DOES CORRUPTION RESTRAIN ECONOMIC GROWTH? THE CASE OF POST-SOCIALIST REPUBLICS

by Kazimov Gahraman

Submitted to Central European University Department of Economics

In partial fulfillment of the requirements for the degree of Master of Economics

Supervisor: Avner Ben-Ner

Budapest, Hungary 2008

ABSTRACT

This thesis analyzes the effects of corruption on economic growth in post-socialist societies. The relationship between corruption and growth is presented in a theoretical framework and supported by empirical analysis. Corruption is found to increase private investment given the prevalence of bureaucratic structure that slows down economic activities in post-socialist societies. The results also conclude that government efficiency, in particular the independence, effectiveness, and accountability of legislative and executive branches reduce the extent of corruption, while they substantially increase private investment in post-socialist republics. The results are robust to controlling for endogeneity by using the level of political competition as an instrument.

ACKNOWLEDGEMENTS

I am grateful to my thesis supervisor Avner Ben-Ner for his informative, creative and useful suggestions and comments, as well as his productive criticism. Moreover, I would like to thank Gabor Kezdi for his suggestions in the field of econometrics and Mr. Hamid Bagirov – the First Deputy Chairman of the State Statistics Committee of the Azerbaijan Republic for the helpful consultations.

TABLE OF CONTENTS

INTRODUCTION	
1. LITERATURE REVIEW	
2. CONCEPTUAL BACKGROUND	7
3. DATA	
4. EMPIRICAL MODEL	
5. ESTIMATION RESULTS	23
6. DISCUSSION	27
CONCLUSION	
APPENDICES	
APPENDIX 1	
APPENDIX 2	
APPENDIX 3	
APPENDIX 4	
REFERENCES	43

INTRODUCTION

Corruption has been a topic of tense discussions for quite a long time. Depending on the context in which it is used, the notion of corruption may possess different meanings. The dictionary defines corruption as "inducement to wrong by improper or unlawful means (as bribery)" (Merriam-Webster Online). Another common definition of corruption is the abuse of power for illegal private benefit. In the context of this thesis I investigate corruption referring to the first definition and focus more on the aspect of bribery.

Despite these brief and compact definitions, the description of corruption as a notion involves many different issues. The sources, features and consequences of corruption are vast. As Svensson (2005) points out, "corruption is an outcome – a reflection of a country's legal, economic, cultural and political institutions" (Svensson, Jakob. 2005. *The Journal of Economic Perspectives*, 19(3), p.20). This statement clearly indicates that corruption can be analyzed from different approaches, such as legal, political, social and economic. In this paper I will study corruption within the framework of economic activities and investigate its effect on economic growth.

Although public opinion about corruption has mostly been negative, it has been and still remains a highly challenging task for economists to answer many questions regarding corruption. What is the right way to measure corruption? Why is the level of corruption high in some countries and low in others? What are the sources of corruption? What are the factors that cause the staying power of corruption? Finally, does corruption hinder or foster economic growth? The problematic part is that although there are numerous theories of corruption, not many of them are supported by empirical results, primarily because of difficulties in generating appropriate empirical measures of corruption. For some countries this information is entirely missing, for others data exist only for a few years, and most variables are subject to some

criticism because, after all, the political and socio-economic measures that attempt to reflect the extent of corruption, political rights and institutional framework are very subjective.

Despite these obstacles, many economists have investigated corruption. Perhaps surprisingly, some economists disagree with the common opinion that corruption has a negative economic effect. Leff (1964) argues that corruption can be desirable as a tool against inefficient regulation by government. Lui (1985), similarly, points out that the allocation of licenses by bureaucrats involves the evaluation of time by agents, and the process could be speeded up through bribes. Beck and Maher (1986) develop the idea of "auction models" and point out that efficiency can be attained in the bidding process, since only efficient firms will manage to afford the highest bribes. On the other hand, Shleifer and Vishny (1993) present a model of corruption and conclude that corruption may be costly to economic development when the central government is not powerful and when the secrecy requirement of corruption causes distortions. In addition, Mauro (1995) carries out an empirical analysis for a cross section of countries and finds that corruption lowers investment and thus hinders economic growth. Akai, Horiuchi and Sakata (2005) carry out a similar empirical analysis for the United States for different periods and conclude that corruption has a negative effect on development. Thus, based on the economic literature the effects of corruption on economic growth are ambiguous.

It is well known that corruption is a widely spread social practice in post-socialist countries, but considering the legacy of the former political regimes and social conditions, its impact on the economy as a whole remains ambiguous. Because the sources of and the predilection to corruption depend on historical factors and their currently effective legacy, in order to understand the effect of corruption on economic development it is crucial to consider the historical background, social conditions, customs and norms.¹

¹ See Hoff and Stiglitz (2002) for a more complete review of the literature on obstacles to the emergence of the rule of law in post-communist societies.

In this paper I explore the issue of corruption in post-socialist countries in order to find out whether or not corruption is a hindrance to economic growth and investigate under what particular conditions can corruption be economically desirable. An empirical model will analyze the effects of corruption in 25 post-socialist countries, covering the period of 1999-2006, using the Two-Stage Least Squares (TSLS) method to account for the possible endogeneity of corruption, and estimating differences to eliminate fixed country effects. The estimation results indicate a positive correlation between corruption and the ratio of private investment to GDP, which is the measure of economic growth. The results also imply that government efficiency increases economic performance, meanwhile decreases the extent of corruption.

This paper consists of six sections and a conclusion. In Section 1 I present a review of the economic literature on corruption. Section 2 presents a conceptual overview of corruption and related issues. Section 3 describes the data used in estimations; Section 4 explains the empirical model specification and assumptions; Section 5 presents the results from estimations. Section 6 discusses the results. The last section concludes.

1. LITERATURE REVIEW

There are many studies by economists that investigate corruption. Some authors contributed empirical analyses, others developed micro-level models. Corruption has been analyzed within different frameworks such as rents, competition, growth, inequality, development etc.² I present a brief review and analysis of the major studies.

Leff (1964) was the first to argue that corruption can lead to economic efficiency. He argues that although corruption is often considered detrimental to efficiency and modernization, through corrupt bureaucratic authorities, investors can avoid government interference into their affairs. Moreover, he stresses that corrupt practices can increase efficiency by allowing more innovations, which are otherwise prevented by limited supply of licenses. Nonetheless, he points out that bureaucracy cannot lead to economic growth and elimination of corruption requires a long period of social and economic development.

Lui (1985) presents a "queuing model" that analyzes customers having different values of time, where the value of time is a random variable. These customers can pay bribes to the queue server for obtaining a better place in the queue. The author derives the bribing strategies of the customers and shows that these strategies lead to Nash equilibrium, where the average value of time costs of the queue is minimized. In order to maximize his own profits, the queue server, on the other hand, will optimize his speed of service based on the same equilibrium. Thus, the model predicts that the service in the queue is not likely to slow down if bribery is permitted.

Beck and Maher (1986) examine bribery in comparison to competitive bidding in the context of government purchasing. In particular, they compare an equilibrium model of bribery to a competitive bidding model and conclude that if bribery is not penalized, it becomes identical to the bidding institutions from the supplier point of view. In the presence of penalties, however,

² See, for example, Dwivedi (1967), Bardhan (1997), Ades and Di Tella (1999), Mauro (1995), Shleifer and Vishny (1993), Bayley (1966), You and Khagram (2005), Bliss and Di Tella (1997)

they predict that the value of the equilibrium bribe is decreased by the amount of penalty, and thus, the structural identity between bribery and bidding is preserved.

Shleifer and Vishny (1993) develop a basic model of corruption, where a government official selling a governmental good (license, permission, passport etc.) as a monopolist has an objective to maximize the value of bribes that he receives from agents. They compare the case where bribery can be penalized with the case were penalties are absent. They conclude that under penalization, the level of the bribe decreases and output increases if the expected penalty depends on the level of the bribe. The level of the bribe remains the same if the probability of being detected and the penalty are independent of bribe. The authors also analyze the industrial organization of corruption, examining bribes under joint monopolist agency, independent agencies and competing government agencies. They show that the level of bribes is the lowest in the last case, intermediate in the first and the highest in the second case. Shleifer and Vishny (1993) also show that corruption is very costly due to weak governmental control and distortions caused by the secrecy requirement. One implication of this study is that competition in the provision of government services can reduce the level of corruption.

The link between corruption and growth has also been investigated by Mauro (1995), who analyzes the effects of corruption, the amount of red tape, the efficiency of the judicial system and political stability on economic growth for a cross section of countries. He uses the Business International subjective indices for corruption and institutional efficiency in a Two-Stage Least Squares (TSLS) estimation with an index of ethnolinguistic fractionalization as an instrumental variable, and concludes that corruption lowers investment and hence hinders economic growth.

