The Effect of Corruption on Growth

A Panel Data Study
EXECUTIVE SUMMARY

The aim of this paper is to investigate, whether evidence in support of the following hypothesis can be found:

\[ H_1: \text{As the level of corruption increases, the economic growth rate decreases and vice versa.} \]

In order to make the complex issue of corruption easily comprehensible a presentation, clarifying the four aspects of what it is, what causes it, its functioning and the consequences of corruption has been produced. Further, the concept of economic growth as well the underlying neoclassical economy theory has been investigated. This is done through the basic mechanisms of the supply- and demand curves as well as the Solow growth model. In relation to this, the importance of investments as a driver of economic growth is emphasized. The implications, which the literature has found corruption to impose on investments and how corruption disrupts competition is examined. How these implications can affect economic growth is addressed in this context as well. In addition, consensus have been found to exist in the literature, that a higher level of GDP per capita seems to be associated with a lower level of corruption.

The empirical analysis is that of a panel data study conducted on 29 former Soviet countries in the period of 1995-2009. This dataset is particularly interesting as all countries share a common past as members of the Soviet Union and have therefore had command economy. The estimation method, which results have been drawn upon in the conclusion of this paper, is that of fixed effects. No evidence in favor of a direct effect form corruption on the growth rate was found. However, through a conditional effect corruption seems to affect the growth rate. The interaction found, is that between corruption and investment, though two other interactions was investigated. The conditional finding indicated that, under an assumption of a linear relation between corruption and investment, a diminishing effect of investment on the growth rate, as corruption increases, emerges. It could even be argued, that at sufficiently high levels of corruption, additional investments could negatively affect the growth rate.
Due to the findings in this paper, the authors argue, that one cannot reject the importance of economic growth as a factor in eradicating corruption. It is merely so, that while the growth rate, in itself, might not decrease corruption, the effect of it – increased wealth – may. Lastly, putting the findings into the perspective of current policies and initiatives, a review of these has been conducted.
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1. INTRODUCTION

Living in a country like Denmark, corruption is not a concept we reflect much on in our everyday lives. Having heard stories from family and friends about corrupted police officers in foreign countries wanting some “chai”, “baksheesh”, “otkat” or “rusvet”, we have mostly made a laugh out of it and not paid much more attention to it than that.

But the following proclamation proved puzzling and challenged the view we had on corruption: “The World Bank sees corruption as one of the single largest obstacles to economic and social development.” (‘World Bank Live, Q&A: Anti-Corruption’, 2012).

Questions such as, “What is corruption, really?” and “How can the World Bank come to this conclusion?” demanded our attention. We decided to investigate the concept of corruption and its effects on growth to figure out, why the World Bank could come up with this horrifying statement about an issue, which we thought we new enough of, to joke about. However, we got wiser through our exiting investigation on the issue.

Having decided on producing a cross-country time study on the effects of corruption on growth and only having studied the existing research on the subject for a few weeks, we came across this statement: “While theories abound, and while numerous case studies have examined the details of corruption in particular countries or regions, cross-national comparative empirical research is much rarer” (Treisman, 2000, p.400).

Due to this statement we realized, that the answers we could possibly find through our analysis, might be interesting to more people than ourselves.

1.1 PROBLEM STATEMENT AND PURPOSE

The objective of this paper is to clarify whether the level of corruption has an effect on the economic growth rate. In order to do this it will be investigated, whether the following hypothesis can be supported:
**H₁:** As the level of corruption increases, the economic growth rate decreases and vice versa.

The purpose of investigating this hypothesis is to gain insight in the existing research on the subject and in addition to the complexity and the many aspects of corruption. We aim at producing a thorough, yet easily comprehensible presentation on this subject. Further, the concept of economic growth will be presented to, the extend needed, so as to gain sufficient knowledge for understanding its underlying mechanisms. In addition, the indirect effects of corruption on growth, will be examined.

1.2 DEFINITIONS

The definition of corruption used in this paper is, as put forward by Transparency International (TI), “the abuse of entrusted power for private gain” (2012a, para. 1). As a consequence, actions are assumed to be corrupted if they entail the misuse of some aspect of entrusted, public power for private gain.

Economic growth is defined as the yearly percentage increase in real GDP per capita.

In order to prevent any potential confusion, the terms economic development and wealth refer to GDP per capita whereas the term economic growth refers to the definition above.

1.3 DELIMITATIONS

The data used in the analysis of this paper is the Corruption Perception Index (CPI) produced by TI. Since the level of corruption is a variable that cannot be measured directly (Dreher, Kotsogiannis, & McCorriston, 2007), this paper assumes the perceived level of corruption, despite discussions in the literature, to be a sufficient proxy for the actual level of corruption.

Causal directionality will not be empirically analyzed in this paper. Where needed, assumptions will be made and discussed based on existing literature.
1.4 METHOD

The empirical method of analysis used in this paper is a panel data study. The data used, is a sample of 29 former Soviet countries in the period 1995-2009.

In the investigation of the main hypothesis of this paper, several estimation methods have been included. Pooled OLS, fixed effects and random effects estimators have all been produced. All outcomes will be presented except the estimations for pooled OLS. In order to assess the right choice of model, a Breusch-Pagan test and a Hausman test have been conducted and included in the paper. Further, interaction terms have been made, calculated and their graphs have been drawn.

1.5 STRUCTURE OF THE PAPER

Firstly, corruption will be thoroughly examined. Then the concept of economic growth will be presented and thirdly the two will be combined in order to show how the two interact. Fourth, the data and methodology of the empirical analysis will be explained in detail. The empirical analysis will follow, where the direct- as well as indirect effects of corruption on the growth rate will be analyzed. Sixth, the findings will be discussed and elaborated on. Then the fight against corruption will be addressed in order to discover, whether the mechanisms found in the analysis of this paper are in line with the current policies and initiatives. Lastly, the paper will be concluded.
2. CORRUPTION

The issue of corruption, its causes, functioning, and consequences are all subject to close scrutiny by many researchers and scholars. In some aspects opinions and findings vary greatly whereas in others, researchers and scholars draw very similar conclusions. In this section we will present what we regard as the most important findings and discussions on the concept of corruption, in relation to the objective of this paper. We aim at providing the reader with a thorough understanding of the issue. However, corruption is complex and its aspects and consequences are far-reaching. For this reason this section is divided into five subsections: Subsections one to four present corruption from four different perspectives. The fifth subsection presents an additional aspect of corruption, but is not part of the fundamental understanding that the reader should obtain from the four preceding subsections.

The first subsection will discuss, what corruption is, the definition used in this paper and tools to determine, whether an action can be classified as corrupted. The second subsection presents what the existing literature has found to be the causes of corruption. The third subsection presents, how corruption functions in a society. After having established an understanding of those three perspectives on corruption, the fourth subsection will explain, what the consequences of corruption are. Lastly, the observation that corruption seems to be fairly stable over time will be addressed.

This structure will perform a clear presentation of the complex subject corruption is. Every subsection builds on the understanding provided in the preceding subsection and adds a new aspect to this. This adds up to a smooth and gradual introduction to the issue of corruption.

2.1 WHAT IT IS

The majority of researchers, who investigate corruption, begin their paper by defining it (Jain, 2001). One could question the necessity of everybody having to propose a definition, but the relevance of this should not be underestimated. As corruption is a complex concept, it is inherently difficult to define. In order to give the reader an overview of this difficulty, a small discussion of the definition used in this paper will now follow.
As mentioned in the introduction, the definition used in this paper is the definition, which Transparency International proposes. This is due to the fact, that the analysis and as such the conclusions, are based on the data they have collected. Working with their data but rejecting their definition of corruption would be absurd. To further argue for the reliance on this definition, it should be noted that, despite discussions, some consensus of the definition seems to have been reached in the literature. Many authors agree that corruption entails some aspect of misusing public office for a personal gain (Jain, 2001).

Transparency International, their work, and their definition of corruption, has been discussed in various papers. Shaxson (2007) argues that their definition is too narrow while Knack (2007) states, that one cannot assign one definition to the work of Transparency International. This is because their indexes, as they are composite indexes, by definition, consist of various definitions from the data, which they have compiled. As such, no one definition can capture what they measure. This paper will not study the difficulties in defining corruption further. However, as this short discussion on the issue indicates, the complexity of corruption is even present in the fundamental phase of defining it.

In order to explain, what corruption is, the concept of rent seeking needs to be elaborated on. Rent seeking refers to the pursuit of economic rents. As defined by Pindyck and Rubinfeld (2009) it means “Spending money in socially unproductive efforts to acquire, maintain, or exercise monopoly.” (p.370). This is desirable as the economic rent as also defined by Pindyck and Rubinfeld (2009), is the “Amount that firms are willing to pay for an input less the minimum amount necessary to obtain it” (p.297). Putting it simply, the price demanded can be increased, by the economic rent, as a result of successful rent seeking activities.

As pointed out by Weil (2009), “Rent seeking usually arises in cases where government policy creates an artificial or contrived rent, such as through licenses or protected monopolies.” (p.288). In other words, the opportunities for rent seeking

1 The Corruption Perceptions Index (CPI)
2 Despite Pindyck and Rubinfeld’s focus on firms, we will extend the definition to entail all actors in the economy.
usually arise in the public sector. This coheres perfectly well with the focus of this paper, which is on corruption in the public sector as stated in the introduction.

The pursuit of these rents seems natural and as Assiotis and Sylwester (2010) state, some level of rent seeking is inevitable in every political system. However, as will be shown later in this paper, rent seeking activities consume resources (Shleifer and Vishny, 1993), misallocates scarce resources (Assiotis and Sylwester, 2010), and hinders economic growth (North, as cited in Assiotis and Sylwester, 2010). Therefore, one needs to define the legality of rent seeking as well as of the established economic rents to ensure, that the rent seeking behavior is not corrupted.

As Murphy, Shleifer and Vishny (as cited in Assiotis and Sylwester, 2010) argue, rent seeking can be divided into corruption – which is illegal – and lobbying – which is legal. Harstad and Svensson (as cited in Assiotis and Sylwester, 2010, p. 7) describe this distinction very well, by arguing that the rules can be switched through lobbying whereas corruption bends the rules. This description leaves no doubt as to which is legal and which is not. The point is, that some political decisions may reward others – including the politician who imposed the law – than who was originally meant to benefit from the decisions. Examples of such reward could be an increase in the probability of that politician being re-elected (Jain, 2001). Whether this is a fortunate by-product of a decision or the underlying and secret incentive of the decision is not trivial. In order to clarify which of the two is the case, Jain (2001) presents a framework for evaluating, whether the rent seeking behavior in question can be characterized as being of illegal or legal nature. Three conditions need to be satisfied for the behavior to be legal: Firstly, the influencing of the decision makers should occur in a competitive game where all players know the rules, and as such act on an equal, competitive basis. Secondly, No secret or side payments should occur and thirdly, none of the opposing groups can benefit from the income earned by the other group. If one of these three conditions is violated, Jain argues, that rent seeking behavior of legal nature becomes illegal.

\[\text{Obviously, as Assiotis and Sylwester (2010) point out, what is legal in one country is not necessarily legal in another. Defining the point at which lobbying becomes illegal corruption may therefore be difficult.}\]
Having settled on a definition of corruption and examined the underlying concept of rent seeking, the concept of corruption can now be investigated on a deeper level. After establishing that corruption, in accordance with the definition used in this paper, evolves in the public sector, it should be stressed that it indeed does matter where and in what part of the public sector the corrupted actions occur. Jain (2001) distinguishes between three types of corruption based on where they occur and on the types of decisions that are influenced by corruption. These are grand corruption, bureaucratic corruption, and legislative corruption.

Grand corruption is found within the political elite and it is the most vitiating type of corruption. As the corrupted decisions come from the absolute top of the public hierarchy, which is supposed to balance the interests of the entire society, this type of corruption can affect everyone in the country. Often this type of corruption refers to how the political elite affects economic policies in order to create the largest benefits for themselves. The political elite can affect the national policies or the implementation of these to serve its own interests and thereby divert the allocation of resources from the populace to themselves. Public spending therefore gets allocated to the sectors where the greatest potential for private gains exists for the corrupted elite. As such, this type of corruption produces serious consequences for a country.

The second type of corruption, which Jain (2001) mentions, is the Bureaucratic type of corruption. This type of corruption includes two links. One link is the one between the political elite and the bureaucrats. The other is what is also known as low-level corruption as it is present in the lower levels of the public bureaucracy – the level that interacts with the populace (Gupta, Davoodi and Tiongson, 2001). In regards to low-level corruption, corrupted officials take bribes to perform a service or to speed up a bureaucratic procedure (a phenomenon also known as speed money (Mauro, 1995)). In addition, the officials can extract bribes to

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4 Jain discusses these three distinctions in relation to democratic societies. In this paper this is disregarded as it is assumed that having power of the general public indeed is public power, irrespective of whether it is obtained through democratic processes.

5 This type of corruption is also called high-level corruption as it occurs in the higher levels of the public sector. (Gupta, Davoodi and Tiongson, 2001). This paper will, however, use the term grand corruption.

6 The focus in this paper is on the second link – low-level corruption.
perform tasks assigned to them by the political elite\textsuperscript{7} or to perform tasks, which they are not supposed or delegated to do. Low-level corruption can even be found in the judiciary where bribes can decrease the costs or legal penalties faced by a person.

