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Corruption in Transition

– Economic and political drivers of government corruption in the transition countries

“...each candidate behaved well in the hope of being judged worthy of election. However, this system was disastrous when the city had become corrupt. For then it was not the most virtuous but the most powerful who stood for election, and the weak, even if virtuous, were too frightened to run for office.”

– Niccolò Machiavelli, Florentine diplomat and patriot

Abstract

This thesis analyses the connection between institutional and geographical factors and the prevalence of government corruption in the transition countries. The main findings are that corruption tends to decrease with the incidence of political freedom, property rights enforcement, and market competition. Political freedom is also shown to be non-linearly related to corruption, so that unfree countries tend to benefit less from democratisation than countries that have already made substantial reform. The effect of geography, in the form of natural resources, does not appear to be a significant determinant of corruption, once institutions are controlled for. Moreover, evidence is presented suggesting that the link from institutions to corruption is causal in nature, and especially so for the institution of market competition. These conclusions about causality are drawn based on the use of instrumental and historical variables for institutional quality.

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1. Introduction

1.1 A historical backdrop

Fifteen years ago the countries of Eastern Europe and Central Asia found themselves on the brink of a transition period. They were about to embark on a process, with the aim of completely and profoundly transforming their political and economic systems, from undemocratic, hierarchic and planned, to democratic, decentralised and market-based. At the outset of the transition process, these twenty seven countries¹, some of which had just earned their sovereignty, had a common communist heritage, which meant that they all had features separating them from both the developed Western world and the developing world. Despite the similarities there were also large differences, as some countries had earlier experiences of democracy and market-economy, whereas others had only experienced subsistence economy and autocratic systems of government.

Since the breakdown of communism and start of transition, the development paths of these nations have diverged in a previously unanticipated manner. Despite initial common turbulence and economic contraction some countries have since then grown into well functioning democratic states and are already on par with old EU-members with which they now compete. Others however, have in spite of initial attempts slid back into undemocratic systems of government and stalled economic development.

The reasons for this great divide are debated, with explanations ranging from cultural, over political, to purely economic. Over the last decades a new field of economic growth research has focused on the role of institutions as a cause of diverging economic development between nations. An important lesson learnt is that corruption and a corrupt economy may be both outcomes and causes of certain paths of development. As much as the transition countries differ in terms of economic development they also differ in the prevalence and impact of corruption.

¹ See Appendix 1 for a specification of which countries are concerned.

1.2 The aim of this study

Because of the diverging trends of corruption over time in the transition countries, and taking into consideration the particular circumstances that were common to all at the outset of transition, this essay deals with the question why corruption is rampant in some of these economies and almost non-existent in others. More precisely, the scope of the paper is such that it aims *to investigate the influence of institutional factors on government corruption in transition countries*. Naturally, many possible explanations for the varying levels of corruption between economies can be derived from economic theory, even within the field of institutional economics. However, we limit this investigation to the drivers deemed most important by previous institutional economics and transition economics research.

1.3 Why study corruption?

The problem of corruption is known today to be one of the most persistent and widespread economic problems. The effects of corruption on an economy are potentially devastating, especially for countries trying to develop the set of economic institutions that are critical for a functioning market economy, such as regulations of financial markets, transportation, and taxation (Tanzi, 1998). Corruption distorts incentives so that more economic resources are put into rent-seeking and less into productive activities (Murphy et al, 1991). It also functions as an exceptionally inefficient tax, with high welfare costs, transferring resources from people and firms to government officials, and is generally detrimental to economic growth (Tanzi and Davoodi, 1997 and 1998; Wei, 1999). This all undermines the legitimacy of the developing democratic institutions with potentially severe negative consequences. The deterioration of the economic and political climate has been demonstrated in Georgia, Ukraine, and Kyrgyzstan by popular uprisings against corrupt regimes, and most recently in Poland, where the former administration was ousted after allegations of corruption.

1.4 Why study transition countries specifically?

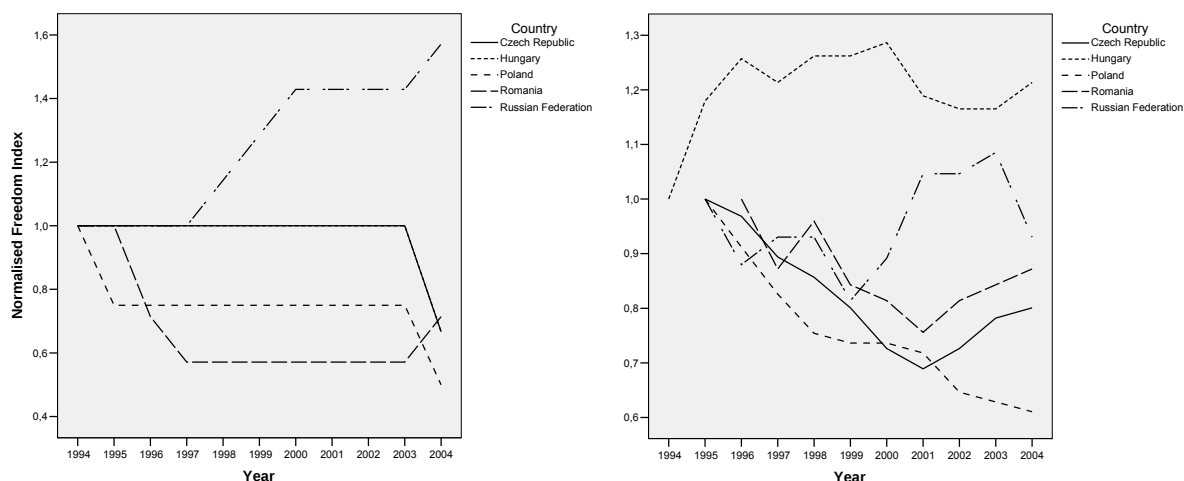
As indicated above, a study of corruption in the transition countries must be made with the historical context of these countries in mind. At the outset of the transition period, the countries had in common the communist parties as the central bodies in charge of organising economic and political activity. It does not seem far-fetched to argue that this, in many ways, aligned the economic and political activity that took place there. Because of this alignment of activities, it is likely that the levels

of corruption in the different countries were comparable and similar in nature, since most economic activity was centrally organised in all the communist countries (Kornai, 1992).

After the downfall of communism, however, the differing historical institutions in the transition countries were unleashed, after which the countries began progressing in separate and in many cases divergent directions. This leads us to believe that the reasons for the varying degrees of corruption are to be found within the institutional framework of each country. In addition to the similar initial circumstances of the transition countries, the fact that the development started almost simultaneously could enable us to isolate some of the connections between institutions and corruption that may exist, something which would be much more difficult under other conditions. As an illustration, the large variations in the development of corruption levels and one measure of institutions can be seen in Figure 1.

Figure 1

The diagrams below show the development of Freedom House's index of political freedom, and Transparency International's measure of corruption for a selection of transition countries. Higher values of the freedom index correspond to less political freedom, and higher values of the corruption index correspond to less corruption. These indices have been normalised to show the relative development of each country. The Czech Republic and Hungary had the same relative development of the freedom index during the period, but otherwise there was a large variation in the development, in both respects, between different countries.



Previously, economic researchers (for example, Acemoglu et al, 2001) have investigated the effects of a simultaneous imposition of differing sets of institutions on otherwise similar economies, such as East and West Germany, and North and South Korea. The simultaneous collapse of communism in Eastern Europe and Central Asia presents a somewhat contrary case, in the sense that initially similar

communist economies started to progress in different directions, not because of enforcement, but because of newfound independence.

Our study is empirical and covers all transition economies. However, it may be enlightening to review some anecdotal evidence of corruption from the authors' field trip to the South Caucasus country of Georgia in 2004. In the countries that are affected by corruption the problem is often of an endemic character, reaching into all aspects of personal and economic life. In the same way as it may be impossible for a Georgian to get a passport in order to travel abroad on vacation without paying a bribe to the local bureaucrat, it may be mandatory for all large firms within the financial industry to pay a fixed share of revenues straight into the pockets of the minister of interior. In remote provinces where policing and civil society are less important and nepotism dominates, it is not uncommon for small and medium sized firms to receive weekly inspections from the tax administration. Managers blamed the problems on imperfect legislation, competitors' contacts within the state bureaucracy and the flow of money coming from huge investments in regional pipelines and infrastructure.² Nevertheless, the regulatory problems of inspections and permits were often so severe that individual businessmen could not imagine a functioning business without the possibility of paying a bribe. The broader question is of course what has caused this terrible state of affairs in Georgia, while at the same time other former communist countries are entering the European Union.

The rest of the study will be structured as follows: Section 2 outlines the relevant economic theories for quantitatively investigating the thesis problem. Section 3 presents the data on which the study is based, and how this data is used in terms of variables that may influence corruption. It also presents the stylised model that will be used for evaluating the theories. In section 4 the empirical results are presented, after which these are discussed and tested. Section 5 concludes.

2. Theory

In the following section economic literature relevant for the purpose of this thesis is presented, drawing on institutional theory, growth theory, and recent studies of transition economies. Using this

² Shalva Giorgadze, National Bank of Georgia, Georgia.

theoretical background, we intend to build a framework, which can be used for evaluating the various economic variables that affect the level of corruption in former communist transition countries.

2.1 What is corruption?

Not long ago, corruption was regarded by some researchers as potentially beneficial to an economy. Samuel P. Huntington (1968), for example, argued that corruption in general could serve as “grease in the machinery” and as such be a second best alternative in an economy otherwise plagued by heavy regulations and restrictions on economic activity. In recent years, however, much advance has been made in the understanding of the effects of a corrupt economic system. Particularly the effects of corruption on growth have been widely researched, and the notion of any potential positive effect of corruption has been widely discarded. The field of corruption research based on solid empirical evidence was pioneered among others by Paolo Mauro in his article “Corruption and Growth” (1995).

In economic literature, a number of different definitions of the concept of corruption have been put forward, and a considerable number of these focus exclusively on the subject of government corruption. For example, a rather narrow definition, presented by Shleifer and Vishny (1993), is formulated “...the sale by government officials of government property for personal gain”. A wider definition suggested by Tanzi (1998), and arguably encompassing the former, is “...the abuse of public power for private benefit”. Since this text draws upon a fairly wide range of theory, and since it is beyond our scope to distinguish between different forms of government corruption, this wider definition is the one adhered to henceforth. This also implies that no distinction is made between so-called petty and grand corruption. Although an interesting topic in its own right, the issue of which level of society that corruption takes place in is thus not addressed here.

2.2 Corruption as rent-seeking

Corruption as defined above can be included in a wider concept of rent-seeking activities as defined for example by Murphy et al (1991). Following their reasoning, rents are all economic proceeds that are generated in an economy, and rent-seeking refers to any government agent attempting to extract these rents from economic agents. Corruption is one such activity, in the sense that it redistributes resources from individuals and firms to corrupt government agents. The idea of rents is thus

fundamental to the study of corruption, as illustrated in the following two questions, which should be critical in determining the level of corruption in an economy:

- Firstly, how much rents are present in the economy, that is, how much economic proceeds exist that attracts rent-seeking behaviour from bureaucrats. By this is implied that, *ceteris paribus*, a firm that is immensely profitable should be a more attractive target for corrupt bureaucrats than a firm that is barely breaking even, simply because there is more money to be made from rent-seeking there.
- Secondly, how easy is it for bureaucrats and other government agents to engage in rent-seeking behaviour? Since corruption is almost invariably illegal, or at least technically so, this should boil down to a question of what deterrence is present, legal but also otherwise, that acts to make rent-seeking behaviour less attractive. Accordingly, a government official faces a choice of whether to engage in rent-seeking or not, where he weighs the incentives for rent-seeking against the deterrence against such behaviour.