Akai, Horiuchi and Sakata (2005) analyze the effects of corruption on economic growth using a state-level cross-section data for the United States. They estimate the effect of corruption for short, middle and long time spans. Using the TSLS method and the level of political competition and Plains Dummy³ as instruments, they conclude that corruption has a negative effect on economic growth in the middle and long spans. The short-run effect of corruptions is statistically insignificant.

The literature on corruption is, in a sense, incomplete and contradictory. Some studies find a negative effect of corruption on economic growth, some show a positive effect and others show no effect. Many studies are incomplete in that they ignore differences among countries. Not only do they disregard differences in development levels, but they overlook the very important fact that corruption is perceived differently in different societies. Thus, the same measure of corruption cannot properly indicate the level of corruption in different countries if corruption is perceived differently.

Therefore, in this paper I analyze the effects of corruption on growth in 25 post-socialist countries. To the best of my knowledge, this is the first empirical study that examines the effects of corruption on economic growth in post-socialist countries. There are several factors that distinguish post-socialist countries from others. One important difference is that these countries are relatively low-income countries, where income inequality is sharp nevertheless.⁴ Moreover, the fact that these countries had identical economic and political regimes implies that they share important systemic legacies. Thus, it is plausible to assume that their perceptions of corruption are alike and expect that a single measure of corruption can fairly reflect these perceptions. Therefore, I conduct an empirical analysis that investigates whether or not corruption has a hindering effect on economic progress, using a panel data set for 25 post-socialist countries covering the period of 1999-2006.

³ Plains Dummy is a dummy variable for a region with the lowest average corruption level.

⁴ For a more complete review of the literature on the relationship between corruption and inequality see You and Khagram (2005)

2. CONCEPTUAL BACKGROUND

Corruption is a broad term and may be defined in various ways. Within the conceptual framework of this thesis, however, I will define corruption as practice of illegitimate actions for private gains and focus more on the aspect of bribery. Corruption, as a practice, has a specific nature that depends on the society in which it developed and is practiced. In order to understand the nature, sources and consequences of corruption in post-socialist countries, it is important to examine some aspects of their history and analyze their legacy that persists today (Dwivedi, 1967). There are several broad factors that distinguish post-socialist countries from the others. One relevant and obvious fact is the former political system – communism. Although corruption has been practiced since ancient times in some societies, such as in India back in the fourth century B.C. (Bardhan, 1997), communism may serve, if not as a source, then at least as a mechanism fostering corruption in post-socialist countries. The communist system created incentives for corruption because of limited access to goods and services, discrimination by social status, permanent deficit in supply and so on.⁵

Let us consider the economy of the former Soviet Union as an example. Since the market was not regulated based on supply and demand relationships and the economy was closed, black market and corruption served as ways to achieve access to goods and services that would otherwise be either difficult or impossible to obtain. In order to obtain a basic good needed for subsistence, one could spend many hours standing in the queue and possibly not even get the good in the end.⁶ On the other hand, members of the higher social class did, of course, get goods much more easily thanks to their power and authority in society. Such situations created incentives among people to practice bribery. For example, in order to avoid

⁵ See J. Kornai (1992) for a broader review of bureaucratic coordination, shortage and its causes as well as T.Kowalik (1987) for the review of problems of the planned economy.

⁶ See R. Portes and D.Winter (1977) for a broader review of the supply of consumption goods in the planned economy.

waste of time and uncertainty, one could pay someone ahead in the queue for getting his or her place.

These historical factors created a persistent legacy in post-socialist countries currently undergoing transition to market economies.⁷ Although the communist system has collapsed and numerous political and economic reforms have been implemented, the impact of the past is still evident. The existence of hierarchical bureaucratic relations is one obvious legacy of the past regime. Bureaucracy, loosely speaking, is a set of regulations aimed to control a set of activities. Its main characteristics are standardized procedures, formal division of power, hierarchy and relationships. Within the framework of my thesis, I will define bureaucracy as "a system of administration marked by officialism, red tape, and proliferation" (Merriam-Webster Online). In particular, I will focus more on the notion of red tape, which is one of the negative features of bureaucratic administration.8 "Red tape", by definition, is "official routine or procedure marked by excessive complexity which results in delay or inaction" (Merriam-Webster Online). It generally includes such seemingly unnecessary requirements as filling out paperwork, obtaining unnecessary licenses, having multiple people or committees approve a decision and various lowlever rules that make conducting one's actions slower and more difficult. It is clear from the definition of "red tape" that it is not desirable, since it hinders many actions that should ideally be easily conducted. "Speed money", on the other hand is an informal side payment (bribery), one use of which is aimed at avoiding "red tape" or bureaucratic actions that slow down an activity. More generally, since bribery is a bilateral process, efficiency in it can be achieved only if both involved parties have not only similar valuations of the activity subject to a possible bribery, but also have similar moral stance as well as estimations and costs of being detected. These similarities create an opportunity for the involved parties to achieve an efficient outcome in bargaining over the level of bribe.

⁷ For a more complete review of the literature on legacies of communism see E.Neuberger (1968).

⁸ Of course, bureaucracy has also important positive elements; see, for example, Max Weber as well as the economics writings on hierarchy by O. Williamson (1975).

In order to understand why some agents prefer paying "speed money" to bureaucratic officials one should take into account the value of time, as illustrated in the following simple model. Consider an agent A, who needs to obtain a license for conducting an activity (starting a business, for instance). The license is issued by a bureaucratic official B. In order to obtain a license A must incur an official cost equal to c > 0 and wait t > 0 periods for approval. Since the official is bureaucratic he will prolong the waiting period and as a result the agent will have to wait t + n periods, where n > 0. However, the agent values his time and prefers commencing the activity as soon as possible, since the activity is profitable and delays are costly. Assume that cost of delay (i.e. the opportunity cost of waiting) per period equals the periodical profits from activity P > c > 0. Thus, the agent will try to avoid the waste of time by offering a bribe equaling b to the official, where c > b > 0. Thus, by paying a bribe the agent will have to wait t + mperiods where m < n, but will incur a total cost equaling c + b(n-m) where b'(n-m) > 0. Thus, the level of bribe depends on the difference n-m: the shorter the period m (i.e. the longer extra time gained by A), the higher the level of bribe. In exchange, however, the agent will get n-mmore periods for conducting his activity and earning a profit $(n-m) \cdot P$, where P > c > 0. Thus, the opportunity cost of not paying the bribe and waiting n periods is equal to $(n-m) \cdot P - b(n-m)$.

There may be three cases in the relevant context. The first-best is the case where the official is benevolent (i.e. n = 0) and the agent incurs a cost of c and obtains the license in t periods. The second case is when the agent decides to bribe the official and thus incurs the cost of c+b(n-m) and receives the license in t+m periods. The third case does not involve bribing by the agent and thus his total cost for obtaining the license equals c and t+n periods of time are needed to receive the license. Under plausible conditions, the opportunity cost of not paying the bribe $(n-m) \cdot P - b(n-m)$ is greater than zero, and the agent prefers to incur an extra cost of b(n-m), but conduct his activity for n-m more periods and earn the profit of $(n-m) \cdot P$,

that is to say, the second case is preferred to the third. This simple model suggests that in a society where the bureaucratic structure is dominant incentives for corruption are created.

The above model may take a different form depending on the context and place where it is practiced, but the essence of the problem remains the same. The difficulty in coming up with strong empirical evidence is that there are many unobservable factors. What may be observed by society and what is actually observed by statisticians is different, and this difference matters. Since corruption is an illegal act, it entails a secrecy clause, which is costly (Shleifer and Vishny, 1993). Secrecy, in a sense, increases the transaction costs related to corruption. Thus, the stronger the government control, the more costly it is to maintain the secrecy of corruption. In theory it can be assumed that in case of a limited supply of goods under central planning, corruption can play the role of a device leading to efficient reallocation of goods through arbitrage. Theoretically, the case of corruption can be compared to market economies. Corruption and its transaction costs are similar to official taxes in a market economy. However, illegitimacy of corruption and costs entailed under it are incomparable features.

Moreover, corruption has numerous significant features, one of which is pervasion (Bayley, 1966). Corruption as a practice spreads in scope so easily that it soon creates competition among both agents and officials. In theory, this may be considered as a "dilution effect" since due to competition bribes may decrease in value so much that corruption will eventually be crowded out and the social structure will become transparent. This process, however, is unlikely to materialize due to other features of corruption such as persistence. In case of competition, the value of bribes may decrease to a certain threshold but may not go below that threshold due to possible collusion among officials. Furthermore, in order to avoid competition the officials may, as a result of collusion and given a weak central government, make the bureaucratic structure even more complex in order to split the revenues, meanwhile not considerably decreasing them. Corruption penetrates society so deeply that over time it may be

accepted by people as a common option that can be used in case of an urgent, emergent or helpless situation (Bayley, 1966).