Thirdly, Jain (2001) comments on legislative corruption. This is the kind of corruption that affects the voting behavior of the legislators. People with specific interests or groups of people who share common interests can bribe the legislative to enact laws that make it easier, more profitable, or favorable to pursue economic rents associated with their activities. This type of corruption also includes ‘vote-buying’ behavior, where legislators in their attempt to be re-elected give or take bribes or perform other corrupted activities. Officials, who wish some specific act passed and for this reason, perform corrupted actions, also falls under this notion.

By now, an understanding of corruption is established. The definition of corruption used in this paper, how rent seeking is an underlying factor of corruption and at what point actions can be classified as corrupted, is discussed. In addition, it is presented, that corruption can be divided into grand corruption, bureaucratic corruption, or legislative corruption depending on where and in what part of the public sector the corrupted actions occur.

Consequently, as the reader knows what corruption is, the focus can now turn to examining the causes of corruption.

2.2 THE CAUSES

An important note to emphasize in regards to this subsection is, that the causal direction of the causes\textsuperscript{8} of corruption will not be examined. The quite simple reason for this is, that the causal direction is heatedly discussed in the literature. The following discussion serves to illustrate this point:

\textsuperscript{7} Which is done through the first of the two links. In assigning the task, bribes may be given or received by both parties.

\textsuperscript{8} This premise of causal direction is in place in regards to the consequences of corruption as well. These are presented in a later subsection. Some of the factors that are addressed as causes of corruption in this subsection, may thus also be referred to as consequences of corruption in the subsection \textit{The Consequences}. 
Shleifer and Vishny (1993) argue – based on their literature review – that corruption is disruptive to development and as such, causes less development. Treisman (2000) argues – based on his own analysis – that higher development causes less corruption. Jain (2001) argues, that the causes and consequences of, and even the solutions for corruption, are often intertwined. In addition to the arguments above, Mauro (1997) states that the question of the directional causality remains unsolved.

Unless stated or discussed otherwise, it is assumed that the factors mentioned in this subsection cause corruption, as this is what the evidence, discovered in the literature, points towards. In addition, it should be mentioned that this subsection should not be regarded an exhaustive list of causes of corruption, but rather a collection of those causes which are found to be the most interesting in relation to the purpose of this paper.

The existing literature seems to have found consensus regarding some causes, but struggles to agree on others. Firstly, the causes where consensus seems to prevail in regards to their effect on corruption will be presented. Secondly, causes, whose effects on corruption, which are subject to more discrepancy in the literature, will follow.

The most important determinant of corruption is, according to Paldam (2002), the level of wealth. Dreher et al. (2007) support the importance of this variable as a determinant of corruption and Rose-Ackerman (2008) finds that income and wealth is found to be both a cause and a consequence of corruption. Treisman (2000) argues that wealth is one of the variables in his analysis that explains the level of corruption best and Buehn and Schneider (2012) as well find that lower levels of economic development is associated with higher levels of corruption.

As clearly shown above, consensus is found in the literature in regards to the effects of wealth on corruption.

An economy’s degree of openness has, by several authors, been found to be associated with corruption. Ades and Di Tella (as cited in Treisman, 2000) discovers that openness may reduce corruption. Mauro (1997) argues, that as import and trade restrictions create incentives for rent seeking activities, corruption may increase. This is due to the point, that even though lobbyism may be used in order to obtain the
economic rents, associated with imposed tariffs, bribes may be used whenever lobbyism does not prove effective. Dreher et al. (2007) argue in line with this.

The effect of bureaucratic inefficiency as expressed through the amount of regulations, seems to be another cause, which the literature agrees on. Tanzi (1998) argues, that the way the public sector functions and carries out its operations affects the level of corruption. Tanzi maintains that the more regulations, with which the public sector operates and which need to be complied with through permits, licenses, passports, visas, etc., the higher the level of corruption exists. In addition, regulations place power with the government officials who are responsible for enforcing the regulations (Jain, 2001), and this establishes the opportunities for extracting bribes. Further, De Soto (as cited in Shleifer and Vishny, 1993) argues, that many regulations, in corrupted countries, exist with the primary purpose of giving officials the power to extract bribes from enforcing these regulations.

As described in the previous subsection, corruption can be viewed as rent seeking which occurs when officials can achieve higher rents from misusing their power (Jain, 2001). As long as government officials enjoy such entrusted power, bribes can be extracted (Shleifer and Vishny, 1993). According to Jain (2001) three factors have to be present for corruption to occur. These are, firstly, that discretionary powers are allocated to certain officials and secondly, that the possibility of obtaining economic rents are associated with these powers. Both of these premises have been explained above. Thirdly, the probability of getting caught or punished for the corrupted actions has to be sufficiently low. When these factors are all present, officials will at least consider taking bribes.

Based on these arguments, this paper interprets a strong link between bureaucratic inefficiency and the level of corruption. Or formulated differently, the more government inference, the higher the level of corruption. This point is supported by Dreher et al. (2007) and Buehn and Schneider (2012).

As well as bureaucratic inefficiency, bureaucratic procedures have an effect on corruption. If these are slow, those who need the permits, licenses, etc. to comply with

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9 The reader should be aware, that Jain states that the empirical literature on the validity of these three elements does neither provide evidence for the relative importance of these elements, nor that they fully describe corruption.
10 This premise will be touched upon in the following subsection.
the regulations, may offer a bribe to the officials to speed up the process. This is the concept of speed money as mentioned earlier. Tanzi (1998) indicates, that officials may intentionally slow down procedures in order to extract such bribes from those who need the permits and licenses and Mauro (1995) further argues that this will have the effect of an evil spiral: As speed money becomes a custom, officials will deliberately slow down procedures of granting the above-mentioned licenses and permits until a bribe is received.

Political factors affect the level of corruption according to Dreher et al. (2007) who argue, that deficiencies in the political system increase corruption. In addition, they state that an established democracy can, through political competition, increase transparency and accountability, which in turn lowers corruption. This conclusion is supported by Buehn and Schneider (2012), who maintain, that weaker government effectiveness, leads to a higher level of corruption. In addition they argue, that promoting political competition and increasing transparency and accountability reduces the scope of corruption.

In relation to culture, neither Paldam (2002) nor Treisman (2000) find evidence to support the argument that this is a determinant for corruption11. Treisman (2000) claims, that his work provides a model, that makes it possible to subject these speculations to scrutiny. Paldam (2002), who likewise argues on the basis of the findings of his model, find little evidence for the argument, that corruption is so deeply imbedded in a country’s culture that it is unchangeable. He discovers that corruption varies greatly within the same cultural area, whereas the level of GDP is more similar. For this reason he argues, “Culture is thus an inferior explanation of the level of corruption” (p.238).

This paper interprets consensus of the fact the question of the influence of culture on corruption remains unsolved.

As stated, the above-mentioned causes have been found to share consensus of opinion in the literature. However, several other causes have been discussed and

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11 At least when working with the time-span as will be analysed in this paper.
concluded upon with less consensus. The focus will now turn to presenting the causes that are subject to more discrepancy.

Ethno-linguistic fragmentation is one factor that is subject to this discrepancy: Mauro (1995, 1997) finds that ethno-linguistic fragmentation is correlated with corruption. Rose–Ackerman (2008) finds, that corruption is higher in countries with higher ethno linguistic fragmentation. However, Treisman (2000), basing his argument on his findings, is more reluctant to conclude that ethno-linguistic fragmentation increases corruption. As a result he holds, that ethno-linguistic fragmentation may decrease economic development and as such only indirectly have an effect on corruption.

Whether school enrollment and the extend to which a population is educated is a cause of corruption, seems to be a question that is subject to further analysis. Dreher et al. (2007) conclude that low school enrollment indeed does increase corruption, whereas Buehn and Schneider (2012) find no such evidence. Mauro (1997) shows, approaching the question from a slightly different perspective, that the fraction of government spending used on education is negatively correlated with corruption. One could infer from this that, as less money is spend on education, the population gradually becomes less educated. Whether this results in an increase in corruption or a high level of corruption has resulted in the smaller fraction of government spending dedicated to education, is out of the scope of this paper, as described above. However, one could discover a relation.

That corruption is complex should by now be clear. The literature has found consensus regarding some causes of corruption whereas less convergence dominate in the question of the validity of others. Wealth, openness, bureaucratic inefficiency, and political factors enjoy consensus of opinion while the question of the effects of culture on corruption remains unsolved. Ethno linguistic fragmentation and education receives more discrepancy in the literature.

The following subsection will explain the practical functioning of corruption.
2.3 THE FUNCTIONING

Knowing the actors involved in corruption and the causes of corruption, detected in this paper, it can now be explained how corruption functions.

Firstly, low-level corruption will be exemplified with four examples and then these will be evaluated with two frameworks. Thirdly, grand corruption will be exemplified with three examples. Lastly, low-level corruption, grand corruption as well as the limitations regarding the abilities of the CPI, in regards to distinguishing between the two, will be discussed.

Rose-Ackerman (2008) considers four generic examples of low-level corruption. The first example regards the allocation of a scarce public benefit. Here, the corrupted officials may assign these benefits to the qualified applicants on the basis of which of them is willing to pay the highest price for them rather than on objective assessments. The second example concerns the allocation of public aid, which is to be allocated based on need. The officials' assessment of need cannot be precisely measured and as such it cannot be disregarded that they may be affected by bribes offered by those who can pay the bribe. This, inherently, results in a neglect of those who need the aid the most, as they cannot finance a bribe due to the implicit fact that they are in need of the aid. Thirdly, Rose-Ackerman (2008) discusses the concept of speed money, in line with the point made by Mauro (1995), as already presented in this paper. Here, officials may deliberately delay the processes and procedures additionally to extract more and higher bribes from the populace. Lastly, Rose-Ackerman (2008) presents the situation where an official may overlook an illegal action or ignore the absence of tax payments in return for a bribe.

To evaluate these examples, the distinction between corruption with and without theft from the government, put forward by Shleifer and Vishny (1993), is relevant to present. This distinction reflects two ways in which a corrupted government official can act. In both distinctions the government official is to provide a good or a service at a cost, set by the government.

In scenario A, a bribe is added on top of the government set, official price. The entire official price received from a sale is handed over to the government while
the official keeps the added bribe. In this case the government receives the expected income from providing the good or service, but the price the populace has to pay becomes the official price, plus the bribe demanded by the official.

Despite Shleifer and Vishny’s (1993) argumentation, that this method of extracting bribes is without stealing from the government, one could reflect on what the consequences for adding a bribe does to future demand of the good or service. In line with the interpretation presented by Buehn and Schneider (2012), the bribe acts like an extra tax, which may drive people underground\(^\text{12}\) or at least try to escape having to buy the good or service. In the light of this view, the bribe may actually cause the future demand of the good or service to drop and as such, the government will lose future sales. The official may thus be ruining otherwise secured future income because of her actions, ceteris paribus.

In scenario B, argued for by Shleifer and Vishny (1993), the official does not hand anything over to the government. As a result the government loses the entire official price. In addition, the official may provide the service or good to the populace at a lower price, which inherently lowers the cost the populace will have to pay for the service or good. The government loses all the income from the provision of the good or service, while the populace only pays the bribe to the official for the good or service.

In relation to Rose-Ackerman’s (2008) examples of low-level corruption presented previously in this subsection, the first, second, and third example are within the scenario A, of corrupted activities that do not include stealing from the government. The official does not disregard the official price of providing a good or service in any of these situations. This is due to the simple fact, that all of the abovementioned situations evolve around services or goods that the government provides for free. The fourth example, however, belongs to scenario B, of corrupted activities with theft as the government loses the revenue earned through taxes, or fails to impose the cost in terms of the punishment that illegal activities should give rise to\(^\text{13}\).

\(^{12}\) By stating that the bribe drives people underground, it is meant, making them prefer operating in the shadow economy.

\(^{13}\) For the purpose of this argument it is considered trivial to discuss, that the government actually saves the costs of penalizing a person for illegal actions, as failing to impose these
In addition, all the examples fulfill the framework by Jain (2001) as presented earlier in this paper. This states that the official needs to have discretional powers, that economic rents are associated with this power and thirdly, that the probability of getting penalized for the corrupted actions is sufficiently low.

Increasing the probability of conviction and penalty for taking bribes does not necessarily lead to the officials becoming less corrupted. Even though Goel and Rich (as cited in Jain, 2001) conclude that increasing the probability of conviction indeed does discourage bribe taking, Shleifer and Vishny (1993) argue that while penalties may change the size or supply of bribes charged by the official, they will not cause corruption to decrease and as such not address the essence of the problem.

Shleifer and Vishny (1993) argue further, that officials go unpunished because their bosses receive a part of the rent from the bribes. Taking this potential hierarchical connection – or cooperation – in the public sector into consideration, the issue of low-level corruption becomes an issue of high-level, or, grand corruption.

Grand corruption, as mentioned in the subsection *What it is*, is the most detrimental and disruptive kind of corruption (Paldam, 2002; Rose-Ackerman, 2008). Rose-Ackerman (2008) highlights three interesting examples of grand corruption: The first case is that of top police officials organizing large-scale corrupt activities in collaboration with organized crime groups. This can cause tax offices, public regulatory inspectorates and the like to collapse and transform into serving the sole purpose of generating money through corrupted activities. Secondly, she addresses the issue of grand corruption on government spending. Grand corruption can change the limits in the types of spending permitted to certain sectors and areas and undermine the imposed limits of spending. In addition, it may subvert sources of funds. The third example is that of initiating large-scale projects, privatizing major firms, allocating natural resource endowments to specific companies, or the like for the purpose of high profile politicians’ private gains in terms of payoffs and kickbacks from the decisions.

costs in terms of penalty, is regarded similar to forgoing a benefit in terms of preventing future or current illegal activities. In addition, not preventing illegal activities may increase future social costs.
In relation to the discussion of the differences in the societal impact resulting from grand corruption and low-level corruption, Bardhan (1997) presents an interesting insight. He states, that in the former communist Russia, the collection of bribes was centralized and effectively monitored. The KGB could even help in the process of monitoring any deviations in the procedures of collecting bribes as put forward by the political elite. As a result the system (although pervaded by grand corruption) functioned very efficiently. In post-communist Russia the collection of bribes is no longer centralized and everybody now attempts to maximize their own revenue from bribe collection, which is far more inefficient.