2.3 What causes corruption in transition countries?

As stated above, finding the factors that affect the level of rent-seeking activity in an economy is central to solving the puzzle of corruption. As a starting point for this analysis, the following core specification is an illustration of the underlying factors that have been suggested as important in determining the amount of corruption in past institutional literature.

$$corruption_t = \alpha_0 + \alpha_1 political_{t-1} + \alpha_2 economic_{t-1} + \alpha_3 geography_{t-1} + \varepsilon_t \quad (1)$$

These stylise factors represent, in turn, political institutions, economic institutions, and geographical properties of the economy in question, and the connection is such that institutions and geography affects the level of corruption over time, as represented by the time-denotations. In the empirical section, an attempt is made to represent these core factors using more tangible variables based on previous research. Thereafter, their signs, sizes, and significance in influencing corruption are established. It is appropriate already at this early stage to mention that there are causality issues in this core specification, in the sense that there may be a reverse connection between corruption and institutional quality, and also a possible causal correlation between political and economic levels of

development. The question of the determinants of corruption, but also these causality issues, are dealt with in the text. An important clarifying point to be made here is that we will phrase a decrease in the amount of corruption as an “improvement”, a “positive” change, or as a “positive” impact; that is, we will maintain a normative view.

Institutions have thus been presented as a possible determinant of rent-seeking and corruption. As a starting point for a discussion of this connection, the concept of institutions itself must be defined. Douglass North (1990, p. 3) describes institutions as “the rules of the game” in an economy. These are described as all non-physical determinants and constraints on human interaction, including economic activity, as contained within the institutional framework of an economy. This is also the wide definition that is used in this paper.

2.4 Political institutions

According to Lederman et al (2005) political institutions, such as the degree of democracy, affect corruption through two separate channels: the structure of the market for government goods and the level of political accountability. In the transition countries, large differences are observed in terms of such political institutions.

The market for government goods

The way in which the government organises its provision of goods and services to society is one political institution that is likely to have an impact on the level of corruption. Shleifer and Vishny (1993) regard this organisation as a market for licenses and permits, where government agencies act as sellers and private firms or individuals as buyers. They base their model of corruption on the structure of this market, with some market types being more conducive to rent-seeking behaviour than others. Notably, they argue that corruption may increase when countries move from an autocratic to a more democratic government.

- Firstly, Shleifer and Vishny consider the situation where government agencies are centrally coordinated and through collusion function as a single monopoly over complementary permits and regulations that govern the economy. Government agencies thus maximise the total amount of rents extracted.

- Secondly, they describe a situation where several government agencies act independently of each other, selling complementary permits and regulations, each trying to maximise its own revenues by extracting bribes (rents) from private firms. Shleifer and Vishny theorise that this latter situation should lead to greater bribe demands as each agency attempts to independently maximise its own revenues, while taking the actions of other agencies as given. The total amount of bribes paid by private firms, however, will be smaller than under a central monopoly, and the government agencies are accordingly hurting both businesses by extracting rents, and each other, by not colluding.
- Finally, these two stylised situations are contrasted to the one where each license and permit can be awarded by more than one agency. In this case, it is argued that Bertrand competition among the agencies will drive the amount of extracted bribes down to zero. This idea of competition between government agencies leading to lower corruption was originally proposed by Susan Rose-Ackerman (1975).

Shleifer and Vishny state themselves that their model is compatible with the arguments of Huntington (1968), who claims that it is likely that a country moving from an autocratic government to a more democratic one is likely to suffer an increase in corruption. The argument hinges on the idea that newly formed governments are likely to exert much weaker control over the rent-seeking procedures of the bureaucracy, making the transition process equivalent to a move from the described first situation to the second. This is thus the result that would be expected in the transition countries as they move from a centrally planned authoritarian (or totalitarian) system to a more democratic decentralised economy. Since Shleifer and Vishny's optimum case of government agencies competing for customers is likely to be a utopia, the process of democratisation and decentralisation should thus lead to an increase in the level of corruption through the structure of the market for government goods and services.

Using the ideas of rents and incentives introduced above, these conclusions can be seen as representing the idea that the institutional framework, here determining the way that licenses and permits are distributed to economic actors, affect the rent-seeking incentives that bureaucrats are facing. A more decentralised bureaucratic system yields more discretion to the individual bureaucrat, enabling him to extract more rents from each firm. At the outset of transition, when the system

changes to being more decentralised, the total amount of rents in the economy is still unchanged, but the individual bureaucrat now has more power in the form of discretion.

Political centralisation and accountability

A more conventional outlook on political institutions and their influence on corruption focuses on the direct effect of different political systems on the level of corruption. Lederman et al (2005) argue that a higher degree of political accountability, within a rent framework, translates to better deterrence against rent-seeking. Furthermore, they suggest three separate mechanisms through which political institutions determine the level of political accountability: political competition, checks and balances, and system transparency.

According to Acemoglu et al (2001, 2004) and Rodrik et al (2002), political institutions may be seen as given within an economy, and according to Lederman et al this should be interpreted as political institutions being the ultimate determinant of corruption in shaping the incentives of government officials. Following this line of reasoning, the deterrence that affect bureaucratic behaviour can be seen as resulting from the political institutional framework of the country. Thus, in their article Lederman et al investigate the effects of political institutions, while controlling for cultural, economic policy, and development factors that may also explain the level of corruption. The authors find that corruption decreases with overall democracy, parliamentary systems, democratic stability, and freedom of press. However, they also find that a presidential system tends to increase corruption about as much as it is reduced by the democracy variable. This is explained by presidential systems empirically tending to exhibit less political accountability than a parliamentary system, since a presidential administration is typically more difficult to remove for the elected legislature. Nevertheless, the total effect on corruption of the variables that are associated with a democratic form of government is found to be positive.

Democratisation is usually associated with general political decentralisation, which has also been observed in many of the transition countries. Lederman et al find, in addition to their general results about democratisation, that there are beneficial effects on corruption of this political decentralisation, defined as greater regional autonomy. These can be expressed as a connection between decentralised government spending and improved accountability. There are also negative effects, however, caused

by central and local government legislation overlapping, which causes “congestion”, decreasing accountability and leaving room for rent-seeking. The authors conclude that the latter harmful effects dominate the former beneficial effects of decentralisation in the sample used, even though the total effect of democratisation is positive. The authors’ separate conclusions about decentralisation are thus in line with the outcome of the market structure model of Shleifer and Vishny, as described above. However, Lederman et al's general findings, of the effects of initial democratisation decreasing corruption, are largely at odds with the ideas of Shleifer and Vishny.

Fiscal centralisation

In contrast to the effects of political centralisation on corruption, which are debated, there is more consensus about the issue of fiscal centralisation versus decentralisation. In a broad cross-country study Fisman and Gatti (2000) have pointed to a positive effect of fiscal decentralisation on the level of corruption. Blanchard and Shleifer (2001) largely agree, but add that the positive effects on rent-seeking from fiscal federalism are conditional upon the political centralisation discussed above. With political centralisation, i.e. centrally appointed governors, local governors have stronger incentives to promote local growth instead of engaging in rent-seeking. This is because their career prospects become dependent on aligning regional policies with the national interest of promoting growth, instead of local protectionism. To isolate the effect of fiscal federalism on corruption it is therefore necessary to assemble data not only on the extent of fiscal federalism in the sample countries, but also on the extent of de facto political centralisation.

Unfortunately, detailed data on the degree of political and fiscal centralisation have not been available for the transition countries. However, the fiscal approach indicates another reason, apart from the market structure of public goods, for why increased political decentralisation commonly associated with democratisation may have a negative effect on corruption, as suggested above. Consequently, this argument can be seen as complementary to the theories of Shleifer and Vishny, since it points to another possible negative effect of democratisation on corruption. The theory of fiscal decentralisation is thus treated because it should make the degree of democratisation and political centralisation more important in determining corruption, not for the effects it has on its own.

2.5 Economic institutions

Economic institutions can be seen as the foundations of an economy, which influence incentives in human exchange (North, 1990). Two of the economic institutions that should be particularly relevant for rent-seeking in a transition context, and which also differ greatly between the different transition countries, are property rights and the market structure. These two institutions can also be said to represent the particular set of Western-style market economy institutions that the countries set out to acquire at the start of transition, and they therefore indicate how far their transition has progressed.

Property rights

It is widely accepted within economics that the extent of property rights enforcement is crucial for economic growth. For example, the importance of secure property rights for growth has been established by Strulik and Lindner (1999) and by Laeven and Claessens (2002). The intuition between property rights and the level of corruption should be clear-cut, in the sense that insecure property ownership of both government and private property gives rise to more opportunities for the rent-seeking of bureaucrats through their bureaucratic discretion, and thus should lead to an increase in corrupt activities. This concept is also central to the transition countries because of their history of public ownership. Because of this history of very weak or non-existent private property rights, a measure of the amount of property rights today could be seen as a good measure of development in terms of economic institutions.

The product market

Another important determinant of the amount of rents available, and hence corruption, is the amount of competition among firms. The amount of rents becomes even more important in transition countries where civil servant salaries are often below subsistence level, making the negative incentives to accept bribes more important.

A number of researchers have focused on the amount of rents that is up for grabs in the economy. This has been put in relation to the amount of deterrence that is present, in the shape of monitoring and other incentives. An important potential deterrence is the level of bureaucrats' salaries. According to Becker and Stigler (1974) paying higher than market-clearing wages in combination with periodic

monitoring may be efficient in inducing non-corrupt behaviour by bureaucrats. Ades and di Tella (1999) use this framework as a foundation for a model that illustrates the effect of rents on the equilibrium level of corruption.

In Ades and Di Tella's model, the value of the bureaucrats' control rights (previously referred to as discretion) is a function of the total rents earned by a firm under the bureaucrats' jurisdiction, and the amount of rents, in turn, is inversely related to the amount of competition that firms face. Corruption takes place when some of the control rights are surrendered by the bureaucrat to the firm in exchange for bribes. When rents are high the bribes paid will be larger as the value of the control rights have increased; as a result the level of corruption in the economy rises.

However, according to Ades and Di Tella there is also an opposite effect. In fact, higher rents may provoke the public into forcing the government to increase the control and monitoring of the bureaucrat, to curb obvious rent-seeking activities. This may also be accomplished through the setting of what has been defined as efficiency wages: a level of salaries, which, by taking into account the amount of rents and incentives facing the bureaucrat, effectively induces a non-rent-seeking behaviour. However, in less democratic transition countries the offsetting effect of public demands for controlling the bureaucrats may be absent. Another factor producing the same outcome may be the inability of governments to actually set wages for bureaucrats above market-clearing levels, due to either ignorance of efficiency-wages or simply strained budgets. This problem applies to bureaucrats as well as to monitoring agents, since these too typically receive low wages, making monitoring ineffective.³ Either way, an important result of a government not setting efficiency wages, due to low accountability, ignorance or lack of resources, is that more competition in the product market will unambiguously decrease corruption since the bureaucrat's incentives will then have improved. In other words, when firms are facing stiffer competition the total amount of rents available for rent-seeking decreases. Accordingly, when competition is greater, even low levels of government wages come closer to the efficiency wage level and reduce corruption more effectively.

³ This problem has been prevalent in the South Caucasus republics, according to Irakli Porchkidsze, an executive at the Open Society Institute (the Soros Foundation), whose efforts are targeted at providing government officials with incentives that prevent rent-seeking behaviour.

The empirical results from a wide range of non-transition countries confirm the theory of Ades and Di Tella of the importance of competition in determining the equilibrium level of corruption in an economy. Due to the low levels of public salaries in many transition countries⁴, this theory should be even more applicable in these countries, and accordingly, competition should be a critical factor in determining corruption here.

