Institutions and the Relation between Corruption and Economic Growth

Wouter Ebben
Albert de Vaal

Nijmegen Center for Economics (NiCE)
Institute for Management Research
Radboud University Nijmegen

P.O. Box 9108, 6500 HK Nijmegen, The Netherlands
http://www.ru.nl/nice/workingpapers
Institutions and the relation between corruption and economic growth

Wouter Ebben & Albert de Vaal*

Radboud University Nijmegen

January 2009

Abstract

We study the effects of corruption on economic growth in a framework that includes corruption as part of the institutional setting of countries. Using a formal growth framework where corruption affects labor inputs and the provision of public goods, we find that particularly in situations where institutions are not well developed corruption may be conducive to growth. In these instances the positive effect of corruption on the working of the institutional system outweighs the negative direct effects of corruption on growth. We also find that the interaction among institutions themselves matters. This underscores the importance of taking into account the complete institutional setting when studying corruption, both in theory as well as in empirics.

1 Introduction

The United Nations’ top anti-crime official, Antonio Costa, estimates that Zaire and Nigeria, two of Africa’s hardest-hit states, have lost some $5 billion

*We thank Robbert Maseland for his useful comments and suggestions. Please send all correspondence to A. de Vaal, Nijmegen School of Management, Department of Economics, P.O. Box 9108, 6500 HK Nijmegen, the Netherlands. Email: a.devaal@fm.ru.nl
each in the last few years to corruption. In Pakistan, an estimated 30 percent of the price of all public works projects goes to kickbacks and bribes, while in Bangladesh corruption eats up about half of all foreign investments (Stevenson, 2003). But corruption is not only a third-world phenomenon. While it is undeniably more prevalent in authoritarian less developed countries, also democratic, western societies are not free of corruption. For example, a 2002 parliamentary enquiry in the Netherlands showed that the Dutch construction industry participated in illegal practices, ranging from fraud, unjustified subsidies and license issuance to real bribery and money or favours to individual politicians or higher-ranking public servants (van den Heuvel, 2005). Overall, a World Bank Institute study estimates the costs due to corruption in both rich and developing countries to be a $1000 billion a year (World Bank, 2004). Other studies show that corruption is detrimental to growth as it lowers domestic investments (Mauro, 1995), the inflow of foreign direct investments (Wei, 1997), international trade (Lambsdorff, 1999) or the productivity and quality of public investment projects (Tanzi & Davoodi, 1997). Furthermore, Mo (2001) shows that corruption creates sociopolitical instability which, by creating uncertainty, lowers productivity and economic growth.

Empirically, there is broad consensus that corruption is detrimental to the economic performance of countries on the long term. This is in sharp contrast to the theoretical literature on corruption and growth. For a long time corruption was treated as a standard distortion. With corruption, resources are spent on bribery instead of production, reducing the efficient allocation of resources and hampering economic growth. However, there are also alternative views. Leff (1964), for instance, argues that those criticizing corruption often seem to have in mind bureaucracies that are working to promote economic development. But if governments are primarily interested in reaching other goals (e.g. staying in control, self-enrichment), a re-evaluation of the effects of corruption may be warranted. Bribery then allows entrepreneurs to gain influence on the decision-making process, fostering economic performance by reducing uncertainty and supporting the innovative activities of entrepreneurs. A similar view is expressed by Huntington (1968), who stresses the
role of corruption in greasing the wheels of bureaucracy. Bribery can be an effective way of surmounting laws or regulations that hamper economic activity. By the same token: when government procedures are dilatory, speed money might help to speed up bureaucratic decision making. Finally, it is argued that corruption enhances growth due to bribe bidding competition. As more efficient entrepreneurs can afford to offer higher bribes, corruption facilitates that projects are assigned to the most efficient firms (Beck and Maher, 1986; Lien, 1986).

These views are not uncontested, however. Myrdal (1968) for instance argues that the practice of speed money gives incentives to government officials to not act efficiently and is therefore one of the reasons behind the inertia of bureaucratic systems. Regarding the alleged benefits of bribe bidding, Baumol (1990) stresses that those who can afford the highest bribe should be considered the most successful in rent-seeking. Corruption reduces growth because the most able individuals will pursue rent-seeking activities rather than socially productive activities. Murphy, Schleifer and Vishny (1991) substantiate this argument in a model of entrepreneurship and growth.

A major drawback of the theoretical literature, while at the same time a potential reason for explaining the different outcomes, is the fact that it disregards completely that the relationship between corruption and growth depends on its institutional environment. If at all, most authors depict the institutional framework as a black box, or study one particular institution in isolation, making it impossible to analyse corruption in interplay with other institutions.1 However, it is well-known that a close web of formal institutions, informal institutions and distortions determine the way an economy functions (e.g. North, 1990). Removing one distortion may alter this web, so that other distortions may be triggered, leaving the economy worse off than before.2 Consequently, the effects of corruption in a particular society cannot be studied without taking into account (the rest of) the institutional framework of that particular society. Corruption will have different effects in

---


2This line of reasoning is in line with the theory of second best, see e.g. Bohm (1967).
different institutional settings and the effects of corruption on the economy will therefore differ from place to place and from time to time. It implies that the outcome of a certain reasoning should become dependent on the institutional setting one has in mind. Studying corruption without taking heed of the interdependencies between corruption and other institutions, as the theoretical literature does, is therefore inappropriate and may moreover lead to wrong inferences.

With this paper, we provide a theoretical framework that gives institutions a decisive role in determining the relationship between corruption and economic growth. As we will show, this provides ample reason to expect ambiguous findings from the theoretical literature (be it for different reasons). In addition, it provides a theoretical underpinning for recent findings in the empirical literature that the impact of corruption cannot be explained without taking into account the institutional setting of countries.\(^3\) Ignoring the interdependency between corruption and other institutions tends to downplay the cross-country variance in the relationship between corruption and growth.

The model we develop takes these vital interdependencies into account. In particular, we construct a two-layer model to emphasize the decisive role of the institutional environment on the relationship between corruption and growth.\(^4\) The first layer models the way corruption affects the rate of growth in an institutional vacuum. In the second layer, institutions are incorporated and modelled to assess how the inclusion of institutions alters the relationship between corruption and growth that was established in the first layer. To do this meaningfully, we also dissect the institutional black box and specify and model the most crucial elements of the institutional setting influencing the relationship corruption-growth. In doing so, our two-layer model captures not only the commonly acknowledged direct effect of corruption on growth

\(^3\)See, for instance, Aidt, Dutta and Sena (2005), Méndez and Sepúlveda (2006) and Méon and Weill (2006). Note that this is in contrast to the earlier empirical studies which always found a clear-cut negative relationship between corruption and growth.

\(^4\)The concept of using a two-layer model is taken from Ehrlich and Lui (1999), who develop a two layer model to analyse the implications of political systems on individual labour supply decisions.
(layer 1), but introduces the crucial indirect effect of institutions on this relationship (layer 2).

For the remainder of this paper it is important to be clear about what we understand under corruption. Corruption has been defined by several authors in different ways, but we adopt the definition of Macrae (1982). He refers to corruption as ‘an arrangement that involves an exchange between two parties (the demander and the supplier) which (i) has an influence on the allocation of resources either immediately or in the future; and (ii) involves the use or abuse of public or collective responsibility for private ends’ (Macrae, 1982, p. 678). This definition is in line with the World Bank definition that corruption is ‘the abuse of public power for private benefit’, but is preferred because it highlights that there are two parties involved, a briber and a bribee. Besides this, Macrae’s definition makes clear that the bribee uses his public position for the benefit of his own or his relations and that it affects the allocation of resources. Consequently, we focus on bureaucratic corruption, involving both a public and a private party. Furthermore, we note that in our treatment of corruption, we refrain from issues of morality and solely study the economic effects of corruption, in particular economic growth.