Another difficult task related to corruption is measuring it. One of the major obstacles to measuring corruption is that besides the value and frequency of it, it entails costs that differ from society to society. In other words, in order to measure the extent of corruption one should know the social (public) attitude towards corruption in a particular country or region (Dwivedi, 1967). It is quite plausible to assume that in a modern, free and democratic society consequences of corruption are much harsher and thus costs of corruptions are much higher than in a society where corruption is a commonly used practice. Moreover, the definition of corruption matters and in fact it differs across societies. A practice considered as containing corruption and thus not desirable in a particular society may well be desirable in another society due to different considerations and views of people (Bardhan, 1997). The fact that the views, norms, customs and other intangible factors cannot be objectively expressed makes measuring corruption an awkward process.

The relationship between corruption and growth in post-socialist societies may involve several positive as well as negative elements. Theoretically, the final effect of corruption depends on whether the scale of positive or negative elements prevails. Corruption in post-social societies may negatively affect economic growth by causing distortions in markets. In particular, corruption may generate unfair competition in competitive markets. Moreover, long-term negative effects of corruption on growth may be even more distortionary since corruption strongly and negatively affects social belief in legitimacy of laws and trust in government (Ackerman et al. (2004)). Nonetheless, corruption may positively affect economic growth in post-socialist republics through several channels. More generally, through corruption businessmen and entrepreneurs can provide themselves with elements of institutional efficiency. In particular, through bribery, they can secure property rights and prevent appropriation of returns. Moreover, by practicing corruption they can avoid unnecessary formalities caused by complexities of the administrative structure and thus avoid unnecessary transaction costs. Hence, corruption may serve as a tool against unfavorable government regulations and laws and create at favorable investment climate in post-socialist societies.

In this thesis, I estimate the effect of corruption on economic growth minding the conceptual and empirical difficulties noted above, using the available data and interpreting the results in light of various theories to understand how corruption affects economic development of post-socialist countries.

3. DATA

The panel dataset consists of annual data for 25 post-socialist countries covering the period of 1999-2006. The panel is unbalanced due to missing information on several countries for certain years. Consequently, it is not possible to estimate the effects for different time spans such as long, middle and short-run. However, it is still possible to estimate the effect of corruption on growth for at least 7 years.

In order to measure the dependent variable, economic growth, I use the ratio of private (domestic) investment to GDP in percentage points. The data are provided by the European Bank for Reconstruction and Development (EBRD).⁹ I assume that domestic investment is a better indicator of economic growth than total investment (domestic and foreign), since the former is relatively more independent of country specific factors such as natural resources for instance. The level of total investment may be very high due to the big share of Foreign Direct Investment (FDI) in more profitable sectors such as energy and petroleum sectors. Since such activities are very profitable, high level of FDI doesn't necessarily reflect the quality of institutions in the country. Within the dataset, the lowest share of investment in GDP was observed in the Kyrgyz Republic in 2003 (11.8%). The highest share, on the other hand, was observed in Azerbaijan in 2005 (56.1%), more than twice the average investment (24.49%) among all the countries included in the dataset.

The variable measuring the extent of corruption in the model is denoted *CORR* and is derived by calculating the simple average of two indices: the Corruption Perception Index (CPI) by Transparency International and the index of Judicial Framework and Independence by Freedom House. I will use a step-by-step approach in order to describe the reason for using *CORR* as a measure of corruption and not solely CPI.

⁹ Data are available for free at http://ebrd.com/country/sector/econo/stats/index.htm

The Corruption Perception Index is created based on the results of surveys from numerous independent institutions.¹⁰ The purpose of the index is to measure the level of corruption according to "the degree to which corruption is perceived to exist among public officials and politicians" within a certain country. Transparency International defines corruption as "the abuse of entrusted power for private gain" and measures the index on a 1 to 10 scale, where 10 is the lowest and 1 is the highest level of corruption. In other words, an increase in the magnitude of the index reflects a more transparent state, i.e., less corruption.

Nevertheless, CPI was criticized for not to measuring institutional corruption well.¹¹ In order to alleviate the problem and account for instituional corruption, I use the index of Judicial Framework and Independence (*JUDIN*). As noted in "Nations in Transit" by Freedom House, the index highlights constitutional reform, human rights protections, criminal code reform, judicial independence, the status of ethnic minority rights, guarantees of equality before the law, treatment of suspects and prisoners, and compliance with judicial decisions. The original Freedom House rating of Judicial Framework and Independence is based on a scale of 1 to 7, with 1 representing the highest level of democratic progress and 7 the lowest.¹² Within the context, therefore, the score of 1 indicates the lowest level of institutional corruption and 7 the highest.

As mentioned above, the extent of corruption in the model is measured by *CORR*. Since *CORR* is the average of two variables that are calculated based on different scales (magnitude and direction), I use a simple but appropriate transformations of CPI in order to ensure that *CORR* is calculated properly. As a result I obtain the rescaled CPI variable, namely *CPI1*, which

¹⁰ Data are available for free at http://www.transparency.org ; See Appendix for the methodology used by Transparency International in measuring CPI.

¹¹ Economists in Bangladesh have questioned the methodology used by Transparency International in measuring CPI, The HINDU News Update Service, 2007-09-27. www.hindu.com/thehindu/holnus/003200709270921.htm ¹² Data are available for free at http://www.freedomhouse.org ; See Appendix for the methodology used by the Freedom House in measuring the Index of Judicial Framework and Independence.

possesses same characteristics as the index of Judicial Independence.¹³ *CPI1* measures corruption on a scale of 1 to 7, with the lowest score indicating the lowest level of corruption.

Hence, *CORR* is the average of *CPI1* and *JUDIN* and thus accounts for institutional climate within the country as well. The scale of *CORR* ranges from 1 to 7, where the level of corruption increases along with higher values of the variable. Thus, the highest level of corruption was observed in Turkmenistan in the year 2005 (6.72) and the lowest in Estonia in 2006 (2.26). The average level of corruption among the countries used in the dataset is 4.62, which is approximately equivalent to the level of corruption in Croatia in the year 2003.

The next variable in the dataset is named Governance, which considers the effectiveness, democratic character and stability of the government, as calculated by Freedom House.¹⁴ The measure is once again on a scale of 1 to 7 and here as well I rescale the variable to the reverse scale.¹⁵ As a result, a score of 1 indicates the lowest and a score of 7 the highest level of government efficiency. The governance indices in the dataset cover the period of 1999-2006. However, it is worth mentioning that starting with the year 2005 Freedom House has introduced two separate measures for national and local democratic governance. I take a simple average of national and local governance indices for the years 2005 and 2006 in order to end up with one measure per country for years 2005 and 2006. Within the dataset, the average level of governance is 3.79 out of 7; the lowest level of governance was observed in Turkmenistan in 2004 (1.00) and the highest in Slovenia in 2006 (6.25).

Since in order to decrease the endogeneity problem the Two-Stage Least Squares (TSLS) method is going to be used in the estimations, I use an instrumental variable found in the dataset, namely an index measuring the level of political competition. In order to measure the level of political competition I use the index called *POLCOMP*, which is calculated by the Center for Systematic Peace. The original index ranges from 1 to 10 and includes three unconventional

¹³ See Appendix for the methodology used in rescaling CPI.

¹⁴ Data are available for free at http://www.freedomhouse.org ; See Appendix for the methodology used by the Freedom House in measuring the index of Governance.

¹⁵ See Appendix for the methodology used in rescaling the variable.

values, namely -66, -77 and -88. Fortunately, the unconventional values occur within the dataset only once and due to the fact that I transform this unconventional value to the conventional form it is not an obstacle to the estimation.¹⁶ The highest value of the index indicates a democratic regime and the lowest positive value indicates an autocratic regime. The negative values indicate interruption, interregnum and transition periods. The average *POLCOMP* score equals 6.97 in the dataset, with the lowest level of democratic regime having been observed in Turkmenistan in 1999 (1.00) and the highest in Slovenia in 2006 (10.00).

In order to account for human capital stock, as a factor affecting both corruption and economic development, I use the gross enrollment ratio as a proxy variable. The gross enrollment ratio reflects school enrollment at all three levels of education: primary, secondary and tertiary.¹⁷ The source providing the gross enrollment ratio is the United Nations Educational, Scientific, and Cultural Organization (UNESCO). As noted by the providing source, the ratio can be used as an indicator to express the level of participation in education and a country's capacity for providing education opportunities. The average gross enrollment ratio among the relevant post-socialist countries equals 79.18%, with the lowest percentage (65.00%) recorded in Albania in the year 2000 and the highest (95.33%) in Slovenia in 2003.

