

# The New Economics of Corruption: a Survey and some New Results

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## Introduction

Governments of all political colours in countries of all levels of wealth are affected by corruption scandals with a frequency and intensity that seems to be always on the increase. Corruption has become a 'hot issue' and is now a major topic of political competition, even in the industrialized democracies. Yet, to a large extent, economists have remained vague about what can be done to reduce it. A main concern is the lack of evidence in support of the main policy alternatives. This paper reviews the state of economic knowledge on the phenomenon of corruption, with special emphasis on the theory behind the most common policy proposals and the evidence that supports them.

During the last thirty years or so economists from different fields have made scattered contributions to the analysis of corruption, so that by now a certain body of literature has emerged. The first published piece on corruption that received wide attention is Rose-Ackerman,<sup>1</sup> though the topic was also in the minds of people doing research in the economics of crime,<sup>2</sup> agency theory,<sup>3</sup> rent-seeking,<sup>4</sup> and development economics.<sup>5</sup> While theories abounded, a lack of data on corruption to test the theoretical contributions allowed conflicting theories on the causes and consequences of corruption to coexist. As a result, the field has been unable to provide coherent policy guidelines to curb corruption and has remained somewhat disconnected from the discussion arena, a place mainly dominated by lawyers, businessmen and judges.

More recently, an emerging body of empirical research has begun to appear, employing subjective indices on corruption produced for business-related purposes. We organize the literature into two broad themes: theories about the causes of corruption and theories of its effects. With regard to the latter, we show how the new data has shed light on a controversy that originated in the 1960s about the theoretical possibility that corruption may

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<sup>1</sup> Susan Rose-Ackerman, 'The economics of corruption', *Journal of Public Economics*, 4(2) (1975), 187–203.

<sup>2</sup> Particularly Gary Becker and George Stigler, 'Law enforcement, malfeasance and the compensation of enforcers', *Journal of Legal Studies*, 3(1) (1974), 1–19.

<sup>3</sup> M. Harris and A. Raviv, 'Some results on incentive contracts with applications to education and employment, health insurance, and law enforcement', *American Economic Review*, 68 (1978), 20–30.

<sup>4</sup> Gordon Tullock, 'The welfare costs of tariffs, monopolies and theft', *Western Economic Journal* (now *Economic Enquiry*), 5 (1967), 224–32.

<sup>5</sup> Gunnar Myrdal, *Asian Drama: an Inquiry into the Poverty of Nations*, vol. II (New York, Pantheon, 1968).

be beneficial to investment and growth in countries with particularly obtrusive bureaucracies.

With respect to the theories on the causes of corruption, we present the theoretical background and empirical performance of some of the most voiced policy proposals. Broadly speaking, there are three types of policy proposals aimed at curbing corruption, which we can call the lawyer's approach, the businessman's approach and the economist's approach. These consist, respectively, in producing tougher new laws and tougher enforcement of existing laws,<sup>6</sup> in paying higher wages to bureaucrats<sup>7</sup> or, finally, in increasing the level of competition in the economy, both among firms and bureaucrats.<sup>8</sup>

Two of the least corrupt countries in the world, Singapore and Hong Kong, are usually set forth as examples of successful applications of the lawyer's approach, as they have quite draconian laws on corruption. As it happens, they are also examples of countries that pay their bureaucrats exceptionally well (especially Singapore), so they are also examples of the businessman's approach to corruption control. However, the level of political competition and civil liberties in these countries is quite poor, something that has allowed exceptional levels of pay in the bureaucracy without too much political opposition, and has often bestowed the anti-corruption agencies with sweeping powers that amounted to a 'guilty until proven innocent' principle, or even the right to violate the privacy of individual citizens. Since these experiences cannot be easily adapted to other countries, it becomes necessary to distinguish how much of their clean record should be attributed to their policy of high wages in the bureaucracy and how much to their tough approach to law enforcement. The third proposal, the economist's approach of unleashing the forces of competition against corruption, has the least cost in terms of civil liberties. As it happens, it is also supported by the experience of Singapore and Hong Kong, as these countries are models of *laissez-faire* societies with market forces competing away rents in an extreme way. Thus, what is required is an assessment of the relative impact of each policy option based on a wider empirical basis.

