

Corruption in Empirical Research - A Review

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Abstract

Data on the perceived level of corruption from a cross-section of countries have been fruitfully introduced into empirical research lately. This study reviews a large variety of studies on the consequences and causes of corruption. It includes research on the impact of corruption on investment, GDP, institutional quality, government expenditure, poverty and international flows of capital, goods and aid. Research on the causes of corruption focuses on the absence of competition, policy distortions, political systems, public salaries as well as an examination of colonialism, gender and other cultural dimensions.

1. Introduction

Empirical research on corruption is quite a new undertaking. In an attempt to determine the causes and consequences of corruption, academics have concentrated lately on cross-country analyses. These are mostly based on professional studies of the degree of corruption in various countries. Such assessments are sometimes compiled by agencies to determine country risks and the data gathered are sold to investors. Other sources, such as surveys, have been compiled in recent years and contribute to cross-country assessments of the extent of corruption. These data have proved useful to the investigations described here in detail. The data on corruption are to a large extent subjective assessments of the level of corruption in various countries. As such perceptions are commonly a good indicator of the real level of corruption, the data permit various regressions with other macroeconomic, political or social data, [Lambsdorff 1999].

Another approach has been taken by Goel and Nelson [1998] and Fisman and Gatti [1999], who use the number of public officials convicted for abuse of public office in various states of the USA, assuming that this may serve as an indicator for actual levels of corruption. Goel and Nelson [1998] relate this variable to the real per capita total expenditures of the local government, arguing that state intervention and public spending give rise to rent-seeking activities and hence corruption. The authors report a significant, positive association between these variables. However, the correlation might be explained differently. As governments increase their spending, the judiciary branch may also be allocated more funding, resulting in higher conviction rates. In this case, conviction rates are not an adequate indicator for the actual incidence of corruption, but rather, reflect the quality of the judiciary. This is an example of why the studies reviewed here have relied on perceptions of corruption as a better indication of real levels of corruption.

With less academic rigor, the media has been engaged in formulating various correlations between perceived levels of corruption and human development, competitiveness, judicial quality, credit ratings or the spread of newspapers. For an overview see Galtung [1997]. Since many other

explanatory variables are absent, however, such correlations risk being misleading, in that they present spurious relationships. This review restricts itself to those studies which have been conducted with at least some sense of academic rigor.

The corruption indices applied were very often those by Transparency International (TI). This is a composite index including many other sources. Some studies used data from these individual sources, i.e. the Political Risk Service (PRS), the Institute for Management Development (IMD), the World Bank and University of Basel (WB/UB) or the World Economic Forum (WEF). For a description of these sources see Lambsdorff [1999]. An older source has been compiled by Business International (BI). A description is provided by Mauro [1995]. All studies which are known to the author are presented here. This review is organized in three sections.

Section 2 will describe the interaction between corruption and other indicators where aspects of causality are difficult to assess. Such difficulties can result when corruption is simultaneously a cause and a consequence of other variables. This is likely to be the case with policy distortions, inequality and poverty as well as lack of economic freedom and absence of competition. Section 3 presents studies which deal with the impact of corruption on investment, GDP, government expenditure and international flows of capital, goods and aid. Research on the causes of corruption focus on political systems, public salaries as well as an examination of colonialism, gender and other cultural dimensions. These will be described in subsection 4.3.

2. General Correlations

Whether corruption causes other variables or is itself the consequence of certain characteristics is sometimes difficult to assess. This section will demonstrate that certain forms of government involvement, poor institutions, inequality and absence of competition may go along with corruption. These indicators and corruption are sometimes two sides of the same coin. It can be helpful to observe the correlations that are reported, but to refrain from drawing iron-clad conclusions with respect to causalities.

2.1 Government Involvement

Government involvement in private markets is commonly seen as a source of corruption. It has been suggested that the overall size of the government budget relative to GDP may therefore be positively correlated with levels of corruption. This is shown by LaPalombara [1994: 338] who used a sample of countries in which Scandinavian countries were regarded as the exceptions. A better measure for a government's interference into private markets may be depicted by its total redistributive activity. This may be better captured by the total government transfers and subsidies. La Porta et al. [1999: 242] show a positive correlation of this variable with corruption. But Rose-Ackerman [1999: 41] argues that such simple correlations may be misleading. It therefore does not come by surprise that the opposite correlation is presented by Elliott [1997: 182-183] for a sample of 83 countries, in which she reports that the size of the government budget relative to GDP decreases with levels of corruption. She concludes that types of activities may be more important than a government's size in causing corruption. Another criticism of the hypothesis by LaPalombara is provided by Husted [1999: 342, 350 and 354]. He argues that governments are larger in societies characterized by a greater acceptance of authority. As discussed below, this cultural variable may determine both corruption and the size of the government.