The structure of our paper is as follows. Section 2 establishes in more detail why corruption cannot be reliably addressed in an institutional vacuum and which institutions are particularly important for the relationship between corruption and growth. Section 3 introduces our modelling framework and establishes that the impact of corruption on economic growth can only be explained when also the institutional environment is taken into account. In particular, we show and analyse how certain specific elements of the institutional environment play a decisive role for the effect of corruption on growth. Section 4 extends our analysis to verify how outcomes depend on the particular political system that is in place. Section 5 concludes.

Further refinements of the definition are of course possible. For instance, one can make a distinction between corruption with and without theft, where the official does or does not turn over the official price of the good to the government. One can also distinguish between centralized and decentralized corruption. Centralized corruption means that once a bribe is paid, the buyer gets full property rights over the set of government goods that it buys. In decentralized corruption one bribe may not be sufficient to render effect.
2 Corruption and the institutional setting

In a purely neo-classical setting, transactions occur under the assumption of frictionless exchange, in which property rights are perfectly and costlessly specified and information is likewise costless to acquire. The neo-classical theory has been a major contribution to economic knowledge and seems to work well in the analysis of markets in developed countries. However, when the stringent assumptions of the neo-classical framework are not satisfied, the theory fails to satisfactorily explain economic performance. What has been mainly missing is an understanding of the nature of human coordination and cooperation. When information is not perfect at all and when property rights are far from perfectly specified, cooperation is hard to realize in the neo-classical setting. This is where institutions come in. When it is costly to transact, institutions matter.

Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction (North, 1990). The major role of institutions is to reduce uncertainty by establishing a stable structure for human interaction. They provide a framework in which transactions and cooperation can occur under conditions that would otherwise make transactions between individuals extremely difficult or even impossible. Institutions can be both formal and informal. Formal rules function to facilitate socially desired kinds of exchange and to discourage the less desirable kinds (e.g. laws, contracts). These formal rules are typically supplemented by codes of conduct, norms of behaviour and conventions. These informal institutions are endogenous, embedded in the culture of a society, and therefore typically only change very slowly. Because formal rules deal with specific problems only and can never be exhaustive, both the formal and informal institutions are essential for the working of societies. Moreover, the institutional framework is a complex system of formal and informal

\footnote{This does not mean that the institutions are necessarily efficient. Laws and social norms may be inefficient, but they still perform a role in the society by reducing uncertainty. By reducing this uncertainty, individuals will engage in cooperation despite the fact that they do not possess perfect information about the other players or despite the fact that the game is not repeated.}
constraints in which only incremental changes will alter the institutional framework over time.

Affecting the transaction costs of economic interactions, institutions are bound to influence the economic performance of countries. Economic literature shows a wide array of studies on the topic of institutions and economic growth.\(^7\) However, when studying the relationship between institutions and growth, authors generally follow the notion of North (1990) that institutions affect economic performance by their effect on the cost of exchange and production. Together with the technology employed, they determine the transaction and transformation costs that make up the total costs of production. Production becomes a combination of the normal technological transformation process and a part that defines the way transactions occur.\(^8\) This last part depends on the institutional framework of a country. Good institutional settings promote economic growth by establishing an environment in which transactions occur under trust and order. Property rights are well established and people do not need to devote a lot of resources to measurement and enforcement. In such a setting, routines will be established. By contrast, bad institutions hamper economic growth because a large share of resources has to be used for accomplishing transactions, leaving fewer resources for the actual transformation process and discouraging individuals to undertake productive activities.

The relationship between institutions and economic growth is not only subject of descriptive argumentations, it also has been formalized and em-

---

\(^7\) Why the interplay between institutions matters for economic growth is described by Granovetter (1985), addressing the problem of embeddedness. Which institutions matter for growth is outlined in Rodrik (1999). Eicher and García Penalose (2003) argue that a certain threshold level of institutional development has to be overcome, before economic growth can take off. The importance of a specific feature of the institutional framework, namely property rights, for economic growth is stressed by Gradstein (2004) and Furubotn and Pejovich (1972).

\(^8\) Nelson and Sampat (2001) follow this line of reasoning by proposing that the theory of production should involve two different aspects: a recipe that is anonymous regarding any division of labour, and a division of labour plus a mode of coordination. They propose that the former is what scholars often have in mind when they think of technology in the conventional sense. This aspect is called the ‘physical’ technology employed. The latter aspect, which involves the coordination of human action, is referred to as the ‘social capital’ involved.
pirically examined. Fedderke (2001) constructs a growth model in which property rights are the institutional feature that affect economic growth. He argues that there is an interdependence between institutional development and economic development and that they mutually determine each other. The model follows the aforementioned notion that the level of production depends on the degree of development of production technology and on the level of property rights and it formalizes that improving institutions positively influences the rate of economic growth. Empirical testing provides plenty evidence for this conclusion. Rodrik, Subramanian and Trebbi (2002) conclude that the quality of (formal) institutions is by far the most important determinant of differences in income levels between countries. In a less recent study, Scully (1988) incorporates informal institutions into the analysis and reports that the institutional framework is not only a statistically significant explanation for intercountry variations in growth rates of real per capita gross domestic product, but also that it is a phenomenon of considerable magnitude.

While the relationship between institutions and economic growth seems clear and straightforward, one should also realise that the institutional setting of a country is a close web of formal institutions, informal institutions and distortions. The interplay between these institutional factors determines whether the institutional environment fosters or depresses growth. In contrast to a neo-classical world in which all resources are used efficiently and where distortions hamper growth by definition, a more realistic picture of distortions and economic growth is provided by the concept of second-best. In a second best world, removing a distortion may trigger other distortions, leaving the economy worse off. The effect of removing distortions on economic growth thus depends on the way the total institutional framework is changed.

This concept also applies to corruption. In a second best setting, it is by

\cite{bohm1967}

Bohm (1967) argues that the problem of second best applies in the real world because “the optimal-feasible allocation of resources is subject to an abundance of ‘irremovable’ institutional and political constraints, which seem to require other solutions to most allocation problems than what follows from a simple Pareto optimum with no other constraints taken into account than those of technology and available resources.” (p. 301)
no means certain that removing corruption promotes economic growth. The
effect on growth also depends on the way the removal of corruption alters
the institutional setting as a whole. Corruption may be a useful element in
the institutional web, mending or precluding other distortions. Removing
corruption may then affect the economy adversely. This notion is generally
missing in economic theory concerning corruption and growth, while empiri-
cally it has been established as relevant (e.g. Méndez and Sepúlveda, 2006).
Economic literature does consider institutions, but always as an exogenous
factor. It forgets that corruption itself is part of the institutional framework
and therefore also affects the relationship between corruption and economic
growth. Apart from the direct impact of corruption on growth (e.g. due to
misallocation of resources), there is also an indirect effect through its impact
on the institutional framework. As such, corruption also influences the direct
relationship between corruption and economic growth. Reducing corruption
by itself may be conducive to growth, but its impact on the institutional
setting may be such that growth reduces after all.

The difficulty with incorporating these notions in economic modelling is
that the institutional web is often depicted as a black box. While it is easy to
acknowledge that the interplay between institutional factors determines the
way institutions affect growth, it is much harder to make that tractable in
economic modelling. In order to adequately model the effects of corruption
on economic growth, one must open the black box and specify the interdepen-
dencies. This problem is also recognized by Bohm (1967), who argues that
without specifying the policy restrictions that arise with second best prob-
lems, it is impossible to argue how the allocation in a second best framework
is different compared to a first best allocation. For our purposes, this implies
that the aspects of the institutional setting that affect the relationship be-
tween corruption and growth must be acknowledged and specified. Only then
will the model be able to elucidate in a meaningful manner how corruption
affects the relationship between corruption and growth through its impact
on the institutional environment. Only then will it be possible to indicate
which effects corruption will have on economic growth.

