CORRUPTION-A GAME THEORETICAL ANALYSIS

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ABSTRACT

CORRUPTION-A GAME THEORETICAL ANALYSIS

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Corruption is an important social and ethical problem; fight with it requires changes in values, norms and behavioral patterns of the society. This is usually a long and difficult process. Decades should pass to change deep values of a society.

In the mean time, it is possible to combat corruption by changing incentive structures in the economy. If deep causes of the problem are analyzed carefully, a new system of governance can be established, such that, even most opportunist individuals do not find getting involved in corrupt practices profitable.

Aim of this thesis is to examine characteristics of the system providing a fertile environment for corruption and to figure out factors stimulating corrupt transactions using game theoretical models.

The first two models examine corruption as a kind of transaction between the briber and the bribee. In the models, it is shown that intermediaries sector occur from the profit maximization behavior of agents. This sector, by establishing long term, trust based relationships with bureaucrats, decreases risks occurring from the fact that the two parties involved in a corrupt transaction do not know each other perfectly. This sector, by reducing the likelihood of detection, serves corrupt transactions, and in return for the service it provided, takes commission, so gets benefit. Third model examines a strange type of corruption, a case of (spurious) middlemen obtaining bribe from the public service bureaucrats give, by pretending that he has influence on the acceptance or speed of it. The model tries to detect the characteristics of the environment making such a deception process persistent.

Key Words: Corruption, Intermediaries, Game Theory

ÖZ

YOLSUZLUK-BİR OYUN TEORİSİ ANALİZİ

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Yolsuzluk, önemli bir sosyal ve ahlaki sorun olarak karşımıza çıkmaktadır. Yolsuzlukla mücadele toplumun normlarında, değerlerinde ve davranış kalıplarında değişiklik yapılmasını gerektirir. Bu, genellikle uzun ve zor bir süreçtir. Toplumun derinliklerindeki değer yargılarının değiştirilmesi onlarca yıl alabilir.

Diğer taraftan, kurumların güdülenme yapısı değiştirilerek yolsuzlukla mücadele edilebilir. Sorunun derinliklerindeki sebepler dikkatle incelenirse, en fırsatçı, çıkarcı insanların bile yolsuzluk yapmayı karlı bulmayacakları yeni bir yönetim sistemi kurulabilir.

Bu tezdeki amaç, oyun teorisi modelleri kullanarak yolsuzluk için uygun bir ortam hazırlayan sistemin niteliklerini incelemek ve yolsuz işlemleri kolaylaştıran faktörleri belirlemektir.

İlk iki model, yolsuzluğu rüşveti veren ve alan arasında bir çeşit ticari anlaşma olarak incelemektedir. Modeller, tarafların çıkarlarını azamileştirme davranışlarının aracılar kurumunun doğmasına yol açtığını göstermektedir. Bu kurum, bürokratlarla daha uzun süreli ve güvene dayanan ilişkiler kurarak tarafların (rüşveti alan ve veren) birbirlerini tam olarak tanımıyor ve güvenemiyor olmasından kaynaklanan yakalanma riskini azaltıcı rol oynamaktadır. Dolayısıyla aracılar yolsuzluk anlaşmalarındaki riski azaltarak taraflara hizmet etmekte, karşılığında da komisyon alarak çıkar sağlamaktadır. Üçüncü model değişik bir yolsuzluk türünü incelemektedir. Modelde, (sahte) bir aracının, bürokratların verdiği kamu hizmetinin kabulünde veya hızında etkisi varmış gibi davranarak çıkar elde etmesi durumu incelenmektedir. Model, bu tip bir aldatma sürecine imkan veren ortamın özelliklerini de ortaya koymaktadır.

Anahtar Kelimeler:Yolsuzluk, Aracılar, Oyun Teorisi

To the Honest People of My Country

ACKNOWLEDGEMENTS

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CHAPTER 1

INTRODUCTION

1.1. Background of the study

Although corruption is an ancient problem, it has recently attracted considerable attention of academicians and policy makers in the last decade. There are efforts in many countries to "clean-up" politics and bureaucracy. More attention is being paid to the social and economic costs of corruption.

Especially in less developed countries, corruption is seen as one of the   reasons for underdevelopment. In the literature, there is almost a consensus about that corruption of the public officers discourages entrepreneurs, causes inefficiencies and waste of resources, discourages foreign investment, distorts income distribution and harms democracy and ethics. Corrupt societies tend to be less developed and socially and politically unstable.

Increasing international awareness on the issue can be largely attributed to increasing number of democratic governments in the world, free and active media, non-governmental organizations and the environment that is created by them in which corrupt acts are more closely monitored and reported. Moreover, greater reliance on market economy put more emphasis on efficiency and leads to higher recognition of distortive, rent-seeking activities. Increasing openness of countries and globalization increased the contacts between countries with high and low corruption levels. International financial institutions and donor countries have become more sensitive about whether the assistance they gave to poor countries is used in appropriate places, so, actors in the world economy began to question corruption in these countries.

It is also possible that increasing interest on the corruption problem may be caused by the increasing scope of it. There are many factors that may have led to increasing scope of corruption, such as raising role of governments in the economies worldwide, increasing bureaucracy and number of required authorizations and permits for business operations, efforts of international companies to access profitable contracts abroad after opening up of many countries, opportunities created by increasing privatization efforts worldwide etc.

Corruption is an interdisciplinary area of research. Its various dimensions are examined by different social sciences. Its social causes and effects constitutes an area of study for sociology. Although the definitions change from country to country, everywhere in the world "corruption offenses" are defined and sanctioned so the issue is also a research area for law. Economics deals with the economic consequences of corruption and examines incentives of the people who engage in corrupt activities.

1.2. Purpose and Significance of the Study

Corruption is an important social and ethical problem. As well as economic incentives; culture, norms and the values of the society are very important determinants of it; therefore, fight with it requires changes in values, norms and behavioral patterns of the society. Usually, this is a long and difficult process. In many countries, corruption is a part of political and social system of a country. It may be systematic, deliberate, caused by the deeper lawlessness characteristics of the society. Decades should pass to change the deep values of a society. In the mean time, it is possible to combat corruption by changing incentive structures in the economy. If deep causes of the problem are analyzed carefully, a new system of governance can be established in which even most opportunist individuals do not find getting involved in corrupt practices profitable.

Aim of this thesis is to examine the characteristics of the systems providing a fertile environment for corruption and to figure out factors stimulating corrupt transactions, using game theoretical models. For this purpose, three game theoretical models are formulated. Models examine the incentives of parties to corrupt transactions and role of intermediaries in these transactions.

Putting the diagnosis truly and knowing the deep causes of a problem correctly are the most important steps in solving the problem. This study aims to take a closer look at the causes of corruption and try to figure out main mechanisms preparing ground for the occurrence of corruption. Results of the models suggest policy actions to combat corruption; to establish a system so as to prevent corrupt transactions from occurring.

1.3. Definition of the Terms

1.3.1. Corruption

There are many definitions of corruption in the literature, most commonly used of which is the World Bank's definition: "the abuse of public office for private gain." Shleifer and Vishny (1993) defines corruption as: "the sale by government officials of government property for personal gain." Although the definitions emphasize the public sector aspect of corruption, this does not mean that corrupt activities are non-existent within private sector. Corruption can be seen as a principal – agent problem. There is usually a delegation of authority by the principal to the agent; a discretion is given to the agent to act in name of the principal. Corruption occurs when this discretion is used for "private benefit" by the agent, to the detriment of the principal. The difficulty of detection or lack of accountability completes the picture. In all definitions, "private benefit" is emphasized, illegality of the ways of obtaining it is the main characteristic of corruption.

Corruption literature has close connections with rent seeking literature. The main motivation behind both is the same: redistribute for private gain rather than produce. However, the two are not the same. Property owners have the incentive to influence decisions of those in power and sometimes

influence of these interest groups may lead to correct decisions both from the point of view of principal and agent, so influence process may not involve corruption.

Legally sanctioned acts of rent-seeking become illegal act of corruption when at least one of the following three conditions is violated i) The process of influencing the decision makers represents a competitive game played according to rules that are known to all players, ii) There are no secret or side payments to the agent, iii) The clients and the agents are independent of each other in the sense that, neither group benefits from the income earned by the other group (Jain, 2001,78).

1.3.2. Red Tape

According to Bozeman (2000), public management should have four core values; efficiency, accountability, performance and fairness. With these values of public management in mind, he defines red tape as:

Rules, regulations and procedures that remain in force and entail a compliance burden but do not advance the legitimate purposes the rules were intended to serve........ Regardless of the source of legitimacy, a rule serving an individuals' or group's self-interest but no legitimate function for the organization qualifies as red tape (Bozeman ,2000, 12, 90).

Some economists like Porta & Vannucci (mentioned in Heywood, 1997), Leff (1964), Leys (1970), Lui (1985) (mentioned in Jain, 2001) mention about benefits occuring from corruption such as corruption being an incentive payment speeding up bureaucracy, removing government imposed, but inefficient rules, giving opportunity to those most valuing the time to get permissions faster by paying for it, and supplementing low wages.

However, here some points are missed. Excessive bureaucracy or red tape is usually created by government officials trying to obtain more bribe. Thus, most probably, the causation is reverse. A large proportion of the times of entrepreneurs

and businessman is spent dealing with government agencies in developing countries. Clients prefer bribing, instead of waiting long queues. They try to gain time by speeding up the process.

Rules, regulations, state monopolies, rationing of goods that are short in supply, publicly owned firms create many opportunities for corruption. When rules are difficult to understand, confusing and cumbersome, administrative procedures are not openly known, procedures require frequent contact of clients with the officers, or excess demand is created by government monopolies and if government officials are given discretion in their decisions, both supply (power of officials to force clients to pay bribe) and demand (since the good or service in question is needed by the clients) for corruption is created.

Jain and Tirtiroglu (2000) (mentioned in Jain, 2001) show that, contributions of financial services industry to legislatures in US decreased after the rents associated with legislative protection have decreased due to globalization.

Buscaglia (2001) finds in his article a statistically significant and positive relationship between both of procedural steps followed in cases and the variation in procedural times to disposition occurring above the code-specified deadlines and perceived frequencies of corruption in Argentina, Ecuador and Venezuela.

Kaufmann (1997) (mentioned in Rijckeghem and Weder, 2001), using cross sectional data composed of Latin American and Asian countries, finds a very strong correlation between bribery given to public officials and "regulatory discretion".

Johnson, Kaufmann and Zoido-Lobaton (1998) (mentioned in Jain,2001) examine the impact of discretionary powers on corruption. They use data of 49 countries and indices of regulation, regulatory discretion, bureaucratic quality and economic freedom (provided by international rating agencies), and find that regulatory discretion is an important cause of the unofficial economy. Also, a higher tax burden results in an increase in the size of the underground economy. Then authors also find a significant relationship between the level of corruption (which is measured using Global Competitiveness Survey's bribery measures) and the size of the underground economy. Thus, authors conclude that, the more discretionary power officials have, the more problems there will be with effective governance.

Manion (1996), in his article, examines how detailed, numerous, complex rules, gap between formal and informal operative standards, and inaccesibility of information about the rules lead to a fertile environment of bribe exchange for the licensing requirement of businesses in China. She also models how expectations of the clients about the honesty/corruptness of the officer and imperfect knowledge of clients about whether her application is acceptable or not affect the occurrence of corrupt transactions.

In such an environment, without abolishing unnecessary rules, making rules, regulations, procedures simple and transparent, without letting price of goods that are scarce in supply to market forces and selling government monopolies, corruption can not be reduced by other measures such as increasing penalties etc.

1.3.3. Whistleblowers

If the two parties involved in a corrupt transaction obey secrecy with care, it is difficult for the law enforcement authorities to uncover corrupt practices. Therefore, whistleblowers, either clients or third party observers who place complaint from corrupt practices, play important role in corruption detection.

However, being a whistleblower is also risky.

In a 1987 survey of whistleblowers, 84 percent in private industry were fired and 75 percent in government were demoted. The vast majority reported harassment, including bugged telephones and other surveillance, and the consequences to their private lives are often severe, resulting in (divorce, financial problems and deter) orated health. Yet, more than 80 percent of the whistleblowers surveyed said they would take the same action again if similar circumstances arose (Bennett, 1997,24).

Bennett (1997) sees whistleblowers as heroes:

Whistleblowers become heroes of conscience because they believe in the most basic moral concept: honesty. Because they speak out against waste, fraud, abuse and danger for the good of the rest of us-often at great personal risk-they should be hailed as major heroes of democracy. (Bennett, 1997,23).

Encouraging and protecting whistleblowers can be an effective strategy in combating corruption. For whistleblowers to feel secure, they must be protected from possible retaliations. In USA, organizations like Government Accountability Project, The Cavallo Foundation and statutes like Whistleblower Protection Act and False Claims Act protect whistleblowers and give rewards to reports of major cases of fraud.

1.3.4. Connections, Transparency and Intermediaries

Corruption is a risky transaction. It is not legally enforceable. Thus, application of the contract largely depends on the relative powers of the parties. The briber may not get the good or service in question even if (s)he paid the price, bribe. The bribee may face blackmail from the briber after delivering the service.

As Jain (2001) also mentions about, open announcement of officer about his willingness to engage in a corrupt transaction may attract the best buyer, but also attracts attention of control authorities and rivals or superiors wishing to share corrupt proceeds. Hence, the process must be secret. All three stages of corrupt transactions, searching and negotiating the contract, contract enforcement and post enforcement lock-in, involve risk.

Building long-term, reputation-based relationships between the briber and the bribee decreases the risks involved so less transaction costs occur in a corrupt transaction. However, building connections is also costly for the bribee so (s)he weighs the costs of building connections against the gains from less uncertainty involved in corrupt transactions with connected officers.

Transparency has two opposing effects on corruption. Since higher transparency causes corruption to be detected more easily, it decreases corruption. Also, transparency makes rules, regulations, procedures more open; so decreases power of public officials. However, transparency may also make identifying key decision-makers easier for outsiders, which may increase incentives to build-up connections for corruption. Baç (2001), in his game theoretical model shows that,

connections effect of increasing transparency may dominate detection effect; so for local improvements in transparency, corruption may even increase.

Intermediaries are specialized connection builders who decrease the costs involved in building connections. They do this job more efficiently by making the connection building "investment" once. After the connection is built, individual clients can get benefit of it at much lower costs than cost of building the connection by themselves. Intermediary also gets benefit, by obtaining their "commission" from the corrupt transaction (s)he helped for.

The intermediaries sector that assists public in obtaining the government services, serves to decrease risks involved in offering bribe to an honest officer (from the side of the briber) with integrity or it decreases the probability to want bribe from a "whistleblower" client (from the side of the bribee).

Heavy red tape, opaque, difficult to understand rules and regulations encourage the establishment of "intermediaries" sector. Even honest people may prefer working with intermediaries to get the services they are legally entitled; since otherwise they would have to struggle with heavy red tape.

Even worse, intermediaries sometimes try to create perceptions of corruption to obtain private benefit, even in the absence of any corrupt demand of the officer. Some intermediaries get more money by saying to the clients that bureaucrats are bribed, even in the case of no occurrence of corruption, pocketing the obtained money.

Oldenburg (1987), mentions about the Indian Land Consolidation Program. He finds out that, to maximize their benefits, middlemen try to spread the rumor that procedures are mysterious, real decisions are made behind scenes, "nothing gets done without bribing the officials". Middleman tries to give the image that, he can reach the officials, get the job done, know subtle hints and techniques of passing money. Thus, administration is perceived to be more corrupt, even though real level of corruption is much lower. Land consolidation officials tried to combat claims, but it is very difficult to overcome these rumors. According to Oldenburg (1987), when it is widely believed that there is widespread corruption, this may even lead the official to corruption, as he is assumed to be corrupt anyway.

CHAPTER 2

LITERATURE REVIEW

2.1. Theoretical Literature on Corruption

There are important theoretical studies examining the types, costs, causes and cures of corruption. Mostly they are based on model studies and use anecdotal evidences and observations on the issue. In this section, basic theoretical studies related to our area of research will be reviewed.

2.1.1.Types of Corruption

Various types of corruption can be defined. Corruption may be bureaucratic or political, briber initiated or bribee initiated, may involve theft or may not, can be centralized or decentralized, internal or external, transactive or extortive, grand or petty, personal or institutional, intensive, nepotistic, etc.

According to Baç (1996), external corruption is simply a transaction between a member of organization and an outsider, as in the case of a bribe taking official. On the other hand, internal corruption is a kind of collusion between superior and subordinate, through which proceeds from external corruption is transferred to upper levels.

Centralized-decentralized and internal-external corruption types are linked in that, centralized corruption is based on a well–organized internal corruption. In extreme cases the entire political and bureaucratic system can work as a monopoly in determining bribes for supplying public services.

As Ackerman (1999) explains, decentralized corruption occurs where there are many public authorities giving independent, complementary services, each

determining and collecting their own bribes. Due to the anarchy and unpredictability it create, decentralized corruption can be more distortionary for the businesses than centralized corruption. As a solution to both, it is frequently argued in the literature that, if a system of officers providing the same public service competitively can be established, competition among officers would reduce bribes down to zero.

Transactive corruption is a voluntary agreement between a donor and recipient, benefiting both parties, on the other hand, extortive corruption involves compulsion, imposed on donor to avoid some form of harm on the part of the donor. (Heywood, 1997).

There is high leveled type of corruption (grand corruption) which involves big projects and big amounts of money in which high level politicians or bureaucrats involved and there is low leveled type of corruption (petty) where small amounts of money given to lower level civil servants just to speed up the procedures or to get small favors.

Corruption may aim personal enrichment (personal corruption) or may aim to benefit an institution such as a political party (institutional corruption).

Nepotistic corruption occurs when friends or relatives are appointed to public office by making them legally unjustified favored treatment over others.

2.1.2. Costs of Corruption

Corruption has important detrimental effects on the economies. Most frequently cited cost of corruption is that, it discourages entrepreneurs, which in turn affects investment, growth and development of the country. Corruption acts as an

implicit tax on entrepreneurs, but it is more distortionary than taxation. (Shleifer and Vishny (1993)). Deadweight costs of negotiating and paying bribe, cost of searching for persons to whom bribe must be paid, fees paid to intermediaries, cost of connections building etc. may add up to such large amounts that entrepreneurs may give up profitable investment projects. When corruption increases in an economy, rent-seeking becomes more profitable than investment, which also deters entrepreneurship. Underground economy expands as firms try to escape from corruption costs incurred while obtaining permits, licenses, etc. Many empirical studies, like Mauro (1995) (mentioned in Bardhan (1997)), Gould and Amaro Reyes (1983), United Nations (1989), Klitgaard (1991) (mentioned in Sheleifer and Vishny (1993)), Paulo (1995) (mentioned in Goldsmith, 1999) find negative relationship between corruption and investment, or general development level.

Corruption causes allocative inefficiency and X-inefficiency in the market. Corrupt officials may prefer inducing investment activities to big projects (usually wastefully bigger than needed) where corruption is difficult to detect. Public officials may raise entry barriers to the market to keep secrecy of corrupt deals within the existing group of firms, which leads to reduction in the number of firms in the market.