Treisman [1999b], concerned with the impact of decentralization on corruption, has been involved in theoretical discussions suggesting opposing viewpoints. He found significant evidence that federal states are more corrupt than centralized ones. But this relationship fell to insignificance when other variables had been included.¹ Therefore, while the dummy variable measuring federalism was shown to correlate with corruption, this outcome was not robust to the inclusion of

other variables. Above that, a dummy variable may not adequately capture all facets of decentralization.

A better variable for measuring the extent of decentralization is presented by Huther and Shah [1998] and Fisman and Gatti [1999]. The authors interpret the share of subnational expenditures in total public spending as a measure of decentralization. In a sample of 80 countries, this index correlates positively with various measures of good governance. Huther and Shah report a correlation with lack of corruption larger than 0.5.² The approach by Fisman and Gatti [1999] makes use of the same variable on decentralization, but tests whether the outcome is robust to the inclusion of other variables. For a wide range of specifications they find a strong negative relationship between fiscal decentralization in government expenditure and corruption.³

In sum, simple conclusions with respect to government involvement and corruption are hard to find. While some studies hint at decentralization as a means to reduce corruption, the overall government budget cannot convincingly be related to the level of corruption. But even the significant result that decentralization lowers corruption does not clearly suggest policy reform. One cannot exclude that certain cultural determinants drive both variables. Countries characterized by civic cooperation and trust among people as well as those with well developed subnational units may be in a position to decentralize and lower corruption at the same time. This points to cultural dimensions to be investigated in subsection 4.3.

2.2 Institutional Quality

There has been extensive debate on whether corruption "greases the wheels" by enabling individuals to avoid bureaucratic delays, or whether it "sands the wheels", mainly by lowering the security of property rights and misallocating resources. A direct method for disproving the notion that corruption greases the wheels can be derived by investigating the impact of corruption on the quality of public institutions. One approach is presented by Kaufmann and Wei [1999]. Making use of data by WEF and WB/UB, the authors compare respondents' assessments of the level of corruption with the time managers waste with bureaucrats. The resulting regressions do not relate to a cross-section of countries but compare firm-specific responses, resulting in thousands of observations to enter into the regressions. The authors produced a highly significant positive association for various specifications of the regressions. Also an indicator of the predictability of corruption from the survey by WB/UB has been introduced into the regressions. Lower levels of predictability were found to lower the time managers waste with bureaucrats. Likewise, corruption is also found to be positively associated with two subjective indicators. The first measures the degree to which "government regulations impose a heavy burden on business competitiveness" and the second measures the degree to which the "government regulations are vague and lax."

Similarly, a positive correlation between corruption and the size of the unofficial economy is presented in Johnson, Kaufmann and Zoido-Lobaton [1998: 391]. This suggests that corruption sands the wheels by negatively impacting on the smooth operation of the official economy. But whether the causality might actually be reversed, i.e. poor institutions being the cause of corruption, is difficult to answer. As pointed out in the next paragraph, many other studies argue that low institutional quality and policy distortions cause corruption.

Treisman [1999a] finds a positive impact of "state intervention" on corruption. The former variable is measured by a subjective index compiled by IMD. But as other explanatory variables enter into the regression, the relationship is reported to break down. Another correlation between corruption and a measure of policy distortion for 39 countries is presented in the World Development Report [1997: 104 and 168]. Unfortunately, a precise definition of policy distortions is absent there. Also, the robustness of the results are not tested by including further explanatory variables. A more detailed analysis of policy distortions is presented by Ades and Di Tella [1997]. The authors make

use of an index that measures "the extent to which public procurement is open to foreign bidders" and another index that measures "the extent to which there is equal fiscal treatment to all enterprises". Both variables and also a corruption variable are taken from the survey by IMD. Explaining the level of corruption, both variables enter significantly into the regressions, even when controlling for other explanatory variables. This leads the authors to assume that policy intervention causes corruption. But the authors acknowledge that corruption may cause policy distortions and not vice versa, bringing about problems of a simultaneity bias. Whether this problem can be adequately solved by the instrumental variables applied by Ades and Di Tella [1997] shall not be the concern here. It is quite often the case that policy distortions and corruption are just two sides of the same coin. As pointed out previously, other studies had focused on corruption as a cause for policy distortions. Whether a causality can therefore be established might be questionable on theoretical grounds. But disregarding this problem, a correlation between political distortions and corruption is an important result, clearly giving direction to policy reform.

2.3 Lack of Competition

Concerning the causes of corruption, studies have been made on the extent to which corruption can be explained by a low level of competition. Competition is commonly assumed to lower the rents of economic activities and consequently reduce the motive of public servants and politicians to seize parts of these rents by means of extortion and corruption.

