Corruption, Institutions and Economic Development

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Abstract

Many scholarly articles on corruption give the impression that the world is populated by two types of people: the "sanders" and the "greasers". The "sanders" believe that corruption is an obstacle to development, while the "greasers" believe that corruption can (in some cases) foster development. This paper takes a critical look at these positions. It concludes that the evidence supporting the "greasing the wheels hypothesis" is very weak and shows that there is no correlation between a new measure of managers' actual experience with corruption and GDP growth. Instead, the paper uncovers a strong negative correlation between growth in genuine wealth per capita – a direct measure of sustainable development – and corruption. While corruption may have little average effect on the growth rate of GDP per capita, it is a likely source of unsustainable development.

Key words: Corruption, Growth, Sustainable Development.

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1 Introduction

Corruption, understood as "sale of government property for private gain", is a persistent feature of human societies. Yet, societies in which corruption thrives at one point in time are not necessarily destined to that state for ever. The road from corrupt to honest politics is, however, intertwined in complex ways with economic and political transitions (Paldam, 2002). In fact, most economists[1] view corruption as a major obstacle to development. It is seen as one of the causes of low income and is believed to play a critical role in generating poverty traps (e.g., Blackburn et al., 2006, 2008; Andvig and Moene, 1990). In short, corruption, according to this view, "sands" the wheels of development and it makes economic and political transitions difficult. But there exist dissenting voices. Voices who argue that corruption "greases" the wheels of development and through that fosters growth. The most prominent advocate of this view is probably Leff (1964) but he is by no means alone. The general idea is that corruption facilitates beneficial trades that would otherwise not have taken place. In doing so, it promotes efficiency by allowing individuals in the private sector to correct or circumvent pre-existing government failures of various sorts. Perhaps the most quoted example of this is "speed money" paid by business people to government officials to speed up bureaucratic procedures.

This paper takes a critical look at the link between corruption and economic development. The analysis centers on whether corruption is sanding or greasing the wheels of development. In section 2, I discuss these two views in some detail and develop a simple theoretical framework that highlights some of the fallacies associated with the view that corruption is efficient. In section 3, I evaluate micro level evidence from field experiments and surveys of firms and their managers. Virtually all such evidence supports the "sanding the wheels hypothesis" and the case for the "greasing the wheels hypothesis" rests solely on anecdotal evidence. In section 4, I evaluate some recent tests of the "greasing the wheels hypothesis" conducted on cross-national data. These tests explore cross-national variation in *perceived* levels of corruption in broad samples of developed and developing countries to estimate the effect of corruption on growth in real GDP per capita. I argue that these tests fail to deliver robust evidence in favour of the "greasing the wheels hypothesis". Most importantly, I show that, with one exception, all the claims made about the corruption-growth nexus based on statistical analysis of the perception-based indices of corruption disappear when a cross-national index of managers' actual experience with corruption is used to approximate cor-

[1] See, e.g., Murphy et al. (1993) and Mauro (1995).

ruption patterns across countries. This finding lends weight to the critique that corruption perceptions are likely to be colored by the economic performance of the country being evaluated – thus producing a spurious negative correlation between the two – and casts serious doubt on the widely held belief that corruption has a sizeable negative effect on economic growth in general.

This does, however, not mean that corruption is harmless – the micro evidence clearly demonstrates that it is not. Even at the macro level there is ample evidence that corruption affects adversely many of the proxy causes of economic growth – e.g., investment in manufactured and human capital. Moreover, high levels of corruption tend to go hand in hand with a lack of political accountability and with disrespect for property rights, factors which themselves tend to be obstacles to economic growth. More fundamentally, however, there is a sense in which the focus on growth in GDP per capita is misguided. Ultimately, development is about sustainable improvements in human welfare. It is well-known that GDP per capita is not a measure of welfare. In Section 5, I argue that new research into the links among welfare, sustainable development and corruption is urgently needed. Based on recent work by Partha Dasgupta and others on genuine wealth (see, Dasgupta, 2001), I take the first modest step in that direction and present some new results that show a strong negative correlation between corruption and growth in genuine wealth per capita. This correlation is surprisingly robust. In particular, it applies equally to perceived corruption and to managers' actual experience with corruption and it is robust to the use of instrumental variables. Overall, while corruption may have little average effect on the growth rate of real GDP per capita, it is a likely source of unsustainable development.

2 Two Different Views on Corruption

The view that corruption can be efficient – or that it greases the wheels of commerce – has a long history.[2] It first gained prominence back in the 1960s with a provocative article called "Economic Development Through Bureaucratic Corruption" by Nathan Leff (see, Leff, 1964). Since then it has been given a theoretical foundation by works of, for example, Lui (1985) and Beck and Maher (1986) and most recently, various empirical claims have been made in its favour. For example, Egger and Winner (2005, p. 949) conclude

[2]The discussion in this section is based on Aidt (2003). For alternative surveys of the literature, see Bardhan (1997), Jain (2001) and Svensson (2005).

> "using a data set of 73 developed and less developed countries, we find that corruption is a stimulus for FDI, which confirms the position of Leff (1964) that corruption can be beneficial in circumventing regulatory and administrative restrictions."

The general idea is that corruption facilitates beneficial trades that would otherwise not have taken place. In doing so, it promotes efficiency by allowing individuals in the private sector to correct pre-existing government failures of various sorts. Leff uses the following example to set the stage. Back in the early 1960s, the relevant government agencies in Chile and Brazil were charged with the task of enforcing price controls for food products. In Chile, an honest agency enforced the freeze and food production stagnated. In Brazil, a corrupt agency effectively sabotaged the freeze and production increased to the joy of consumers. Another piece of anecdotal evidence of how corruption can grease the wheels and be beneficial is Daniel Levy's fascinating account of how an illegal market, supported by a chain of bribe payments[3], emerged during the Soviet era in the Republic of Georgia (Levy, 2007). Its aim was to overcome the problem of shortage and other inefficiencies associated with the centrally-planned economy. Although significant real resources had to be devoted to run this market, it can hardly be disputed that corruption allowed the Georgian economy to produce far more output and to allocate what was produced far more efficiently than would otherwise have been feasible.