Public resources that can be used in productive projects are wasted or used by those in power. Cross country comparisons show that corruption leads governments spend less on education and health and more on public investment. Regression analysis show that a country which improves its standing on the corruption index from 6 to 8 (on a scale of 10, 0 being the most corrupt, 10 the least) will rise its

spending on education by ½ percent of GDP (Mauro, 1998). In countries with corrupt governments, public budget deficit increases due to low tax collection and high spending, which in turn causes interest rates and/or inflation to rise.

Wei (mentioned in Jain, 2001) found that,

> An increase in either the tax rate on multinational firms or corruption levels in the host governments would reduce inward foreign direct investment. An increase in corruption level from that of Singapore to that of Mexico is equivalent to raising tax rate by 21-24 percentage points (Jain, 2001, 95).

Corruption has also adverse consequences on income distribution. Usually, the poor does not have the resources to be able to pay bribes or to establish connections with politicians or bureaucrats to reach resources.

Corrupt income is spent differently from honest income due to the secrecy needs, corrupt proceeds are usually invested and spent in abroad so capital flight is associated with corruption. As a result, redistribution caused by corruption do not bring about multiplier effects for the economy.

Corruption lowers the legitimacy of the government. Countries that are more corrupt tend to be more politically unstable (Mauro,1998). Regulatory role of the government is much diminished. Democracy and ethics are also harmed in a corrupt society.

Political corruption is perceived to be a more serious problem in democracies than in other forms of political systems, since corruption damages democracies more by undermining its basic principles of equality and rule of law. (Heywood, 1997).

2.1.3. Causes and Cures

Determining fundamental causes of a problem is the most important step in finding the cures. There are many causes of corruption differing from country to country.

Corruption can be seen from the perspective of supply and demand. Corruption is like a transaction where, there is demand by the briber (to get a benefit) and supply by the bribee (public office, having the power to sell the benefit). A price (bribe) occurs which is in proportion to the benefit obtained by the briber and compensates the officer for the risks and the effort involved.

There are many causes of corruption cited in the literature. Below subsistence level wages are shown to be one of the most important causes of corruption. If wages are below subsistence, corruption is thought to be an easy way of survival. Below subsistence wages attract only corrupt people who think of getting the difference from bribe to the public office. Empirical studies (which will be reviewed in the next section) show that there is a statistically significant negative relationship between corruption and the wage level.

Salaries also serve as a positive sanction, effectiveness of which depends in part on its amount in absolute terms, but mainly on its relative contribution to the total income of the official. The more dependent the official on salary, the more risky it is to deal in corrupt transactions. (Kiser and Tong, 1992).

According to Krueger (1993), besides wages, increasing weight of government in the economy also has detrimental effects on corruption. Growing state intervention in the economy shifts control over greater financial resources into the hands of political class and bureaucrats. This usually prepares the ground for

corruption. Economic interventions of governments not always aim optimum benefit for the society but frequently self-interest motives of politicians affect the choice of policies.

Culture and social structure are two of the most important factors affecting corruption. What is perceived as corrupt in one country can be seen as a normal way of doing business in another. In some countries kinship, clanship based loyalties may be more important than public duties. Some cultures value hard working, entrepreneurship, and success, while some others value building connections, rent seeking and fast gains.

Free media, existence of non-governmental organizations, organizations providing information about politicians to the voters (which are possible in democratic countries) establish a credible threat for the corrupt politicians and by decreasing trust to them, can decrease reelection chances of corrupt politicians. Various kinds of independent accountability institutions like ombudsman and independent investigation agencies prove to be helpful in combating corruption (as long as they have the power to enforce penalties and do not report to any political person or institution).

An independent judiciary system, existence of rule of law, a well-designed discouraging fine system, merit based, well-defined career paths for the bureaucrats, frequent job rotations, rules reducing discretion of officers, are important factors decreasing corruption.

According to Kiser and Tong (1992), coalition formation among corrupt subordinates are common. There are "clans" and "cliques" in most large

organizations, which raise costs of control much so rulers must try to minimize collusion while designing organizations. Long-term relationships between officials, long training periods, recruiting officials from the same social group, joint production relationships increase collusion for corruption.

Poverty and low education level also increase corruption. Educated people are more aware of the costs of corruption and are more equipped to combat with it. Poverty creates vicious circles of low education, more competition for scarce resources and insufficient possibilities for setting up a legal framework.

There are important externality effects associated with corrupt environments. Widespread corruption decreases the risk of offering bribe to an honest official. Probability of detection by control agencies also declines. Parallel to this, low level of corruption leads to even lower levels of it in the future. Manion (1996) in her game theoretical model shows that, increasing expected probabilities of encountering clean officials by the applicants, after some point, leads to a shift from corrupt equilibrium to honest equilibrium. Applicants do not offer bribe if they believe that the proportion of honest officials are high enough. Lui (1986), using a dynamic overlapping generations model, shows how the externality effects and collusion of corrupt officers lead to multiple corrupt equilibria. Optimizing behavior of overlapping generations against government deterrence schemes may lead to high or low corruption equilibria depending on a number of factors like initial level of corruption, resources devoted to corruption detection and level of penalties. Once low corruption equilibrium is reached, economy can be kept there using considerably lower amount of resources. The author also shows evidence from the case of China

from the early 1950s to mid 1980s, whose severity of deterrence schemes and thus level of corruption underwent large changes during the period.

Heavy sanctions decrease the level of corruption by increasing the costs involved in corrupt transactions (Berkman,1988). In nearly all countries, corruption is regulated in criminal law. However, to be effective, heavy penalties must be associated with intensive control. Cadot (1987) shows with a game theoretical model how corruption may be thought of as a gamble where government officials face risk each time they ask for bribe. He then examines how harshness of the sanctions (which is loss of job, more costly when wages are higher), degree of risk aversiveness of the official, time discount rate of the official, probability of being caught and when caught, probability of getting rid of sanction by bribing superiors affect the decision of a government official to enter into a corrupt transaction or not.

Macrae (1982) also shows in his game theoretical model that, effective legal sanctions that are severe enough can change the outcome of the corruption game, namely, decision of the parties to engage in a corrupt transaction.

Combatting corruption is not an easy task and may require redesign of the system of governing. Anti-corruption cleaning-up campaigns, to be successful, must be credible within the eyes of the individuals. Dedication from the top of the state is necessary. Basu, Bhattachary and Mishra (1992) show with a model that existence of an incorruptible force at some level of the hierarchy may decrease corruption even down to zero. Changing expectations of people, with externality effects, leads to a new equilibrium with lower corruption level. For this, people should be convinced that campaign would target all corrupt acts, including the rich and powerful, not only

political enemies or small cases of ordinary citizens. Otherwise, necessary citizen support can never be obtained.

2.2. Empirical Literature on Corruption

In this section the empirical studies on corruption will be reviewed. Measurement problems, use of data obtained from various measurement methods in making econometric interpretations and causal and consequential links detected by these analysis are examined.

2.2.1. Measuring Corruption

To examine progress in a country, to compare different countries or to do research on causes and consequences of corruption, it must be measured. Exact measures of corruption are difficult to find. It has numerous types and it is unobservable so corruption is measured by proxies.

World Bank defines four types of proxies to measure corruption: i) net asset evaluation ii) arrests and convictions iii) survey methodology iv) macroeconomic empirical studies.

Berg (2001) classifies corruption measures into two: objective measures and subjective measures. Objective measures are quantifications based on verifiable information, most often used of which are number of corruption charges or the number of internet search engine hits on corruption in a particular country.

Subjective measures are perception or experience based and composed of data collected from surveys or polls in which individuals are asked to assess the level of corruption.

There are also other less widely used measures such as estimates of the percentage of politicians and public servants that are corrupt, provided by regional experts of various institutions. Johnston and Hao (1997) (mentioned in Jain, 2001), examines the number of complaints of corruption to estimate changes in levels of corruption in China.

Berg (2001) proposes use of "a subjective, experience – based corruption indicator, which combines a number of desirable features and avoids some of the weaknesses of existing indicators" (Berg, 2001, 15). He defines the "bribe ratio" as total bribe value (total value of all bribes paid in a specified period) divided by total income in the same period.

Most frequently used measures in both cross-country comparisons and empirical research are survey measures provided by various international institutions or private researchers.

Institutions like Economic Intelligence Unit, Political Risk Services Inc., Political & Economic Risk Consultancy, Institute for Management Development, World Bank, Price Waterhouse Coopers, Word Economic Forum, Freedom House, Transparency International provide surveys on corruption perception for a number of countries.

A number of economists like Hall and Yogo, Kaufmann, Kraay and Ziodo-Laboton, Ades and Di Tella (mentioned in Jain, 2001), Helpman, Jones, Kaufmann & Schankerman, Neumann (mentioned in Berg (2001)) also provide perceptions based or experience based indicators of corruption for the countries investigated.

Empirical studies on corruption also requires measurement of a number of social, economic and political variables that are used as dependent or independent variables in regressions analyzing corruption. Objective measures of these variables are also difficult to obtain. Jain (2001) gives a list of proxies for these variables and the researchers providing data. Among such difficult-to-measure variables are economic freedom, civil liberties, bureaucratic harassment, legal environment, managerial efficiency, liberalization and economic reform, unofficial economy, value of economic rents.

How useful are the proxy measures of corruption and what are the advantages and disadvantages of each proxy?

Berg (2001) defines four characteristics that must exist in a good corruption indicator as: i) trustworthiness, i.e. people creating the index are objective and indicator reflects general opinion, not personal opinion of one or a few people. ii) validity, i.e. measuring what we actually are interested in, (i.e. corruption). iii) accuracy, i.e. measurement errors are not large, standard deviations are small (increasing the number of respondents increase accuracy). iv) preciseness, i.e., everyone agrees on what the quantity measures; questions are not ambiguous and do not depend upon individual standards.

Mostly used subjective indicators in empirical analysis, perception based indicators are usually valid and trustworthy, but may not be accurate and are often imprecise. First, perceptions of corruption may lag actual corruption, so indicators have low sensitivity against policy changes. Perceptions of corruption may be endogenous such that, media coverage, big scandals etc. usually affect perceptions

more than experience. Indicator assumes that public is informed about the level of corruption in the country, however, especially grand corruption cases occur behind the doors; they are secret. Surveys usually measure only bureaucratic corruption, political corruption remains out of the scene. Definition of corruption is culture specific, so what is counted as a corrupt act in one country may not be seen as corrupt in another. Also, judgements and prejudices of the experts preparing and implementing surveys may affect the survey results. Indicators are highly correlated with measures of bureaucratic efficiency so it is difficult to differentiate the two effects.

Experience based indicators are based on surveys of corruption experiences of individuals or institutions. They overcome many of the disadvantages of perceptions based indicators, so, they are usually more appropriate for cross-country comparisons. They do not lag the actual corruption level and if questions are well chosen so as to be verifiable, validity and precision can be achieved. Appropriate implementation may lead to indicators that are both trustworthy and precise.

Disadvantages of them being aside, correlation between various indicators that are perceptions or experience based are high, so, providing support for the reliability of the indicators (Jain, 2001). The high prices paid by multinational companies and banks to rating agencies also show that international actors value this information (Mauro, 1998).

Objective indicators, most often used of which are arrests or convictions from corruption, have high trustworthiness, precision and are relatively accurate. But due to their low validity, they are not useful for cross country comparison. Differences in

number of convictions between countries may depend more on differences in judiciary or police effectiveness than differences of corruption. Goel and Rich (1989) solves this problem in their regression analysis. They regress convictions from corruption on a number of independent variables like salary, unemployment etc., by involving on the right hand side of the equation a variable measuring government policing activities, namely real police expenditure per government employee, to control for the effect of them on convictions.

Lastly, although seem very different from many perspectives, objective measures and subjective measures are also highly correlated, as Boylan (2001) suggests.

2.2.2. Empirical Studies on the Causes of Corruption

In the first part of the chapter, theoretical work on the causes of corruption were examined. In this part the results of some empirical studies on the issue will be summarized.

One of the most comprehensive studies on the issue was done by Treisman (2000). Treisman tries to figure out how culture, history and institutions of the countries affect corruption. He does a panel study of developing and developed countries, using perceived corruption indices compiled from business risk surveys for a number of years between 1980s and 1990s. As a result of his study, Treisman finds that countries with a long history of democracy, cultural and institutional tradition of rule of law have significantly lower corruption levels, while the current degree of democracy is not a significant factor. He also reaches to the conclusion that more developed and economically more open countries experience less corruption.

Theoretical studies emphasize the effect of wage level of public officers on corruption. Buscaglia (2001), in his panel study of Argentina, Ecuador and Venezuela between years 1991–99, tests whether increasing wages decrease corruption and finds that effect of wage levels of judges on judicial corruption level is statistically insignificant.

Rijckeghem and Weder (2001) in their panel data analysis of 31 developing countries over the period 1982–94 finds a statistically significant negative relationship between corruption (measured using survey data of International Country Risk Guide) and the ratio of government wage level to manufacturing sector wage level. However, the analysis shows that this is a long-run relationship; in the short-run higher wage level does not lead to lower corruption. The effect of wage policy on corruption may occur with lag due to social and political inertia. Authors also find that there is no statistically significant relationship between education variable and corruption; neither there exists a significant relationship between GDP per capita and corruption.

Chand and Moene (1997), in their article examine the Ghana case of fiscal reform and show that a bonus scheme for tax collecting civil servants combined with decreased general tax level and increased sanctions caused very significant improvements in tax collection ability of the government in Ghana. Authors also show with a game theoretical model that bonuses given to tax collectors, if at the same time corruption at higher levels of management is contained, will cause the shrinkage of the gap between reported and true tax liabilities and decrease incentives for corruption.

Broadman and Recanatini in their article examine 26 Transition Countries and analyse the role of competitive market institutions and effectiveness and transparency of legal systems in decreasing corruption. Authors regress Graft Index of perceived corruption (calculated by Kaufmann, Kraay and Zoido-Lobaton (1999)) on a vector of institutional indicators.

Result of the regression show that greater entry barriers, a less effective legal system, less competitive infrastructure services are associated with higher corruption. Increasing democracy has a decreasing effect on corruption while coefficient of the openness variable, is not statistically significant. When per capita GDP is also included in the regression as an independent variable, explanatory powers of other variables decline, due to strong correlation between the institutional indicators and GDP. Moreover, the coefficients of GDP per capita is insignificant.

Rauch and Evans (2000) collect survey data on various elements of bureaucratic structure for 35 countries on the dimensions of meritocratic recruitment, merit based career paths and salary levels. Then they do a number of regressions using measures of bureaucratic performance defined by international rating agencies (International Country Risk Guide (ICGR) and Business International (BI)) like corruption, red tape, speed, efficiency, quality and autonomy of the bureaucracy against the survey data defined above and GDP per capita, average years of schooling (education measure), ethnic diversity variable. As a result of the regression analysis, authors found that per capita GDP is a significant determinant of the two corruption measures (that of ICRG and BI) and meritocratic recruitment and education each are significant in explaining one of the corruption measures. All three

has a decreasing effect on corruption. On the other hand, the coefficients of career, salary and ethnic diversity measures are insignificant for both corruption measures.

Goldsmith (1999), using a sample of 34 low and middle income countries, explores the link between corruption and political variables of economic liberalization, political democratization, administrative centralization and per capita GNP. He uses Transparency International's 1996 Corruption Perceptions Index to measure corruption. Results of the regression show that, per capita GNP has a strongly significant decreasing effect on corruption variable; increasing economic liberalization and increasing centralization of the state are also significant factors decreasing corruption. Although less significant than other variables, higher levels of political democratization is also associated with diminished corruption.

Lee (1981) (mentioned in Berkman (1988)) examines the relationship between traditional values and tolerance for corruption in Hong Kong and finds that those of the surveyed people whose traditionality points are higher tolerate corruption more and those with lower traditional bonds, tolerate corruption less. When age and education dimensions also included in the study, it is seen that, those who are comparatively older and less educated are more tolerant to corruption in comparison to the ones who are younger and more educated.

Gardiner (1970) and Price (1975) (mentioned in Berkman (1988)) also found negative relationship between education level and tolerance for corruption, in their survey analysis of USA Wincanton city and Ghana respectively.

Ades and Di Tella (1997) in their article, first regress corruption (index of World Competitiveness Report (WCR) for perceived corruption and Nuemann's

index in different regressions) on per capita GDP, average years of total schooling, extent of political rights in the country (to proxy political competition), security (measuring the extent to which there is general crime prevention) imports as a percentage of GDP (to proxy openness) and industrial policy of the government (which is the main variable of interest, measured with WCR indices of industrial policy, monetary subsidies to private and public enterprises and manufacturing as a percentage of sectoral GDP, in different regressions). A number of panel and cross-section versions of the model's regression analysis are done and results in general show that (all measures of) more active industrial policy is significantly correlated with higher levels of corruption. Degree of political rights in the country has no significant effect on corruption and education level, degree of openness to foreign trade and security level of the country have significantly negative relationships with the level of corruption. Authors then show with another regression analysis that, total effect of government's industrial policy on investment ranges between 56 % and 84 % of the direct impact of it when corruption increase that industrial policy caused is accounted for.

Laffont and Guessan (1999) examine the relationship between competition and corruption with a game theoretical model and show that the effect of greater competition on corruption depends on the complementarily or substitutability of the two instruments that can be used to decrease informational rents, namely low powered incentives and greater competition.

Authors also empirically test the relationships between competitiveness and corruption using African data. They regress quality of institutions from the point of

view of corruption (using Business International's index for the year 1995) against average annual percentage growth of GDP between 1990–95, net official development assistance from all donors (as a share of recipient GDP at 1990), ratio of imports in 1995 to GDP in 1990, percentage of population 15 years of age and above that is illiterate (average of 1990 and 1995).

Results of the regression show that openness variable (imports/GDP, which is assumed to show competitiveness) is a strongly significant factor decreasing corruption. Growth rate increase also decreases corruption. Aid and illiteracy rate has a weakly significant increasing effect on corruption. When an interaction variable between the competition and corruption variables is introduced, it is shown that openness variable (imports /GDP)) does not have a uniform sign; it is positive for high levels of corruption but negative for low-levels of it.

Goel and Rich (1989), using United States data, regresses corruption variable (measured by the government employees who are convicted of bribery) on policing activities (measured by real police expenditure per government employee), probability of being convicted (measured by the ratio of convictions to indictments in each year), severity of punishment (measured by average prison term of embezzlement), relative incomes of government employees (obtained by subtracting government employee earnings from alternative earnings), unemployment (to account for implicit costs) and total real annual advertising expenses (to account for demonstration effects).

Results of regression analysis show that the coefficient of probability of being convicted and severity of punishment are negative as expected, implying that greater

probability of being convicted and higher prison terms discourage bribe taking. The policing variable has no significant effect. Raising salaries have decreasing effect on the level of corruption. Coefficient of unemployment variable is positive and significant, which may reflect a rise in bribe offers during recessions. Lastly, advertising variable is significant and positive, most probably due to the fact that an increase in the volume of advertising leads to greater corruption by raising individual rates of discount.

