruption more of an ethical choice and universally condemned it under any circumstance while functionalists saw that corruption should be defined and studied more objectively. For functionalists corruption was

considered as an inevitable and necessary part of an economy's adjustment process. (Leff 1964)

Eventually the debate ended in mid 1970s after new generation of scholars successfully challenged both views by recasting corruption as an individual choice (Rose-Ackerman 1978). Corruption was viewed as a carefully calculated decision that at the very ideal circumstances could lead to no cost to society, but usually came at a cost. While this view was embraced by many and enjoyed great popularity due to its tractability with standard economics, it ultimately proved empirically highly inaccurate and interest in corruption waned. (Sequeira 2012)

The second and current wave of corruption research began in early 1990s, fueled by frustration in many third world countries' lack of development due to rampant corruption (Farrales 2005). While the phenomenon of corruption was far from new, the breakdown of communist systems since the end of cold war made it much more visible. As the iron curtains came down the sheer size of rampant corruption was revealed and sharply raised the awareness of the problem. Another factor that has raised the public awareness of corruption is development of mass media where news travels faster around the world in the form of electronic data. Development in technology has also provided a channel for people suffering from public corruption to voice their concerns.

Due to the absence of a working unified theory of corruption studies have become largely case studies with little effort to develop a unified theory of corruption. Development of corruption indices has encouraged cross-national statistical work on the causes and consequences of corruption. Some of the most popular indices in the 1990s were Business Intelligence (BI), World Competitiveness Report (WCR) and Impulse. I'll go over these indices and other methodologies in part 2.

Issues that were the focus of study had evolved as well since the first wave. Nowadays endemic corruption, political corruption and transnational corruption are receiving considerably more attention (Farrales 2005). Starting from the 1990s, western donor countries have become unwilling to ignore corruption of third world countries just because of the right political orientation of their governments. Another landmark change in public

attitude towards corruption was the OECD anti-bribery convention in 1997 which ended the very common practice of subsidizing bribes through tax deductibility.

1.3. Effects of Corruption

As of late corruption has been recognized as one of the most detrimental factors to economic and social development (Armantier & Boly 2011, Beylis, Finan & Mazzocco 2012). In this chapter I will examine the effects of corruption on the welfare of society. Since there are many facets to corruption, its effects are equally diverse. For this purpose I will examine the effects in three spheres relevant to society's welfare: Economic, Political and Social. I strive to present a multilateral and holistic approach to the effects of corruption and not merely monetary one since virtually anything that can affect the economy, ultimately has economic value eg: a political office or the power to write fines. Another point of view is that it can be difficult to estimate the monetary value of certain aspects of society that are still vital to a functioning economy such as the rule of law.

I will also examine the motives and mechanics of corruption in each case and present empirical evidence from extant literature. Lastly, I will address the issue of efficient corruption and review its extant research and antecedents and finish with a discussion of the prerequisites and benefits of efficient corruption.

Economic effects

Corruption is generally seen as a tax on private sector that ultimately holds back global growths and increases poverty (Runde, Hameed & Magpile 2014). For the past two decades there has been an increasing awareness of the severity of adverse effects corruption has on economy. In a survey of 144 countries conducted by World Economic Forum, 67 of them listed corruption as one of the top three challenges to conducting business in their country. According to the World Bank Institute over one trillion US dollars' worth of bribes is being paid annually around in the world which totals 2% of 2012 world GDP (~$58 trillion). Over $500 billion is attributed to private sector corruption. This figure is three times as large as all foreign assistance paid out in 2012 (Runde, Hameed & Magpile 2014). According to an estimate by the Control Risk Group, a consulting company specialized in economic and

political risk analysis, developing countries lost close to 1$ trillion in "fraud, corruption and shady business transactions" which amounted to 13,7 percent increase from 2010.

The effects of corruption on the economy are by no means one sided, but have been shown to affect it in many different ways. In addition to direct costs, corruption also carries an opportunity cost which is especially relevant for developing countries as it represents lost potential growth. This can take the form of discouraged investment or other business transactions. Corruption is thus a tax on investment (Runde, Hameed & Magpile 2014). One such example is the research by Khwaja & Mian (2005) in Pakistan where they found that politically connected firms received 45% larger loans from government banks despite having 50% higher default rates. They estimated that this carries the cost on annual GDP between 0,3% - 0,9% as firms with greater potential are left undercapitalized.

Corruption also increases inefficiencies in the economy. It may raise the marginal tax rate of firms and decrease business activity (Olken & Pande 2011). For example bribe payment by border officials increases the costs of shipping that acts as an additional import tax. Sequira and Djankov (2010) estimated this tax to increase the shipping costs by 14% in South Africa and 4% in Mozambique.

In public sector corruption raises marginal costs of public funds and makes certain government projects economically unviable. For example a very common and recurring theme in less development countries are bloated road costs. Olken (2006) estimated that 24% of road costs in Indonesia went to corruption. Anecdotal evidence tells that the figure in St. Petersburg, Russia is close 70%. Another example of bloated costs comes from India where Niehaus and Sukhtankar (2010) found that the difference between officially paid and actually paid labor expenditures were 79%. These types of budget bloats can easily make many if not most projects economically unviable or alternatively result in the poorest quality work.

Lastly, corruption has also been shown to hinder trade. Private actors attempt to distort the market in order to create monopolies. Increase of corruption also facilitates the birth rate of offshore accounts, sham charities, opaque commissions and other similar fraudulent entities (CREATE 2013).

Political effects

Effects of corruption however need not be limited to merely quantifiable monetary, but can also have consequences and costs in more intangible forms. A number of papers have argued that generally a political cost of corruption undermines the legitimacy and efficacy of existing governments (Olken 2006, Faccio 2006, Finan and Ferraz 2010, McMillan and Zoido 2004, Levin & Satarov 2000).

More specific characterizations of this are presented by Runde, Hameed & Magpile (2014). One such is a reduction in tolerance for public officials seeking to make constructive, but difficult changes. Since politicians' reputation is in tatters already, making more unpopular decisions will likely spell certain doom to a politician undertaking unpopular, but necessary changes like anti-corruption programs that require strong trust and support of the population (Levin & Satarov 2000). And rightly so for often anti-corruption measures turn out to be merely a façade for new graft.

This leads to a very stagnated political arena where elected officials prefer to keep a status quo and have no incentive to ruffle the feathers of the electorate any further without a large personal gain. This could serve as an explanation to the trend where there are currently so many billionaires running for top political offices in Eastern Europe? In terms of society many economically and socially important structural and legislative changes may be postponed. With the citizens disillusioned by the authorities it will be very hard for any politician to gain strong enough backing from the people for implementation of any anticorruption initiatives.

Another example of how corruption levies a political cost is through public officials receiving excessive amounts of discretionary power over regulations and increasing state capture. Varese (1997) describes in his paper a number of cases in post-Soviet Russia where state agencies had gained wide discretionary powers and became targets for powerful lobbies. One such example was tax agencies being able to give tax exemption which most companies won through bribery. Faccio (2006) shows in his cross-country research that a company value benefits 2,3% - 4,3% when a businessman or board member becomes a politician in a country where corruption is above median.

Corruption can also undo the government's ability to correct externalities which leads to inefficient outcomes (Olken & Pande 2011). While the true costs are hard to estimate, Olken (2006) estimated a theft of rice from a program that distributed subsidized rice in Indonesia. The result was that that 18% of the rice disappeared before reaching households.

Social effects

Last, but not least, the sphere of social effects of corruption is perhaps the least quantifiable, but arguably the most detrimental. The main effect is the decline in morals of the society through diminishing moral costs that affects the existing norms. And given that moral costs influence the individual decision making regarding the following of the law, their distribution in the population influences the overall level of corruption (Della porta and Vanucci 2005). An empirical evidence of this would be Levin & Satarov's (2000) description of post-Soviet Russian attitudes to grassroots corruption to be considered an everyday element of life as in "by default". Varese (1997) reports how Russian police neglected to register crimes due to political ambitions of its commanders. It is estimated that registered crimes in 1994 made up only one third of actual amount of crimes committed.

Elster (1989) points out that corruption across countries is largely explained by the "public spiritedness" of their officials and not the cleverness of the institutional design. He characterizes moral costs as an "immune defense system" of society that tends to weaken as moral costs drop. This can explain variations in corruption between countries sharing similar institutional conditions. The average moral attitudes have a significant impact on the level of corruption. Barr & Serra (2010) showed in their bribery experiment that they could predict corruption based on decision makers' home country. However, they also found out that morals tend to converge to the social average and prediction results only applied to individuals who had recently moved to UK. Identical experiment played amongst migrants with several years of residence behind them showed no significant divergence based on the home country.

The degradation of moral values in social cost of corruption is reflected in extreme maximization of individual utility with little to no regard for common wellbeing. An example country of this could be Uganda where Reinikka and Svensson (2004), found that schools received on average only 13% of grants for non-wage payment with the other 87% stolen by

various officials. An example of a particular result of this effect may be an override of safety or quality regulations that creates risk for physical harm for general population (Runde, Hameed & Magpile 2014). A research paper by Escaleras, Anbarci and Register (2007) finds a link between public sector corruption and the deadliness of earthquakes. The authors suggest that while earthquakes cannot be prevented, their disastrous consequences can be mitigated or even prevented by proper building inspections and honest contractor work. Naturally corrupt countries' officials flaunt safety regulations more often than those of less corrupt countries. In addition to costs like these corruption imposes a wide range of social costs by also being a major obstacle to reducing poverty, inequality and infant mortality in emerging economies (Kaufman 2004).

Efficient corruption

Despite its many adverse effects on society corruption is not always undesirable from the point of welfare of society. Indeed, the view of efficiency-enhancing corruption has been in economics for a long time (Aidt 2003). Ades and Di Tella (1997) even argue that one of the reasons of economics neglecting corruption as a research topic for so long was the assumption that a bribe is simply a transfer and therefore causes no serious welfare losses. For example Gorodnichenko and Peter (2007), showed that on average, public employees in Ukraine had the same consumption as their counterparts in private sector despite their officials salaries being 24-32 percent lower. In this case corruption didn't seem to provide extra income to public servants as their government pay was exactly offset by the amount received in bribes.

Aidt (2003) defines efficient corruption as corruption that "arises to facilitate beneficial trade between agents that would not otherwise have been possible". This allocative efficiency is achieved by allowing agents in the private sector to correct pre-existing governmental failures. These failures could be the result of misguided governmental policies or red tape in which case corruption is merely a rational market response to existing harmful legislation. The famous study by Leiff (1964) demonstrated this effect where the focus of the study was the bureaucracies of Chile and Brazil. The two countries both adopted price controls for food products in the early 1960s. In Chile the officials enforced the policies diligently and food production stagnated. Brazil on the other hand had a corrupt

bureaucracy that sabotaged the controls and food production increased to the benefit of consumers.

It is important to note however that this is the result of second-best reasoning as the optimal choice would be to remove harmful price controls themselves. Efficient corruption thus requires existing economic inefficiencies. Aidt (2003) describes two specific channels through which corruption can turn out efficiency increasing:

1. Corruptions speeding up the bureaucratic process (greasing the wheels)
2. Corruptions introducing a competition for a scarce resource resulting in more efficient allocation than what otherwise would have been.

Shleifer and Vishny (1994) study the possibility of bribery facilitating the efficient allocation process of resources. They find that bribery is a cheap way to distribute wealth between politicians and private actors, because otherwise the resource allocation would be politically motivated and much more inefficient. Another possibility is circumvention of a quota system that allows only the most efficient firms to gain a license. However, once again, both points are assuming an already broken society and efficient corruption turns out to be just a lesser of two evils.

As Aidt (2003) points out, the notion of efficient corruption is based on a number of problematic assumptions. The first one being that corruption is always self-serving where officials are incentivized to supply a bribe maximizing quantity/quality of goods or services rather than the efficient one. The second issue is of a more practical kind where public resources are often wasted on keeping corrupt deals secret or for searching suitable partners. This reason might also get in the way of efficient allocation for often corrupt officials prefer to minimize the chance of detection along with profit. Thirdly, corrupt contracts are unenforceable in court which makes a poor foundation for an economy. Efficient corruption is thus a short term solution to a major problem. But lastly and most importantly, the implicit assumption that corruption is exogenous and unrelated to the government failure is highly unrealistic. The unreasonable policies may well be put in place and maintained by officials benefitting from the corruption that follows them.

1.4. Mechanics of corruption

As I have previously mentioned and explained, corruption is a complex matter compared to more ordinary economic variable like unemployment. After all, corruption's definition alone took decades to settle (Farrales 2005) and there still exist many nuances to it that greatly affect its mechanics.

Understanding these factors of corruption and what creates it is critical for planning fair and efficient economic systems. I believe this warrants a discussion on mechanics of corruption from both practical and theoretical points of view. In this section I will introduce the mechanics from both practical and theoretical angles. Practical view is necessary to understand the unique challenges posed to economic research of corruption. As corruption is clandestine by nature data for it is hard to come by. Direct observation in most cases is impossible or dubious at best due to its illegal nature. Theoretical part introduces four categories of corruption and showcases applications of the methods of standard economics to describe these different forms of corruption.

As sound theory must be rooted in practice I will begin with a discussion of the ways corruption manifests in the world today, trying to isolate its general traits and practices. These can be further used in the construction of a theoretical framework.

Corruption in practice

Corruption can be a highly multi-faceted and multi-layered process that is often mixed into legitimate processes. One of the prevailing themes of corruption is secrecy and informality as parties to a corrupt transaction take steps to ensure corrupt transactions are not detected.

Secrecy is usually achieved through deceit, misdirection and tight networks. Börzel & Pamuk (2011) study Southern Caucasus which has ranked amongst the most corrupt areas in the world. The researchers describe the public sphere as permeated with tightly organized patronage networks and clans. This kind of extensive misuse of social networks greatly facilitates corrupt transactions by providing a trustworthy infrastructure. It also makes detection virtually impossible as everyone is in on the deal and mutually dependent on corrupt arrangements. My personal interview with several Russian state managers and

businessmen revealed similar practices. This makes research very difficult although not impossible. Members no longer active or non-members held in confidence can provide some data on economies with well-established corrupt social networks.

Another popular measure of secrecy can be the assumption of both roles. A private businessman runs for public office or an official opens private businesses. This way private agent and the corrupt official are the same person. This effectively eliminates the possibility of whistleblowing (Börzel & Pamuk 2011, Levin & Satarov 1999). This sort of arrangement undermines many corruption models that rely heavily based on the possibility of whistleblowing.

Misleading is a common trick in countries with high corruption levels. State authorities target petty corruption with raids and crackdowns while allowing high level corruption to flourish. For example former president of Georgia Mikhael Sakaashvili cracked down heavily on corrupt traffic police and several other government agencies putting them under direct control of his closest allies. Later he had been accused of turning a blind eye to the major corruption and abuse of power by allies in prominent positions. In addition it is common to use anti-corruption campaigns against political opponents. (Börzel & Pamuk 2011, Levin & Satarov 1999)

Informality is powered by strong culture and customs which can act as a proxy of unofficial law. A measure of trust between parties is thus achieved without resorting to usual guarantees such as contracts or deposits. Della Porta & Vanucci (2005) characterize it as a development of an alternative language also in part to ensure certain payments are regarded as 'regular, normal and accepted business transactions'.

This leads to another trick of corruption which is renaming bribes under legitimate transactions (Thompson 1993). This can mean disguising bribes as gifts, campaign or voluntary donations or payment for services of the official's private company. In Finland, many high ranking government officials sell private consultation or expensive lectures on the side, sometimes even art that is subsequently bought by private businesses in bulk. This makes it easy to circumvent restrictive legislation on political campaign donations. (Koikkanen & Riepula 2010)

Another common method to achieve informality is implicit trades. Officials trading favors, often for a job in the private sector once the term in the office ends. This leads to another variety of bribery which is intangible bribes. Bribes not nominated in any currency, but in subjective matters like political power, votes, prestige or vacation trips. To complicate matters even further, intangible bribes can be done in reverse through blackmail. In this case the mechanics controlling the official's decision making are not those of greed, but loss aversion. Blackmail is usually not monetary, but involves intangible assets such as reputation or health of oneself or family. Thus these sorts of bribes can be considered to hold tangible economic value, but are extremely hard to measure or quantify. This makes obtaining data virtually impossible.

Exploitation of unsupervised activities is the outcome of corrupt state structure and legislation. Laws and regulations are sabotaged to remain vague, complex and full of loopholes. This gives officials more discretionary power to exact rents from private sector. Varese (1997) points out undeveloped property rights and predatory tax systems as particularly common cases in countries with high corruption.

Finally, there's also an inevitable side to corruption in countries that have suffered political instability and economic collapse. Impoverishment of the population and inability of the state to ensure a decent existence to public servants push both sides to violate the law and engage in massive grassroots corruption (Levin & Satarov 1999). An example of this is a personal experience from the 90s Russia where many traffic police departments gave their employees empty fine books in place of salary. The policemen were supposed to hand out fines, real or imagined, and pocket the fines as their salary. This is a striking example of a case where corruption mechanics are simply those of survival.