Since the institutional web of a country is extremely complicated and
specific, it is impossible to compile an exhaustive list of elements of the institutional setting that would influence the relationship between corruption and growth. We therefore highlight four institutional features that we believe are crucial in studying the effects of corruption, i.e. the political system, political stability, property rights, and culture. We motivate our choice by the fact these features have been acknowledged in several papers as being important determinants for growth.\textsuperscript{10}

\textit{The political system}

The effects of corruption on economic growth are not uniform across political systems. It particularly matters whether corruption exists in a democratic system or in a totalitarian system.\textsuperscript{11}

In a democratic system, individuals have the opportunity to vote and thereby be represented by politicians who share their preferences. Because everybody has the opportunity to do this, the social outcome is a government who represents the majority of the people. This is in line with a key characteristic of the neo-classical paradigm that it is socially optimal if individuals strive to maximize their own benefit. Corruption is therefore expected to reduce economic growth in a democratic system, as it acts as a distortion misusing resources. Furthermore, it is bound to change the incentives of economic agents. Less production takes place than would ideally be the case, while also future production will be reduced as the incentives of entrepreneurs are shifted from productive use to rent-seeking activities.

Of course, also the democratic systems of modern, industrialized societies are far from the neo-classical free-market ideal. However, individuals accept the creation of the welfare state and other institutions in order to protect selected groups, and/or to redistribute wealth and income. In order to achieve

\footnote{The importance of property rights for economic growth can be found in Gradstein (2004). The way culture affects corruption and growth is outlined in Husted (1999). Colombatto (2003) presents the political system and the degree of political stability as a crucial determinant for the relation between corruption and growth.}

\footnote{The perception indices in both Tanzi (1998) as Mauro (1995) show that countries with a totalitarian system have lower scores than countries with a democratic system, indicating that corruption is more present in a totalitarian system than in a democratic one. Given our focus on the effects of the political system on the corruption-growth relationship, this is by itself not so relevant though.}
this goal, power is delegated to bureaucrats and politicians. These politicians are subject to fairly loose formal controls, because elections only occur once every four or five years. Because such controls are deemed to be insufficient, corruption can be useful by acting as a device through which political organizations can be monitored (Colombatto, 2003). Corruption will then elicit predictable behaviour and reduce uncertainty. While this may be true in the short run, on the long term the disadvantages of such corruption will outweigh the advantages. In the presence of corruption, bureaucrats will change their behaviour in a way that will reduce efficiency (Myrdal, 1968). The payment of bribes may be an inducement for the bureaucrats to reduce the speed at which most practices are being processed. When frequently bribed, government officials will clearly try to keep on earning these bribes, so that corruption will become a standard feature of such a bureaucracy. In democratically oriented political systems, therefore, corruption is detrimental to growth.

This will be completely different in a totalitarian system, where economic and political freedoms are limited. When studying the effects of corruption on economic growth in totalitarian systems, the distinction between centralized and decentralized corruption becomes important. When corruption is decentralized, an economic agent is never certain that bribing will be effective. Once the agent bribes a government official to get something done, this does not preclude the possibility that also the next official will demand a bribe for the public good or service. In such a system of uncoordinated corruption and often anarchy, a high degree of uncertainty will prevail, lowering economic growth. Centralized corruption, by contrast, takes away these uncertainties as the regime has institutionalised corruption to serve a clear, common goal. In a way, producers can hedge the risks of uncertainty, since they know who to bribe to obtain certain public goods or services. As such, the distinction between decentralized and centralized corruption also relates to Mancur Olson’s (1993) distinction between “roving bandits” and “the stationary bandit”. While roving bandits are characterized as dictators trying to extract from the society as much as possible, generating high uncertainty regarding investment and production, a “stationary bandit” realises that
such uncertainty will also affect his future earnings and therefore monopolizes corruption. If corruption hampers economic growth in this case, it is not because of the uncertainty it creates.\footnote{One could see such monopolized corruption as taxes, be it of course that the tax receipts are not used for the benefit of society, but purely for enriching the autocrat.}

**Political stability**

A second feature of the institutional framework that influences the effects of corruption on growth is the degree of political stability. In an environment of political stability, corruption is expected to reduce economic growth. Apart from the fact that it misuses resources and distorts incentives, it also introduces an element of irrationality in the decision-making process. Even the argument that corruption ‘greases the wheels of bureaucracy’ does not apply here, because in a politically stable environment, introducing corruption will cause an uneven income distribution, thereby creating a hazard for the degree of political stability (Mo, 2001; Tanzi, 1998). It allows well positioned individuals to benefit from government activities, at the cost of the rest of the population. Corruption serves no positive function in a politically stable environment.

The effects of corruption should be reconsidered when the focus shifts to an environment of political instability. In such a setting, cutting down corrupt practices is less desirable than it sounds when a corrupt system is the least of all evils. This corresponds to Colombatto (2003), who argues that this applies mainly to countries where ethnic differences and violent rivalries are pervasive, so that the perceived alternative to corruption is not Western-style political confrontation, but daily physical aggression. Unless the rules of the game are changed drastically, efforts to eliminate corruption in such systems will only lead to political instability and corruption serves the positive function of holding society together. It is then beneficial for the entire population that a certain degree of corruption is maintained. Following Colombatto, “it is believed that illiberal rules are often the outcome of a bottom-up process, whereby a large majority of the population may voluntarily decide to give up economic freedom in order to attain other goals,
like enhancing physical security.” (2003, p. 375) Of course, economic outcomes are optimal in a situation with no distortions and thus no corruption. But when corruption is one of the only ways to avoid anarchy and physical aggression, its effect on economic growth is far less detrimental than in a situation of political stability. When determining the effects of corruption on economic growth, therefore, it is useful to consider the stability of the political environment.

Property rights
The protection of property rights is a third important element for a good institutional environment (Furubotn and Pejovich, 1972; North, 1990; Gradstein, 2004). In the presence of a system of property rights, economic agents do not have to worry about the availability of their resources and are therefore able to invest their resources productively. In such an environment, corruption is expected to reduce economic growth by misusing resources and distorting incentives for both economic agents and government officials. While the positive effects of so-called speed money may apply in the short run, corruption will remain depressing for economic activity in the longer run.

The verdict changes, however, once the system of property rights does not function properly. In such an environment, uncertainty becomes a crucial element of the economic system, which can be reduced by corruption, facilitating investments and production. However, besides reducing uncertainty, the long-run adverse effects of corruption remain present. When widespread, corruption infects an economic system with rent-seeking behaviour which in the long run reduces economic growth. The positive effects of corruption for economic growth should therefore not be highlighted too soon. In a situation where property rights are violated, but not completely absent, introducing a role for corruption is not suitable, nor desirable. Corruption only has a positive function when formal property rights are absent altogether. Then corruption could to a certain degree take over the role of property rights in reducing uncertainty, fostering production and investments.

Culture
Another factor that should not be ignored when studying the effects of corruption on economic growth is culture. Compared to the aforementioned elements, this factor is undoubtedly the most difficult factor to study because of the complexity of identifying and measuring a country’s culture. Where a political system, the degree of political stability, and to a lesser extent, the protection of property rights are more or less observable, determining and objectively describing a country’s culture is far more complex. In order to define a culture in a way suitable for economic analysis, Hofstede’s (2001) treatment of culture is useful. Hofstede defines culture as “the collective programming of the mind” and postulates five dimensions representing fundamental problems of societies, i.e. power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation. While Husted (1999) examined the impact of these cultural variables on the level of corruption in a country, correlation-issues thwart a systematic analysis of the way by which cultural dimensions influence the relationship between corruption and growth.