2.2.3. Empirical Studies on Turkish Case

Most comprehensive questionnaire based survey in Turkey has been done within the framework of "Good Governance and Anti-Corruption Technical Assistance" program applied in Turkey with World Bank Assistance. Following the Turkish government's project on good governance and anti-corruption, a steering committe has been established at November 2000, members of which are Treasury, Prime Minister Inspection Board, Ministry of Finance and Ministry of Interior. At January 2001, a working group has been established to work on the Government's six-step anti-corruption strategy: i) An analysis of corruption in Turkey: basic origins of corruption; definitions, reasons, incentives, ii) International experience with fighting corruption, iii) Diagnostic surveys to identify areas prone to corruption (household, business and bureaucracy), iv) Analysis of the results of the surveys, highlighting reform areas and priorities, v) Technical assistance to the related agencies regarding techniques for fighting corruption and developing a strategy and action plan. vi) Informing and briefing the public about the anti-corruption campaign and involving civil society in the fight against corruption.

Within this framework, Turkish non-governmental organization Turkey Economic and Social Studies Foundation (TESEV) makes comprehensive survey studies, composed of three phases. First phase is household survey, second phase is Business Survey and third phase is Bureaucracy Survey. Surveys are directed by Fikret Adaman from Boğaziçi University, Ali Çarkoğlu from Boğaziçi University and Burhan Şenatalar from İstanbul Bilgi University Transparency International helps as an advisor. Household survey was completed at February 2001 (and published-Adaman, Çarkoğlu, Şenatalar (2001)) and business survey was completed at November 2001. Studies for Bureaucracy Survey will begin.

In the household survey, the relations of voting age citizens (18 years and older 3021 citizens from 17 provinces and their districts in Turkey) with public organizations are investigated by conducting face to face interviews. Main focus was perceptions, attitudes and behavioral experiences of the target population.

Business survey is done again by face to face interviews with 1200 companies from 12 cities in Turkey. Of the surveyed firms, 36 % was from industrial, 32 % from commercial, 15 % from transportation and telecommunication, 7 % from construction, 6 % from independent business and 3 % from financial sectors. Some interesting results of the two surveys are summarized below.

34 % of the respondents in household survey see the most important problem that should be resolved in Turkey as inflation. Unemployment comes second with 26 % and bribery and corruption is third with 14 %. In business survey, 29 % of the respondents answered the same question as inflation and bribery and corruption

comes second with 22 %, followed by unemployment (17 %). Bribery and corruption are seen to be a more important problem by business in comparison to households.

Businessmen rank most trusted institutions as armed forces, universities and Turkey Industrialists and Businessmen Association (TÜSİAD), while political parties, central government and Turkish Grand National Assembly (TGNA) are least trusted. Most trusted institutions by households are armed forces, Association for Search and Rescue (AKUT) and least trusted are political parties, TGNA and central government.

Traffic polices, customs and tax inspection institutions are first three institutions which are thought to include widespread corruption, by households. Same ranking is customs, traffic polices and land register offices for business people. Armed forces and primary/secondary schools are thought to be relatively corruption free by households, while armed forces and universities are thought so by businessmen.

58 % of the households surveyed think that central government does not treat people equally in providing services and 61 % think that central government does not treat firms equally in government adjudications.

75 % of the business survey respondents think that, in government adjudications, municipalities do not treat firms equally and 79 % think so for central government.

74 % of households respond to the question "How are job applications being evaluated" as based on favoritism and patronage for public sector, when question is

asked for municipalities and private companies these numbers are 78 % and 45 % respectively. 85 % of businessmen think that job evaluations are based on favoritism and patronage in municipalities and 83 % think so for public sector job applications.

52 % of the businessmen think that credit demands are evaluated with favoritism in publicly owned banks while only 27 % think that favoritism exists in private banks' credit evaluations.

Courts are thought to be equitable by 42% of businessmen in resolving the disputes between private sector firms, but this number falls to 33 % for the disputes between public institutions and private sector firms.

64 % of business survey respondents think that unlawful contributions of private interest groups to political parties and election campaigns affect their business contracts much. 15 % of the respondents said that they made contributions to a municipality foundation with the thought that it will benefit their business; the numbers are respectively 7 % and 15% when the same question is asked for a political party or a foundation in close relationships with a political party.

18 % of households made irregular payments (or gave gifts) at least once in last two years. From the ones who have made irregular payments, 23 % of households said that they made irregular payments or gave presents to traffic polices in last two years; the numbers are 20 % for customs, 13 % for non-traffic police and 12 % for primary and secondary schools. It is interesting that 74 % of households think that corruption is widespread among traffic polices, 72 % think so for customs and 34 % think so for primary and secondary schools, much larger numbers from actual experience. Respondents gave gifts or made payments whose approximate

value is 168 million TL to customs, 156 million to primary and secondary schools. Least amount given is by 15 million to traffic polices. In 68 % of the cases irregular payment or gift is openly asked by primary/secondary schools, in 67 % of the cases done so by non-traffic police, in 59 % by traffic police, in 55 % by customs. 19 % of household respondents used intermediary, for bribing tax inspectors, 17 % did so in bribing land registry officers, 15 % in dealings with courts/legal system, and 13 % in dealings with customs.

46 % of business survey respondents made irregular payments or gave gifts; a much larger number than households. 53 % of the respondents made irregular payments/gave gifts to traffic polices, 49 % to customs, 38 % to land registry officers. Payments/gifts were openly asked by traffic police in 67 % of cases, by non-traffic police in 62 % of case, by electrical service officers in 59 % of cases (least proportion is in courts/legal system; 36 % of cases). 30 % of the respondents used intermediary in their dealings with courts/legal system, 24 % in customs, 21 % in land register offices. Intermediary usage is apparently more common among businessmen in comparison to households. Courts are the public institutions that businessmen least frequently give bribe; however, when they give bribe, they use intermediaries more often in comparison to the dealings with other institutions.

Amount of the average bribe is also larger in business payments to officers, with 1,420 million TL to customs, 855 million TL to municipalities, 783 million TL to court/legal system, 308 million TL to tax administration and 187 million to traffic polices.

Surveys also try to measure attitudes of citizens against bribe giving. 66 % of household survey respondents reported that, if they are caught by the traffic police while breaking the speed limit, they would not offer bribe any pay the fine, 16 % said that they would not offer bribe but if the police officer asks, they would give bribe and 13 % said that they would offer bribe and try to avoid the fine (% 5 are undecided). The corresponding numbers for the same question are 49 %, 18 % and 29 % (% 4 undecided) for businessmen. Apparently, businessmen are more tolerant to corruption in comparison to households.

61 % of the businessmen said that, while trying to get a government adjudication they do not give bribe, 19 % said they would give and 13 % said that they would give if an intermediary exists (7 % are undecided).

In case of trying to get an urgent file at land registry office, 65 % of the household said that they would not offer bribe and wait, 15 % said that they would offer bribe and 14 % said that they would give bribe if asked by the officer.

Another survey with interesting results is done by Prof. Dr. Haluk Gürgen and Prof. Dr. Ali Atıf Bir from Anadolu University for Undersecreteriat of Customs. Survey includes 8600 customs personnel, 15.6 % of which are working at the central office of Undersecretariat of Customs and 84.4 % of which is working at provincial offices.

While 46.1 % of the respondents said that bribery definitely does not exist in customs, 39.8 % said that bribery is widespread in the institution. 61.4 % of the personnel thinks that bribe taking is individualistic; on the other hand, 22.2 % thinks

that bribe taking is collective. According to 55.2 % of the respondents, gifts can not be counted as bribe. 9.9 % thinks that bribe ensures wage equitability.

Most of the respondents are not happy with working in the institution, only 26 % said that they wouldn't want to work anywhere other than Undersecretariat of Customs. 71.5 % think that they should have more authority and 93 % think that media distorts the image of customs. 70.4 % blame the "customs advisors" on the bad things occurring in customs. The study give interesting results in that, there is a widespread belief among the personnel that there is corruption in the institution, however, they are disturbed with the negative image of the institution about corruption.

2.3. Relationship Between Literature and the Models

Models of the thesis focus on causes of corruption; incentives of people in dealing with corrupt transactions and role of intermediaries. There are many theoretical and empirical studies in the literature about costs, causes and cures of corruption. However, in the literature, there are no game theoretical studies explicitly modeling role of intermediaries. Manion (1996) is the closest study to my second model. She formulates a model involving expectations of the clients about the honesty/corruptness of the officer and uncertainty of the clients about whether their application is an acceptable one or not. In her article, she also mentions about the role of intermediaries and give some anecdotal evidence; however, she does not introduce intermediaries explicitly in the model.

The anecdotal evidence given by Oldenburg (1987) about Indian Land Consolidation Program is very similar to the case examined in the third model. Observations given by Oldenburg (1987) have been useful in formulating the model.

CHAPTER III

METHODOLOGY

Models of the thesis use game theory. They are Bayesian Games, reflecting uncertainties of the players about the types of each other, which originates from the fact that in corrupt transactions usually parties do not know each other perfectly. In the thesis, how use of intermediaries affect these uncertainties are examined.

The first two models examine corruption as a kind of transaction between briber and bribee. The models show that the existence of intermediaries sector occur from the profit maximization behavior of the agents. Corruption is a type of transaction and as nearly all transactions, it involves risks due to the fact that parties do not know each other perfectly. Intermediaries, using their respectively longer term and more trust based relationships, decrease detection risk; so, by reducing the likelihood of corruption detection, serve corrupt transactions, and in return for the service they provide, get commission. First model examines the role of intermediaries in bribee (that is, public officer in charge of the public service given) initiated corruption cases and the second model examines the role of intermediaries in briber (that is, clients, users of the public services) initiated corruption cases.

The third model defines a case of spurious (insider) middlemen who obtain benefit by pretending that he makes the job done by sharing the bribe with the officer, although in fact the officer is honest and does not take bribe. Aim of this model is to examine the characteristics of the environment leading clients to the "spurious middlemen" instead of the exact person in charge of the service. Moreover, answer to the question "How and why honest officers giving the public service can not prevent occurrence of such a deception process" is searched. Results of the model show that, if government does not intervene by policies changing the context, the deception process may be persistent.

Game theoretical modeling enable us to think systematically on the issue and to put various scattered observations into a theoretical framework. Use of game theory also makes us derive policy conclusions from the examination of interactions between the individuals.

CHAPTER 4

MODELS AND RESULTS

4.1. A Bribee Initiated Corrupt Transaction

4.1.1. The Model

This part of the study models a bribee initiated corrupt transaction, that is, a corrupt transaction occurring between the client and the public officer where public officer is the one who plays active role in the transaction, i.e. (s)he is the one who demands bribe. Two different cases will be examined; first one is the case in which there is no intermediary and the second one is the case in which there is intermediary and he mediates the transaction. Then, results of the two models will be compared.

4.1.1.1. The Case Without Intermediary

There are three players: public officer, intermediary and client. Clients want to get a service valuable for them from the public officer. They have different types, which are determined by the nature at the beginning of first period. Public officer, using his advantageous position as the unique provider of the service, tries to obtain illegal private benefit from clients. In the second period, he decides on how much red tape to apply to be able to enforce clients to pay bribe. In the third period, clients observe the red tape choice of the officer and decide on whether to accept the red tape or not. In the fourth period, officer decides on whether to demand bribe or not from the clients who rejected the red tape. In the fifth period, observing the bribe demand of the officer, standard type clients decide on whether to pay bribe, go through red tape or withdraw from his demand and whistleblower type clients reject bribe demand and complains the public officer to the law enforcement agency. Appendix A shows the game tree of the model.

Public officer is assumed to be corruptible and takes bribe whenever it is profitable for him to do so. Public officer chooses amount of red tape (δ) he will apply while giving the service and bribe level (β) which are assumed to be continuous variables. His strategy space can be defined as $S_P=[0,z)x\{f: [0,z)\rightarrow[0,z)\}$.

Client applies to the public office for a service. The service is valuable for her. Red tape and bribe are her costs. Type of a client has two dimensions: a) willingness to pay for the service b) attitude against whistleblowing.

On the first type dimension, clients have types within the interval [0,1] according to their willingness to pay for the service. Valuation parameter is represented with σ. Client of type σ attach σz amount of value to the service, where z is the maximum amount of value attached by the clients to the service. Client of type $\sigma =1$ values the service by z, similarly, clients of type $\sigma =0$ gives zero value to the service. Valuation parameter of each client, σ, is a random draw from the uniform distribution UN [0,1].

On the second type dimension, attitude against whistleblowing, there are two types of clients: a) standard type clients (represented by S), who never report or complain about bribery b) whistleblower type clients (represented by W), who are people with high ethical values, report or place a complaint if they are asked to pay bribe. The probability of a client being whistleblower type is equal to λ, where $\lambda \in [0,1]$.

Type set of each client can be represented by the pairs (σ, S) or (σ, W). Types on both dimensions are private knowledge and independent of each other. Officer does not know which type of client he is encountering with, he only knows probability distribution of the types.

Clients play in the third period, after the nature draw their types and public officer decides on the amount of red tape he will apply. Clients decide on either to accept or reject red tape. Clients who rejected going through red tape also play at the fifth period, after officer decides on whether to

demand bribe and the amount of bribe to demand from the clients who reject going through red tape. At the fifth period, after observing the bribe demand of the officer, standard type clients have three alternative actions available to them. They can pay the bribe demanded by the officer and get the service (represented by PB), they can go through red tape and again get the service but incur red tape costs (represented by GRT) or they can withdraw, so abandon their demand for the service (represented by W). Strategy space of the standard type client can be defined as: $S_S = [f:[0,z] \rightarrow \{A, R\}$, $g: [0,z)^2 \rightarrow \{PB, GRT, W\}]$, where A is the strategy of accepting red tape in the first place.

Whistleblower type clients do not play at the fifth period. Due to their type, whistleblower clients do not have the option of paying the bribe. When officer demands bribe, they report the officer to the law enforcement authority. They play only at the third period, after officer informs the level of red tape. Strategy space of whistleblower client is: $S_W = [h:[0,z] \rightarrow \{A, RW\}]$. Where A stands for accepting red tape at the third period and so going through red tape and RW stands for rejecting red tape at the third period and withdrawing from demanding the service (and complaining the officer to the law enforcement authority if he demands bribe).

Law enforcement authority is the institution responsible for investigating and punishing corrupt officers. It does not open an investigation on its own. Detection/punishment of a corrupt officer occurs only through whistleblower clients' report/complaint. Assumption is that, there is no possibility of detection other than the complaints of whistleblower clients. This assumption is realistic since it is known that in bribery cases, police usually does not open investigation by its own initiative. Bribe takers are mostly caught by the investigations opened due to the complaints of the users of public services. If a complaint is placed, corrupt officer is punished with probability α. There are two costs for the corrupt officer if punished: loss of wage (ω) and some fine/imprisonment (which costs F to the official). F is independent from β, so, amount of the fine does not change with the amount of bribe. This is also thought to be realistic, since in the Turkish Criminal Law, penalties of bribe do not change much with its magnitude.

Payoff function of a standard type client for each of the strategies available to her, (given that β is the amount of bribe public officer demands and δ is the amount of red tape applied to the client when he wanted to get the service without paying bribe, s_s is an element of the strategy space of the standard type client) is defined as (where t $\in$ {PB, GTR, W} :

$$
U_s{}^\sigma(\delta, \beta, s_s) = \begin{bmatrix} \sigma z - \beta & \text{if} & s_s(\delta, \beta) = (R, PB) \\ \sigma z - \delta & \text{if} & s_s(\delta, \beta) = (A, t) \text{ or } s_s(\delta, \beta) = (R, GRT) \\ 0 & \text{if} & s_s(\delta, \beta) = (R, W) \end{bmatrix}
$$

Level of the red tape and amount of the bribe are determined by the officer. Clients take both β and δ as given. Red tape is taken as money equivalent, that is monetary value corresponding to the disturbance caused by red tape.

Payoff function of whistleblower type client for each of the strategies of her is defined as:

$$
U_w{}^\sigma(\delta, s_w) = \begin{bmatrix} \sigma z - \delta & \text{if} & s_w(\delta) = A \\ 0 & \text{if} & s_w(\delta) = RW \end{bmatrix}
$$

Whistleblower client, due to her type, does not have the option of getting the service by paying bribe. If red tape is below her valuation, she gets the service by incurring red tape costs, if not, she rejects red tape and if she comes across with the bribe demand of officer, she places complaint and withdraws.

Officer gets utility from the amount of bribe he takes and gets disutility if caught while getting bribe and punished. Officer also gets disutility from applying red tape (may be in the form of

getting warning from superiors, increasing probability of being detected by catching attention etc.). The amount of disutility officer gets from applying high red tape is represented by $\gamma(\delta)$. γ is a function with properties $\gamma'>0$, $\gamma''>0$.

So, expected payoff of the officer (if he decides to demand bribe) for each of the strategies of the clients are:

$$V(\delta,\beta,s_s,s_w,) = \begin{bmatrix} \omega-\gamma(\delta) & \text{if} & s_s(\beta,\delta)\neq(R,PB) & \text{and} & s_w(\delta)=A \\ \omega-\gamma(\delta)-\lambda\alpha(\omega+F) & \text{if} & s_s(\beta,\delta)\neq(R,PB) & \text{and} & s_w(\delta)=RW \\ \omega-\gamma(\delta)+(1-\lambda)\beta & \text{if} & s_s(\beta,\delta)=(R,PB) & \text{and} & s_w(\delta)=A \\ \omega-\gamma(\delta)-\lambda\alpha(\omega+F)+(1-\lambda)\beta & \text{if} & s_s(\beta,\delta)=(R,PB) & \text{and} & s_w(\delta)=RW \end{bmatrix}$$

If the officer does not demand bribe, apparently he will get only his wage.

Officer chooses bribe level (β) and red tape (δ). Assumption here is that the service in question is a legal one. If client does not give the bribe to the officer, the officer must deliver the service anyway. However, he has the power to increase red tape (by incurring the cost of $\gamma(\delta)$).

Perfect Bayesian Equilibrium of the game will be tried to be found. Using backwards induction, I begin from the last period, the decision making problem of the clients.

At the fifth stage, standard type client, prefers accepting bribe demand of the officer as long as $\sigma z-\beta \geq \sigma z-\delta$ (i.e $\delta \geq \beta$, amount of red tape is greater than or equal to the amount of bribe demanded) and does not withdraw as long as at least one of the actions give positive utility. When $\beta=\delta$, $\sigma z-\beta=\sigma z-\delta$, so, standard type client gets same utility from accepting or rejecting bribe demand of the officer. However, it is assumed that the client prefers paying bribe (possibly due to his afraid from rejecting bribe demand of the officer) in such an equality situation.

Whistleblower type client goes through red tape as long as σz-δ>0, that is, if the amount of red tape does not exceed her valuation of the service. Otherwise she rejects red tape and withdraws, if officer demands bribe at the fourth period she reports him.

In the second and fourth stages, officer plays. At the fourth stage, after observing the choice of the client about whether to accept the red tape or not, officer calculates posterior probabilities of what type of client he encounters with and decides on whether to demand bribe or not.