One government activity suspected of encouraging corruption is restriction on economic freedom. Henderson [1999] argues that corruption is negatively correlated with different indicators of economic freedom. This result is largely supported by Paldam [1999a] in multivariate regressions that include further explanatory variables such as GDP per head for a sample of 77 countries. A country's openness has been used by Ades and Di Tella [1995 and 1997] as an indicator of competition. The authors argue that openness, defined as the ratio of import to GDP, is negatively associated with corruption. They apply corruption data from BI (in cross-section of 55 countries) and IMD (in cross-section of 32 countries). With both approaches the results are robust to the inclusion of further explanatory variables. The authors conclude that economic competition as measured by the degree of a country's openness reduces corruption. This idea has been supported by Brunetti and Weder [1998c], who apply data from PRS in a cross-section of 122 countries in bivariate regressions. However, Treisman [1999a], using the TI-index, did not find significant evidence for such an impact. Apart from the mixed evidence, the ratio of import to GDP is a distorted indicator of competitive pressure. To a large extent this variable depends on the size of a country, measured for example by its total population. This is because large countries can compensate for a low ratio of import to GDP by more competition within their own country. The usefulness of this variable is therefore questionable here. Another valid measure of the extent of competition existing in a country can be derived from the number of years it has been open to trade, as assessed by Sachs and Warner [1995]. Treisman [1999a] and Leite and Weidmann [1999] provide evidence that this variable negatively and significantly impacts on the level of corruption.

Ades and Di Tella [1995] test for the influence of two other indicators of competition taken from the survey by IMD. A subjective index of "market dominance" measures the extent to which dominance by a limited number of firms is detrimental to new business development. Another index of "anti-trust laws" measures the effectiveness of these laws in checking non-competitive practices. The authors conclude that the less competitive a market environment, the higher will be the amount of corruption by giving public servants the incentive to extract some of the monopoly rents through bribes. However, the authors are aware of the problems of causality and acknowledge that corruption may provide incentives for politicians to support monopolies. In this case lack of competition would result from corruption and not vice versa.

2.4 Poverty and Inequality

The benefits from corruption are likely to accrue to the well-connected at the expense of the poor. Gupta, Davoodi and Alonso-Terme [1998] therefore argued that corruption increases income inequality, as measured by the Gini coefficient. In a cross-section of 37 countries, a significant positive impact of corruption on inequality was found, while taking into account various other exogenous variables. When controlling for GDP per head, this impact remains significant at a 10 % level. It was concluded that a deterioration in a country's corruption index of 2.5 points on a scale of 0 to 10 is associated with the same increase in the Gini coefficient as a reduction in average secondary schooling of 2.3 years. The authors test various instrumental variables to ascertain whether the relationship between corruption and inequality is not a case of reverse causality. The authors find further evidence that corruption increases inequality in education and land distribution. Since these variables contribute to income inequality (and had been controlled in the first regression) the overall impact of corruption on income inequality may even be stronger. Gupta, Davoodi and Alonso-Terme [1998] also investigate the income growth of the bottom 20 per cent of society. While controlling for various influences, they report that growth of corruption exerts a significant and negative impact on this variable. However, since the perception of such levels of corruption may change quicker than the levels themselves, it is not certain that the variable which measures growth of corruption was soundly determined.

But whether the causality actually moves in a direction from corruption to inequality has been questioned by Husted [1999: 342-3], who argues that inequality also contributes to high levels of corruption. This has also been suggested by Swamy et al. [1999]. Moreover, both variables might be driven by cultural determinants. Acceptance of authority and low accessibility of people higher in hierarchy may increase inequality and corruption at the same time.

3. The Consequences of Corruption

3.1 Total Investment

The first investigation on the impact of corruption on investment in a cross-section of countries was undertaken by Mauro [1995]. He makes use of an older corruption index provided by Business International (BI), a private firm that sold this and related indicators of country risks to banks, multinational companies, and other investors. The author finds that in a sample of 67 countries, corruption negatively impacts on the ratio of investment to GDP. He claims that if Bangladesh were to improve the integrity of its bureaucracy to the level of that of Uruguay, its investment rate would increase by almost five per cent of GDP.

Regressions using other measures of corruption and a different selection of countries help to support the Mauro findings. Similar results were obtained by Keefer and Knack [1995], who incorporate corruption among other explanatory variables into one single index of "institutional quality". Their data were acquired from PRS, which like BI, collects its data from a network of country analysts. Referring to a corruption index by WB/UB for a sample of 41 countries, Brunetti, Kisunko and Weder [1997:23 and 25] also reinforce the Mauro results. They find that corruption significantly reduces the ratio of investment to GDP. Mauro [1997a] provides further backing for his results by presenting a larger sample of 94 countries and by also making use of the corruption data by PRS. The same source was used by Brunetti and Weder [1998] to show that corruption has a significant negative impact on the ratio of investment to GDP in a sample of 60 countries.