This problem of correlation relates to the notion that culture itself can be argued to be a reflection of the total institutional environment instead of one of its specific elements. Douglas North (1990) uses Boyd and Richardson’s (1985) definition of culture, being “the transmission from one generation to the next, via teaching and imitation, of knowledge, values, and other factors that influence behavior”. North attaches high value to culture because of its long-run implications. Culture, through social transmission, underlies informal institutions and “plays an important role in the incremental way by which institutions evolve and hence is a source of path dependency” (North, 1990, p. 44). This implies that culture is not an element of the institutional framework, but a factor influencing institutional change. Formal rules may change overnight, but the culturally derived informal constraints will not. Consequently, institutional change is an outcome of the tension between changed formal rules and persisting informal constraints.\textsuperscript{13}

\textsuperscript{13}In an introduction to Max Weber’s “The protestant ethic and the spirit of capitalism” (1992), Anthony Giddens provides a description of how institutional change and economic performance is affected by local traditions, religions etc. This provides a picture of how culture plays an influential role in a how a country’s institutional setting evolves.
North’s notion of culture being a shaping factor for informal institutions is also present in Williamson’s (2000) sketch of four levels of social analysis. Williamson constructs a framework which considers four levels of social analysis: embeddedness, institutional environment, governance, and resource allocation and employment. These are given in Figure 1

(*insert Figure 1 about here*)

In the figure, the solid arrows signify that the higher level imposes constraints on the level immediately below. We are interested in the two top levels. Social embeddedness includes culture. Williamson, as does North, argues that institutions at this level change very slowly. Institutional environment includes the formal “rules of the game”. Although Williamson, like North, introduces interconnection by feedbacks from the lower to the upper levels, the emphasis is on the way the top level affects the second level. In this analysis, culture acts as a binding constraint to formal institutions. The elements of the embeddedness level, including culture, confine the formal institutions of the second level. (Changes in) an institutional environment can only exist in accordance with a country’s culture. The institutional environment is therefore partly “a product of evolutionary processes”. Consequently, culture can be seen as a reflection of a country’s institutional environment, instead of being an element of this environment. This implies that an adequate analysis of the effects of culture on the corruption-growth relationship is impossible, since in doing so one would actually analyze the effects of the total institutional setting.

3 A basic model for corruption and growth

To verify the vital role of institutions for the relationship between corruption and growth, we construct a model that acknowledges the direct and indirect effects corruption has on growth. We develop a two-layer model where the first layer models the direct relationship between corruption on economic
growth and where the second layer models how the interplay between corruption and institutions affects this relationship. By ignoring institutions, the first layer can be seen as the conventional treatment of corruption as a distortion. The second layer, by contrast, models how some of the specified elements of the institutional environment affect the rate of economic growth that follows from the first layer. Besides formalizing the significant indirect effect of institutions on the corruption-growth relationship, this modelling structure allows us to argue which of the possible theorized effect of corruption will occur in a certain setting. In this section, we will thereby confine ourselves to the degree of political stability and the degree of protection of property rights.

3.1 The first layer – corruption and growth in an institutional vacuum

The first layer follows Mauro (2002), who models corruption as lowering production and hampering the rate of economic growth. Mauro’s line of reasoning is based on the well-known Barro (1990) framework, where public goods are provided by the government and act as an input for private production. Private returns to scale may be diminishing, but the social returns can be constant or increasing. Mauro incorporates corruption in this model as rent-seeking, altering the growth rate.

The economy consists of economic agents who try to maximize overall utility, as given by:

$$U = \int_0^\infty u(c)e^{-\rho t}dt$$ (1)

where $c$ is per capita consumption and $\rho$ represents the constant rate of time preference. The consumption good is produced by economic agents using capital, labour and public goods $G$, specifically $Y = F(K, L, G)$. This last feature represents the productive role of government in the model. However, the incorporation of the role of the government also creates room for bureaucratic corruption. Economic agents will attempt to use some of the
public goods for their own benefit, instead of using them for production. In
the model, individuals allocate their time between productive work, \( L \), and
socially unproductive stealing, \( S \). Corruption therefore has two effects on
output: due to rent-seeking, less time will be devoted to productive work,
while it also implies that less public goods reach the production process as a
productive input. Specifically,\(^{14}\)

\[
Y = K^{1-\alpha}L^\alpha[G(1 - S)]^\alpha \tag{2}
\]

Individuals allocate their time between productive work and rent-seeking. In
equilibrium, the net wage must equal the marginal product of rent-seeking.
For an individual, the marginal product of rent-seeking is \( G \). When the
government produces more public goods, rent-seekers can consequently ap-
propriate a larger amount of these public goods. The marginal product of
labour is the wage net of taxes which is \((1 - \tau)\partial Y/\partial L\). Using equation (2),
we get

\[
\frac{\partial Y}{\partial L} = \frac{\alpha Y}{L}
\]

Since the net wage must equal the marginal product of rent-seeking, the
equilibrium value of \( L \) becomes:

\[
L = 1 - S = \alpha(1 - \tau)\frac{Y}{G}
\]

Substituting this value of \( L \) into the production function, subsequently de-
rising the marginal product of capital \( \partial Y/\partial K \), gives rise to the following
growth path:

\(^{14}\)In the construction of the production function we depart from Mauro in the sense
that Mauro introduces a term \( \phi(S) \) representing the amount of stolen goods that the rent-
seekers actually keep. This is assumed to be a positive function of the total amount of
rent-seeking in the economy, reflecting the concept of strategic complementarities: if one
agent does something, it becomes more profitable for other agents to do the same thing.
Because of this, the Mauro-model results in multiple equilibria: a good equilibrium with
no rent-seeking and a bad equilibrium with a considerable amount of rent-seeking. Given
the focus of our analysis, we want to rule out the possibility of a good equilibrium and
therefore set \( \phi(S) = 1 \).
\[
\gamma = \frac{(1 - \tau)\partial Y / \partial K - \rho}{\sigma} = \frac{1}{\sigma} \left[ (1 - \tau)(1 - \alpha) \left( \frac{\alpha(1 - \tau)Y}{G} \right)^{\frac{\alpha}{1 - \alpha}} \left( \frac{1}{Y} \right)^{\frac{\alpha}{1 - \alpha}} [G(1 - S)]^{\frac{\alpha}{1 - \alpha}} - \rho \right] \tag{3}
\]

which is essentially a tax-ridden Euler equation with \(1/\sigma\) representing the intertemporal substitution elasticity in consumption. The expression is by and large similar to the one derived by Mauro (2002),\(^{15}\) making clear that rent-seeking impedes economic growth. It lowers the amount of public goods that reaches the production process (the **-term), while it also reduces agents’ optimal labour input (the *-term, equalling \(1 - S\)). By that token, the inclusion of corruption also leads to an additional effect of government expenditures on growth. In addition to the Barro (1990) effects of government expenditures on economic growth — \(G\) makes capital more productive but the implied tax burden also implies lowers labour input, increasing government expenditures also creates more room for corruption. This leads to an increase in rent-seeking and consequently to a decrease of productive work.

### 3.2 The second layer – incorporating institutions

To incorporate the effects institutions might have on the relationship between corruption and growth, we extend the basic set-up with a second, institutional layer. As we have argued, the expected interactions will vary with the particular institution considered. We therefore model each institution separately, which also enhances tractability as it allows for a clear analysis of the effects a particular institution exerts on the corruption-growth relationship. The alleged drawback is of course that we do not give the complete picture, as we do not specify the interactions within the institutional framework. Our

\(^{15}\)The difference is the absence of the strategic complementarity term \(\phi(S)\) as a premultiplier of the \(G\) terms in (3).
analysis should therefore be seen as a first attempt to unravel some of the theoretical intricacies that are involved when taking the impact of the institutional framework on corruption seriously. We first deal with the degree of political stability and then with the degree of property rights protection.