This insight is interesting to add to the discussion of how corruption functions, as Bardhan’s input suggest an image of the effect of grand corruption which is more blurred than one would otherwise imagine. Disregarding the discussion of severity resulting from the two types of corruption, one can question, based on Bardhan’s discussion, whether the more detrimental, grand corruption, actually produces a more efficient and in addition, perhaps, a more reliable system than the less centralized system of post-communist Russia where low-level corruption dominates.

Shleifer and Vishny (1993) present a well-suited analogy explaining the mechanisms of Bardhan’s point: They distinguish between three situations in which a road is tolled. The first one is where a monopoly exists on charging a toll. Paying a one-time toll payment will allow drivers to use the road. Shleifer and Vishny (1993) refer to this situation as a joint monopoly. The second situation is one where everybody can erect a tollbooth and charge a toll of whatever amount they wish, regardless of the number of tollbooths already erected along the road. This situation is named an independent monopoly as independent monopolies are created along the road. Thirdly, a situation of competition is presented, where multiple parties are competing to erect a tollbooth.

\[14\] At least in the case of Russia.
\[15\] In fact, Bardhan refers to the exact same mechanism, presented by Shleifer and Vishny (1993), in his paper.
\[16\] Shleifer and Vishny (1993) use the expression “joint monopoly” to describe a situation where two government goods or services are needed and one monopolist enjoys a monopoly on both goods or services, hence the word joint. For this example however, the word ”joint”, as only one service is in question, could be synonymous for ”collaborative”, meaning that only one tollbooth is erected on the entire road.
\[17\] The third case is not relevant in the discussion presented by Bardhan and will not be commented on any further.
Applying this analogy to Bardhan’s discussion, former communist Russia would be a case of a joint monopoly. Despite having to pay a toll\(^\text{18}\) to the authorities, drivers did get permission to use the entire road after having paid that toll. Post-communist Russia however, is the case of an independent monopoly. As bribe-collection is no longer coordinated from the elite, all government agencies charge a bribe, whose size and quantity is completely independent of the size and quantities of bribes charged by other government agencies. The level of bribes is lowest in the first case and thus more efficient than the second case.

Despite the diversity in the effects of low-level and grand corruption, this paper cannot distinguish between the two in its analysis and conclusion, as the CPI does not discriminate between these (Mauro, 1997). However, as the two types, as argued above, varies in their severity, extend, and hierarchical position in the public sector, the distinction is important to realize in order to understand how corruption functions.

After having established, what this paper regards as corruption, what causes corruption and how corruption functions, it will now turn to exploring, what the consequences of corruption on a society are. The following subsection addresses this particular matter.

### 2.4 THE CONSEQUENCES

The consequences of corruption have been found by various researchers, scholars, international organizations, etc. to be numerous, diverse and devastating. This is illustrated by the following three quotations.

Ban Ki-moon formulates, in the message of the Secretary-General for 2011 on the International Anti-Corruption Day 2011 “Corruption afflicts all countries, undermining social progress and breeding inequality and injustice.“ (United Nations (UN), “International Anti-Corruption Day”, 2011). According to TI, the effects of corruption are four-fold. They encapsulate almost all aspects of society in their formulation stating that, “The cost of corruption can be divided into four main

\(^{18}\) Which obviously is synonymous with a bribe in the context of corruption.
categories: political, economic, social, and environmental” (2012a, para. 4) Finally, the World Bank “…sees corruption as one of the single largest obstacles to economic and social development.” (“World Bank Live, Q&A: Anti-Corruption”, 2012).

Corruption has been found to lower economic growth (Mauro, 1995, 1997; Shleifer and Vishny, 1993; Dreher et al., 2007). However, the way corruption and growth interact is a subject of discussions. As this particular link is the primary focus of this paper, the presentation and discussion of this will be presented later, in its own designated section, Corruption and Growth. This subsection will discuss additional consequences of corruption discovered in the literature.

The remaining part of this subsection will be organized as follows: Firstly, rent seeking will be touched upon. Subsequently the issue of the misallocation of talent due to corruption will be addressed. Thirdly, some of the economically distortionary effects of corruption will be discussed followed by the distortions in investments caused by corruption. Then the issue of competition will be shown and thereafter political legitimacy and general trust will be attended. Lastly, Inequality will be discussed.

As previously established in the subsection What it is, corruption may create large opportunities for rent seeking (Mauro, 1997; Paldam, 2002). The consequences of people pursuing these rents are far reaching and numerous as will be shown in the following. As this paper concludes that rent seeking is the driving force that causes many of the consequences, which will be explained in the following, the reader should have the concept of rent seeking in mind throughout this subsection.

In a corrupted system, money is channeled through to the sectors, industries or specific positions, where the corrupted elite (in the case of grand corruption) or certain officials (in the case of low-level corruption) see large potential private gains. Financial incentives may cause talented or educated people to engage in rent seeking activities rather than in productive work (Mauro, 1997). In addition, they may even be assigned to rent seeking activities (Murphy, Shleifer and Vishny as cited in Mauro, 1995), especially in countries where grand corruption prevail, as the corrupted elite in these cases may use all the talent they can find in the country to ensure the economic
rents they pursue. Talent will thus be misallocated based on where the highest rents can be obtained.

Corruption acts like an extra tax in the economy that, according to Buehn and Schneider (2012) drives individuals underground to the shadow economy. Not only will the government loose the revenue from the tax collection they forego (Bardhan, 1997), the official economy becomes smaller while the unofficial economy, where no official redistribution of wealth occurs, increases (Buehn and Schneider, 2012). In addition to this, Bardhan (1997) and Shleifer and Vishny (1993) agree, that corruption indeed does act like a tax, but that it is worse and more distortionary than taxation. As Shleifer and Vishny (1993) further argue, this is due to the need of keeping corruption secret. The efforts to avoid detection or penalties create a worse distortion than a regular, government imposed tax would.

Another way corruption distorts an economy, is through investments. Certain investment projects may be favored based on the ease of hiding the gains through bribes in these rather than others (Shleifer and Vishny, 1993). The distortionary effects of corruption thus include a favoring of projects based on the potential for private gains rather than societal – or countrywide – gains.

Numerous authors have found a relation between higher levels of corruption and overinvestments in high profile and potentially useless projects at the expense of more important and useful investments in education and health, which the country indeed needs (TI, 2012a, para. 4; Shleifer and Vishny, 1993; Buehn and Schneider, 2012). Examples of such overinvestments include excessively large infrastructure projects and investments in the national defense. The argument presented in the literature is, that corruption distorts investments and channels them through to the excessively large projects where higher potential for extracting bribes exists and where these can be hidden in an extensive cost structure (Mauro, 1995, 1997; Shleifer and Vishny, 1993).

It is argued in the literature, that corruption distorts competition (Buehn and Schneider, 2012; TI, 2012a, para. 4), which is harmful to the economy’s equilibrium level, as it will fluctuate from its actual equilibrium based on how much corruption changes the supply and demand of goods and services. As Shleifer and Vishny (1993)
point out, officials may ban the importation of some goods to induce substitution into others if the extraction of bribes is more easily hidden in these. In addition, Mauro (1997) point out, that the importation of specific foreign goods can be subjected to tariffs to protect a home industry. By bribing the government officials who are responsible for evaluating such tariffs, the home industry can secure a monopoly and thus the economic rents associated with such monopoly. This can obviously have significant effects on the economy, as banning the importation restricts the supply of the good and by definition obstruct competition.

Political legitimacy is, according to Rose-Ackerman (2008), absent for corrupted governments. As TI argues, this is due to them misusing their entrusted powers for private gains (2012a, para. 4). Besides losing political legitimacy, the government loses the trust of the people (TI, 2012a, para. 4; Paldam, 2002, Buehn and Schneider, 2012). This can in turn produce an increasingly harder political and social environment in the country and this does not foster a development into a less corrupted society. An evil spiral evolves where developing into a less corrupted society becomes increasingly difficult.

Paldam (2002) indeed argues in favor of this line of thought based on his model. Identifying four different dynamic mechanisms, he argues that a more corrupted society tends to develop into being ever more corrupted. On the other hand, a less corrupted society will develop towards becoming ever less corrupted. The seesaw mechanisms in the model controlling the development are thus dynamic and can either pull towards less corruption or towards more corruption. The direction depends on, whether the country in question is relatively more or less corrupted than the pivot, which Paldam (2002) argues, exists. Only a sufficiently hard push towards reducing corruption can push a country under the pivot and consequently change the developmental trends in the country’s corruption.

Moreover, corruption is found to increase inequality (Dreher et al., 2007) since it produces a more unequal societal income and wealth (re-) distribution as well as undermining programs designed to help the poor (Rose-Ackerman, 2008)\textsuperscript{19}.  

\textsuperscript{19} It should be mentioned, that Rose-Ackerman (2008) also finds, that inequality increases corruption, and as such that the causal directionality runs both ways.
Relating this issue to the concept of rent seeking, as the underlying factor for corruption, increases the potential for understanding the consequences rent-seeking behavior can produce. To put it simple, when a few, but powerful people use their power, which is entrusted to them for the purpose of distributing resources throughout the country, to increase their private gains, the poor – the general population – become even more poor. In addition, the gap between the elite and the general population increases. The resources, which the powerful elite gains, are the ones, which should have been distributed to the ones who need it and as such, inequality increases throughout the country.20

Several consequences of corruption have been presented in addition to hampering economic growth, namely the misallocation of talent, the economic distortions due to the inherent secrecy of corruption, the distortions in investments and competition, the political leaders’ loss of political legitimacy and the increased inequality.

As can be concluded from this subsection, corruption can produce severe consequences. It is therefore not questionable why international organizations such as the OECD (OECD, 2006), the UN (2004) as will be discussed later in the section The Fight Against Corruption, and TI (2012b) all participate in fighting corruption. However, despite the work of these, and many other organizations, corruption seems to be rather stable over time.21 The following section will present the issue of the stability of corruption.

2.5 THE STABILITY

Corruption has been found to be rather stable over time (Dreher et al., 2007). Interestingly, it has also been argued, that when countries grow from being poor and more traditional to being wealthy and more liberal democracies, corruption seems to decrease (Paldam, 2002). These two points could be interpreted to be somewhat contradicting, however, it is important to emphasize, that even though corruption has been found to decrease as countries grow rich, the transition through which this

20 This is an example of grand corruption.
21 Corruption has been found to be stable in the long term; however, it fluctuates from year to year.
happens is very slow (Paldam, 2002; Treisman, 2000). Treisman (2000) argues that after 40 years of consecutive democracy, the level of corruption may decrease slightly. This indeed suggests, that corruption will be reduced very slowly and as such seem stable over long periods of time.

In relation to the discussion of whether a change towards democracy will reduce corruption, Paldam (2002) is skeptical towards the argument that democracy in itself reduces corruption. Assiotis and Sylwester (2010) reaches the similar conclusion, that no clear pattern exists between democratization and changes in corruption.

Furthermore, in the transition from a more controlled economy to a more liberalized, corruption may prevail or even increase, as the process through which an economy is liberalized offers opportunities for rent seeking behavior (Jain, 2001). The argument presented by Jain (2001) is, that even though the goal of liberalizing the economy is to achieve less government intervention, the path towards this goal often includes a high level of government intervention, where opportunities for rent seeking behavior are numerous. Furthermore, he argues that imperfections in the reform process, as well, could lead to rent seeking behavior.

As institutions change during transitions, so does the pattern of bribe collection. If grand corruption has created a very efficient bribe-collecting mechanism, where the elite controls bribes, a transition may cause all the individual officials to maximize their own bribe collection, resulting in an overall increase in bribe-collection and as such, corruption (Shleifer and Vishny, 1993).

Summing up, developing towards a less corrupted society happens very slowly. When substantial constitutional or political changes are enacted with the purpose of reducing corruption, an increase in corruption may occur. However in the long run a decrease in corruption may appear. This suggests, that decreasing the level of corruption in a country is a project with a very long perspective, which demands substantial political or constitutional changes. Implementing these changes is a slow process and as such, corruption may be fairly stable over time.

In conclusion to the section Corruption, it has been established, what corruption is, and how it can be classified, whether an action is corrupted. Further,
selected causes have been established and the practical functioning of corruption as well as its consequences have been discussed. Lastly, the insight that corruption seems to be fairly stable over time has been covered.

The next section examines the concept of economic growth.
ECONOMIC GROWTH

Economic growth is an issue, which receives much attention. Policy makers and international- as well as national leaders, often debate economic growth and how the pursuit of this is most successfully accomplished. A couple of good examples of the attention that it receives are, that the International Monetary Fund (IMF), as one of its founding principles, seeks to promote economic growth through its work (IMF, n.d.). Also, the OECD aims towards facilitating economic growth as exemplified by the issuing of the publication “Economic Policy Reforms: Going for Growth”\(^{22}\) (Johnston, 2005).

Economic growth has the implied effect of enlarging a country’s economy. One may ask why we care about enlarging our economy and by definition, why we care about economic growth. Blanchard explains this very well in his book “Macroeconomics”: “The reason we care about growth is that we care about the standard of living.” (Blanchard, 2009, p.228).