Another variable used in the estimations is the Political Rights Index (PRI) by Freedom House. The index is created based on the results of surveys and similar to all other indices measured by Freedom House; the Political Rights Index is also scaled from 1 to 7, where 1 indicates the highest and 7 the lowest freedom in political environment.¹⁸ As in the previous cases, I transform the scale of the variable to the reverse direction, where 1 indicates the lowest and 7 the highest freedom in political environment.¹⁹ I denote the transformed variable *PRI1*.

¹⁶ Data are available for free at http://www.systemicpeace.org/polity ; See Appendix for the methodology used by the Center for Systematic Peace in measuring the level of political competition and the methodology used in transforming the variable to conventional values.

¹⁷ Data are available for free at http://www.uis.unesco.org/en/stats/statistics/database/DBIndex.htm

¹⁸ Data are available for free at http://www.freedomhouse.org; See Appendix for the methodology used by the Freedom House in measuring the Political Rights Index.

¹⁹ See Appendix for the methodology used in rescaling the Political Rights Index.

Within the countries included in the dataset, the lowest level of freedom in political rights was observed in Belarus in the year 2004 (1.00). The highest score (7.00) was recorded in several countries: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia. The average *PRI1* score in the dataset equals 4.51.

The correlation between the variables of interest, corruption (*CORR*) and the dependent variable investment equals -18%. There is a 10% correlation between the transformed Governance Index – GOV1 and the dependent variable measuring investment. The instrumental variable measuring the level of political competition is highly correlated with *CORR* (-68%), and slightly correlated with investment (-18%). There is also high negative correlation between the corruption measure and the transformed Governance index (-94%), which indicates that the higher governmental efficiency leads to a decrease in corruption.

Thus, there are six variables that will be used in the empirical estimation. Variables measuring the level of corruption, government efficiency and political rights are all based on a scale ranging from 1 to 7, where a higher value indicates higher level of the measured factor. The purpose of the estimation is to determine the partial effect of corruption on economic growth in 25 post-socialist countries during the period 1999-2006 and to find out whether or not corruption, given the political, institutional and economic conditions, restrains economic growth.

4. EMPIRICAL MODEL

In order to estimate the partial effect of corruption on economic growth I use an econometric model with the Two-Stage Least Squares (TSLS) method combined with the First Differencing (FD) method. While the goal behind using the former method is to ameliorate the endogeneity problem, the aim of the latter method is to eliminate serial correlation.

However, before moving to estimation I need to make a theoretical assumption regarding the source of corruption in the post-socialist countries and support it statistically. The assumption is that the source of corruption in the post-socialist countries is excessive bureaucracy (or "red tape") that slows down economic activities by causing government inefficiency. Hence, bureaucracy in this context can be proxied by the level of government efficiency: excessive bureaucracy leads to a lower level of government efficiency. Thus, I assume that corruption is a function of government efficiency and the latter is determined by the level of bureaucracy. Mathematically this assumption can be stated as following:

Corruption =
$$F(Government Efficiency)$$
 and $F'(\cdot) < 0$ (1)

In the above equation, F is a decreasing function of Government Efficiency. Restating the equation using the variables included in the dataset leads to the following expression:

$$CORR = F(GOV1)$$
 where $F'(\cdot) < 0$ (1')

Since an increase in the magnitude of CORR indicates a higher level of corruption, the function F in equation (1') decreases in GOV1, meaning that higher efficiency by the government decreases the level of corruption.

Although the assumption seems economically and socially logical and convenient, it is still necessary to prove it statistically. In order to see whether government efficiency affects corruption, I regress *CORR* on *GOV1* by using simple Ordinary Least Squares (OLS) with First Differencing (FD) due to the serial correlation problem. Moreover, for comparison reasons I run the same regression using the OLS with Fixed Effects and control for cross-section, i.e., country, fixed effects. The regression can be expressed as following:

$$d(CORR) = \beta_0 + \beta_1 \cdot d(GOV1)_{i,t} + u_{i,t}$$
⁽²⁾

for the OLS method with the FD, where "d" denotes differencing, "i" the cross-sectional observations, "t" the period and "u" the error term. The coefficient of interest is β_1 , showing the partial effect of the government efficiency on corruption.

Moreover, since the effect of government efficiency on corruption may not be observed within the same period, I estimate the effect of government efficiency in the past period on corruption in the current period. In other words, I regress the lagged *GOV1* variable on *CORR* using FD and FE methods again. The regression can be expressed as following:

$$d(CORR) = \alpha_0 + \alpha_1 \cdot d(GOV1(-1))_{i,t} + e_{i,t}$$
(3)

where the definition of subscripts are the same as in the previous equation, "e" denotes the error term and *GOV1*(-1) is the lagged variable measuring the government efficiency in the past period. The coefficient of interest is α_1 and shows the effect of government efficiency in the previous period on corruption in the current period. Once again I conduct the same process with FE method and compare the results.

After supporting the main assumption of the model, I analyze the main part of the model, i.e., the effect of corruption on economic growth. In order to estimate the partial effect of corruption on private investment I use the Two-Stage Least Squares method with First Differencing. As stated earlier, there are two problems regarding the main variable *CORR*. The first problem is the endogeneity problem. This is the reason for using TSLS in the estimation. The second problem is the serial correlation in the error term and the solution for the problem is provided by means of the FD method. FD is preferred to FE since the former turns out to be more efficient than the latter method due to the serial correlation.

The dependent variable in the main estimation is the ratio of private investment to GDP. Within the framework of the model, I assume that investment is a function of corruption, government efficiency and other factors that will be added later as control variables. Mathematically the assumption can be expressed as following:

or restated with the variables of the model:

$$INV = Z(CORR, GOV1, Control Variables)$$
(4')

where INV is the ratio of private investment to GDP. The main point of interest is the function *Z*, particularly whether the function increases with corruption or not. Let us consider equation (4³). If Z is an increasing function of *CORR*, then corruption as a result will have a positive effect on investment. In other words, as the value of *CORR* increases the value of INV also increases, which means that corruption fosters private investment. On the other hand, if the function Z decreases with *CORR*, this implies that corruption has a negative effect on investment, meaning that corruption is a hindrance to economic growth. I will illustrate these two cases with two simple graphs:



Graph 1 corresponds to the case when corruption has a positive effect on investment, i.e., as the value of *CORR* increases the value of investment also increases. This is the case when the function Z is an increasing function of *CORR*. Graph 2 corresponds to the opposite situation, when Z is a decreasing function of *CORR* (corruption has a negative effect on investment).

So the main goal of the estimation is to determine the direction of the partial effect of corruption on economic growth. To put it differently, the aim is to determine whether function Z increases or decreases with *CORR* and hence to identify whether corruption is really a hindrance to economic progress. In order to see the total effect of corruption on private investment I first estimate the following equation:

$$d(INV) = \delta_0 + \delta_1 \cdot d(CORR)_{i,t} + \varepsilon_{i,t}$$
(5)

where ε is the error term, INV is the percentage of private investment in GDP and *CORR* is the average of *CPI1* and *JUDIN*, i.e. variable measuring the extent of corruption. Since *CORR* is endogenous in the model, I use the level of political competition (*POLCOMP*) as an instrumental variable (IV) for *CORR*. As stated previously, *POLCOMP* is highly correlated with *CORR* and slightly correlated with INV, which means that *CORR* is the potential channel through which *POLCOMP* affects INV. However, the main feature that *POLCOMP* should possess to be a good IV is to be uncorrelated with the error term. Unfortunately, it is not possible to measure this fact statistically, but under favorable conditions it is plausible to make an assumption that *POLCOMP* is uncorrelated with the unobserved factors that affect INV. Therefore, I assume that using the level of political competition as an IV for *CORR* should not cause problems.

The next estimation will determine the effect of not only corruption, but also government efficiency on the private investment. The very estimation will determine whether the function Z described in equation (4') increases or decreases with the level of corruption (*CORR*). The equation can be expressed as follows:

$$d(INV) = \delta_0 + \delta_1 \cdot d(CORR)_{i,t} + \delta_2 \cdot d(GOV1)_{i,t} + \varepsilon_{i,t}$$
(5)

where δ_1 and δ_2 are the coefficients of interest showing the partial effect of corruption and government efficiency on economic growth, respectively.

Next I estimate equation (5') adding some control variables. There are two control variables that I use: the Gross Enrollment Ratio and the Political Rights Index. The first variable is aimed to control for education as proxy for human capital stock, whereas the second one is aimed to control for the political climate (environment). The estimable equation can be expressed as following:

$$d(INV) = \delta_0 + \delta_1 \cdot d(CORR)_{i,t} + \delta_2 \cdot d(GOV1)_{i,t} + \delta_3 \cdot d(GER)_{i,t} + \delta_4 \cdot d(PRI1)_{i,t} + \varepsilon_{i,t}$$
(5")

The results of equation (5") will be interpreted and the partial effects will be compared to the ones from previous equations.