**Political stability**

A certain degree of political stability is a necessary condition for production and economic development. In a situation of political stability, one has a certain amount of trust and confidence, facilitating investment and production. In a situation of political instability, however, production will be much lower. Furthermore, as a situation of political instability can easily break down into a situation of anarchy and physical aggression, the climate for production is anything but well. Therefore, political stability is a key element of the institutional framework affecting production and growth.

To integrate a role for political stability, the production function of the first layer needs to be altered. Here, a new production function is constructed. Following Klein, Welfe and Welfe (1999), the production function is a combination of a long-run production function and an extra variable. As in the first layer, production in the long-run depends on capital, labour and public goods. The extra variable here is the so-called stability factor. Formally,

\[
Y = K^{1-\alpha}L^\alpha[G(1 - S)]^\alpha \cdot [Stab]
\]

so that political stability enhances production, being as it is a necessary condition to produce. Stability itself depends on stealing as well, apart from a multitude of other factors that might influence it. The effect stealing has on political stability, however, differs between a situation of political stability and a situation of political instability. When a country is characterized by a politically stable climate, corruption is detrimental to political stability. But, as argued, in a situation of high political instability, corruption serves to enhance it. Then, corruption is one way to hold the economic system together, or to avoid the system to explode. To formalize these threshold
effects, we assume the following function for stability:

\[ Stab = X + S[\overline{Stab} - Stab] \]

where \( X \) represents a composite of other (institutional) factors influencing political stability and where \( \overline{Stab} \) is some threshold level of stability above (below) which stealing affects political stability negatively (positively). Rewriting this to \( Stab = (X + S \cdot \overline{Stab}) / (1+S) \), it follows that only if \( \overline{Stab} - X > 0 \) stealing will affect political stability positively, be it at a decreasing rate.\(^\text{16}\)

The intuition is that only when all other factors that determine political stability are insufficient to lift stability over the threshold level, stealing affects political stability positively.

For the growth rate this implies

\[
\gamma = \frac{1}{\sigma} \left\{ \frac{(1-\tau)(1-\alpha)\left[\alpha(1-\tau)\frac{Y}{G}\right]^{\frac{\alpha}{1-\alpha}}}{(1+\tau)^{\frac{\alpha}{1-\alpha}}} \right. \\
\times \left. \frac{G(1-S)^{\alpha}}{1-S} \left( \frac{X + S \cdot \overline{Stab}}{1+S} \right)^{\frac{1}{1-\alpha}} - \rho \right\}
\]

As before, stealing affects growth directly by affecting labour input choices (*) and by diminishing the availability of public good provision for private production (**). But now also an effect arises through its impact on political stability (the ***-term). This effect is ambiguous, as it depends on the extent of political stability in society whether stealing affects political stability positively or negatively. There is no additional impact of stealing through its effect on optimal labour choices since labourers do not take the indirect effects of stealing on political stability into account when making their choices.

Formally, the effect of stealing on the growth rate is given by

\(^{16}\text{Formally, } dStab/dS = (\overline{Stab} - X)/(1 + S)^2 \geq 0 \text{ with } d^2Stab/dS^2 = -2(\overline{Stab} - X)/(1 + S)^3 \geq 0.\)
The effect of corruption on the economic growth is negative if the threshold level of stability is low enough, so that corruption affects political stability negatively. If this is not the case, corruption may enhance growth, provided labour is not too important in production (small $\alpha$). Corruption reduces the amount of labour that is used for directly productive activities, so that the smaller the importance of labour in production, the less likely it is that corruption affects growth negatively on that account.

Considering the evolution of political stability over time, we note that it is always constant, provided the government pursues a policy of balanced budget at any point in time (which we assume). The growth rate of public good provision is then always equal to that of aggregate output, implying that the marginal revenue of rent-seeking changes in tandem with the marginal revenue of productive work. Consequently, the level of $L$ and $S$ that are chosen are always the same. One implication is that whether or not corruption facilitates or hampers economic growth, depends on the initial setting of the parameters. As such, our model incorporates an extreme form of path dependency. If the initial situation is such that corruption facilitates or hampers growth, it will always do so unless exogenous changes occur in the environmental variables.

**Property rights**

Also the degree of protection of property rights is a feature of the institutional environment affecting the relation between corruption and growth. Without a proper system of property rights, the economic system is plagued by severe uncertainty. A system of property rights can therefore be regarded as a crucial condition for economic growth. When property rights are effectively protected in an economic system, corruption has adverse effects on
economic growth. In line with the aforementioned arguments, corruption lowers growth because resources are being misused. However, when an economic system lacks a decent protection of property rights, economic growth is also reduced. In such a situation, corruption can positively affect growth by taking over the role of property rights.

To take account of the positive effect of a system of property rights on production, we alter the production function into:

\[ Y = K^{1-\alpha}L^\alpha[G(1-S)]^\alpha \cdot [Prop]^\beta \]  

with \(0 < \beta < 1\) and where \(Prop\) indicates the presence of a system of property rights. This specification signifies the extreme importance of property rights for production. When there is no system of property rights, production is zero. The marginal productivity of introducing a property rights system is extremely high — \(dY/dProp \to \infty\) for \(Prop \to 0\) — while also increments to the system have positive marginal productivity (be it at a declining rate: \(dY/dProp = \beta Y/Prop > 0\) and \(d^2Y/dProp^2 = \beta(\beta - 1)Y/Prop^2 < 0\)).

We see \(Prop\) as a system that includes both formal and informal rules, implying that under certain conditions corruption may substitute for some of the formal rules. We acknowledge this by assuming that especially when formal property rights are absent or hardly there, stealing may replace its function, facilitating production, but that above a certain minimum level of formal property rights, it will obstruct the system’s functioning. More specifically, we assume that \(Prop = PR + S(PR - PR)\) with \(PR > 0\) and where \(PR\) denote the formal property rights. Note that since \(0 \leq S \leq 1\) and \(PR > 0\), \(Prop \geq 0\) as well. The magnitude of \(Prop\) can therefore take any positive value, also greater than one. For the sake of interpretation it is however useful to think as if it will take a value between zero and one, indicating that a system of property rights facilitates production rather than that it contributes directly to it.

The production function becomes

\[ Y = K^{1-\alpha}L^\alpha[G(1-S)]^\alpha \cdot [PR + S(PR - PR)]^\beta \]  

(8)
which retains the importance of having a system of property rights, while it also shows the divergent roles corruption may have on it. When the formal property rights are below a certain threshold level $\mathcal{PR}$, corruption is conducive to private production as it takes over part of the functioning of a property rights system. If, by contrast, such a system of property rights is sufficiently established, corruption erodes its working, affecting production negatively.