2.6 Geography - The Resource Curse

A wealth of natural resources which countries are unable to handle productively is widely believed to be a source of corruption, and there are also a number of transition countries that are well endowed in terms of such resources, such as Azerbaijan, Russia, Kazakhstan and Turkmenistan. One explanation for the impact of natural resources on corruption, theorised by Lane and Tornell (1999), is that an increase in natural resource extraction will tend to increase the amount of rents in the economy. The authors argue that this leads to a 'feeding frenzy' of rampant rent-seeking activities. Empirically, Sala-i-Martin and Subramanian (2003) have managed to show how the negative impact from high-worth oil and minerals income has impaired Nigerian economic growth since the 1970s. The authors argue that the main channel of damage from natural resources was through a deterioration of the institutional climate. Their findings are also confirmed by Isham et al (2003) who find that a wealth of natural resources tends to affect economic institutions negatively. This is thus an alternative to the so-called Dutch disease effect, which explains slow growth following a resource boom with an associated real exchange rate appreciation, having a negative effect on the tradable sector of the economy.⁵

An explanation for the suggested relation between resource extraction and deterioration of the institutional climate is the higher government spending that a resource boom enables. With higher public expenditure and investment, the scope for kickbacks and rent-seeking is increased. Sala-i-Martin and Subramanian confirm this in their explanation for the Nigerian economic decline, and blame it mainly on inefficient investment in, and expansion of, the government sector. This in effect produced large rent-seeking opportunities, since a greater share of national income was now up for

⁴ Mark Mullen, Transparency International, Georgia.

⁵ For a discussion on the Dutch disease see for example Sachs and Warner (1995).

grabs in the newly expanded government sector. This caused both a deterioration of institutional quality and an increase in corruption.

Boschini et al (2003) propose a different rent-seeking perspective in which the quality of institutions is the critical factor in determining the effect of resource abundance. In contrast to the Sala-i-Martin and Subramanian paper, Boschini et al find that the effect of natural resource abundance is critically dependent on the quality of institutions, rather than determining the quality of institutions. The authors introduce the concept of *appropriability* as a measure of the amount of rents that a particular resource causes. Their findings are essentially that the effect of high-appropriability resources depends more critically on institutional quality than that of low-appropriability resources, since “better institutions increase the costs of non-productive activities”, and accordingly that good institutional quality is necessary to handle the large rents induced by certain resources. Resources identified as having high appropriability are, for example, petroleum products, precious metals and diamonds.

2.7 The causality problem

As stated, it is likely that some degree of reverse causality, or endogeneity, is present in the stylised model presented above, in the sense that the level of corruption may affect, and develops in parallel with, the explanatory variables. Moreover, it is also likely that a degree of correlation exists between the institutional explanatory variables, and Acemoglu et al (2004) suggests that there is indeed a causal connection running from the level of political institutional development to the quality of economic institutions. This implies that certain economic institutions are much more likely to emerge under certain political circumstances. Since causality is of great importance for the purpose of this paper, these issues are dealt with at some length, in the analysis.

3. Empirical setup

3.1 The dataset

The empirical study outlined below, which aims to estimate the proposed stylised relationship of factors connected to the level of corruption, is based on data which has been compiled from a number of sources and which takes on different formats. The data covers the 27 transition countries, with the

exception of Serbia and Montenegro, which is absent due to missing observations. In the following pages the characteristics of this dataset and its variables are described. If one is so inclined, more detailed descriptive statistics of the dataset, as well as descriptions of the individual variables and their connections with corruption, can be studied in *Appendix 1*.

Timing issues

The variables included in the empirical study cover the years 1994 through 2005, even though data for the earlier years is missing for a few countries. The data in the base case has been pooled into two time periods of equal length, with 1994 through 1999 as the first six-year period, and 2000 through 2005 as the second, each serving as a separate observation for each country, so that there are two observations for each country, save for some missing observations. For all the explanatory variables, save for initial GDP per capita, simple means have been used for the years that make up the period, whereas the final observation has been used for the dependent variable corruption.

The reason for dividing the data into two periods is twofold: Firstly, the variation in most of the variables occurs to a much higher degree *between* countries than within the countries, over time. This is the reason why time-series data would have been less useful. Secondly, the negative effect of measurement problems in transition countries is likely to be alleviated by the use of means. It must also be noted that the two-period approach can be used only because there is substantial variation between the two periods for the respective countries, so that each period may serve as a separate observation in explaining corruption variation over time. The decision to use exactly two periods instead of, say, three, is of course somewhat arbitrary. However, it can be argued that for shorter time periods than five years, there would not be enough variation between periods to draw better inference than what could be done with five-year periods.

As described above, there is an implicit lag in the connection between dependent variables and corruption, since final observations are used for corruption levels, and means over time for the explanatory variables. This configuration was chosen because, firstly, it is likely that changes in institutions happen over longer periods of time, and secondly, because it seems equally likely that such changes will not immediately affect rent-seeking behaviour, but rather over time.

Measurement problems

Inherent in the concept of corruption is the element of secrecy, and accordingly problems of measurement. One significant problem in empirically investigating the corruption issue has been the lack of reliable data (Bardhan, 1997), which in effect prevented the use of quantitative modelling for determining the effects and causes of corruption. Mauro, however, used subjective data based on evaluations from country-specific risk assessments to compile variables that do not measure corruption per se, but which serve as reasonably good proxies.

Since then, much progress has been made in the data collection department, but one problem that remains is the inherent difficulty in collecting first-hand data from economic actors in different countries. This is both because economic agents may have different points of reference in their perception of the phenomenon, and also because they are typically reluctant to even speak about practices that are per definition illegal in most countries. Furthermore, there is always a risk of a home bias, in which domestic respondents deliberately underestimate the extent of problems.⁶ In order to address the potential measurement problems the results will be tested using different measures of corruption, described in the following paragraphs.

Dependent variable: Corruption Perceptions Index (TI)

A brief description of the variables included in this study is called for at this point. In order to capture the general level of corruption in an economy the Corruption Perceptions Index from Transparency International, designated TI, is used. This is a composite subjective measure, constructed mainly by an unweighted average of various surveys of foreign businessmen operating in the respective countries. Previously, data of this character has been criticised for containing certain systemic biases, in the sense that countries that are doing well economically are perceived as less corrupt (see, for example, Ades and Di Tella, 1999). However, in the dataset there is no significant correlation between the countries' TI index and their economic growth, which contradicts this critique.

Furthermore, many African countries, which are arguably more corrupt, score better on the TI ranking than several of the transition countries, pointing to another possible bias against some

⁶ Mark Mullen, Transparency International, Georgia.

regions.⁷ Nevertheless, the TI measure of corruption levels is widely used and often cited as the gauge to beat in measuring corruption. In our dataset, the variable TI is simply the unaltered grade assigned to each country by Transparency International and as such it should be interpreted carefully, since there is no quantitative scale with which to compare different values.

Auxiliary dependent variable: EBRD's BEEPS

In addition to the TI data, and to counter some of the questions that may be raised concerning the subjective nature of the first measure of corruption presented above, data from the Business Environment and Enterprise Performance Surveys (BEEPS) from the European Bank for Reconstruction and Development (EBRD) and the World Bank in 1999 and 2002 is used. These surveys included about 4100 and 6100 small and medium sized firms respectively, evenly distributed across the 27 former communist countries. For a detailed description of the BEEPS studies, see Fries et al (2003) or EBRD (1999). The chief difference between this data and the variable TI is that BEEPS is based on replies given by actual businesspeople in the countries concerned, and not on grades assigned by external experts and various surveys. However, the data in the BEEPS report is also subjective to some degree, as they are based on the perceptions of managers. Another important issue is the timing of these variables: They are only available for the years 1999 and 2002, which is obviously different from the main corruption variable TI.

The part of the BEEPS data that is used as an alternative measure of corruption takes the form of a variable designated CORR. This variable is based on the survey respondents' reply to the question "Does corruption constitute an obstacle to the operations and growth of your business?" where replies are on a scale of one to four. The variable CORR is constructed using the simple means of all replies in all countries where the BEEPS studies were conducted. One obvious advantage of using local firms' own statements about corruption is that the resulting data will be unbiased of external experts' perception of the different countries and accordingly more likely to be reliable. However, the CORR variable inherently gives a narrower measure of corruption, since it only takes small and medium sized businesses into account. Nevertheless, CORR is strongly and significantly correlated with TI. From this it may be concluded that either of the variables could possibly serve as a measure of government

⁷ For a discussion of this possible bias, see Shleifer and Treisman (2005).

corruption, and as such the CORR variable is used for checking the reliability of the results obtained by using the broader variable TI.

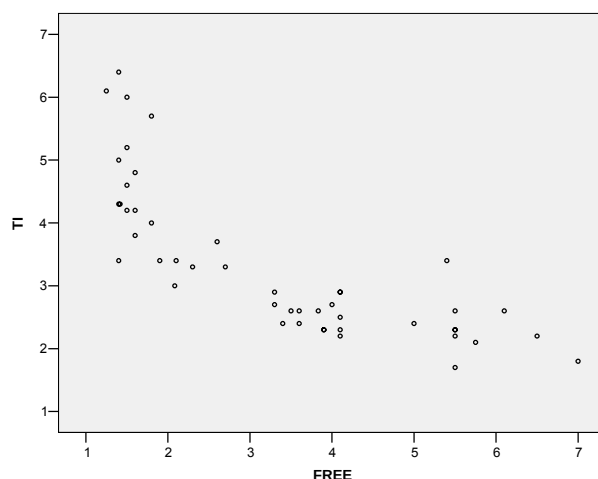
Explanatory variables: the political institutions variable

As described in the theory section above, the degree of democratisation is likely to have an important impact on the level of corruption in the transition economies. In order to capture this effect, a subjective measure of the degree of political freedom is used. This variable, dubbed FREE, is the average of the measurements of political rights and civil liberties, known together as the *Gastil Index*, which is provided yearly by Freedom House. This variable is used to measure the general degree of political institutional development in a country. On the scale, countries are assigned values between one and seven, where lower levels correspond to a more democratic system. Because of the fairly complex relation between this variable and corruption, as described above, it deserves a somewhat detailed discussion.

The level of political institutions development, as measured by the FREE variable, may well have an ambiguous impact on the level of corruption. Firstly, political freedom, as it is defined by Freedom House, is positively related to the level of accountability of representatives to the electorate. This should, according to Lederman et al, have a solid beneficial effect on the level of corruption. On the other hand, it has also been suggested above that higher levels of political freedom is likely to be associated with political decentralisation, which could be conducive to *higher* levels of corruption. However, the proponents of this latter view, Shleifer and Vishny, argue that for more decentralised societies it may be beneficial to further decentralise, so that more political freedom for semi-free countries lowers corruption.

Figure 2

The chart below shows some of the relationship between the variables FREE and TI, that is, between estimated political freedom and Transparency International's corruption index for each country. Note the apparently changing relationship between TI and FREE for different values of FREE.



Turning to the transition countries, the seemingly ambiguous connection between political freedom and corruption also appears to hold. Displayed in *Figure 2* is a simple scatter plot of the variables FREE and the corruption variable TI. Judging from *Figure 2*, it appears that for more free countries, more freedom is associated with less corruption, whereas for less free countries, it is possible that the connection is less clear-cut. This interesting issue is dealt with in the analysis. A potential problem concerning the FREE variable is that, due to its subjective nature, it may be affected by the general perception of each country, including the degree of corruption, which indicates a potential endogeneity problem in the FREE variable. An attempt to counter this problem is made in section 4.2.

Explanatory variables: the economic institutions variables

Two well established measures of economic institutions are used in order to capture the effect of such institutions on corruption. The first variable, PROP, measuring property rights enforcement, is taken from the annual *Index of Economic Freedom* survey compiled by the Heritage Foundation. In their subjective measure of property rights the extent of judicial contract enforcement and property rights security is taken into account, ranging from conditions between complete enforcement of contracts to a state of affairs where all property is either owned by the state or contracts are never enforced. The

data from the Heritage Foundation have been widely used in economic research, for example by Heckelman (2000) and Rose (2002). Nevertheless, since PROP is based on subjective measures of each country much like FREE, it is possible that it suffers from an endogeneity problem, in the sense that it is likely to be influenced by perceptions of the variable that it is supposed to explain, corruption. Another potential source of endogeneity is that in a corrupt economy property rights are likely to be easier to circumvent, so that corruption, of for example the justice system, in itself obstructs property rights enforcement. However, it is our belief that the extent of property rights enforcement in transition economies today is highly dependent on historical factors, which makes it possible to address the endogeneity problem using historical proxies for property rights. Just as for the variable FREE, this issue is discussed in section 4.2.