An alternative view of corruption is that it *creates* rather than *corrects* inefficiencies. This view has a long tradition within public choice (e.g., Buchanan and Tullock, 1962; Rose-Ackerman, 1999). It has more recently been given new life by Shleifer and Vishny (1993, 1998, chapter 1). They have, in fact, coined the term "the grabbing hand" to describe how corruption arises because government officials seek rents whenever they can, subject only to the constraints given by economic, legal and political institutions. One example of this is the Philippines under the Marcos regime where "cheap credit, tax incentives, state licences and monopoly privileges hinge on 'personal considerations' (and) state resources are .... appropriated for private ends" (Hutchcroft, 1991). Another example comes from Russia after the fall of the Soviet Union where a system of ill-defined property rights, corruption, and Mafia-style crime developed (Varese, 1997).

It is instructive to formalize the conceptual differences between these two views in some detail. As in Aidt and Dutta (2008), consider, therefore, an economy in which individuals can choose between two occupations. An

[3]See Hillman and Katz (1987) for a formal model of such chains.

individual can either be a worker and earn wage income $w(.)$ or become an entrepreneur, hire workers and earn profit income $a_i\pi(.)$, where a_i is the talent or productivity of individual i. To keep it simple, I suppose that individuals are either talented with $a_i = a > 1$ or not with $a_i = 1$. The wage is increasing in the number of firms, which I denote by n. On the other hand, profits are decreasing in n because there is more competition. An individual decides to become an entrepreneur if $a_i\pi(n) - w(n) > 0$. In a free market, talented individuals set up firms until the return from the two occupations is the same, i.e., $a\pi(\lambda_H) - w(\lambda_H) = 0$ where λ_H is the number of firms at equilibrium.[4] We notice that the First Welfare Theorem applies and that this outcome is allocatively efficient. There is, therefore, no reason for government intervention.

Yet, suppose that the government introduces a licensing system that requires an individual to obtain permission to set up a firm. The system has no effect on the economy unless the government issues fewer licences than λ_H. In that case, the economy becomes allocatively inefficient and successful entrepreneurs earn more than the going wage. Let me consider two different scenarios.

In the first scenario, the number of licences $\overline{\lambda}$ is given and less than λ_H. The task of the government is to allocate these licences among the population. It would be easy to do so if talent could be observed, but often it cannot. One possibility then is to allocate the permits randomly, but, by doing so, some of the firms would end up being run by untalented entrepreneurs. Another possibility is to let a corrupt government official "sell" the licences to the highest bidders. Clearly, by setting the price at $a\pi\left(\overline{\lambda}\right) - w\left(\overline{\lambda}\right) > 0$ only talented individuals will pay the bribe. As a consequence, the fixed number of licences will be put to the best possible use: corruption is efficiency-enhancing in the sense that more output will be produced in the economy with corruption than in the one without. However, there are two critical points to notice. Firstly, the corrupt economy is still allocatively inefficient, so corruption can only improve efficiency in a second-best sense. That is, given a set of unavoidable distortions already created by the government, corruption can promote efficiency by helping agents to circumvent these distortions; yet the first-best would be to remove the distortions themselves. Secondly, one would have to ask why the "wheels" need greasing in the first place, and that question leads me to the second scenario.

Suppose that the aim of the government itself is to extract rents from the economy. Such a government would "sell" licences (λ) to the private sector

[4]We assume that the number of talented individuals in the population is larger than this and that $\pi(\lambda_H) - w(\lambda_H) < 0$.

at the price $p(\lambda)$ and keep the revenues $\lambda p(\lambda)$. To extract rents, rents must, however, be created through artificial scarcity. The way to do so is to create an *inefficient* licensing system with a limited number of licences on offer. As before, these will be snapped up by the talented entrepreneurs, but it is clear that the bribe maximizing number of licences is below the efficient allocation (λ_H): if the government were to issue λ_H licences no one would be willing to pay for them.

The critical point is that corruption and inefficient regulation are two sides of the same coin. On the one hand, inefficient regulation is needed to generate scarcity rents. On the other hand, scarcity rents create corruption potential because individuals are willing to pay (for licences and other government policies) only if there is scarcity. In other words, the very distortions that corruption is supposed to help individuals avoid or overcome may well be put in place and maintained by corrupt politicians precisely *because* of their corruption potential. Or put slightly differently, even if corruption helps overcome cumbersome regulation in the short term, it creates incentives to create more such regulation in the long term. This is the *fallacy of efficient corruption*: it is, at best, misleading to argue that corruption can be efficient when, in fact, the very purpose of many of the most unvieldy and inefficient government interventions are caused by corrupt government officials in the first place. At worse, such an argument is dangerous because it encourages tolerance to corruption.

Moreover, even if we were to accept that corruption can sometime grease the wheels, there is another fallacy luring in the background. In the example above, the *creation* of the rent (through the licensing system) causes efficiency losses, but the process of *extraction* is merely a transfer of income from the private sector to a government official – a transfer that was voluntary and therefore beneficial to all parties involved. As highlighted by a large literature on rent seeking[5], the jobs of those government officials are contestable. As a consequence, *real* resources, sometimes of a value equal to the total bribe revenues, are wasted in contesting these jobs and, in the process, entrepreneurial talent is misallocated (e.g., Acemoglu and Verdier, 1998). This makes it even more doubtful if corruption can ever be said to be efficient.

Of course, which of the two views is a better description of how the world actually works cannot be settled purely on theoretical grounds; it is an empirical matter. In the follows sections, I shall present and evaluate some of the available evidence, starting with evidence gathered at the microeconomic level and then moving on to macroeconomic evidence based on cross-country

[5]See, e.g., Nitzan (1994), Hillman (2009, chapter 2) or Congleton et al. (2008).

comparisons.

3 Micro evidence

Most corrupt activities are outright illegal and those which are in the grey area of the law are, at best, risky. Individuals involved with these activities, therefore, go a long way to conceal what they do[6] and corruption is by its very nature (mostly) unobserved. Researchers must, as a consequence of this, find ingenious ways of measuring it and inferring its consequences from what can be observed.