Officer calculates posterior probabilities of encountering with whistleblower type and standard type clients (given that the client rejected red tape) as below:

$$P(W|R) = \frac{P(R|W)P(W)}{P(R|W)P(W) + P(R|S)P(S)}$$

$$= \frac{P((\sigma z - \delta) < 0)\lambda}{P((\sigma z - \delta) < 0)\lambda + P(R|S)P(S)} = \frac{(\delta/z)\lambda}{(\delta/z)\lambda + (1-\lambda)} = \frac{\delta\lambda}{z(1-\lambda) + \delta\lambda}$$

Then $P(S|R) = 1 - P(W|R) = \dfrac{z(1-\lambda)}{z(1-\lambda) + \delta\lambda}$

where W represents the event of facing with whistleblower clients and R represents the event of rejection of red tape by the client. λ is the proportion of whistleblower clients, δ/z is the probability that red tape exceeds amount of valuation of whistleblower clients. $P(W|R)$ and $P(S|R)$ are the posterior probabilities of encountering with a whistleblower and standard type clients respectively, calculated by the officer, given that the client rejected the red tape. Standard type client gets $(\sigma z-\delta)$ amount of utility if he accepts the red tape. On the otherhand, if he rejects red tape, after he hears bribe demand of the officer, if the bribe demanded is lower than

red tape, he pays bribe and gets a higher utility of (σz-β). If the bribe demanded is high, he still has the opportunity to reject bribe and go through red tape (and get utility of (σz-δ)). Thus, by rejecting the bribe demand, he guarantees to get at least the amount he rejected and he has the possibility of getting higher utility by paying an amount of bribe less than the level of red tape. Therefore, at the third stage, all standard type clients reject red tape to try their chance in facing with a lower bribe demand than red tape.

With (δ/z) probability, whistleblower client has valuation below the red tape demanded so reject red tape (not with the aim of getting bribe offer, but with the aim of withdrawing if the officer does not make any reductions in the red tape without demanding any bribe).

At the fourth stage, officer decides to demand or not to demand bribe from the clients who rejected red tape and knows that if standard type clients prefer going through red tape or withdrawing he would not get any bribe. If β>δ, standard type clients reject red tape at the third stage but, after observing β, they prefer going through red tape or withdrawing. Thus, the officer expects to get utility:

$$V_1 = \omega - (\frac{\delta\lambda}{z(1-\lambda)+\delta\lambda})\alpha[\omega + F] - \gamma(\delta)$$

On the other hand, if the officer chooses the amount of red tape to be greater than or equal to the bribe demanded (δ≥β), standard type clients who value the service more than the bribe demanded, will prefer giving the bribe. Whistleblower clients whose valuation of the service exceeded the amount of red tape reject the red

tape and when encountered with bribe demand of the official report and withdraw in both cases. In the case where δ≥β, officer's expected utility will become:

$$V_2 = \omega + (\frac{z(1-\lambda)}{z(1-\lambda)+\delta\lambda})\left(1-\frac{\beta}{z}\right)\beta - (\frac{\delta\lambda}{z(1-\lambda)+\delta\lambda})\alpha[\omega + F] - \gamma(\delta)$$

First term of the payoff function shows that with probability z(1-λ) /[z(1-λ) +δ λ] officer comes across with a standard type client and with probability (1-β/z) this client values the service more than the amount of the bribe wanted (which is the integral of the area between β and z in the uniform distribution of σz defined above). Amount of wage officer gets is represented by ω as explained before. With P(W│R)=δλ/[z(1-λ)+δλ] probability, officer encounters with a whistleblower client and a complaint is placed. If a complaint is placed, officer gets penalty with probability α, and he is fired (so loses his wage). He also pays a fine of amount F.

Officer maximizes V_2 using β

$$\frac{\partial V}{\partial \beta} = P(S│R)\ (1-\frac{2\beta}{z})$$

$$\frac{\partial V}{\partial \beta} = 0 \Rightarrow \beta^* = \frac{z}{2}$$

Then we check second order conditions to be sure about that β* is indeed the maximum point:

$$\frac{\partial V}{\partial \beta \partial \beta} = P(S│R)\frac{-2}{z} < 0$$

Optimum level of bribe demanded increases as the client's maximum valuation of the service increases. Amount of bribe demanded does not depend on the proportion of whistleblower and standard type clients or fines, etc.

Increasing red tape, (in addition to its direct cost $\gamma(\delta)$), is costly for the officer due to the fact that it increases posterior probability of encountering with whistleblower clients, since more whistleblower clients would reject red tape as red tape gets higher and thus, risk of demanding bribe from a whistleblower client increases. On the other hand, when red tape is below β, bribe demanded, standard type clients would never pay bribe. It is assumed before that, when $\beta=\delta$, client will prefer paying bribe. Therefore, to induce clients to pay the bribe, setting $\delta=\beta$ is the strategy of the officer at the second stage. Officer does not set level of red tape any higher than the bribe demanded since increasing red tape is costly.

Knowing that he will determine β as $z/2$ at the fourth period, officer chooses the optimum level of red tape δ^* as $\delta^*=z/2$ at the second stage. Officer's expected utility function at the optimal points of bribe β^* and δ^* takes the value:

$$V^* = (\frac{z(1-\lambda)}{z(1-\lambda)+\delta*\lambda})\frac{z}{4}+\omega - (\frac{\delta*\lambda}{z(1-\lambda)+\delta*\lambda})\alpha[\omega+F]-\gamma(\delta^*)$$

$$V^* = \frac{(1-\lambda)}{(2-\lambda)}\frac{z}{2}+\omega-\frac{\lambda}{2-\lambda}\alpha[\omega+F]-\gamma(\frac{z}{2})$$

For the officer to have incentive to take bribe, utility at the optimal bribe value of V^* must be greater than wage, which is the utility officer gets if he decides not to demand bribe (so, does not apply red tape neither). Thus:

$$V^* > \omega^* \qquad \Rightarrow \qquad P(S\,|R)\,\frac{z}{4} > P(W\,|R)\,\alpha\,[\omega + F]+\gamma(\delta^*)$$

is the participation constraint which determines the bribe taking/not taking decision of the officer. If this condition does not hold officer does not demand bribe. If this condition holds, officer decides to get bribe and demands his optimum bribe $\beta^*=z/2$ and applies the optimum amount of red tape δ^*, equal to β^*. Otherwise he does not demand bribe and does not apply red tape either, since officer expects no gains (on the contrary incurs costs) from increasing the red tape. Lower posterior probability of facing with standard type clients, lower valuations of the clients the service, higher posterior probability of facing with whistleblower type clients, higher wages, higher fines, higher probability of getting penalty when caught and higher costs of increasing red tape decrease the probability of participation constraint to hold; that is, corrupt transaction is less likely to occur.

In response to the strategy of the officer, standard type clients whose valuation exceeds the amount of bribe $((\sigma z - z/2)>0)$ prefers paying the bribe. Others withdraw. Whistleblower clients prefer going through red tape as long as their valuation exceed amount of red tape, that is, $(\sigma z - z/2)>0$, otherwise reject red tape and withdraw. If bribe is demanded from them, they complain to the law enforcement authority.

Payoff levels of the players from playing their equilibrium strategies are (if participation constraints hold):

$U_w= \sigma z - z/2$

$U_s= \sigma z - z/2$

$$V^* = \frac{(1-\lambda)}{(2-\lambda)}\frac{z}{2} + \omega - \frac{\lambda}{2-\lambda}\alpha[\omega + F] - \gamma(\frac{z}{2})$$

If the participation constraint does not hold, officer does not demand bribe. $\beta = 0$, so δ is zero also. In such a case, utility levels the players get are: $U_w^{\sigma} = U_s^{\sigma} = \sigma z$ and $V = \omega$.

4.1.1.2. The Case With Intermediary:

When there is the possibility of using intermediary, structure of the game changes much. If the officer uses intermediary, he never demands bribe directly from the clients, so does not face the risk of demanding bribe from the whistleblower clients. Standard type clients have the alternatives of whether to go through red tape, withdraw or go to intermediary and pay bribe plus the commission of the intermediary. They never try to give bribe directly because they know that when the intermediary sector is established for a public service, officers do not bother to get the risk of dealing directly with the clients, types and characteristics of whom are not precisely known. Even if a client do not know the system working through intermediaries, he can not pay bribe directly since he face with no bribe demand. Red tape and acceptance or rejection of red tape are no longer used to give and take signals. Officers use red tape only to induce standard type clients to go to the intermediary instead of going through red tape.

Intermediary plays at the second period, in cooperation with the public officer and determines the amount of commission (x) he will get. Strategy space of the intermediary is defined as: $S_I = [0, z)$.

As before, at the first stage, nature plays and determines the valuation and attitude types of clients. At the second stage, intermediary and public officer jointly determine the amount of bribe and amount of commission such that one price will be said to the clients who apply to the intermediary. Officer and intermediary share the proceeds according to a pre-determined sharing rule. At the third stage public officer determines amount of red tape. At the fourth stage, clients observe the level of red tape and price of the intermediary and standard type clients decide on whether to go through red tape, go to intermediary or withdraw from their demand and whistleblower clients decide on whether to go through red tape or withdraw (they never go to intermediary due to their type).

Strategy space of the officer becomes $S_{PO}=[0,z) \times \{f: [0,z) \rightarrow [0,z)\}$. Strategy space of the intermediary is: $S_I=[0,z)$

Strategy space of the whistleblower type clients become: $S_W=[f:[0,z)\rightarrow \{GRT,W\}]$. Here GRT is action of going through red tape and W is withdrawing from the demand. Utility function of the whistleblower type client becomes:

$$U_w{}^\sigma(\delta, s_w) = \begin{bmatrix} \sigma z - \delta & \text{if} & s_w(\delta) = GRT \\ 0 & \text{if} & s_w(\delta) = W \end{bmatrix}$$

Whistleblower type client by her nature, has not the option of going to the intermediary and bribing. She goes through red tape if the level of red tape does not exceed her valuation, otherwise she withdraws from her demand.

Strategy space of the standard type clients become: $S_S=[f:[0,z)\times[0,z)\rightarrow \{GRT,W,GI\}]$ (where GI is the action of going to intermediary. Utility function of standard type is (where b is the amount of bribe demanded by the officer through intermediaries, x is the commission of intermediary):

$$U_S{}^\sigma(b,\delta,x,s_s) = \begin{bmatrix} \sigma z - \delta & \text{if} & s_s(b,\delta) = GRT \\ \sigma z - (b+x) & \text{if} & s_s(b,\delta) = GI \\ 0 & \text{if} & s_s(b,\delta) = W \end{bmatrix}$$

According to changing actions of the players, utility function of the officer (if he decides to obtain bribe through intermediary) becomes:

$$V(\delta,b,s_s) = \begin{bmatrix} \omega - \gamma(\delta) & \text{if} & s_s(b,\delta) = GRT & or & s_s(b,\delta) = W \\ \omega - \gamma(\delta)+(1-\lambda)b & \text{if} & s_s(b,\delta) = GI \end{bmatrix}$$

If the officer decided not to try to obtain bribe, obviously he gets only his wage, ω, and does not apply any red tape.

Intermediary plays in cooperation with the public officer and determines his share from total amount demanded from the client. Payoff function of the intermediary is defined as:

$$\Pi = (1-(b+x)/z)P(I)x$$

where $(1-(b+x)/z)$ $P(I)$ is the multiplication of the proportions of clients who have valuations above the total price of bribe and commission and the proportion who decide to use intermediary.

Now Perfect Bayesian Equilibrium of the game will be tried to be found.

Standard type client prefers not to withdraw as long as at least one of the other options gives positive utility. If $\delta \geq (b+x)$ she does not go through red tape, she prefers to go to the intermediary and pays the bribe plus commission (as long as $\sigma z - (b+x) > 0$ also holds). If $\delta < (b+x)$, no standard type client prefers going to the intermediary, so, officer can not obtain any money. Thus, $\delta < (b+x)$ is a dominated strategy for the officer. If $\delta \geq (b+x)$, all standard type clients, $((1-\lambda)$ proportion of the total) prefer using the intermediary As in the case without intermediary, when $\delta = (b+x)$, standard type client prefers to pay bribe.

Officer and intermediary, taking into the strategies of the clients and probability distribution of the types into consideration, try to maximize joint payoff. Then, they put the sharing rule according to their bargaining powers (representing $T=(b+x)$):

Max $\Pi=(1-T/z)(1-\lambda)T$

Optimum amount to be demanded from the clients becomes:

$T^*=z/2$

After determining amount to be demanded from the clients as such, officer determines amount of red tape taking into consideration that standard type clients would not go to intermediary if $\delta<(b+x)$. Thus he sets optimum level of red tape as $\delta^*=(b+x)$. Participation constraint of the officer (for whether demanding bribe through intermediaries or not)can be represented as such:

$\omega+(1-\lambda)b^*-\gamma(\delta^*)>\omega$ $\Rightarrow$ $(1-\lambda)b^*>\gamma(\delta^*)$

For the officer to demand bribe through intermediaries, utility of doing so must be greater than wage of the officer, which is the utility he gets if he does not engage in corrupt activities. If the constraint does not hold, he does not make an agreement with the intermediary and does not engage in corrupt transactions. This constraint can also be interpreted as, if officer incurs high costs from increasing red tape, his bargaining power for getting share b from the total amount obtained from the client, T, increases. Intermediary participates as long as his share is positive, x>0.

Thus, in Perfect Bayesian Equilibrium, standard type client always prefers to apply to the intermediary and officer sets red tape high enough to induce standard clients to do so. Standard type clients pays $(b+x)=z/2$ to the intermediary as long as $\sigma z-z/2>0$, otherwise withdraw. Officer and intermediary share total amount obtained, T, with share b and x respectively, amount of which is determined according to the bargaining power of each (after officer is compensated for the costs he incurs from

increasing red tape). Whistleblower clients go through red tape as long as $\sigma z - \delta^* = \sigma z - z/2 > 0$, they withdraw otherwise. They never face with a bribe demand.

In the case with intermediaries, getting bribe becomes completely riskless for the officers. So, their utility increase. Remember that equilibrium utility levels of the players in the first case (the case without intermediaries) was:

$U_w = \sigma z - z/2$

$U_s = \sigma z - z/2$

$$V^* = \frac{(1-\lambda)}{(2-\lambda)} \frac{z}{2} + \omega - \frac{\lambda}{2-\lambda} \alpha[\omega + F] - \gamma(\frac{z}{2})$$

In the case with intermediaries, utilities of the clients remain the same, utility of the officer increases.

At equilibrium, utility of the officer in the case with intermediaries is:

$V = \omega + (1-\lambda)b^* - \gamma(\delta^*)$

This utility level is higher than that of the first case, as long as officer's share from the total amount gathered from the clients is not too low. This also enters into the bargaining process of the officer with the intermediary. Officer does not accept a share of T, such that he will get lower utility in comparison to the case where intermediary is not used. Hence, for the public officer prefer getting bribe through intermediary, the share of public officer must be higher than:

$$b > \frac{z}{(2-\lambda)2} - \frac{\lambda}{(2-\lambda)(1-\lambda)} \alpha[\omega + F]$$

Share of the public officer increases with increased valuations of the clients decrease with increased proportion of whistleblower clients. Share of the public officer decreases also with increased costs of being caught up, i.e, ω, F and α.

4.1.2. Results

The model aims to examine the factors leading to the establishment of intermediaries sector and to figure out how they facilitate corrupt transactions. The most significant result of the model is that, existence of intermediaries can decrease the corrupt officers' probability of being caught down to zero. Existence of such a "big service" makes demanding bribe nearly "always profitable" from the viewpoint of officers.

In the case where there is no intermediary, in some situations, risks involved may be so large that, officer may prefer not demanding bribe. High wages, big penalties, big probability of getting penalty when caught taking bribe or high ratio of whistleblower type clients in comparison to standard type clients may cause the participation constraint not to hold. Thus, a benefit maximizing officer, not necessarily due to his honesty, but since bribe taking is not profitable, may prefer processing the applications without demanding bribe.

On the other hand, in the cases with intermediary, detection risk is reduced down to zero so taking bribe becomes nearly always more profitable for the officer (as long as cost of increasing red tape is not very high). In such a situation, high wages, high penalties, high proportion of whistleblower clients etc. can not stop the officers from demanding bribe. Such changes in these parameters can only increase share of intermediary from the payments made by the client, thus encourage establihment of intermediaries sector.

Another important point is that the model shows that intermediaries give the biggest "service" to the officers. Clients do not get benefit from the existence of intermediaries, their utility do not increase. Officer and the intermediary get the whole benefits. Clients are always worse off than in the case where there is no corruption and so they get the service without paying any bribe and without incurring red tape costs.

Public officer demands bribe using the threat of increasing red tape and clients give bribe directly or through intermediary to avoid the cost of dealing with red tape. Therefore, discretion of the officers to increase red tape, vague rules, procedures, regulations lead to a fertile environment for corrupt transactions occur and intermediaries sector to be established.

4.2. A Briber Initiated Corrupt Transaction

4.2.1. The Model

In this model, a briber initiated corrupt transaction is examined. Client wants to get a service valuable for him/her from the public office. (S)he thinks of offering bribe to get rid of red tape, however, she hesitates due to the possibility of offering bribe to an honest public officer and getting penalty. Client also hesitates due to the possibility of offering an amount of bribe lower than the reservation price of the corrupt officer and thus being rejected. Intermediary, knowing which officers are corrupt and reservation prices of the corrupt officers, decreases the risk of offering bribe.

In the model, there are three players: public officer, intermediary and client. Clients want to get a service valuable for them from the public officer. The value client attaches to the service is represented by the parameter z. Here, z is known to the client and to the intermediary, but, unknown to the public officer. Public officer can be honest or corrupt type; which is also chosen by the nature at the beginning of the period, with known probabilities. Public officer can choose amount of red tape, either high or low. Officers never initiate corrupt transactions (perhaps due to their risk aversity or high- being-catched-up probability); however, corrupt officers can signal that they can accept bribe; by applying high red tape. Corrupt officers have reservation prices, they reject bribe offers below a threshold level.

Type of public officers are chosen by the nature at the beginning of the game and it is known that a public officer can be honest with probability h and corrupt with probability (l – h). Public officers choose amount of red tape which can be either high (δ^H) or low (δ^L). We assume that δ^H is the maximum level of red tape officer can apply without catching attention of the superiors, law enforcement agencies etc. So, we assume that there is no cost to the corrupt officer from applying δ^H instead of δ^L. For calculational simplicity, we will set low level of red tape (δ^L) to zero. Corrupt officers apply high red tape to give the signal to the client that his type is corrupt. High level of red tape also induces clients to search for ways other than just going through red tape and getting the service. It is known that "a" percent of the honest officers are fastidious and slow moving, so, always apply high red tape (δ^H), even though they have no bribe collecting purpose. Client does not know which officers are honest/corrupt and/or slow moving but know proportion of such officers. Public officers know their own types. Therefore, strategy space of the public officers can be defined as: $S_p^{C,R} = \{\delta^H, \delta^L\}$ and $S_p^{H} = \{\delta^H, \delta^L\}$ for the corrupt and honest officers, respectively. Corrupt officers also have reservation prices (represented by R) below which they reject bribe, which is selected by nature from the known uniform distribution between [0, T], i.e. R~UN [0,T]. Corrupt officers know their reservation prices exactly, however, clients know only distribution of the types. Every corrupt officer have different "price", some are satisfied by low bribes, some are not. No matter how much the officer is unethical, getting bribe is undesirable and has at least some psychological costs, amount of which changes from person to person.