5. ESTIMATION RESULTS

Before moving to the main results and findings of the model, it is necessary to show the results from estimating equations (2) and (3) in order for the assumptions of the model be proven statistically. The results of the FD estimation of equation (2) presented in Table 1 indicate that a 1 point increase in the level of government efficiency decreases the level of corruption by 0.36% and is statistically significant even at the 1% significance level. As expected, the sign of the coefficient is negative, supporting the notion that government efficiency decreases corruption.

Running the same regression with the FE gives analogous results. Accounting for country level fixed effects, the effect of *GOV1* on *CORR*, i.e. β_1 , equals -0.32. In order to account for serial correlation I used "White period standard errors" and the coefficient turns out to be statistically significant even at the 1% level. Nevertheless, using OLS with the FD rather than FE is more efficient, since the Durbin Watson statistic under FD equals 1.90 (compared to 0.91 under the FE), indicating that the serial correlation problem is eliminated. Table 1 shows the results of the estimation using both FD and FE methods.

Table 1	Equation (2).	OLS estimation re	sults with FD and F	E methods
---------	---------------	--------------------------	---------------------	-----------

Method: Ordin	ary Least Squares		
First Differencing (FD)		Fixed Effects (FE)	
Dependent variable: <i>d(CORR)</i>		Dependent variable: CORR	
Total panel observations: 153		Total panel observations: 182	
Coeff. (White period st.err.)			Coeff. (White period st.err.)
d(GOV1)	-0.36 (0.050)	GOV1	-0.32 (0.038)

The next set of results is from the OLS estimation of equation (3). The FD results show that α_1 equals -0.07 and is significant at the 5% significance level. Thus, a 1 point increase in the level of government efficiency in the previous period decreases the level of corruption by 0.07% in the current period.

Estimating the equation (3) by the FE method and controlling for the country fixed effects shows analogous results. Under the FE method α_1 equals -0.23 and is significant at the 1% significance level using once again "White period standard errors". However, similar to the previous case, using the FD method is more efficient based on the Durbin-Watson statistic which equals 1.69 using the FD method versus 1.06 under the FE method.

Table 2Equation (3). OLS estimation results with FD and FE methods.

Method: Ordinary Least Squares						
First Differencing (FD)		Fixed Effects (FE)				
Dependent variable: <i>d(CORR))</i>		Dependent variable: CORR				
Total panel observations: 133		Total panel observations: 159				
	Coeff. (White per. st.err.)		Coeff. (White per. st.err.)			
d(GOV1(-1))	-0.07 (0.033)	GOV1(-1)	-0.23 (0.052)			

Thus, the results from estimating the equations (2) and (3) have shown that corruption in post socialist countries does depend on the level of government efficiency. In fact, higher government efficiency was proven to decrease the level of corruption. Hereby, assuming that higher government efficiency is caused by a decrease in the level of bureaucracy and vice versa, I showed that excess bureaucracy increases corruption. Thus, the assumption underlying equation (1) is supported.

Since the main assumption of the model is supported, the results of equation (5) can now be analyzed. As noted earlier the coefficient of interest in equation (5) is δ_1 , which indicates solely the effect of corruption on investment. The results of the TSLS estimation using *POLCOMP* as an instrumental variable for *CORR* imply that a 1 point increase in the level of *CORR* causes a 9.21% increase in the level of investment. In other words, the coefficient of interest δ_1 equals 9.21 and is statistically significant at the 5% significance level. Although the sign of the coefficient may seem surprising at the first glance, further explanation and interpretations will justify the anticipation of the very fact.

The results of the TSLS estimation of the equation (5') using the same instrumental variable (*POLCOMP*) for *CORR* conclude that δ_1 equals 13.43 and δ_2 equals 7.21, where the latter coefficient is significant at the 5% (in fact almost at 1%) level and the former at the 1% level. In other words a 1 point increase in the level of corruption increases the level of private investment by 13.43% and a 1 point increase in the government efficiency increases private investment by 7.21%. Once again a positive correlation between the level of corruption and private investment is observed. Nevertheless, it is important to mention that the magnitude of the effect of corruption on investment has increased compared to the result from estimating equation (5). Contrary to the level of corruption, but not surprisingly, higher level of government efficiency of Slovakia in the year 2000 was the same as the one of the Czech Republic, then the private investment in the former country would increase by 7.21 percents.

CEU eTD Collection

The results of estimating equation (5") by TSLS (using the same IV) are shown in Table 3 below. Including the control variables for education and political rights does not change the results considerably. However the inclusion of control variables has decreased the sample size from 145 to 118 observations. The sign of the coefficient on *CORR* still remains positive, but the magnitude of the effect has slightly increased to 13.70. The effect of government efficiency on private investment also remains positive. A 1 point increase in the level of government efficiency induces a 7.20% increase in the private investment. Both coefficients are statistically significant at the 5% significance level. Unexpectedly, the Gross Enrollment Ratio has a negative

effect on private investment. However, the magnitude of the effect is economically and statistically insignificant. Since the panel dataset includes data for 8 years, it is not reasonable to expect sharp changes in the Gross Enrollment Ratio within the period. This is why the coefficient reflecting the partial effect of education on investment is not very reliable and not of great interest given the time constraints. The coefficient on the Political Rights Index is positive in sign, but statistically insignificant from zero.

Table 3Equation (5"). TSLS estimation results with FD method.

Method: Panel Two-Stage Least S	quares	
Dependent variable: <i>d(INV)=d(1</i>	00 x Investmen	t/GDP)
Instrumental Variable for CORR:	d(POLCOMP)	= level of political competition
Total panel (unbalanced) observat	ions: 118	
Independent variable	Coefficient	White period standard errors
d(CORR)	13.70	(6.547)
d(GOV1)	7.20	(3.118)
d(POLCOMP)	-0.24	(0.131)
d(PRI1)	0.53	(0.787)

To conclude, the results of the estimation imply that the level of corruption positively affects the amount of private investment. Hence, conditional on the political and economic climate, corruption is not necessarily a factor that hinders economic growth. More specifically, given the existence of a strong hierarchical bureaucratic regime, corruption increases investment through several channels that are described in the next section.

6. DISCUSSION

The fact that corruption is publicly perceived as a negative concept is clear, and there is a vast literature of the negative effects of corruption. As Bayley (1966) points out, corruption represents a failure in achieving the objectives set by the government, it increases administrative costs, in a form of a kickback it decreases the amount spent for public purposes, worsens reputation and lowers respect towards the corrupt authority. Various empirical studies (Mauro (1995), Akai, Horiuchi and Sakata (2006) for instance) have also proven that corruption has a negative effect on investment, per capita GDP and other indicators of the overall economic progress.

However, despite being socially undesirable, corruption may have positive effects, conditional on where and under which circumstances it is practiced.²⁰ As the results of my empirical model imply, given the prevalence of hierarchical bureaucracy and "red tape", corruption has a positive effect on private investment. For this statement to be true and make sense, the condition of the existence of powerful bureaucracy is crucial. Under such a bureaucratic regime, the first-best economic and social outcome is by definition unattainable. By first-best outcome I consider an efficient government, and consequently, the absence of corruption. Thus, given a high level of bureaucracy in post-socialist countries and hence the fact that the first-best social outcome is not achievable, corruption serves as the second-best solution.

Corruption, then, is a response – a tool against government inefficiency. With inefficient government in power, corruption serves as a key enabling access to many things that otherwise would be inaccessible. Despite being aware of the negative features of corruption, people living in corrupt societies governed by inefficient authorities do not in general perceive corruption as bad as people in more developed societies do, where transparency is dominant. The reason for this is that in a society where excessive bureaucracy and strong hierarchical relations dominate,

²⁰ For a broader review of benefits of corruption see Bayley (1966)

corruption becomes an accommodating device that easily grows into an integral part of everyday life.

As mentioned in Section 5, corruption affects investment through several channels. One such channel is property rights. In order to secure the returns on investment, strong property rights should be guaranteed by the legislative and institutional framework of the country.²¹ Although legislations in post-socialist countries include provisions on property rights, the enforcement of these provisions is a major problem. Therefore, corruption in post-socialist countries is used as a tool for creating a favorable investment climate, where the illegitimate appropriation of returns is prevented by the existence of property rights and the enforcement of laws. To put it differently, the use of corruption for achieving the credibility of the powerful authorities and hence preventing potential future appropriation has become a common practice in post-socialist countries. Thus, property rights in post-socialist countries may be classified as a private rather than a public good.²² Corruption in this case is a useful device for building favorable grounds for investment.