David Weil points to several of the correlations between improved standards of living and GDP growth in his book, “Economic Growth” (2009). Firstly, he argues that life expectancy increases, as a country grows richer. Health and nutrition also improves and even height of the population increases as the economy grows. The level of education is higher in richer countries as well and inequality decreases with economic growth. Weil even states, “…growth is almost always good for the poor…” (2009, p.379). In addition, Weil argues, that even though inequality has increased between countries\(^{23}\), it has decreased within countries, suggesting that the general increase in wealth, which the world has experienced since 1820\(^{24}\), has resulted in a general within-country decrease in inequality.

Many of these factors are correlated with each other. As Weil (2009) exemplifies, improved nutrition results in improved health conditions for the population. Healthier people are better workers and besides making the people who

\(^{22}\) This publication serves the purpose of debating economic reforms and their effects as well as proposing policies that promote stronger economic growth, for each OECD member country.

\(^{23}\) The discussion of inequality between countries is outside the scope and aim of this paper and will therefore not be addressed.

\(^{24}\) Which is the year where Weil’s analysis begins.
are already working more productive, the people who were too weak to work because of malnutrition, can enter the workforce when nutrition is improved.

These correlations serve as an additional argument as to why economic growth is important for a society and as such, why countries and international organizations argue in favor of policies that promote and ensure a successful pursuit of economic growth.

One may question whether increasing the size of a country’s economy improves the living standards of the society as a whole. Indeed, the usage of GDP as a measure of the conditions and living standards for the entire society, and by nature also the poor has been challenged (Lawn and Clarke, 2010). However, this paper will not take part in such discussion, as strong correlations have been found to exist between several indicators of improved living standards and GDP growth, as presented above. The point of interest in this paper is on these correlations rather than on a discussion on the validity of the tool of measurement.

The purpose of this paper is to examine the effect of corruption on economic growth. The concept of corruption has been investigated in the previous section, and the effects of economic growth have now briefly been presented. As opposed to corruption, economic growth is a phenomenon that is well known and well debated in the public environment. Corruption is inherently fuzzy, dubious, and based on shady activities whose extend, and included persons may be difficult to measure and monitor. For this reason, it is assumed that while the reader may not have much insight into corruption, some basic understanding of the phenomenon of economic growth and of its importance, does exist. This paper will therefore not embark on the same extensive presentation, as was the case with the topic of corruption.

The following subsection will explain the fundamental principles of neoclassical economic theory, which this paper, will drawn upon. The second subsection will explain and investigate the Solow growth model.

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25 As in the previous section, directional causality will not be examined, as determining the directional causality would require an individual analysis, which is outside the scope of this paper.
This paper draws on the framework of neoclassical economic theory. This framework is well suited for explaining and analyzing economic growth within the scope of this paper, as well as illustrating the implications corruption may have on economic growth, as found in the previous section. The neoclassical economic theory is appropriate because it is based on assumptions and principles that directly contribute to the understanding of economic growth. This forms the fundament for the analysis in this paper.

The fundamentals of neoclassical economic theory dictate, that the prices are set through the mechanisms of demand and supply. The price, at which both the seller and the buyer are willing to trade, is the market clearing, or equilibrium. Refer to figure 1 for an illustration of the supply and demand curves. The equilibrium is at quantity, \( q^{E} \) and price, \( p^{E} \). If goods are oversupplied, the seller will be willing to reduce the price at which she sells, in order to meet the demand. If demand, on the contrary, exceeds supply, the buyer become willing to pay an additional amount in order to obtain the particular good in question. The price thus builds on scarcity of goods ("The History of Economic Thought Website", n.d.). Under perfect competition, the market regulates this scarcity. If a certain good is undersupplied, additional suppliers will enter the market, hence the scarcity will decrease. If, on the other hand, supply exceeds the demand, some of the suppliers will be forced to shut down. This in turn will decrease the oversupply. Through these dynamic mechanisms, the economy will converge towards its equilibrium as mentioned above.
Returning to figure 1: If the quantity supplied is fixed at a point lower than the equilibrium $q^{EQ}$, such as point $q^R$, permanent scarcity will arise. As indicated in figure 1, the seller can charge a price $p^R$, which is higher than the price at which she becomes willing to trade, $p$. This difference is the scarcity rent (Tietenberg and Lewis, 2009). The shaded area: $A$, less the triangle: $B$, is the additional profit that the seller obtains due to this scarcity rent.

Scarcity rent is a specific type of the economic rent as discussed previously in the section Corruption. By the looks of it, this rent seems to be additional earnings for no extra work, and this is exactly what it is. For this reason, firms, persons, or officials, as discussed in the previous section, can attempt to pursue these rents. This is what is called rent seeking as mentioned earlier.

In addition to above, the neoclassical economic theory builds on the concept of diminishing marginal returns (Rynn, 2001). Hypothesizing, in order to simplify the
explanation, that only two different inputs in a production\textsuperscript{26} exists, namely labor and capital\textsuperscript{27}, the concept holds, that the marginal returns to additional investments in only one input in the economy, are diminishing. In other words: Only increasing one input will eventually produce the result, that the costs and benefits of the addition become equal and as such, further additions will not contribute to further benefits. In this concept, an equilibrium exists as well: The point where the marginal costs and the marginal benefits of one additional unit of input are equal. This is the point where no additional investment in the input should occur and the other input should be considered in order to increase the output.

3.2 THE SOLOW GROWTH MODEL

To analyze the neoclassical view on economic growth, this paper applies the Solow growth model, which is appropriate for analyzing growth and its relation to capital accumulation (buildings, machines, roads, etc.) and investment. According to the Solow model, investment is a driver of economic growth. The model does not stand alone in regards to this argument, as this is one of the underlying principles of neoclassical economic theory.

For the purpose of investigating the hypotheses presented in this paper, fairly strict assumptions will be added to the model. These assumptions will be presented in the following and further commented on in the presentation of the model. This will ensure, that the purposes of the assumptions stand out clearly: Firstly, the effect of human capital and education will be disregarded. Secondly, growth in the workforce as a fraction of the total population is assumed to be constant. Thirdly, technological progress will not be considered and as such, disregarded. Fourth, no distinction between the types of capital will be made, and all types, qualities, attributes, functionalities, etc. of capital will as such be regarded as bearing the same effect to

\textsuperscript{26} As this paper work with the economy in general rather than the production of a good, reference will, from this point and on, be to the economy and not production. The principle is the same.

\textsuperscript{27} It is standard neoclassical conditions, to assume, that capital and labour are the only forms of input (Solow, 1956)
Lastly, and perhaps most importantly, investment will be assumed to include both private and public investment, which is contradicting the original assumption, presented by Solow (1956)\textsuperscript{29}. The reason for this, somewhat risky, assumption is, that for the purpose of analyzing the hypotheses in this paper, it is not important whether the investment is private or public, as the sole aim of including the model is to present a fairly intuitive model for understanding growth. Further, the aim is to illustrate how investment can contribute to both positive as well as “negative growth”\textsuperscript{30}. In addition, this assumption is supported by Barro (1990) who finds that private and public investments can, plausible, be assumed to bear the same effects.

Having established a framework for interpreting the model, a presentation will now follow:

The Solow model evolves around a production function: \( Y = F(K, L) \). This production function shows that output (\( Y \)) is function of capital (\( K \)) and labor (\( L \)). The function (\( F \)) indicates some level of technology or productivity\textsuperscript{31} in the economy. As this paper will investigate a rather simplified version of the Solow model, technological progress will largely be assumed to be constant as mentioned above. However, if this assumption was not in place, changes in technological progress would change the slope of the production function and as such, both the growth path of the economy and the steady state of the economy (which is the point at which the economy ceases to growth as explained below). Looking at figure 2, this output curve can be detected.

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\textsuperscript{28} This is a standard neoclassical assumption (Foss, Foss, Klein, and Klein, 2006)

\textsuperscript{29} This assumption will not be commented on besides this presentation, as it regards a conceptual understanding on the framework of the model, rather than a modification to the mechanisms in the model.

\textsuperscript{30} The term "negative growth" is used as a figurative expression for the term "recession”.

\textsuperscript{31} Which is largely the same in this context. From now on, this will commonly be referred to as technological progress.
In the model, all factors of production are denoted in lower case letters to show that everything is presented on a per worker basis. This allows for the paper to disregard any changes in the population and the labor participation rate. In addition, as human capital and education is disregarded, as mentioned as an assumption above, all workers are assumed to be of equal weight in the economy. Having presented the three above mentioned conditions, that technological progress, the labor participation rate, and human capital and education are constant, the depreciation curve can now be explained.

As these three conditions are in place, the only endogenous type of depreciation is the depreciation of capital \( (K) \). The logic of this is straightforward: As machines age and are used in production, they wear out, become obsolete, or break down. As they either need to be maintained or replaced, they become a cost burden for the economy. This cost burden is what the depreciation curve depicts. The depreciation curve indicates the level of depreciation that is associated with every level of capital in the economy. As all types of capital is assumed to be equal, the
slope of the depreciation curve is constant, implying that additions to the capital stock bear the same cost in terms of depreciation to the economy.

The last curve, which binds the whole model together, is the savings curve. Every economy saves a fraction of its output. Importantly, savings, according to neoclassical principles is equal to investment. As it is investment that is of interest in the model, the curve is labeled investment rather than savings.

The size of this fraction varies from economy to economy. Since the savings rate is a fraction of the total output, this curve will be somewhere below the output curve, depending on the rate of savings. In figure 2 it is depicted just below\textsuperscript{32}.

The growth of the economy is determined by the interaction between the investment curve and the depreciation curve. As long as the investment curve is above the depreciation curve, investments will have the capacity to maintain and replace existing capital as well as invest in new capital. For this reason the economy is growing. At the point where the investment curve and the depreciation curve intersect, the economy’s steady state exists. This is the point, where economic growth will cease to occur. As indicated by the slope of the investment curve, the contribution to growth by additional capital is diminishing as the steady state is approached. In the steady state additional capital will not contribute to further growth. This exemplifies the neoclassical assumption of decreasing returns to capital. The explanation of the steady state is, that at the steady state, the investments can only exactly manage to sustain the capital already contained in the economy and as such, not add any new means of production to it. At this point, capital and labor will no longer suffice as the only inputs to promote economic growth. This is where other factors such as technological progress or human capital can facilitate growth. However, these factors are regarded exogenous to the model presented in this paper, as previously assumed.

It should be emphasized, that, according to the Solow model, every economy, by definition, will converge towards its steady state. Factors, endogenous as well as exogenous to the model presented in this paper, that facilitate the growth path, will establish a new steady state. From that point and on, the economy will converge

\textsuperscript{32} Figure 2 implies that the economy has a saving rate of approximately 75\%, which is an unrealistically high savings rate (Blanchard, 2009). However, as figure 2 only serves as an illustration of the mechanisms, this is not of importance.
towards this. There is, in other words, no one-time solution to eternal growth; new steady states are merely established towards which the economy will converge\textsuperscript{33}. If, for some reason, the economy is above its steady state, the economy will therefore experience a recession in order to reach its steady state. The arrows on the output curve indicate this natural convergence.

Returning to the savings rate, it seems clear that the level of the savings rate determines the point at which the intersection occurs and by definition, at what level of capital the economy’s steady state is. However, the rate of savings will not affect the growth rate in the long run. Merely at what size the economy stops growing (Blanchard, 2009).

A last comment that should be added to the framework presented in the Solow model is, that no distinctions have made between types, qualities, attributes, etc. of capital as assumed previously. All capital is simply regarded of equal functionality and capabilities of adding value to economic growth. Paul Samuelson (Foss et al., 2006) called the type of capital that emerges from this view “shmoo”, representing the implications such an assumption has. Factors such as substitutability, and the abovementioned distinctions have been completely disregarded and, by definition, also the effects of variances in these. Obviously this paper, accepts such assumption as the model, despite this, provides a more than sufficient framework for understanding economic growth within the scope of this paper. The reader should, however, be aware of the fact, that neoclassical theory receives critique in the literature for this assumption (Foss et al., 2006).

In this section, the importance of economic growth as well its correlations with mediators of living standards have been presented. Further, the fundamentals of neoclassical economic theory have been addressed with a focus on the basics of the supply- and demand curves, as well as the mechanisms of the market clearing, or, equilibrium. The concept of scarcity rent was introduced and presented within the framework of the supply- and demand curves. In order to analyze and understand the

\textsuperscript{33} Concepts such as “Balanced Growth” as presented by Blanchard (2009, p.275), where growth occurs in the steady state is disregarded in this paper. In the context of this paper, introducing such concepts will be well outside the scope.
mechanisms of economic growth, the Solow model was explained. In relation to this, the importance of investment as a driver of economic growth was pointed out.

The relation between corruption and economic growth can now be addressed in the following section.
4. CORRUPTION AND GROWTH

An understanding of corruption and a framework for analyzing economic growth have now been established. Corruption, its implications and consequences have been discussed and the importance of achieving economic growth as well as a model for understanding growth is presented. This forms the basis for investigating, what the literature has found to be the consequences of corruption on economic growth. The consequences found in the section, Corruption will, in this section, be combined with the economic models presented in the section Economic Growth.

As found in the subsection The Causes, evidence was presented that GDP per capita is associated with the level of corruption. This was found to enjoy consensus of opinion. The data employed in this paper, supports this argument, as indicated by graph 1 below.