At times, in the cases of efficient corruption, the public is better served with corruption. In this case the resulting private benefit is larger than the public expense. This scenario however is viable only when the public resources are grossly mismanaged and democratic institutions are compromised (Varese 1997).

Corruption in theory

Building a working theories on corruption based on the observed common practices discussed above is a challenging task. After all, the debate on its very definition alone took decades (Farrales 2005) before settling on corruption being defined as the abuse of public office for private gain. However, this definition still leaves corruption open to various mechanics depending on what type of corruption is at hand. A simple example of this is whether there are bribes involved or not. Building a model with bribes as the defining mechanic of corruption will not fit scenarios of active graft where the official simply steals from the government for himself, a case of assuming both roles.

Shleifer and Vishny's (1993) Theft – No Theft categorization of corruption inspired me to create a model to help categorize corruption more effectively. This is a simple model in form of a 2 by 2 matrix of corruption. The two dimensions are Passive – Active Corruption (horizontal axis) and Corruption with Theft – No Theft (vertical axis). The model provides us with a quick and easy way to determine the defining mechanics of corruption in question. The matrix below has four quadrants with representative forms of corruption in each of the four corruption types: Passive Theft, Active Theft, Passive No-Theft, Active No-Theft.
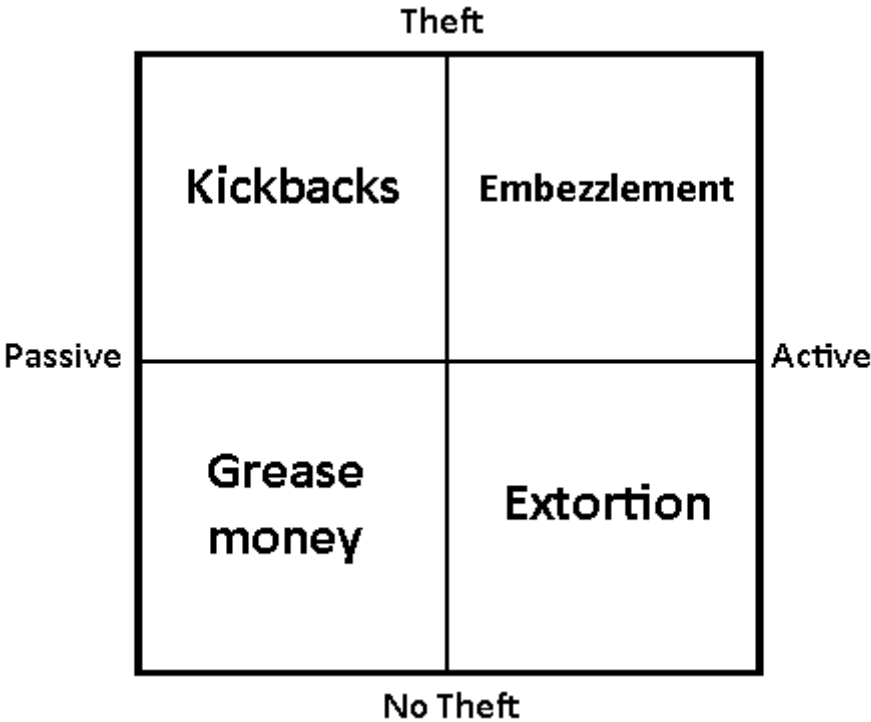
Matrix of corruption

Passive Corruption refers to a situation where the official does not actively pursue corrupt activity and the initiative comes from the private sector. Analogously Active Corruption means that the official shows initiative himself to engage in corruption.

Corruption with (without) theft remains as before. It measures whether the state loses any of its existing assets to the act of corruption. To characterize the various quadrants I've come up with examples of what sort of corruption they could represent. A passive corruption with theft can be kickbacks on state contracts. Private sellers promise the official a sum of money (often proportionate to the contract value) in exchange for granting a government contract to their firm. Passive corruption without theft however can be viewed as "grease money". For example, a payment to speed up a bureaucratic process like a visa application or a building permit.

The top right quadrant of active corruption with theft is just plain graft. The official simply appropriates state property to himself usually through the means of embezzlement. The final lower right quadrant of active corruption without theft can be extortion. A simple example of this would be a police officer harassing passersby for made up problems in their documents. The problems can be then fixed with an unofficial fine that is essentially a bribe to a legal issue created by the official.

Using the four distinct forms of corruption in the matrix as a structure I will outline the most common analytical approaches in standard economics to corruption. The purpose is to present different forms of modeling without going outside the scope of this work by delving into them too deeply.

Kickbacks

One of the very first theoretical analyses of corruption was written in a paper by Susan Rose-Ackermann (1974) that formalized corruption in government contracting with private sector. In the matrix of corruption this was a case of kickbacks where the bribe was a function of private sector's excess profits. The model examines the decision making of an official and one or more private agents that represent private companies competing for a government contract.

The model is intuitive and relatively straightforward and begins by stating the profit functions of the official and a private agent.

Official: $\qquad G(X^i) = X^i - J(X^i) - R(X^i)$

Private agent: $\qquad \pi^i(X^i) = P^i q - T^i - X^i - D^i(X^i) - N^i(X)$

Where X is the bribe amount, $J(X^i)$ / $D^i(X^i)$ is the cost of penalties in terms of price, income and bribe while $R(X^i)$ / $N^i(X)$ represents the moral costs for official and private agent respectively. $P^i q - T^i$ represents product price times quantity minus total production costs. The profit functions are rather symmetrical for both players although the model allows a separate moral and punishment cost functions for both public and private sectors.

In this model a bribe can affect two variables: seller's identity and terms of sale. All players maximize their profits with private agents submitting their bribe bids accordingly. The model assumes a rather auction-like environment where unsuccessful bribes are not paid or all bribes are paid after the fact.

Perhaps the first interesting implication of the model is that for corruption to exist there needs to be excess profits. In other words perfect competition eliminates corruption because no firm can afford bribes nor does it need them as it can sell its products on the private market. In case of imperfect markets it follows that the most efficient firms have the greatest excess profits and can thus afford the largest bribes. Does this mean then that corruption can only lead to efficient outcomes for the government under this kind of model?

Far from it, bribes can affect the terms of sale, namely the price (P). This in turn directly affects the profit functions of firms. The bribe is still paid by the most efficient firm, but the deal will be altered either in terms of price or quality of the product. Theoretically in the model this can lead to infinite bribes and prices if the second derivatives of the penalty cost functions J_{xx} and D_{xx} are negative. This means that the penalties are not based on income, but bribes and have diminishing returns. This reflects real world's legislation as most laws specify punishment by the size of the bribe.

Susan Rose-Ackermann (1974) also makes an important distinction in product differentiation. If the needs of the government are poorly specified, it makes comparison and evaluation of various firms' offers difficult. The policymakers are thus encouraged to make their

preferences as clear as possible and review purchasing decisions. This is somewhat confirmed by empirical evidence as many poor countries with high corruption seem to pursue the opposite. Shleifer and Vishny (1993) observe that many poor countries prefer to spend their meager budgets on rather defense and infrastructure projects where corruption opportunities are easier to exploit instead of education and health.

The model thus concludes that penalty function need to be rewritten in terms of bribes, prices and income: $J(P^i, Y^i, X^i)$ and $D^i(P^i, Y^i, X^i)$. However legal remedies might still be insufficient even with stiff penalties if the probability of conviction goes down with the severity of the punishment as is often the case in the real world. I will discuss this more at length in the next chapter on Anti-corruption measures.

Embezzlement / Extortion

Corruption is defined as the abuse of public office for private gain. One of the simplest interpretations of this can be an official involved in a provision of an official good like a passport, import license or the use of government property like roads. Shleifer and Vishny (1993) outline an industrial organization method that can be used to model these basic assumptions for corruption.

The first basic important distinction that needs to be made is whether the corruption is with theft or without theft. Corruption without theft here means that the government receives all the necessary payments from the sale of the official good and corrupt income is the one the official is able to charge on top of the government's fee. Corruption with theft on the other hand is the same except that the official retains the entire fee without giving the government its share.

The two cases are conceptually similar and differ only in the level of the marginal cost to the official. This fact however has important consequences. In the case without theft corruption always raises the total price of the good whereas with theft it can go either way. The figures below represent solutions to both cases respectively.

Corruption without theft   Corruption with theft
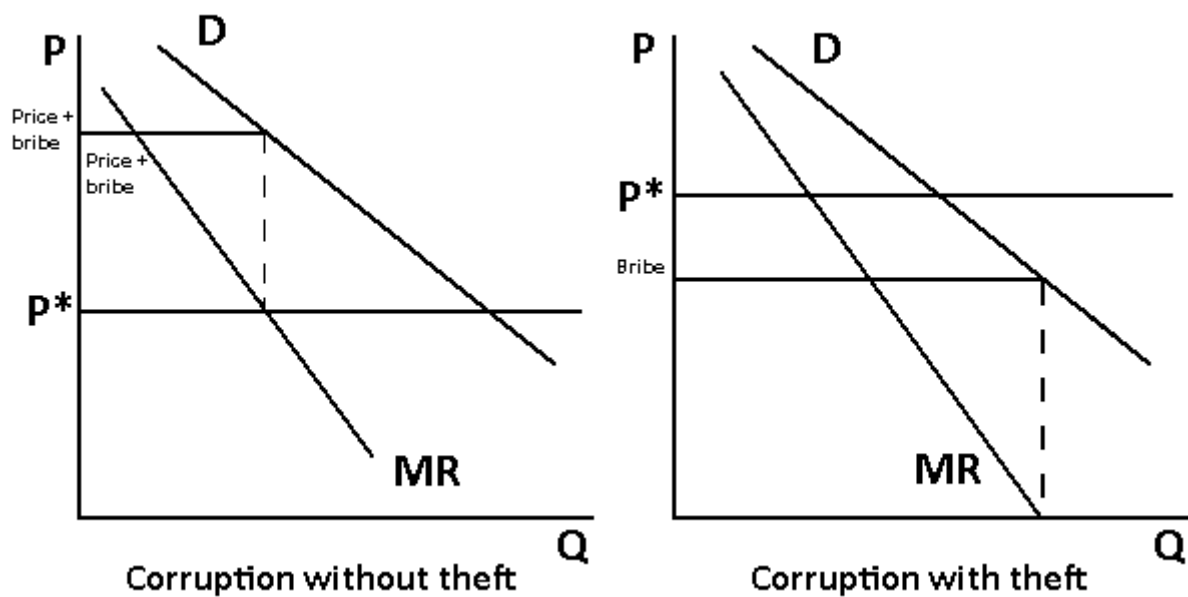
Based on this framework we can model a corrupt official's decision making with standard industrial economics methods. For example in a case where an official faces no competition in provision of the official good, it pays to set the marginal revenue equal to the marginal cost and reap monopoly profits. In a case without theft the marginal cost is simply zero.

Shleifer and Vishny (1993) conclude that this type of analysis suggests a similarity between taxes and bribes. Another important notion is that corruption with theft aligns the interests of both official and private sector. The private agents get a discount on the government good while the official embezzles the rest.

However, corruption without theft pits interests of the official and private agents against each other as now the private agent pays extra on top of the official price. The government gets its due and the official collects an informal tax. This amounts to extortion as the official has the power to block the purchase of the governmental good without a bribe.

Like the previous model, this model offers only an imperfect solution to the problem of corruption. Both models cannot eliminate corruption so they focus on reducing and controlling it.

The model by Shleifer and Vishny (1993) notes that competition amongst corrupt officials would drive the bribes down. It also recommends to avoid possibilities of monopolizing

corruption. Unfortunately this requires the officials not to collude that can be difficult to achieve in many instances as real world corruption is often highly organized.

Grease money

The final form of corruption analyzed in this section is "Grease money" which is a case of non-theft, passive corruption. Aidt (2003) outlines the framework in form of an agency model that focuses explicitly on probabilities as determinants of corruption. As an example case he used a tax official that firms could bribe in order to conceal their profits and avoid taxes. This still constitutes as non-theft since the official is not stealing any active assets of the government, but merely "helps with the paperwork" so to speak.

In its simplicity, the model focuses on the corrupt official and states his decision to accept a bribe as:

$$(1-p)b + p(w_0 - w - f) > 0$$

Where p is the probability of being caught, b size of the bribe, w_0 wage he could earn in private sector after being caught, w current wage and f the aggregated cost of penalty if caught. If the expected value is positive, the bribe is accepted.

This implies that corruption depends on the wage (w), quality of the monitoring system (p) and the cost of legal consequences (f). The most insightful part of the model is the analysis of wages. It is often said that corruption is the result of poor wages. Initial papers on corruption focused on this determinant such as Becker and Stigler (1974) who considered that the fundamental answer to corruption was to raise salaries above jobs the officials could have. The idea is that efficiency wage deters corruption by increasing the cost of being caught.

In terms of above specification, the efficiency wage that would keep all officials honest (excluding the effect of legal sanctions) would be:

$$w^e = w_0 + [(1-p)/p]*b (where f = 0)$$

In this case the efficiency wage is a mark-up on the private sector wage, equal to benefit of corruption. This shows us an important realization that viability of such efficiency wages are tied to efficiency of the monitoring system. It is evident that this method of reducing

corruption is highly expensive and what is even worse, it doesn't universally guarantee the absence of corruption. Corrupt officials may demand higher bribes as a consequence to compensate for the costs of dismissal. Higher bribes and salaries attract more unscrupulous workers and may lead to more and not less corruption.

Besley and McLaren (1993) have explored an opposite strategy of capitulation wages where wages are set to bare minimum such that only corrupt citizens would accept the job. This may maximize the total net revenue in the case of tax collection as personnel costs are low and revenue is collected only when corruption is discovered. Empirical evidence shows that public officials in many developing countries with high corruption are paid extremely low capitulation wages (Klitgaard, 2007). While this is not an ideal solution, it is more reliable than the case of efficiency wage.

The purpose of this section was to discuss the relevant results of popular economic analytical approaches to corruption. To summarize the main outcomes of the models discussed:

- Corruption is very difficult to root out entirely and doing so may not be the most optimal outcome in terms of public benefit.
- Corruption can be controlled as it does respond to economic incentives.
- Ill designed legal penalties can encourage rather than discourage corruption. Specifically if the expected punishment function is concave with regard to the size of the bribe. e.g.: can lead to huge bribes that act as an entry deterrent thus facilitating monopolies.

1.5. Anticorruption policies

The ultimate purpose of corruption research is to eventually come up with reliable and efficient anti-corruption policies to curb corruption and thus increase public welfare. With the rising awareness of corruption and its consequences many governments and organizations have undertaken a major effort to create and implement anti-corruption policies (Mungiu-Pippidi 2006). For the past 15 years the majority of countries ridden with widespread corruption have initiated numerous anticorruption policies with the support of international community. Unfortunately most if not all anti-corruption policies have

provided mixed results with varying success depending on the setting (Hollyer 2012). In worst cases, misguided anti-corruption policies have backfired and actually increased corruption rather than decreasing it (Persson, Rothstein & Teorell 2012). As such, economists today have no reliable universal anticorruption guidelines. A general recommendation is to tackle corruption on a case by case basis. However what's even more troubling is that current empirical economic literature is ill-suited to suggest which form in particular a given policy maker should choose (Hollyer 2012).

Much of the previous and existing guidance was based on theoretical works that modeled corruption on the assumption of a set of rational preferences. This lead to many international anti-corruption guidelines suffering from theoretical mischaracterization of the problem of systemic corruption (Persson, Rothstein & Teorell 2012).

One of the most important assumptions of most anticorruption policies is the existence of a benevolent non-corruptible principal. This assumption is crucial for many anticorruption policies to work. Persson, Rothstein & Teorell (2012) frame corruption as a collective action problem which is dependent on the state of society and expected actions of others than just those of the individual. Thus corruption under these circumstances is not solvable from the ground level. Persson, Rothstein & Teorell (2012) come to the conclusion that such corruption requires either a big economy wide push that believably affects the expectations of others' actions or high level political will. Unfortunately corruption benefits increase with power. A high level principal is needed, but at the same time he has the highest incentives to engage in corruption.

It is important to note that even in theoretical work based on rational expectations corruption is rarely eliminated entirely, but instead managed and diminished. Eliminating it entirely is often either impossible or too expensive resulting in even lower public benefit.

Many anti-corruption practices that work great in theory can have surprising and opposite results in practice due to unexpected mechanics revealed in experimental studies. These results can explain at least in part the reason for failure of many anticorruption initiatives.

Mechanics of anticorruption

The mechanisms that anti-corruption policies use is altering of the incentives under which corrupt or potentially corrupt officials base their decisions on. There are two ways these policies can be implemented: A Top-down and a Bottom-up approach. In a Top-down approach, the anti-corruption responsibility is put on a government official to audit and sanction a government agency. In a Bottom-up approach the hopes are placed on the consumer by empowering them through better access to information or a reporting mechanism of corruption. (Hollyer 2012)

Bottom-up approach has been experimented with in countries with high levels of corruption. As any government initiative is most likely to become corrupt, the citizens who receive no benefit from corruption can be a reliable mechanism of oversight. The Bottom-up approach works best in situations where the citizens are in close contact with officials and their services thus being able to observe corruption most effectively. Additionally knowledge of the government function at hand and costs associated is important. Olken (2007) found in a road building experiment in India that villagers were quite accurate at detecting inflated prices in a road project, but not inflated quantities. Thus Bottom-up approach is reliant on how observable the work of an official is and how well-informed the citizens are.