Criticism of the results by Mauro has been voiced by Wedeman [1996]. He argues that while the correlation between corruption and the ratio of investment to GDP might be strong for countries with little corruption, it loses power for countries with higher levels of corruption.⁴ He therefore

concludes that certain kinds of corruption might have more significance for investment decisions than the overall level of corruption as such. With a similar point of view, the World Development Report [1997: 34] quotes an entrepreneur who contends that "there are two kinds of corruption. The first is one where you pay the regular price and you get what you want. The second is one where you pay what you have agreed to pay and you go home and lie awake every night worrying whether you will get it or if somebody is going to blackmail you instead." This idea was picked up in the survey by WB/UB and in addition to an overall level of corruption also its predictability was determined, i.e. whether a corrupt service is actually delivered as agreed. The resulting impact of this variable on the ratio of investment to GDP was investigated in the World Development Report [1997]. In a sample of 39 industrial and developing countries, it was concluded that for a given level of corruption, countries with more predictable corruption have higher investment rates. This approach has been extended and further elaborated by Campos, Lien and Pradhan [1999], who make use of the same data by WB/UB in a cross-section of 59 countries. While controlling for GDP per head and secondary school enrollment, the authors find that both, low predictability and the overall level of corruption, reduce the ratio of investment to GDP. The authors conclude that the nature of corruption is also crucial to its economic effects.

As corruption increases the risks associated with making investments, e.g. by lowering the security of property rights, theory predicts that corruption will have a clear negative impact on the ratio of investment to GDP. But if corruption affects the productivity of capital, an adverse impact on the ratio of investment to GDP will result, as outlined in Lambsdorff [1999b]. This derives from the fact that as the productivity of capital declines, total output - that is GDP - drops in relation to the capital stock, meaning that the ratio of investment to GDP is likely to increase in reaction to corruption. As a result, studies on the ratio of investment to GDP might easily underestimate the total impact of corruption on investment.

3.2 GDP

There is a strong correlation between GDP per head and corruption reported in many of the studies reviewed here. But there is equal agreement that no causality can be derived from this. While corruption is likely to lower GDP per head, poorer countries lack the resources to effectively fight corruption, [Husted 1999: 341-2] and [Paldam 1999a]. A simple regression would not provide a causal link between corruption and GDP but report some correlation of unknown origin. One attempt to disentangle this simultaneous relationship is provided by Hall and Jones [1999]. The authors regress output per worker on an indicator of social infrastructure, which includes a measure of corruption among other variables. There exist a variety of potential simultaneity problems that are addressed by the authors. One of them is related to the fact that the indicator of corruption is based on perceptions. If countries of equal stage of development differ in the extent of corruption, perceptions are undisturbed and may be particularly informative. But in case countries widely differ in their development, perceptions may be overshadowed by these differences and be less reliable. The idea advanced by the authors is that these problems of simultaneity can be solved by instrumental variables technique. The approach by Hall and Jones [1999] is applied by Kaufmann, Kraay and Zoido-Lobaton [1999: 15] to the relationship between corruption and GDP per head. This appears to be a fruitful path for future research. Of particular relevance for this approach will be whether the instruments applied can be shown to adequately impact on corruption but not directly on GDP per head. Another concern will be whether the outcomes are robust to the application of different statistical techniques, such as system estimation techniques.

Efforts have been made to ascertain the influence of corruption on the **growth** of GDP - with ambiguous results. Keefer and Knack [1995] report that a variable of institutional quality by PRS, which incorporates corruption among other factors, exerts a significant negative impact. Brunetti, Kisunko and Weder [1997: 23 and 25] produced insignificant results. Mauro [1995] found a slightly significant impact in a bivariate regression. But as soon as the ratio of investment to GDP was

included as an explanatory variable, this impact disappeared. Making use of data on corruption provided by PRS, Mauro [1997a] produced significant results at a 95 per cent confidence level. A significant positive impact is also reported by Leite and Weidmann [1999: 24] and Poirson [1998: 16]. On the basis of mixed evidence, it is sometimes argued that corruption primarily impacts on the accumulation of capital, which can be derived from the ratio of investment to GDP, but it does not clearly effect the productivity of capital, because otherwise a link between corruption and growth of GDP should be observable.

But the question of whether corruption should affect levels of GDP or its growth may be debated. In line with Paldam [1999a], Lambsdorff [1999a] argues that lack of corruption is a factor for the production of GDP. If this holds, growth of GDP should not be explained by absolute levels of corruption but by a change in these levels. This is investigated by Lambsdorff [1999a] in a cross-section of 53 countries. He uses data by WEF based on responses to the question of whether corruption has decreased in the past 5 years. This variable is shown to better explain growth of GDP as opposed to absolute levels of corruption.

Another related contribution was made by Tanzi and Davoodi [1997], who examine the impact of corruption on the quality of investments. The quality of investments plays an important role in the productivity of capital and, hence, GDP. Referring to panel data on corruption from PRS for 1980-95, the authors suggest that corruption lowers the quality of the infrastructure as measured by the condition of paved roads and power outages. They support their hypothesis by reporting a high significance in their statistical results. However, based on own regressions for a cross-section of countries using the TI index for 1998 it was not possible to reproduce the significant results. This sheds some doubt on the robustness of the findings to different methodologies.⁵

Another approach for linking corruption to capital productivity is presented in Lambsdorff [1999a]. The ratio of GDP to capital stock is interpreted as a macroeconomic measure of the average capital productivity. The capital stock is determined as accumulated and depreciated investments. A significant negative impact of corruption on this ratio is found in a cross-section of 69 countries, while controlling for the total capital stock and testing for various other variables. It is concluded that a 6-point improvement in integrity on the TI index - for example an increase in Colombia's level of integrity to that of the United Kingdom - would increase Colombia's GDP by 20 per cent.