**GRAPH 1: GDP PER CAPITA PLOTTED AGAINST CPI IN THE PERIOD 1995 TO 2009**
As the trend clearly shows, a lower level of corruption\textsuperscript{34} is associated with a higher level of GDP per capita.

Knowing the relation between corruption and economic development as presented above, it seems suitable to discover, how corruption affects economic growth according to the existing literature. This is specifically relevant as the effect of corruption on economic growth, is less clear, than on the level of development (Anders and Gray, 2006). An interesting inside to add to the blurry picture of how or whether corruption affects economic growth, is the finding put forward by Assiotis and Sylwester (2010). They argue that the effect of corruption on growth is not constant but subject to a country’s political regime. Further, they argue that controlling corruption has larger effects on growth in non-democracies than in democracies. In addition, they find, that controlling corruption in, what they call strong democracies\textsuperscript{35} can even reduce growth.

No clear direct effect, from corruption on growth, seems to emerge from the literature review, presented in this paper. Rather, it seems that corruption affects mediators for growth, which results in an indirect effect. Many of the consequences of corruption, found in this paper, also acts as these mediators for the effects of corruption on growth. The relation between these mediators, when affected by corruption, and growth will now be explained. Specifically, the two mediators, which this section will focus on, namely competition and investment, will be addressed.

The supply and demand function, which was presented in the subsection; The Fundamentals of Neoclassical Economic Theory was made under the assumption of perfect competition. Under this assumption, neoclassical economic theory dictates, that the prices at which the supplier sells is set at a point where marginal cost is equal to average revenue. If this assumption is disrupted or abandoned, another, less efficient situation, for society, can arise. This will be examined in the following.

\textsuperscript{34} Note the inverse scale of measurement of corruption: A lower numerical value indicates a higher level of corruption and vice versa.

\textsuperscript{35} Assiotis and Sylwester (2010) use the Freedom House (Gastil) index, however inverted and rescaled, to measure the level of democracy.
As mentioned, one consequence of corruption is the distortion of competition. This distortion, and its effect on society, is illustrated in figure 3 (a). From (a), it can be seen, that the situation is the same as shown in figure 1 regarding the effects of scarcity rent. The quantity is at a lower point than the equilibrium dictates. This can be due to rent seeking of an illegal nature, hence corruption. An example of how this situation can arise, due to corruption, will now be presented:

An importer needs an import license to stay in business. If it is acquired through the official procedure, the process is long and costly. However, if a bribe is paid, the procedure will be cheaper and faster processed. Eventually, those who acquire the permit, through the official procedure, will go out of business because those who pay the bribe will outperform them. Assuming that one importer outperforms the others by bribing the officials, a monopolistic situation can arise. Being the sole supplier to the market, he can restrict the quantity to \( q^R \). As with scarcity rent, the price will be set at an abnormal level, namely \( p^R \), resulting in an economic rent to the supplier. Here, the quantity provided is set at the point where the marginal cost is equal to the marginal revenue. At this point the monopolist maximizes his profit.

This inefficiency produces a distortion in the market. The shaded area in (b) indicates the deadweight loss, which is the price the society pays for this distortion. Assuming that this microeconomic mechanism can be scaled up to a macroeconomic perspective, one could speculate whether this inefficiency could be a determinant of the country’s level of wealth.\(^{36}\)

\(^{36}\) The deadweight loss in figure 3 (b) is the value which, we postulate, is removed form the country’s GDP. In other words, scaling the microeconomic deadweight loss up to a macroeconomic level, the GDP is lower than it could be.
The level of distortion does not necessarily affect the country’s growth rate. However, one could wonder whether, the relative change in the deadweight loss, could be reflected in the growth rate, as the country changes its level of distortion, which is caused by corruption.

The second mediator, as addressed earlier in this subsection, is investment. This was found to be negatively affected by corruption in the subsection The Consequences. The Solow model explained the importance of investment as a driver of economic growth, so the relevance of this finding should not be questionable. However, the interesting question remains, through which relations corruption affects growth. Jain (2001) finds three direct ways, in which the distortion of investment by corruption, affects growth. These are: The misallocation of human capital – or talent –, the misallocation of funds, and lastly, a reduced incentive for entrepreneurs to engage in innovation. Those three ways will be addressed in the following:
One way, through which corruption affects growth through investment, is the misallocation of human capital, or as this paper has referred to it; misallocation of talent. This is also pointed out by Mauro (1997), who points to the fact that as rent seeking misallocates talent (as previously discussed), it actually restrains people from participating in productive work, and as such, contribute to the economic growth. In addition, Mauro states that this may have adverse consequences for the growth rather than merely not contributing to growth. This misallocation of talent is both to positions in the private and public sector, as well as to positions where bribes are taken and where bribes are given. In relation to the mechanism presented in figure 3, talent will be allocated to industries or positions where a monopolistic situation exists (Jain, 2001). Firstly, this can, as shown above, be favored industries, which through rent seeking activities have obtained monopoly power. As Larsen (2006) point out\(^\text{37}\), these industries will seek to attract the more talented people by offering higher returns. This will cause talent to move from industries with competition to stronger industries with monopolistic power. This is because the latter, due to the economic rents they achieve, can offer the above mentioned higher returns. Due to this, the competitive industries, which potentially can contribute to the growth of the economy losses the talented part of the workforce. Larsen (2006) refers to the negative effect, that technology, and the progress and development of know-how within this is lost. Allowing for technological progress in the Solow model as presented in the subsection *The Solow Model*, the loss of this can cause the output curve not to shift upwards, ceteris paribus. As such, the growth path will not be changed.

Secondly, this effect on growth, can also be found in public positions, where the talented people obtain monopolistic power of the issuing of permits, licenses, visas, etc., which produces opportunities for extracting bribes as thoroughly discussed in the section *Corruption*.

Another way, through which Jain (2001) finds corruption to affect growth through investments, is the misallocation of financial funds.

As explained earlier, the Solow model does not distinguish between the types of investments made. Loosening the assumption of “shmoo” capital leads us to the

\(^{37}\) Larsen (2006) argues for these mechanisms in relation to the resource curse. However, they apply to the general situation of the effects of corrupted rent seeking activities as well.
next explanation: Investments made, when corruption is highly present, tends to be of low quality in comparison with the alternative investment opportunities. Stated differently: Instead of investing in projects of need, the investments are spend on huge projects either because of their extravagant value or because of their size, say a 50 kilometer long, ten-lane highway in an area with no traffic.\(^{38}\)

Shleifer and Vishny (1993) draw attention to the secrecy, which is inherent to corruption, as detrimental to growth. They argue, that the secrecy can shift investments away from the highest value projects to potentially useless projects based on where bribe extraction can most easily be hidden.

Investments in such projects leads to extreme maintenance cost and thereby depreciation in accordance with the interpretation of depreciation in the Solow Model. Not only is the value added non-existing, since the highway is barely used, but worse, the alternative investment opportunities which bear a higher opportunity value, is not invested in, and thereby not adding value.

The third situation, though which Jain (2001) argues that corruption affects growth through investments, is by decreasing the incentives for entrepreneurs to engage in innovation. Murphy, Shleifer and Vishny (as cited in Assiotis and Sylwester, 2010) point out, that innovation is a driver of growth. By hampering the incentive for innovative entrepreneurs, no alternative investment opportunities emerge and the progress therefore stagnates.

Some of the possible relations between corruption and growth have now been investigated. Competition can be hampered through successful rent-seeking activities, which create monopolies. In addition, investment is found to be a mediator of corruption on growth. Three explanations, based on the reasoning put forward by Jain (2001) have been found and discussed.

The focus will now turn to the empirical analysis of the relation between corruption and growth.

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\(^{38}\) The example serves only as illustration and is constructed after the Danish saying: “exaggeration promotes understanding”
5. DATA AND METHODOLOGY

This section intends to give an overview of the data and method used in this paper. Firstly, the choice of dependent- and control variables will be explained in association with their unique features and expected effects. Next, the dataset will be explained. In this subsection common characteristics will be discussed, followed by the development in the period of analysis. Thirdly, outliers in the dataset will be commented on in order to provide the reader with an idea of some exogenous factors that potentially have had an influence on the economic development in the region of interest. Finally, the methodology of the analysis will be described.

5.1 THE DEPENDENT VARIABLE

GDP Growth per capita is the dependent variable. This paper will employ Robert J. Barro’s neoclassical growth model (Barro, 1997) to calculate the growth rates. It is given by:

\[
\Delta \ln \left( \frac{GDP}{Population} \right) = \frac{\ln(GDP \text{ per capita}_t) - \ln(GDP \text{ per capita}_{t-p})}{p}
\]

5.1

Where \( t \) is the base year and \( p \) is the number of years included in the specified period. As this analysis regards the yearly change in GDP per capita, a period has been calculated, for every year, for every country. Barro’s measure is chosen because it belongs to the school of neoclassical economic theory, which is the economic framework of this paper.

5.2 THE INDEPENDENT VARIABLES

In this subsection, the various control variables, which are included in the empirical model, will be explained. These are included isolate the relation between GDP growth per capita and corruption. All variables are chosen because they are believed to have an effect on the growth rate, which must be controlled for in order to isolate the effect of corruption on growth as effectively as possible. In the following, a
list of the variables included, the reasoning for their inclusion in the model\textsuperscript{39}, and their expected effect on growth, is presented:

- *Ln to Initial GDP* is expected to have a negative effect on the growth rate. It is throughout the literature of economic theory well known, that countries with lower initial GDP per capita levels have higher growth rates than countries with higher initial GDP per capita levels\textsuperscript{40} (Blanchard, 2009; Barro, 1997). This can be explained by the “Catch up Effect” (The Economist, n.d.). This effect states, that underdeveloped countries have the opportunity to adopt more advanced technology, developed by advanced economies, at a lower cost and at a higher pace, than developed countries can. The natural logarithm is taken to make the variable symmetric.

- *Government expenditure* is, according to neoclassical economic theory, expected to have an ambiguous effect on the growth rate. It is a common belief among most macroeconomists, that fiscal policy has a positive effect on growth in the short run while it is likely produce a budget deficit in the long run. This is prone to have negative effects on growth (Blanchard, 2009). Since the long run effect of government expenditure is not included\textsuperscript{41}, this variable is expected to have a slightly positive effect on growth, if any. This reasoning is similar to the augments presented by Mauro (1995).

- *EU member* is expected to have a negative effect on the growth rate. This argumentation is based on the findings presented by Bjørnskov (2011), who discovers a significantly negative impact on the growth rate from this variable. An explanation to this could be the fact that applicant countries have to comply with the requirements for acceptance, as put forward by the European Union (EU, “Conditions for Enlargement”, 2012). In order to comply with these requirements, the countries will have to implement certain policies,

\textsuperscript{39} All data sources and source definitions can be found in *Appendix IV*.

\textsuperscript{40} By initial, it is meant the beginning of the calculated period.

\textsuperscript{41} This is due to the inherent difficulty of defining, what the long run is. In addition, the relatively short independent life span of the countries in the dataset makes it difficult to assess long run effects.
which in turn can contribute to additional growth. After the point of acceptance, the growth may however, return to its normal rate. This can be recorded as a negative effect by the variable.

- **Openness** is expected to have a positive effect on the growth rate since increased trade can be seen as a sign of a well functioning economy that enjoys growth. Openness is the total trade, measured as a percentage of GDP. This is supported by Weil (2009) who further argues that countries who are more open to trade tend to be richer. However, it should be noted, that the latter notion is not necessarily an argument for an effect on growth but merely an indication that it could be the case.

- **Investment** is expected to have a positive effect on the growth rate. It is, as previously described, throughout neoclassical economic theory accepted, that increased investment, in physical capital as well as human capital, increases a country’s level of GDP and thereby contributes with a positive effect on the growth rate. The measurement used is Penn World Table’s measure. This is defined as investment share of PPP converted GDP per capita at current prices. The term **investment** is defined in accordance with UNSNA’s definition of gross fixed capital formation\(^{42}\).

- **The Corruption Perception Index (CPI)** (TI, 2011b) is the main variable of interest. TI publishes the CPI on a yearly basis. The index ranges from 0 to 10, where 0 indicates that a country is highly corrupted, while 10 indicates that there is no corruption present. Hence, the higher the index level, the lower level of corruption. As the name **Corruption Perception Index**, indicates, the index is based on perception i.e. Households’ subjective assessment of the corruption level in a given country (Knack, 2007). As perception, inherently, is subjective, this could be a source of bias. Another potential problem, by using the CPI, is that the index is not made for time studies. TI proclaims, that

\(^{42}\) UNSNA (2009) defines gross fixed capital formation as: “…the total value of a producer’s acquisitions, less disposals, of fixed assets during the accounting period plus certain specified expenditure on services that adds to the value of non-produced assets.” It is notable that there is no distinction between public and private investment.
the CPI should not be used for time studies since the reports on which the CPI is constructed, deviates from year to year and from country to country (TI, 2011a, para. 6). The CPI score for each country is, as a minimum, constructed of three un-weighted reports (Knack, 2007). Based on the argumentation put forward by Bjørnskov and Freytag (2010), this paper intends to use it, for a time series study anyway. They argue that the index might be instable in two ways: Firstly, the scale might stretch or contract over time. Secondly, the midpoint of the scale might slide over time. They do not detect any clear signs of scale instability in the index and by including time dummy variables, any instability of the midpoint will be treated.

• *Lagged CPI* is also tested. Since the chosen indicator for corruption is based on perception, the effect of corruption might be delayed. By allowing the previous year’s level of corruption to affect the given years growth rates, a better estimate might be obtained, since business opportunities might not only be evaluated on the current perceived level but most likely also on “how it used to be”.