The purpose of this paper is, therefore, twofold: first, to describe the main topics in the economics of corruption, including the present directions of research; and second, to place special emphasis on the theory and evidence behind the policy alternatives in restraining corruption.

### The New Data on Corruption

In general, recent empirical studies of corruption have used data from three different sources. All three data sets have been created for business related purposes, to be consumed by banks, institutional investors, or multi-national firms. The first two data sets are bought at quite high prices.

The first data set comes from *Business International* (BI), a subsidiary of *The Economist Intelligence Unit*. Data is available for the period 1980–83 and covers

<sup>6</sup> One such policy proposal is by Italy's judge Antonio Di Pietro, who argues that a way to curb corruption is to reform the judiciary system to allow for plea bargaining and to give judges the ability to grant immunity from prosecution to those that cooperate with the investigations.

<sup>7</sup> See, for example, Becker and Stigler, 'Law enforcement, malfeasance and the compensation of enforcers'.

<sup>8</sup> See Susan Rose-Ackerman, *Corruption: a Study in Political Economy* (New York, Academic, 1978) and Alberto Ades and Rafael Di Tella, 'Competition and corruption', *Applied Economics Discussion Paper Series No. 169*, Oxford University (1995) and Christopher Bliss and Rafael Di Tella, 'Does competition kill corruption?', *Journal of Political Economy* (1997), forthcoming.

close to 70 countries. The corruption measure in this data set is quite general and is provided by BI's network of correspondents who must grade on a scale of 10 'the degree to which business transactions involve corrupt payments' in each of the countries covered. All correspondents use the same methodology and their reports are further checked for comparability at the regional level and at BI's headquarters.

A second data set comes from the *World Competitiveness Report (WCR)*, a business publication produced by the World Economic Forum in Switzerland, and consists of a survey of top and middle managers in the most dynamic firms in each of the countries covered. The surveys have included a question on corruption since 1989, cover a minimum of 32 countries and usually involve over a thousand executives. The question asked is 'the degree to which improper practices (like corruption) prevail in the public sphere'. An advantage of the WCR over the BI data is that it covers people with an intimate knowledge of business practices in each of the countries covered. But the apparent lack of a centralized office to consolidate the answers of those surveyed by the WCR could be a drawback of the WCR data in a cross-section study, as it calls into question the comparability of the answers between countries. The fact that the companies to which the survey respondents belong are successful and internationally oriented is only a partial answer to that concern.

The third data set was gathered by Peter Neuman and his collaborators at *Impulse*, a German business publication. It also consists of a survey, this time of German businessmen who normally conduct business with each of the countries covered (typically exporters). On average, 10 persons were interviewed for each country, and an effort to have a minimum of three respondents per country was made. An important advantage of this data set is that there is less subjectivity involved as respondents must simply provide an estimate of the kickback per deal (as a percentage of the deal's value) that would have to be paid in order to conduct business in each country. The data was published in 1994 and covers 103 countries. Another advantage is that it originated in a very homogeneous group of people (German exporters), with practical business experience in each country covered and who answer a quantitative question.

Traditionally, empirical economists expect to use hard data in their research. In the case of corruption, attempts have been made to use data on number of convictions for corruption, but this type of data is of extremely low comparability between countries, and cannot capture undiscovered corruption cases, so effectively it is more a measure of the effectiveness of enforcement policies than of the level of corruption. Thus, the advantage of using subjective data on corruption; in addition, these indices can be defended using an argument of revealed preference: they are the market's choice of a corruption indicator.

The degree of correlation between the three corruption measures is quite high, as shown in Table 1.