Let me start with evidence related to the "sands in the wheels hypothesis". In the mid-1980s, the sociologist Hernando de Soto organized a very interesting social experiment in Peru (de Soto, 1990). He was concerned that (too) much economic activity and wealth accumulation took place outside the formal economy and wanted to understand why. To this end, he asked teams of researchers to go out and undertake a seemingly simple task: obtain all the permits and approvals needed to start a small two-sewing machine garment factory in a Lima shanty town *legally* and record the time and effort required in this endeavor. The result of the experiment is striking. It took about 300 days of 6 hours per day or, put differently, what would correspond to 32 times the monthly minimum wage to complete the task. It is easy to see why most entrepreneurs prefer to stay in the informal sector and why those who try to become legal might be tempted to cut the red tape by paying "speed money". But one strongly suspects that many of these regulations, whatever their original rationale might have been, are kept in place with the sole purpose of allowing bribes to be collected. Djankov et al. (2002) confirm this suspicion. They asked similar questions about the number of procedures that a small start-up firm must go through to become legal in a sample of 85 countries, and they report a strikingly strong correlation between this and (perceived) corruption levels. Against this background, it is hard to maintain that corruption is anything but inefficient: it clearly distorts policies and creates contestable rents.[7]

Another important piece of evidence suggesting that corruption is an obstacle to development comes from the expenditure tracking surveys recently

[6] A counter-example in which corrupt activities, including the payment of bribes, were documented in great detail comes from Peru in the 1990s (McMillan and Zoido, 2004).

[7] Corruption can also allow agents circumvent *efficient* regulation. Bertrand et al. (2007), for example, study corruption in the driving licensing process in Delhi. They find that not only did the average applicant pay more than twice the official price, but many unqualified drivers ended up getting a licence and they did so because they were willing and able to pay for the privilege.

undertaken by the World Bank. The purpose of these studies was to quantify how large a fraction of public funds earmarked for specific spending programs actually reached the intended destination. The setting of one of the first tracking studies was Uganda in the beginning of the 1990s (Reinikka and Svensson, 2004). At that time, Uganda had just emerged from a lengthy period of dictatorship and civil war with an extremely run-down primary school system. The schools were partly financed through capitation grants that allocated a fixed amount per enrolled pupil. This rule made it relatively easy to work out how much each school should receive. A comparison, then, between what was disbursed from the treasury and what was actually received by each school measured the misuse of public funds. This calculation showed that as little as 12 per cent of the intended funds were ever received by the schools. Corruption in District Administrations, which were responsible for the allocation to the schools after the money had left the treasury, clearly harmed primary education. Subsequent studies from other countries in the region have revealed slightly smaller, but still very substantial, leakages of funds. Given the importance of primary education in fostering development, this type of corruption is clearly inefficient. Olken (2006) goes one step further in his study of an Indonesian anti-poverty program that was aimed at distributing rice at a subsidized price to poor households. Not only does he document that at least 18 per cent of the rice disappeared (it was presumable stolen by corrupt village heads), he also shows that, for reasonable estimates of the marginal cost of public funds, corruption turned a program that would otherwise have been welfare improving into one which, in fact, reduced social welfare.[8]

Let me now turn to the "greasing the wheels hypothesis". Besides the anecdotal evidence discussed in the previous section, quantitative evidence on this is sparse. Kaufmann and Wei (1999) ask if corruption really is "speed money". To this answers this question, they use firm-level data from around the world to link bribe payments to the time wasted by managers of firms in dealing with bureaucrats. If bribes really were "speed money", one would expect that those managers who answered yes to the question "is it common for firms in your line of business to have to pay some irregular, addition payments to get things done" would waste less time on such dealing than other managers. Kaufmann and Wei (1999) report that the opposite is, in fact, true! Along similar lines, Fisman and Svensson (2007) show, using a survey of Ugandan firms, that a one percentage point increase in the bribery rate is associated with a reduction in firm growth of three percentage points.

[8]See also Olken (2007) for an interesting field study of corruption in road projects in Indonesia.

In conclusion, all attempts, I am aware of, to quantify the effects of corruption at the microeconomic level suggest that corruption is much more likely to sand than to grease the wheels. One will have to relay on anecdotal evidence, such as Levy (2007), to find instances of efficiency-enhancing corruption, or, perhaps, invoke cross-national macroeconomic evidence.

4 Macro evidence

What is the relationship at the macro level between corruption and economic development? And what can this relationship reveal about whether corruption is efficiency-enhancing or not? Many scholars have tried to answer these questions by looking for a relationship between data on growth in real GDP per capita and cross-national measures of perceived corruption derived from surveys of risk analysts, of business people and of citizens in different countries. Some of this research, e.g., Mauro (1995) and Mo (2001), report evidence, albeit not particularly robust, that, on average, corruption reduces growth. Mauro (1995, p. 683), for example, concludes that "if Bangladesh were to improve the integrity and efficiency of its bureaucracy to the level of that of Uruguay, ..., its yearly GDP growth rate would rise by over half a percentage point."

This line of research, however, cannot answer the second question: is the macroeconomic evidence consistent with corruption being efficiency-enhancing or not? This is because the "greasing the wheels hypothesis" does not presume that corruption is beneficial everywhere. It only presumes that corruption can help in situations where other aspects of governance are deficient and/or economic policy is inefficient. Accordingly, if the hypothesis is correct, then the relationship between corruption and economic growth must be conditional on governance structures and/or economic policy. Moreover, the relationship should be non-monotonic with positive growth effects at low levels of corruption only. This is because it is isolated instances of corruption, not systemic corruption, that are supposed to help entrepreneurs. These insights have been explored in a number of recent contributions to the debate where three different ways of testing the "greasing the wheels hypothesis" with cross-national data have been devised:

1. The marginal effect of corruption is conditional on the institutional environment. In particular, the marginal effect of corruption on growth is positive in countries with deficient political institutions or policies and negative elsewhere (Méon and Sekkat, 2005; Méon and Weill; 2008).

2. There exists a growth maximizing level of corruption. In particular,

at low levels of corruption the beneficial effects of corruption dominate the detrimental effects and vice versa (Méndez and Sepúlveda, 2006).

3. The effect of corruption is regime specific and countries sort themselves into different growth-corruption regimes, conditional on the quality of their political institutions. In particular, in countries with good governance, the effect of corruption on growth is negative, while in countries with poor governance, the effect is positive (or less negative) (Méndez and Sepúlveda, 2006; Aidt et al. 2008).