Knowing the models dependent- and independent variables, the focus will now shift to describing and examining the characteristics of the dataset employed in this paper.

5.3 THE SAMPLE OF FORMER SOVIET COUNTRIES

After the breakdown of the Soviet Union, nearly 30 independent countries emerged. These countries were given a unique chance to start over and rebuild their run down economies and industries under market economy. Ehrlich and Lui (1999) argue, that any government intervention in an economy assigns some resource allocation responsibilities to a bureaucratic structure. Since there often is a mismatch between the prices set through here, and the free market prices, an opportunity for rent seeking, as previous described, arises to close this gap (Ehrlich and Lui, 1999). Since most prices, under command economy, are determined through allocation, the incentive for corruption is potentially high. Unfortunately, not much data exists
regarding the levels of corruption before the fall of the Soviet Union (Ehrlich & Lui 1999). Nonetheless given the above reasoning and the common feature of command economy, it is assumed that the levels of corruption, in the included countries, have been somewhat identical under the Soviet Union. The fact that these countries all, to some extent, have had command economy and all were given the opportunity to start over; through new constitutions and by shifting to market economy, makes this dataset particularly interesting in relation to the focus of this paper.

In order to give a better overview of the economic development, in the region of concern, a graph of the mean GDP per capita growth rates has been calculated and depicted in graph 2. As it can be seen from graph 2, the region experienced, on average, a recession during the period from 1990 to 1995. This is referred to as the transitional problem (Bjørnskov, 2011). The cost of shifting from command economy to market economy is so high, that the first years of transition resulted in this recession. 40 years of command economy, and for some countries even longer, had run down these economies and their industries. Also, Some economic instability, in the early years of these newly established market economies, can be detected. The average growth rate does not reach, what could be seen as, a steady state until after 1995 - five years after the transition.

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43 The mean growth rates have been calculated using Barro’s growth model. All countries are equally weighted in the calculation of the mean.
The period of instability is expressed through relatively large fluctuations with some extreme observations, which is revealed by graph 2. The period of instability and the many outliers do not result in heterogeneity. The reason for this is, that not all of these outliers are relevant in relation to the analysis conducted. In order to better provide an understanding of, why many of these extremes are irrelevant, graph 3 has been made.

Graph 3 illustrates the levels of CPI plotted against time. An average for each time period has been made. As it can be seen from graph 3, the first observation of CPI scores is obtained in 1995. The period of instability and recession, described above, together with the extreme negative outliers, from 1990 to 1995, are therefore of no concern. From 1995 to 2000, many observations are lacking. The low number of observations is a plausible explanation of the fluctuations in the average CPI curve in this period. From 2000 and onwards, the data, for nearly all countries, are available. The average level of corruption seems to have found a steady level. This is in accordance with the findings, previously described in the subsection The Stability. It is worth mentioning, that there is some fluctuations within each country. The unbalanced panel of the CPI can potentially be a problem if the missing observations are correlated with the idiosyncratic error term (Wooldridge, 2009). The authors of
this paper assume that this is not the case, since the missing observations seem to be
due to the choice of TI, rather than to some systematic effect. A summary of the first
obtained observations of the CPI score, for each country, as well as an overview of
missing observations can be found in Appendix I.

GRAPH 3: AVERAGE CPI SCORE IN THE PERIOD 1995 TO 2011

Knowing which outliers that are of no concern, the focus can be turned to
those who are. In order to do this, graph 4 has been made. As it can be seen from
graph 4, the average growth rate, for each country, is without major deviations and
especially if the major outliers are excluded. The average growth rate lies between
10% and 0%. Montenegro is the only country in the dataset, which has experienced a
recession during the period examined, whereas several others have experienced
stagnation or barely any growth. Looking at the outliers, as observed in the previous
graph, both extremely high and dramatically negative rates can be observed. Firstly,
focusing on the negative outliers, the four major outliers, below -30% are Moldova (-
0.3), Tajikistan (-0.3) and Montenegro (-0.31 & -0.47). None of these are of concern
since all observations lie before the period of interest.
Observing some of the extreme growth rates next, graph 2 reveals enormous rates in the period 1996-1997. These extreme observations, belonging to Bosnia & Herzegovina (1996 at 0.44 and 0.31 in 1997), Georgia (1996 at 0.28) and Montenegro (1996 at 0.21), are not of concern either, since the CPI scores are not represented until 2003, 1999 and 2004 respectively. Jumping to the period between 2005 and 2007, extreme outliers can be observed again. These extremes are Azerbaijan (2005-2007) and Croatia (2005). All four observations are of interest since there is corresponding CPI values for these observations. An expanding oil sector and two newly established pipelines can explain these extremes in 2006, in Azerbaijan. These pipelines run through the country and Azerbaijan thereby gained access to the strong European market. No direct explanation has been found for the Croatian outlier.

When taking the reasoning above into account, it can be justified to argue, that all observations lie within a normal range and that no extreme outliers that potentially can cause significant disturbances in the empirical analysis therefore occur.
5.4 METHODOLOGY

As stated in the introduction, the main objective of this paper is to answer the main hypothesis: *As the level of corruption increases, the economic growth rate decreases and vice versa.* This paper will make an empirical analysis of this question based on the sample described above. Due to the unsettled discussion of casual directionality, as presented in the *Delimitation*, this paper will assume that causation mainly runs from corruption to growth. The relationship will therefore be examined through the following model:

\[
\text{Growth}_{it} = \beta_0 + CPI_{it} \beta_1 + \text{Control variable}_{it} \beta_n + \gamma_t + \alpha_i + \epsilon_{it} \number{5.2}
\]

Where \(i\) is country and \(t\) is year. The dependent variable is Barro’s growth rate. \(CPI\) is the main variable of interest. \(Control variable\) is the various variables included in order to control for other effects. \(\gamma_t\) is period dummy variables included to control for year-specific effects that might influence the growth rate in all the countries at the same time. \(\alpha_i\) is the individual unobserved fixed effect, which is fixed over time. Lastly, \(\epsilon_{it}\) is the idiosyncratic error, or time varying error.
6. EMPIRICAL ANALYSIS

In this section, the empirical analysis will be conducted. Firstly, the apparent relation between corruption and growth will be investigated. Secondly, the direct effect will be examined and a validation of the best-fitted type of estimation method will be presented. After the examination of whether any direct effect can be detected, any potential conditional effects will be examined.

In order to give an initial idea of the empirical relation between corruption and the growth rate, these have been plotted against each other in graph 5. The fitted line is almost flat, and if anything, slightly falling, suggesting that when the level of corruption falls, so does growth. This seems quite counterintuitive taking the literature review into account. A last observation, worth mentioning, from graph 5 is, that the fitted line, at no level of corruption, is below zero (some individual observations are, though). In other words: Growth seems to be positive at every level of corruption.

6.1 THE DIRECT EFFECT

Firstly, a general validation of the model will be made as well as a valuation of the best-fitted type of estimation method. An examination and interpretation of the results will follow.

The random effects (RE) and fixed effects (FE) estimators, for equation 5.2, are shown in table 1. Case 1 and 2 include the normal CPI variable while cases 3 and 4 have the lagged effect CPI, CPI(t-1), included instead. All 29 countries are represented. The number of observations ranges from 294 in case 1 and 2, to 265 observations in case 3 and 4. 294 observations seem to be an acceptable number of observations, while 265 observations can be considered to be in the lower end of the range of what would be considered optimal.

<table>
<thead>
<tr>
<th>GDP growth</th>
<th>1 (RE)</th>
<th>2 (FE)</th>
<th>3 (RE)</th>
<th>4 (FE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openess</td>
<td>0.00908</td>
<td>0.01948</td>
<td>0.0161</td>
<td>0.04721**</td>
</tr>
<tr>
<td></td>
<td>(0.01265)</td>
<td>(0.02175)</td>
<td>(0.01258)</td>
<td>(0.02208)</td>
</tr>
<tr>
<td>Government</td>
<td>-0.12925</td>
<td>-0.13263</td>
<td>-0.1830*</td>
<td>-0.29254</td>
</tr>
<tr>
<td>expenditure</td>
<td>(0.09722)</td>
<td>(0.19132)</td>
<td>(0.09649)</td>
<td>(0.18891)</td>
</tr>
<tr>
<td>Ln Initial GDP</td>
<td>-0.52477</td>
<td>-8.51167***</td>
<td>-0.1472</td>
<td>-5.4007</td>
</tr>
<tr>
<td></td>
<td>(0.68632)</td>
<td>(3.18823)</td>
<td>(0.68494)</td>
<td>(3.38639)</td>
</tr>
<tr>
<td>Investment</td>
<td>0.05168</td>
<td>0.05129</td>
<td>0.07144</td>
<td>0.06365</td>
</tr>
<tr>
<td></td>
<td>(0.04769)</td>
<td>(0.07022)</td>
<td>(0.04681)</td>
<td>(0.07033)</td>
</tr>
<tr>
<td>EU member</td>
<td>-2.32828**</td>
<td>-3.57718***</td>
<td>-1.61329*</td>
<td>-2.55158**</td>
</tr>
<tr>
<td></td>
<td>(0.93741)</td>
<td>(1.03823)</td>
<td>(0.91486)</td>
<td>(1.03609)</td>
</tr>
<tr>
<td>CPI</td>
<td>-0.16992</td>
<td>0.61261</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.44289)</td>
<td>(0.60042)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPI(t-1)</td>
<td></td>
<td></td>
<td>-0.80469*</td>
<td>-0.23005</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.44190)</td>
<td>(0.59211)</td>
</tr>
<tr>
<td>Observations</td>
<td>294</td>
<td>294</td>
<td>265</td>
<td>265</td>
</tr>
<tr>
<td>Number of countries</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>R-squared:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.4538</td>
<td>0.474</td>
<td>0.4983</td>
<td>0.5146</td>
</tr>
<tr>
<td></td>
<td>Between</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.2802</td>
<td>0.1299</td>
<td>0.3901</td>
<td>0.1501</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.4328</td>
<td>0.1874</td>
<td>0.4829</td>
<td>0.2922</td>
</tr>
<tr>
<td>Wald/ F test (p-value)</td>
<td>217.35</td>
<td>11.04</td>
<td>234.38</td>
<td>12.11</td>
</tr>
<tr>
<td></td>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td>(0.0000)</td>
</tr>
<tr>
<td>Breusch-Pagan (p-value)</td>
<td>11.03</td>
<td></td>
<td>9.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0009)</td>
<td></td>
<td>(0.0026)</td>
<td></td>
</tr>
<tr>
<td>Hausman (p-value)</td>
<td>18.41</td>
<td>(0.4951)</td>
<td>12.66</td>
<td>(0.7584)</td>
</tr>
<tr>
<td>corr(u i, Xb)</td>
<td>0 (assumed)</td>
<td>-0.8385</td>
<td>0 (assumed)</td>
<td>-0.6983</td>
</tr>
</tbody>
</table>

Note 1: Standard errors in brackets; *,**, and *** denote statistical significance at a 10%, 5% and 1% levels, respectively
The R-squares ($R^2$) ranges from 0.4538 in case 1 to 0.5146 in case 4 which is the fixed effects model with the lagged CPI variable. It should be stressed, that these relatively high $R^2$'s can be explained by the inclusion of time dummy variables. Two explanations for this could be: The time dummy variables control for year-specific effects, that apply to all countries in the dataset. Second, by including more variables in the model, however, the $R^2$ can be artificially inflated (Wooldridge, 2009). We cannot conclude, which of these effects – or to what extend they – cause the relatively high $R^2$.

A Wald test, for RE, and F-test, for FE, is conducted to examine the overall significance of the regressions (Wooldridge, 2009). With P-values at 0.000, in all cases, the Wald test clearly rejects the null-hypothesis and it can therefore be concluded, that the empirical model is acceptable.

After assessing the general validity of the model, different tests can now be conducted, in order to determine the optimal type of estimation method. These will be commented on in the following: Firstly, a Breusch-Pagan Lagrange Multiplier test is conducted to test for panel effects, which would indicate whether the variance over time is different from zero (Torres-Reyna, n.d.). If this is not so a panel data regression cannot be made, and pooled OLS should be preferred. The null hypothesis is rejected with a chi$^2$ value of 11.03 and 9.05 resulting in p-values of 0.000. This indicates that panel effects are present in the panel data. It can therefore be concluded, that a random- or fixed effects model, will be more appropriate than a pooled OLS model.

To determine whether a random- or fixed effects model is the most appropriate treatment to apply, a Hausman test is conducted. In both cases, the p-value indicates a failure to reject the null hypothesis, indicating that the difference in coefficients is not systematic. Intuitively, the Random effects model should therefore be chosen as the preferred method. However, several indicators indicate that doing so, could result in a type 2 error: First of all, relatively big differences between the estimators can be detected. Secondly, the reported correlations between $u$ and $X\beta$, in the fixed effects model, are -0.8385 and -0.6983 in model 2 and 4, respectively$^{44}$.

$^{44}$ This method of comparison can only be used if the exact same variables are included in both regressions due to multicollinearity.
Conducting the Hausman test on the same regression but without time dummy variables yields a P-value of 0.000 and the $H_0$-hypothesis can thereby be rejected. This rejection suggests the choice of fixed effects as the preferred model of estimation. This could indicate, that the inclusion of time dummy variables results in some interference, which affect the Hausman test.