The second variable used as a measure of the level of competition in the transition countries is each country's ratio of imports to gross domestic product, IMPGDP. This specification is also used by Ades and Di Tella (1999) as a measure of the level of competition, based on the rationale that product market competition is directly affected by the degree of economic openness. As described above, they argue that the level of product market competition has a direct influence on the amount of rents available for rent-seeking activities.

Two potential problems can be identified with the use of IMPGDP as a measure of the competition that the firms of a country face: Firstly, small countries tend to trade more with the outside world, which will generally give them a higher IMPGDP compared to larger countries with the same level of corruption, *ceteris paribus*. In turn, this would lead to an overestimation of competition's anti-corruptive effect in larger countries, since they generally trade less. However, Ades and Di Tella control for this effect by using population and land area as instruments for the share of imports in national income. Their results are that it does not matter whether one controls for the country size, since imports are just as efficient in inducing competition in small countries as in large ones. Hence, for the purpose of this study, it can be argued that IMPGDP is a good variable for measuring market competition. Secondly, it is possible that the trade flows of a country may be endogenous in the level of corruption. This problem was also addressed by Ades and Di Tella, with the conclusion that endogeneity with corruption was not a problem for the imports share variable, at least not for the

sample they used.⁸ Nevertheless, despite the results of previous research, there are reasons to suspect two endogenous connections between the level of corruption and the flows of trade for the transition countries. Firstly, there is arguably an exaggerated perception of rampant corruption in many transition countries (Shleifer and Treisman, 2004), which could possibly hamper trade flows. Secondly, there is a large problem stemming from the prevalence of state capture, in the sense that corrupt business interests that benefit from trade protectionism could directly influence state policy (Hellman et al, 2003). Because of these two mechanisms that may be present in several transition countries, controlling for possible endogeneity between corruption and IMPGDP is advised. These procedures are discussed in section 4.2.

Explanatory variables: the natural resources variable

The next variable in question is FUMSH, which should measure the possible negative effects of natural resource abundance on the level of corruption, as described in the theory section. FUMSH is defined as the share of a country's dollar exports that is made up of fuels and mining products. This serves as a fairly good proxy for the natural resource abundance of a country, but there is yet another point of using exports rather than a measure of the actual amount of resources that a country possesses: Since the amount of rents that result from extraction of natural resources depends on the price of these resources as well as their quantity, use of the exports variable will account for the extra rents generated by an increase in world prices, such as a hike in oil prices. The definition of natural resources used is congruent with the definition suggested by Boschini et al as having high *appropriability*, and as such being more likely to produce rents. The data on fuels and minerals exports of the countries of study was obtained from the World Bank's World Development Indicators.

A problem with the inclusion of the variable FUMSH into any model is the small number of transition countries that actually are well endowed in high-worth resources, which could make estimation difficult. Still, it is our belief that the natural resources effect is simply too important in these countries to be left out of a model.

⁸ For a discussion on the micro foundations of the possible endogeneity problem of imports in connection with corruption, see Ades and Di Tella (1999)

Control variables

Corruption tends to correlate with the general level of societal development, which is why control variables for such development must be included in any model aiming to estimate effects on corruption. In his 1997 paper Sala-i-Martin uses the schooling level, as represented by primary enrolment rates, as a measure of the human capital stock, which the author treats as axiomatically positively related to economic development and growth. Here, the same measure of societal development is used.

In the model shown below, the educational control variable is designated SCHOOL, and is defined as the net primary school enrolment rate. Considering the impact on rent-seeking, the schooling level is also used as a control variable by Ales and di Tella. The data for the SCHOOL variable were collected from the World Development Indicators (WDI) of the World Bank.

Another control variable which has also been used as a measure of societal development is the level of income per capita (for example by Sala-i-Martin). In our dataset, this variable is included in the form of the initial level of gross domestic product per capita at the beginning of each period, GDPCAP. The reason for using initial levels rather than means is that income growth tends to be negatively affected by corruption levels, as shown by Mauro, which would bring an unnecessary endogeneity problem into the model. The data for the variable GDPCAP is collected from the World Bank. A possible issue regarding this variable is that the income level of the transition countries, for the period of the early 1990's, may be subject to measurement errors, as discussed by Shleifer and Treisman (2004), even though these errors are likely to be small in relation to the differences between the sample countries. Since both the income level and the education level are related to more general societal development, they are likely to be correlated, but it can still be argued that they are inherently different and accordingly that both of them should be controlled for.

A third issue that can be raised is that some of the countries are former members of the Soviet Union, while others are not, which in itself is likely to have an impact on the level of corruption, since these countries should have even more in common than the sample as a whole. The control variable FSU is thus a dummy variable which will be used to control for any effect that is specific to either of the two groups of countries within the sample. Another similar control variable which could have been useful

under other circumstances would be a dummy indicating whether the countries achieved candidate status for entering the EU during the period. However, the theoretical foundations for such a variable would have been dubious, since it is likely that the governance incentives for the candidate countries changed once their applications were formally accepted⁹. The fact that the effect of such a hypothetical variable would not have been uniform over time makes it inappropriate for inclusion into the model, and it has thus deliberately been left out.

3.2 Possible data problems

Due to the nature of many of the variables, it is reasonable to suspect a degree of multicollinearity to be present in the data. *Table 1* displays the crosswise correlation between the variables used.

Table 1

Correlation coefficients and significance levels of each variable in the base case. The number of observations is 47. Checking variables PAY and PERCENT are excluded since the timing of these variables is different.

		TI	FREE	PROP	IMPGDP	FUMSH	SCHOOL	GDPCAP	FSU
TI	Pearson Correlation		-.791	-.757	.850	-.521	.363	.796	-.375
	Significance		.000	.000	.000	.000	.012	.000	.009
FREE	Pearson Correlation			.710	-.637	.642	-.448	-.712	.553
	Significance			.000	.000	.000	.002	.000	.000
PROP	Pearson Correlation				-.578	.461	-.262	-.594	.235
	Significance				.000	.001	.075	.000	.112
IMPGDP	Pearson Correlation					-.526	.210	.725	-.352
	Significance					.000	.157	.000	.015
FUMSH	Pearson Correlation						-.253	-.345	.445
	Significance						.086	.018	.002
SCHOOL	Pearson Correlation							.343	-.363
	Significance							.018	.012
GDPCAP	Pearson Correlation								-.574
	Significance								.000

⁹ For a discussion of the impact of Eastern European countries' accession to the EU on governance, see Berglöf and Bolton, 2002.

Clearly, the explanatory and control variables correlate within themselves and in some cases fairly strongly. At a glance, the most problematic variable in terms of multicollinearity is GDPCAP, which has absolute correlation coefficients in the range between 0.5 and 0.8 with most of the other variables, which is high but not catastrophic.¹⁰ FREE, PROP and IMPGDP show slightly lower coefficients, but still significant. The collinearity problem should thus be borne in mind when analysing the model, but it should be said that this problem is a rather complex issue:

- Some of the correlation between the explanatory variables stems from the fact that many aspects of economic development tend to come together, without any distinct causal connection. This type of multicollinearity is very hard to address.
- The correlation between FREE and PROP, on the other hand, has been described by for example Acemoglu et al (2004) as more directly causal in nature. In our sample this would imply that certain political institutions, for which political freedom is a proxy, are prerequisites for certain economic institutions, such as property rights. Thus, the strong correlation can be said to be expected and perhaps even inevitable. However, it indicates that it may become difficult to separate the effects of these two from each other. An attempt is made to address this problem, as described below.
- Lastly, a multicollinearity problem can be worsened as a result of the sample size being too small, in the sense that there may be stronger perceived correlation within the sample than the actual correlation between the explanatory variables. In this case multicollinearity is more of a sample phenomenon than a mathematical one, making the isolation of individual effects more difficult.¹¹ This is likely to pose a problem for our data, since the sample size is indeed relatively small.

¹⁰ Gujarati (2003) suggests, as a rule of thumb, that pair wise correlation between regressors in excess of 0.8 signals a severe multicollinearity problem, even if multicollinearity can very well be a problem even for lower coefficients.

¹¹ For a discussion on the problem of multicollinearity in connection with small sample sizes see, for example, Gujarati, p 349.

4. Findings

4.1 Initial results

As outlined above, economic researchers have proposed and produced evidence for a number of possible determinants of the level of corruption, which may be applicable in transition economies. Departing from the stylised equation (1), presented in section 2.3, a first tentative model can be formulated, which can be used quantitatively for estimating the variables' impact on corruption. Normally, a sample size of 27 countries over a twelve-year period would not permit very solid conclusions to be drawn. However, because of the unique circumstances described it is likely that the quantitative results have more relevance in this case.

Variable correlations

Firstly, some basic characteristics of the dataset and the individual variables that have been used to investigate the stylised equation (1) are presented, before proceeding to the analysis (see also *Appendix 1* for further descriptive statistics). As described above, to counter a potential problem stemming from measurement errors in the main dependent variable TI, an auxiliary measure of corruption is also used in the form of the variable CORR. Still, the dependent variables are relatively straightforward compared to the more abstract concepts of political and economic institutions.

From *Table 1*, it is clear that FREE exhibits a strong negative correlation with the level of corruption. From the discussion of this variable above, however, there are reasons to suspect that this relationship should hold more strongly for lower values of FREE, that is for more free countries. The second explanatory variable in question is the measure of property rights, PROP, representing the quality of economic institutions. This variable also shows the expected strongly negative and significant correlation with TI. Closely related to this fairly narrow indicator of economic institutions is the variable IMPGDP. This variable exhibits the expected positive sign and strong correlation with TI.

As shown in *Table 1* the geographic variable FUMSH has the expected negative correlation with the TI variable, indicating that the countries in the sample that are more reliant on high-worth natural resource exports tend to be more corrupt. This effect may, as suggested, also be closely related to the general institutional development of the economy. The strong bivariate correlation between the

suggested explanatory variables and TI suggests that any of them has the potential of explaining corruption. These relationships are also graphically illustrated in *Appendix 1*. Finally, the control variables SCHOOL and GDPCAP are positively correlated with TI, much as would be expected. The control variable FSU, for whether or not a country was part of the Soviet Union, also has the expected negative sign, indicating that the countries of the former Soviet Union are indeed generally more corrupt. To conclude, all variables have the expected basic relationship with respect to TI.

Testing the model

The stylised model (1) presented above is first tentatively represented by equation (2),

$$TI_i = \beta_1 + \beta_2 FREE_i + \beta_3 PROP_i + \beta_4 IMPGDP_i + \beta_5 FUMSH_i + \beta_6 c_i + u_i \quad (2)$$

where c is the group of control variables outlined above. Running simple OLS (ordinary least squares) regressions according to specifications (2), with stepwise addition of the control variables, produces the results displayed in *Table 2*.

Table 2

Estimated coefficients and results from OLS run using specification (2). All coefficients at all times have the expected signs as outlined above. The institutional variables remain significant even with control variables included, while the natural resource abundance variable FUMSH is insignificant.