Besides providing fundamental factors for an investment to take place, corruption may also be practiced during the period when the investment is actually being realized. For instance, side payments are a common way for avoiding circumstances that slow down the operations of a firm, such as unnecessary permanent controls by the inspectorate or delays during obtaining licenses for the daily operations. Hence, corruption may be considered as a tool decreasing the transaction costs of daily operations, namely the circumstances that cause delays in operations, since entrepreneurs are better off paying a side payment and earning profits rather than facing a delay in their business operations and thus foregoing profits.

To conclude, I have to mention the corrupting effect of corruption. With the persistence of corruption, eliminating this effect is big challenge. As noted by Ackerman et al. (2004), the

²¹ For a more complete literature on property rights and investment see North and Weingast (1989)

²² For a more detailed review of property rights as a private good see Bates (2004).

attitudes that arise from practicing corruption in the economic sphere pervade society and are likely to affect moral values and relationships among individuals in families, schools, politics, the judicial system, and much else. This may generate cynicism, distrust and other attitudes that are not consistent with a healthy and productive society. A very long period of time is needed to erase the rigid and pervading immoral effects of corruption on society. This is in fact one of the major obstacles observed in post-socialist countries facing transitions to market economies.

Economic, political, judicial and institutional reforms cannot have an immediate effect on social views, norms and perceptions. Therefore, transition to a successful market economy is a very gradual process. It is absolutely not a solely economic process. In fact, the most challenging phase of the process deals with public perceptions, mentality and norms, which are rigid features of people. After all, in order for a market economy to work, on top of economic, political and judicial reforms, both the supply and demand side agents of the market as well as members of governmental structures have to modernize their views based on a framework where bureaucracy and market economy are theoretically mutually incompatible.

In this section I have justified the results of the empirical model by discussing potential channels through which corruption can positively affect private investment in post-socialist countries. Particularly, given the inefficient regulation by the government, corruption can have a positive impact on investment by providing entrepreneurs with property rights, decreasing transaction costs and thus, avoiding potential delays in their business operations and obtaining credibility of governmental authority.

29

CONCLUSION

This paper examined the effects of corruption on economic growth in 25 post-socialist countries within the period of 1999-2006 using the Two-Stage Least Squares method with level of political competition as an instrument for corruption. Results indicate a positive correlation between corruption and economic growth. In particular, a 1 point increase in the level of corruption causes a 13.70% rise in the ratio of private investment to GDP. Moreover, it has been shown that government efficiency decreases corruption and increases investment. Thus, the study concludes that given the low level of government efficiency in post-socialist countries, corruption can be efficient.

The unique feature of the study was the fact that all examined countries are currently developing and experiencing a transition to market economy. Moreover, these countries share common historical features, with similar political regimes in their past. Due to this fact, these countries are currently facing similar legacies. Therefore, it is plausible to assume that an index of corruption properly reflects perceptions of corruption in these countries.

There are, however, several weaknesses in the empirical model. The first weak point is related to the panel data set. Unfortunately, I was not able to assemble a data set for postsocialist countries that covers a larger time interval, although a study covering a longer period of time would yield more robust results. Moreover, it could be possible to rely on the effects of education if the examination period was longer, since indicators of education do not sharply change over a short period of time. The second shortcoming of the empirical model is the control variables. Further research can improve the empirical model by controlling for the effect of income inequality on economic growth. Since post-socialist countries are considered lowincome countries with sharp income inequalities, and income inequality in turn is correlated with corruption and economic growth, it is expedient to account for it while investigating the effect of corruption on growth.²³

Although the model predicted a positive relationship between corruption and growth in post socialist countries, due to several reasons this does not imply that maintaining corruption is efficient. Considering the fact that the examined countries are in transition to market economies and are integrating into the global world, corruption cannot have a long-term positive effect on economic progress. In fact, the modernization of economy and globalization are definitely incompatible with an administrative structure as hierarchical bureaucracy, which slows down economic activities and creates incentives for corrupt practices. In other words, a modern system would not be able to operate efficiently and increase social welfare if it is built on bureaucratic grounds.

Nonetheless, corruption in my opinion cannot be confronted effectively through laws and enforcement. In order to eliminate corruption from society, it is essential to build a social structure that does not create incentives for corruption. Excessive bureaucracy and strong hierarchical relations, on the contrary, create incentives for corruption and in fact, the main assumption of the model was that excessive bureaucracy is the main source of corruption in post-socialist societies, which was empirically supported. One way of solving this problem is decentralizing governmental powers, abolishing monopolistic state authorities providing governmental services and thus weakening hierarchical relations and creating an independent and competitive environment. The elimination of monopolies and thus the decentralization of power would establish governmental offices that act as independent profit maximizing firms. In a sense, bribes would be "legalized" in this case, meaning that governmental offices would offer higher prices (i.e. new prices will account for bribes), but have incentives for providing quality service in exchange.

²³ See You and Khagram (2005) for a broader review of inequality and corruption

In addition, in case of a competitive environment, appropriate monitoring authorities should be in place in order to prevent potential collusion among the competitors. The establishment of an independent judicial system and the amplification of law enforcement are also crucial elements for the establishment of the rule of law in society and the provision of secure property rights – the factor that fosters and attracts investment into economy. Appropriate and carefully thought economic, political and judicial reforms are required in order to achieve the above mentioned goals and thus reduce the scope of corruption in society.

More generally, establishing an administrative structure with independent, effective and credible legislative and executive branches is crucial for the elimination of corruption and its harmful effects. Otherwise, the pervasion, persistence and the corrupting effects of corruption will make it an even more challenging task over the passage of time. Achieving transparency is, of course, a gradual process that cannot be realized in a short time span, but attempts towards accomplishing it should be expedient and effective. Otherwise, under the dominance of excessive bureaucratic regulation, the true efficiency and advantages of modernization and globalization in post-socialist countries are doubtful.

APPENDICES

APPENDIX 1

METHODOLOGICAL NOTES

a) Transparency International Corruption Perceptions Index (CPI) 2007 ²⁴

1. The CPI gathers data from sources that span the last two years (for the CPI 2007, this includes surveys from 2007 and 2006).

2. The CPI 2007 is calculated using data from 14 sources originated from 12 independent institutions. All sources measure the overall extent of corruption (frequency and/or size of bribes) in the public and political sectors and all sources provide a ranking of countries, i.e., include an assessment of multiple countries.

3. For CPI sources that are surveys, and where multiple years of the same survey are available, data for the last two years are included to provide a smoothing effect.

4. For sources that are scores provided by experts (risk agencies/country analysts), only the most recent iteration of the assessment is included, as these scores are generally peer reviewed and change very little from year to year.

5. Evaluation of the extent of corruption in countries is done by country experts, non resident and residents (in the CPI 2007, this consists of the following sources: ADB, AFDB, BTI, CPIA, EIU, FH, MIG, UNECA and GI); and resident business leaders evaluating their own country (in the CPI 2007, this consists of the following sources: IMD, PERC, and WEF).

6. To determine the mean value for a country, standardization is carried out via a matching percentiles technique. This uses the ranks of countries reported by each individual source. This method is useful for combining sources that have a different distribution. While there is some information loss in this technique, it allows all reported scores to remain within the bounds of the CPI, that is to say, to remain between 0 and 10.

7. A beta-transformation is then performed on scores. This increases the standard deviation among all countries included in the CPI and avoids the process by which the matching percentiles technique results in a smaller standard deviation from year to year.

8. Next, all values for a country are averaged, to determine a country's score.

9. The CPI score and rank are accompanied by the number of sources, high-low range, standard deviation and confidence range for each country.

10. The confidence range is determined by a bootstrap (non-parametric) methodology, which allows inferences to be drawn on the underlying precision of the results. A 90% confidence

²⁴ Information copied from http://www.transparency.org

range is then established, where there is 5% probability that the value is below and 5% probability that the value is above this confidence range.

11. Research shows that the unbiased coverage probability for the confidence range is lower than its nominal value of 90%. The accuracy of the confidence interval estimates increases with a growing number of sources: for 3 sources, 65.3%; for 4 sources, 73.6%; for 5 sources, 78.4%; for 6 sources, 80.2%; and for 7 sources, 81.8%.

12. The overall reliability of data is demonstrated in the high correlation between sources. In this regard, Pearson's and Kendall's rank correlations have been performed, which provided average results of .77 and .62 respectively.

b) Polity IV Political Competition Concepts (POLCOMP)²⁵

As mentioned in the "Dataset Users' Manual" about POLCOMP concept variable:

"Political Competition: Concept variable combines information provided in two component variables: PARREG and PARCOMP... The Polity dataset measures two dimensions of political competition: (1) the degree of institutionalization, or regulation, of political competition (PARREG) and (2) the extent of government restriction on political competition (PARCOMP)".

c) Freedom House: Judicial Framework and Independence; Governance ²⁶

Judicial Framework and Independence: Highlights constitutional reform, human rights protections, criminal code reform, judicial independence, the status of ethnic minority rights, guarantees of equality before the law, treatment of suspects and prisoners, and compliance with judicial decisions.