Given all the indications of a false selection of model estimation as mentioned above, this paper will be focusing on the fixed effects estimator. This estimation method is a more convincing method to measure the ceteris paribus effect than the random effects method (Wooldridge, 2009). For this reason the question of the effects of culture can, conveniently, be disregarded. As such, a potential correlation between culture and corruption and a potential effect on growth is irrelevant. The random effects estimators will, however, be stated in the output tables in the remainder of this paper, for the reader to be able to compare the two. By now the validity of the model and the estimation method has been established. The interpretations of the estimators in case 2 and 4 will now follow:

**Openness** is found to be insignificant in case 2 while it is significant at a five-percentage level in case 4. It has the expected positive effect on the growth rate. **Government expenditure** was expected to have a positive effect on the growth rate in the short run. In both cases, however, the effect is negative and insignificant. **Initial GDP** was expected to have a negative effect on the growth rate, which is so in both cases. It was only found to be significant in case 2, however, at a 1-percentage level. **Investment** is in neither of the cases found to be significant, but it does have the expected, positive, sign. In both cases, joining the European Union seems to have a significantly negative effect on the growth rate.

**CPI** is insignificant in both cases. It does, however, have the expected effect on the growth rate. A development towards more corruption will thus yield a decrease in the growth rate, and vice versa. Looking at the lagged effect of CPI in case 4, however, the sign is not as expected. It should be noted that the effect seems to shift from having a negative effect on the growth rate (in case 2) to a positive effect (in case 4), which seems quite counterintuitive.

45 Note the inverted scale of the CPI.
This paper finds no significant evidence of any direct effect of corruption on the growth rate, and therefore continues to investigate any potential indirect effect that could potentially exist.

6.2 THE CONDITIONAL EFFECTS

In order to investigate the indirect effects of corruption, an interaction term has been included in the model. The model constructed will thus look like the following:

\[ \text{Growth}_{it} = \beta_0 + \text{CPI}_{it}\beta_1 + \text{Ctrl var}_{it}\beta_n + \text{CPI} \times \text{Ctrl var}_{it}\beta_2 + \gamma_t + \alpha_i + \epsilon_{it} \]  

6.1

Everything is the same as in model 4.2, except the inclusion of the interaction term \( \text{CPI} \times \text{Ctrl var}_{it}\beta_2 \). The three variables tested for interaction with the \( \text{CPI} \) in this paper are, openness, government expenditure and investment. As explained in previous sections, all three variables are believed to have an effect on the growth rate. This is the reasoning behind the choice of testing the interaction effect on exactly these three variables.

The interaction between Investment and CPI is the only interaction, which is found to be significant. Interaction effects for government expenditure and openness have also been computed. Since none of these interactions are found to be significant, their results and interpretations thereof are not included in this paper but graphs and calculations for these can be found in Appendix II. The focus of this paper will now shift to the following hypothesis:

\( H_1: \text{An increase in investment is associated with an increase in the growth rate when corruption is sufficiently absent, and vice versa when corruption is high.} \)

In table 2, the interaction term for investment is included for CPI and CPI(t-1). Based on the same argumentation as when investigating the direct effect, fixed effects estimations are chosen to calculate the estimators for the indirect effects. An increase in the \( R^2 \) is observed in both cases compared to the model without the interaction term. Looking at the significance of the estimators, for fixed effects in case 6 and 8, it can
be observed that almost all variables included are significant. This is especially so in case 8 where the interaction term is based on the lagged effect of CPI. Every variable is significant, except the variable government expenditure.

### TABLE 2: MAIN RESULTS, LINEAR INTERACTIONS. OUTPUT WITH TIME DUMMY VARIABLES (TIME DUMMY VARIABLES EXCLUDED FROM THE PREVIEW)

<table>
<thead>
<tr>
<th>GDP growth</th>
<th>5 (RE)</th>
<th>6 (FE)</th>
<th>7 (RE)</th>
<th>8 (FE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openness</td>
<td>0.0082</td>
<td>0.02249</td>
<td>0.01679</td>
<td>0.04936**</td>
</tr>
<tr>
<td></td>
<td>(0.01308)</td>
<td>(0.02092)</td>
<td>(0.01303)</td>
<td>(0.02135)</td>
</tr>
<tr>
<td>Government expenditure</td>
<td>-0.08724</td>
<td>0.02838</td>
<td>-0.15358</td>
<td>-0.18418</td>
</tr>
<tr>
<td></td>
<td>(0.10264)</td>
<td>(0.18724)</td>
<td>(0.00102)</td>
<td>(0.18458)</td>
</tr>
<tr>
<td>Ln Initial GDP</td>
<td>-0.48164</td>
<td>-10.062602***</td>
<td>-0.10091</td>
<td>-7.85497***</td>
</tr>
<tr>
<td></td>
<td>(0.71872)</td>
<td>(3.09945)</td>
<td>(0.71747)</td>
<td>(3.32956)</td>
</tr>
<tr>
<td>Investment</td>
<td>-0.20301*</td>
<td>-0.58275***</td>
<td>-0.14692</td>
<td>-0.48421***</td>
</tr>
<tr>
<td></td>
<td>(0.11243)</td>
<td>(0.15370)</td>
<td>(0.11059)</td>
<td>(0.15200)</td>
</tr>
<tr>
<td>EU member</td>
<td>-2.63316***</td>
<td>-4.7234***</td>
<td>-1.80855**</td>
<td>-3.49075***</td>
</tr>
<tr>
<td></td>
<td>(0.93609)</td>
<td>(1.02886)</td>
<td>(0.91356)</td>
<td>(1.02828)</td>
</tr>
<tr>
<td>CPI</td>
<td>-2.06002**</td>
<td>-3.76451***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.90421)</td>
<td>(1.11436)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPI(t-1)</td>
<td></td>
<td></td>
<td>-2.48794***</td>
<td>-3.95898***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.90436)</td>
<td>(1.08802)</td>
</tr>
<tr>
<td>CPI * Investment</td>
<td>0.08364**</td>
<td>0.19608***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.03350)</td>
<td>(0.04270)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPI(t-1) * Investment</td>
<td>0.07269**</td>
<td>0.1702***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.03325)</td>
<td>(0.04223)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Observations    | 294       | 294       | 265       | 265       |
| Number of countries | 29     | 29        | 29        | 29        |
| R-squared:       |           |           |           |           |
| Within           | 0.4767    | 0.5158    | 0.5171    | 0.5486    |
| Between          | 0.182     | 0.1036    | 0.3085    | 0.0975    |
| Overall          | 0.4271    | 0.147     | 0.4776    | 0.2091    |
| Wald/ F test (p-value) | 229.09  | 12.38     | 244.17    | 13.12     |
|                  | (0.0000)  | (0.0000)  | (0.0000)  | (0.0000)  |
| Breusch-Pagan (p-value) | 14.2     | 11.43     |           |           |
|                  | (0.0002)  | (0.0007)  |           |           |
| Hausman (p-value) | 8.67      | 22.34     |           |           |
|                  | (0.9864)  | (0.2677)  |           |           |
| corr(u_i, Xb)    | 0 (assumed) | -0.8953   | 0 (assumed) | -0.8302   |

Note 1: Standard errors in brackets; *, **, and *** denote statistical significance at a 10%, 5% and 1% levels, respectively

A typical table, like table 2, does, however, not convey the necessary information in order to test the conditional hypothesis (Brambor, Clark, and Golder, 2006). Another issue, also stressed by Brambor et al. (2006) is, that the interaction must be examined symmetrically, since it is difficult to assess which of the variables,
that is the moderating factor and which is the moderator. In other words: We do not know whether CPI affects investment or whether investment affects CPI.

As found in the previous section, Corruption and Growth, corruption affects investment, and thereby growth, in various ways. The authors of this paper have therefore decided to analyze the interaction based on the assumption, that corruption is the mediating factor, and investment the mediator.

Graph 6 shows the interaction with CPI as the mediating factor. Calculations of conditional estimators, standard errors and t-statistics, can be found in Appendix II. It should be stressed, that this graph is made under the assumption, that the interaction effect is linear. The following interpretation is likewise based on this assumption.

\[ \beta_{inv} = 0.19608 \text{CPI} - 0.58275 \]

Note 1: The X-axis only ranges from 1 to 7 even though the CPI index ranges from 0 to 10. This is due to the ranges of CPI scores in the dataset (see Appendix III).

Graph 6 shows how the marginal effect of investment increases as the level of corruption falls. Although not illustrated by a figure, the results are almost identical when the lagged variable of CPI is included as the conditional variable. The interaction term is significant from a CPI at 3.4 and rising. In this range, investment
has a positive, and increasing effect on growth as the level of corruption is descending. As a country moves one numerical value up on the CPI score, say from 4 to 5, investment will have an additional, increased effect of 0.196% on the growth rate.

The graph reveals another interesting point. When the CPI score gets below 2.3, additional investment has a negative effect on growth. It must be mentioned that the lowest observed value of CPI is 1.5; nevertheless it is significant in this interval, since the confidence interval do not touch the zero line. This paper will focus on two possible explanations of the negative growth effect. These explanations are not mutually exclusive but rather complementary. Based on the two perspectives from which this paper intends to explain this effect, namely efficiency and effectiveness, the complementarity can be seen.

As explained earlier, the Solow model explains how investment affects the output and thereby growth. As Dreher et al. (2007) argues, countries with a high level of corruption tend to invest in large capital-intensive projects, since it is easier to hide bribes in the large budgets associated with these. If larger projects are assumed to be associated with overinvestments, the level of investment will be pushed further to the right than the steady state in the Solow model dictates. Capital thus exceeds the level, which the economy can sustain, and negative effect on the growth rate will be experienced in order to return to the steady state. To sum up, the investments, as they are overinvestments due to a high level of corruption, are inefficient and can thereby explain, how a negative effect on the growth rate can occur from additional investments46.

The other side of the argument is in regards to the effectiveness of investments as mentioned above. The reasoning for the decreasing effect of additional investments as the level of corruption increases, as indicated by graph 6, is very much the same as presented in the section Corruption and Growth. However, in order to address the negative effect on the growth rate, which appears on graph 6, additions need to be made to the arguments presented in that particular section: A discussion of the assumption of “shmoo” capital, applies in this case as well. By addressing the fact,  

46 It should be mentioned, however, that this interpretation is produced by the authors of this paper, and no direct evidence for this explanation has been found in the literature.
that capital indeed is not “shmoo”, and that the kind of capital which is invested in, does matter for the economy’s growth rate, the negative effect on the growth rate can, in line with this argumentation, be explained by situations where the funds used for the investments exceed the return on the investments. As this negative effect on the growth rate occurs at very high levels of corruption, the authors of this paper argue, that as corruption reaches such high levels, investments can, in addition to reducing growth, actually result in a negative effect on the growth rate. Returning to the section Corruption and Growth, the example of the 50-kilometer, ten-lane high way constructed in an area where no need for such high way exists, indeed illustrates this point.

Concluding this section, a valid fixed effects method was used to estimate the effect of corruption on growth. No significant direct effect from corruption on growth was found. This was neither the case when using CPI or CPI(t-1). The indirect effect of corruption on growth was also tested. The only significant finding was the interaction effect, with investment as the mediator. Corruption was found to cause the effect of investment on the growth rate to decrease. Two interesting explanations for the negative effect on the growth rate, which appeared in the output, emerged. These two explanations are summed up in the following: Additional investments can cause a negative effect on growth due to an overinvestment in capital projects. This over-investment is, as such, inefficient. Further, investments can be ineffective and thereby contribute to the negative effect on the growth rate. This is because the ineffectiveness produces junk investments, as capital indeed is not “shmoo”. Therefore, another explanation to the negative effect on the growth rate can be, that the wrong types of investments are made because of the possibility to hide corruption in their excessive budgets.
7. DISCUSSING THE FINDINGS

Three important findings have been discovered. Firstly, richer countries seem to be less corrupted. This is the conclusion throughout the literature, as previously established, and in addition, also from the findings in the dataset of this paper. Secondly, no direct effect from corruption on the growth rate has emerged from the analysis produced in this paper. Corruption has been found to affect the growth rate indirectly, though. Through its various effects on investments, corruption does affect the growth rate by causing the investments to be more ineffective and inefficient. In some cases, and under certain assumptions, this paper even argues, that corruption can cause additional investments to contribute negatively to the growth rate.

Combining these three findings indeed supports the point, that corruption is complex, as argued previously: If a country is rich, it tends to be less corrupted, but no clear pattern seems to emerge on the effect of corruption on the growth rate. For this reason one might, plausibly, argue, that though corruption does not affect the growth rate, growth will reduce corruption since the result of growth is, that a country turns richer. In other words: While the growth rate might not in it self reduce corruption, the result of growth – increased wealth – may reduce corruption. This argument is indeed supported by Treisman (2000).

Based on this line of thought, it may be interesting to see how the relation between every country’s level of GDP per capita and corruption has developed over a 11-year period, namely in 1999 and 2009. In graph 7, this has been plotted\textsuperscript{47}. All countries are plotted in 1999 and 2009. The arrow indicates the chronological movement.

\textsuperscript{47}Bosnia and Herzegovina, Montenegro, Serbia, Tajikistan, and Turkmenistan are excluded from the plot, as the CPI was not recorded for either of them in 1999. The time span is chosen based on data availability.
Each arrow indicates the development each country has experienced from 1999 to 2009. Two clusters, denoted *Cluster 1* and – 2 in graph 7, seems to emerge. The countries in *Cluster 1* generally all experienced a smaller decrease in the level of corruption or even an increase. Georgia is a major exception, and will be examined in the following section. The countries in *Cluster 2* all, except Hungary, experienced a larger decrease in corruption, in comparison to *cluster 1*. In addition, the total growth rates in *Cluster 2* generally seem lower than the ones in *Cluster 1*. Furthermore, an interesting observation is, that it seems to be the case that a positive development towards less corruption is more certain once a country is below a certain threshold of corruption. The indication of this is the indecisiveness of direction that seems to rule in *Cluster 1* as compared to, what seems to be, the relatively higher degree of alignment in *Cluster 2*.