These tests are, however, not simple to implement. For starters, a reliable empirical measure of corruption is needed. Several business risk analysts and polling organizations routinely construct indexes of "perceived" corruption, based on survey responses of business people, of country experts and of local residents. These indices, typically, measure corruption by asking those surveyed to score a country with respect to the likelihood that government officials would demand bribes. The three most popular of these indices are the corruption perception index constructed by Transparency International (the TI index); the corruption index from the International Country Risk Guide (the ICRG index); and the control of corruption index (the WB index) from the "Governance Matters" database at the World Bank (Kaufmann et al. 2005). A major problem with all these indices is that they rely on *perceptions*. It is quite possible that these perceptions are informed, not only by conventional wisdom about what institutions and cultures may be conducive to corruption, but also by the economic performance of the country being evaluated. If so, they cannot be used to infer neither the causes of corruption nor the effects on economic outcomes. Fortunately, the World Business Environment Survey conducted in 1999-2000 provides an alternative cross-national index (the WBES index). It is based on survey responses of managers living and working in particular countries about their *own* experience with corrupt officials and so, it portraits to measure actual, as opposed to perceived, corruption.[9] While this index avoids some of the potential biases associated with the perception-based indexes, it is clear that managers may have incentives to understate their direct experience with corruption. Treisman (2007) has thoroughly investigated the relationship between and the determinants of the two types of indices. His findings are enlightening:

[9] At the national level several other objective measures of corruption are available. This include data on the number of officials convicted for corruption (see e.g., Alt and Lassen (2003) for a study of US states and Del Monte and Papagni (2001) for a study of Italian regions) and data on the amount of leakage from infrastructure projects in Italian regions (Golden and Picci, 2005).

he shows that the correlation between the two types of measures is very weak and that many of the standard predictors of perceived corruption, such as democracy and press freedom (Treisman, 2000; Paldam, 2002) are mostly unrelated to the WBES index.

A second major challenge is to establish causality. This challenge is linked to three problems. Firstly, it is impossible to control for all factors that might affect growth in a single growth regression. Some of these omitted factors are likely to be correlated with corruption and the effect of such factors are then wrongly attributed to corruption. Secondly, the causality may run from growth to corruption rather than the other way around. Aidt and Dutta (2008), for example, show how economic growth can reduce corruption because corrupt leaders want to collect their bribes from a growing pie but to do this they must hold on to power and pander to their citizens in the short term (by reducing corruption). Paldam (2002) argues that a growing economy has got more resources to invest in corruption control. Either way, growth may cause a reduction in corruption. Thirdly, as alluded to above, all the corruption indices are measured with error which may also bias inference. In principle, the solution to all these problems is to use instrumental variables: variables which are correlated with corruption (relevant), but uncorrelated with all unobserved (or excluded) determinants of economic growth (valid).[10] It is a nebulous task to find such instruments and the ones commonly used in the literature, e.g. ethno-linguistic fractionalization (Mauro, 1995) or the extent of democracy (Gupta et al. 2002), are problematic. While the presence of many different ethic groups may foster corruption because officials may favor their own group or because it leads to less coordinated bribe taking, it is less clear that the degree of fractionalization is unrelated to economic growth other than through its effect on corruption. For example, Easterly and Levine (1997) show that ethno-linguistic fractionalization is related to economic growth in Africa. Likewise, countries with a long democratic tradition have had time to establish checks and balances and the rule of law which arguably will enable more effective control of corruption. Although

[10] In principle, it is also possible to deal with some of these issues by exploring movements in corruption over time within a country (Méndez and Sepúlveda, 2006). However, the scope for doing this is limited by the fact that country experts often build their perceptions about corruption up gradually over time. This introduces inertia in the corruption indices and it is doubtful how informative the time series variation really is. It is also a problem that there are inconsistencies over time in the way they are constructed and that the time span for which the indices are available is relatively short (the ICRG index is available from the early 1980s, the TI and WB index are available from the mid-1990s, and the WBES index is available only for one year, 1999-2000). The later observation also implies researchers trying to explain the growth experience from, say, 1960 to 2000 must assume that corruption at the time it is measured, say in the 1990s, affects this experience.

it has been hard to establish any robust causal links between democracy and economic development (Przeworski and Limongi, 1993; Acemoglu et al. 2008), recent research by Papaioannou and Siourounis (2008) has shown that democratization may have positive growth effects and Gundlach and Paldam (2008) report evidence suggesting a long-run casual link running from income to democracy.

With these caveats in mind, Tables 1 and 2 show the results of the three types of tests. I use information on annually growth rates of real GDP per capita over the period 1970 to 2000 in a sample of 60 to 80 developing and developed countries. The size of the sample is dictated by available information. It does not include any of the former socialist countries in Eastern Europe or any of the states of the former Soviet Union.[11] We condition on the investment share, population growth, enrolment in primary education, initial real GDP per capita and regional dummies in all specifications. We begin by studying the potential relationship between *perceived* corruption, as represented by the TI index and the growth rate of real GDP per capita.[12] The TI index ranks countries on a scale from 0 (most corrupt) to 10 (least corrupt). To set the stage, regression 1 is a simple linear specification similar to the one estimated by Mauro (1995). We observe a significant negative correlation between corruption and growth of roughly the same magnitude as the one reported by him. However, regression 2, which uses the ethnolinguistic fractionalization index and an index of the extent of democracy[13] as instruments for corruption[14], casts doubt on the causal nature of this estimate: the coefficient on corruption becomes insignificant.

[Table 1: The relationship between the TI index and the growth rate of GDP per capita, 1970-2000.]

Regression 3 implements the first of the three tests of the "greasing the wheels hypothesis". As suggested by Méon and Sekkat (2005), the effect of corruption should, if the hypothesis is correct, interact systematically with the quality of political institutions. This can be tested by including an interaction between the TI index of corruption and variables that capture institutional quality. To this purpose, we use the variable "rule of law" which

[11] For a detailed discussion of sources, see Aidt et al. (2008).

[12] Similar results can be obtained with the other perception-based indexes (not reported).