The growth rate becomes:

$$
\gamma = \frac{1}{\sigma} \left\{ \frac{(1 - \tau)(1 - \alpha)}{(1 - \tau)(1 - \alpha)} \left[ \frac{\alpha(1 - \tau)Y}{G} \right]^{\frac{\alpha}{1 - \alpha}} \left( \frac{1}{Y} \right)^{\frac{\alpha}{1 - \alpha}} \right\} \times \left[ G(1 - S) \right]^{\frac{\alpha}{1 - \alpha}} \left[ PR + S(\mathcal{PR} - PR) \right]^{\frac{\beta}{1 - \alpha} - \rho} \right\}
$$

so that the effect of corruption on growth is given by

$$
\frac{\partial \gamma S}{\partial S} \gamma = \frac{S}{1 - S} \left( \frac{\sigma \gamma + \rho}{1 - \alpha} \frac{\beta(\mathcal{PR} - PR)}{PR + \frac{S}{1 - S} \mathcal{PR}} - 2\alpha \right) \geq 0
$$

The effect of corruption on the growth rate is clearly negative if $\mathcal{PR} < PR$, so if the formal property rights are above a certain threshold level. If this is not the case, corruption may enhance growth, depending on the marginal importance of property rights in production ($\beta$) and the importance of labour in production. Everything else the same, the larger $\beta$, the more likely corruption will enhance growth as the marginal productivity of a system of property rights (i.e. corruption taking over its role) is high. Corruption however also reduces the amount of labour that is used for directly productive activities. Hence, the smaller the importance of labour in production ($\alpha$ small), the lower the negative effect of corruption on growth on this account.

The evolution of property rights over time is as before. The levels of $L$ and $S$ that are chosen are always the same, making the magnitude of Prop constant as well. Once more, it holds that the dependency of growth on corruption is determined by initial conditions. There are no tendencies in the model that imply that $\mathcal{PR} - PR$ may switch sign over time.
4 The political system

Also the political system, being part of the institutional setting, may have consequences for the relation between corruption and economic growth. As we discussed in Section 2, the effects of corruption in democratic systems are different from those in totalitarian systems, whereas in the latter also the particular form of totalitarian system in place is relevant, in line with Mancur Olson’s (1993) distinction between "roving bandits" and “the stationary bandit”. In this section we apply our two-layer framework to analyse to what extent the political system matters for the impact of corruption on economic growth.

The analysis we offered so far can be seen as resembling the outcomes of corruption in a democratic system. No individual agent has power over other agents, whereas the role of government is limited to producing and distributing public goods. This would change under a totalitarian system with either a 'roving bandit' or 'stationary bandit' in power. Regarding government spending and taxation the distinction is clear from the following quote from Olsen: “Their (stationary bandits) thefts were distinguished from those of roving bandits only because they took the form of continuing taxation rather than occasional plunder. [...] The rational stationary bandit will take only a part of income in taxes, because he will be able to extract a larger total amount of income from his subjects if he leaves them with an incentive to generate income that he can tax.” (Olson, 1993, p. 568). "Roving bandits" are therefore characterized as dictators trying to extract from society as much as possible without taking heed of future implications; “stationary bandits” realise that future earnings are doubtful if individual agents are not left incentives to produce.

To analyse these different set-ups we retain our assumption that government collects taxes and produces public goods, facilitating private production. When there is a democratic government in place, outcomes are as in the previous section requiring no further elaboration. The growth rate in the institutional vacuum is given by (3), whereas the growth rates when also political stability or property rights is taken into account are given by,
respectively, (5) and (9). When a totalitarian system is in place, we assume that government – the dictator – also uses tax income to serve needs that do not add to private production. When the dictator is of the roving bandit type, it will use all tax revenues for its own purposes, extracting as much from society as possible. This disables private production, obviously with disastrous effects on economic growth. For that reason, we will not further elaborate on the ‘roving bandit’ type of totalitarian system. When the dictator is a ‘stationary bandit’, things will be different. Recognizing that public goods facilitate production, a stationary bandit will choose "the revenue-maximizing tax rate [...] and will spend money on public goods up to the point where his last dollar of expenditure on public goods generates a dollar’s increase in his share of the national income." (Olson, 1993, p. 570).

As we will see, such optimisation stance actually improves economic growth in the presence of corruption: by rationally reducing public goods provision, the stationary bandit effectively reduces the amount of corruption in society, which is good for growth.

To see this formally, we note that the marginal cost of public good provision is one for the stationary bandit, whereas its marginal benefit is $\tau \frac{dY}{dG}$. Consequently, of all tax revenues collected, the stationary bandit will spend $G = \tau \alpha Y$ on public goods, keeping the remainder selfishly for itself. Everything else the same, public good provision is less under a stationary bandit than in a democratic society. This reduces the amount of stealing that is going on and increases the amount of labour individuals decide to supply:

$$L_{SB} = \frac{(1 - \tau)}{\tau} > \frac{\alpha (1 - \tau)}{\tau} = L$$

where $L_{SB}$ is optimal labour input under the stationary bandit regime and where the value for $L$ is taken from Section 3. Moreover, we have applied $G = \tau \alpha Y$ in case of the stationary bandit and $G = \tau Y$ in case of the democratic system. Using this in the growth function yields

$$\gamma_{SB} = \frac{1}{\sigma} \left[ (1 - \tau)(1 - \alpha)[\alpha(1 - \tau)L_{SB}]^{\frac{\alpha}{T - \alpha} - \rho} \right]$$

which is bigger than the equivalent growth rate in a democratic system.$^{17}$
We note that this growth rate is also higher in comparison to a democratic society where government would set public expenditures and tax rates optimal for economic growth. In such a society, which is an appropriate benchmark for the 'planning' stationary bandit, the government would set $G/Y = \tau$ equal to $\alpha$, which is the natural efficiency condition for government expenditures (Barro and Sala-i-Martin, 1999: 155). This implies a labour input of $L = (1 - \tau) < L_{SB}$. In the presence of stealing, however, the natural efficiency condition for government expenditure changes into $G/Y = \alpha \sqrt{1 - \tau}.$ Stealing implies that it is optimal to spend a lower percentage of national income on public goods, which the stationary bandit accidently honours by selfishly requiring a higher marginal benefit on public goods provision.

To infer the importance of the political system in an institutional setting, we verify the implications of having a stationary bandit for the second layer of our framework. Since we know that $S_{SB} < S$, for both political stability and property rights, the effect of a stationary bandit on growth boils down to determining how the growth rates (5) and (9) change the moment that $S$ decreases. We recall from the previous section that:

$$\frac{\partial \gamma}{\partial S} \bigg|_{Stab} = \frac{S}{1 - S} \frac{\sigma \gamma + \rho}{(1 - \alpha) \sigma \rho} \left\{ \frac{1 - S}{1 + S} \left( \frac{Stab - X}{X + Stab \cdot S} \right) - 2\alpha \right\} \geq 0$$

$$\frac{\partial \gamma}{\partial S} \bigg|_{PR} = \frac{S}{1 - S} \frac{\sigma \gamma + \rho}{(1 - \alpha) \sigma \rho} \left\{ \frac{\beta (PR - PR)}{PR + \frac{S}{1 - S} PR - 2\alpha} \right\} \geq 0$$

Whether or not a stationary bandit enhances growth when also other institutional settings are taken into account thus depends on the quality of the institutional framework. From Section 3 we know that the effect of corruption on economic growth is negative in case the political environment is sufficiently stable or when the system of formal property rights is sufficiently

---

\textsuperscript{17} Eqn. (3) can be rewritten to $\gamma = \frac{1}{\sigma} \left( (1 - \tau)(1 - \alpha)[\alpha(1 - \tau)L]^{\frac{2}{1 - \alpha} - \rho} \right)$. 

\textsuperscript{18} Recognising that part of public good production dissipates because of corruption, the government sets $(1 - S)dY/dG = 1$. The expression in the text then readily follows upon substitution of $1 - S = (1 - \tau)\alpha Y/G$. 

26
developed. With $S_{SB} < S$, the stationary bandit is therefore beneficial to growth in these cases. For insufficient political stability or formal property rights, growth thrives upon corruption, making a stationary bandit detrimental to the growth rate. Only if stealing enhances growth – because of lacking institutions – a stationary bandit is uncalled for. This also underlines the mutual dependence of different institutions for generating end-outcomes.