National Democratic Governance. Considers the democratic character and stability of the governmental system; the independence, effectiveness, and accountability of legislative and executive branches; and the democratic oversight of military and security services.

Local Democratic Governance. Considers the decentralization of power; the responsibilities, election, and capacity of local governmental bodies; and the transparency and accountability of local authorities.

Ratings and Scores

For all 29 countries and territories in *Nations in Transit 2006*, Freedom House, in consultation with the report authors and a panel of academic advisers, has provided numerical ratings in the seven categories listed above. The ratings are based on a scale of 1 to 7, with 1 representing the highest and 7 the lowest level of democratic progress.

²⁵ See "Dataset Users' Manual" at http://www.systemicpeace.org/polity for a broader review of methodology.

²⁶ Information coped from http://www.freedomhouse.org

The ratings follow a quarter-point scale. Changes in ratings are based on events during the study year in relation to the previous year. Minor to moderate developments typically warrant a positive or negative change of a quarter (0.25) to a half (0.50) point. Significant developments typically warrant a positive or negative change of three-quarters (0.75) to a full (1.00) point. It is rare that the rating in any category will fluctuate by more than a full point (1.00) in a single year.

Nations in Transit does not rate governments per se. Nor does it rate countries based on governmental intentions or legislation alone. Rather, a country's ratings are determined by considering the practical effect of the state and nongovernmental actors on an individual's rights and freedoms.

The *Nations in Transit* ratings, which should not be taken as absolute indicators of the situation in a given country, are valuable for making general assessments of how democratic or authoritarian a country is. They also allow for comparative analysis of reforms among the countries surveyed and for analysis of long-term developments in a particular country.

The ratings process for Nations in Transit 2005 involved four steps:

- 1. Authors of individual country reports suggested preliminary ratings in all seven categories covered by the study.
- 2. The U.S. and CEE-NIS (Central and Eastern Europe-Newly Independent States) academic advisers evaluated the ratings and reviewed reports for accuracy, objectivity, and completeness of information.
- 3. Report authors were given the opportunity to dispute any revised rating that differed from the original by more than .50 point.
- 4. Freedom House refereed any disputed ratings and, if the evidence warranted, considered further adjustments. Final editorial authority for the ratings rested with Freedom House.

d) Freedom House: Political Rights ²⁷

Rating of 1 – Countries and territories that receive a rating of 1 for political rights come closest to ensuring the freedoms embodied in the checklist questions, beginning with free and fair elections. Those who are elected rule, there are competitive parties or other political groupings, and the opposition plays an important role and has actual power. Minority groups have reasonable self-government or can participate in the government through informal consensus.

Rating of 2 – Countries and territories rated 2 in political rights are less free than those rated 1. Such factors as political corruption, violence, political discrimination against minorities, and foreign or military influence on politics may be present and weaken the quality of freedom.

Ratings of 3, 4, 5 – The same conditions that undermine freedom in countries and territories with a rating of 2 may also weaken political rights in those with a rating of 3, 4, or 5. Other damaging elements can include civil war, heavy military involvement in politics, lingering royal power, unfair elections, and one-party dominance. However, states and territories in these categories may still enjoy some elements of political rights, including the freedom to organize quasi-political groups, reasonably free referenda, or other significant means of popular influence on government.

Rating of 6 – Countries and territories with political rights rated 6 have systems ruled by military

²⁷ Information copied from http://www.freedomhouse.org

juntas, one-party dictatorships, religious hierarchies, or autocrats. These regimes may allow only a minimal manifestation of political rights, such as some degree of representation or autonomy for minorities. A few states are traditional monarchies that mitigate their relative lack of political rights through the use of consultation with their subjects, tolerance of political discussion, and acceptance of public petitions.

Rating of 7 – For countries and territories with a rating of 7, political rights are absent or virtually nonexistent as a result of the extremely oppressive nature of the regime or severe oppression in combination with civil war. States and territories in this group may also be marked by extreme violence or warlord rule that dominates political power in the absence of an authoritative, functioning central government.

APPENDIX 2

TRANSFORMATION OF VARIABLES:

1. GOV1:

Formula used to transform the variable to the reverse scale: $GOV1 = (GOV - 8) \cdot (-1)$

2. PRI1:

Formula used to transform the variable to the reverse scale: $PRI1 = (PRI - 8) \cdot (-1)$

3. CPI1:

Formula used to transform the variable to the reverse scale, as well as decrease the range of scale from [1, 10] to [1, 7]:

 $CPI1 = (CPI - 11) \cdot (-1) \cdot (0.7)$

4. CORR:

CORR = (CPI1 + JUDIN) / 2

5. POLCOMP:

Dataset Users' Manual by Center for Systemic Peace states:

Cases of "transition" are prorated across the span of the transition. For example, country X has a POLITY score of -7 in 1957, followed by three years of -88 and, finally, a score of +5 in 1961. The change (+12) would be prorated over the intervening three years at a rate of per year, so that the converted scores would be as follows: 1957 -7; 1958 -4; 1959 -1; 1960 +2; and 1961 +5. Note: Ongoing (-88) transitions in the most recent year (2006) are converted to "system missing" values. Transitions (-88) following a year of independence, interruption (-66), or interregnum (-77) are prorated from the value "0."

APPENDIX 3

DATA:

DESCRIPTIVE STATISTICS

	INV	CORR	GOV1	POLCOMP	GER	PRI1
Mean	24.39459	4.559392	4.024122	7.256757	79.24902	4.831081
Median	23.45000	4.935000	4.250000	9.000000	78.43363	6.000000
Maximum	56.10000	6.470000	6.250000	10.00000	95.32606	7.000000
Minimum	11.80000	2.360000	1.370000	0.000000	64.99582	1.000000
Std. Dev.	6.172374	1.179313	1.533658	2.892923	8.303800	1.707879

CORRELATION AMONG VARIABLES

	CORR	GOV1	PRI1	POLCOMP	GER	INV
CORR	1.000000	-0.942894	-0.856931	-0.695039	-0.551502	-0.150899
GOV1	-0.942894	1.000000	0.902491	0.773936	0.409911	0.096579
PRI1	-0.856931	0.902491	1.000000	0.834952	0.352154	0.020305
POLCOMP	-0.695039	0.773936	0.834952	1.000000	0.201118	-0.114366
GER	-0.551502	0.409911	0.352154	0.201118	1.000000	0.026456
INV	-0.150899	0.096579	0.020305	-0.114366	0.026456	1.000000

APPENDIX 4

ESTIMATION RESULTS:

Equation (2) : First Differencing

Dependent variable: **D(CORR)** Method: Panel Least Squares Sample (adjusted): 2000 2006 Cross-sections included: 25 Total panel (unbalanced) observations: 153 White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c d(<i>GOV1</i>)	-0.02499 -0.36024	0.008801 0.050282	-2.83944 -7.16455	0.0051 0
R-squared	0.241043	Mean dependent var	-0.02075	
Adjusted R-squared	0.236017	S.D. dependent var	0.160656	
S.E. of regression	0.140423	Akaike info criterion	-1.07533	
Sum squared resid	2.977518	Schwarz criterion	-1.03571	
Log likelihood	84.26252	F-statistic	47.95733	
Durbin-Watson stat	1.898977	Prob(F-statistic)	0	

Equation (2): Fixed Effects

Dependent variable: CC	DRR			
Method: Panel Least Sq	uares			
Sample (adjusted): 1999	2006			
Cross-sections included	: 25			
Total panel (unbalanced) observations:	182		
White period standard e	rrors & covaria	nce (d.f. corrected)		
1		````		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
c	5.876247	0.149321	39.35315	0.0000
GOV1	-0.319896	0.038048	-8.407733	0.0000
	E	Effects Specification		
Cross-section fixed (dur	nmy variables)			
D 1	0.004500	ът 1 1 <i>г</i>	4 (20707	
R-squared	0.984588	Mean dependent var	4.620797	
Adjusted R-squared	0.982118	S.D. dependent var	1.198/41	
S.E. of regression	0.160299	Akaike info criterion	-0.691983	
Sum squared resid	4.008561	Schwarz criterion	-0.234268	
Log likelihood	88.97045	F-statistic	398.6392	
Durbin-Watson stat	0.908449	Prob(F-statistic)	0.000000	

Equation (3) : First Differencing

Dependent variable: D (<i>CORR</i>)
Method: Panel Least Squares
Sample (adjusted): 2001 2006
Cross-sections included: 25
Total panel (unbalanced) observations: 133
White period standard errors & covariance (d.f. corrected)

1.054446

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c d(<i>GOV1(-1</i>))	-0.024557 -0.069117	0.013573 0.033038	-1.809267 -2.092036	0.0727 0.0384
R-squared	0.009532	Mean dependent var	-0.022644	
Adjusted R-squared	0.001971	S.D. dependent var	0.160166	
S.E. of regression	0.160008	Akaike info criterion	-0.812261	
Sum squared resid	3.353940	Schwarz criterion	-0.768797	
Log likelihood	56.01537	F-statistic	1.260717	
Durbin-Watson stat	1.690223	Prob(F-statistic)	0.263569	

Equation (3) : Fixed Effects

Durbin-Watson stat

.