[13] The variable is the Voice and Accountability Index from the World Bank's "Governance Matters" database (Kaufmann et al., 2005). This index measures the extent to which citizens of a country are able to participate in the selection of their government and able to hold it accountable for its choices. The index has been re-scaled to lay in the interval 0 (weak institutions) to 1 (strong institutions).

[14] The instruments pass the tests for relevance and validity.

measures "the extent to which agents have confidence in and abide by the rules of society".[15] We observe that corruption has a positive impact on growth, but that this effect is reduced (but never entirely reversed) in countries with better institutions. This is consistent with the "greasing the wheels hypothesis". But it is unclear how robust the finding is: it does not hold up to instrumentation; for many other governance indicators the effects are insignificant; and Méon and Sekkat (2005), using a slightly larger sample and a different specification[16], report systematic evidence against the hypothesis.[17]

The second test, proposed by Méndez and Sepúlveda (2006), suggests that the marginal effect of corruption on growth depends on how widespread corruption is. This can be tested by including the square of the TI index in the empirical model or by including dummy variables for countries with high, medium and low levels of corruption. The test using the quadratic term is, however, inappropriate because the TI index is an ordinal ranking and not measured on a cardinal scale. The test using dummy variables sidesteps this issue but suffers from the problem that the definition of high, medium and low levels of corruption is arbitrary. From regressions 4 and 7, it is clear that the data rejects the notion of a growth maximizing level of corruption in general. However, when the sample is split into two sub-samples, one containing countries with a high degree of political freedom (as measured by the Freedom House index of political rights) and one containing countries without, we observe something interesting (see regressions 5, 6, 8 and 9).[18] In countries with political freedom, but not in those without, corruption appears to be beneficial at the margin starting from a very low level for then to become detrimental. According to regression 5, the growth maximizing level of corruption occurs when the TI index is around 9, so it is only in countries with a high degree of integrity that "a little corruption" is helpful.[19]

[15]This variable is also from the World Bank's "Governance Matters" database (Kaufmann et al., 2005). It is representative of the governance variables that Méon and Sekkat (2005) use to measure the quality of institutions.

[16]In contrast to my specification, they do not include the governance variable as separate regressors.

[17]In a related study, Méon and Weill (2008) study the impact of corruption on aggregate efficiency. They report that corruption reduces efficiency in societies with effective institutions, but improves aggregate efficiency in societies with ineffective institutions.

[18]The Freedom House index of political rights codes countries according to several dimensions of political freedom, such as censorship, freedom of association, free elections etc. The index ranges from 1 (most free) to 7 (least free). I have split the sample using 3.5 as the cut-off.

[19]The scaling of the TI index matters greatly for this result. For example, if one inverts the TI index, e.g. by subtracting it from 11, (which is often done in applied work) so that it becomes increasing in corruption, the non-monotonic relationship reported in regression 5 is no longer statistically significant.

Moreover, we see from regression 8 that countries coded as having low or medium levels of corruption record higher growth than countries coded as being highly corrupt. But the positive growth differential between countries with medium and low levels of corruption is not statistically significant and the point estimates are very sensitive to the coding of the dummy variables. This casts doubts on the robustness of the results reported by Méndez and Sepúlveda (2006), and leaves two broader questions open. Firstly, even if accepted at face value, it is doubtful if these results can be taken as evidence that corruption is "beneficial" for growth at low level of incidence. After all, countries with a TI index above 9 (e.g., Denmark, Finland and Canada) are hardly the types of countries for which Leff (1964) saw corruption as a means of development. Secondly, how the sample is split into two is essentially arbitrary.

The third test, proposed by Aidt et al. (2008), addresses this last point. This is done by estimating a growth model that allows for endogenous threshold effects and the possibility of reverse causality from growth to corruption. More specifically, the estimation procedure, which is due to Caner and Hansen (2004), firstly identifies different growth-corruption regimes and then secondly estimates a regime specific relationship between the two using an IV estimator. Using the Voice and Accountability Index from the World Bank's "Governance Matters" database as the measure of good governance, the data *is* consistent with two distinct growth-corruption regimes: one with good governance, high average growth and low corruption and one with poor governance, low average growth and high corruption. Secondly, in regressions 10 and 11, which show the regime specific linear growth models, corruption only has a negative impact on growth in the regime with good governance; in the regime with poor governance, there is no statistically significant effect of corruption on growth.[20] This suggests that corruption has the least detrimental effect on growth in countries with poor governance, which is consistent with the "greasing the wheels hypothesis".

However, there are at least two reasons to be suspicious about this interpretation. Firstly, the fact that corruption has less of an effect where institutions are weak *is* consistent with the "greasing the wheels hypothesis" but it is not the *only* valid explanation. Aidt et al. (2008) develop an alternative theory that also produces the observed regime specific difference. In this theory, however, there is no sense what so ever that corruption is efficiency-enhancing: corruption has less of an impact on growth in the

[20]The regime-specific linear growth models are estimated using instrumental variables. The instruments are the Voice and Accountability Index and the index of ethno-linguistic fractionalizations. Similar results obtain with OLS and with alternative instruments. Moreover, there is no evidence of a non-monotonic relationship in any of the two regimes.

regime with poor governance simply because things cannot get much worse. The evidence does not discriminate between these alternative explanations. Secondly, looking for evidence of the "greasing the wheels hypothesis" in macro data may simply be a fallacy of composition. The underlying theory as well as the anecdotal evidence presented in its support identify instances at the microeconomic level where corruption can enhance efficiency. But will there be macro effects? Probably not, and as Mauro (1995, p. 685) points out what is beneficial for the individual may turn out to be detrimental for society: ".. when individuals offer speed money to officials, they contribute to establishing a custom, so that granting of, say, a license will be artificially delayed until a bribe is received. Corrupt practices such as speed money (which may actually avoid delay for an individual) may therefore increases red tape for the economy as a whole". What is more, as shown by Kaufmann and Wei (1999), corruption may not even be able to speed things up for individuals.

As discussed above, the TI index, along with the ICRG and the WB index, is problematic because it is based on perceptions about corruption, perceptions which may be colored by observed economic performance. It is, therefore, important to ask if the results presented in Table 1 can be replicated with the WBES index that sets out to measure the actual experience of managers with corruption. Table 2 shows that the answer is clearly no: the WBES index is, with one expectation, insignificant in all regressions.