Intermediary has long term relationships with the officers and clients. She can observe the types of the officers (honesty/corruptness and reservation price of the corrupt ones) and the amount of red tape. She determines the amount of commission (x) to demand from the clients by making bargaining with the clients after client sees the level of red tape demanded by the officer.

Clients attach amount of z valuation to the service, magnitude of which is unknown to the officer but known to the client and intermediary.

We will examine the two different cases with and without intermediaries and then compare the results of the two.

4.2.1.1. The Case Without Intermediary

The game we define is a Bayesian Game. At the beginning of the game, nature selects corrupt/honest status of the officers and reservation prices of the corrupt ones. Nature also selects whether the honest officer is fastidious and slow moving or not. Public officer, plays at the first stage observing his types and decides on whether to apply high level of red tape or low level of red tape. Client, observing the level of red tape choice of the officer, but not knowing whether he is faced with an honest or corrupt officer (not knowing reservation price of the corrupt officers, neither), decides whether to offer bribe or not. Clients have valuation of the service "z", which is unknown to the officer. If client decides to offer bribe, she also determines amount of it. If the client decides to offer bribe, the officer turns out to be a corrupt one and offered bribe exceed reservation price of the corrupt officer, officer gets the bribe and client gets the service by paying the bribe (without incurring the red tape costs). If the client decides to offer bribe and the officer turns out to be an honest one, client is complained to the law enforcement authority or faces with some other unfavorable treatment and gets a disutility of amount (–F). The parameter (-F) is not necessarily a punishment, imprisonment etc. faced by the client after an investigation opened due to the complaint of the officer. It may be any perceived cost of offering bribe to an honest officer and naturally getting her negative reaction (anger, complaint to a superior or law enforcement authorities, ruined image of the client etc.). If the client offers bribe and although the officer turns out to be corrupt, if the bribe is below reservation price of the corrupt officer, client's bribe offer is rejected and she has to go through red tape. If the client does not offer bribe, he can go through red tape and get the service by incurring the red tape cost. (Game tree is given at appendix B)

Strategy space of the clients can be represented as: $S_{cl} = [f:\{\delta^H, \delta^L\} \rightarrow \{O, DO\}]$. Where O represents offering bribe directly to the officer (and also determining amount of the bribe to be offered) and DO represents not offering bribe and going through red tape.

Expected utility function of the corrupt public officer can be defined as (where s_{cl} is an element of the strategy space of the client, S_{cl}, and β is the amount of bribe offered by the client):

$$
U_{PO}^{CR}(\beta, s_{cl}, \delta) = \begin{bmatrix} \beta & if \quad \delta = \delta^H \quad and \quad s_{cl} = O \quad and \quad if \quad \beta > R \\ 0 & if \quad \delta = \delta^H \quad and \quad s_{cl} = O \quad and \quad if \quad \beta < R \\ 0 & if \quad \delta = \delta^H \quad and \quad s_{cl} = DO \\ 0 & if \quad \delta = \delta^L \end{bmatrix}
$$

Assume here is that, low red tape level δ^L is effectively zero, so, if faced with it, no client takes the risk of offering bribe to the officer; she just goes through the low level of red tape.

Utility function of the honest public officer can be defined as:

$$
U_{PO}^{HN}(\delta) = \begin{bmatrix} 0 & if \quad \delta = \delta^H \\ 0 & if \quad \delta = \delta_L \end{bmatrix}
$$

Honest officers, due to their type, reject every offer of bribe so do not have any expectations from applying high red tape. Therefore, due to minimum public spirit assumption they do not apply high level of red tape, δ^H, except for the ones who are fastidious and slow moving ("a" is the proportion of the honest officers, who apply δ^H all the time). In other words, (1-a) proportion of the honest officers always apply low level of red tape, and "a" proportion of the honest officers always apply high level of red tape. Since all behavior of honest officers are assumed, they are not genuine players; however, since clients can not differentiate between honest and corrupt officers, they perceive both types as players.

Expected utility function of the clients are defined as:

$$U_{CL}(\beta,\delta,s_{cl})=\begin{bmatrix} P(CR|\delta^H)(z-\beta).\dfrac{\beta}{T}+P(HN|\delta^H)(-F)+ & & \\[4pt] P(CR|\delta^H).\dfrac{(T-\beta)}{T}(z-\delta^H) & if \quad \delta=\delta^H \quad and \quad s_{cl}=O \\[6pt] z-\delta^H & if \quad \delta=\delta^H \quad and \quad s_{cl}=DO \\[6pt] z-\delta^L & if \quad \delta=\delta^L \qquad\quad s_{cl}=DO \end{bmatrix}$$

where β is the amount of bribe offered by the client to the officer and β/T is the probability that offered bribe is greater than the reservation price of the officer. Correspondingly $(T-\beta)/T$ is the probability that bribe offered is less than the reservation price of the corrupt officer (since, reservation price, is uniformly distributed, R~UN [0,T]). We assume that $(z-\delta^H) >0$.

Perfect Bayesian Equilibrium of the game will be tried to be found so I begin to solve the problem from the last stage; decision making problem of the clients.

It is assumed before that low level of red tape is zero and when they are applied low level of red tape, clients do not attempt to offer bribe. When they are applied high red tape on the other hand, clients offer bribe as long as doing so gives higher utility than not offering bribe and going through red tape:

$$P(CR|\ \delta^H).(z-\beta).\frac{\beta}{T}+P(HN|\ \delta^H)(-F)+P(CR|\ \delta^H)\frac{(T-\beta)}{T}(z-\delta^H)>z-\delta^H$$

is the participation constraint of the client for offering bribe. Client knows that prior probabilities that the officer he applied is honest equals to (h) and the probability that the officer is corrupt equals to (1− h). However, client updates his beliefs according to the strategy of the officer he observed. He makes forward induction and try to deduce information about the officer's type, from the observation that public officer applies high red tape. He knows that honest public officers do not apply high red tape except for the ones that are fastidious and slow moving ("a" proportion of the honest officers apply δ^H all the time).

On the other hand, corrupt officers would always prefer applying high red tape since δ^L is a weakly dominated strategy for the public officer, since: $\beta \geq 0$ always holds. The corrupt officer has the probability of being offered some bribe (which can exceed his reservation price) if he applied high red tape, but he has no such chance if he applied low red tape so he always apply high red tape.

Taking all of these information into consideration, client calculates his posterior beliefs that the officer he faces is corrupt, given that he applies high red tape:

$$P(CR|\delta^H) = \frac{P(\delta^H|CR)P(CR)}{P(\delta^H|CR)P(CR) + P(\delta^H|HN)P(HN)} = \frac{(1-h)}{(1-h) + a \cdot h}$$

$$P(HN|\delta^H) = 1 - P(CR|\delta^H) = 1 - \left(\frac{1-h}{(1-h) + a \cdot h}\right) = \frac{ah}{(1-h) + a \cdot h}$$

correspondingly.

Client's participation constraint (for offering bribe instead of going through red tape)becomes:

$$\frac{1-h}{(1-h) + a \cdot h}(z - \beta).\frac{\beta}{T} + \frac{ah}{(1-h) + a \cdot h}(-F) + \frac{(1-h)}{(1-h) + a \cdot h} \cdot \frac{T - \beta}{T}(z - \delta^H) > z - \delta^H$$

For calculational simplicity I call $C = \dfrac{1-h}{(1-h) + a \cdot h}$ and $(1-C) = \dfrac{ah}{(1-h) + a \cdot h}$,

posterior probabilities of observing corrupt and honest officers respectively.

If participation constraint holds, client tries to maximize her expected utility form offering bribe, using β:

$$\underset{\beta}{Max} \quad C(z - \beta).\frac{\beta}{T} + (1-C).(-F) + C\left(\frac{T - \beta}{T}\right)(z - \delta^H)$$

Solving the maximization problem, β is obtained as:

$$\beta^* = \frac{\delta^H}{2}$$

Amount of bribe, β, offered by the clients to the officer increases as amount of maximum red tape applied by the officers rises. (As long as participation constraint holds). One interesting result here is that amount of bribe offered is independent of the level of reservation price of the corrupt officer. Amount of bribe does not depend on expected proportions of honest and corrupt clients, amount of fines and valuation of clients, neither.

If participation constraint holds and the client offers bribe, β*; his expected utility is:

$$\frac{(\delta^H)^2 C}{4T} + CF - F + C(z - \delta^H).$$ Corrupt public officers' expected utility is: $\left(\dfrac{\delta^H}{2}\right)$ as long

as β>R and zero as long as β<R. This means that expected utility of the officer increases as the maximum level of red tape he can apply increase. As expected posterior probability of facing with corrupt officers, C increases, utility level of the clients increase, on the other hand, as maximum reservation prices of the officer and maximum level of red tape officers can apply increase, utility of the clients decreases. Fine increases also decreases utility of the clients as expected. If participation constraint does not hold, client does not offer bribe and gets the service by incurring the red tape costs. So, get utility of z-δ^H. In such a case, corrupt officers can not obtain any bribe and gets zero utility.

Participation constraint of the clients can be expressed as:

$$\frac{(\delta^H)^2 C}{4T} + (1-C)\delta^H > (1-C)(z+F).$$

Participation constraint suggests that increasing fines, F, decreases incidences of corruption, however, if posterior probability of facing with a corrupt officer, C, is high, effect of increasing fines

is very low, at the extreme, as C approaches to one, increasing fines becomes totally ineffective in preventing bribe offers.

As valuation clients attach to the service, z, increase, incidences of corruption decrease. Also, increasing reservation prices of the officers decreases cases of corruption. As expected, increase in the maximum red tape level, δ^H, increases incidences of corrupt transactions.

4.2.1.2. The Case With Intermediary:

When the intermediary enters into the picture, structure of the game changes. The intermediary knows the honesty/corruptness status of public officers in the public office to whom the client applied and if the officer is corrupt intermediary knows also reservation price of him. Thus, by applying to the intermediary, the client avoids the risk of offering bribe to an honest officer and risk of offering to a corrupt officer an amount of bribe lower than his reservation price.

Again, at the beginning of the first stage nature plays and determines the types of officers. At the second stage, officer plays and decides on the level of red tape. At the third stage, the intermediary plays and in interaction with the client determines his level of commission (represented by x). At the fourth stage, the client decides whether to offer bribe, not to offer bribe or to go to intermediary. The client can offer bribe directly if she decides to bear risks of encountering with an honest official and risk of offering bribe lower than the reservation price of the corrupt officer. If she decides not to offer bribe, she can go through red tape and gets the service by incurring red tape costs. If she uses the intermediary, risks are reduced down to zero and she shares her increasing utility with the intermediary according to her bargaining power. The intermediary pays the corrupt officers reservation prices of them. He can not make any payment to the honest officers so the client has to bear red tape costs if the officer turns out to be honest (even if the client uses intermediary).

Strategy space of the clients can be represented as: $S_{cl} = [f:\{\delta^H, \delta^L\} \rightarrow \{O, DO, GI\}]$. Where O represents offering bribe directly to the officer (and also determining amount of the bribe to be

offered), GI represents going to the intermediary and DO represents not offering bribe and going through red tape. Strategy space of the intermediary can be defined as $S_I = [0,z)$.

Hence, the client's expected utility function becomes:

$$U_{CL}(\beta,\delta,s_{cl},x) = \begin{bmatrix} P(CR\mid \delta^H)(z-\beta).\dfrac{\beta}{T} + P(HN\mid \delta^H)(-F) + & & \\ P(CR\mid \delta^H).\dfrac{(T-\beta)}{T}(z-\delta^H) & if \quad \delta=\delta^H \quad and \quad s_{cl}=O \\ z-((1-C)\delta^H+x) & if \quad \delta=\delta^H \quad and \quad s_{cl}=GI \\ z-\delta^H & if \quad \delta=\delta^H \quad and \quad s_{cl}=DO \\ z-\delta^L & if \quad \delta=\delta^L \end{bmatrix}$$

where $(1-C)\delta^H$ represents expected probability of facing with an honest officer, $(1-C)$, multiplied by the red tape cost, δ^H (since if faced with honest officer, clients have to bear the high level of red tape even though they use intermediary). Again, low level of red tape is assumed to be equal to zero so clients, when faced with low level of red tape, neither go to intermediary, nor offer bribe directly to the officer; they just get the service by going through the procedures. Here, x is the amount of commission the intermediary demands. Honest public officer's utility function is as before:

$$U_{PO}^{HN}(\delta) = \begin{bmatrix} 0 & if & \delta=\delta^H \\ 0 & if & \delta=\delta^L \end{bmatrix}$$

Corrupt public officer's utility function becomes:

$$U_{PO}^{CL}(\beta,\delta,s_{cl},R) = \begin{bmatrix} \beta & if & \delta = \delta^H & and & s_{cl} = O & and & if & \beta > R \\ \\ 0 & if & \delta = \delta^H & and & s_{cl} = O & and & if & \beta < R \\ \\ 0 & if & \delta = \delta^H & and & s_{cl} = DO \\ R & if & \delta = \delta^H & and & s_{cl} = GI \\ 0 & if & \delta = \delta^L \end{bmatrix}$$

When client applies to the intermediary and if the officer turns out to be corrupt, the intermediary pays reservation price of the officer.

Expected utility function of the intermediary is:

$$x - (\frac{CT}{2}),$$

where CT/2 is the multiplication of posterior probability of facing with a corrupt officer and expected payments to be made to the corrupt officers as reservation prices.

The game will be solved using Perfect Bayesian Equilibrium concept so I begin to solve the game from the last stage; clients prefer to go to intermediary as long as:

$$P(CR|\ \delta^H).(z - \beta)\frac{\beta}{T} + P(HN|\ \delta^H)(-F) + P(CR|\ \delta^H).\frac{(T-\beta)}{T}.(z - \delta^H) < z - ((1-C)\delta^H + x)$$

and $z - ((1-C)\delta^H + x) > z - \delta^H$

Clients calculate posterior probabilities of a public officer being corrupt given that he applies high level of red tape. Honest public officers do not apply high red tape except the ones who are fastidious and slow moving ("a" proportion of them). Corrupt public officers always apply high red tape since both: $\beta \geq 0$ and $R \geq 0$ so δ^L is a weakly dominated strategy for the corrupt public officers.

Therefore, $P(CR|\delta^H)$ is calculated as before:

$$P\big(CR\big|\delta^H\big) = \frac{P(\delta^H|CR)P(CR)}{P(\delta^H|CR)P(CR) + P(\delta^H|HN)P(HN)} = \frac{(1-h)}{(1-h) + a \cdot h}$$

$$P\big(HN\big|\,\delta^H\big) = 1 - P\big(CR\big|\delta^H\big) = \frac{ah}{1-h+a\,h}$$

Representing $P(CR|\delta^H) = C$ as before, first participation constraint of going to intermediary can be represented as:

$$C(z-\beta) \cdot \frac{\beta}{T} + (1-C) \cdot (-F) + C\left(\frac{T-\beta}{T}\right)(z-\delta^H) < z - ((1-C)\delta^H + x)$$

If, participation constraint does not hold, client determines β^* as before and offers bribe directly to the officer.

Putting $\beta^* = \dfrac{\delta^H}{2}$ in its place, the first participation constraint of going to intermediary instead of offering bribe directly becomes:

$$\frac{(\delta^H)^2 C}{4T} + C(z-\delta^H) - F + CF < z - ((1-C)\delta^H + x).$$

Second participation constraint says that if $z - ((1-C)\delta^H + x) < z - \delta^H$, client would prefer going through red tape and intermediary would not get any client.

Client and intermediary, knowing the parameters of each other, share the gain (from going to intermediary instead of offering bribe directly to the officer), according to their bargaining powers. Thus, for the two participation constraint to hold, commission intermediary gets must be smaller than:

$$x < (1-C)z + (2C-1)\delta^H - \frac{(\delta^H)^2 C}{4T} + (1-C)F \text{ and}$$

$$x < C\delta^H$$

As fines increase, expected utility of the intermediary increase, so, increasing fines may work in the direction of the encouraging establishment of the intermediaries sector. Also increasing maximum level of red tape increases commissions of the intermediaries and so plays a role in the establishment of intermediaries sector.

As long as $x - \frac{CT}{2} > 0$, an intermediary sector is established. If so, basic participation constraint for corruption to occur (through intermediation) becomes:

$$z - (\frac{CT}{2} + (1-C)\delta^H) > z - \delta^H \text{...(1)}$$

instead of the constraint we defined in the case without intermediary:

$$\frac{(\delta^H)^2 C}{4T} + CF - F + C(z - \delta^H) > z - \delta^H \text{...(2)}$$

we know that, RHS of equation (1) is higher than the RHS of equation (2) if intermediary sector has been established. So, existence of intermediaries makes corruption more likely, increases incidences of corruption by causing otherwise impossible corrupt transactions to occur.

Equation (1) can be summarized as:

$$\delta^H > \frac{T}{2} \text{...(3)}$$

Therefore, if δ^H is above the level given in equation (3), corruption through intermediaries occurs. Increasing penalties, F, has no role in preventing corruption instead, it can only increase intermediary usage. Increasing level of maximum reservation prices, T, can prevent corruption, since in both without and with intermediary cases, it decreases the probability of corrupt transactions to occur. Apparently, decreasing the level of high red tape, δ^H also can prevent corruption by decreasing both the probability of using intermediaries and offering bribe directly to the officers. Increasing C, posterior probability of facing with corrupt clients, decreases cases of intermediary usage, by increasing clients' probability of offering bribe to the officers directly.

4.2.2. Results

The model tries to analyze a briber initiated corrupt transaction by examining the two cases with and without intermediaries and then by comparing them. When utility comparisons of the cases with intermediary and without intermediary are done, we see that, corrupt officers, if could apply high enough red tape level δ^H, always get their reservation price in the case with intermediaries. This may be higher or lower than the bribe they get in the case of direct offer. If the maximum level of red tape officer can apply without incurring costs are high enough, officer gets more utility from direct bribe offers than offers through intermediaries.

Clients are better of in the case with intermediary, in comparison to the case without intermediary if they face with high level of red tape. However, a client is always worse off than in the first best case where red tape is at its low level δ^L. If corruption can be prevented, all officers (except for the slow moving honest officers) would apply low red tape so client's utility increases.

Participation constraint also suggests that, existence of intermediary can increase incidences of corruption by putting another alternative (better than going through red tape) in front of clients who do not find offering bribe profitable. Thus existence of intermediaries increases incidences of corruption.