The Top-down approach comes often more naturally as a solution as it seems logical that the government who is in charge of regulating everything else would also have the responsibility of ensuring its employees conduct themselves honestly. The main mechanics through which Top-Down approach works is audit and power of sanction. On the first sight, there are several advantages to a government oversight of its own agencies. The auditors are professionals and specifically funded for this particular purpose. Secondly, they can directly affect the expected utilities of the officials and agents through sanctions that make them a very credible threat to corrupt parties. However, Top-down approach suffers from all the main dilemmas of anticorruption; Transference, Red tape and Capture.

Dilemmas of anticorruption policymaking

Some policies have shifted the balance of the corruption process in a way that has encouraged corruption instead of stemming it. Many anti-corruption policies have

unexpected results because mechanics of the corruption are poorly known and lack empirical study. Theoretical examination goes only so far as there are valid assumptions, but if we don't know what the assumption should be, any theoretical discussion will be moot.

Anticorruption policy thus faces challenges that need to be addressed for the policy to work as intended. I have identified three major recurring dilemmas based on corruption literature that have plagued anticorruption policies. They are Transference, Red tape and Capture.

Transference refers to simply transferring the benefits of the corruption from one official to another. The most straightforward issue with any anticorruption measure is that they rarely eliminate the problem, but merely shift the corruption elsewhere or spread it around. For example the creation of a special watchdog organization to oversee the conduct of corrupt officials will shift the bribe benefits from officials to the oversight officials. Tougher punishments for corruption lead to higher incentives for judges and prosecutors to engage in corruption because corrupt officials are now more motivated to bribe them. Since the end of Soviet Union, Russian tax agency was regarded as highly corrupt which led to the creation of special tax policy to prosecute tax evaders. Immediately since its creation the tax policy unit became one of the most corrupt agencies in Russia since tax evasion was rampant and highly lucrative (Levin & Satarov 1999). As can be seen here, the problem of corruption remains unsolved. If the government is unable to prevent corruption in one department then why should we expect that another will remain corruption free? Addressing Transference is a difficult, but necessary requirement for any anticorruption policy.

Red tape is another phenomenon that perverts anticorruption policies into corruption enhancing. Anticorruption measures can lead to official process become more cumbersome for the private sector and thus incentivize payments of grease money. Red tape is a significant threat where the corruption is passive and instigated by the private sector. In Russia and Eastern Europe traffic police has been one of the most corrupt government agencies where people go to work for bribes only (Börzel & Pamuk 2011). An example of red tape causing an anticorruption measure to backfire is when the Russian government reduced the amount of fines a traffic policeman could charge on the spot. Fines in Russia had to be paid on the spot or else your driver's license would be confiscated until the fines were paid. The bureaucracy of the latter option would usually take a full day to accomplish.

With lowering the maximum amount of fines the traffic policemen were forced to confiscate the driver's license for much lesser violations. This led to people being more eager than ever to bribe the traffic police in order to avoid wasting a full day running around government agencies in order to pay the fine. The new law discouraged people from upholding the law and in fact strengthened the corrupt policemen's leverage in the bribe negotiation.

Capture means a risk of government officials twisting an anticorruption policy to further their own ends. Officials in charge of oversight are thus "captured" by corrupt officials (Hollyer 2012). While this is an issue mostly for high level corruption, it has been highly prevalent in the fight against corruption in Southern Caucasus. Börzel & Pamuk (2011) describe how incumbent regimes of Georgia, Armenia and Azerbaijan had implemented anticorruption policies to cut the power resources of their political opponents. Another example of capture is monopolizing of corruption. If corruption of a government service is prevalent and spread over several organizations the power can be misguidedly concentrated in the hands of a single organization through an anticorruption policy. This in turn allows it to set monopoly bribe-levels; Aidt (2003) provides an industrial organization analysis of such a case. The result is that corruption is nominally decreased, but public welfare is worse as bribes are no longer competitive.

Behavioral economics have changed economists' views of an agent. Agents are not driven by cold rational self-utility maximizing calculus, but also have social motives. The preference function assumed to govern the agents' decision making is much more complex than previously assumed and includes peculiarities like inequality aversion, moral costs and reciprocity invoking reference points. They are affected by ethical considerations and intrinsic motivations. Experimental studies of corruption have shown that this paradigmatic shift is highly relevant and can provide the missing link in explaining the true decision process of corruption. It can provide answers to questions such as why some corrupt acts are enforced by the power of reciprocity or why some officials forgo their narrow self-interest and serve the public instead. (Lambsdorff 2012)

Lambsdorff (2012) has written about a number of other anti-corruption policy examples that were based on sound argumentation and logical assumption, that fell short. Keeping to the mathematical principle of OLS regression, having too few explanatory variables can lead to a

breakdown of the model. An example of sound argumentation coupled with lack of empirical understanding is the four-eyes principle. The four-eyes principle is based on a rather straightforward, but highly plausible assumption that two people getting corrupted is less likely than one person. If we assume that an official is corrupt with some probability p, then it follows that the probability that two officials being corrupt is p^2 which is less than p ($0 > p > 1$). Two auditors becoming both corrupt are less likely a probability than just one auditor becoming corrupt and if one auditor remains honest, no corruption can take place.

This principle is most commonly utilized through peer review that is a standard organizational method. However, Schikora (2010) provides experimental evidence that groups are more self-seeking than individuals and are better at cultivating reputation for a reliable reciprocity thus making the policy backfire. It appears that groups can have entirely different utility functions than individuals. Studies by Cain, Loewenstein and Moore (2005) show however that four-eyes principle in fact increases the probability of corruption rather than decreasing it as people are bolder and suffer less from moral costs in a group than when working alone. They also get reinforcement from the group by shifting responsibility of the act to the other members believing that it must be alright if another person approves it too. This means that their moral cost functions are not static and change with the number of other auditors on the case. This is hardly foreseeable with theoretical analysis and serves as an excellent example to merit the use of experimental research.

Another long held truth in anti-corruption policies is transparency which is believed to universally decrease corruption. After all, perhaps the most prominent anti-corruption agency in the world is called Transparency International. Yet experimental studies show that transparency can cause moral licensing in agents as well as impair judgment of the informed.

Loewenstein, Cain & Sah (2011) report of an experiment involving a large jar of marbles. Participants had to estimate the number of marbles, but were also provided with an advisor who possessed more detailed information regarding the quantity of the marbles. While the estimator's payoff depended on the accuracy of the estimate, the advisor's payoff depended on how much the estimator overestimated the quantity. In addition to the control group, two treatments were made. One where the advisors had to disclose this conflict of interest and another where they kept it secret. The results were shocking, people in the group

without disclosure made much better estimates than those who knew the advisors were biased. Additionally, advisors who disclosed information behaved more unscrupulously than those that didn't by giving worse advice.

Similar "transparency errors" can be observed in recent history. A top-down approach to transparency in the form of auditing can create financial incentives to auditors that were at the heart of Enron and mortgage crises. The existence of auditors provided a corruption shield to companies and paid lip service to regulators. While transparent on the surface, the conflict of interest led auditors to be incapable of objective analysis of the companies' finances.

Disclosures can also be misinterpreted as a sign of honesty or professional standing by the recipients. At the same time those who disclose conflicts of interest receive a moral license and feel their burden of moral responsibility transferred. Disclosure also was found to increase the pressure to comply with bad advice.

Anti-corruption policy can thus be a two edged sword. In the case of failure it may have no results or facilitate corruption at worst. The failures of anti-corruption policy show the importance of understanding correct corruption mechanics. They are not dependent solely on the constraints the actors face, but political institutions and culture also heavily affect the mechanics under which individuals operate.

2. Research Methodology

There are many various methods employed in the study of corruption, but not all of them have proven to be successful. Early corruption research was mostly theoretical focusing on systemic causes of corruption such as theories of individual incentives for government officials to engage in corruption (Sequeira 2012). During the last decades beginning from early 1970s various methods have been employed with varying amounts of success to measure and model corruption. During the last decade research methods of corruption have been revolutionized which is indicated by a rapid increase in corruption literature. In this chapter I will cover the studies of the five most used methods for the study corruption: Perception indices, surveys, observation, laboratory experiments and field experiments. In

addition I will briefly review some of the prominent corruption literature related to each approach.

2.1. Perception Indices

After the initial attempt of theoretical approach, the first form of empirics used in corruption research were surveys of perception that subsequently became quite popular. Since corruption was hard to observe directly, perception survey sounded like a good proxy to observe corruption. This methodology was quite popular in the 1990s and until quite recently most estimates of corruption were based on perception surveys (Olken & Pande 2011).

Perception surveys were sent on a country basis to a number of individuals in relevant positions relating to business and government such as businessmen, judges, lawyers, policemen and politicians. Questions were simple where the recipients had to grade various questions. The perception surveys focused on questions about general levels of corruption such as financial honesty of politicians, the likelihood of firms having to pay bribes for government services or about the number of elected leaders who are perceived to be involved in corrupt deals (Sequira 2012). The results were then aggregated and combined into indices that gave a single numerical measure on a country or industry basis. These surveys generated much needed macro-level data that could be used to measure corruption's effect on important macroeconomic factors such as growth or foreign investment (Mauro 1995).

Indices formed from perception surveys were used as a basis for cross-country studies of corruption. The two most famous indices used today are Transparency International's Annual Corruption Perception Index (CPI) and World Bank's Control of Corruption Index. These perception indices can be quite specific varying in different aspects and types of corruption ranging from grassroots to high level corruption.

However, despite their prevalent use, the explanatory power of perception surveys came eventually under question. From conceptual point of view, corruption perception surveys tried to sum together often too many forms of corruption under a handful of indicators.

Secondly, corruption literature still lacked empirical evidence to back up its corruption related policies. (Sequeira 2012)

In terms of methodology, challenges were even more severe in terms of sampling and reporting bias. Perception surveys were often sent to international businessmen considered experts in their field and thus most informed. However they might not be the most objective evaluators of corruption in given countries. Olken (2009) shows that individual characteristics such as education have much more power in predicting perceived corruption than actual corruption. Sampling bias may also occur if a firm's business sector has a proclivity to engage in corrupt behavior in the first place. Sequeira (2012) names oil sector in Nigeria as an example of this where officials may be particularly corrupt. This results that the country is shown to be disproportionally corrupt based on one industry. Olken & Pande (2011) describe how after the fall of Indonesian dictator Soeharto in 1998 surveys reported that corruption had become much worse according to Transparency International Index. While this is entirely possible, the press became much freer to report allegations of corruption which it did. Therefore it cannot be excluded that perceptions of corruptions rose while the actual corruption fell.

The other type of bias, reporting bias may come in two varieties. The first one being the "bandwagon effect" under which respondents are influenced by the commonly held perception in the resident country. Thus respondents are not evaluating their personal perception of corruption, but what is their belief of the general public's perception of corruption. The other form of reporting bias known as the "halo effect" emerges when international experts and businessmen fall prey to prejudice where they expect poor countries or dysfunctional governments be more automatically more corrupt.

Finally, the comparison of corruption perception indices across countries and time is rather questionable as the perception of what is corrupt varies by country and culture.

Empirical evidence has also shown that perception surveys' accuracy can vary highly depending on how the corruption is organized. Olken (2009) examined villagers' perception of the level of corruption in a local road building project in India. He found that while the villagers' perceptions did reflect actual corruption in the road project, the magnitude was quite weak. Increasing the actual missing expenditures in the road project by 10 percent led

only to a 0,8 percent increase to a probability that a villager reported any corruption in the road project. Furthermore the public perception was curiously biased on the method of corruption. While the villagers were good at detecting marked up prices through overcharging they were much less accurate at detecting inflated quantities. For example, billing for a 1000m^3 of rocks, but supplying only 800m^3. This may be the reason for the relatively low correlation between perceptions and actual corruption as people must make an inference about the aspects of corruption they cannot perceive and that's where most corruption is usually hidden Olken & Pande (2011).

While perception surveys are still popular amongst non-academic organizations such as Transparency International and the World Bank, they have become uncommon in academic literature and replaced by other methods due to their limitations in explanation of micro-determinants of corruption or the complete set of mechanics of corruption in the economy. They were also unable to explain important within country variation in the incidence of corruption across different public services or to differentiate between different types of corruption (eg: grassroots vs. high level or coercive vs. collusive) as well as the range of behavioral responses it can induce (Sequiera 2012).

2.2. Surveys

While perception surveys measured corruption levels they did little in the way of explaining many different forms and methods of corruption. In response to the growing need of empirical research scientists began to seek new ways to gather micro-level data on corruption. The result was a redesign of survey questions with a focus of eliciting truthful reporting on actual bribe payments with intent of later applying them to a representative sample of agents in the economy. These surveys had standardized questions on whether firms or individuals had actually engaged in corruption in a specific and well defined situation such as obtaining a government contract, an import license or a certificate. Additionally they were easily replicable and thus allowed more specific and meaningful longitudinal and cross-sectional comparisons of corruption between countries based on a more representative sample of respondents. (Sequiera 2012, Olken & Pande 2011)

Svensson (2003) illustrates the method by using self-reported bribe payments by Ugandan firms to show that the incidence of corruption varied by firm characteristics even while corruption was considered as pervasive. It also showed a more accurate distribution of bribe payments across different types of agents. This is an important result as it brings us closer to understanding distributional costs of corruption and specific ways to target them. For example Mocan (2008) found that income and education of an individual had positive impact on the probability of being asked for a bribe in developing countries, but an opposite effect in developed ones.

However, this new survey data had some challenges of its own. The quality and consistency of the questions played an important role in the surveys as cross-national attitudes on corruption still varied as before. Even with the right questions respondents may understand the same question differently depending on their country of residence especially with the fact that what constitutes as corruption was up to interpretation. What might be perceived as a gift in one country might be viewed as a bribe in another.

Another challenge was the extent to which the respondent might misreport the bribe payments on purpose for various reasons. One being that fear or shame of exposure can lead to underreporting of bribes. Attempts of strategic manipulation of results by misreporting can also play a role. These are known as social desirability bias where individuals might have a personal interest to over or under-report corruption depending on whether he is benefitting from it or not. Finally, imperfect recall of events also remains as a limitation (Rose-Ackermann 2007).

While not really a methodological concern, but still a research limitation, the close-ended and few in number questions allow little room for detail on the micro-dynamics of corruption. This make it difficult to detect alternative forms of corruption the researchers might not have even thought of.

2.3. Observation

A recent, but very innovative approach to estimate corruption is estimation that can be conducted through *direct* or *indirect* observation. This approach has gained popularity in recent years and provided quite accurate and interesting results.

Naturally the best way to measure corruption is to observe it directly in practice. While this is difficult it is not impossible, especially when it comes to grassroots corruption. Olken & Barron (2009) have managed to gather data on actual bribes to police paid by truck drivers on their routes in the Indonesian province of Aceh. The researchers spent over nine months travelling along with the drivers disguised as assistants while recording and observing the bribing in practice. In total they spent over 300 trips and observed more than 6000 illegal payments. They calculated that in aggregate these costs made up 13 percent of the marginal cost of the trip. A rather steep cost considering the salary of the truck driver was only 10 percent.

Sequeira and Djankov (2010) used a similar method by shadowing customs agents in Mozambique and South Africa as they processed customs for cargo. Together they observed bribe payments of 1300 shipments. Based on this they estimated that bribes represent 14 percent of the shipping costs for a standard container passing through the port of Maputo, Mozambique and 4 percent of the shipping costs for a standard container passing through Durban, South Africa.

This level of detail in the data allows researchers to identify different mechanisms of corruption in specific government agencies. The challenge of the method comes however in the form of logistics both from the side of effort and time. Additionally making these kinds of arrangements can be difficult and will vary from context to context depending on trust between the researcher and the subjects. Aside from feelings of shame or embarrassment subjects may also have concerns for legal repercussions.

Indirect observation methods are essentially creative ways to detect corruption through identification of gaps between primary and secondary data. In this type of estimation of corruption by subtraction a researcher obtains two sets of measures for some quantity of resources which one is from before corruption occurs and the other one after. By comparing the measures the researcher obtains an estimate of the size of graft. An emerging subfield of

indirect observation called "forensic economics" applies more complex methods although in a similar manner. These methods seek to uncover corruption through applications of price-theoretic models and market equilibrium conditions in order to identify patterns of statistical anomalies that may indicate corruption (Sequeira 2012).

A good example of indirect observation is Reinikka and Svensson (2004) where the researchers used such a method to compare the amount of special education funds officially sent by the central government in Uganda to the one reported received by schools. They estimated a rate of corruption they termed as "leaking" as high as 87 percent. After publishing the results, the leakage rate fell to less than 20 percent.