From this, one can infer an interesting observation: A decrease in corruption seems to be associated with an absolute change in GDP per capita rather than a relative, percentage change from the starting point. This could be an explanation of the fact, that the level of GDP per capita is a more powerful determinant of corruption than the growth rate is. In addition, the absent direct effect of corruption on the growth rate could, possibly, be explained by this graph. For this reason, the authors of this paper suggest, that one cannot reject the importance of economic growth as a factor in eradicating corruption despite the findings of this paper. It is merely so, that

**Note 1:** The growth rates are calculated based on Barro’s growth model.
while the growth rate in itself might not decrease corruption, the effect of it – increased wealth – may.

   It should be noted, that the sample used for this discussion is too small to infer a general trend and that the effect of absolute growth is not empirically investigated. The examination is, as such, subject to future research.
8. THE FIGHT AGAINST CORRUPTION

As this paper should sum up to, the consequences of corruption are indeed numerous and diverse. However, the focus in this paper is on the consequences, which corruption can incur on the rate of economic growth and this discussion will therefore, likewise, focus on this specific relation.

The findings of this paper suggest, that corruption has an indirect effect on the growth rate through investments, rather than a direct effect. For this reason the authors of this paper argue, that policy implementations that are in place to decrease corruption should target the specific relation between corruption and growth by cleaning the investments for corruption. Several other indirect effects may exist, however the one presented above is the focus of this discussion.

In general it seems, that international organizations, such as the UN, target a broad variety of consequences of corruption. This discussion will, however, be on which initiatives the UN argues in favor of, that, in accordance with the findings of this paper, can increase the growth of the economy, and as such, the wealth. This is because this factor may play a large role in eradicating corruption, as indicated in the section Discussing the Findings.

Based on the argumentation above, it is therefore interesting to clarify, which policies the UN argues in favor of, that have an effect on the relation through which this paper has found corruption to slower a country’s growth rate. This is, as mentioned, the relation between corruption and investment, as corruption has been found to be extremely detrimental to the latter.

Returning to the three ways in which Jain (2001) has discovered corruption to affect investment, as presented in the section Corruption and Growth, seems natural in order to evaluate the policies, suggested by the UN. Those three ways through which corruption affects investments are: Through the misallocation of funds, through the misallocation of talent and by decreasing the incentives for entrepreneurs. As such, policies that target a reduction of the effect of corruption through these three ways should have an impact on growth.
In the United Nations Convention Against Corruption (2004) the misallocation of funds and talent is addressed in the absolute beginning. In addition, the incentives for entrepreneurs as well as the issue of rent seeking incentives are addressed indirectly. By improving the two misallocations, the latter two points will be improved.

Efficiency in the processes of finding the right persons for the public sector as well as mechanisms for retaining and promoting them are addressed in the convention. In addition, teaching officials the consequences of corruption as well as training them to, and if necessary, removing them from positions, are mechanisms that are mentioned. The public officials’ private interests, investments, and the like should be investigated so as to ensure that situations where public officials have multiple interests are eradicated.

All the above seems to address the aspect of rent seeking which can divert competition. If these measures are implemented successfully it should be easier to eradicate monopolies and large economic rents. In addition the bureaucracy would become more efficient and as such more businesses and entrepreneurs would enter the market.

In regards to the issue of misallocation of funds, several points have been made in the convention as well. First of all, public procurement programs should be transparent and competitive. In addition, objective criteria for decision-making should be established. All actors should be invited to tender for public contracts and as such participate on an equal competitive basis. Sufficient time for the actors to prepare their tender should be allowed. Predefined criteria and objective measures should be established so as to ensure no predefined decisions of who will get the contract to prevail in the process. In addition, a declaration of personal interests should be put forward when possible. Also, budgets and expenses should be audited in a timely manner.

This adds up to the allocation of funds on a competitive basis. Having allocated the right people to the public positions, as mentioned in the preceding paragraph, these guidelines will ensure that public investment projects are executed as
efficiently as possible. In addition, investment projects will be initiated based on the need of the population rather than on the possibilities of hiding bribes.

Further, the UN urge countries to cooperate in the fight against corruption on an international scale. One could argue, that this is due to the fact that many of the problems arising with corruption in the above mentioned situations, are associated with grand corruption, which might be impossible to attack and erode on a national scale. However, quite a few initiatives exist on a national scale and these should be addressed as well:

The report “Anticorruption in Transition” (Anderson and Gray, 2006) published by the World Bank targets some of these initiatives occurring in the transition countries (which is used as the dataset in this paper). These have all been implemented on a national level, in the fight against corruption. Selected policies and initiatives will now be addressed:

Public procurement reforms, which the UN argued in favor of, as discussed above, have indeed been target by the transition countries. Procurement agencies have been established and rules and regulations within the field of public procurement have been reformed to create more transparency and efficiency. Modern technology has been implemented to ensure a competitive environment where all potential contractors can tender for public procurement contracts. Also, this ensures that the potential for favoring specific tenders decreases since the distance between the official and the bidder has been increased.

This indeed seems to be a step in the right direction, based on the findings of this paper.

In regards to customs and restrictions on international trade, liberalizations have occurred. Rent seeking opportunities in terms of import licenses in line with the example given in the section Corruption and Growth, have been reduced, providing increased competition, transparency, and efficiency to the market.

This indeed addresses the issues related to the disruption of competition due to rent seeking opportunities as presented in the section Corruption and Growth. For this
reason, this paper argues in favor of this initiative as the issue of disrupted competition is addressed through this initiative.

As mentioned in the previous section, *Discussing the Results*, Georgia was found to be an outlier in graph 7. One reason for Georgia’s extraordinary accomplishments in reducing corruption despite only achieving a minor increase in wealth could be explained by the seesaw mechanism presented by Paldam (2002). After the rose revolution, the new Georgian government replaced all managers and staff in the customs and tax departments. In relation to the seesaw mechanism, it could be argued, that this proved to be a sufficiently hard push towards reducing corruption, so as to pushing the country under the pivot and thereby switching the dynamic mechanisms, as Paldam (2002) explains. As such this could be arguing in favor of radical initiatives if the objective is to reduce corruption.
9. CONCLUSION

Corruption is indeed a complex issue but by dividing it into the four aspects of what it is, what causes it, how it functions, and what the consequences of corruption are, this paper has provided a very comprehensible presentation of the issue.

General consensus in the literature regarding the relation between the level of GDP per capita and corruption has been found. This is in turn supported by the data employed in this paper. Using a fixed effects method of estimation to analyze the effect of corruption on growth has, however, revealed that no evidence of a direct effect could be found. Further investigation revealed that a conditional effect seems to exist. Out of the three conditional effects tested, the interaction effect between the variables investment and CPI was the only one found to be significant. Under the assumptions of a linear relation, the effect of investment on growth was found to be diminishing as the level of corruption increases and vice versa. Further, evidence of a high level of corruption causing additional investments to have a negative effect on growth was argued for. Basing the argumentation on the aspects of efficiency and effectiveness both the diminishing- and negative effect was explained.

In a discussion of the above described results it was argued by the authors of this paper, that despite not finding any direct relation of the effect of corruption on the growth rate, one cannot reject the importance of economic growth as a factor in eradicating corruption. It is merely so, that while the growth rate in itself might not decrease corruption, the effect of it – increased wealth – may. This suggests, that investments should be cleaned of corruption in order to ensure growth and this indeed is in line with what international organizations, such as the UN, target.

Assiotis, A., & Sylwester, K. (2010). Do the effects of corruption upon growth differ across political regimes?


Brambor, T., Clark, W. R., & Golder, M. Understanding interaction models: Improving empirical analyses. Oxford University Press. doi: http://dx.doi.org/10.1093/pan/mpi014


Torres-Reyna, O. *Panel data analysis fixed & random effects*. Unpublished manuscript.


### APPENDIX I – SAMPLE COVERAGE

Countries included in the dataset, together with missing values of CPI and first year of observation:

<table>
<thead>
<tr>
<th>Countries included in the dataset</th>
<th>Year of first CPI observation</th>
<th>Missing observations of CPI</th>
<th>Countries included in the dataset</th>
<th>Year of first CPI observation</th>
<th>Missing observations of CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armenia</td>
<td>1999 2000 - 2001</td>
<td>Moldova</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belarus</td>
<td>1998 2001</td>
<td>Montenegro</td>
<td>2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bosnia</td>
<td>2003</td>
<td>Poland</td>
<td>1996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulgaria</td>
<td>1998</td>
<td>Romania</td>
<td>1997</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croatia</td>
<td>1999</td>
<td>Russia</td>
<td>1996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1996</td>
<td>Serbia</td>
<td>2005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>1995</td>
<td>Tajikistan</td>
<td>2003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>1999</td>
<td>Turkmenistan</td>
<td>2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latvia</td>
<td>1998</td>
<td>Uzbekistan</td>
<td>1999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>1999</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX II – CALCULATIONS METHOD, ESTIMATORS AND GRAPHS FOR CONDITIONAL FINDINGS

**Name:**

**Calculation method:**

Marginal effect of X:

\[ \beta_1 + \beta_3 \]

Standard error:

\[ \sqrt{\text{var}(\beta_1) + \text{var}(\beta_3) + 2\text{cov}(\beta_1\beta_3)} \]

t-statistics:

\[ \frac{\beta}{\sigma^2} \]

---

**ESTIMATORS USED IN THE CALCULATION OF CONDITIONAL EFFECTS**

<table>
<thead>
<tr>
<th>Variable name</th>
<th>variable ( \beta )</th>
<th>interaction ( \beta )</th>
<th>Covariance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment</td>
<td>-0.0058275</td>
<td>0.0019608</td>
<td>-5.90E-07</td>
</tr>
<tr>
<td>Variance</td>
<td>0.001537</td>
<td>0.000427</td>
<td></td>
</tr>
<tr>
<td>Openess</td>
<td>0.018057</td>
<td>0.0004951</td>
<td>-3.89E-04</td>
</tr>
<tr>
<td>Variance</td>
<td>0.0399141</td>
<td>0.0116246</td>
<td></td>
</tr>
<tr>
<td>Goverment expenditures</td>
<td>0.1655963</td>
<td>-0.0935953</td>
<td>-5.13E-02</td>
</tr>
<tr>
<td>Variance</td>
<td>0.44736</td>
<td>0.1268863</td>
<td></td>
</tr>
</tbody>
</table>

**EFFECT OF OPENNESS, GIVEN THE PERCEIVED LEVEL OF CORRUPTION**

[Graph showing the effect of openness on conditional findings]
EFFECT OF GOVERNMENT EXPENDITURES, GIVEN THE PERCEIVED LEVEL OF CORRUPTION
### APPENDIX III - DESCRIPTIVE STATISTICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
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<tbody>
<tr>
<td>openc</td>
<td>529</td>
<td>100.1071</td>
<td>34.23321</td>
<td>26.87</td>
<td>287.43</td>
</tr>
<tr>
<td>cg</td>
<td>529</td>
<td>11.27996</td>
<td>4.239571</td>
<td>3.19</td>
<td>34.44</td>
</tr>
<tr>
<td>barrogrow</td>
<td>500</td>
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<td>0.0853345</td>
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<td>0.4464369</td>
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<tr>
<td>lnnigdp</td>
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<td>8.639158</td>
<td>0.7863637</td>
<td>6.646559</td>
<td>10.22598</td>
</tr>
<tr>
<td>cpi</td>
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<td>3.468949</td>
<td>1.240196</td>
<td>1.5</td>
<td>6.7</td>
</tr>
<tr>
<td>cpi(t-1)</td>
<td>323</td>
<td>3.469876</td>
<td>1.24336</td>
<td>1.5</td>
<td>6.7</td>
</tr>
<tr>
<td>p95-p109</td>
<td>638</td>
<td>0.0454545</td>
<td>0.2084623</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>eunmember</td>
<td>638</td>
<td>0.1159875</td>
<td>0.3204611</td>
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<td>1</td>
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<tr>
<td>ci</td>
<td>529</td>
<td>21.0106</td>
<td>7.834445</td>
<td>0.76</td>
<td>50.38</td>
</tr>
</tbody>
</table>
## APPENDIX IV - DATA SOURCES AND THEIR DESCRIPTIONS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Source</th>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln_initial GDP</td>
<td>PWT</td>
<td><strong>2005 International dollar per person (2005 IS/person)</strong></td>
<td>PPP Converted GDP Per Capita (Chain Series), at 2005 constant prices</td>
</tr>
<tr>
<td>Openness</td>
<td>PWT</td>
<td>%</td>
<td>Openness at Current Prices (%)</td>
</tr>
<tr>
<td>Government expenditure</td>
<td>PWT</td>
<td>%</td>
<td>Government Consumption Share of PPP Converted GDP Per Capita at current prices [cgdp], (%)</td>
</tr>
<tr>
<td>Investment</td>
<td>PWT</td>
<td>%</td>
<td>Investment Share of PPP Converted GDP Per Capita at current prices [cgdp], (%)</td>
</tr>
<tr>
<td>CPI</td>
<td>TI</td>
<td>scale</td>
<td>Relates to perceptions of the degree of corruption as seen by business people, academics and risk analysts, and ranges between 10 (highly clean) and 0 (highly corrupt).</td>
</tr>
</tbody>
</table>

*Note: TI stands for Transparency International.*