The raw data show that corruption is strongly negatively correlated with the level of development of the country, as measured by the level of income per capita or the average years of schooling in the population over 25. The lack of political competition (as proxied by the Gastil Index of political rights) is positively associated with the level of corruption. The weakest relationship is shown for the WCR data set, and is due to the inclusion of two very 'clean' countries, like Hong Kong and Singapore, that have also a very low degree of

TABLE 1. Simple Correlations

	BI	WCR	German
WCR	0.84 (0.00)		
German	0.81 (0.00)	0.84 (0.00)	
GDP	-0.74 (0.00)	-0.74 (0.00)	-0.61 (0.00)
Political rights	0.50 (0.00)	0.23 (0.20)	0.35 (0.00)
Schooling	-0.70 (0.00)	-0.59 (0.00)	-0.56 (0.00)
Openness	-0.21 (0.11)	-0.41 (0.02)	-0.21 (0.04)

*Note:* The correlation between BI and WCR is based on 38 observations, the one for WCR and German is based on 39 and that for BI and German is based on 62 observations. The rest of the correlations for BI are based on 55 observations, those for WCR on 32 while those for German are based on 92 observations. The significance probability of the correlation under the null hypothesis that the statistic is zero is shown in parenthesis.

TABLE 2. Frequency Histogram for the *Business International* Corruption Index (BI)

BI = 0	0 < BI ≤ 1	1 < BI ≤ 2	2 < BI ≤ 4	4 < BI ≤ 6	6 < BI ≤ 9
Australia	Belgium	Angola	Argentina	Algeria	Egypt
Canada	Chile	Austria	Cameroon	Bangladesh	Ghana
France	Denmark	Hong Kong	Dominican	Brazil	Haiti
Iraq	Finland	Japan	Greece	Colombia	Indonesia
Netherlands	Germany	Jordan	Italy	Ecuador	Iran
New Zealand	Ireland	Nicaragua	Ivory Coast	India	Liberia
Norway	Israel	South Africa	Kuwait	Jamaica	Mexico
Singapore	UK	Uruguay	Malaysia	Kenya	Nigeria
Switzerland	Sweden	Zimbabwe	Peru	Korea	Thailand
United States			Portugal	Morocco	Zaire
			Spain	Pakistan	
			Sri Lanka	Panama	
			Taiwan	Philippines	
			T&Tobago	Saudi Arabia	
			Turkey	Venezuela	

*Note:* The BI corruption index covers 68 countries.

political rights in a relatively small data set.<sup>9</sup> The raw data also show that the degree of openness is negatively correlated with the three corruption indicators.

Table 2 presents a frequency histogram for the BI data.

### The Costs of Corruption

One of the reasons often cited for the relative neglect of corruption as a research topic in economics is that a bribe is simply a transfer and therefore entails no serious welfare losses. Myrdal seriously questioned this view arguing that if corruption is allowed, government officials will have an interest in generating

<sup>9</sup> In some regressions that hold constant the level of development, the lack of political rights can even have a significant and positive effect on corruption. Again, this is due to the inclusion of these two extreme countries and only shows if the sample size is small.

bureaucratic hurdles to demand bribes.<sup>10</sup> Thus, rather than supporting production, the bureaucracy becomes a burden obstructing efficiency.<sup>11</sup>

If, instead, delays are the product of pre-existing rules devised by rather hyperactive social planners, then corruption may serve a useful purpose. This is the approach taken by Leff<sup>12</sup> and others, who argue that corruption improves social welfare, both because it is a way to avoid cumbersome regulations and because it is a system of building in rewards for badly paid bureaucrats.

These two approaches, corruption as 'sand' and corruption as 'oil' in the machine, coexisted with ingenious rationales behind each approach being constantly added to the list. But the lack of data prevented these competing hypothesis from being directly tested against one another.