This also shows that this type of method can be used to both estimate the levels of corruption as well as test the effects of anticorruption policies. As a limitation the method is far from exact and relies on the quality of recordkeeping. If receiving organizations have poor records the money might not show up in the books even though it has been received (Olken & Pande 2011). Statistical inference of forensic economics may struggle to isolate which part of the detected deviation from equilibrium conditions can be attributed to corruption as well as completeness of the equilibrium model itself.

2.4. Laboratory Experiments

Experimental methods in the study of corruption in economic literature present a rather novel area of research to study the micro-determinants of corruption and effects of anti-corruption policies. Lab experiments allow a researcher to overcome the unobservability of corrupt behavior while at the same time maintaining a controlled and often quite cost-effective environment. This way formulated theories can be thus tested empirically and their results can facilitate formulating policy measures to counter corruption. Lab experiments have recently enjoyed a sharp rise in popularity which is indicated by a large number of papers published in the last decade (Bobkova & Egbert 2012).

One of the very first such experiments was Frank & Schulze (1998) where the researchers studied individual tendencies to engage in corruption in procurement and whether economists are more likely to accept bribes. This study was followed in a few years by an

extended analysis of how intrinsic motivations are affected by threats of penalties (Schulze & Frank 2003).

In economic lab experiments subjects are provided with explicit instructions which explain the exact consequences of their actions and that these consequences are purely monetary. An important aspect of all corruption experiments in economic literature is the concept of non-deception where the subjects are never deceived during experiments, not even temporarily. However this does allow certain leeway such as uncertainty or subject pool manipulation (Armantier & Boly 2011).

The corruption experiments are then often subjected to various treatments to pinpoint the identity and magnitude of its determinants. Three common themes that have long been studied for their ability to promote or deter corruption have been size of the bribe (Rose-Ackermann 1974), size of the wage (Besley & McLaren 1993) and monitoring and punishment (Schulze & Frank 2003).

Laboratory experiments can answer similar questions as perception surveys, but with more precision in explaining the determinants of corruption between different countries. Armantier & Boly (2011) specify two main advantages the laboratory experimental approach offers in this regard:

1. Corrupt behavior is unambiguously observed at the individual level
2. The researcher controls both the environment and the characteristics of the subjects' population

A vast majority of the corruption lab experiments have been investigations of bribery. In many cases the experiment is designed in a way where a participant designated as a public official takes a bribe in exchange for some sort of favor (Lambsdorff & Frank 2010, Abbink, Irlenbusch & Renner 2002). These experiments address reciprocity and are often investigated in the form of a modified economic games such as ultimatum, dictator or trust games (Bobkova & Egbert 2012).

The limitation of laboratory experiments is that they don't involve explicit abuse of public office and it can be argued that the essence of corruption has not been captured in the lab. Another concern along the same lines is that lab subjects might make moral choices over

wealth maximizing ones due to them knowing they're being observed (Levitt and List 2007) although Armantier & Boly (2011) have shown evidence that finds no significant effects from being observed. However, non-monetary intangible considerations such as moral, ethical or legal remain difficult to capture in a lab setting although not impossible as I will consequently attempt to demonstrate in the experiment section of this thesis.

2.5. Field Experiments

While most experiments on corruption have been conducted in a laboratory setting there have been a few experiments conducted in the field. Field experiments are essentially lab experiments conducted without subjects knowing they're in an experiment, but believe that everything is real. Participants are usually notified of the experiment once it is over although this not always possible.

Since the entire experimental method is at its infancy, the field experiments on corruption have been very rare as there exists only a handful of such accounts in the literature. While there have been conducted many pointless lab experiments with hasty planning the few field experiments performed have been exemplary. They are very inspiring and have lots of good though put into them brilliantly showcasing the potential of the approach. While I will briefly mention them below, I will present them in greater detail in the next chapter.

Armantier & Boly (2011) perform a controlled field experiment on corruption where an exam grader is bribed for a better grade. The experiment takes place in Burkina Faso, a country with a serious corruption problem (Corruption Perceptions Index consistently below 5). To really make the research complete, they ran the same experiment under a laboratory setting for comparison of the results.

Another ingenious corruption field experiment was conducted by Bertrand et al. (2006), where they studied obtaining drivers' licenses in India and attempting to identify which rules can be broken through bribery. The researchers divided participants randomly in two groups in addition to the control group. First group was offered a bonus for obtaining the license fast while the second group was given free lessons. The results indicated that bureaucrats

raised red tape on purpose to extract such bribes and thus undermined the very purpose of regulation.

Lastly a pioneer of corruption field experimentation Benjamin Olken, details in his Olken (2006) of a robust study of over 600 village road projects in India. He used independent engineers to estimate the cost of inputs in each road project which he then compared with the official village expenditure accounts. The results indicated the importance and effectiveness of top-down monitoring even in highly corrupt environments.

The advantages of corruption field experiments are significant. Results are directly from real life and highly representative of what happens when agents engage in corruption. The research also doesn't need to be constrained by hypotheses. Field experiments allow surprising and unforeseen mechanics to occur that are completely real and not merely theoretical.

Another advantage of a field experiment is that there is no contamination of the subject pool from deception since subjects are not away of the experiment in the first place. This is an important fact as some deception is practically mandatory in case of corruption research due its illegal and immoral nature. Obviously any part where researchers are involved and identified as researchers must remain deception free.

However as a counterweight to its benefits designing field experiments has the most challenges of all approaches. While producing the purest and more realistic data, the field experiments are logistically heavy and difficult to control. However this too can be overcome with proper experiment planning as the literature has shown. As more researchers adopt this approach the additional thought being put into it will undoubtedly come up with clever ways to conduct corruption field experiments.

3. Literature Review

In this chapter I will review the extant literature on experimental study of bribery under laboratory and field settings. During the past decade there has been a veritable boom in experimental study of bribery under lab setting. While field experiments have been few in number, interest in them is growing rapidly (Sequeira 2012). Laboratory experiments

particularly have become quite popular only in recent years with the rise of neuroeconomics and other adoptions of interdisciplinary methods by visionary economists. Lab experiments consist of running various sorts of psychological games, very similar to those in behavioral economics. These games usually test some form of theory or try to create data that would shed light on the mechanics of corruption and moral choice of individuals. One of the main lines of study of experiments is a bribery situation that will be the focus of this literature review. In bribery situations the subject that represents a public official either by imagination (lab) or proxy (field) takes a bribe from an individual in exchange for a favor at public's expense (Bobkova & Egbert 2012).

Despite of the high promise of the method, the experimental literature on corruption is still in its infancy. The major weak point of the method, external validity also remains partially open as it is not yet clear how generalizable the results of experimental studies are. However, List (2006) shows that representativeness of the environment, rather than representative of the sampled population, is the most crucial variable in determining generalizability of results for a large class of experimental laboratory games. This is an important insight because constant environment and highly representative sample population cannot be both had in any other study aside from a very large scale field experiment.

The inherent difference between lab and field studies is that the subjects are aware of being observed in the lab, but not in the field. This scrutiny can have significant impact on the subjects' behavior as lab subjects may be more inclined to make "moral choices" when wealth and morality are competing objectives as is often the case with corruption (Levitt & List 2007). This effect can be very significant as moral, ethical and legal reasons serve often as major deterrents of corruption (Armantier & Boly 2010). Secondly, in most corruption situations there is a framing effect where the participants frame the interaction in a way other than immoral corruption, but as a gift exchange, a business transaction or as some other seemingly legitimate affair. This can also make observing corruption more difficult in the lab as corruption is usually disguised under a veil of legitimacy that is harder to achieve under sterile lab conditions.

With the failures of anticorruption measures in developing countries the universal validity of corrupt behavior has been questioned (Hollyer 2012). The empirical literature in

development economics has provided many studies that clearly establish that corruption may vary across countries and cultures based on many attributes such as education, religion, ethnicity or language heterogeneity (Armantier & Boly 2010). However, these studies do not tell if corruption between countries has the same determinants and responds to the same factors. This brings forth a question of location for experiments as while most corruption happens in undeveloped countries, much of the lab experimentation is conducted in developed countries.

3.1. Laboratory experiments

In general bribery lab studies consist of subjects playing either the role of a private agent or a public official. Games are run either as one-shot or multiple-round although one-shot games are much more common. The focus of study is usually the decisions individuals take to bribe as well as reciprocate in the role of public officials. In addition to this, experiments are often subjected to various treatments in order to explore how the results change and estimate the significance of assumed corruption determinants.

The purpose of alternate treatments is mainly to measure the effectiveness of deterrents with the intent of finding out which determinant would be most effective in curbing corruption. But treatments can have other meanings too; they can serve to bring more realism in the experiment as is the case with externalities or play down the sterility of the lab such as when instructions are framed in an abstract/neutral way.

While experiments begun as a study of general levels of bribery they were quickly followed up by various treatments focusing on certain determinants. These determinants can be roughly divided into three categories: Tangible, Intangible and Intermediary. Tangible determinants are those that directly affect the payoffs and can thus be precisely measured and quantified such as wages, fines or externalities – monetary costs to third parties. Intangible determinants on the other hand affect such costs and benefits that are highly individualistic and difficult to predict such as moral or social costs or framing effects. Since they are a definite missing link from theoretical work, experimental study has made many interesting findings in this area. Lastly, the method of bribery has also been studied in the form of intermediaries. The role and effect of intermediaries have been recorded to

significantly increase the efficacy of bribery which is supported by empirical evidence as a huge and prosperous lobbying industry in both the U.S. and the EU.

Bribery

The first economic corruption experiment ever recorded was conducted by Frank and Schulze (2000). This was a relatively straightforward experiment of bribery in general and focused entirely on the behavior of public officials. Bribe paying private firms were made up and simulated by the experimenters. The role of the principal was given to a local self-financing student film club which served as a realistic passive victim of corruption. The experiment was conducted during one of the movie showings before which moviegoers were asked to make a decision on behalf of the movie club. A 200DM (~102€) bank note owned by the film club had fallen into a drainpipe and could only be retrieved by a plumbing company. Ten companies had submitted their offers that consisted of two sums. The first sum was the price to the movie club while the second was the amount of money the company would pay the decision maker for getting the deal. Prices were positively linked with the bribes ranging from 20 DM (at bribe = 0) to 200 DM (with 144DM bribe and zero rent to the movie club). Additionally it was credibly announced that the movie club would receive all rents as well as two randomly chosen subjects would get their bribes. They found that economics students, especially males, were significantly more corrupt than students of other subjects. In the second treatment the experimenters examined whether participants would be less inclined to act corruptly if awarded independently of the bribe a lump sum payment for participation in the experiment. This treatment had no effect on the outcome.

Since Frank and Schulze (2000) several experiments have been run to target specifically the impact of tangible determinants of corruption such as risk of punishment, effect of wages and externalities. Following their 2000 experiment Schulze and Frank (2003) extended their experiment to include a detection mechanism. This probability of detection increased with the size of the bribe accepted. In case of detection the bribe as well as the lump sum "participation fee" was forfeit. The results were astounding, introduction of detection mechanism significantly reduced number of honest actions to the point of marginality. In the no risk treatment 9,4% accepted the zero bribe offer, but with monitoring this figure became 0,9%. This finding was in accordance with the notion of intrinsic motivation being crowded

out by monetary rewards or monitoring by the principal. However monitoring did have some impact in the sense that it significantly reduced the average size of the bribe due to it increasing the chance of detection.

Abbink et al. (2002) were the first to design a bribery experiment with treatments to measure the influence of punishment and negative external effects. This experiment had a deep impact on the literature and has been replicated and modified in many ways since then. Drawing on Frank and Schulze (2000) Abbink et al. (2002) expanded the experiment to include the role of the private agents for participants. The experiment begins with a *pure reciprocity* treatment that examined pairs of players where a firm has an option to offer a bribe to an official. In return it has to pay a relatively low transfer fee. If the bribe is rejected, both parties receive their initial endowments minus the transfer fee for the firm. If the official accepts the bribe, the payoffs of both parties are significantly increased. In the second stage of the game the official can choose among two options where the first results in equal gains for both parties while the other significantly increases the payoffs of the briber while slightly decreasing the payoff of the official. It is worthy to note that this game is run as multiple-round game and the first treatment studies reciprocity and trust only. This is contrasted to a game theoretic prediction where the unique subgame perfect Nash-equilibrium predicts that bribery should never occur since the official should never reciprocate.

In the second treatment a negative externality is added in the form of a penalty to other groups in the experiment. Reciprocating the bribe will cause a monetary damage to all other participants in the experiment. Due to these damages reciprocating is inefficient in terms of total payoffs for all players as total damages exceed the mutual gains realized by the corrupt pair. No feedback is provided to any of the players during the game or between rounds regarding their own or others' payoffs. Abbink et al. (2002) found that this negative externality had virtually no effect on the choices of players, possible due to the fact that other groups were in an equal position to cause the same negative externality to them.

The third and final treatment introduces a danger of being caught. The risk however is so low (0,3%) that only very risk-averse subjects would refrain from corruption for this reason alone. The risk-lottery is run in case the bribe is accepted and does not depend whether the

bribe is reciprocated or not. In case of getting caught, the event is treated as a sudden death causing both players of the pair to lose all their earnings and be barred from playing the game any further. The game is played 30 rounds so the maximum probability of getting caught by accepting a bribe every round is $p = 1 - (1-\theta)^{30} = 0,086 = 8,6\%$, where $\theta = 0,003$ is the chance of being detected. Chance of a drastic penalty was found to significantly decrease the acceptance rates of bribes as well as frequency of reciprocation.

Framing

In Abbink & Henning-Schmidt (2006) the authors add a framing treatment to the game played in Abbink et al. (2002). The authors investigate whether suggestive phrasing as compared to a neutrally framed abstract wording can produce differing results. The hypothesis here is that due to corruption having a negative connotation it could play an effect on individuals' decisions. This treatment however brought not significant effects in risky or risk-free games. There was no significant difference in the level of bribes or the frequency of permissions given by the public officials.

A much talked paper of Lambsdorff & Frank (2010) produces similar results in the experiment that examines whether there is a difference if players frame their bribe payment as a gift or a bribe. The authors find only very marginal difference between the choice of words although calling the bribe a bribe does elicit reciprocation slightly more consistently. This game is also played in pairs and in three stages where in the first stage the firm decides whether to pay a bribe and if so whether to call it a gift or a bribe. In the second stage the official decides whether to report the bribe, accept and reciprocate or accept and betray. There appears to be no option of simply rejecting it. Additionally there's a third and last round of the game where the bribing firm may choose to whistle blow on the official at an additional cost. Personally I find this experiment somewhat flawed as the choice of words was meant to have no effect on the outcomes. In the real world bribes are called gifts because it is believed to provide some form of protection in case of detection. In this case it had semantic meaning only and the results were according. There was virtually no difference between opportunism (58% vs 59%) and whistle blowing (29% vs 27%) between the gifts and bribes respectively. Reciprocation was 13% when bribe was called a gift and 16% when it was called a bribe.

Armantier & Boly (2010) run an innovative bribery experiment in both lab and field settings. While the purpose of the study is to investigate external validity of a lab experiment it still serves as a fine example of a bribery experiment conducted under lab setting. To measure the external validity the experiment was conducted in both a developed (Montreal, Canada) and an undeveloped (Ouagadougou, Burkina Faso) country. In the lab experiment players were divided in two groups. The first group had to write a dictation and their payoff depended negatively on the number of mistakes they make. These players had an option to bribe the other group of players who were correcting their dictation to overlook some mistakes. Failed papers received zero payoffs. Each grader had exactly 20 papers to grade and each stack of 20 papers contained one paper with a bribe as 11th paper. It is also interesting to note that players writing the dictations were real students while the graders were real teachers hired through a recruiting company complete with strict academic requirements. As a result it was surprising to find in the pure reciprocity, no-risk control treatment 50% of Ouagadougou teachers rejected the bribe, but in Montreal only a third.

In addition to the experiment described above, three treatments targeting tangible determinants were applied: a high wage, a high bribe and monitoring. The high wage treatment was identical to that of the control treatment except wages were 40% higher. The teachers in the experiment were all paid the market wage for their time so this was on top of that. This reduced bribe taking acceptance in both locations by roughly 35%. In the high bribe treatment the size of the bribe was doubled. This led to an increase of bribe acceptance in Ouagadougou, but had virtually zero effect on Montreal. The monitoring introduced a risk of detection by experimenters. Five randomly chosen exams of the graders were re-graded and if there were grading mistakes the graders were punished according to their amount of mistakes, but only the worst of these five papers was considered for this penalty. Once again this diminished bribe acceptance in Ouagadougou by roughly 20%, but had no effect on Montreal.