[Table 2: The relationship between the WBES index and the growth rate of GDP per capita, 1970-2000.]

At the face of it, this seems to suggest that actual, as opposed to perceived, corruption is irrelevant for economic growth, but this is too strong a conclusion. Firstly, eighteen countries drop out of the sample because they were not surveyed, and they are almost all of them countries with good governance. The average effect of the WBES index on growth is therefore dominated by countries with poor governance and we know from Table 1 that it is among these that (perceived) corruption has the weakest correlation with growth. Secondly, in regressions 21 and 22, which show the IV estimations of the two-regime model, actual corruption *is* significant in the regime with good governance (albeit this is based on only 17 countries).[21]

There is, therefore, a sense in which the two sets of results are sending the same message: the macroeconomic evidence, if anything, shows that the average effect of corruption on growth is close to zero, but that it may have

[21] Restricting attention to the 42 countries for which the WBES index is available has little effect on the results presented in Table 1.

a negative (marginal) effect in countries with otherwise strong governance. As argued above this should not be taken as evidence of efficiency-enhancing corruption, a conclusion which is further strengthened by a vast literature that studies the effects of corruption on the constituents of growth. This literature shows that (perceived) corruption is negatively related to investment (Mauro, 1995); that it distorts the portfolio of public spending towards less productive activities (Mauro, 1998; Tanzi and Davoodi, 1998) or it creates inefficiently large public sectors where resources that should have been used productively are wasted through rent seeking (Baldacci et al., 2004); and that it increases military spending (Gupta et al., 2001). The only possible exception to this pattern is with respect to foreign direct investment (FDI). While Wei (2000) reports that corruption acts like a tax on international investments and Hines (1995) documents that US FDI mostly go to less corrupt countries, Egger and Winner (2005) and Sena and Martianova (2008) report evidence that corruption might encourage FDI.

5 Corruption and Genuine Investment

The research into the consequences of corruption on growth in GDP per capita and the constituencies of growth has provided many useful and important insights, but there is a sense in which it may be barking up the wrong tree. Ultimately, development is about sustainable improvements in human welfare. It is widely recognized that GDP per capita is *not* a measure of this.[22]

In recent years, progress has been made in constructing empirical measures of sustainability and in developing the underlying theory (Dasgupta, 2001, chapter 9; Hamilton and Clemens, 1999). Loosely speaking, sustainable development is related to an economy's ability to maintain living standards through time. More precisely, Arrow et al. (2004) suggest that an economy is sustainable at a given point in time if its intertemporal social welfare at that time is not decreasing. The most important determinant of intertemporal social welfare is an economy's productive base. This base consists of all its capital assets, including manufactured capital, human capital, natural capital and the knowledge base, and its institutions. The change in the productive base is called genuine investment. It can be expressed as the sum of the values of investment or disinvestment in the underlying capital assets, where the assets are priced at their social opportunity cost. As shown by

[22] I am not the first to recognize this general point within the context of corruption. Gupta et al. (2002), for example, study the impact of corruption on various measures of inequality.

Dasgupta and Mäler (2000), intertemporal social welfare is nondecreasing if and only if genuine investment is non-negative. Thus, if one can somehow measure empirically genuine investment or, equivalently, the change in an economy's genuine wealth over time, then one can start asking questions about sustainable development and its link to corruption.

Fortunately, based on the work by Hamilton and Clemens (1999), the World Bank has for the last 10 years published measures of genuine investment.[23] The starting point for calculating genuine investment is gross national saving from which an estimate of consumption of fixed capital is deduced. To this is added a measure of investment in human capital (education expenditures) and estimates of disinvestment in natural resources (damage from CO_2 emissions, energy depletion, mineral depletion and net forest depletion) are deducted.[24] The result is a rough estimate of genuine investment. This, however, does not take population growth into account. There are two different ways of converting genuine investment as percentage of GNI into growth in genuine wealth per capita. Arrow et al. (2003) and Arrow et al. (2004) start by converting the estimate of average genuine investment as a percentage of GNI into a growth rate of genuine wealth by multiplying with a presumed GNI-wealth ratio[25] and then subtracting the population growth rate from this. Hamilton (2005), on the other hand, estimates genuine wealth per capita directly from adjusted consumption data and assumptions about the consumption rate of interest and the rate of growth of per capita consumption and then calculates the change over time. It goes without saying that these estimates are rough and ready, but the fact that the data is constructed using two alternative methods allows for some robustness analysis.

The question I am interested in here is whether there exists a link between corruption, both perceived and actual, and growth in genuine wealth per capita. To answer this question, I have estimated the impact of the TI index and the WBES index on the two measures of growth in genuine wealth per capita. I control for other potential determinants of sustainability such as initial income (real GDP per capita in 1970), geography (regional dummies), education (enrollment in primary education) and political and legal institutions. The results are striking and shown in Tables 3 and 4. Corruption reduces the growth rate of genuine wealth substantially. Importantly,

[23] See World Development Indicators (various years, Table 3.15). The World Development Indicators uses the term genuine saving. Here, I follow Arrow et al. (2004) and use the term genuine investment.

[24] For details of how to estimate these deductions, see World Development Indicators (various years) or Arrow et al. (2004).

[25] They use a ratio of 0.2 for industrialized countries and a ratio of 0.15 for developing and oil-rich countries.

both actual (the WBES index) and perceived corruption (the TI index) are negatively related to growth in genuine wealth per capita. This continues to be true when I estimate the relationship using an IV estimator.[26] In fact, the IV estimates are more precise and larger in magnitude than the corresponding OLS estimates, perhaps suggesting a downwards bias in the latter. A direct comparison of Table 3 and 4 shows that it does not matter much which of the two alternative measures of growth in genuine wealth per capita that I use.

To get an idea of how large these effects are, imagine, for example, that India were to "adopt" the (perceived) corruption level of the United Kingdom.[27] As a consequence of this, India's growth rate of genuine wealth per capita would go up from about 1 per cent to 3.4 per cent per annum.[28] Or alternatively, one can ask by how much (perceived) corruption in the United Kingdom could increase before the UK economy became unsustainable? Using the OLS estimate from regression 23 and keeping initial GDP per capita and geography fixed, the answer is that the TI index would have to fall from 8.65 to just below 2. Countries with such a low score include Russia and Uganda. Using instead the IV estimate from regression 24, the UK economy would become unsustainable once its TI index falls to the level of Italy (which has a score of 4.7). All in all, the estimates point to economic as well as statistical significance.