Dependent variable: CO	DRR							
Method: Panel Least Squ	Method: Panel Least Squares							
Sample (adjusted): 2000	2006							
Cross-sections included:	25							
Total panel (unbalanced)) observations:	159						
White period standard en	rrors & covaria	nce (d.f. corrected)						
1		`````						
Variable	Coefficient	Std. Error	t-Statistic	Prob.				
с	5.518107	0.203708	27.08834	0.0000				
GOV1(-1)	-0.228941	0.052005	-4.402316	0.0000				
	E	Effects Specification						
Cross-section fixed (dun	nmy variables)							
R-squared	0.982249	Mean dependent var	4.621321					
Adjusted R-squared	0.978912	S.D. dependent var	1.208196					
S.E. of regression	0.175450	Akaike info criterion	-0.494440					
Sum squared resid	4.094083	Schwarz criterion	0.007393					
Log likelihood	65.30802	F-statistic	294.3800					

Prob(F-statistic)

0.000000

Equation (5)

Dependent variable: **D**(*INV*) Method: Panel Two-Stage Least Squares Sample (adjusted): 2000 2006 Cross-sections included: 24 Total panel (unbalanced) observations: 145 White period standard errors & covariance (d.f. corrected) Instrument list: **c d**(*POLCOMP*)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c d(<i>CORR</i>)	1.337056 9.206389	0.287352 4.234869	4.653023 2.173949	0.0000 0.0314
R-squared	-0.364991	Mean dependent var	1.166897	
Adjusted R-squared	-0.374536	S.D. dependent var	2.627791	
S.E. of regression	3.080838	Sum squared resid	1357.294	
F-statistic	1.815773	Durbin-Watson stat	1.619808	
Prob(F-statistic)	0.179948	Second-stage SSR	981.8933	
R-squared	-0.364991	Mean dependent var	1.166897	
Instrument rank	2.000000	-		

Equation (5')

Dependent variable: **D(INV)** Method: Panel Two-Stage Least Squares Sample (adjusted): 2000 2006 Cross-sections included: 24 Total panel (unbalanced) observations: 145 White period standard errors & covariance (d.f. corrected) Instrument list: **c d(POLCOMP) d(GOV1)**

	0000
c 1.554303 0.338260 4.594989 0.	0000
d(CORR) 13.42843 5.242070 2.561666 0.	0115
d(GOVI) 7.209188 2.459510 2.931149 0.	0039
R-squared -0.393645 Mean dependent var 1.166897	
Adjusted R-squared -0.413274 S.D. dependent var 2.627791	
S.E. of regression 3.123950 Sum squared resid 1385.787	
F-statistic 3.761544 Durbin-Watson stat 1.729169	
Prob(F-statistic) 0.025597 Second-stage SSR 944.3309	
Instrument rank 3.000000	

Equation (5")

Dependent variable: **D**(*INV*) Method: Panel Two-Stage Least Squares Sample (adjusted): 2000 2005 Cross-sections included: 23 Total panel (unbalanced) observations: 118 White period standard errors & covariance (d.f. corrected) Instrument list: **c d**(*POLCOMP*) **d**(*GOV1*) **d**(*GER*) **d**(*PRI1*)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c d(<i>CORR</i>) d(<i>GOV1</i>) d(<i>GER</i>) d(<i>PRI1</i>)	1.668283 13.70232 7.198299 -0.238327 0.524740	0.383742 6.546747 3.117585 0.130613 0.786989	4.347412 2.092997 2.308934 -1.824674 0.666769	0.0000 0.0386 0.0228 0.0707 0.5063
R-squared Adjusted R-squared S.E. of regression F-statistic Prob(F-statistic) Instrument rank	-0.280135 -0.325449 3.225905 2.163508 0.077610 5.000000	Mean dependent var S.D. dependent var Sum squared resid Durbin-Watson stat Second-stage SSR	1.181356 2.802012 1175.931 1.670414 853.2531	

REFERENCES

Ackerman Susan Rose, Kornai Janos and Rothstein Bo. 2004. "Creating Social Trust in Post-Socialist Transition". *Palgrave Macmillian*.

Ades, Alberto and Di Tella, Rafael. 1999. "Rents, Competition and Corruption". The American Economic Review", 89(4), pp. 982-993.

Akai ,Nobuo, Horiuchi Yusaku, Sakata Masayo. 2005. "Short-run and Long-run Effects of Corruption on Economic Growth: Evidence from State-Level Cross-Section Data for the United States," *International and Development Economics Working Papers* idec05-5, International and Development Economics.

Bates, Robert H. 2004. "On the Politics of Property Rights by Haber, Razo and Maurer". *Journal of Economic Literature*, 42(2), pp. 494-500.

Bardhan, Pranab. 1997. "Corruption and Development: A Review of Issues". *Journal of Economic Literature*, 35(3), pp. 1320-1346.

Bayley, David H. 1966. "The Effects of Corruption in a Developing Country". The Western Political Quarterly, 19(4), pp. 719-732.

Beck, Paul J. and Maher, Michael W. 1986. "A Comparison of Bribery and Bidding in Thin Markets". *Economic Letters*, 20(1), pp. 1-5.

Bliss, Christopher and Di Tella, Rafael. 1997. "Does Competition Kill Corruption?". The Journal of Political Economy, 105(5), pp. 1001-1023.

Center for Systemic Peace. http://www.systemicpeace.org/polity

Dwivedi, O.P. 1967. "Bureaucratic Corruption in Developing Countries". Asian Survey, 7(4), pp. 245-253.

European Bank for Reconstruction and Development (EBRD). http://ebrd.com/country/sector/econo/stats/index.htm

Freedom House. http://www.freedomhouse.org

Hoff, Karla and Stiglitz, E. Joseph. 2004. "After the Big-Bang? Obstacles to the Emergence of the Rule of Law in Post-Communist Societies". *The American Economic Review*, 94(3), pp. 753-763.

Kornai, Janos. 1992. "Co-ordination Meachanisms", Ch.6 in "The Socialist System: The Political Economy of Communism". *Clarendon Press, Oxford*. Pp 91-109.

Kornai, Janos. 1992. "Shortage and Inflation: The Phenomena", Ch.11 in "The Socialist System: The Political Economy of Communism". *Clarendon Press, Oxford*. Pp 228-262.

Kornai, Janos. 1992. "Shortage and Inflation: The Causes", Ch.12 in "The Socialist System: The Political Economy of Communism". Clarendon Press, Oxford. Pp. 262-302.

Kowalik, Tadeusz. 1987. "Central Planning" in "The New Palgrave Series: Problems of the Planned Economy". (eds.: J. Eatwell, M.Milgate, P.Newman), pp.42-51.

Leff, Nathaniel. 1964. "Economic Development through Bureaucratic Corruption". American Behavioral Scientiest, pp. 8-14.

Lui, Francis T. 1985. "An Equilibrium Queuing Model of Bribery". Journal of Political Economy, 93(4), pp. 760-781.

Mauro, Paolo. 1995. "Corruption and Growth". The Quarterly Journal of Economics, 110(3), pp. 681-712.

Merriam-Webster Online Dictionary. http://www.merriam-webster.com/dictionary/

Neuberger, Egon. 1968. "The Legacies of Central Planning". RM5530-PR, RAND.

North, Douglas C. and Weingast Barry R. 1989. "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England". *The Journal of Economic History*, 49(4), pp. 803-832.

Portes, Richard and Winter, David. 1977. "The Supply of Consumption Goods in Centrally Planned Economies". *Journal of Comparative Economics*, Vol 1, pp. 351-365.

Shleifer, Andrei and Vishny, Robert W. 1993. "Corruption". The Quarterly Journal of Economics, 108(3), pp 599-617.

Svensson, Jakob. 2005. "Eight Questions about Corruption". *The Journal of Economic Perspectives*, 19(3), pp.19-42.

Transparency International. http://www.transparency.org

United Nations Educational, Scientific, and Cultural Organization (UNESCO). http://www.uis.unesco.org/en/stats/statistics/database/DBIndex.htm

Williamson, Oliver. 1975. "Markets and Hierarchies". New York, NY: The Free Press.

You, Jong-Sung and Sanjeev Khagram. 2005. "A Comparative Study of Inequality and Corruption". *American Sociological Review*, 70(1), pp. 136-157