Following the experiments of Abbink et al. (2002) and Alatas et al. (2009), Rivas (2012) ran experiments with a focus on investigating gender effects in corruption. The experiment was modeled according to *pure reciprocity* game of Abbink et al. (2002) and put through four treatments: Two treatments where both roles were filled by the same gender and two treatments where the genders were opposite with only the role varying. Rivas (2012)

concluded that gender had no significant statistical effect on the probability of offering a bribe except that women tended to offer lower bribes on average than men. At the same time, women also tended to accept bribes less frequently especially if the briber was another woman. They were also less likely to reciprocate after accepting the bribe compared to men. Based on these results Rivas (2012) concludes that men are more corrupt than women and postulates that increasing the number of women in positions of high corruption could lower the levels of corruption.

Tangible Determinants

Risk

Schikora (2010) produces experiments focused specifically on the study of the effects from various methods of detection. He studies three very popular methods of monitoring corruption: The four-eyes principle, Whistle-blowing and asymmetric design of sanctions. All games were played as multiple-round games. The results are quite interesting, the four-eyes principle as previously mentioned failed to deter corruption and in fact increased it in comparison to a single official treatment. Schikora (2010) traces this to the fact that groups are often more self-seeking than individuals and better at cultivating reputation for reciprocity. Whistle-blowing treatments with leniency to whistle-blowers backfired as well. Whistle-blowing generally happens only when bribe takers cheat and ends up serving as a tool for enforcement for corrupt transactions resulting in bribe takers not daring to cheat. This leads to more successful corrupt transactions and increased reciprocation by officials thus stabilizing corruption. Officials also refuse bribes unless they have intent to deliver. The last treatment is an innovative idea that uses the results of whistle-blowing treatment and attempts to create opposite results; destabilize corruption by increasing mistrust between corrupt parties. This is achieved by actually helping one party to cheat the other by asymmetric design of sanctions. These sanctions give great leniency to a cheating bureaucrat who blows the whistle as well as allow him to keep the bribe. This resulted in a significant decrease of corruption and bribes were rarely reciprocated, but often accepted and reported. These results provide an innovative approach to tackling corruption by targeting the mechanics and incentives of reciprocity between parties engaged in corruption.

Externality effects

Barr & Serra (2009) investigate the effects of externalities in corruption as a one-shot ultimatum game of three players; one official, one firm and one as a member of society whose payoff is affected by corruption. They find that externalities do decrease bribe acceptance if externalities are comparatively high to the gain. The authors hypothesize that this may be attributed to the inequality aversion of the players. Barr & Serra (2009) also try different framings in instructions, but find no significant differences. Barr & Serra extend this experiment in Barr & Serra (2010) to study cultural effects on corruption. They compare British students' choices to those of a mixed group of students from countries rated poorly on Transparency International's corruption index. They find that first year British students engage in corruption significantly less than those coming from countries with high corruption. However these results do not hold for graduate students indicating that immigrants tend to conform to cultural norms of the resident country.

Culture and Environment

Continuing with cultural research Cameron et al. (2009) run the same game as Barr & Serra (2009) with the exception that the third player whose payoffs diminish because of corruption has an option to punish corrupt players at a further cost to himself. Cameron et al. (2009) investigate the effects of cultural differences on individual decision making of four countries: Australia, India, Indonesia and Singapore. Australia and Singapore count on Transparency International's Corrupt Perception Index (CPI) amongst the least corrupt countries in the world whereas opposite applies to India and Indonesia. The aim of the experiment is to test whether a corrupt environment promotes corruption by lowering inhibition threshold and on the other hand whether this creates tolerance for corruption and thus lowers propensity to punish corrupt behavior. They play two treatments where one has welfare reducing corruption while the other has welfare enhancing corruption.

The authors find significant cross-country differences. Indians, as compared to Australians, have a lower propensity to punish and are more willing to accept bribes. This does not transfer to Indonesians however who have significantly lower tolerance to corruption despite ranking poorly on corruption index. Singaporeans exhibited very similar behavior to Indians being eager to engage in corruption and disinclined to punish for it. Cameron et al.

(2009) argue that institutional and historical framework of corruption in the countries has a considerable effect on individual decision making and that it may be the reason why CPI is unable to capture all relevant factors.

Wages

Jacquemet (2007) investigates the effects of a higher wage on an agent's willingness to accept a bribe in a three player game. Agents that accept bribes are essentially in a conflict of interest in terms of reciprocity as they are confronted by two parties that request reciprocity. A decision needs to be made as to whom they owe their allegiance. With higher wages from the principal, some agents reject bribes more often. An interesting caveat here is that high-wages seem to polarize agents. While some agents reject bribes altogether, those that do accept them reciprocate much more often to the briber. Curiously income of the agents seemed to have no effect on corruption which means that richer agents are not more honest as is commonly believed. Jacquemet (2007) underlines that in order for higher wages to have their desired effect, the increased income must be seen specifically coming from the principal rather than nature (eg: scheduled pay raises, union contracts etc..)

Intangible Determinants

Trust

Intangible determinants have been found to produce more significant results than tangible ones. Trust and respect govern our everyday interaction to a great degree and it is no less important a factor in corruption mechanics. Azfar & Nelson (2007) conducted an experiment where they formed groups of eight students in which one was appointed as the monitor. In the first treatment this student was randomly determined, but in the second he was appointed by a vote. The result was that the elected monitor was observed to be significantly more vigilant and devoted more resources to uncovering executives' malfeasance than unelected one. Azfar & Nelson (2007) conclude that election created bonds of reciprocity and cultivated a desire to serve the electorate.

Falk & Cosfeld (2006) run a similar experiment regarding the effects of trust. In a very simple two player game of principal and an agent, the agent has a set of choices x_i from which he can choose with the lowest being $x_L = 0$. The higher the x, the higher the cost for the agent.

At the first stage of the game, the principals can either restrict the agent's choice set by eliminating some low value choices for the principal or they may leave the choice set unrestricted. The control does not come for free however and the principal incurs a cost for it. Falk & Cosfeld (2006) find that when control is exercised agents usually select the lowest allowable x in the choice set. This means that if there are agents who are intrinsically motivated to perform in the principal's interest, controlling may actually decrease performance. A potential reason is that agents do not like to be restricted and perceive control as a negative signal of distrust. In addition, these agents might also assume that the principal has low expectations of them.

Subject Pool effects

Alatas et al. (2009) conduct an experiment studying the difference in subject pools of experiments by running a three player one-shot bribery game as in Barr & Serra (2009). Subjects are drawn from two different pools, students and public servants. The test is conducted in Indonesia that ranks as one of the most corrupt countries in the world. Results show that students in the role of a firm are much more likely to engage in corruption than public servants in the same role. Students appear also more corrupt in the role of a public official. No differences are captured in punishment frequency between the two pools. The authors also study, but do not find self-selection effects, students that plan to become public servants are statistically no more corrupt than those aiming for private sector.

Intermediary

Lately the methods of corruption have garnered interest in experimental literature. The use of delegation has posed another challenge to the rationality of our moral calculus. Action incurs immediate moral costs that are known to be attenuated when the same consequences result from inaction (Lambsdorff 2012). This translates to lighter moral burden if the misdeed is committed by a third party. Hamman, Loewenstein and Weber (2010) study the use of intermediaries in a dictator game where dictators had to delegate the decision making to a third party. However, before choosing a delegate, the dictator was informed of the decisions delegates would make in advance. This resulted to almost zero payoffs of recipients when delegates were used. The authors suggest that distancing themselves from the process through an intermediary distorted the norms of fairness of the

dictators. Coffman (2011) introduces a fourth player into the game who has the power to punish unfair dictators. He finds that dictators are punished more leniently when they involve an intermediary than compared to the control group without intermediaries.

Drugov, Hamman and Serra (2011) replicated Coffman's four-player game without punishment and studied the levels of bribery with and without intermediaries. They found that officials accepted bribes more often and of smaller size with an intermediary and firms demonstrated higher willingness to bribe if an intermediary was available. These results suggest that intermediaries may enhance corruption by reducing the moral costs of bribery.

3.2. Field experiments

The major difference between field and lab is the fact that subjects are not aware of being observed in the field. This guarantees 100% natural data and facilitates the existence of costs that are extremely difficult to create under lab setting such as legal or moral costs. Additionally field experiments are not hindered by rules regarding deception in economic experiments since subjects are not away of being in an economic experiment and thus there is no contamination of subject pool. Despite these advantages, field experiments have so far been few and far between. They are often costly to run and difficult to control not to mention the requirement of very creative thinking because of corruption's sensitive and illegal nature. Due to the high cost, all of them so far have been held in developing countries.

To this day there have been very few field experiments on corruption in economic literature. I was able to find only four in total and one of them was more of an accident than a planned experiment.

While not technically an experiment the results analyzed in McMillan & Zoido (2004) might have as well come from a perfect economic field experiment. McMillan & Zoido (2004) study the detailed records of Vladimiro Montesinos Torres, the chief of secret-police of President Alberto Fujimori, a Peruvian president in 1990s. During the course of his career Montesinos systematically bribed judges, politicians and the news media. But unlike most bribers, Montesinos kept meticulous records of all transactions requiring people to sign contracts

that detailed their obligations to him and going even so far as to record corrupt transactions on video. These records allowed economists to study the dynamics, breakdown and size of bribes to various entities. McMillan & Zoido (2004) used these records to estimate the cost of bribing various types of public officials.

Bribes were paid from a special secret government fund that was mainly funded solely by three sources; ministry of the interior, ministry of defense and Peruvian army. From this fund the average monthly bribes paid to ordinary judges were around $3000 while superior court judges and judges of national elections board were paid around $50 000. Politicians received a monthly payment of $20 000, but the payment to large new media averaged $1 500 000 being the most valuable tool of power by revealed preference. All the large news Medias were paid off with only smaller news outlets remaining independent, fact that ultimately proved Montesino's undoing. This reflects the power of mass media in the modern world and provides food for thought as to how it could be harnessed to fight corruption.

Perhaps the first planned economic field corruption experiment was conducted by a pioneering economist Benjamin Olken who has conducted several studies of real life corruption during the last decade and spearheaded new methodologies in corruption research.

Olken (2007) studies data in over 600 rural road projects of Indonesia. He goes about this very meticulously by comparing the official records of money spent on the road with an independent engineering estimate of what the road actually cost to build. To increase the accuracy of the estimate he had engineers dig core samples of the road to make reliable estimates of materials quantities, survey prices to estimate the local price level and interview villagers to estimate exact wages paid. Even after all this there remained the fact that some materials naturally disappear during construction so to make his estimate complete Olken built several small "test roads" to calibrate the metric under zero-corruption conditions. This allowed Olken to estimate the "missing expenditures" of 24% between the official figure and actual cost of the road. He also examined the efficacies of top-down and bottom-up monitoring of corruption. He found that increasing the probability of government audit from 4% to 100% lowered the amount of missing expenditures by 8% that was more

than enough to cover the costs of the audit indicating that top-down monitoring can be efficient even in highly corrupt environments. Increasing grassroots monitoring as a bottom-up monitoring measure proved inefficient on average and decreased corruption only in situations with limited free-rider problems and elite capture.

A study by Bertrand et al. (2007) was perhaps the most straightforward application of a lab experiment in a field setting. In the experiment the researchers study the corruptibility of driving test officials in India as well as the ease of obtaining a driver's license this way. It is interesting to note that while this is a field experiment, subjects are aware of being in an experiment although not the purpose of the experiment and subsequent corruption is still as real as it gets.

The subjects of the experiment were randomly assigned into one of three groups; control, bonus and lesson. The control group subjects were simply tracked through the process and received a payoff after a fixed time period for showing up for an interview. Bonus group subjects received the same treatment as control group except with an added bonus of five times the normal payoff if they manage to obtain their driver's license in minimum time possible plus two days. The minimum time to obtain a driver's license in India is 30 days so the time limit for the bonus group was 32 days. Lastly, the lesson group also received the same treatment as control group except they were given 15 hours of free lessons from certified driving schools. After obtaining their license all subjects were invited to a final interview to receive their payments as well as go through a surprise driving test. The researchers found that both bonus and lesson groups were much more likely to obtain their driver's license than the control group. Alas, the surprise driving test revealed that most members of the bonus group were unsafe drivers. The subjects were very open to talk about corrupt practices and readily admitted using bribery to obtain their licenses with bonus group subjects being the most inclined. Interesting mechanics were also revealed that all bribery was made through specialized intermediary agents. The driving skill appeared to have no impact on the size or acceptance rate of the bribe which resulted in many licensed drivers obtaining their license without a test or even any driving lessons. Bertrand et al. (2007) conclude that these results support the view that corruption does not merely reflect transfers between citizens and officials, but distort allocation as many unsafe drivers got

their licenses, while good candidates were denied. This study showcases a creative way to study real life corruption with almost laboratory level control.

Armantier & Boly (2010) is the most recent corruption field experiment related to bribery that aimed to study the external validity and differences between results gained from lab and field settings. The field experiment was based on lab experiment and conducted in Oaugadougou, Burkina Faso except only graders were experiment participants. The experiment involved hiring graders to grade 20 dictates out of which exactly 11th one contained a bribe with intent to prevent receiving a failing grade. The experimenters used a local recruiting firm to hire teachers for a part-time job grading exam papers. The teachers were paid 5000FCA which was the going market rate for that kind of work. After validating the graders' credentials the graders were given the time and place for grading. To control for the distribution of mistakes the experimenters created a mix of real and fabricated exam papers although the bribe paper was typed by a real student from the lab experiment who had chosen to offer a bribe. To maintain a legitimate appearance of the task, the experiment was conducted at a rented local high school in the center of Oaugadougou.

On the exam grading day, each grader was randomly assigned a private room that contained the specially prepared stack of 20 exam papers. Graders were explicitly instructed to grade the papers in order and not to leave the room under any circumstance until the grading was complete. They were also told that a supervisor would stop by their room at exactly every 15 minutes to answer any questions so any disturbances would be predictable and they would be certain of their privacy in between.

The bribe solicitation was written on an easily removable post-it note with a handwritten text "Please find few mistakes in my exam paper". The second page of the 11th exam had a bank note securely taped to it not visible under the cover page but noticeable before the examiner begun grading the paper. If the examiners decided to report the bribe during a supervisor visit, they were instructed to fail the paper automatically and write "fraud attempt" in large letters on the exam paper.

In addition to the control group, the experiment was run in the same three treatments as the lab one; high bribe, high wage and increased monitoring. The results were quite similar to those of the lab experiment. Graders responded most favorably to higher bribes while

the effect of higher wages remained ambiguous as in many other studies, on one hand they lower bribe acceptance rate, but foster reciprocation in case the bribe is taken thus providing stability to corruption. Effects of monitoring were ambiguous as well, while they did reduce corruption the researchers cannot exclude the possibility of crowding-out intrinsic motivation for honesty. Lastly, several micro-determinants of corruption were revealed concerning corruptibility. Armantier & Boly (2010) found that age, religiosity and ability tended to reduce corruption while gender seemed to have no effect, contrary to evidence of previous studies.

Armantier & Boly (2010) is a bold study of corruption by involving real public servants in a simulated corruption, but real to the participants at the time of decision making. All participants were told of the experiment afterwards and assured anonymity of results. The participants seemed to take the revelation very well and no complaints were received although this experiment might edge the line of moral experiments. This however can be a necessary evil if the purpose is to study immoral acts.

4. Experimental motivation

In this chapter I will draw conclusions based on the literature review and methodological challenges as well as offer thoughts on future research. What are the critical challenges facing corruption research in economics today? How should we proceed to solve them and what research areas would yield the highest benefit to the field? I will begin by introducing my views on the pressing challenges of corruption research after which I will propose possible solutions to them. I will formulate a theoretical background for a future corruption experiment based on these conclusions. Finally I will distinguish between the needs of experimental execution and experimental planning.

4.1   Current needs of corruption research

The complexity of corruption process is so high that no workable model has ever been invented that could even remotely reflect the mechanics of the real world. One of the main reasons for this is that data to build models from has been extremely difficult to obtain. As previously mentioned, observing actual corruption is very hard and corrupt officials or

bribing agents rarely keep records of their bribes. In the real world parties involved in corruption develop an alternate language where payments are referred as normal and accepted business transactions (Della Porta & Vanucci 2005). These can be implicit cultural customs or simply the use of highly sophisticated intermediaries who have developed a mutual reciprocal understanding with government officials as witnessed in Bertrand et al. (2007).

But complexities of observing corruption do not merely end in secrecy. Other distortionary effects play a role in distinguishing corruption from legitimate business. Cultural customs and traditions vary from country to country and heavily affect the perspectives of corruption. What is regarded as blatant corruption in one country could be held perfectly innocent in another. Thus in practice definitions of corruption are not uniform even though academically they (finally) are. Perspectives on corruption may also vary not by semi-predictable factors like culture, but individual beliefs as well such as "does the government deserve my tax money?" If the answer is no, bribing a tax official might not be regarded as corruption at all, but as correcting an unjust government policy. This is a critical result in terms of how intangible factors will affect utilities and thus decision making of individuals. Making incorrect assumptions of intangible costs here may lead to very wrong results.