It is also interesting to notice, from regressions 31, 32, 43 and 44, that political freedom[29] (democracy, a free press etc.) increases growth in genuine wealth and thus contributes positively to sustainable development. La Porta et al. (1997) and others have argued that legal origin, in particular whether the legal code is based on the Civil or the Common law tradition, matters for economic and financial development. Using a dummy variable equal to one if a country belongs to the Common law tradition as a proxy for legal origin, I find no correlation between the legal system and sustainable development (regressions 33, 34, 45 and 46). Clearly, these findings warrant further investigation which should take into account potential endogeneity.

In conclusion, the evidence presented in Tables 3 and 4 suggests that corruption (however measured) is a hindrance for sustainable development. Societies with high levels of corruption seem to be running down their genuine wealth and be putting their economies on a path with declining intertemporal welfare. On reflection, this is, perhaps, not overly surprising as corruption, theft and rent seeking often feed on rents generated through un-

[26] I use the same instruments as in the growth regressions.

[27] The TI index for India is 2.85 while that for the United Kingdom is 8.65.

[28] This is based on the estimated coefficient on the TI index in regression 23 in Table 3.

[29] As measured by the Freedom House index of political rights.

sustainable use of natural resources (Leite and Weidmann, 2002) or through under-investment in human and manufactured capital (Mauro, 1998).

[Table 3: The relationship between corruption and the growth rate of genuine wealth per capita (as defined by Arrow et al. (2004))]

[Table 4: The relationship between corruption and the growth rate of genuine wealth per capita (as defined by Hamilton (2005))]

6 Conclusion

Does corruption, then, sand or grease the wheels? While corruption in a very narrow sense can be seen as a lubricator that may speed things up and help entrepreneurs getting on with wealth creation in specific instances, in a broader sense, corruption must be considered as an obstacle to development. This is so for a number of related reasons. One is the fallacy of efficient corruption: the cumbersome procedures that corruption is supposed to help overcome may be created and maintained precisely because of their corruption potential and substantial real resources may be devoted to contesting the associated rents. This leads to pure waste and to misallocation of resources. There is also a fallacy of composition lurking: undisputed, but isolated, instances of efficiency-enhancing corruption at the microeconomic level cannot be taken as evidence that corruption can be efficiency-enhancing at the macroeconomic level.

Both the micro and macro evidence evaluated here support this view. Quantitative evidence from field studies and surveys points to substantial costs of corruption. At the macro level, although the search for a negative effect of corruption on the average growth rate of GDP per capita has failed to produce convincing and robust evidence, this does not imply that corruption is irrelevant (or even beneficial) at the marcroeconomic level. At least in societies with otherwise good governance and strong political institutions, corruption reduces growth at the margin. More importantly, even if the average effect of corruption on GDP growth is close to zero, the new evidence presented above suggests that corruption is a significant hindrance for sustainable development. Arguably, I have only scratched the surface. Much more work is needed to establish how robust and causal the correlation between corruption and the growth rate of genuine wealth per capita is and to construct better measures of genuine wealth. Nevertheless, as Dasgupta (2009) rightly points out, we should be shifting our attention away from growth in GDP per capita to growth in genuine wealth and start asking

questions about what role economic, political and legal institutions play in promoting accumulation of genuine wealth and sustainable development.

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Table 1: The relationship between the TI index and the growth rate of GDP per capita, 1970-2000.

	1	2	3	4	5	6	7	8	9	10	11
Sample	Full	Full	Full	Full	Political freedom	Absence of political freedom	Full	Political freedom	Absence of political freedom	Good governance	Poor governance
TI Index	0.27** [2.27]	0.29 [1.36]	-0.58** [2.31]	0.27 [0.90]	0.67** [2.11]	-0.95 [1.58]				0.38*** [3.28]	1.09 [1.52]
TI-index*Rule of Law			0.36 [1.43]								
Rule of Law			6.24*** [2.76]								
TI index squared				0.0001 [0.01]	-0.038* [1.73]	0.099 [1.66]					
TI index > 9							1.12 [1.47]	1.23* [1.85]	2.13 [1.01]		
3 < TI index < 9							0.84 [1.47]	1.31** [2.12]	-0.51 [0.89]		
Initial GDP	-0.003*** [4.95]	-0.003*** [3.67]	-0.003*** [5.28]	-0.003*** [4.82]	-0.003*** [2.93]	-0.01 [1.52]	-0.003*** [4.45]	-0.003** [2.33]	-0.01*** [4.60]	-0.003*** [2.89]	-0.003** [2.24]
Population growth	-0.43 [1.22]	-0.41 [1.25]	0.075 [0.22]	-0.43 [1.16]	-0.26 [0.94]	-1.57 [1.52]	-0.35 [0.97]	-0.29 [1.04]	0.19 [0.17]	-0.21 [0.58]	-1.96* [1.94]
Initial investment share	0.02 [0.54]	0.022 [0.57]	0.002 [0.07]	0.02 [0.55]	0.052 [0.91]	0.099* [1.90]	0.029 [0.76]	0.096* [1.84]	0.06 [0.84]	0.001 [0.04]	0.08 [1.55]
Enrollment in primary education	0.02 [1.59]	0.017 [1.47]	0.032** [2.57]	0.02 [1.60]	0.016 [0.61]	0.008 [0.56]	0.021 [1.47]	0.011 [0.45]	0.03 [1.38]	-0.023 [0.54]	0.002 [0.23]
J-statistics		0.90								0.66	0.66
1st stage F test		16.3***								29.9***	29.9***
Estimation method	OLS	2SLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	Threshold IV	Threshold IV
Observations	60	58	60	60	43	17	60	43	17	33	25
R-squared	0.54		0.63	0.54	0.51	0.8	0.52	0.45	0.85		

Notes: Robust t statistics in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%; Include regional dummies and a constant term; J-statistics: the p-value of Hansen's J-test for the Null that the extra instrument is valid; 1st stage F test: The Null is that the coefficients on both instruments are zero; Political freedom (Absence of) is the sub-sample with countries with a score below (above) 3.5 on the Freedom House index of political right; Good (poor) governance is the sub-sample of countries with a score above (below) 0.65 on the normalized Voice and Accountability Index. The instruments are the Voice and Accountability Index and the ethno-linguistic fractionalization index.