3.3 Government Expenditure

Those who allocate resources may have better opportunities to extract illegal income from large investment projects than from small labor contracts. Public investments are particularly susceptible to this kind of inefficient allocation and Mauro [1997a] suggests that corruption may increase public investments. But the subsequent regressions provide no significant evidence. In contrast, there is more convincing evidence that corruption affects government expenditure on education. Mauro [1998 and 1997a] finds that corruption lowers expenditure on education, arguing that other expenditures offer public servants better opportunities to collect bribes. His results hold for various specifications but may suffer a little from the low explanatory power of the regressions.⁶

The impact of corruption on public investment has also been investigated by Tanzi and Davoodi [1997]. Referring to panel data on corruption provided by PRS for 1980-95, they show that corruption significantly increases public investment. This is in contradiction to the results by Mauro [1997a]. But on the basis of the mixed evidence there does not appear to be clear support that corruption increases public investment.

3.4 Capital Inflows and Foreign Direct Investments (FDI)

Corruption may undermine a country's ability to attract foreign capital. In this context it is

noteworthy that Fons [1999] reports a significant correlation between the TI index and Moody's bank financial strength ratings (BFSRs) and country ceiling ratings. The former index by Moody aims to provide investors and cross-border interbank lenders with a measure of a bank's safety and soundness, while excluding factors related to country risk concerns. The latter relates to the default risk for debt obligations issued by a national government. Fons argues that poor transparency and high levels of corruption increase credit risks. Those holding deposits or granting loans to such banks are likely to withdraw their engagement. As a consequence, one should observe an impact of corruption on capital movements.

One study in this context was carried out by Hines [1995], who proves that US investors differed from others in preferring to locate their FDI in less corrupt countries after 1977. Hines relates this to the imposition of the Foreign Corrupt Practices Act (FCPA). A related effort was undertaken by Wei [1997a] to find out whether Japan has a tendency to invest more in corrupt countries, the implication being a possibly higher Japanese propensity to pay bribes. But the author did not find any differences between the investment pattern of Japan and the United States.

Other studies have been more concerned about the relationship between capital inflows and corruption. In an early study, Wheeler and Mody [1992] did not find a significant correlation between the size of FDI and the host country's risk factor - which included corruption among other variables and was highly correlated with corruption. More recently, a significant negative impact was detected by Wei [1997a], who focused on bilateral flows between 14 source and 45 host countries in 1990 and 1991. He finds that an increase in the corruption level from that of Singapore to that of Mexico is equivalent to raising the tax rate by over twenty percentage points.⁷ Alesina and Weder [1999] conducted regressions of corruption on FDIs in a cross section of countries, testing a variety of different specifications and explanatory variables. They conclude that for almost no specification the impact of corruption is significant at conventional levels. In sum, the evidence of an impact of corruption on FDIs is mixed.⁸

But FDI represent only a minor fraction of a country's total capital inflows. The impact of corruption on these total net capital imports is proven in Lambsdorff [1999b]. In a cross-section of 65 countries, corruption is shown to decrease capital inflows at a 99 % confidence level, controlling for various explanatory variables such as GDP per head, domestic savings rates and raw material exports. An increase in Colombia's level of integrity to that of the United Kingdom is found to increase net annual capital inflows by 3 percent of GDP.

3.5 International Trade

In a first inquiry Beck, Maher and Tschögl [1991] found that corruption had a small but still significant impact on the export competitiveness of the USA as a result of the FCPA. Similar conclusions are reported by Hines [1995], showing that US aircraft exports after 1977 decreased in countries perceived to be corrupt. These results are however not sufficient to argue that the USA has a competitive disadvantage, since they could just as well indicate that competitive advantages in corrupt marketplaces before 1977 had been neutralized thereafter. In order to adequately address this question in a broad study, Lambsdorff [1998a] examined bilateral trade data between 1992 and 1995 for the leading 18 exporting and 87 importing countries. While controlling for common languages, geographic distance, export composition and trade blocks, he concludes that Belgium, France, Italy, the Netherlands and South Korea have competitive advantages in countries perceived to be corrupt. Disadvantages exist for Australia, Sweden and Malaysia. The USA also has significantly less market share in corrupt countries than the first group of countries. It is concluded that these differences should be explained by differences in exporters' willingness to offer bribes and that the results indicate that exporting countries must share part of the responsibility for the level of bribery in international trade. An update of this study, including more countries and trade data, is presented by Lambsdorff [1999c], that largely supports the results described above.

3.6 Foreign Aid

Alesina and Weder [1999] investigated whether corrupt governments attract or deter aid from OECD countries. The authors make use of a variety of different measures of corruption and investigate different samples of countries. Testing for various specifications of the regressions, the authors do not find evidence that corrupt countries are discriminated against by foreign donors. Quite the contrary, some results suggest that corrupt countries are even more apt to attract foreign aid from OECD countries.