Intangible factors of corruption

This brings us to the importance of intangible costs. Intangible factors such as moral and ethical considerations can heavily impact decision making of individuals and lead to very different results than those predicted by rational choice game theoretic predictions (Klitgaard 1988). Intangible effects are thus the missing link, the dark matter of corruption decision process that can explain us the variations from predictions of rational game theory. Lab experiments of corruption have often failed to simulate these intangible effects as there is no real responsibility in games. Even the very name "economic game" suggests make-belief leaving critical parts of the brain dormant in the decision process. We do not need neuroeconomics to tell us that emotions play a large role in human decision making. As any person intuitively knows, people are affected by a multitude of emotions from anger to exhilaration that all affect their judgment. Economics readily admits that it is hard to explain

the reasons for gambling at a casino or the use of harmful drugs. Knowledge of these intangible costs would go a long way explaining the decision making process of corruption.

While there are many intangible factors in corrupt decision making I now turn to focus on those intangible elements that, based on current economics corruption literature, would benefit it the most. I've identified three categories of intangible mechanics that would greatly benefit future corruption research: biasedness of agents to evaluate their own morality, effects of group influence in corruption and deeper analysis of the mechanics of reciprocity. All of these topics have been popular in other fields of research, but are yet to be taken advantage of in the research of corruption.

Self-serving bias

Agents are rarely objective in self-evaluation when the ethics or moralities of their actions are concerned. In psychology this effect is known as self-serving bias that is often automatic, viscerally compelling and unconscious whereas understanding ethical and professional obligations requires a more cognitive process. The automatic nature of self-interest gives it a primal power to influence judgment which makes it difficult to become aware of it or eradicate it (Moore & Loewenstein 2004). Anecdotal evidence of people being good at justifying outcomes which unfairly advantage themselves have been also backed by several studies (Diekmann at al. 1997) and have been deeply studied in the field of psychology. Thus as corruption is an immoral act, methods based on surveys or imaginary games have a potential to produce results distorted from reality. Methods that would elicit true responses are thus crucial for the study of corruption.

Group dynamics and norms

Several experiments have confirmed that group norms affect utility formation. Aspects such as inequality aversion also depend on group norms. Humans and animals have all been governed by group dynamics for as long as we know. The norms have been observed to affect preferences and choices of people in a way that they converge to existing social norms (Barr & Serra 2010). This could also explain somewhat why some anticorruption measures work in one country and utterly fail in another. Bobkova and Egbert (2012) call for a broader perspective to investigate the influence of groups and group norms such as networks on

corrupt behavior. *"While research on group behavior and effects of individual behavior on group members is a standard topic in experimental economics, the transfer to the research on corruption has not been exploited yet"*

Reciprocity

Measuring reciprocity in individuals is a line of research that focuses on this critical element of corruption. These studies strive to understand what factors and under which conditions affect corruption - the negative reciprocity in individuals. These studies are very important in developing a working model of corruption as well as understanding its mechanics. They also provide a rich set of data to build assumptions from that in turn can be used as building blocks for models.

Reciprocity as a mechanic is at the very core of bribery. There are at least two important reasons that warrant the study of reciprocity in greater detail with regard to corruption. a) Experimental evidence shows that anticorruption measures targeting reciprocity produce very promising results in curbing corruption (Schikora 2010) and b) Many experiments have shown participants spending resources to punish those breaking reciprocity even in one-shot games where there is no tangible benefit from punishment (Cameron et al. 2009). This clearly indicates that reciprocity has a tangible value and is an important part of utility formation. As such it should be measured and investigated more deeply in relation to corruption as it helps us closer to building a unified theory of corruption, something that has never been successfully done before.

4.2   Thoughts for future research

If our goal is to understand the actual dynamics of corrupt behavior and the mechanisms through which corruption affects the economy, addressing the issues of intangible costs and mechanics of corruption is imperative (Sequeira 2012). Models based on assumption of rational choice have failed to explain corruption or come up with policies helping to curb it. Some policies have actually backfired and created opposite results than what was expected (Schikora 2010). The challenge of observing corruption is high, but given creative and innovative experimenters, it is quite surmountable as the latest field experiments have shown.

Anticorruption policies can be made more complete with increased attention to intangible factors in corruption and these can be readily studied through experiments. The fact that most of these factors have been long studied in other fields of science such as psychology or social sciences makes approaching these issues easier. This makes them a good platform to build corruption theory on.

Group mechanics can be observed through treatments in experimental testing. Some of the popular ones yielding interesting results are to make cross-country comparisons like in Barr & Serra (2010) where immigrants' corruption choices converged to that of the native residents. Anecdotal evidence from interviews of Russian state company managers and businessmen has reinforced this result by confirming that it works in other direction as well where initially honest foreign managers converge to corruption practices of the country. Another group mechanic worthy of study besides convergence is inequality aversion. Initial experimental evidence has shown that corruption that has large externalities compared to gains tends to be avoided by individuals (Barr & Serra 2009). Experiments measuring the limits of externalities in a group setting through the use of asymmetric payoffs could doubtlessly unveil some interesting results.

Most criminals have a plausible explanation for themselves that justifies their crime and corruption is no different. This is why studying the effects of self-serving bias could be crucial for deeper understanding of corruption as an individual's application of moral costs and benefits will vary depending on the subjective view of his actions. Performing experiments that try to trigger these self-serving biases in various ways could explain the circumstances that cause them to emerge. One such way is using framing in field experiments to see how people react in various treatments. My interviews of Russian businessmen and officials reveals that everyone feels like they have a legitimate reason to be corrupt, even if that reason is just that *"if I won't steal/take a bribe then someone else will do it anyway so it's a sunk cost to society"*. Further surveys to compile justifications of corrupt officials could reveal a consistent thought pattern that might have a lead to an effective solution to corruption.

As bribery revolves around the mechanic of reciprocity, studying it in isolation from other factors could reveal its exact magnitude in relation to monetary benefits. It has been

established already that knowingly breaking reciprocity triggers moral costs in both the breaker and the one betrayed. Interviews with Russian businessmen and officials tell that while corruption is condemned, it appears that deceptive corruption – corruption without reciprocation – is considered lowest of the low. According to anecdotal evidence, accepting a bribe and not delivering have been known to even lead to criminal charges of embezzlement! It is clear that reciprocity is an important concept to humans, but little is known of the limits of the benefits of reciprocity to individuals and what mechanics govern its use. Equally important is to know how it plays into various decision makings. Experiments that would measure how much people are willing to pay to avoid breaking reciprocity under different circumstances could reveal more of its exact value in decision making process.

Dichotomy of planning and execution

The importance of robust experimental planning should not be neglected. The lack of resources to conduct fruitful experiments should not stand as an impediment for corruption research, but instead motivate those academics to publish papers detailing an innovative experimental idea with the hopes having it run by someone else with resources at their disposal. It is an academic travesty when schools with huge resources run pointless, but expensive experiments while innovative researchers are forced to dilute or abandon their experimental ideas. Since experimental study of corruption is still at its infancy I find the exchange of ideas of the study of corruption very important for facilitation of robust experiments. Considering the great methodological challenges of the field it is important to gather more brain power on their development. Thus I greatly encourage more planning and discussion about new and creative experimental methods to study corruption and publishing more papers that focus purely on planning experiments, if resources to their conduction are a constraint.

5. Experimental design

I begin this chapter with an introduction of a corruption experiment followed with three treatments and the questions it is designed to provide answers to. Following the introduction of experimental design I will derive the experiment in detail in section 5.1 by

laying out my theoretical basis of the experiment and deepen the motivations concerning the areas of corruption research it is intended to address.

Inspired by the methodology of Armantier & Boly (2010) where the same experiment is conducted under both lab and field settings I will be designing both lab and field versions of this experiment. The interesting question is that do the results differ significantly based on the setting? While in their research Armantier & Boly (2010) find they do not, I find it worthwhile to explore whether they can be replicated here as well. Chapters 5.2 and 5.3 will provide experimental instructions for specific settings; lab and field respectively.

The main purpose of the experiment is to study whether reciprocation alone can lead to corruption. Many people detest the feeling of being indebted to somebody and this can create intangible benefits for reciprocating the benefit back.

The basic experiment

The experiment, in its most basic form, is an examination of the effects of the results of a dictator game followed by an opportunity to act corruptly. In each trial group, there are two Proposers and one Receiver. A proposer is endowed a fixed sum x that they need to split with the receiver. The Receiver has no say over the split proportions and simply receives his share. This share can range from 0 – 100% of the endowment and is entirely up to the Proposer. Neither of the Proposers is aware of the decisions of each other and must be examined as independent choices. After the Dictator game, the Receiver must conduct a random lottery in order to assign additional lump sum bonus payoff to one of the two Proposers. This lottery will be conducted in complete privacy by the Receiver and experimenters will not know whether the bonus was truly assigned randomly or arbitrarily. The question of interest here is whether possible high shares in the dictator game will cause the Receiver to reciprocate by secretly foregoing the lottery and arbitrarily assigning the win to the "fairest" Proposer. While the individual choice will be unknown, statistics of the lottery winners can reveal if receiving a high share in the Dictator game causes bias in the Receiver. The Proposer will naturally not be informed about the existence of the lottery before the game.

The required amount of wins for the highest paying proposer will depend on the number of trials in the experiment. Below is a table for a quick reference that shows the standard error associated with a certain number of trials with a 95% confidence. The next two columns indicate the lower and upper limit range for the proportion. If the proportion of wins for the highest paying is below that it means that paying most money in the dictator game actually reduces your chances of winning the lottery while breaking the top range indicates that the Receiver is positively biased towards the highest paying Proposers in the lottery. Last column "Wins" is a minimum number of wins for the highest paying Proposer needed to show that Receivers are biased on average (with 95% confidence).

Nr of trials	st error	min	max	Wins
100	9,80 %	40,20 %	59,80 %	59,8
90	10,33 %	39,67 %	60,33 %	54,3
80	10,96 %	39,04 %	60,96 %	48,8
70	11,71 %	38,29 %	61,71 %	43,2
60	12,65 %	37,35 %	62,65 %	37,6
50	13,86 %	36,14 %	63,86 %	31,9
40	15,50 %	34,50 %	65,50 %	26,2
30	17,89 %	32,11 %	67,89 %	20,4

St.error and confidence bands for 2 player lottery

The experiment is low tech friendly and can be run in a pen and paper form or as a computerized version. In the computerized version it is important to make sure that Proposers of the dictator game see the Receiver and Receiver sees them to maintain the personal feeling of the game and avoid the payment from being faceless.

Experiment treatments

In addition to this basic experiment, I've also developed three treatments that can be run to deepen the analysis and explore different variables that can affect the corruptibility and decision making of the Receiver. These three treatments are: High Benefit, Social variables and Framing.

High Benefit treatment

The goal of this treatment is to investigate whether increasing the benefit to the Proposer (and subsequently the costs to society) will affect the decision making of the Receiver and

secondly. It is also interesting to explore if increasing the number of people being cheated will reflect in increased moral costs of the Receiver.

The objective of the "High Benefit" treatment is thus to increase the individual benefit of the lottery winner by increasing the number of subjects participating in the lottery. This way the expected return of both Proposers changes from *P/2* to *P/n* and the benefit from the corrupt act to *P - P/n = P(n-1)/n*. To keep matters simple the original game stays the same except the lottery will be between them and *n* other people. These people can be randomly picked from the subject pool, but do not need to attend the experiment itself, only to receive the prize should they win.

This essentially creates a higher benefit to the Proposer in case the Receiver decides to reciprocate. As in the basic game the probability of a Proposer winning the lottery is 50%, in a game with 20 players it now becomes only 5%, a ten times smaller chance. The purpose of the treatment is to observe whether this would act as a higher externality since in a way more people are being cheated in case of corruption. Secondly, it may act as a deterrent since it is now less plausible that the Proposer who paid most in the Dictator game would come out as a winner.

Lastly, this treatment is also suitable for situations where the resources of the researchers are constrained as this method will greatly lower the standard error of the experiment with no additional cost! Below I have complied tables for a case of 5 and 20 players lotteries.

Trials	st error	min	max	Wins	Trials	st error	min	max	Wins
100	7,84 %	12,16 %	27,84 %	27,8	100	4,27 %	0,73 %	9,27 %	9,3
90	8,26 %	11,74 %	28,26 %	25,4	90	4,50 %	0,50 %	9,50 %	8,6
80	8,77 %	11,23 %	28,77 %	23,0	80	4,78 %	0,22 %	9,78 %	7,8
70	9,37 %	10,63 %	29,37 %	20,6	70	5,11 %	0,00 %	10,11 %	7,1
60	10,12 %	9,88 %	30,12 %	18,1	60	5,51 %	0,00 %	10,51 %	6,3
50	11,09 %	8,91 %	31,09 %	15,5	50	6,04 %	0,00 %	11,04 %	5,5
40	12,40 %	7,60 %	32,40 %	13,0	40	6,75 %	0,00 %	11,75 %	4,7
30	14,31 %	5,69 %	34,31 %	10,3	30	7,80 %	0,00 %	12,80 %	3,8

St.error and confidence bands for 5 player lottery   St.error and confidence bands for 20 player lottery

As can be seen the burden of proof becomes much lower the more participants there are in the lottery. For example, suppose we run the basic form game in 80 trials out of which there are 7 Receivers that are truly corrupt. Let us further assume that the rest of the lotteries are fair and highest paying Proposers win in a proportion that is expected from them. In this

case they win approximately 38 times fairly + 7 times when the corrupted Receiver rigs the lottery = 45 wins. According to the 2 player table this is not enough to disprove our null hypothesis as with 95% confidence the minimum number of wins required will be 48,8!

However, if the lottery had 20 participants then the highest paying Proposers would win approximately 4 of them + the 7 rigged lotteries = 11 wins which is more than the minimum win amount in the 20 player lottery table (7,8 wins). This would clearly indicate that Receivers on average are biased to the received pay from the Dictator game.

Social treatment

This is simply the basic game run with subjects of another culture, preferably from a country that scales very differently on a Corruption Perceptions Index than the country whose subjects participated in the first version of the game. Depending on the culture it may create interesting contrast and shed light on the group norms and dynamics of various cultures. These could further offer cues on how these mechanics affect corruption.

Gender treatment

A variation of the Social Treatment can be a gender treatment. Experiments focusing on detecting variations in decision making based on gender have been relatively popular in experimental economics literature (eg: Lambsdorff & Frank 2011). Trials can be run by switching the composition of the groups from all men or all women to cross-gender pairings where Proposers are women and Receiver a man and vice versa.

Framing treatment

In the framing treatment the Receiver's instructions also include an economic analysis of the Dictator game stating that the game theoretically optimal solution for the Proposer would be to give nothing. This has twofold purpose, the first being to stress the nature of reciprocity. The Receiver is made aware that any money paid to him is simply from the goodness of the Proposer's heart and thus might place the Receiver in a stronger feeling of indebtedness. Secondly, this treatment studies the self-serving bias where the Proposer is given a moral sounding excuse to cheat in the lottery for the benefit of the highest paying Proposer. This could be something like "fair behavior must be rewarded".

5.1. **Theoretical basis**

This experiment was developed based on the needs of the field discussed in the previous chapter as well as to maximize the realism of corruption and bribery. The driving forces of the experimental design are unobservability and existence of real intangible costs and benefits. I will now show how the various parts of the experiment were derived based on these requirements.

Unobservability

As in the real world, bribes are rarely given explicitly and in many cases are not mere cash, but something harder to evaluate like objects or intangible benefits. These can be favors and services such as dinners and vacation trips. They are usually passed completely tacitly with a vague implicit suggestion of reciprocity at most (Della Porta & Vanucci 2005). Thus I find it important to focus more on the study of bribes as gifts rather than as explicit bribes.

The most important parts of a good corruption research would be the presence of real moral issue and real or believed unobservability. The subject must believe that the corrupt activity will remain unknown and only between the parties of exchange. Otherwise it may tamper with the responses since people do not like to think of themselves committing immoral acts. Also, in most corruption situations there is a framing effect where the participants frame the interaction in a way other than immoral corruption, but as a gift exchange, a business transaction or as some other seemingly legitimate affair. This can also make observing corruption more difficult as it is usually clad in a veil of legitimacy. Thus I plan to measure corruption through aggregates in the experiment instead of being able to single out who acted corruptly. The results will tell whether people contributing the most in a Dictator game will be lucky in a statistically significant way in the subsequent lottery.

Intangible effects

It is important to note that in none of the reviewed lab experiments were moral costs sufficiently captured. Maximizing your own payoffs in a game is hardly immoral nor is the act of refusing to give money to a charity. Even if the choices of the players indirectly affected the amount of money a charity would receive, it can still be compared to a player giving

money to the charity directly and simply neglecting to do so is not immoral in itself even if some people might misguidedly believe so. In any case I consider it a poor proxy to simulate moral costs.

Laboratory experiments are usually well controlled and would provide interesting results if not for the absence of real moral costs. First, as Levitt & List (2007) mention, actual corruption in laboratory setting is hard to achieve since corruption involves an immoral act which does not really happen in a simulated setting. In any problem of moral choice it is relevant to have some real moral consequences in the experiment or else the parts of the brain that controls moral decision making won't activate and the results may vary significantly from a real life situation. To involve the moral costs in a lab experiment there has to be some form of dishonesty that the participant does not perceive to merely be a part of the game. Without resorting to deception, we can run a game followed by a survey and an opportunity to deceive. Holding the position of the principal here will be the researchers and to some extent other players. To achieve the feeling of real guilt (and because games are not necessarily perceived as having any real impact besides the imagined) the goal of the experiment must be to get the subject to cheat the experimenters by violating their instructions.