Increasing fines, F, has limited role (especially if the posterior probability of facing with corrupt officers is high) in preventing corrupt transactions in the case without intermediary and in the

case with intermediary increasing F does not decrease incidences of corruption, it only increases intermediary usage. Increasing maximum reservation price of the officer (T) decreases incidences of corruption by decreasing both direct offers and intermediary usage. Increasing posterior probabilities of facing with a dishonest officer (C) increases incidences of corrupt transactions by increasing direct offers and decreasing intermediary usage. On the other hand, decreasing the level of δ^H enough, i.e decreasing the discretion of the officer on increasing red tape can be an effective solution to prevent corruption, since it leads to a fall in both types of corruption cases (with and without intermediary). Such a fight of corruption also requires disciplining slow moving honest officials (to prevent corrupt officers' hiding their exact intentions when they apply high red tape).

4.3. -Spurious- Insider Middleman

4.3.1. The Model

Aim of the model is to describe a type of corruption similar to the one mentioned in Oldenburg (1987), people taking bribe from the jobs officials do, by pretending that they have influence on the acceptance or speed of the service in question. It is a deception process of the people. These spurious middlemen allege that they can mediate the bribing of the officials for the public service to be taken, when in fact they have no such role. Oldenburg (1987) gives anecdotal evidence of such cases in Indian Land Consolidation Program. In this part of the thesis, a very similar case to the one mentioned in Oldenburg (1987) is modeled, with one difference, in Oldenburg, -spurious- middlemen are outside the public office, in this model, they are inside the public office.

There are three players in our model, bribe taking official (BTO), application processing bureaucrat (APB) and client. Client wants to get a public service that is valuable for her. The person in charge of the service is application processing bureaucrat. She is honest and does her job without

demanding bribe. Bribe taking official is at the same office with APB and demands bribe from the clients by pretending that he makes done the service in question. He tries to disseminate the image that, if he does not intervene, APB rejects the demand of client or applies heavy red tape. Client does not know who is APB and whether she takes bribe or not. With her limited information, client tries to decide on whether to apply to BTO or APB for the service. Client may prefer applying to BTO because he finds searching who is exact APB costly and/or because he thinks that even if he finds exact APB, she may not give the service without bribe is paid through intermediation of BTO.

Bribe taking official (BTO) is the person who obtains benefit from the uninformed clients, by pretending that he makes the job done (on which he has no influence in fact). In the bureaucratic hierarchy BTO is at the lower level than the application processing bureaucrat. BTO gets benefit from the bribe he obtained, amount of which depends on how uninformed clients are and how much they value the job that will be done. BTO decides on his strategy by making choice on two issues. First he decides on whether to demand bribe (β) or not and if he decides to demand bribe, he determines amount of it. He also chooses how much cost (C) to incur to disseminate the image that he influences the application processing bureaucrat and makes the service in question done. These costs decrease the utility of BTO but ensures more clients apply to him for the job. Strategy space of BTO is defined as : $S_{BTO}=R_+ \times R_+$

Application processing bureaucrats are the people who are responsible from the public service given. APB is honest and gives the service in question without applying red tape or taking bribe; she is disturbed with the image that the job she does is done under the influence of someone. She cares about her image so gets disutility from the clients' application to the BTO with the mistaken belief that if they apply directly they will face heavy red tape. Application processing bureaucrat does not have the possibility to directly observe or detect the secret deals corrupt official and client do. However, she hears gossips about what corrupt official does. She tries to prevent such secret deals. For this purpose, she chooses the effort level (K) to inform the prospective clients that she and other APBs are honest and processes applications without taking bribe. Strategy space of APB is defined as: $S_{APB}= R_+$. APB plays in simultaneity with BTO.

The game is a Bayesian game composed of three stages. At the first stage nature plays and draws the valuation type of client. At the second stage, BTO determines amount of bribe to demand, β, and amount of costs to build up the image that he makes the service done, C, and APB determines K (costs to incur for informing the clients that she is honest) simultaneously. Since neither APB can observe the costs BTO incur, nor BTO can observe the results of the decisions of APB, we solve the game as if BTO and APB decide on their parameters simultaneously. BTO and APB do not know the types of clients but know the probability distribution of types. In the third stage, observing the outcome of first two stages, client constructs his belief about α, that is, subjective probability (perceived by clients) that the APB turns out to be corrupt and the client decides on whether to apply directly to APB or to apply to BTO and pay bribe.

Client is a member of the public who values the service that application processing bureaucrat gives. He has type according to the value he gives to the service. Type of him is a random draw from the uniform distribution UN[0,1], represented by σ. Clients of type, σ have the valuation σZ for the service, where Z is the valuation parameter of most eager client, that is, valuation of the client of type σ=1.

Client gets disutility from the bribe he pays and also gets disutility from the effort needed to learn about who is the exact APB and whether she gives the service without demanding bribe. Two actions are available for him: search for who is APB and apply directly to APB (represented as A-APB), or apply to BTO (represented as A-BTO) and pay bribe. His strategy space is: $Sc=[f:[0,\infty)x[0,\infty)x[0,\infty)\rightarrow\{$ A-APB, A-BTO $\}]$.

Expected payoff function of the client is defined as (where α is the perceived probability of client's encountering with an APB who is corrupt and who does not process the application unless bribed, δ is the cost of searching about who is in duty for the job in question and s_c is an element of the strategy space of the client):

$$V_{CL}{}^{\sigma}(C, K, \beta, Sc) = \begin{cases} (1 - \alpha(C, K))\sigma Z + \alpha(C, K).0 - \delta & \text{if} & s_c = A - APB \\ \sigma z - \beta & \text{if} & s_c = A - BTO \end{cases}$$

Here, α is a function of C and K, efforts of BTO and APB in giving their messages. APB is in the public office, one of the many people in charge of the job. I assume that application is legal and all APBs are honest, the service will be given to the client in all cases. However, client, due to his imperfect information, thinks that, with probability α, APB may be dishonest and if applies directly to APB she could not get the service (or will encounter with such heavy red tape that is equal to the value he attaches to the service). Thus, he may prefer applying to BTO and giving the bribe. Cost of searching about who is in duty for the job in question, (which one of the APBs actually processes the application) is represented by δ. Amount of bribe that BTO demands is represented by β. K is cost of informing clients by the APB and C is cost of disseminating the (false) image that jobs are not done without his intermediation by the BTO. As propaganda of BTO increase, client's belief that he would coincide with a corrupt official increases and as efforts of APB increase, same perceived probability decreases. We define the function α as; $\alpha'(C)>0$, $\alpha''(C)<0$, $\alpha'(K)<0$, $\alpha''(K)>0$. Efforts of both BTO and APB are subject to diminishing returns. As efforts increase, marginal return to these efforts decrease.

If client decides to apply directly to APB, he expects that with (1-α) probability APB is honest and client expects to get the service without paying bribe or incurring red tape costs. On the other hand, with α probability, client expects that the APB is corrupt and she could not get the service or have to incur high red tape

costs so will get zero utility. If client decides to apply directly to APB, he will also incur cost of finding which APB is processing his demand (δ). On the other hand, if client applies to BTO, she expects that he will get the service by paying the bribe BTO demands.

BTO can take bribe if at the third period client decides to apply to BTO rather than APB. So, expected payoff of the BTO can be defined as (where ξ is the independent probability of being caught while taking bribe and F is the amount of penalty BTO gets if he is caught):

$$V_{BTO}(\beta, F, C, s_c) = \begin{cases} (1-\xi)\beta + \xi(-F) - C & \text{if} \quad s_c = A\text{-}BTO \\ -C & \text{if} \quad s_c = A\text{-}APB \end{cases}$$

Thus, if client applies to BTO, BTO expects to get his bribe if he is not caught by law enforcement authorities and expects to get an amount of fine (-F) if caught. In all cases he incurs cost of building up his image (C).

APB gets disutility if in the third period client applies to BTO instead of applying to her for the service, so her expected payoff can be defined as (given that A is the amount of disutility APB gets from client's application to BTO).

$$V_{APB}(K, s_c) = \begin{cases} (1-\xi)(-A) - K & \text{if} \quad s_c = A\text{-}BTO \\ -K & \text{if} \quad s_c = A\text{-}APB \end{cases}$$

If the client applies to BTO and BTO is not caught up, APB gets (-A) amount of disutility due to her ruined image. She incurs cost of informing the clients that she is honest, K, in both cases.

Perfect Bayesian Equilibrum of the game will be calculated. Thus, using backwards induction, I begin to solve the game from the third stage. It is apparent that, client prefers to apply BTO as long as his expected utility from doing so is greater than the expected utility from applying to the APB. Thus, in the third period client applies to BTO as long as: $((1-\alpha(C,K))\sigma Z-\delta) < (\sigma Z-\beta)$.

Knowing this, at the second stage, BTO calculates his expected payoff as below:

$$V_{BTO}(\alpha,\sigma,\beta,F,C,K) = (1-\xi)P[(1-\alpha(C,K))\sigma Z - \delta) < (\sigma z - \beta)]\beta + \xi(-F) - C$$

BTO can take bribe as long as expected utility of clients' direct application to APB is smaller than that of application to BTO. He demands bribe as long as $V_{BTO}>0$ (which is the participation constraint of the BTO). Probability of being caught while demanding bribe (or while disseminating the image that he makes the job done) is represented by ξ. BTO takes probability of being caught as given. If caught, he gets penalty of amount F. The probability of being caught is independent of K and β. Since APB can not directly observe the corrupt transaction, by increasing K, she can not increase the probability of BTO's being caught. She can only disseminate the information that she is honest. Also level of β does not affect the probability of being caught since BTO's ability to keep dealings secret is independent of the amount of bribe taken. Since usually bank accounts vs. are used in payment; even getting big amounts of money usually do not caught attention. Moreover, even when β is excessively high, usually clients think of going to APB directly but do not think of whistleblowing, since at this stage, even they do not know who is processing the application and to how high levels the bribe tie goes in the hierarchy. So they perceive whistleblowing as very risky.

Similarly expected payoff of APB is defined as:

$$V_{APB} = (1-\xi)P[((1-\alpha(C,K))\sigma Z - \delta)) < (\sigma z - \beta)](-A) - K$$

APB takes C and β as given since she is unable to observe what efforts does BTO make to disseminate the image that he gets the job done. She can not observe the amount of bribe exchanged, either. For this reason, we treat APB and BTO as if playing simultaneously.

We will examine the benefit maximization behavior of the agents (Presuming that, ((β-δ)>0) and (β-δ)<αZ). BTO tries to maximize his payoff according to both the bribe he will demand and according to the costs he will incur to spread the image that he gets things done. Maximizing the utility function of BTO with respect to β and C, we get:

$$V_{BTO} = (1-\xi)P\left[\frac{\beta-\delta}{\alpha Z} < \sigma\right]\beta + \xi(-F) - C$$

Since σ is uniformly distributed, V_{BTO} can be written as:

$$V_{BTO} = (1-\xi)(\frac{\alpha Z - \beta + \delta}{\alpha Z})\beta + \xi(-F) - C$$

$$\frac{\partial V_{BTO}}{\partial \beta} = (1-\xi)\left[\frac{-\beta}{\alpha Z} + (\frac{\alpha Z - \beta + \delta}{\alpha Z})\right] = 0$$

$$\alpha Z - 2\beta + \delta = 0 \qquad\qquad \beta^* = \frac{\alpha Z + \delta}{2}$$

Optimum amount of bribe BTO demands increases with the increased valuation of client the service. Amount of bribe also increases as clients attach higher probability to encountering with a corrupt APB. Bribe demanded is again positively related to cost of searching who is exactly processing the application and whether she takes bribe or not.

BTO also tries to maximize his payoff according to the costs he incur to disseminate the image that he gets the job done:

$$\frac{\partial V_{BTO}}{\partial C} = (1-\xi)\beta \frac{(\alpha_C Z)\alpha Z - \alpha_C Z(\alpha Z - \beta + \delta)}{(\alpha Z)2} - 1$$

$$(1-\xi)\beta \frac{(\alpha_C Z\beta - \delta\alpha_C Z)}{(\alpha Z)^2} - 1 = 0$$

Putting the value of β in its place we get:

$$\alpha_C^* = \frac{4(\alpha^2 Z)}{((\alpha Z)^2 - \delta^2)(1-\xi)}$$

BTO incurs costs up to the point where its marginal return on the corruption perception of clients is equal to α_c^*. As ξ increases, α_C^* increases, meaning that, BTO chooses to incur less costs, C decreases, (so the effort of BTO to give the image that "he makes the job done" decreases). As the initial level of α decreases and z increases, α_C^* decreases so C increases.

Therefore, we can say that, increasing probability of being caught up decreases the image building efforts of BTO. On the other hand, as the beliefs of clients about the probability of encountering with a corrupt APB decrease or the valuations of the clients the service increase, BTO increases image building efforts.

If the participation constraint of the BTO

$$V_{BTO}=(1-\xi)P[(1-\alpha(C^*,K))\sigma z-\delta)<(\sigma z-\beta^*))] \beta^*+ \xi(-F)-C^*>0 \quad \text{or}$$

$$V_{BTO} = (1-\xi)(\frac{(\alpha z + \delta)^2}{4\alpha z}) + \xi(-F) - C^* > 0$$

fails, BTO does not find making efforts to obtain bribe profitable, so does not engage in corrupt activities. Participation constraint suggests that, increasing fines (F), increasing costs of building reputation, decreasing effect of these costs on the subjective probability consumers attach to the officer's being corrupt, higher probability of being caught up while taking bribe (ξ), lower search costs (to find who is exact APB) make it more likely that participation constraint of the BTO to fail.

Optimization problem of APB is to maximize V_{ABP} using K:

$$V_{APB} = (1 - \xi)P\left[((1 - \alpha(C,K))\sigma Z - \delta)) < (\sigma z - \beta)\right](-A) - K$$

$$V_{APB} = (1 - \xi)(-A)(\frac{\alpha Z - \beta + \delta}{\alpha Z}) - K$$

$$\frac{\partial V_{APB}}{\partial K} = \frac{(1 - \xi)(-A)\left[(\alpha_K Z)\alpha Z - \alpha_K Z(\alpha Z - \beta + \delta)\right]}{(\alpha Z)^2} - 1 = 0$$

$$(1 - \xi)(-A)\left[\alpha_K Z\alpha Z - \alpha_K Z\alpha Z + \beta\alpha_K Z - \delta\alpha_K Z\right] = (\alpha Z)^2$$

$$\alpha_K = \frac{\alpha^2 Z}{(-A)(1 - \xi)(\beta - \delta)} = -\left(\frac{\alpha^2 Z}{(A)(1 - \xi)(\beta - \delta)}\right)$$

When we put optimum amount of bribe, $\beta*$ in its place,

$$\alpha_{K*} = \frac{2\alpha^2 Z}{(-A)(1 - \xi)(\alpha Z - \delta)} = -\left(\frac{2\alpha^2 Z}{A(1 - \xi)(\alpha Z - \delta)}\right)$$

which is negative as expected (since increasing K aims to decrease α). As ξ and δ increase, value of α_K decreases (increases in absolute value). Remembering the condition $\alpha_K < 0$, $\alpha_{KK} > 0$, this means that, APB makes more effort to inform public. Again, as A and Z increases, α_K increases (decreases in

absolute value), meaning that, APB makes more efforts to inform clients. This means that, increasing independent probability of detection of BTO and increasing disturbance of APB from her ruining image increases efforts of APB to inform clients.

APB's participation constraint (that is, the constraint for APB's decision of whether to incur costs to inform clients or not) fails whenever:

$$
\begin{aligned}
&\left[(1-\xi)P\left[((1-\alpha(C*,K*))\sigma Z-\delta))<(\sigma Z-\beta*)\right](-A)-K*\right]< \\
&\left[(1-\xi)P\left[((1-\alpha(C*,0))\sigma Z-\delta))<(\sigma Z-\beta*)\right](-A)\right]
\end{aligned}
$$

If cost of informing clients is high, effect of these efforts on perceived probability of the clients (α) is low, APB intimidates and does not try to defend her reputation.

At the third stage clients play. Given C and K, clients determine their expectation about α. Clients also observe the amount of bribe demanded by BTO and decide to apply either to BTO or APB comparing expected utilities from each act. If the client goes to BTO, she gets service and pay bribe. On the other hand, if the client decides to go to APB, she gets the service without paying anything; since APB is honest.

4.3.2. Results

This model examines a strange type of corruption, insider officer (bribe taking officer (BTO)), who has no effect on the implementation, but has the ability to observe the procedures of the public service given, obtains benefit from the clients by pretending that, he makes the jobs done. Strange thing here is that, officer do this even though the exact person in charge of the service, the application processing bureaucrat (APB) is honest.

In usual cases of intermediation, insider or outsider intermediaries mediate the corrupt transaction, and share the proceedings with the officer/bureaucrat giving the service. They give a "service" increasing the utility of the officer/bureaucrat by decreasing detection risks of them.

In the case explained in our model, BTO increases "only" his utility by even not doing any mediation. He just deceives uninformed people by giving the false image that "he gets the job done". This behavior of his gives negative utility to both clients and honest APB. To decrease the costs imposed on her, APB must incur further costs and must compare the costs of her damaging reputation and cost of disseminating the information that she is honest and does her job without getting any bribe. Sometimes this cost (K) may be so large and/or its effect on the perception of clients (α_K) may be so low and efforts of BTO may be so effective (α_C is high) that, APB may give up the efforts and just accept the situation as it is. Therefore, sometimes, APBs can not prevent BTOs by their individual or uncoordinated, fragmented efforts.

Preventing such corruption cases necessitates government help. Government may help by providing easy to reach systems (with computers etc.) showing which bureaucrat exactly processes which application. This may decrease δ and so increase the probability that client applies directly to APB. Moreover, a general honest and transparent image of bureaucracy can shift α downwards so, perceived probability of clients' coming across to a corrupt bureaucrat decrease. A well established, dependable complaint processing system which protects whistleblowers would be an important factor decreasing the clients' willingness to bribe the BTO with the fear that they could not get the service they needed even if they think that they can encounter to a dishonest APB.

Increasing the independent probability of detection, ξ, increasing controls and encouraging the clients to place complain about the BTO, increasing the amount of penalty when BTO is detected may cause BTO's participation constraint to fail. This means that if ξ and F can be designed such that expected utility of BTO from taking bribe is negative, corruption can be prevented.

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

5.1. Conclusions

Corruption is an important social and ethical problem which affects nearly all societies in the world. In this thesis, a closer look at the results of the models will be given and policy implications will be examined.

Bureaucratic rules, permits, licenses etc., in many countries lead to the occurrence of intermediaries industries. These industries are usually established around the bureaucratic services involving heavy red tape. Formally, they are established to earn clients' valuable time, to follow up the bureaucratic procedures, fill in forms, give required documents. However, behind the scene, these industries may be a way of serving corrupt transactions. Sector may decrease the risks involved in the corrupt transactions by separating the briber and the bribee, playing a mediator role.

The first two game theoretical models examine the role of intermediaries under two different scenarios. First one is a bribee (officer) initiated case, second one is the briber (client) initiated case. In both models, intermediary decreases the detection risk and the initiator of the corrupt transaction evaluates the expected utilities from directly dealing with the other side and bearing the risk versus using intermediaries and decreasing risks (however, having to pay commission).

In the bribee initiated case, intermediary is the agent of the public officer and existence of the intermediary increases the utility of the officer. Utility of the clients do not change whether there is an intermediary or not. However, clients are absolutely worse off than in the case where there is no corruption (no red tape).