Bilateral aid flows are also investigated. Scandinavian countries and Australia have a significant tendency to avoid providing aid to corrupt countries. At the opposite extreme is the US, where a significant negative coefficient of the corruption variable indicates that the US tends to favor corrupt countries in providing aid. Unfortunately, regressions on bilateral aid flows were only made using the corruption variable provided by PRS. The authors did not cross-check their results by employing other indices, leaving a grain of skepticism regarding these controversial insights.

4. The Causes of Corruption

Some of the studies cited in section 3 provide first insights into the causes of corruption. It was shown that levels of corruption had an impact on flows of bilateral trade and donor assistance. This gave rise to the argument that the large exporting countries and donors in question exhibit a different propensity to pay bribes and to accept illegitimate payments. This provides reason that levels of corruption are not only determined domestically but that the responsibility must be shared with others, particularly the larger global players. But, without doubt, there also exist a variety of domestic causes for corruption. These will be investigated next.

4.1 Public Institutions

By regressing various measures of corruption on indicators of press freedom, Brunetti and Weder [1998b] show that a free press effectively deters corruption. The latter variables consist of "laws and regulations that influence media content", "political influence over media content", "economic influence over media content" and "repressive actions" as compiled by Freedom House. These four separate indices and an aggregate index of press freedom all impact negatively on the level of corruption in various specifications.

Brunetti and Weder [1998c] investigate the impact of openness and democracy on the level of corruption in selected countries over intervals of time. Making use of a time series for the level of democracy, the authors report reductions in the level of corruption in South Korea, Paraguay and Bolivia, as measured by the PRS corruption index. Whether these results can be reproduced for Eastern European countries is doubtful, however. A cross-section analysis is applied in the same study. The corruption index by PRS is regressed on a country's openness (ratio of exports and/or imports to GDP) and protectionist trade distortions (import duties, export duties, black market premium and the distortion of the real exchange rate) and a subjective measure by PRS with respect to the risk of expropriation. The authors argue that all these indicators represent a form of "exit", that is, the possibility of citizens to "substitute" their country with another one. This variable contrasts to "voice", the chance to fight corruption by control and participation. It is suggested that this variable be measured by the extent of political rights, democracy and various measures of control over politics and bureaucracy. Also these variables of voice are reported to significantly impact on the level of corruption. As the work is still in progress, some final conclusions are still pending. It remains noteworthy that both exit and voice contribute to containing the level of corruption.

An approach by the World Development Report [1997: 104 and 168] focuses on the quality of the judiciary. While controlling for other explanatory variables, an index of the predictability of the judiciary from WB/UB significantly influences the level of corruption in 59 countries. A similar correlation between corruption and the independence of the judicial system is proposed in Ades and Di Tella [1996].

The impact of the Gastil index for democracy on corruption is tested by Paldam [1999a]. While the correlation between these variables is large, in multivariate regressions this relationship breaks down as soon as GDP per head enters into the equation. The author argues that the effect of democracy is ambiguous. This insignificance is also reported by Treisman [1999a], using the same index on democracy. But for a selection of 64 countries, a small but significant influence is found when testing for countries which have been democracies without interruption since 1950. It is argued that while the current degree of democracy is not significant, a long period of exposure to democracy lowers corruption.

Another less technical line of research took a corruption index as a starting point to illustrate the impact of political institutions on corruption. Noteworthy, among others, are contributions by Heidenheimer [1996] and Bardhan [1997].

4.2 Recruitment and Salaries

The impact of merit-based recruitment on corruption in 35 developing countries has been investigated by Evans and Rauch [1996]. Higher values in the merit-based recruitment index are associated with a greater proportion of higher-level officials in the core economic agencies to be either in possession of a university degree or to enter the civil service through a formal examination system. While controlling for income, this index is negatively associated with corruption. To what extent the level of public sector salaries is linked to the amount of corruption was examined by Rijckeghem and Weder [1997]. They argue that low salaries force public servants to supplement their incomes illicitly while high salaries mean higher losses if a public servant gets caught. In a small sample of 28 developing countries, they find a significant negative influence on the level of corruption of civil service wages relative to manufacturing wages. Doubling the civil service wage, i.e. from 1 to 2, will improve the corruption index by the order of 2 points on the TI index.² By acknowledging the existence of more indirect effects, the impact might be even larger. Yet the authors are very careful in addressing the problem of causality: Corrupt countries tend to have a poor budgetary performance or may subscribe to the view that civil servants earn sufficient income from corruption and may reduce civil service pay as a consequence.

More recent studies by Swamy et al. [1999] and [Treisman 1999a] investigated inter alia the impact on corruption of the average government wage as a multiple of per capita GDP, controlling for a variety of other influences. The results are ambiguous and mostly insignificant, depending on the indicator for corruption employed and the inclusion of control variables.