Mauro presents the first systematic empirical analysis of the effects of corruption by focusing on the relationship between investment and corruption.<sup>13</sup> He uses the BI index of corruption to estimate the effects of corruption on the average ratio of total and private investment to GDP for the period between 1960 and 1985 for a cross-section of 67 countries. Mauro finds that corruption lowers investment, thereby reducing growth. For example, he finds that if Bangladesh were to improve the integrity of its bureaucracy to the level of that of Uruguay (this corresponds to a one standard deviation improvement in the index), its investment rate should rise by almost 3 percentage points and its yearly GDP growth rate would rise by over half a percentage point. The potential endogeneity of corruption is dealt with using instrumental variables. The magnitude of the estimated effects is somewhat larger but finding a plausible instrument in this context remains a daunting task.

Mauro also constructs a 'bureaucratic efficiency index' as the arithmetic average of the BI indexes of 'efficiency of the legal system and the judiciary', an index for the amount of 'bureaucracy and red tape', and the BI 'corruption' index. The index is again negatively and significantly associated with investment. Furthermore, the effects are quite strong. A one standard deviation improvement in bureaucratic efficiency is associated with an increase in the investment rate by 4.75 per cent of GDP. The estimated magnitude of the effects are higher and remain significant when controlling for possible endogeneity using TSLS techniques.

For the 'bureaucratic efficiency index', similar results obtain in the context of a more general investment regression. In this more general setup, Mauro adds the 'bureaucratic efficiency' index to the standard set of controls from Barro.<sup>14</sup> These include the level of income per capita in 1960, primary and secondary school enrolment in 1960, the average share of government consumption expenditure to GDP from 1960 to 1985, the number of revolutions and coups per year from 1960 to 1985 in each country, the 1960 PPP value of the investment deflator (US = 1.0) and the absolute value of its deviation from 100,

<sup>10</sup> See Myrdal, *Asian Drama* and also Rose-Ackerman, *Corruption*, ch. 5.

<sup>11</sup> The Santhanam Committee report on corruption in India (cited by Myrdal, *Asian Drama*) notes that '(w)e have no doubt that quite often delay is deliberately contrived so as to obtain some kind of illicit gratification'.

<sup>12</sup> Nathaniel Leff, 'Economic development through bureaucratic corruption', *American Behavioral Scientist*, (1964), 8–14.

<sup>13</sup> Paolo Mauro, 'Corruption, country risk and growth', mimeo, Harvard University (1995). [Forthcoming *Quarterly Journal of Economics*].

<sup>14</sup> R. Barro, 'Economic growth in a cross-section of countries', *Quarterly Journal of Economics*, 106 (1991), 407–44.

and average per capita political assassinations. In this regression, the magnitude of the effect of bureaucratic efficiency on investment is halved, though it remains significant at the 5 per cent level.

The results from Mauro are supportive, therefore, of the claim that corruption has a negative impact on investment, and through that channel it negatively affects growth. It is still worth considering whether the effects of corruption are different depending on the level of red tape in the economy, as argued by Leff and his followers. Mauro provides some evidence against Leff by dividing his sample into high red tape and low red tape sub-samples, and finds a negative and significant association between investment and corruption regardless of the level of red tape. However, he finds that the negative impact is smaller in the high red tape sample, though he makes no attempt to test whether this difference is significant.

To examine this proposition more closely, we regress the investment rate in country  $i$  on the BI *corruption* index, a dummy variable that takes a value of 1 if the BI index for *bureaucracy and red tape* exceeds the median, and an interaction term between the two. Essentially, this is just testing whether the negative effect of corruption on investment is significantly lower in countries with high levels of red tape. The regression below shows our results, with standard errors in parenthesis. The sample we use is smaller than Mauro's as we restrict attention to the 55 countries with data for at least three years.

$$V_i = 0.270 - 0.019 \text{ CORR}_i - 0.087 \text{ BUREAU}_i + 0.014 \text{ INTERACT}_i$$

(0.012)      (0.008)                      (0.027)                      (0.009)

As shown, the negative and significant coefficients of the corruption and bureaucracy indices indicates that both have a negative impact on investment. Interestingly, the coefficient on the interaction term, while statistically weak, has the sign predicted by Leff and his followers, indicating that in countries with high levels of red tape corruption has less damaging effects on investment.