Spec (2), N=47	Const	FREE	PROP	IMPGDP	FUMSH	SCHOOL	GDPCAP	FSU	R ²	AdjR ²
	4.055***	-.229***	-.407***	8.151***	-.480				.863	.850
		(-3.023)	(-2.851)	(6.211)	(-.218)					
	4.023***	-.240***	-.395***	8.165***	.462			.053	.864	.847
		(-3.110)	(-2.708)	(6.147)	(1.079)			(.326)		
	3.474***	-.187**	-.334**	6.470***	.029		.00006*	.245	.877	.858
		(-2.348)	(-2.215)	(3.992)	(.071)		(1.897)	(1.548)		
	1.845	-.162*	-.340**	6.638***	.0147	.033	.00006*	.271	.881	.860
		(-1.994)	(-2.220)	(4.176)	(.033)	(1.311)	(1.912)	(1.651)		

The t-statistic of each variable, calculated using White's robust standard errors, is displayed in parentheses under each coefficient. Significant coefficients are represented by * (10 percent level), ** (5 percent level) or *** (1 percent level). Multicollinearity statistics are displayed in *Appendix 2*.

As shown in *Table 2*, the three institutional variables all enter specification (2) with significant coefficients and the signs that would be expected, judging from theory. The effects appear to be robust to the inclusion of the control variables, even though the absolute coefficients drop, especially after controlling for the initial per capita GDP levels. Particularly the effect of competition, as manifested as the share of imports to GDP, appears to be overestimated when not controlling for initial income levels. Even so, the coefficient for IMPGDP remains highly significant even after control variables are included.

The notable exception is FUMSH, which although correlated with TI, is insignificant as a determinant in a wider specification, such as (2). These results can be interpreted as evidence that institutional quality indeed has primacy over geography and natural resources in determining the amount of rent-seeking in society, much as suggested by Boschini et al. Since the institutional quality of the resource-abundant countries in the sample is likely to be below the critical level where resources can be considered an asset rather than a liability, the potential positive effect of resource abundance that Boschini et al identifies is not likely to be captured in the data. Furthermore, the small number of observations for which FUMSH assumes a substantial value (resource-abundant countries) is another likely reason for the inconclusive evidence about the FUMSH variable. Henceforth, any possible effect of resource abundance, in this sample at least, is considered as captured by the institutional variables, and the variable FUMSH as a candidate for exclusion from the model.

Of the control variables, initial GDP per capita is significant and has the expected sign, while primary school enrolment ratio is close to significance at the 10 percent level, also with the expected sign. As pointed out above, the GDPCAP variable may be subject to measurement error, even though Åslund (2002) argues that the figures from the mid-nineties and onwards should be relatively reliable, implying that GDPCAP is a useful control variable after all. As for the control variable FSU, any effect that is unique to former Soviet Union members appears to be captured by the other variables, as indicated by the insignificant coefficient of this variable.

It is also worth noting that the specification (2), even without the control variables included, exhibits a relatively high explanatory power, as shown by its high R^2 coefficient. It appears that most of the effect of the institutional factors outlined in the stylised model (1) is indeed captured by the tangible

institutional variables in (2). As implied by the hardly-significant coefficients of the control variables, and also confirmed by the explanatory power of the specification once these variables are included, it appears that the control variables add little extra explanation to the model.

Economic Institutions and Corruption

The variable PROP, representing the economic institution of property rights enforcement, enters specification (2) with a strong and significant coefficient, and the sign that would be expected judging from theory. Its estimated impact on corruption is significant: a one-standard deviation improvement of property rights would improve corruption by 0.23 standard deviations, or 0.28 points on Transparency International's scale. This appears to largely confirm the ideas of the importance of secure property rights in lowering the amount of government corruption. The fact that political freedom, FREE, remains highly significant even after economic institutions PROP and IMPGDP have been controlled for could be seen as surprising in the light of Acemoglu et al's idea of causality running from political to economic institutions, affecting the economy through the latter. Rather, the results here seem to support Lederman et al's theory that democratic institutions have a direct effect on institutions through accountability. However, we will not presume to draw any conclusions either about the discreet effects of these two types of institutions on the level of corruption, or about the possible causality between them. Rather we conclude at this point that both of them appear to have a very strong and significant impact on the level of corruption in transition economies, even when controlling for other variables. A further discussion on the interlinkage between these two political and economic institutions and their causal effect on corruption is presented below.

The second economic institutions variable, IMPGDP, is highly significant in influencing TI in all specifications, and is in fact the most highly significant of all variables. This supports the theory of Ades and Di Tella presented above, pointing to the utmost importance of product market competition in reducing the level of rents that are up for grabs in the economy. The coefficient for IMPGDP is around 6.5 in specification (2), even after the inclusion of control variables. This implies that if, say, Georgia were to increase her import share of GDP with ten percentage points, *ceteris paribus*, the extra competition induced would result in a climb from her 2005 Transparency International ranking of 130 in the world, on par with Congo, to position 85, equivalent to EU-

member *in spe* Romania. An economic environment conducive to competition thus appears to be a very beneficial economic institution in lowering the level of corruption in our transition sample.

Political Institutions and Corruption

As stated above, the variable measuring the degree of political freedom in the sample countries (FREE) enters the regression above with the expected sign and significant coefficient. In terms of magnitude, it appears to be comparable to the variable PROP: a one-standard deviation improvement would, hypothetically and with all else held constant, produce a 0.25 standard deviation improvement in TI.

As has been discussed above, and judging from the scatter plot in *Figure 2*, there are reasons to suspect that the influence of the variable FREE on the level of corruption TI is non-linear, since they correlate much stronger for smaller values of FREE, while the correlation appears less clear-cut for larger values. However, a casual glance at the numbers is not likely to give the whole picture, since this correlation could be the result of the influence of other variables on TI. Thus, to investigate the effect of FREE on TI for different levels of FREE, a dummy variable can be introduced to the model. This dummy, dubbed AUTH, assumes the value 1 for the countries where the FREE variable exceeds a threshold value (for countries less free than this point), or otherwise 0. AUTH is thus introduced in specification (2), according to (3), where $FREE_{crit}$ denotes the threshold point for the piecewise regression.

$$TI_i = \gamma_1 + \gamma_2 FREE_i + \gamma_3 PROP_i + \gamma_4 IMPGDP_i + \gamma_5 FUMSH_i + \gamma_6 AUTH(FREE_i - FREE_{crit}) + \gamma_6 c_i + u_i \quad (3)$$

A limited specification equation, designated (4), drops the natural resource variable FUMSH, which is insignificant in specification (2) above. The results thus obtained are practically identical to those from (3), but are nevertheless displayed in *Appendix 3*.

$$TI_i = \delta_1 + \delta_2 FREE_i + \delta_3 PROP_i + \delta_4 IMPGDP_i + \delta_6 AUTH(FREE_i - FREE_{crit}) + \delta_6 c_i + u_i \quad (4)$$

Table 3

Results from regression using specification (3). Significant coefficients of the explanatory variables all have the expected signs. Note the changing coefficients for FREE and AUTH as the threshold value for the variable FREE changes.

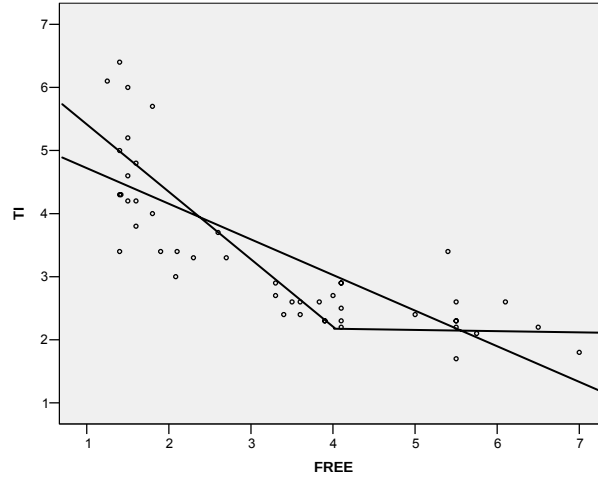
	Const	FREE	PROP	IMPGDP	FUMSH	SCHOOL	GDPCAP	FSU	AUTH	AdjR ²
Spec (3), N = 47										
i. FREE _{crit} =3	3.057**	-.587*** (-3.063)	-.261* (-1.848)	6.472*** (4.100)	-.090 (-.251)	.014 (1.204)	.00003 (.734)	.185 (1.107)	.538*** (2.379)	.871
ii. FREE _{crit} =4	2.384*	-.364*** (-3.136)	-.281* (-1.834)	6.523*** (4.243)	-.072 (-.197)	.017 (1.375)	.00003 (1.029)	.234 (1.452)	.367** (2.223)	.870
iii. FREE _{crit} =5	2.048	-.239** (-2.263)	-.317** (-2.056)	6.576*** (4.176)	.049 (.121)	.017 (1.335)	.00005 (1.583)	.264 (1.635)	.265 (1.004)	.860

The *t*-statistic of each variable, calculated using White's robust standard errors, is displayed in parentheses under each coefficient. Significant coefficients are represented by * (10 percent level), ** (5 percent level) or *** (1 percent level). Collinearity statistics are displayed in *Appendix 2*.

The results from the different runs of specification (3) are interesting. The connection between political freedom and corruption suggested above still appears to hold for a part of the sample, as represented by the significant and negative coefficients for the variable FREE. There is, however one caveat, as suggested by the additive coefficient for the dummy variable AUTH, which can be interpreted as different effects of political freedom on corruption as a country progresses from authoritarian to more democratic modes of government. Equation (3), implies that the coefficient for FREE holds for countries more free than a threshold value (FREE_{crit}), whereas the coefficient for AUTH is added for countries above the threshold; that is for less free countries. The impact of this is that the *effective* coefficient of FREE in unfree countries is different from that in free countries, by the magnitude of the AUTH coefficient, as illustrated in *Figure 3*.

Figure 3

The charts below illustrates the non-linear relationship between variables FREE and TI, as implied by specification (3)ii, for $FREE_{crit} = 4$, with the linear relationship implied by (2) for comparison.



The three different suggested threshold levels for the FREE variable can be interpreted as three different hypotheses about the actual connection between FREE and TI. The first of these, (3)i in *Table 3*, suggests that the beneficial influence of increased freedom on corruption is very strong for countries with FREE-values greater than 3, and less substantial for less free countries. Specification (3)ii sets the threshold level at values of FREE at 4, and suggests that the opposing effects of FREE and the dummy variable for unfree countries roughly balance for higher levels of FREE. Specification (3)iii suggests that the effect of being unfree is so strong that it outweighs the benefits of increased democracy, so that an increase in democracy would tend to worsen corruption for very authoritarian countries. Judging from the significance of AUTH, it appears that the correct threshold value could be within the range between $FREE_{crit} = 3$ and $FREE_{crit} = 4$. This would imply that a country such as Romania, with a level of freedom of 2.5, would benefit greatly from increased political freedom, while the effect would be much more ambiguous for authoritarian Russia, at $FREE = 5.5$. This ambiguous effect of increased freedom for unfree countries can also be checked by testing the joint significance of coefficients FREE and AUTH. This can be performed using the test statistic

$$t = \frac{(\hat{\gamma}_2 + \hat{\gamma}_6) - (\gamma_2 + \gamma_6)}{\sqrt{\text{var}(\hat{\gamma}_2) + \text{var}(\hat{\gamma}_6) + 2\text{cov}(\hat{\gamma}_2, \hat{\gamma}_6)}},$$

where $(\gamma_2 + \gamma_6) = 0$ under H_0 . For $FREE_{crit} = 3$ this t -statistic takes the value $t = 0.487$ whereas for $FREE_{crit} = 4$ it takes the value 0.025. Neither of these t -statistics implies that the null hypothesis can be rejected at any conventional level of significance. This, in turn, means that the effect of FREE on TI for values of FREE greater than $FREE_{crit}$ is indeed statistically ambiguous. This follows from the combined effect of FREE and AUTH, which can be assumed to be zero for higher values of FREE.