4.3 Cultural Determinants

Some societies are characterized by a high level of trust among its people, while others may lack this. Investigating the consequences of such forms of "social capital" has been made possible with data from the World Value Service, which surveyed 1000 randomly selected people in each of 40 countries in the 1980's and again in the 1990's. One question has been: "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" La Porta et al. [1997: 336] argue that trust can be helpful in fighting corruption, since it helps bureaucrats to better cooperate with each other and with private citizens. In a sample of 33 countries, the authors show that trust has a significant negative impact on corruption, while controlling for GDP per head.

Also the role of religion in contributing to the level of corruption was examined by La Porta et al. [1997: 337]. The authors consider the Catholic, Eastern Orthodox and the Muslim religion to be particularly hierarchical - and that such hierarchical forms of religion are detrimental to civic engagement, a factor which should help reduce corruption. For the same sample of 33 countries mentioned above, the authors report a positive association between the percentage of population belonging to a hierarchical religion and corruption, controlling for other influences. For a larger section of 114 countries this relationship is reproduced by La Porta et al. [1999: 251-2]. But here the relationship becomes rather weak as soon as GDP per head is included. A strong association between religion and corruption is obtained by Treisman [1999a]. He regresses corruption on the percentage of Protestants in the total population in a sample of up to 64 countries and obtains a highly significant negative impact of this index on corruption, controlling for other variables such as GDP per head. A more in-depth analysis of the impact of religion is provided by Paldam [1999b]. He identifies 11 different groups of religions and tests their impact on corruption, controlling for other variables. While in countries with a large fraction of Reform Christianity and Tribal religion corruption is lower, higher levels of corruption can be found in countries with a large influence of Pre- Reform Christianity, Islam, Buddhism and Hinduism. However, the impact is only significant for Reform Christians (Protestants and Anglicans).

In line with the argument by La Porta et al., the idea that hierarchies contribute to corruption has been supported by Husted [1999], who uses a totally different set of data. Based on the surveys by Hofstede [1997], he employs the resulting data on cultural values. One variable defined there is called "power distance" which measures "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally", [Husted 1999: 343]. This variable is shown to have a positive impact on the level of corruption in a sample of 44 countries in various regressions, while controlling for other explanatory variables. Concomitant with this indicator, two further cultural variables positively and significantly impact on the level of corruption: first, the extent to which the quest for material success dominates over a concern for the quality of life¹⁰ and, second, the extent to which members of a culture feel threatened by uncertainty or unknown situations. The latter variable must clearly be distinguished from risk avoidance, which might be expected to lower corruption. The idea is that corruption may give its beneficiaries the hope of reducing the level of uncertainty they face. But statistical support for this hypothesis still comes as a surprise because avoiding uncertainty should also give third parties who suffer from corruption the incentive to fight it.

The impact of gender on corruption, another aspect which is treated here as a cultural dimension, has also been investigated recently by Swamy et al. [1999] and Dollar et al. [1999]. The authors determine the percentage of women in the labor force and in parliament. Both indicators negatively impact on the level of corruption in a cross-section of up to 66 countries. The influence is large in magnitude, highly significant and robust throughout a large variety of regressions, controlling for various variables. These findings are in line with some micro-evidence reported by Swamy et al. and suggest that policies designed to increase the role of women may help in lowering the level of corruption.

Tracing the level of corruption to cultural determinants should not suggest that levels of corruption are largely inevitable. Culture can only explain a certain fraction of the level of corruption and there remains sufficient room for improvements of a country's integrity. Moreover, cultural attitudes can also be a reflection of the organizational patterns that led to their formation. The extent to which these organizational patterns can be the subject of policy reform reflects the further scope for anti-corruption initiatives. But a clear conclusion drawn by Husted [1999] is that effective measures to fight corruption are dependent on culture. Countries with a large power distance or a strong desire for material wealth will require different treatment than others.

4.4 Further Variables

There are still no full-fledged studies about the impact of colonialism on the level of corruption. But variables of colonial heritage sometimes enter as control variables when some studies investigate the causes of corruption. This is the case in Swamy et al. [1999] and Treisman [1999a]. According to Treisman, former British colonies exhibit lower levels of corruption than other countries, controlling for the level of income per head and various other variables, for example the existence of a common law legal system. This result is reproduced by Swamy et al. [1999]. Both studies found that colonies of other countries do not exhibit the same reduction in the level of corruption.

It is surprising that colonialism does not increase the level of corruption, as suggested by anecdotal evidence. But as outlined above, these studies did not primarily intend to investigate the impact of colonialism on corruption. To arrive at sound conclusions further analysis is required which should go beyond the use of dummy variables and take into consideration certain characteristics of colonial rule, as was done by Treisman [1999a] for British colonies.

Leite and Weidemann [1999] argue that abundance of natural resources creates opportunities for rent-seeking behavior and gives rise to corruption. They measure the first variable as a country's exports of fuels and minerals as a share of GNP. This variable is found to significantly increase the level of corruption in a cross-section of 72 countries, controlling for income in 1970. The results appear to be robust for a variety of specifications.