Self-serving bias

Self-serving bias in corruption are essentially excuses that justify the act of corruption in the mind of the official. These excuses serve to act as counter to moral costs that come from corruption and work like moral benefits of corruption. A human psyche is very capable of defending itself from negative feelings and able to reason out most immoral acts. When criminals are asked what were they thinking when they were committing the crime, they respond that they understood that what they were doing was wrong, but they had some excuse, no matter how implausible to explain that they were forced to commit the crime. These self-serving biases are very prevalent in the real world corruption and studying them is imperative if we want to use intangible costs in anticorruption policies. The experiment studies these biases through the reciprocity effect and intangible costs it may cause to an individual, especially in the framing treatment. The potential misguided belief that "fairness"

must be rewarded stands here as the self-serving excuse as it is come at the expense of others.

Reciprocity

Naturally reciprocity serves as the starting point of my experiment as existing studies are pointing that the key to corruption lies in reciprocity. The most noteworthy aspect of this experiment regarding reciprocity is that its effects can be studied in isolation here. Culturally the effects of reciprocity have been known for a very long time. Many cultures, especially oriental, have gift giving built in as part of good manners without any explicit or implicit request of reciprocation. It is as if people are expected to instinctively feel the need to reciprocate. Everybody probably has friends or family members who abhor exchanging birthday or holiday gifts claiming feelings of discomfort that come from not giving, but receiving gifts. This anecdotal evidence points to the fact that there is something about reciprocity built in into human brain that naturally motivates people to reciprocate a free benefit.

The experiment studies the effects of reciprocity in isolation. The payment serving the role of a would-be bribe is given with no request of reciprocation as Proposers are not even aware of the lottery the Receiver is going to conduct. Naturally, the Receiver has no other reason to reciprocate aside for the sake of reciprocity itself. Nothing was asked from him, even implicitly so he is under no obligation to favor the highest paying Proposer. This experiment thus investigates that can there exist corruption even under ideal conditions when gifts are involved.

A hot topic regarding governance and politics is the existence of the lobby industry. It is clear that lobbyists provide some sort of benefits to the politicians and get something in return. In Finland there have been lots of discussions regarding the relationships between big business and politicians. Lots of new legislation has also been passed regarding campaign contributions and gifts officials and politicians can receive. This experiment may help shape these policies in the future.

Lastly, the group norms and dynamics are examined through the social variables treatment. I call these social variables instead of cultural since it doesn't necessarily have to be cross-country comparison, but can be run between different social classes, age groups or employments.

As there are two players in the game, the Receiver will be able to compare the splits of the endowment. In an ideal case, one Proposer will give nothing while the other Proposer will split the money evenly. This will create the greatest contrast and make the high money Proposer to stand out. This will act as a signal to the Receiver of the group norms whether high payments are special or not.

5.2. Experiment – Laboratory

The instructions of a lab experiment must be specific and delivered to all subjects in as identical manner as possible. This is usually accomplished via written or pre-recorded audio instructions. I recommend written instructions in this case as people can re-read parts they might find confusing.

While subjects are randomly assigned the roles of the Proposers and Receivers, the two must be kept separated at the start of the experiment. This can be accomplished by having them come to read their instructions in separate rooms. After having read instructions for their roles, they are led to a third room with Receiver first. The Receiver takes a seat at a table, knowing already that his role is just to receive the money. The first Proposer is then led into the room and he will see the Dictator game question on a paper into which he will need to fill out two numbers; the amount he will take for himself of the endowment and the amount he assigns to the Receiver. The Proposer can see the Receiver, but any communication is forbidden. After the Proposer has filled out the form he may leave the room to fill out a questionnaire (see Appendix).

After each Proposer has completed the form, the results are shown to the Receiver. Once the second Proposer has completed the task he is led away by the experimenter to answer his questionnaire. The Proposer is left alone in the room to fill out his questionnaire in which

the last point asks him to perform the lottery amongst the two Proposers and two other unknown students. The instructions say to use an ordinary dice that will be placed on the table prior to the experiment. After writing in the winner on the questionnaire, the Proposer seals his answers in an envelope and drops it into a collection box. This will guarantee the anonymity to the Receivers.

The experiment can be run with x Proposers and *n* lottery participants. As the Receiver needs to be paid a fixed fee for his service, w, I recommend it being proportionate to the endowment in the Dictator game by a factor of half. If we call the Receiver's "wage" w and the Dictator game endowment αw, a cost of one trial would be

$$αwP + w + V \text{ and cost of one treatment } (αwP + w + V)g$$

where αw is the Dictator game endowment, P is the number of Proposers, V is the value of the lottery prize and g the number of trials. A suitable number of trials could be 80 trials which would give us a standard error of 8,77% under 95% confidence (Z = 1,96) in a five person lottery. Increasing the number of trials or lottery participants will decrease the standard error.

5.3. Experiment - Field

Bertrand et al. (2007) showed how they measured the corruptibility of driving exam officials in India. This gave the idea of studying officials in charge of examinations to study corruptibility. In place of driving exam instructors, teachers can be used for the field version of this thesis' lab experiment. In this case there needs to be only one student who gives a gift at the end of a course, after grades have been posted, to the course lecturer. Since money is too implausible a gift, other gifts such as a box of chocolates, a bottle of wine or some other corporate style gift can be used. Also to avoid the feeling of being bribed, only students who received the highest grade are to be used. This way the gift will feel as a selfless act.

Following this, the teacher is informed he has to perform a surprise lottery amongst the highest grade students of the class by his superior to randomly award a prize "from a school sponsor". The rest is just an analysis of the results. The experiment is relatively lightweight

as it requires only one student and one teacher per trial and the teacher doesn't even need to be paid for experiment participation for obvious reasons. For efficiency, this experiment could be run simultaneously on as many teachers per school as possible. The concurrent lotteries of other courses would add to the credibility to the story of a "school sponsor".

6. Experiment Analysis

In this section I will outline some of the ways that can be used in analyzing the results of the experiment. These ways include variables of interest and general statistics of the outcomes of the Dictator game and the lottery. Additionally I will make five hypotheses that should be answered with the experiment. Naturally the most critical result will be whether there can be detected any statistically significant winning probability of individual's paying the most in the Dictator game. If the answer is negative, the effect of treatments should be analyzed.

6.1 Explanatory variables

The results of most economic corruption experiments are followed by a regression analysis in which the experimenters attempt to form a model based on certain variables of interest that can differentiate between the participants. Economists often analyze a wide array of explanatory variable in corruption experiments this way. The aim of such analysis is to refine the results of the experiment and attempting to identify the reasons why some participants' decisions might differ from others. For the purposes of this section I have grouped these variables of interest under three main categories; Personal, Game and Status.

Personal variables are those that apply to an individual's personal characteristics. These can be:

- Sex
- Age
- Major

- Religiosity
- Education
- Profession

Age and religiosity are especially interesting as Armantier & Boly (2011) found them very significant in reducing corruption. Game variables of interest are those that relate to the actions taken during the Dictator game. These are:

- The difference between Proposers' payments
- Event of no payment from anyone (as dummy variable)
- The value of payment (expected to be increasing with the probability of winning).

Lastly, status variables are variables that describe the subject's cultural or social status.

- Residential status (has the subject lived in the country for more than 1 year?),
- Work sector (public/private)
- Country of origin's CPI value

6.2 Hypotheses

To clarify the most interesting results of the experiment, I have listed several hypotheses regarding the decision making of the subjects. The main expectation is that the free money received in the Dictator game will establish a feeling of reciprocity in the receiver causing him to reciprocate to the highest payer. This brings us the first hypothesis.

Hypothesis 1: Proposer who paid the most wins most often. This effect is correlated with the difference between the payments to the Receiver of the two Proposers.

This is a fairly straightforward supposition where the highest paying Proposer wins. Since money can be received only from those who play the Dictator game, it stands to reason that as the contribution of other participants of the lottery to the Receiver is zero, a form of reciprocity can be established between the players as a group. This might lead to non-players to become excluded from the lottery in case the players decide on making a payment to the Receiver.

Hypothesis 2: Proposers tend to win more often in general than others.

The focus of the High Benefit treatment is whether increased externalities and lessened plausibility of the rigged lottery result will lead to a decrease in corruption. As the briber's behavior either reflects his fear of getting caught or aversion to corruption (Schulze & Frank, 2003) the Receiver might be less willing to cheat a large number of people or might think that people will think more easily that he cheated if the highest paying player wins the lottery.

Hypothesis 3: Receivers in High Benefit-treatment tend to be more honest than in other treatments.

In countries where corruption is more rampant people are more used to reciprocating favors and acting corruptly as the experiment in Barr & Serra (2010) revealed. This result can be replicated as a social treatment in this experiment as well by comparing them with a group from the low CPI countries.

Hypothesis 4: People from countries ranking poorly on Corruption Perceptions Index tend to reciprocate more often than people from countries ranking well on CPI.

In the Framing treatment the instructions introducing the Dictator game to the Receiver are written in a neutral and explaining the economic viability of zero payment. While still not under any moral obligation to share the money, those people who do are expected to look particularly positive in the eyes of the Receiver. Thus I form the first part of the fifth hypothesis:

Hypothesis 5a: Proposers in Framing-treatment who pay the most win more often than in the basic version.

This effect is expected to work in other way as well as in cases where the payments are small, Proposers are looked upon as greedy and unfair individuals. This may cause a punishment effect where they will both be excluded from the subsequent lottery.

Hypothesis 5b: In cases where both Proposers pay very little or nothing Proposers tend to win disproportionately less often than non-Proposers (High benefit treatment).

6.3 Follow-up research possibilities

There are many interesting research possibilities to follow-up on in case there will be evidence to support the existence of reciprocal activity from the Receiver. I will now briefly outline two such experiments that would be very fitting for future research of this experiment.

Bribery experiment

Based on the result of their lab experiments, Abbink et al. (2002) conclude that reciprocity can establish bribery relationships in which negative externalities have no apparent effect. This means that once reciprocity relationship is established, it becomes easier to proceed from gifts to bribery. This effect could be studied in a follow up experiment studying pure bribery and compared to how Proposer-Receiver pairs in which *potential* corruption was detected compare to others. Would this unintended corruption on the Proposer's part make the Receiver more receptive to an actual bribe proposal from the same individual?

Multiple-round game

As corruption in the real world is rarely a one-time isolated event it would be even more realistic to perform the experiment several times in succession. Anecdotal and experimental (Abbink et al. 2002) evidence points that once reciprocal relationships have been established they remain quite stable. This means that the deterrence to corruption works best only the first time and in the subsequent opportunities of corruption the moral costs are not as high anymore. The experiment could be run during the course of 5-7 weeks once a week to see if there will develop such completely implicit relationship where the Proposer assigns a fair share to the Receiver in exchange for a guaranteed win in the lottery. In this case it is imperative to promise anonymity to the Receiver that experimenters would not be able to trace the rigged lottery back to the Receiver. On the other hand, a treatment effect could create a risk of punishment to test its deterrence effect.

7. Conclusion

This thesis had three main aims: introduction of foundational theory of corruption, review of methodologies and design of an exemplary corruption experiment that furthers field.

As corruption is a highly nuanced and complex matter it was necessary to begin with a thorough introduction of the theoretical foundation of the concept. Since the emergence of corruption research in economics, great definitional debates had raged for many decades until settling to define corruption as an abuse of public office for private gain. However this

definition is far from exhaustive as there are many aspects to corruption from both theoretical and practical points of view. For this reason the first chapter of the thesis served to introduce corruption in economics from both theoretical and practical perspective.

The theoretical part consisted of the various forms and categories of corruption that are important to be aware of when reading any corruption related literature. The most important being the difference between grassroots and high-level corruption as methods to fight or research them vary greatly. Grassroots corruption is often a collective action problem where agents engage in corruption in mass. High-level corruption on the other hand is often much more calculated and secretive resulting in great public scandal when discovered. Further nuances introduced are efficient and self-reinforcing corruption as well as various assumptions regarding the principal. While this may look as nitpicking on a first glance, these assumption have very strong effects on the outcomes of the corruption models. For example incorrectly assuming a principal is benevolent when he is not will just lead to corruption rents accumulating in the hands of the principal.

From the practical point of view the world history of corruption shows that corruption is a very old problem and just as dangerous as it was before if not more so in the age of nuclear weapons where collapse of large states can easily wreak havoc on a global scale. This is contrasted by the fact that in terms of academic interest from the side of economics, corruption is a very new topic whose research is at just beginning to develop in earnest.

Monetary estimates by the World Bank Institute indicate that the value of bribery alone is over one trillion US dollars on a global scale. Unfortunately the monetary costs are not the only costs to be concerned about as corruption carries political and social costs as well that are hard if not impossible to quantify in monetary terms. The concept of efficient corruption that has been popular in economics of the previous century can be welfare increasing, but only if there exist major harmful policies that they serve to circumvent. As such, efficient corruption is always based on a second-best reasoning which is hardly an efficient solution.

Anecdotal evidence of mechanics of corruption reveals highly systemic yet informal practices that make research and observation difficult. To categorize these mechanics I propose a matrix of corruption that assigns corruption along two dimensions. The first one questions whether the public loses any existing resources or not while the second focuses on the

initiating party of the corruption. Four different types of corruption emerge from this division; kickbacks, embezzlement, grease money and extortion that help quickly categorize the dominant mechanics. Application of traditional economic methods reveals that while corruption does respond to economic incentives eliminating it entirely can be economically unviable. The results of such analysis are obviously limited to tangible costs and do not take into account political or social costs of corruption or the possibility that utility functions of individuals may depend on the aggregate levels of corruption.

As a conclusion to the theoretical foundation of corruption I reviewed and introduced the anticorruption policies concluding that economists today cannot provide general recommendations for anticorruption policies and each case must be tackled on individual basis. This is accentuated even more in the fact that approaches to anticorruption can rely either on the state or its people, top-down and bottom-up approaches respectively. Both methods have merit and their effectiveness depends on the mechanics of corruption at hand. Bottom-up approach works best where citizens can readily observe corruption and have sufficient knowledge of the resource being misused. Top-down approach is more suited to behind-the-scenes type of corruption or one that requires sophistication or auditing powers to observe. In addition to the correct approach any anticorruption policy must have a solution to avoid three common pitfalls; Transference, Red tape and Capture as described in chapter 1.5. These dilemmas make any anticorruption policy a two-edged sword that can result in an increase of corruption instead of decrease.

Overall the theoretical foundation of corruption is large and complex like the issue itself, but necessary to be understood. Otherwise a researcher runs the risk of mischaracterization of the issue or employing unrealistic assumptions.

Research Methodologies of Corruption in Economics

There are five main methodologies employed in corruption research: Perception indices, surveys, observation, lab experiments and field experiments. While studies based on perception indices and surveys are becoming scarce in economic corruption literature, observation and experimental methods have become much more prominent. Much of the recent surge in experimental literature has been accredited to the new revolutionary methodologies in the form of experimental approach. I have introduced and discussed the

merits and challenges of each method as each has its own strengths and weaknesses and is suited for different parts of corruption research.

I wanted to highlight the recent revolutionary progress in the methodology of the field that is largely to thank for the great increase of interest in the topic in the economics community. In addition to this I've conducted an exhaustive literature review relating to experimental corruption studies of bribery as precursors to my experimental design. The focus of the experimental studies of bribery has been the underlying determinants of corruption. These can be divided into three categories; tangible determinants, intangible determinants and intermediaries. The main goal of the first two categories is to study mechanics of corruption of individual decision making while the last category investigates a specific method of conducting corrupt affairs – using an intermediary. Studies show that the use of an intermediary greatly facilitates corruption above any other determinant. Empirical evidence seems to point to the same conclusion as much of the high level corruption is conducted through intermediaries colloquially known as power brokers. The most exciting and potential form of methodology appears to be field experimentation as it manages to effectively capture all relevant determinants. The challenge is however not merely the cost, but the difficulty of designing experiments that need to be carefully balanced in order to not actually break the law.

Corruption Experiment

On the foundation of existing corruption theory and experimental research I've designed a corruption experiment based on best practices of the field with the aim of producing results that can offer critical findings into the mechanics of corruption. While it is unrealistic to expect these findings alone will explain corruption, they will provide a very used part in its explanation. I've planned a laboratory experiment in detail with an additional design of running it as a field experiment without the subjects' knowledge.

While not having the resources to conduct it myself, it is important that more innovative research designs are developed if funding is an issue. Developing a sound economic experiment is often underestimated as a task that can result in poor quality results. This can be due to statistical issues such as too small sample size or a poorly formed theoretical basis that overlooks critical mechanics of corruption.