One interpretation of the results is that for unfree countries, Shleifer and Vishny's negative "market effect" appears to equal the positive "accountability effect" suggested by Lederman et al. On the other hand, for countries that have already made substantial progress in their transition towards democracy, the positive effect clearly dominates. The arguments made by Shleifer and Vishny, suggesting that a decentralization of the political system may lead to a deterioration of a corrupt bureaucracy, are thus supported by the observation that democratisation does not seem to be unambiguously good for authoritarian regimes. This would be in line with the argument that a country progressing from an initial very authoritarian type of government to a more democratic system may experience an initial increase in rent-seeking and corruption, as originally suggested by Huntington. At the same time the data, as noted, also seem to support the ideas of Lederman et al, suggesting that there is a general positive effect on corruption of democratisation. In other words it is possible that there indeed is a U-shaped relationship between the level of political freedom and the level of rent-seeking and corruption, even though this cannot be observed in our sample. What can be observed, however, is what looks like an L-shaped relationship, where the initial democratisation process for authoritarian states is not necessarily conducive to less corruption.

4.2 Testing our results

Controlling for Measurement Bias

As discussed above, the TI variable is of a subjective nature that has been criticised for exhibiting biases against certain countries. Accordingly, in order to check the reliability of the findings made based on TI, the BEEPS data can be used as an alternative and probably reliable measure. It could be argued, however, that if TI is indeed reliable it is likely to be more valid than BEEPS since it is a

much broader measure. In order to check the reliability of the findings above, the variable CORR can simply be substituted into specification (2), replacing TI as a measure of corruption:

$$CORR_i = \mu_1 + \mu_2 FREE_i + \mu_3 PROP_i + \mu_4 IMPGDP_i + \mu_5 FUMSH_i + \mu_6 C_i + u_i \quad (5)$$

It should be noted, that although the specification and the sample size are identical to that of specification (2) above, the time periods for this auxiliary specification are necessarily different due to the different timing of the BEEPS surveys. In stead of two six year periods, the data here covers the years 1997 – 1999 and 2000 – 2002. Nevertheless, the results are useful for gauging of the initial TI results, and are displayed in *Table 4*.

Table 4

Estimated coefficients and results from OLS run using specification (5). Note that the scale of the dependent variable CORR is the inverse from that of the original variable TI. The significant coefficients thus have the expected signs (opposite of TI's) as outlined above, with the exception of FREE.

Spec (4), N=47	Intercept	FREE	PROP	IMPGDP	FUMSH	SCHOOL	GDPCAP	FSU	AdjR ²
	2.302***	-.092*	.294***	-3.142***	-.475			-.064	.452
		(-1.841)	(4.204)	(-3.745)	(-1.514)			(-.570)	
	3.083***	-.142***	.195**	-1.293**	-.063		-.00008***	-.334***	.595
		(-3.534)	(2.472)	(-2.092)	(-.244)		(-5.021)	(-3.222)	
	2.601***	-.138***	.191**	-1.264**	-.049	.005	-.00008***	-.334***	.589
		(-3.213)	(2.372)	(-2.035)	(-.196)	(.648)	(-4.894)	(-3.423)	

The t-statistic of each variable, calculated using White's robust standard errors, is displayed in parentheses under each coefficient. Significant coefficients are represented by * (10 percent level), ** (5 percent level) or *** (1 percent level).

Interestingly, the results do not change much in comparison to the original specification, with the political freedom variable FREE being the only notable exception. The fact that it is the variable FREE that changes sign, and not any other, could possibly be attributable to the somewhat ambiguous theoretical connection between political freedom and corruption already presented. Apart from this, the results seem to strengthen the findings already made, bearing in mind that very similar results are obtained using an entirely different measure of corruption.

Controlling for initial corruption values

One obvious question that may be raised is whether the explanatory variables actually affect the *development* of the corruption variable TI. An indication of the opposite would be if the TI-variable tended to change very little over time, so that most of the countries' TI-values could be explained by their initial values. One way to control for this potential problem is to include the initial TI-values for each country in the model, and see how the explanatory variables react. Since the initial values of TI and the values from the first period are so similar, however, only the second period can be used. This greatly limits the number of observations and is clearly a strong drawback, possibly to the point where the value of this testing can be seriously questioned. Nevertheless, the findings presented thus far appear fairly robust to the introduction of the initial values into specification (2) above (displayed in *Appendix 4*). Even if the institutional variables FREE and PROP are no longer significant at any conventional levels (although FREE remains just above the 10 percent level), neither is the new control variable TIINIT. Signs of the explanatory variables remain unchanged, and more interestingly, the coefficients for the initial TI-values are close to zero. Judging from these results, there seems indeed to be a dynamic development of the levels of corruption in the transition countries, and it is likely that this development is caused by the factors suggested thus far.

The endogeneity problem in IMPGDP

As mentioned above, the similar historical backgrounds of the transition countries make them suitable for investigation, not least because their similar initial starting-points makes it somewhat easier to establish causal links between dependent and explanatory variables. However, a more technical approach to the causality/endogeneity problem is also appropriate, and is thus outlined in the following pages.

According to Ades and Di Tella's line of reasoning, there should not be a problem of endogeneity for the IMPGDP variable. They base this on the notion that the agents that benefit from corruption are not the same as those who influence trade policy. Thus there should be no causal connection from corruption to import competition, manifested as the share of imports in GDP. There are at least two reasons why this argument may not be as valid in the transition economies as elsewhere. Firstly, there is evidence for state capture being a problem on both a micro level, as indicated by BEEPS 1999, but also on a top policy-making level according to Vladimer Papava, former minister of finance in

Georgia. The prevalence of state capture may induce a two-way causality, in the sense that corrupt agents who benefit from trade barriers manage to influence policy makers. With this mechanism in place, an increase in corruption could lead to higher trade barriers, effectively decreasing competition from imports. Secondly, as described above, there is a risk that several of the countries in our sample are suffering from perception bias of being more unstable and corrupt than countries of similar levels of development. For example, Shleifer and Treisman (2004) points out that Russia is ranked on par with Niger and Sierra Leone in terms of corruption as perceived by foreign businessmen. Judging from the level of development of these countries, and based on incidental evidence, this claim seems very counterintuitive. However, if they exist, these negative perceptions bias may cause an unfair reluctance against investing in and trading with transition countries, in which case the variable IMPGDP could suffer from endogeneity in the perceived level of corruption, TI.

The possible endogeneity of a variable can be checked if one can find a good instrument for the variable, which is uncorrelated with the error term of the original regression. Ades and Di Tella use the logs of country area and population as very good exogenous instruments of imports to a country in a setting different from ours. The main strength of these instruments is that they are strongly negatively correlated with the relative amount of imports for each country, while at the same time being uncorrelated with economic growth. We see no reason why these two instruments would not be satisfactory in our setting, since we do not see any connection between them and the amount of corruption in each country, while they still show high correlation with the variable IMPGDP. Neither do they correlate with the other explanatory variables, as can be seen in *Appendix 5*. These two instruments are thus used for the endogeneity testing described below.

The endogeneity problem in PROP and FREE

Following the discussion above on the importance of subjective perceptions in the interaction with, and evaluation of economies, it can easily be argued that the variable PROP is likely to be even more sensitive to this type of bias. As mentioned in the description of the variable, this follows from the fact that it is a subjective grade assigned to each country by foreign experts at the Heritage Foundation. The same line of reasoning can be applied to the variable FREE, which may also be biased by perception. In order to check for endogeneity in *both* variables at the same time, we would need to find separate instruments for each variable, and check for reverse causal links simultaneously. For

IMPGRP, good instruments are already available, but finding good instruments for both FREE and PROP is likely to be difficult, especially since these two are strongly correlated within themselves and have developed concurrently. What can be done however, is finding a variable known to correlate strongly with both these variables, while surely not being affected by them or the dependent variable TI, and check if our findings hold when we use this variable as a *historical proxy* for the effects of *both* FREE and PROP.

Based on discussions with Vladimer Papava, research conducted by him (Papava, 2001), and inspired by Dabrowski et al's (1995, 2001) critique of the Stiglitz-perspective, focusing on pre-World War II institutions in Hungary, Poland and former Czechoslovakia, the following reasoning is the foundation for such a proxy variable. Firstly, in most of the countries that had been sovereign states before World-War II, there was a recent tradition of market-economic institutions and liberal democracy, and people who were still alive remembered how these institutions worked, whereas in countries that had been under Soviet rule, no such tradition was even remotely present. Secondly, a distinction can be made between countries that had been sovereign states during most of the 20th century, for example those of Central Europe, as opposed to those countries that had not been sovereign, such as the Soviet states or the republics of Yugoslavia. Once again, the former countries had many critical political institutions in place or at least partly so, which were lacking or underdeveloped in the latter. The institutions affected by communist government and any history of sovereign democracy are for example a legislative system that could enact property rights legislation, a working judicial system that could enforce contracts, and the bureaucratic foundations for a tax system that is conducive to properly organized taxation. An example of the importance of such governance routines is how the former Soviet Republics were unable to enact effective bankruptcy laws (Papava, 2001), or how the Georgian authorities have been forced to copy the German tax system¹².

The proxy for the combined effect of the institutional variables FREE and PROP is thus based on two distinct sub-variables: Firstly, the number of years that each country was under communist government was taken as the base to represent how deeply rooted non-market economic institutions

¹² Dr. Marina Karchava, ESM, Tbilisi, Georgia.

were in each country. Secondly, from this number was subtracted the number of years that each country was governed by a distinctly democratic government during the first half of the 20th century.¹³ Accordingly, the resulting variable HISTORY should capture the ability of the different nations to reform political and economic institutions, and as such should be a useful proxy for PROP and FREE at the outset of transition. The correlation coefficient for the variable HISTORY with PROP is 0.607 and with FREE 0.815, both highly significant.

A simple model addressing the endogeneity problem

Using the historical variable HISTORY as an historical proxy for both the degree of political freedom and the protection of property rights in each of the transition countries, and making use of the instruments for the countries' openness to imports identified above, a model can be formulated which addresses some of the problem of reverse causality that is inherent in the data. This will take the form of a two-stage least squares model, where the first stage is given by:

$$IMPGDP_{est} = \varphi_1 + \varphi_2 HISTORY_i + \varphi_3 C_i + \varphi_5 LOGAREA_i + \varphi_6 LOGPOP_i + u_i \quad (6)$$

while the second stage of the regression is estimated according to

$$TI_i = \omega_1 + \omega_2 HISTORY_i + \omega_3 IMPGDP_{est} + \omega_4 C_i + u_i \quad (7)$$

In using LOGAREA and LOGPOP as instruments, we implicitly assume that these variables do not directly affect the level of corruption. Without proving this assumption technically, we simply suggest that intuitively it does not seem like an overly strong assumption. Furthermore, the natural resources variable FUMSH has been left out of the specification because of its insignificance in specification (2). Results from the second stage (7) of the regression, using the instrumental IMPGDP as estimated by (6) yields results as displayed in *Table 8*.

¹³ For a description of the relevant years for establishing this variable for each country see *Appendix 6*.

Table 5

Results from the two-stage least squares regression, using LOGAREA and LOGPOP as instruments for IMPGDP, and HISTORY as a proxy (not an instrument) for *both* property rights and political freedom.

	Intercept	HISTORY	IMPGDP _{est}	SCHOOL	GDPCAP	FSU	R ²	AdjR ²
Spec (5)	-.18342	-.0181**	6.465***	.0254*	.00011***	.687**	.789	.764
n=47		(-2.204)	(2.974)	(1.707)	(3.362)	(2.324)		

Significant coefficients are represented by * (10 percent level), ** (5 percent level) or *** (1 percent level). *t*-values calculated using White's robust standard errors are displayed in parentheses.

Signs of causal connections

The significance and signs of the variables do not change from the OLS specification of (2), even though the explanatory power is, as expected, slightly lower. It must be said, however, that the R² value of 0.774 is quite high bearing in mind that we now use two fairly rough explanatory variables. Judging from the strongly significant and large coefficient for the instrumented IMPGDP-variable, we can conclude that there appears to be a connection running from IMPGDP to TI. This would imply that there is a causal relationship such that an increase in trade openness in period one should yield a decrease in corruption in period two, which is a rather interesting finding. This supports the idea that the amount of competition in the product market is important in determining the amount of rents in the economy, and hence the level of corruption.