5. Conclusions

In a recent wave of empirical studies the causes and consequences of corruption have been investigated. It can be concluded that corruption commonly goes along with policy distortions, inequality of income and lack of competition. But to derive clear arguments with respect to causality is rather difficult. On the one hand, corruption may cause these variables but is at the same time likely to be the consequence of them. On the other hand, cultural determinants may drive corruption and the variables in question at the same time. These empirical results are nonetheless helpful in identifying areas which are prone to corruption or which indicate its existence.

Empirical studies on the welfare effects are sometimes producing inconsistent results, e.g. with respect to foreign direct investments. Similarly, the proven impact of corruption on investment is commonly related to an adverse effect of corruption on incentives to invest. But this is not without theoretical strings. But there is strong evidence that corruption lowers a country's attractiveness for making investments. This reduces capital accumulation and lowers capital inflows. Also the productivity of capital suffers from corruption. This corroborates that large welfare losses result from corruption.

With respect to the causes of corruption not all results were consistent. For example the role of wages is ambiguous. Also the impact of democracy and colonialism on corruption was not very clear and may deserve further scrutiny. Press freedom and the independence of the judiciary appeared to be important elements in reducing corruption. Also, an increased role of women in society turned out to strongly reduce the level of corruption. Abundance of natural resources increased the level of corruption. Further cultural dimensions were determined to be important. In particular, a mentality of accepting hierarchies was found to increase corruption.

While domestic causes of corruption have been identified, the role of the international community deserves equal recognition. In globalized markets corruption often takes place in cross-border activities. This idea was investigated in various studies, suggesting that some exporters and donors tend to favor countries perceived to be corrupt. This suggests that some global players contribute to high levels of corruption more than others.

Notes

1. At first, part of the negative impact of a dummy variable for federal states on corruption is explained by a country's overall size as measured by total population. This comes about as federal states are commonly larger than centralized ones. Another dummy variable tested by Treisman indicates whether separate police forces exist both at central and subnational levels. Treisman argues that in this case regulatory authorities overlap, providing incentives for the police to "overgraze" by excessively extorting bribes. This variable turns out to significantly increase the level of corruption. Another side-aspect of decentralization can be that the number of veto-players who can block central governments decision increases. Corruption can emerge for buying off these veto-players or because corrupt regional governments will have far greater leverage to protect their ill-gotten gains. Treisman shows that if a regionally elected upper house can block non-financial legislation by the central government this can increase corruption. But the coefficient reported for this variable is less significant.
2. Huther and Shah do not include further explanatory variables. One cannot exclude that more developed countries are less corrupt and more decentralized at the same time. This could introduce an omitted variable bias.
3. For the regressions the authors make use of subjective indicators of corruption. The authors also suggest that corruption may be larger when spending is decentralized while revenue collection remains in the responsibility of the central government. The argument appears plausible. But the authors proxy the level of corruption in local states of the USA by the number of convictions for abuse of office. However, this variable can easily grow with the effectiveness and effort of the judicial system rather than with actual incidents of corruption.
4. In statistical terms, there appear to be problems of heteroskedasticity in the Mauro regressions. Also the scatterplots in Brunetti, Kisunko and Weder [1997] suggest that heteroskedasticity may be prevalent in the regressions.
5. For the approach with panel data there might be problems of serial correlation - the quality of roads and the level of corruption change little from year-to-year. Treating each annual observations as independent is therefore questionable.
6. The R2 is as low as 0.13, indicating that either too much noise is affecting this relationship or too little is known about other influencing factors.
7. A further contribution by Wei [1997b] argues that in addition to the overall level of corruption it is arbitrariness that harms capital inflows. As those who pay bribes have no legal recourse, contracts obtained through bribery cannot be enforced. This is why corruption, while not necessarily more expensive, is more harmful than taxes. Wei derives a measure of arbitrariness from the survey by WEF. While the question posed relates to the overall level of corruption, Wei argues that the variance in the replies represents a form of arbitrariness. This can be considered valid if the insecurity among respondents about the true costs of bribes is reflected in the variance. Arbitrariness, thus defined, significantly enters into the regressions on FDI. But it has been questioned whether arbitrariness is adequately measured by this variable. Particularly, the variance among respondents could also reflect heterogeneous conditions in a country or be related to subjective difficulties among respondents in judging the right score on the questionnaire. Arbitrariness may be better measured by the predictability of corruption as determined by WB/UB.

8. The approach by Wei [1997a] is superior in so far as an investigation of bilateral flows allows to consider geographic proximity as an explanatory variable. But since his conclusions refer to the overall performance of host countries in attracting FDI, it could arise that the error terms are correlated with each other. This can bias the significance levels he reports.
 9. The authors refer to a 1-point improvement in a corruption index by the Political Risk Service. This index has about half the standard deviation of the relevant subsample of countries in the TI index.
 10. This variable is called masculinity-femininity. But I avoid this term because it might mislead some readers.
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