Thoughts for the future corruption research

I hope this thesis will inspire more economists to get interested in studying corruption and serve as a solid starting point in familiarizing themselves with the subject. Additionally I hope this work will help economists plan and conduct experimental methods in the study of corruption, even if they have no resources to run it themselves. The field requires innovative research techniques that don't necessarily come hand in hand with resources.

I wish to encourage more economists unfamiliar with experimental economics to try these new methodologies in corruption research and especially move out of the lab and bravely attempt field experiments as well. Progress in corruption research has not been achieved from inside an office. While the number of lab experiments in corruption has mushroomed during the last decade, the number of field experiments remains only a handful yet all have provided fascinating results.

Until now a bulk of corruption research has also been focused on approximating the amount of corruption from macro data. This unfortunately does little to explain the underlying determinants of corruption and help formulate anticorruption policies. Thus more research needs to be focused on trying to explain mechanics of corruption rather than merely trying to measure it on macroeconomic level.

Lastly, we should take advantage from the collusion with other fields such as psychology and criminal science as they have studied many areas relevant to corruption. There is no reason to reinvent discoveries well established in other disciplines from scratch. Particular advantage should be taken of neuroeconomics to shed light on the neural underpinnings of corruption. These findings could offer more diverse explanations of determinants of corruption.

Appendix: Experiment Instructions

In this appendix you will find the instructions and sample questionnaires given to the participants of the experiment.

Instructions to the Proposer

Many thanks for participating in this experiment which runs as follows: After having finished reading these instructions you will be led to another room where you will have to make a decision on a sum of money. Your decision will be final and payment will be processed **according to your decision alone**.

You are not to communicate with anyone in the room except the experimenters. After making your decision, leave the paper on the table and exit the room to fill out a questionnaire upon which your participation in the experiment is concluded.

Your ID is:

Instructions to the Proposer inside the Experiment room

There is a sum of money *[insert sum].* Please specify a portion between 0% - 100% below.

I take _____ percent.

The other person in the room sitting across the table will be receiving the rest.

Instructions to the Receiver

Many thanks for participating in this experiment. You have been chosen to be an independent observer and for this service the experimenters will be paying you *[insert sum]* salary. The experiment runs as follows: After having finished reading these instructions you will be led to another room where you will observe another person making a decision on a sum of money of *[insert sum]*. He will decide what portion of the money (0% - 100%) he will take for himself. The rest will be left to you, added to your existing salary of *[insert sum].*

You will observe two decision makers **A** and **B** after which you will be asked to complete a brief form. Once you're done, put it in an envelope and drop it into the collection box by the door. Exit the room and your participation in the experiment is completed.

Your ID is:

Instructions to the Receiver - (Framing Treatment)

Many thanks for participating in this experiment. You have been chosen to be an independent observer and for this service the experimenters will be paying you *[insert sum]* salary. The experiment runs as follows: After having finished reading these instructions you will be led to another room where you will observe another person making an economic decision on a sum of money of *[insert sum]*. This is called a Dictator experiment where he will decide what portion of the money (0% - 100%) he will take for himself. The rest will be left to you, added to your existing salary of *[insert sum].* The game theoretic, economically rational choice is to take 100% of the money as there is no benefit in sharing the money for the decision maker.

You will observe two decision makers **A** and **B** after which you will be asked to complete a brief form. Once you're done, put it in an envelope and drop it into the collection box by the door. Exit the room and your participation in the experiment is completed.

Your ID is:

Experiment Questionnaire

ID number:_____

Age:_____

Sex:_____

Religion:_____

Education/School:_____   Major:_____

Profession:_____

Country or origin:_____

Lived in this country for more than one year:_____yes _____no

--**Receiver's questionnaire only**--

The experimenters wish to thank the decision making participants by raffling off [insert prize] amongst five decision makers A through E. Please use the dice on the table to draw the winner.

Circle the winner:

Decision maker   **A**   **B**

References

Abbink, Irlenbusch & Renner, 2002, "An Experimental Bribery Game", *Journal of Law, Economics & Organization*, V18 N2, Oxford University Press.

Abbink & Henning-Schmidt, 2006, "Neutral versus Loaded Instructions in a Bribery Experiment", *Experimental Economics*, 9(2), pp. 103-121.

Ades & Di Tella, 1997, "The new economics of corruption: A survey and some new results", *Political Studies,* 1997 Special Issue, Vol. 45 Issue 3, pp. 496-515.

Aidt, 2003, "Economic Analysis of Corruption: A Survey", *The Economic Journal,* 113, pp. 632-652, Royal Economic Society, Blackwell Publishing.

Alatas, Cameron, Chaudhuri, Erkal & Gangadharan, 2009, "Subject Pool Effects in a Corruption Experiment: A Comparison of Indonesian Public Servants and Indonesian Students", *Experimental Economics*, 12(1), pp. 113-132.

Armantier & Boly, 2010, "Can Corruption Be Studied in the Lab?", *CIRANO - Scientific Publications*, No. 2008s-26.

Armantier & Boly, 2011, "A controlled Field Experiment on corruption", *European Economic Review,* 55, pp. 1072-1082.

Azfar & Nelson, 2007, "Transparency, Wages and the Separation of Powers: An Experimental Analysis of Corruption", *Public Choice*, 130, pp. 471-493.

Barr & Serra, 2009, "The Effects of Externalities and Framing on Bribery in a Petty Corruption Experiment", *Experimental Economics*, 12(4), pp. 488-503.

Barr & Serra, 2010, "Corruption and Culture: An Experimental Analysis", *Journal of Public Economics*, 94(11-12), pp. 862-869.

Becker & Stigler, (1974), "Law enforcement, malfeasance and the compensation of enforcers", *Journal of Legal Studies*, vol 3, pp. 1-9.

Bertrand, Djankov, Hanna, Mullainathan, 2006, "Obtaining a driver's license in India: an experimental approach to studying corruption", *Quarterly Journal of Economics*, 122 (4), pp. 1639-1676.

Besley & McLaren, 1993, "Taxes and bribery: the role of wage incentives", *Economic Journal*, vol. 103, pp. 119-141.

Beylis, Finan & Mazzocco, 2012, "Theory and Evidence from the Audits of Local Governments", *Working Paper*.

Bobkova & Egbert, 2012, "Corruption investigated in the lab: a survey of the experimental literature", *MPRA Paper No. 38163*, University Library of Munich, Germany

Börzel & Pamuk, 2011, "Pathologies of Europeanization. Fighting Corruption in the Southern Caucasus", Available at: http://euce.org/eusa/2011/papers/12k_boerzel.pdf, retrieved: 15 March 2014.

Cameron, Chauduri, Nisvan & Gangadharan, 2009, "Propensities to Engage in and Punish Corrupt Behavior: Experimental Evidence from Australia, India, Indonesia and Singapore", *Journal of Public Economics*, 93(7/8), pp. 843-851.

Cain, Loewenstein and Moore, 2005, "The Dirt on Coming Clean: Perverse Effects of Disclosing Conflicts of Interest", *Journal of Legal Studies*, 34(1): pp. 1-25.

CREATE, 2013, "Guide to Improving Your Anti-Corruption program", Available at: www.create.org/views-blog/new-create-launches-anti-corruption-improvement-guide, retrieved 11.05.2014, *Center for Responsible Enterprise and Trade (CREATE)*.

Coffman, 2011, "Intermediation reduces punishment (and reward)", *American Economic Journal: Microeconomics*, 3, 77-106.

Cooper & Fargher, 2011, "Accounting for corruption: Abuse of rank and privilege", *Critical Perspectives on Accounting Conference,* (pp. 1-34), Florida, USA: Elsevier.

Della Porta & Vanucci, 2005, "Corruption as a Normative System", Prepared for presentation at the International Conference on Corruption control in Political Life and the

Quality of Democracy: A Comparative Perspectve Europe − Latin America, Available at: http://home.iscte-iul.pt/~ansmd/CC-DellaPorta.pdf, retrieved: 01.04.2014.

Diekmann, Samuels, Ross & Bazermann, 1997, "Self-interest and fairness in problems of resource allocation: Allocators versus recipients", *Journal of Personality and Social Psychology*, 72, pp. 1061-1074.

Drugov, Hamman & Serra, 2011, "Intermediaries in Corruption: An experiment, Available at SSRN: http://ssrn.com/abstract=1838591, retrieved: 27.03.2014.

Elster, 1989, "The Cement of Society", *Cambridge University Press*, Cambridge.

Faccio, 2006, "Politically Connected Firms", *American Economic Review*, 96(1): pp. 369-386.

Falk & Costfeld, 2006, "The Hidden Costs of Control", *American Economic Review*, 96(5), pp. 1611-1630.

Farrales, 2005, "What is Corruption? A History of Corruption Studies and the Great Definitions Debate", (June 2005). Available at SSRN: http://ssrn.com/abstract=1739962, retrieved: 20.04.2014.

Finan & Ferraz, 2010, "Electoral Accountability and Corruption: Evidence from the Audits of Local Governments." *American Economic Review*, 101(4): pp. 1274-1311.

Frank & Schulze, 2000, "How Tempting is Corruption? More Bad News About Economists" , *Diskussionbeiträge aus dem institutfür volkswirthschaftslehre,*520, Universität Hohenheim.

Gallego & Wantchekon, 2012, "Experiments on Clientelism and Vote-Buying", New Advances in Experimental Research on Corruption Research, *Experimental Economics*, Volume 15, pp. 177-212, Emerald Group Publishing Limited.

Gorodnichenko and Peter, 2007, "Public Sector Pay and Corruption: Measuring Bribery from Micro Data", *Journal of Public Economics*, 91(5-6), pp. 963-991.

Gupta, Davoodi & Alonso-Terme, 1998, "Does Corruption Affect Inequality and Poverty?" *Working Paper*, WP/98/76, International Monetary Fund.

Hamman, Loewenstein & Weber, 2010, "Self-interest through delegation: An additional rationale for the principal-agent relationship", *American Economic Review*, 100, pp. 1826-1846.

Hollyer, 2012, "Is it better to empower the people or the authorities? Assessing the conditional effects of the "Top-down" and "Bottom-up" anticorruption interventions", New Advances in Experimental Research on Corruption Research, *Experimental Economics*, Volume 15, pp. 247-277, Emerald Group Publishing Limited.

Jacquemet, 2005, "Corruption as Betrayal: Experimental Evidence on Corruption Under Delegation", GATE Groupe d'Analy se et de Théorie Économique UMR 5824 du CNRS.

Jain, 2001, "Corruption: a review", *Journal of Economic Surveys*, vol. 15(1), pp. 71-121.

Kaufman, 2004, "The Costs of Corruption", Available at: *http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20190187~menuPK:34 457~pagePK:34370~piPK:34424~theSitePK:4607,00.html,* retrieved 29.04.2013.

Klitgaard, 2007, "Why Are They Doing It? Social Democracy and Market-Oriented Welfare State Reforms", *West European Politics*, Vol. 30, No. 1, 172–194, January 2007.

Koikkanen & Riepula, 2010, "Näin valta ostetaan: *lyhyt oppimäärä poliittisesta korruptiosta Suomessa 2006-2009", ISBN10: 9510361453, WSOY, Finland.*

Khwaja & Mian, (2005), "Do Lenders Favor Politically Connected Firms? Rent Provision in an Emerging Financial Market", *The Quarterly Journal of Economics,* (2005) 120(4), pp. 1371-1411.

Lambsdorff, 2012, "Behavioral And Experimental Economics as a Guidance to Anticorruption", New Advances in Experimental Research on Corruption Research, *Experimental Economics*, Volume 15, pp. 279-299, Emerald Group Publishing Limited.

Lambsdorff & Frank, 2010, "Bribing versus gift-giving – An experiment", *Journal of Economic Psychology,* 31, pp. 347-357.

Lambsdorff & Frank, 2011, "Corrupt reciprocity – Experimental evidence on a men's game", *International Review of Law and Economics,* 31, pp. 116-125.

Leff, 1964, "Economic development through bureaucratic corruption", *American Behavioral Scientist*, 8(3), pp. 8-14.

Levin & Satarov, 2000, "Corruption and institutions in Russia", European *Journal of Political Economy*, 16, pp. 113-132.

Levitt & List, 2007, "What Do Laboratory Experiments Measuring Social Preferences Tell us about the Real World", *Journal of Economic Perspectives*, 21(2), pp. 153-174.

Levitt & List, 2009, "Field experiments in economics: the past, the present and the future", *European Economic Review*, 53(1), pp. 1-18.

List, 2006, "Field Experiments: A Bridge Between Lab and Naturally-Occurring Data", *Advances in Economic Analysis & Policy*, 6 (2).

Loewenstein, Cain & Sah, 2011, "The Limits of Transparency: Pitfalls and Potential of Disclosing Conflicts of Interest", *American Economic Review: Papers and Proceedings*, 101(3), p. 423-428.

Long & Rao, 1995, "The Wealth Effects of Unethical Business Behavior", *Journal of Economics and Finance*, 19, pp. 65-73.

MacMullen, 1988, "Corruption and the Decline of Rome", *Phoenix,* 45(1), pp. 85-87.

Mauro, 1995, "Corruption and Growth", *Quarterly Journal of Economics,* 110, pp. 680-712.

McMillan & Zoido, 2004, "How to Subvert Democracy: Montesinos in Peru", *Journal of Economic Perspectives*, 18(4), pp. 69-92.

Mocan, 2008, "What Determines Corruption? International Evidence From Microdata", *Economic Inquiry*, 46(4), pp. 493-510.

Moore & Loewenstein, 2004, "Self-interest, automaticity and the psychology of conflict of interest" *Social Justice Research*, 17, pp. 189-202.

Mungiu-Pippidi, 2006, "Corruption: Diagnosis and Treatment.", *Journal of Democracy*, 17 (3), pp. 86-99.

Niehaus & Sukhtankar, 2010, "Corruption Dynamics: The Golden Goose Effect", *Working Paper*.

Nye, 1979, "Corruption and political development: A cost-benefit analysis", *The American Political Science Review,* 61(2), pp. 417-427.

Olken, 2006, "Monitoring corruption: evidence from a field experiment in Indonesia", *Journal of Political Economy*, 115 (2), pp. 200-249.

Olken, 2009, "Corruption Perceptions vs. Corruption Reality", *Journal of Public Economics,* 93(7-8), pp. 950-964.

Olken & Barron, 2009, "The Simple Economics of Extortion: Evidence from Trucking in Aceh", *Journal of Political Economy*, 117(3), pp. 417-452.

Paldam, 2002, "The cross-country pattern of corruption: economics, culture and the seesaw dynamics", *European Journal of Political Economy*, 18, pp. 215-240.

Persson, Rothstein & Teorell, 2012, "Why Anticorruption Reforms Fail – Systemic Corruption as a Collective Action Problem", *Governance: An International Journal of Policy, Administration and Institutions*.

Reinikka & Svensson, 2004, "Fighting Corruption to Improve Schooling: Evidence from a Newspaper Campaign in Uganda", *Journal of European Economic Association*, 3(2-3), pp. 259-267.

Rivas, 2012, "An Experiment on Corruption and Gender", *Bulletin of Economic Research*, 65(1), pp. 3007-3378.

Rose-Ackerman, 1974, "The Economics of Corruption", *Journal of Public Economics*, 4, pp. 187-203.

Rose-Ackerman , 2007, "International Handbook on the Economics of Corruption", Edward Elgar Publishing.

Roubini, 2011, "The Instability of Inequality", Available at Economonitor: http://www.economonitor.com/nouriel/2011/10/14/from-project-syndicate-the-instability-of-inequality/, retrieved: 17.05.2014.

Schikora, 2010, "Bringing the four-eyes principle to the lab", Paper presented at the annual meeting of the Vrein fur Socialpolitic. Available at: http://www.econstor.eu/dspace/handle/10419/37465, retrieved: 25.6.2014.

Schulze & Frank, 2003, "Deterrence versus intrinsic motivation: Experimental evidence on the determinants of corruptibility", *Economics of Governance*, 4(2), pp. 143-160.

Sequiera, 2012, "Advances in Measuring Corruption in the Field", *New Advances in Experimental Research on Corruption Research in Experimental Economics*, 15, pp. 145-175.

Sequiera & Djankov, 2010 "An Empirical Study of Corruption in Ports", *MPRA Paper 21791*, University library of Munich, Germany.

Serra & Wantchekon, 2012, "New Advances in Experimental Research on Corruption", *Research in Experimental Economics*, 15.

Shleifer & Vishny, 1993, "Corruption", *NBER Working Paper,* No. w4372

Shleifer & Vishny, 1994, "The politics of market socialism", *Journal of Economic Perspectives*, 8(2), pp. 165-76.

Svensson, 2003, "Who must pay bribes and how much? Evidence from a cross section of firms", *The Quarterly Journal of Economics*, 118, pp. 207-230.

Varese, 1997, "The transition to the market and corruption in post-socialist Russia", *Political Studies,* 1997 Special Issue, 45(3), pp. 579-596.

Wilson, 1989, "Ancient Republicanism: its Struggle for Liberty against Corruption", *American University Studies,* Series X, Political Science 20, Pp. vii + 223.