A slightly less robust finding is that the variable HISTORY seems to have an influence on the level of corruption. This implies that countries with a history of democracy and free markets, at the outset of transition, and countries where communism had less time to deeply root itself, tend to suffer less from the plague of corruption. However, it must be pointed out that even if the variable HISTORY tends to correlate with our two measures of institutional quality, PROP and FREE, the findings are not evidence that these variables inexorably affect the level of corruption. Nevertheless, the findings still seem to indicate that there is a causal effect running from institutions to corruption, as suggested by a wide range of literature, some of which is presented above.

4.3 Summary of findings

We set out with the objective to investigate whether the institutional factors outlined above have a significant impact on the levels of corruption in the transition countries. We found that although it is difficult to separate the effects on corruption of the institutional variables measuring political freedom and property rights enforcement, progress in these fields tends to be strongly associated with improvements in corruption. We also found that economic openness, manifested as larger relative imports, is clearly associated with lower levels of corruption, and that the effect appears to be causal in nature. We also found, somewhat surprisingly, that abundance of natural resources does not appear to influence corruption, even though this could be attributable to the small number of countries that actually do possess great resources. Finally, we found that the effect of democratisation, represented by political freedom, can have ambiguous effects on corruption, depending on the political starting point of a country. An important confirmation of the validity of our results was that a different and arguably less biased measure of government corruption managed to render very similar results.

5. Conclusion

There are several interesting points to take home after studying the results of this thesis. Largely, institutional theory, emphasizing the role of institutions in determining the incentives of individuals and firms, is validated as indeed applicable to rent-seeking, and transition. Accordingly, the importance of property rights and market competition in decreasing corruption is unequivocal. But there are also some more unpleasant traits of the transition landscape.

Indeed, in the transition countries there appears to be an L-shaped relationship between democratic institutions and corruption, where the potential gains from democratisation and increased accountability may be offset by initial negative effects of decentralization. This is especially true for still authoritarian regimes. In the light of ideas about the second-best benefits of political centralization this finding may help us explain recent Russian reforms, criticized in the West, from a rational perspective rather than disregarding them as purely power political (Baev, 2005). From a corruption viewpoint, such undemocratic reforms may in fact be justified, and economically rational. The inverse or at best unclear relationship between corruption and decentralization also helps to

explain why some countries, such as Belarus, Turkmenistan, and Uzbekistan, have opted not to leave the centralized *modus operandi* of the Soviet Union in the first place.

So when disregarding our moral wishes, which may make us frown upon certain political systems, we must acknowledge that institutions do rule, unfortunately also when the result may be appalling.

Turning to the causality of factors, we have been able to establish the directions of some mechanisms. Competition appears to be at least partly exogenous in influencing corruption. Interestingly, there seems to be not only an overall strong relationship between Western institutions of democracy and free markets and corruption for the countries that have actually decided to leave the authoritarian system of government, but also a clear channel of causality. For the countries that have managed to bring down corruption, a historical heritage of democracy and free markets has been shown to be a decisive factor in determining the quality of institutions. The number of years of each country under a communist regime and of pre-Second World War democracy and sovereignty is an important historical fact still influencing the societies of today. In this right the number of years served as a proxy for investigating the influence of the transition countries' quality of deeper institutions at the outset of transition. These institutions, initially embedded under the communist blanket common to all, appear to have been decisive in determining the level of corruption during transition. The relevance of this heritage points to the importance of yesterday's institutions in determining the corruption of today.

We may conclude that in the transition countries institutions do matter. And history.

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7. Appendices

Appendix 1 – Variable properties and descriptives

Base variables

Variable	Name/description	Source	Range	Mean	Std Deviation	Min	Max
TI	Corruption Perception Index	Transparency International	1 (worst) – 7 (best)	3.319	1.208	1.7	6.4
CORR	BEEPS – Corruption seen as an obstacle to business	European Bank for Reconstruction and Development	1 (best) – 4 (worst)	2.363	.430	1.63	3.37
FREE	The Gastil Index of political freedom	Freedom House	1 (best) – 7 (worst)	3.328	1.676	1.3	7.0
PROP	Property Rights Enforcement Index	The Heritage Foundation	1 (best) – 5 (worst)	3.330	.7580	2.0	5.0
IMPGDP	Imports' share of GDP	The World Bank, World Development Indicators	0 – 1	.1569	.0810	.0529	.3458
FUMSH	Fuels and metals' share of total exports	The World Bank, World Development Indicators	0 – 1	.2162	.2214	.0216	.8869
GDPCAP	Per Capita Gross Domestic Product	The World Bank, World Development Indicators	N/A	6689	4454	993.2	18741
SCHOOL	Net primary school enrolment ratio	Education Group of the Human Development Network (HDNED) of the World Bank	0 – 100	89.26	5.398	78.23	99.81

Constructed variables

Variable	Name/description	Values	Observations
FSU	Former Soviet Union, dummy variable	1 (member), 0 (non-member)	27 obs (15 countries) = 1, 20 observations (12 countries) = 0
AUTH	Critical FREE-value dummy variable	1 (observation above $FREE_{crit}$), 0 (observation below $FREE_{crit}$)	For $FREE_{crit} = 3$, 26 obs = 1, 21 obs = 0 For $FREE_{crit} = 4$, 17 obs = 1, 30 obs = 0 For $FREE_{crit} = 5$, 11 obs = 1, 36 obs = 0
LOGPOP	Natural log of population	N/A	N/A
LOGAREA	Natural log of country surface area	N/A	N/A

Missing observations

To facilitate comparison, all regressions are based on the same sample, as described in the text. From this sample, a few observations are absent, since data for these observations was unobtainable. These observations, and their reasons, are:

Country	Reason for absence
Bosnia and Hercegovina – 1999	TI and SCHOOL missing
Macedonia – 1999	TI and SCHOOL missing
Serbia and Montenegro – 1999 and 2004	SCHOOL missing
Tajikistan – 1999	SCHOOL missing
Turkmenistan – 1999	Several variables missing
Uzbekistan – 1999	SCHOOL missing
Total: 7 observations missing	

Data details

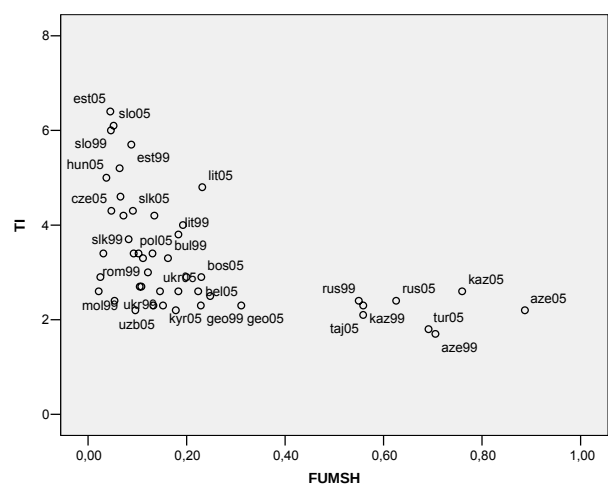
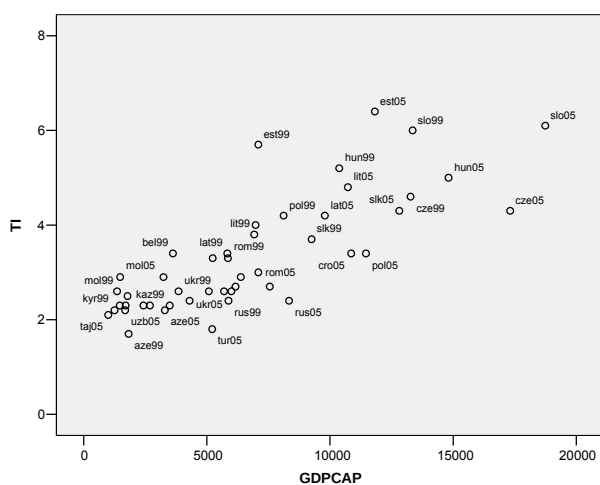
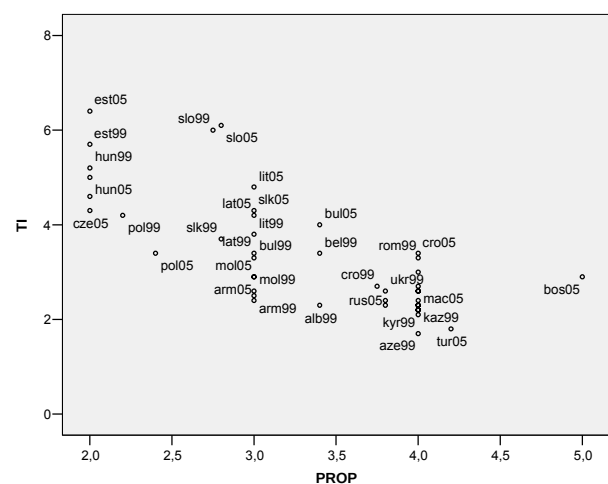
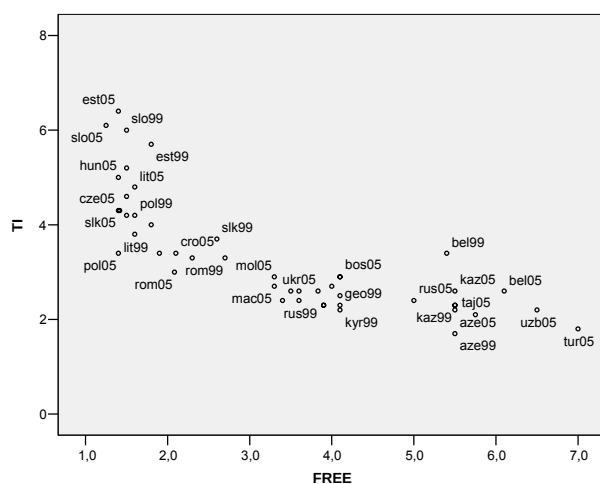
Country	Year	TI	FREE	PROP	IMPGDP	FUMSH	GDPCAP	SCHOOL	FSU
Albania	1999	2.3	3.9	3.4	.08	.13	2684.29	99.81	0
Albania	2005	2.4	3.4	4.0	.12	.05	4297.81	96.71	0
Armenia	1999	2.5	4.1	3.0	.13	.25	1774.81	85.20	1
Armenia	2005	2.9	4.1	3.0	.11	.20	3237.13	87.34	1
Azerbaijan	1999	1.7	5.5	4.0	.06	.71	1820.05	84.38	1
Azerbaijan	2005	2.2	5.5	4.0	.07	.89	3291.69	80.92	1
Belarus	1999	3.4	5.4	3.4	.18	.10	3620.20	85.27	1
Belarus	2005	2.6	6.1	4.0	.19	.22	5695.60	93.66	1
Bosnia and Herzegovina	2005	2.9	4.1	5.0	.17	.23	6377.49	86.00	0
Bulgaria	1999	3.3	2.3	3.0	.11	.16	5238.03	91.69	0
Bulgaria	2005	4.0	1.8	3.4	.17	.19	6977.33	91.85	0