In the case where clients initiate the corrupt transaction (briber initiated case), intermediary is the agent of the client and client is better of in the with-intermediary case, in comparison to the case without intermediaries, if he faces with high level of red tape. On the other hand, utility level of the public officer may be higher or lower in the case with intermediary (in comparison to the case without intermediary). As in the first model, client is always worse of than the first best case where there is no corruption and red tape is at its low level. If corruption can be prevented, level of red tape decreases and clients get higher utility.

The case should also be evaluated from the viewpoint of social costs it caused. Opportunity cost of the "service" given by the intermediaries sector should also be taken into consideration. In addition to direct costs of increasing corruption, establishment of intermediaries sector causes waste of resources, due to the possibility that time and effort used in intermediary sector could have been used in other sectors, could have produced goods and services that are valuable, instead of preventing a bad (red tape).

5.2. Policy Suggestions

Combating corruption should of course involve moral education; values, norms of the society play important role. However, systems should be designed by taking into consideration the people who can abuse it. There would always be immoral people, who will engage in corruption whenever (s)he finds it profitable. It is very important to design systems such that, even to most opportunist people, bribe taking seems unprofitable. Analysis of the motivations and factors behind corrupt transactions suggests some policies to be able to design such a robust system.

It is apparent that, governments should play active role in designing such a system. Without the interventions of the government, system may not escape from the undesirable equilibrium where corruption is persistent.

One of the important implications of all the three game theoretical models is that red tape is a major cause of corruption. Public officer obtains bribe depending on his power to increase red tape at will. Clearly defined, simplified rules, effective complaint mechanisms (when more procedures are applied other than determined by law) can be a solution. As such, most important power of the officers for demanding bribe can be taken out of their hands. Thus, if the threat power of public officers are taken out of their hands, they can not collect bribe. If rules were widely known, easy, procedures were simple and fast, there are well established mechanisms controlling officers, clients would prefer getting the service by going through formal procedures. A general honest image of the public office combined with clearly defined rules regulations, procedures showing which service require how much red tape can help to decrease incidences of corruption. If a simple enough bureaucratic system can be established, neither intermediaries sector could continue to exist, nor clients would want to bribe the officers to get the services they need.

The third model shows that, information deficiencies about red tape level in the office and the honesty of the officials can simply cause some people to get illegal benefit from the public service given (even if the exact person in charge of the service is honest). Since the dealings are secret and the client does not meet with the exact person in charge, detection of such corrupt transactions are more difficult. Thus, such cases rarely enter into records and how prevalent it is can not be predicted. Prevention of it by increasing fines, etc. is also difficult. Rather, the conditions preparing the ground for such a process should be prevented. Here, in addition to transparent rules and procedures, easy to reach systems (with computers etc.) should be established in public offices showing which bureaucrat exactly processes which application.

Raising the level of fines seems not to be always a solution; it can even encourage establishment of intermediaries sectors. So, both corruption can not be prevented and pave can be

given to the more waste of resources through causing transfer of resources to a sector established to make corrupt dealings. Increasing fines can only be effective if the results of its interactions with other parameters are taken into consideration. Fines policies should be applied in combination with other measures.

E-government efforts beginning in many countries can be a good solution to the problems defined in the models. Automation of the procedures ensures simplicity and clearness of the rules, as well as the predictability of the results. When clients can do their applications from internet, they follow standardized procedures and do not need to engage with intermediaries. Even they do not need to know who processes the application or whether the officer is corrupt or not.

5.3. Implications for Further Research

In the first three models, the cases examined are that where the service client demands is legal, client has the right to get the service and officer must provide it although he has the power to increase the red tape. Another aspect of the problem that can be examined in future work may be the corrupt transactions involving illegal services. In cases where the client applies for a service that she is not legally entitled, problem changes much. Public officer this time has more power than just increasing red tape, he can refuse providing the service. Risks involved are also higher due to easier detectability. In such a transaction intermediaries sector provides more important services for the corrupt parties. Manion (1996) formulates a model including acceptable/unacceptable service distinction, however, she does not introduce role of intermediaries explicitly.

Another extension of the first model may be endogeneizing whistleblowing. Costs and benefits of whistleblowing can be included in the utility functions of the citizens. In such a case, governments could have another policy tool to combat corruption. It becomes possible to increase proportion of whistleblower clients by providing extra protection etc. for the users of public services, in the cases when they place complaint about public officers. Also, in all three models, actions of law enforcement agency are taken as given. In further study, law enforcement agency can also be introduced as a player and policy tools to make it more effective can be examined.

The thesis models bureaucratic corruption, it does not deal with political, grand corruption cases. Political corruption involves more complex power relationships and usually this type of corruption is more destructive for the economy. Examination of the motivations and the environment behind political corruption cases can give interesting results.

The thesis does not involve repeated game possibilities. Models can also be evaluated under repeated game structure. In repeated game structure learning process of the agents and reputation, building relationships etc. gets more important. Players can deduce types of each other in repeated interaction, trust based relationships may be built and this may work in the direction of decreasing dependence on intermediaries for safe corrupt transactions.

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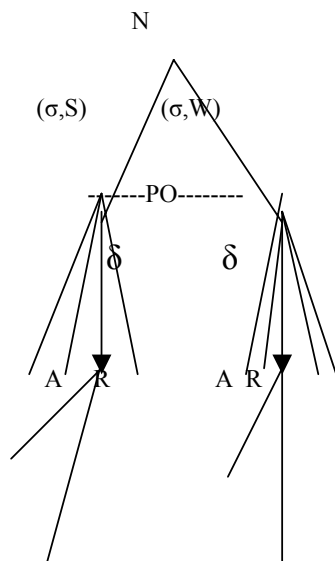Shleifer, A., Vishny, R.W. (1993), "Corruption", The Quarterly Journal of Economics, 108, 519-617.

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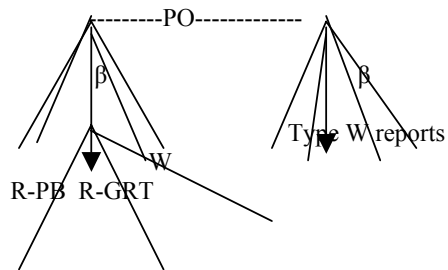
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APPENDIX A . Game Tree of the First Model-The Case Without Intermediary

N

(σ,S) (σ,W)

--------PO--------

δ δ

A   R   A R

APPENDIX B . Game Tree of the Second Model-The Case Without Intermediary

N

CR
(1- h)

HN
h

PO

PO

δ^H

δ^L

δ^H

δ^L

Client goes thru red tape

.------------CL------------

O

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O

DO
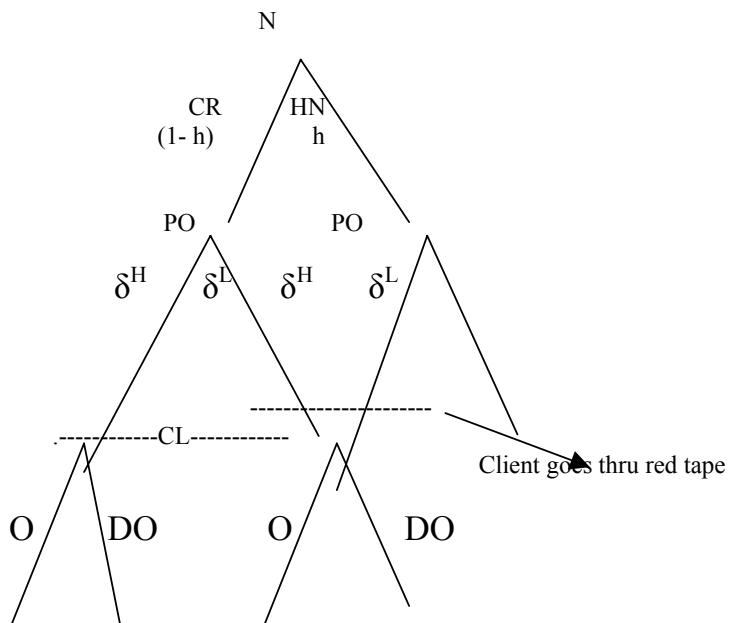
APPENDIX C . TURKISH SUMMARY

Yolsuzluk antik çağlardan beri hemen her toplumda görülen bir olgudur. Ancak özellikle son yıllarda akademisyenlerin ve politika belirleyicilerin dikkatini daha çok çekmekte, sosyal ve ekonomik maliyetleri daha çok gündeme gelmektedir.

Konunun gündeme gelmesinde dünyada sayıları artan demokratik devletlerin, serbest ve faal medyanın, sivil toplum kuruluşlarının etkisiyle yolsuzlukların daha yakından izlendiği ve bildirildiği bir ortamın oluşmasının etkisi bulunmaktadır. Bir çok ülkede pazar ekonomisine geçiş verimliliğe verilen önemi ve rant arama faaliyetlerine karşı hassasiyeti artırmıştır. Ülkelerin gittikçe dışa açılması yüksek ve düşük yolsuzluk seviyesine sahip ülkeler arasındaki temasları geliştirmiştir. Uluslar arası finansal kuruluşlar ve yardım yapan ülkeler, yardım edilen fakir ülkelerde kaynakların yerinde kullanılıp kullanılmadığına karşı duyarlı hale gelmişlerdir. Dolayısıyla dünya ekonomisinin aktörleri yolsuzluğu sorgulamaya başlamıştır.

Yolsuzluk disiplinler arası bir araştırma konusudur. Sosyoloji bilmi yolsuzluğun sosyal sebep ve sonuçlarıyla ilgilenir. Kültürden kültüre tanımı değişse de, yolsuzluk hemen hemen tüm ülkelerin ceza kanunlarında tanımlanmış bir suçtur ve yaptırımları vardır. Dolayısıyla yolsuzluk, hukukun da araştırma alanı içindedir. Ekonomi bilmi ise yolsuzluğa karışan tarafların ekonomik güdüleri ve yolsuzluğun ekonomik sonuçları ile ilgilenir.

Yolsuzluk önemli bir ekonomik ve sosyal problemdir. Bir çok ülkede yolsuzluk toplumun değer yargıları ile yakından ilgilidir ve yolsuzlukla mücadele toplumun normlarında, değerlerinde ve davranış kalıplarında değişiklik yapılmasını gerektirir. Bu, genellikle uzun ve zor bir süreç olmaktadır. Diğer taraftan, kurumların güdülenme yapısı değiştirilerek yolsuzlukla mücadele edilebilir. Sorunun derinliklerindeki sebepler dikkatle incelenirse, en fırsatçı, çıkarcı insanların bile yolsuzluk yapmayı karlı bulmayacakları yeni bir yönetim sistemi kurulabilir.

Bu tezdeki amaç, oyun teorisi modelleri kullanarak yolsuzluk için uygun bir ortam hazırlayan sistemin niteliklerini incelemek ve yolsuzluğu kolaylaştıran faktörleri belirlemek olmuştur. Teşhisi doğru koymak tedavinin ilk ve en önemli basamağıdır. Bu sebeple, yolsuzlukla mücadele etmek isteyen ülkeler öncelikle yolsuzluğu kolaylaştıran ortamın özelliklerini bilmelidir.

Yolsuzluğun yazında (literatür-literature) pek çok tanımı bulunmaktadır. En çok kullanılan Dünya Bankasınınkidir : "kamu kurumunun kişisel çıkar için kötüye kullanılması". Tanımlar yolsuzluğun kamu sektörü yönünü vurgulasa da, bu, özel sektörde yolsuzluğun olmayacağı anlamına gelmez. Yolsuzluk müvekkil-vekil ilişkisi problemi olarak da tanımlanabilir. Genellikle müvekkil tarafından vekile bir iş havale edilmekte ve vekile müvekkil adına hareket etme yetkisi verilmektedir. Bu yetki, vekil tarafından müvekkil aleyhine ve kendi lehine haksız kazanç elde etmek için kullanıldığında yolsuzluk gerçekleşir.

Yazında çeşitli yolsuzluk türleri tanımlanmıştır. Yolsuzluğun başlıca bürokratik veya politik, alanca başlatılan veya verence başlatılan, hırsızlık içeren veya içermeyen, merkezi veya ademi-merkezi, iç veya dış, anlaşmalı veya zorlamalı, büyük veya küçük, kişisel veya kurumsal olmak üzere çeşitli türleri bulunmaktadır. Adam kayırma, iltimas, zimmet de yolsuzluk türleri arasındadır.

Yolsuzluğun topluma ekonomik ve sosyal maliyetleri hakkında çok sayıda yayın yapılmıştır. Yolsuzluğun en sık bahsedilen zararı yatırımcıları caydırması, dolayısıyla ülkenin yatırım, büyüme ve kalkınmasını olumsuz etkilemesidir. Rüşvete ve aracılara giden, kamu görevlileri ile bağlantılar kurmak için yapılan masraflar, devlet görevlilerinin rüşvet almak amacıyla artırdığı kırtasiyecilik o

derece önemli masraflar oluşturabilir ki, diğer türlü karlı olabilecek yatırım projeleri rafa kaldırılabilir. Firmalar izinler, lisanslar vs. için gereken rüşvetten kaçınmaya çalışırken kayıt dışı ekonomi genişler. Yolsuzluğun yaygın olduğu ekonomilerde rant kollama faaliyetleri yatırımdan daha karlı hale gelebilir ve bu da müteşebbisliği caydırır. Konu üzerinde yapılan ve çeşitli ülkeleri kapsayan çalışmalar yolsuzluk ile yatırımlar ve kalkınma seviyesi arasında negatif ilişki bulmuştur.

Yolsuzluk tahsis verimliliğini ve kaynak dağılımını da olumsuz etkilemektedir. Yolsuz devlet görevlileri yatırımların, yolsuzluğun tespit edilmesinin daha güç olduğu, büyük (genellikle müsrifçe gerektiğinden büyük) projelere yönlendirilmesini tercih etmektedirler. Kamu görevlileri, mevcut firmalarla olan yolsuz anlaşmaların gizliliğinin korunabilmesi için pazara giriş engelleri çıkarabilmektedirler.

Verimli projelerde kullanılabilecek kamu kaynakları yolsuzlukla israf edilmektedir. Ülkeler arası karşılaştırmalı çalışmalar yolsuzluğun yüksek olduğu ülkelerde devletin eğitim ve sağlığa daha az kaynak ayırdığını göstermektedir. Kamuda kaynak israfı bütçe açıklarını artırmakta, bu da enflasyondan yüksek faizlere pek çok ekonomik sorunun kaynağı olmaktadır.

Bunların yanı sıra yolsuzluk gelir dağılımını bozmakta, devletin güvenilirliğini ve meşruiyetini sarsmakta, demokrasiye zarar vermektedir.

Yazında, yolsuzluğun faydaları olduğunu iddia eden az sayıda çalışma da bulunmaktadır. Bu çalışmalarda yolsuzluğun bürokrasiyi hızlandıran bir teşvik olduğu, devletçe yüklenen amaçsız-verimsiz kuralları aşmaya yaradığı, zamana en çok değer verenlerin bedelini ödeyerek işlerini hızlandırmalarına imkan verdiği anlatılmaktadır. Ancak, burada gözden kaçırılan önemli nokta, illiyet bağıntısının tersine olduğudur. Yavaş işleyen bürokrasi, gereksiz kurallar vs. daha fazla rüşvet almak isteyen devlet görevlilerince yaratılmaktadır.

Yolsuzluğun sebepleri üzerine pek çok araştırma yapılmıştır. Yolsuzluk bir arz-talep ilişkisi olarak görülebilir; alanla veren arasında yapılan bir ticari anlaşmaya benzer. Rüşvetin vericisinin

kamu kurumundan isteği hizmete karşılık (talep), rüşvetin alıcısının bu hizmeti kendi çıkarı için "satma" gücü ve isteği (arz) tarafların anlaşmasına zemin hazırlamaktadır.

Genel anlamda yolsuzluğun en çok bahsedilen sebepleri arasında geçim seviyesinin altında memur maaşları gelmektedir. Maaşların memurun hayatını sürdürebileceği seviyenin altında olması kamu hizmetine girmek isteyen kişilerin genellikle farkı rüşvet alarak kapatmayı düşünenler olması sonucunu getirmektedir. Ampirik araştırmalar yolsuzlukla maaşlar arasında istatistiksel olarak anlamlı aksi bir ilişkinin olduğunu göstermektedir.

Devletin ekonomideki ağırlığının fazla olması da yolsuzluğu artıran en önemli sebepler arasında sayılmaktadır. Devletin ağırlığı arttıkça kaynakların kontrolü siyasetçilere ve bürokratlara geçer; bu da yolsuzluğa uygun bir zemin hazırlar. Devletin ekonomiye müdahaleleri her zaman toplum için en yüksek faydayı hedeflemez; siyasetçilerin kişisel çıkar güdüleri genellikle politika seçimini etkiler.

Kültür ve sosyal yapı da yolsuzluğun önemli sebepleri arasındadır. Bir ülkede yolsuzluk sayılan bir durum, diğerinde iş yapmanın normal yolu olarak görülebilir. Kimi toplumlar akrabalık vs. küçük gruplara aidiyeti kamu görevinden üstün tutar. Bazı kültürler çok çalışmaya, başarıya, girişimciliğe değer verir, bazıları ise bağlantı kurmayı, rant-kollamayı ve hızlı kazançları daha önemli görür.

Ülkede demokrasinin yerleşmiş olması, serbest medyanın, bağımsız sivil toplum kuruluşlarının, seçmene siyasetçiler hakkında bilgi sağlayan gönüllü faaliyetlerin varlığı, siyasetçilerde yolsuzluğa bulaştıkları takdirde kendilerine olan güvenin sarsılıp yeniden seçilme şanslarının azaltılabileceğine dair inanılır bir tehdit oluşturabilmektedir.

Bağımsız bir yargı sisteminin varlığı ve hukukun üstünlüğü, iyi tasarlanmış ceza sistemleri, bürokraside liyakate dayalı kariyer planlaması, kurallarda kişisel uygulamalara ve keyfiyete izin vermeyen bir tasarım yolsuzluğu önlemekte önemli olmaktadır.

Yolsuzlukta dışsallıklar da önemli bir etmendir. Yolsuzluğun yaygınlığı, devlet görevlisine rüşvet önermenin riskini azaltmakta; kanun uygulayıcıların yakalama ihtimalini düşürmektedir. Yolsuzluğun yüksek olduğu kurumlarda rüşvet alandan daha çok almayan üzerinde sosyal baskı oluşabilmektedir. Dolayısıyla yolsuzluğun düşük olduğu toplumlarda yolsuzlukla mücadele daha kolay, yüksek olduğu toplumlarda mücadele daha zor olmaktadır.

Yolsuzluk konusunda yazında pek çok anket çalışması ve ampirik çalışma da bulunmaktadır. Türkiye üzerinde yapılmış en kapsamlı çalışma TESEV ve Dünya Bankasının katkılarıyla Fikret Adaman, Ali Çarkoğlu ve Burhan Şenatalar tarafından yapılmıştır. Çalışma üç aşamadan oluşmakta olup, birinci aşaması olan hanehalkı anketi ve ikinci aşaması olan iş dünyası anketi tamamlanmıştır. Üçüncü aşama olan bürokrasi anketine başlanılacaktır. Bu çalışmalarda görüşülen kişilere çeşitli devlet kurumlarına olan güvenlerinden bu kurumlarla yaptıkları işlerdeki deneyimlerine ait izlenimlerine ve kişilerin yolsuzluğa karşı tutumlarına dair pek çok soru sorulmuştur.