Corruption may, however, affect growth through channels other than investment. Mauro estimates the effects of corruption on the composition of government expenditure.<sup>15</sup> This approach consists in examining in more detail some of the possible channels through which corruption affects economic performance, the allocation of government spending being one of them. For a cross-section of countries, Mauro finds that corruption and political instability are negatively and significantly correlated with the share of government expenditure on education in total spending and in GDP. As a possible explanation, he conjectures that it may be more difficult to collect bribes on education projects than on other components of government expenditure. These are preliminary efforts, however, as one would want to make sure that this is not merely capturing the effect of the level of development in the composition of government expenditure.

The results obtained so far on the effects of corruption on investment and the allocation of government spending should be treated with caution given the narrowness of the data sets used. However, there is already some evidence to suggest that corruption acts mainly as 'sand in the machine', and the possibility that it has positive effects in countries with high red tape does not receive conclusive support from the data.

<sup>15</sup> Paolo Mauro, 'The composition of government expenditure: the good guys and the bad guys', mimeo, Harvard University (1994).

### **The Causes of Corruption**

In order to analyse the causes of corruption and compare the three approaches to anti-corruption policies, namely tighter enforcement of laws, higher wages in the bureaucracy and more competition in the product market, we focus on a stylized case of corruption. As a heuristic device, we can think of most cases of corruption as occurring in a structure similar to this:

#### **THE PUBLIC**

*Objectives:* Maximize social welfare

*Actions:*

- Chooses rules and regulations
- Sets market structure of Firms and Bureaucrats
- Designs formal and informal incentives
- Carries out monitoring of activities and outcomes

*Constraints:*

- Resources
- Participation
- Information

#### **BUREAUCRATS**

*Objective:* Maximize utility

*Actions:*

- Decide to participate
- Apply regulations to please voters and receive wages
- Not apply regulations to please Firms and demand bribes
- Invent regulations to relax later in exchange for bribes

*Influences:*

- Monitoring by The Public
- Formal and informal incentives specified by The Public (influenced by the market structure in which Firms operate)
- The market structure in which Bureaucrats operate

#### **FIRMS**

*Objective:* Maximize profits net of bribes

*Actions:*

- Decide to participate
- Obey rules set up by The Public and by Bureaucrats
- Disobey rules and offer bribes
- Denounce bribe demands to The Public

*Influences:*

- Regulations imposed by Bureaucrats (influenced by the market structure in which Bureaucrats operate)
- Monitoring by The Public
- The market structure in which Firms operate.

The Public wishes to maximize social welfare. For this it uses a variety of instruments such as pollution regulation (to keep the air clean), or export subsidies (to promote 'national champions' that are technological leaders) to name just two. To pursue its objective, the public can do one of two things: it can either set up a bureaucracy or it can periodically elect politicians. The two alternatives have their advantages as bureaucrats usually have longer horizons

but politicians are more accountable for their actions. Typically The Public will want to employ both types, and we will stress some of the differences below, but for now we shall call them Bureaucrats. In our example, Firms are the third and final party to the corrupt relationship.

The important point is that the public's choice of policies to maximize social welfare typically entail the transfer of rents in favour of some groups at the expense of others. This is the case when import duties or quotas are imposed. Thus, the bureaucrat's actions have value for the private agents involved. Ideally, bureaucrats should have a high degree of social conscience, so that their objectives would be perfectly matched with those of society, acting only as a 'veil' and perfectly translating those objectives into policies. In practice, however, the public's objectives are less clear cut than implied above. Furthermore, bureaucrats have, like most other economic actors, an agenda of their own, and monetary income is certainly one of the arguments of their objective function. Corruption can take place if the bureaucrat decides to cash-in the value of control rights by taking bribes.