Since the stationary bandit apparently also has some qualities that makes it equivalent to a social planner, it is worthwhile to compare the outcomes of a stationary bandit with a democratic government that also takes on a role as social planner, a so-called rational democratic government (RDG). The distinction between the RDG and the stationary bandit is of course that the RDG takes aggregate output as a yardstick for its social planning, whereas the stationary bandit would maximise its own income. In our framework, several levels of social planning are possible and we distinguish two of them. First, we see social planning as the situation in which government acknowledges that in the presence of rent-seeking individual labour input decisions are suboptimal, determining the optimal division between labour and rent-seeking itself. Second, we analyse the consequences when government recognises that both $L$ and $S$ are functions of $G$ and that it optimises public good provision accordingly. In all cases, we apply our analysis to the case of political stability only. In the appendix we derive the results for property rights, showing that the qualitative effects are the same.

**Optimising labour supply choices** The societal optimal value of $L$ is obtained by setting the marginal product of labour equal to that of rent-seeking. For the RDG, the former is $\alpha(Y/L)$ while the latter is:\textsuperscript{19}

$$\frac{dY}{dS} = \frac{Y}{1 + S} \left( \frac{Stab - X}{X + S \cdot Stab} \right) - \frac{\alpha Y}{1 - S}$$ (11)

This differs from the marginal product of rent-seeking for the individual, which was simply $G$. Moreover, $dY/dS$ is positive only if $Stab > X$, that is:

\textsuperscript{19}Output also depends on stealing through the effect of stealing on $G$. This has no effect on the optimal labour input choice as we require balanced government budgets. $G$ is therefore a fixed proportion of $Y$ that is independent of $S$. 

27
if stability is below the threshold level. In that case, equation (11) illustrates that rent-seeking has two opposing effects. For the stationary bandit, the relevant comparison is between the marginal effect of stealing and working on the share of tax revenues it keeps for itself, \((1 - \alpha)\tau Y\). Hence, the stationary bandit also optimises \(L\) by setting \(dY/dL = dY/dS\), choosing an optimal labour input that is the same as the RDG would choose (for \(\overline{Stab} - X > 0\)):

\[
L = 2\alpha(S + 1) \left(\frac{X + S \cdot \overline{Stab}}{\overline{Stab} - X}\right)
\]  

(12)

Optimal \(L\) is positively correlated with the presence of stealing in society if, and only if all other factors that determine political stability \((X)\) fall short of the threshold level of stability, \(\overline{Stab}\). Then, stealing implies a positive externality on political stability, which the social planner internalises — irrespective of its type. If this positive externality is absent, the marginal benefit of stealing is clearly negative, by (11), implying an optimal labour supply choice of one.

The ambiguity of the effect of corruption on growth is also reflected in the growth function. Using the equilibrium value of \(L\) from equation (12), the growth function becomes

\[
\gamma = \frac{1}{\sigma} \left\{ (1 - \tau)(1 - \alpha) \left[ 2\alpha(S + 1) \frac{X + S \cdot \overline{Stab}}{\overline{Stab} - X} \right]^{\frac{\alpha}{1-\alpha}} \left(\frac{G}{Y}\right)^{\frac{\alpha}{1-\alpha}} \right. \\
\left. \times \left[ (1 - S) \frac{\alpha}{1-\alpha} \left(\frac{X + S \cdot \overline{Stab}}{1 + S}\right) \right]^{\frac{1}{1-\alpha}} - \rho \right\}
\]  

(13)

As before, rent-seeking influences the rate of growth by altering the degree of political stability and the input of public goods for private production, the **- and *-term respectively, but now also through its impact on the amount of labour employed, which is indicated by the ***-term. This last effect arises because the social planner acknowledges that rent-seeking also has consequences for total output. Moreover, it only contributes positively
to economic growth rate if stability falls short of the threshold level. This holds for both the RDG and the stationary bandit. The growth rate will nevertheless be lower with the stationary bandit in charge\( - \gamma_{SB} < \gamma_{RDG} \). The stationary bandit provides less public goods \( G/Y = \alpha\tau \) as opposed to \( G/Y = \tau \) by the RDG. It emphasises that it was the planning part of the stationary bandit’s behaviour that made the difference before, and not its selfishness.

### Optimising public good provision

Suppose now that social planning involves choosing the optimal level of public good provision, thereby taking into account that individual labour supply decisions depend on \( G \). This boils down to assuming that government equates the marginal cost and benefits of \( G \), based on an aggregate production function that incorporates the individual optimal labour supply choices we derived in Section 3. Recalling from there that \( L = 1 - S = (1 - \tau)\alpha Y/G \) and ignoring momentarily the impact of political stability on output, the relevant production function becomes \( Y = K^{1-\alpha}[(1 - \tau)\alpha^{2a}Y^{2a}G^{-\alpha}] \). Rearranging gives

\[
Y = [(1 - \tau)\alpha]^{\frac{2a}{1 - 2a}} K^{\frac{1 - a}{1 - 2a}} G^{\frac{\alpha}{2a - 1}} \tag{14}
\]

For the stationary bandit the marginal costs of public good provision are one and the marginal benefits amount to \( \tau \frac{dY}{dG} \). This implies

\[
G/Y = \frac{\alpha}{2\alpha - 1}\tau
\]

which is positive only if \( \alpha > 1/2 \). Hence, labour must have sufficient weight in final good production to convince the stationary bandit to produce a positive amount of \( G \). Provided that is the case, the stationary bandit will choose a higher level of \( G/Y \) than before, when it did not take into account the impact of stealing. Acknowledging the impact of stealing ensures that the stationary bandit increases public good provision, to keep the stream of tax revenues in tact. In the absence of a political stability externality, this has no effect on the growth rates though. Higher public good provision entails level effects only.
For the RDG, the marginal costs of public good provision are one while the marginal benefits amount to \( \frac{\partial Y}{\partial G} \). This yields

\[
G/Y = \frac{\alpha}{2\alpha - 1}
\]

since balance budget requires \( G = \tau Y \) as well. Again, public good provision is positive if \( \alpha > 1/2 \), in which case \( G/Y \) is also higher than before. Also for a RDG it thus holds that if it acknowledges that society is plagued by stealing, it will increase its outlays on public good provision.

Investigating optimal public good provision in the presence of other institutions such as political stability of course alters these results. Since the optimal labour supply choice of individuals remain the same, the production function is essentially the stability augmented version of (14):

\[
Y = [1 - \tau]\alpha^{\frac{\alpha}{2\alpha - 2}} K^{\frac{1-\alpha}{1-2\alpha}} G^{\frac{\alpha}{2\alpha - 1}} Stab(G)
\]

where \( Stab(G) = (X + S(G) \cdot Stab) / (1 + S(G)) \). The implications of including \( Stab(G) \) in the production function may be verified by deriving \( dY/dG \):

\[
\frac{dY}{dG} = \frac{\alpha Y}{2\alpha - 1 G} + \alpha(1 - \tau) \left( \frac{Y}{G} \right)^2 \left[ \frac{Stab - X}{(X + S \cdot Stab)(1 + S)} \right].
\]

The first term on the right-hand-side is the expression for \( dY/dG \) in the institutional vacuum. Including political stability therefore implies that if stealing affects political stability positively, that is: only if \( Stab - X > 0 \), \( dY/dG \) goes up. Since the marginal costs of generating \( G \) are constant for both the RDG and the stationary bandit, this implies that if stealing exerts a positive externality through political stability, it is optimal to increase spending on public goods.
5 Conclusion

A major drawback of much of the empirical and theoretical literature regarding corruption and economic growth is that it disregards that the relationship between corruption and growth depends on the institutional environment. Most authors depict the institutional framework as a black box, implying an impossibility to analyse corruption in interplay with other institutions. However, it is a close web of formal institutions, informal institutions and distortions that determines the way an economy functions. Removing one distortion may alter this web, triggering other distortions and leaving the economy worse off than before. The effect of corruption on economic growth can therefore not be studied without taking into account the rest of the institutional framework.