Türkiye'ye ilişkin bir diğer anket çalışması ise Haluk Gürgen ve Ali Atıf Bir tarafından Gümrük Müsteşarlığında gerçekleştirilmiş, Müsteşarlığın taşra ve merkez teşkilatında çalışan personele sorulan sorularla personelin rüşvete ve yolsuzluğa bakış açıları yansıtılmaya çalışılmıştır.

Yukarıda kısaca özetlendiği gibi, ekonomi ve sosyoloji yazınında yolsuzluğun tanımına, sebeplerine ve sonuçlarına ilişkin çok sayıda teorik ve ampirik çalışma yapılmış bulunmaktadır. Ancak yazında, yolsuzlukta aracıların rolüne ilişkin herhangi bir oyun teorisi analizi bulunmamaktadır. Bazı yazarlarca aracıların rolü hakkında deneyime dayalı araştırmalar yapılmıştır; ancak aracıların rolü modellenmemiştir. Bu tez yazındaki bu boşluğu doldurmaktadır.

Tezde üç oyun teorisi modeli ile yolsuzluk anlaşmalarında aracıların rolü irdelenmektedir. İlk iki modelde yolsuzluk rüşveti alan ve veren arasında bir ticari anlaşma olarak incelenmektedir. Modeller, aracılık kurumunun tarafların çıkar azamileştirmesi çabalarından doğduğunu göstermektedir. Aracılar, daha uzun vadeli ve güvene dayalı ilişkiler kurarak yolsuzluğa taraf olan

kişilerin birbirlerini iyi tanımıyor olmalarından doğan riskleri azaltıcı rol oynamakta; bunun karşılığında da komisyon alarak çıkar sağlamaktadır. İlk model anlaşmanın rüşveti alan tarafça başlatıldığı (kamu görevlisi) durumda ve ikinci model anlaşmanın rüşveti veren tarafça başlatıldığı (vatandaş-müşteri, kamu hizmetlerinin kullanıcısı) durumda aracıların rolünü incelemektedir. Daha sonra iki durum arasındaki farklılıklar ortaya konmaktadır.

Üçüncü model alışılmışın dışında bir yolsuzluk türünü incelemektedir. Sahte bir aracı, müşterinin bilgisizliğinden yararlanarak ona işi yapan kamu görevlisinin yolsuz olduğu, doğrudan başvurursa hizmeti alamayacağını, ancak kendisinin aracılığını kabul ederse, belli bir ücret karşılığında kendisine hizmetin sağlanmasını garanti edebileceği fikrini empoze etmektedir. Hizmeti veren kamu görevlisi dürüst bile olsa, sahte aracı müşteriyi aldatarak kendisine rüşvet vermeye ikna edebilmektedir. Tezin son modeli böyle bir aldatma sistemin yerleşebilmesine uygun olabilecek ortamın özelliklerini incelemektedir.

Oyun teorisi modellemesi konu üzerinde sistematik düşünmeyi ve çeşitli dağınık gözlemleri teorik bir çerçevede bir araya toplamayı sağlamaktadır. Bunun yanında, oyun teorisi kişiler arası etkileşimleri inceleyerek yolsuzluğun önlenebilmesi için politikalar önerme imkanını da vermektedir.

Tezin birinci modeli rüşveti alanın faal olarak müşteriden talep ettiği, müşterinin rüşvet talebini kabul edip etmeme kararı verdiği durumu incelemekte, kamu görevlisi, müşteri ve aracının böyle bir durumda karşılıklı çıkarlarını azamileştirmesinden doğan sonuçları irdelemektedir. Modelde aracının varolduğu ve olmadığı durumlar ayrı ayrı incelenmiş ve karşılaştırılmıştır.

Modelin sonuçları aracılar kurumunun yolsuzluk anlaşmasındaki yakalanma risklerini sıfıra indirebileceğini, böyle bir durumda, kamu görevlisi için rüşvet istemenin neredeyse her zaman istememeye göre daha karlı olduğunu göstermektedir. Aracının olmadığı durumlarda risklerin yüksekliği kamu görevlisinin rüşvet talep etmemesine sebep olabilmektedir. Yüksek maaş seviyesi, ağır cezalar, rüşvet alırken yakalanma ihtimalinin yüksekliği, ahlak seviyesi yüksek (kendinden rüşvet istendiğinde ödemeyip savcılığa şikayette bulunan) kişilerinin oranının yüksekliği kamu görevlisini

caydırabilmektedir. Ancak aracıların olduğu durumlarda tüm bu riskler kalkmakta, kamu görevlisi her şart altında rüşveti aracısı vasıtasıyla talep etmeyi tercih etmektedir. Böyle bir durumda maaş artışı, cezaların artırılması vs tedbirler rüşveti önlemede etkin olamamaktadır. Aksine, parametrelerdeki bu tip değişiklikler ancak aracının alınan rüşvetten payını artırmakta, böylece aracılar kurumunun oluşmasını teşvik etmektedir.

Modelin bir diğer önemli sonucu ise, aracıların faydayı kamu görevlisine sağladığı, müşterinin aracının varlığı durumunda (aracının olmadığı duruma göre) fayda fonksiyonunun artmadığıdır. Kamu görevlisi ve aracı, riskin düşmesinden kaynaklanan tüm fayda artışını paylaşmaktadır. Müşteriler her halükarda (aracılı veya aracısız) yolsuzluğun olmadığı duruma göre daha az fayda elde etmektedir.

Kamu görevlisi bürokrasiyi artırabilme güç ve yetkisine dayanarak rüşvet toplayabilmektedir. Müşteriler, bürokrasi-kırtasiyecilikle uğraşma masrafından kaçınmak için doğrudan veya aracı vasıtasıyla rüşvet vermeyi kabul etmektedir. Böylece, kamu görevlilerinin kırtasiyeciliği keyfi olarak artırma gücü, belirsiz, açık ve saydam olmayan kurallar, yöntemler, düzenlemeler, yolsuzluk anlaşmalarının oluşması için verimli bir ortam oluşturmaktadır.

İkinci model, rüşveti veren kişi tarafından inisiyatifin alınarak teklifin yapıldığı durumu incelemektedir. Oyuncular yine kamu görevlisi, müşteri ve aracıdır. İkinci modelde müşteri kamu görevlisine bir kamu hizmetini almak için başvurmakta ve kendisine uygulanan kırtasiyecilikten kurtulabilmek için kamu görevlisine rüşvet teklif etmeyi düşünmektedir. Ancak, müşteri bilmeden dürüst bir görevliye rüşvet teklif etme veya yolsuz bir görevliye asgari kabul fiyatının altında rüşvet önerme ihtimalinden dolayı tereddüt etmektedir. Böyle bir durumda, kamu görevlilerinin hangilerinin dürüst olduğunu ve dürüst olmayanların da asgari kabul fiyatlarının ne olduğunu bilen bir aracı riskleri düşürerek müşterinin elde ettiği faydayı artırıcı rol oynamaktadır. Bu modelde de aracıların olduğu ve olmadığı durumlar ayrı ayrı incelenerek sonuçları karşılaştırılmıştır.

Modelin sonuçlarına göre, aracıların olduğu durumda kamu görevlisi, eğer dikkatleri üzerine çekmeden yeterince yüksek kırtasiyecilik uygulayabiliyorsa her zaman asgari kabul fiyatını rüşvet olarak alır. Bu, miktar aracıların olmadığı durumda almayı beklediğinden daha yüksek veya daha düşük olabilir. Bu modelde inisiyatifi ele alarak aracıyla anlaşan ve rüşveti öneren taraf müşteri olduğundan, aracı müşterinin vekili olmakta ve müşteri aracının varlığı ile faydasını artıran taraf olmaktadır. Ancak, bu durumda bile müşteri rüşvetin hiç olmadığı duruma göre daha az fayda edinmektedir.

Aracının varlığı, müşterinin önüne daha karlı bir seçenek koyarak aracının olmadığı durumda gerçekleşemeyecek yolsuzluk anlaşmalarını gerçekleşebilir kılmakta, böylece yolsuzluğu artırıcı rol oynamaktadır.

Cezaları ağırlaştırmak, aracıların olmadığı durumda bile yolsuzluğu azaltmada sınırlı bir role sahipken, aracıların olduğu durumda yolsuzluğu hiç engelleyememekte, sadece aracı kullanımını artırmaktadır. Kamu görevlilerinin asgari kabul fiyatının artması hem doğrudan, hem de aracılı teklifleri azaltarak yolsuzluğu azaltıcı rol oynamaktadır. Müşterilerin kırtasiyeciliğin yüksekliği veriyken yolsuz bir görevliyle karşılaşma beklentilerinin artması, doğrudan rüşvet teklif etme ihtimallerini artırarak yolsuzluğu artırmaktadır. Diğer taraftan, kamu görevlisinin bürokrasiyi artırma yetkisinin kısıtlanması doğrudan veya aracıyla yapılan yolsuzluğu önlemektedir.

Üçüncü model alışılmışın dışında bir yolsuzluk türünü incelemektedir. Kamu kurumunun içindeki bir görevli verilen kamu hizmetinde herhangi bir rolü olmamasına rağmen, işleri yaptıran kendisiymiş gibi müşterilerle konuşmakta, müşterilerin bilgisizliğinden yararlanarak işi yaptıracağı iddiasıyla bilgisiz müşterilerden rüşvet toplamaktadır. Üstelik bu sahte aracı, hizmeti vermekle yükümlü asıl görevlinin dürüst olduğu, rüşvet almadan ve kırtasiyecilik uygulamadan hizmeti herkese verdiği halde dahi bu aldatma faaliyetini sürdürmektedir. Bu modelde hizmetin verilmesinden sorumlu bürokrat, rüşvet alan memur ve müşteri olmak üzere üç oyuncu bulunmaktadır. Sahte aracı, kendinden başka hiç kimsenin faydasını artırıcı rol oynamamakta, aksine diğer iki oyuncunun da faydasını azaltmaktadır. Müşteri dürüst bürokrattan rüşvetsiz ve kırtasiyecilikle karşılaşmadan

edinebileceği kamu hizmetini, bürokratın dürüst olduğunu bilmediğinden ve sahte aracının, kendi aracılığı olmadan bürokratın işini yapmayacağına ilişkin yalanına inandığından (sahte aracıya) rüşvet ödeyerek almaktadır. Diğer taraftan, hizmeti veren dürüst bürokrat kendi rüşvet almadığı halde sahte aracının rüşvet toplamasından dolayı itibarının zedelenmesinden rahatsız olmaktadır. Bürokrat, sahte aracının yaptıkları hakkında söylentiler duymasında rağmen yapılanları gözlemleyecek ve ispatlayacak imkana sahip değildir.

Modelin sonuçları, dürüst bürokratların sahte aracının faaliyetlerini parça parça dağınık çabalarıyla önleyemeyebileceklerini, devletin sistemi düzenleyici müdahalelerine ihtiyaç duyulabileceğini göstermektedir. Bu tip bir yolsuzluk faaliyetinin engellenebilmesi için devlet öncelikle hangi bürokratın hangi başvuruyu sonuçlandırmakta olduğunu gösteren kolay erişilir sistemler (bilgisayar vs gibi) kurmalıdır. Ayrıca kamu kurumunun genel olarak dürüst bir imajının olması müşterilerin yolsuz bir bürokrata rastlama ihtimali hakkındaki beklentilerini azaltarak, işinin yapılmaması korkusuyla sahte aracıya gitmesini engelleyebilir. Kamu kurumunda müşteri şikayetlerini dinleyen, haksızlığa uğrayan, işi yapılmayan, geciktirilen müşterilerin haklarını aramasını sağlayan bir sistemin olması da müşterinin sahte aracıya yönelmesi ihtimalini azaltıcı rol oynar. Bu modelde kamu kurumunda kontrolün artırılması ve cezaların ağırlaştırılması da sahte aracıyı engelleyici rol oynamaktadır.

Kısaca toparlamak gerekir ise, tezin üç modeli değişik yönleriyle yolsuzluklarda aracıların rolünü incelemektedir. Bürokratik kurallar, izinler, lisanslar vs bir çok ülkede aracı kurumların kurulmasına yol açmaktadır. Bu kurumlar genellikle ağır kırtasiyeciliğin uygulandığı kamu hizmetlerinin etrafında oluşmaktadır. Görüntüde, bürokratik işlemleri takip, müşteriye zaman kazandırma, gerekli belgeleri temin etme vs amaçlarla kurulsalar da, bazıları rüşvet alıp vermede önemli roller oynamaya başlayabilmektedir.

Dolayısıyla aracıların oluşabilmesinde baş rolü kamu görevlilerinin kırtasiyeciliği, istedikleri gibi neredeyse keyfi olarak artırabilmeleri oynamaktadır. Müşteriye zaman (ve dolayısıyla para) kaybettirme gücü görevlinin rüşvet toplamasına uygun bir zemin hazırlamaktadır. Müşteri, aracıya

kırtasiyecilikten kurtulmak için başvurmaktadır. Bu bağlamda, devlete düşen görev, kamu görevlilerinin müşteriye zorluk çıkarma inisiyatifini elinden almak, dolayısıyla görevlilerin rüşvet toplamak için ellerindeki en önemli güçten yoksun bırakmak olmalıdır.

Aracının taraflara sağladığı fayda rüşvet anlaşmasının hangi tarafına vekillik rolü üstlendiğine göre değişmektedir. Rüşvet alanın (kamu görevlisi) inisiyatifi aldığı durumda alana, rüşvet verenin (müşteri) inisiyatifi aldığı durumda ise verene fayda sağlamaktadır. Ancak, her iki durumda da müşteri rüşvetin hiç olmadığı duruma göre zarardadır. Müşteri inisiyatifi alarak aracıyı kendi vekili olarak kullandığında faydasını artıramamakta, sadece yüksek seviyedeki kırtasiyecilikten gördüğü zararını azaltmaktadır.

Üç modelde de aracılar rüşveti artırıcı rol oynamaktadır. İlk iki modelde yoklukları halinde tarafların riskleri göze alamayarak vazgeçebilecekleri yolsuzluk anlaşmalarını aracılar mümkün ve karlı kılarak yolsuzluğu artırmaktadır. Üçüncü modelde ise zaten sahte aracının salt varlığı başlı başına yolsuzluğun sebebidir.

Aracılar sorunu aynı zamanda fırsat maliyetleri ve kaynak israfı açısından da değerlendirilmelidir. Aracıların faaliyet göstermesi için ayrılan zaman ve kaynak, zaten olmamış bir zaman kaybını önlemek yerine, ekonominin başka yerlerinde değer verilen mal ve hizmetleri üretmekte kullanılabilir.

Yolsuzlukla mücadelede tabi ki eğitim çok önemlidir. Toplumun değer yargıları ve normları yolsuzluk bilincinin oluşmasında önemli rol oynamaktadır. Ancak sistemler, onları kötüye kullanabilecek insanların varlığı göz önünde bulundurularak kurulmalıdır. En çıkarcı insanın bile rüşvet almayı (kendi faydası açısından) karlı bulmayacağı sağlam sistemler oluşturulabilir. Bunda da devlete önemli görevler düşmektedir. Net tanımlanmış, basit, anlaşılır kurallar, saydam bir yönetim anlayışı, hızlı hizmet, etkin şikayet değerlendirme mekanizmaları, üç modelde de bahsedilen tipte yolsuzlukları önlemede çok faydalı olacaktır. Kamunun genel olarak dürüst bir imajının olması da

beklentileri yönlendirerek yolsuzlukları azaltmada önemli rol oynar. Bürokrasi yeterince basit ve hızlı olduğunda, vatandaşlar haklarını alabileceklerine inandıklarında aracılara başvurmayacaklardır.

Üçüncü model, salt kamu kurumundaki kırtasiyeciliğin seviyesi ve kamu görevlilerinin dürüst olup olmadığına ilişkin bilgi eksikliklerinin bazı kişilerin durumdan haksız ve kanunsuz çıkarlar elde etmesine yol açtığını göstermektedir. Bu kişilerin müşterileri aldatarak yaptıkları anlaşmalar gizli kalmakta, ortaya çıkarılması daha zor olmaktadır. Bu durumda devletin zemini hazırlayan ortamı yok etmesi önemlidir. Böyle bir yolsuzluk türünde kişileri bilgilendirmek ve gerekli güvenceleri vermek önem kazanmaktadır.

Cezaları artırmak her zaman işleyen bir çözüm yolu gibi görünmemektedir. Ağırlaşan cezalar yolsuzluğu azaltmak yerine, aracılarla yapılmasını teşvik edebilir. Bu durumda hem yolsuzluk önlenememiş olur, hem de aracılar sektörünün kurulmasıyla kaynak israfına sebep olunur. Artan cezalar, ancak diğer değişkenlerle etkileşimi göz önünde bulundurulduğunda etkin olabilir. Ceza politikaları diğer önleyici politikalarla uyum içinde, beraber uygulanmalıdır.

Bir çok ülkede uygulamaları başlayan e-devlet politikaları üç modelde de anlatılan yolsuzluk türlerini engellemekte başarı sağlayabilir. Yöntemlerin otomasyonu kuralların basitliğini ve sadeliğini, sonuçların standartlığını sağlar. Hizmeti alan ve verenin temasının bu şekilde azaltılması da yolsuzluğu engellemeyi kolaylaştır.

Bu tezde, müşterilerin talep ettiği hizmetlerin onların yasal hakları olduğu durum incelenmiştir. Daha sonraki çalışmalarda incelenebilecek bir diğer durum, hizmetin müşterinin hakkı olmadığı, müşterinin kendisine yasa dışı özel muamele veya çıkar sağlanmasını talep ettiği durum olabilir. Bu durumda yakalanma ihtimali, riskler daha fazla olacak, kamu görevlisinin müşteri karşısındaki gücü artacak, aracılara daha fazla ihtiyaç duyulacaktır.

Modellerde, kanun uygulayıcıların (emniyet, savcılık) rolü açıkça ele alınmamış, veri kabul edilmiştir. Başka çalışmalarda kanun uygulayıcılar da modele oyuncu olarak konup, diğer oyuncularla etkileşimlerinden bu konuda önerilebilecek politikalara ait yorumlar da yapılabilir.

Yine, modellerde yalnızca bürokratik yolsuzluk türü üzerine yoğunlaşılmış, siyasi yolsuzluk türü incelenmemiştir. Siyasi yolsuzluk, bürokratik yolsuzluğa göre daha büyük projeleri içerir ve çok daha önemli miktarlarda rüşvet el değiştirir. Siyasi yolsuzluğun topluma maliyetleri de çok daha fazla olmaktadır. Dolayısıyla siyasi yolsuzluk da konunun ilerideki çalışmalarda incelenebilecek bir başka yönünü oluşturmaktadır.

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