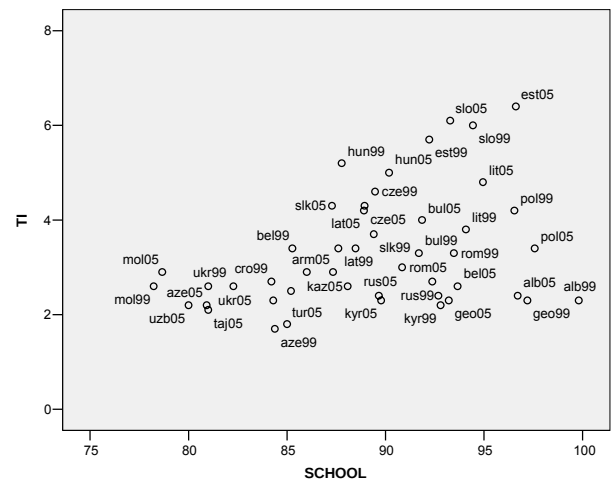
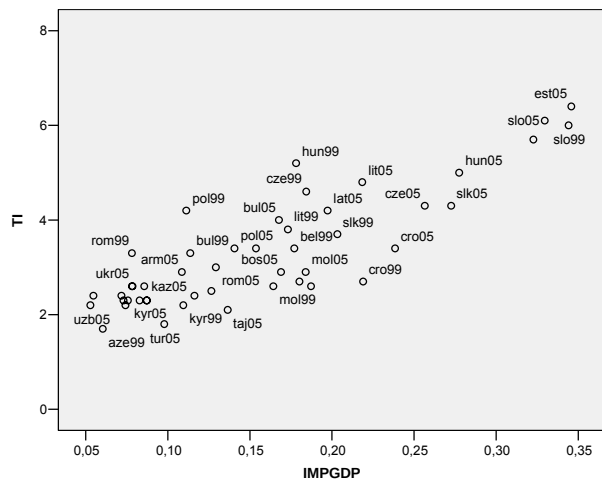
Country	Year	TI	FREE	PROP	IMPGDP	FUMSH	GDPCAP	SCHOOL	FSU
Croatia	1999	2.7	4.0	3.8	.22	.11	7554.54	84.21	0
Croatia	2005	3.4	2.1	4.0	.24	.13	10859.72	88.48	0
Czech Republic	1999	4.6	1.5	2.0	.18	.07	13272.03	89.47	0
Czech Republic	2005	4.3	1.4	2.0	.26	.05	17317.64	88.94	0
Estonia	1999	5.7	1.8	2.0	.32	.09	7088.46	92.22	1
Estonia	2005	6.4	1.4	2.0	.35	.05	11820.55	96.62	1
Georgia	1999	2.3	4.1	4.0	.09	.23	1459.50	97.20	1
Georgia	2005	2.3	3.9	3.8	.09	.31	2423.57	93.21	1
Hungary	1999	5.2	1.5	2.0	.18	.06	10374.80	87.78	0
Hungary	2005	5.0	1.4	2.0	.28	.04	14813.42	90.18	0
Kazakhstan	1999	2.3	5.5	4.0	.07	.56	3490.37	84.30	1
Kazakhstan	2005	2.6	5.5	4.0	.09	.76	5995.61	88.08	1
Kyrgyz Republic	1999	2.2	4.1	4.0	.11	.18	1248.23	92.80	1
Kyrgyz Republic	2005	2.3	5.5	4.0	.08	.15	1701.38	89.78	1
Latvia	1999	3.4	1.9	3.0	.15	.03	5829.88	87.60	1
Latvia	2005	4.2	1.5	3.0	.20	.07	9789.95	88.90	1
Lithuania	1999	3.8	1.6	3.0	.17	.18	6920.49	94.08	1
Lithuania	2005	4.8	1.6	3.0	.22	.23	10725.68	94.95	1
Macedonia	2005	2.7	3.3	4.0	.18	.10	6162.64	92.37	0
Moldova	1999	2.6	3.6	3.0	.16	.02	1351.49	78.23	1
Moldova	2005	2.9	3.3	3.0	.18	.02	1476.96	78.66	1
Poland	1999	4.2	1.6	2.2	.11	.13	8113.44	96.54	0
Poland	2005	3.4	1.4	2.4	.14	.09	11460.01	97.57	0
Romania	1999	3.3	2.7	4.0	.08	.11	5854.70	93.47	0
Romania	2005	3.0	2.1	4.0	.13	.12	7089.60	90.84	0
Russian Federation	1999	2.4	3.6	3.0	.07	.55	5876.09	92.68	1
Russian Federation	2005	2.4	5.0	3.8	.05	.63	8337.10	89.66	1
Slovak Republic	1999	3.7	2.6	2.8	.20	.08	9252.43	89.40	0
Slovak Republic	2005	4.3	1.4	3.0	.27	.09	12813.99	87.28	0
Slovenia	1999	6.0	1.5	2.8	.34	.05	13354.15	94.43	0

Country	Year	TI	FREE	PROP	IMPGRP	FUMSH	GDPCAP	SCHOOL	FSU
Slovenia	2005	6.1	1.3	2.8	.33	.05	18741.22	93.28	0
Tajikistan	2005	2.1	5.8	4.0	.14	.56	993.22	81.00	1
Turkmenistan	2005	1.8	7.0	4.2	.10	.69	5214.94	85.00	1
Ukraine	1999	2.6	3.5	3.8	.08	.15	3847.30	81.00	1
Ukraine	2005	2.6	3.8	4.0	.08	.18	5078.89	82.28	1
Uzbekistan	2005	2.2	6.5	4.0	.05	.10	1677.55	80.00	1

Scatter plots of the variables

The following scatter plots display a graphical representation of the relations between the explanatory variables and the main dependent corruption variable, TI.





Appendix 2 – Collinearity statistics

Specification (2)		
	Tolerance	Variance Inflating Factor
FREE	.232	4.310
PROP	.411	2.433
IMPGDP	.349	2.865
FUMSH	.436	2.291
SCHOOL	.766	4.094
GDPCAP	.244	1.305
FSU	.477	2.097

Specification (3), FREE _{crit} = 3			Specification 3, FREE _{crit} = 4			Specification 3, FREE _{crit} = 5		
	Tolerance	Variance Inflating Factor		Tolerance	Variance Inflating Factor		Tolerance	Variance Inflating Factor
FREE	.030	32.794	FREE	.392	2.552	FREE	.400	2.497
PROP	.380	2.631	PROP	.348	2.870	PROP	.348	2.871
IMPGDP	.348	2.875	IMPGDP	.432	2.314	IMPGDP	.434	2.304
FUMSH	.431	2.322	FUMSH	.766	1.305	FUMSH	.766	1.305
SCHOOL	.761	1.313	PRIMSCHO	.202	4.951	PRIMSCHO	.219	4.557
GDPCAP	.181	5.521	GDPCAP	.472	2.117	GDPCAP	.476	2.099
FSU	.455	2.199	FSU	.198	5.054	FSU	.364	2.748
AUTH	.048	20.982	AUTH	.089	11.206	AUTH	.123	8.122

None of the variables in (2), despite substantial correlation between themselves, seem to pose any really severe collinearity problem, even though the variables FREE and GDPCAP exhibit relatively low tolerance levels. This is likely to be a result of the strong correlation that FREE shows with PROP and which GDPCAP shows with IMPGDP, apart from the likewise substantial correlation that exists between FREE and GDPCAP themselves. The collinearity statistics from (3) seem to be problematic, but the fact that FREE and AUTH are sources of strong multicollinearity is only due to the fact that AUTH was calculated from the difference between FREE and the different threshold values, multiplied by a dummy variable. Collinearity for this specification is thus inevitable.

Appendix 3 – Excluding the geography variable

Results from OLS-run of specification (4), dropping the natural resource variable FUMSH.

Results from regressions using the dummy variable AUTH, with different values of $FREE_{crit}$ as displayed in the first column. Coefficients of the explanatory variables all have the expected signs, including AUTH, which enters with a positive sign at all times.

Spec (4), N=47	Constant	FREE	PROP	IMPGDP	SCHOOL	GDPCAP	FSU	AUTH	AdjR ²
$FREE_{crit} = 3$	3.069** (2.115)	-0.588*** (-3.105)	-0.265* (-1.886)	6.584*** (4.743)	0.014 (1.218)	0.000 (0.745)	0.174 (1.079)	0.531 (2.346)	.874
$FREE_{crit} = 4$	2.401* (1.724)	-0.367*** (-3.282)	-0.283* (-1.867)	6.613*** (4.806)	0.017 (1.392)	0.000 (1.085)	0.224 (1.470)	0.364** (2.220)	.873
$FREE_{crit} = 5$	2.032 (1.402)	-0.235** (-2.504)	-0.316** (-2.067)	6.516*** (4.485)	0.017 (1.346)	0.000* (1.899)	0.271* (1.734)	0.263 (1.021)	.864

The *t*-statistic of each variable, calculated using White's robust standard errors, is displayed in parentheses under each coefficient. Significant coefficients are represented by * (10 percent level), ** (5 percent level) or *** (1 percent level).

Appendix 4 – Controlling for initial corruption

Displayed are the results from OLS-regression using specification (2), including control variable (TIINIT) for initial values of the variable TI.

Results from control regression, including the initial value of TI as control variable. Signs of the institutional variables remain unchanged, although PROP is no longer significant. FREE is only barely significant in this specification.

Spec (2), N=23	Constant	FREE	PROP	IMPGDP	FUMSH	SCHOOL	GDPCAP	FSU	TIINIT	AdjR ²
	3.191**	-0.123 (-1.146)	-0.369 (-1.588)	8.745*** (3.791)	0.702 (1.540)				0.079 (0.501)	.845
	2.388***	-0.239* (-2.081)	-0.162 (-0.696)	8.438*** (4.359)	0.536 (1.134)			0.537* (2.600)	0.157 (0.998)	.867
	2.189	-0.210 (-1.696)	-0.123 (-0.533)	7.411*** (3.473)	0.177 (0.325)		0.000 (0.993)	0.663** (2.945)	0.071 (0.475)	.869
	1.103	-0.190 (-1.480)	-0.167 (-0.750)	7.530*** (3.446)	0.144 (0.253)	0.015 (0.706)	0.000 (1.130)	0.669** (2.963)	0.015 (0.098)	.864

The *t*-statistic of each variable, calculated using White's robust standard errors, is displayed in parentheses under each coefficient. Significant coefficients are represented by * (10 percent level), ** (5 percent level) or *** (1 percent level).

Appendix 5 – Instruments for IMPGDP, correlations

Correlation coefficients for instruments logarithm of population and area							
		LOGPOP	LOGAREA	IMPGDP	SCHOOL	GDPCAP	FSU
LOGPOP	Pearson Correlation		.844	-.553	-.138	-.061	.040
	Significance		.000	.000	.354	.684	.792
LOGAREA	Pearson Correlation			-.547	-.113	-.152	.323
	Significance			.000	.451	.307	.027

Appendix 6 – The HISTORY variable

The content of the HISTORY variable is displayed below. This information is taken from Bell (2001).

Country	Sovereign and democratic history in the 20th Century
Albania	None
Armenia	Was independent and formally a parliamentary republic between 1917-1922
Azerbaijan	Was independent and formally a parliamentary republic between 1917-1920
Belarus	Less than one year of liberal democracy
Bosnia	Neither sovereign nor democratic
Bulgaria	Parliamentary democracy from 1918 until coup of 1934
Croatia	Neither sovereign nor democratic
Czech republic	Independent and democratic between 1918 and 1938
Estonia	Independent and democratic between 1918 and 1940
Georgia	Was independent and a parliamentary republic between 1917-1921
Hungary	Independent democracy from 1918-1944
Kyrgyzstan	None
Kazakhstan	None
Latvia	Military coup in 1934 ended democracy since 1918
Lithuania	Coup d'etat in 1926 ended democracy since 1918
Macedonia	None
Moldova	None, Russian and then Romanian.
Poland	Independent and mostly democratic between 1918 and 1939
Russia	Less than one year of liberal democracy
Serbia and Montenegro	Neither sovereign nor democratic
Slovenia	Neither sovereign nor democratic
Slovakia	Democratic between 1918 and 1938
Romania	Parliamentary democracy from 1918 until 1938
Tajikistan	None
Turkmenistan	None
Ukraine	Less than one year of liberal democracy
Uzbekistan	None