The model we develop in this paper tries to take (some of) these vital interdependencies into account. We construct a two-layer model in which the first layer treats the relation corruption-growth in an institutional vacuum, while the second layer adds institutions to assess how the inclusion of institutions alters the relationships found in the first layer. The institutions that we incorporate are political stability, property rights and the political system.

The model’s first layer shows that, in an institutional vacuum, corruption depresses growth by lowering both the input of productive public goods and labour. The relationship between corruption and growth becomes ambiguous, however, when institutions are taken into account in the second layer. When the amount of political stability is above (below) some threshold value of political stability, corruption affects political stability negatively (positively), thereby depressing (fostering) economic growth. This argumentation applies in much the same way to the issue of property rights protection. This implies that the initial institutional environment is important for determining the corruption-growth relationship. In our set-up this path dependence takes an extreme form, since in steady-state the trade-off between work and corruption is constant. If the initial situation is such that corruption facilitates or hampers growth, it will always be like that unless exogenous changes
occur in (some of) the environmental variables.

Also the political system affects the corruption-growth relationship. Applying our two-layer model to a comparison between corruption in a democratic society and corruption in a totalitarian system, we find that in a democratic society the amount of corruption will be higher than in the autocratic system. Whether or not this promotes economic growth again depends on the initial settings of the institutional environment. Comparing the totalitarian autocrat with a rational democratic government shows however that it is the planning part of the totalitarian autocrat’s behaviour that makes the difference, not its selfishness. Ceteris paribus, a rational democratic government that acts as a social planner generates a higher growth rate than the totalitarian autocrat.

The extension of our two-layer model with the political system also proves our premise that corruption, being an institutional factor, should be studied in close interaction with other aspects of the institutional environment. The interaction between the political system and the amount of political stability, respectively property rights protection, is important for the relationship between corruption and economic growth. Our model takes a first step in opening the institutional black box and in applying it to a formal growth framework.

Our modelling framework also provides an explanation for the ambiguous findings in theoretical literature, just as it provides a theoretical underpinning for recent findings in the empirical literature that the institutional setting of countries is of importance for assessing the effects of corruption. While these findings are generally ascribed to Huntington’s greasing-the-wheels-hypothesis, our model provides a deeper theoretical foundation to the argumentation that corruption can raise efficiency by circumventing institutional hurdles. The modelling framework provides a theoretical basis that makes it possible to analyse and predict the effects of corruption in a specific institutional setting.

We would like to emphasize that our argumentation and modelling should be considered as a first attempt to formalize the view that institutional factors must be studied in close interaction with the entire institutional envi-
environment. Therefore, our analysis is all but complete and many challenges lie ahead. For instance, it remains uncertain which factors of the institutional environment should be incorporated in the analysis, apart from, or instead of, the ones we considered. Furthermore, we have only partially succeeded in analyzing the interplay between several institutional factors. Our model also entails an extreme form of institutional path dependency, since only exogenous changes are capable of changing existing corruption-growth paths. We believe, however, that our modelling framework could serve as a useful guideline for future analyses of corruption, institutions and economic growth.

References


A Appendix

**Property rights and optimising labour supply choices**  For both the rational democratic government and the stationary bandit, the optimal value of \( L \) is obtained by setting the marginal product of labour equal to that of rent-seeking. The former is \( \alpha(Y/L) \) while the latter is:

\[
\frac{dY}{dS} = \frac{\beta (PR - PR)}{Prop} \frac{Y}{1 - S} - \frac{\alpha Y}{1 - S}
\]  

(15)

Consequently, for both types of regime the socially optimal level of rent-seeking becomes:

\[
S = 1 - L = \frac{\beta (PR - PR) - 2\alpha PR}{\beta + 2\alpha (PR - PR)}
\]

(16)

which is positive if \( \beta (PR - PR) > 2\alpha PR \). A social planner therefore only chooses a positive level of stealing if it helps for the functioning of the property rights system (\( PR > PR \), a necessary condition) and moreover, if the relative weight that such a system has over direct government outlays in facilitating production is relatively high (\( \beta >> \alpha \)). As expected, for \( PR = 0 \), \( S > 0 \) as well.

This carries over to the effect of corruption on growth. Rewriting (16) to obtain \( L = \frac{2\alpha Prop}{\beta (PR - PR)} \), the growth function becomes:
\[
\gamma = \frac{1}{\sigma} \left\{ (1 - \tau)(1 - \alpha) \left( \frac{2\alpha [PR + S(PR - PR)]}{\beta(PR - PR)} \right)^{\frac{\alpha}{1 - \alpha}} \left( \frac{G}{Y} \right)^{\frac{\alpha}{1 - \alpha}} \times [(1 - S)]^{\frac{\alpha}{1 - \alpha}} \left[ PR + S(PR - PR) \right]^{\frac{\beta}{1 - \alpha}} - \rho \right\}.
\]

which holds for both the RDG and the stationary bandit. In analogy to the political stability case, \( \gamma_{SB} < \gamma_{RDG} \) since the stationary bandit provides less public goods.

Property rights and optimising public good provision  If social planning involves choosing the optimal level of public good provision, while taking into account that individual labour supply decisions depend on \( G \), the individual optimal labour supply choices remain as derived in Section 3: \( L = 1 - S = (1 - \tau)\alpha Y/G \). Ignoring the impact of property rights on output therefore yields exactly the same results as for political stability. Including property rights in the production function yields a property rights augmented version of (14):

\[
Y = [1 - \tau]^{\frac{2\alpha}{2 - \alpha}} K^{\frac{1 - \alpha}{2 - \alpha}} G^{\frac{\alpha}{2 - \alpha}} Prop(G)
\]

where \( Prop(G) = PR + S(PR - PR) \). The implications of including \( Prop(G) \) in the production function may be verified by deriving \( dY/dG \):

\[
\frac{dY}{dG} = \frac{\alpha}{2\alpha - 1} \frac{Y}{G} + \alpha(1 - \tau) \left( \frac{Y}{G} \right)^2 \left[ \frac{PR - PR}{PR + S(PR - PR)} \right].
\]

The first term on the right-hand-side is the expression for \( dY/dG \) in the institutional vacuum. Including property rights in the analysis therefore implies that if stealing affects the functioning of the property rights system positively, that is: if \( PR - PR > 0 \), \( dY/dG \) goes up. In analogy to the political stability case, therefore, this implies that if stealing exerts a positive externality through the system of property rights, it is optimal to increase spending on public goods.
<table>
<thead>
<tr>
<th>Level</th>
<th>Frequency (years)</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embeddedness: informal institutions, customs, traditions, norms, religion</td>
<td>100 to 1000</td>
<td>Often noncalculative, spontaneous</td>
</tr>
<tr>
<td>Institutional environment: formal rules of the game - esp. property (polity, judiciary, bureaucracy)</td>
<td>10 to 100</td>
<td>Get the institutional environment right.</td>
</tr>
<tr>
<td>Governance: play of the game - esp. contract (aligning governance structures with transactions)</td>
<td>1 to 10</td>
<td>Get the governance structures right.</td>
</tr>
<tr>
<td>Resource allocation and employment (prices and quantities; incentive alignment)</td>
<td>continuous</td>
<td>Get the marginal conditions right.</td>
</tr>
</tbody>
</table>

Figure 1: Williamson’s framework of social analysis.