Table 2: The relationship between the WBES index and the growth rate of GDP per capita, 1970-2000.

	12	13	14	15	16	17	18	19	20	21	22
Sample	Full	Full	Full	Full	Political freedom	Absence of political freedom	Full	Political freedom	Absence of political freedom	Good governance	Poor governance
WBES Index	0.544 [1.32]	0.74 [0.99]	-0.73 [1.44]	-1.49 [0.95]	-1.38 [0.58]	-5.04 [1.02]				1.25*** [3.00]	0.019 [0.03]
WBES Index*Rule of Law			1.36 [1.65]								
Rule of Law			-2.05 [0.49]								
WBES index squared				0.24 [1.25]	0.22 [0.85]	0.61 [1.05]					
WBES index > 5							0.14 [0.19]	-1.36 [0.87]	0.24 [0.25]		
3 < WBES index < 5							-0.37 [0.70]	-1.92 [1.20]	0.28 [0.14]		
Initial GDP	-0.003*** [5.00]	-0.003*** [4.20]	-0.003*** [4.84]	-0.003*** [4.32]	-0.003*** [2.06]	-0.0001 [0.66]	-0.003*** [3.97]	-0.0001 [1.18]	-0.001 [0.81]	-0.0001 [0.54]	-0.0001 [1.49]
Population growth	-0.77 [1.56]	-0.74 [1.46]	-0.42 [0.78]	-0.63 [0.66]	-0.25 [0.66]	-2.11 [1.23]	-0.74 [1.55]	-0.50 [1.62]	-3.07 [1.21]	0.42 [0.80]	-3.06*** [3.57]
Initial investment share	0.034 [0.68]	0.032 [0.73]	0.008 [0.17]	0.027 [0.55]	0.067 [0.70]	0.083 [1.82]	0.034 [0.56]	0.055 [0.73]	0.093 [1.90]	-0.002 [0.03]	0.084*** [3.09]
Enrollment in primary education	-0.021 [1.16]	-0.025 [1.34]	-0.005 [0.32]	-0.014 [0.78]	0.02 [0.52]	-0.002 [0.13]	-0.003 [0.18]	0.038 [0.99]	-0.032 [1.13]	0.029 [0.39]	-0.017 [1.13]
J-statistics		0.77								0.64	0.64
1st stage F test		6.8**								13.7***	13.7***
Estimation method	OLS	2SLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	Threshold IV	Threshold IV
Observations	42	41	42	42	27	15	42	27	15	17	24
R-squared	0.54		0.61	0.56	0.45	0.79	0.51	0.42	0.83		

Notes: See Table 1.

Table 3: The relationship between corruption and the growth rate of genuine wealth per capita (as defined by Arrow et al. (2004)).

	23	24	25	26	27	28	29	30	31	32	33	34
TI index	0.42*** [2.74]	0.97*** [3.50]			0.40** [2.51]	1.05*** [3.62]			0.36** [2.47]		0.45*** [2.75]	
WBES Index			0.80* [1.95]	2.04*** [2.70]			1.05** [2.16]	2.51*** [3.06]		0.70* [1.88]		0.81* [1.91]
Initial GDP	-0.17** [2.00]	-0.37*** [2.83]	-0.15* [1.85]	-0.31** [2.17]	-0.21** [2.58]	-0.44*** [3.21]	-0.17* [1.87]	-0.34** [2.25]	-0.23** [2.46]	-0.21** [2.27]	-0.15* [1.73]	-0.15 [1.67]
Enrollment in primary education					0.02 [1.27]	0.001 [0.02]	-0.025 [1.16]	-0.057* [1.96]				
Political Freedom									-0.279* [1.80]	-0.28* [1.67]		
Common Law											-0.53 [1.08]	-0.01 [0.02]
J-statistics		0.91		0.78		0.73		0.78				
1st stage F test		12.1***		10.4***		15.9**		16.1***				
Estimation method	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	OLS	OLS	OLS
Observations	73	59	52	41	65	58	47	41	72	52	72	51
R-squared	0.60		0.52		0.58		0.51		0.62	0.55	0.60	0.51

Notes: Robust t statistics in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%; Include regional dummies and a constant term; J-statistics: the p-value of Hansen's J-test for the Null that the extra instrument is valid; 1st stage F test: The Null is that the coefficients on both instruments are zero; The instruments are the Voice and Accountability Index and the ethno-linguistic fractionalization index.

Table 4: The relationship between corruption and the growth rate of genuine wealth per capita (as defined by Hamilton (2005)).

	35	36	37	38	39	40	41	42	43	44	45	46
TI index	0.35*** [2.77]	0.75*** [3.84]			0.31** [2.57]	0.72*** [3.64]			0.31** [2.50]		0.35** [2.66]	
WBES Index			1.04*** [2.83]	2.05*** [4.22]			0.99** [2.66]	2.05*** [3.83]		0.96*** [3.03]		1.01** [2.68]
Initial GDP	-0.18** [2.34]	-0.31*** [3.14]	-0.14* [1.97]	-0.25** [2.44]	-0.19*** [2.82]	-0.31*** [3.07]	-0.14* [2.02]	-0.25** [2.40]	-0.24*** [3.13]	-0.20*** [2.86]	-0.17** [2.29]	-0.16** [2.34]
Enrollment in primary education					0.027** [2.13]	0.013 [1.36]	0.004 [0.38]	-0.013 [0.88]				
Political Freedom									-0.27* [1.84]	-0.32** [2.45]		
Common Law											-0.092 [0.23]	0.34 [0.71]
J-statistics		0.42		0.35		0.81		0.48				
1st stage F test		16.1***		8.2***		14.3**		7.7***				
Estimation method	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	OLS	OLS	OLS
Observations	65	52	49	39	59	52	44	39	65	49	64	48
R-squared	0.40		0.56		0.45		0.52		0.46	0.63	0.40	0.57

Notes: See Table 3.