Therefore, the public must provide the bureaucrat with the appropriate incentives if its goals are to be achieved. Broadly speaking, there are three types of constraints that affect the eliciting of desired behaviour from the bureaucrat. The first limitation is a constraint on the amount of resources and technological possibilities available at any one time. Examples are the limitations in monitoring technology, and the characteristics of the population of potential bureaucrats such as history, risk aversion or moral scruples. A second limitation is the possibility available to bureaucrats and firms in free societies of refusing to participate in the contract with the public. Regulated firms may decide to close their operations and relocate elsewhere, or simply switch to other activities. Bureaucrats may seek employment in the private sector. The third limitation is the amount of information that the public has. As stressed by Laffont and Tirole<sup>16</sup> amongst others, informational asymmetries are important in understanding why voters have incomplete control over the agencies they set up. Even in this highly stylized representation we can guess that the design of an optimal programme to achieve the public's objective can be an extremely demanding task. In a more realistic setting, where the bureaucracy is divided into many agencies, the constraints are interdependent as they must take into account both the natural uncertainty in the environment and the effects of other regulatory agencies. Thus, for example, if restrictions on imports are increased, the value of the control rights of the bureaucrats in the pollution regulation department are increased, so the optimal contract of the bureaucrats implementing commercial policy *and* of the pollution regulators must change.

Bureaucratic performance will also depend on the market structure of the bureaucracy itself. As shown by Rose-Ackerman and Shleifer and Vishny,<sup>17</sup> the equilibrium amount of corruption will critically depend on whether bureaucrats collude, acting as joint monopolists in the process of maximizing bribes, whether they act independently of each other, or whether overlapping jurisdictions induces some competition between them.

<sup>16</sup> Jean Jacques Laffont and Jean Tirole, *A Theory of Incentives in Procurement and Regulation* (The MIT Press, 1993).

<sup>17</sup> Rose-Ackerman, *Corruption*. Andrei Shleifer and Robert Vishny, 'Corruption', *Quarterly Journal of Economics*, (1993), 599–617.

The objective of firms is to maximize profits. Their behaviour is affected by the amount of rules and regulations the public decides to impose on the private sector. A second influence on the behaviour of firms results from direct monitoring by the public to ensure compliance with its regulations. Lastly, there is the market structure in which firms operate, something that is the outcome both of natural technological possibilities and of intentional policy choices of the public, such as the level of the tariff rates on foreign trade. The market structure in which firms operate will affect the value of the control right owned by the bureaucrat. Typically, the ability of bureaucrats to extract bribes in exchange for softer regulations will be higher in environments in which firms enjoy monopoly rents. Thus, bribe determination between bureaucrats and firms is akin to the rent-sharing models of wage determination, where the exchange of control rights takes the place of labour.

To summarize, the public can influence the level of corruption in this very general setting, by acting on two broad fronts: providing the right incentives to bureaucrats, and designing competitive market structures both for bureaucrats and firms. The businessmen's and the lawyer's approach to curbing corruption are both part of the former, whilst the economist's approach is an example of the latter.

#### *A. Incentives*

Businessmen usually argue that there is a very simple way to curb corruption: do what a private firm would. This typically implies that the public should provide formal incentives, usually in the form of very high wages, according to the importance of the bureaucrat's position. The lawyer's approach is to increase monitoring of inputs and performance and to improve the enforcement of laws. Traditionally there are three ways in which incentives are provided: through *formal incentives*, such as wages or bonus schemes; *informal incentives*, such as career concerns and reputations; and finally, by directly *monitoring inputs* through periodic inspections or by employing supervisors.<sup>18</sup>

#### *Formal incentives*

Formal incentives, such as wages and bonus schemes, usually play a minor role in controlling corruption, basically because measurable performance indicators are not always easy to construct. In some areas of government where performance is clearly defined some attempts have been made to tie pay to performance. For example, employees at the Bolivian customs service were promised in 1985 part of the agency's revenues, which led to a 60 per cent increase in customs revenues.<sup>19</sup> In Italy, the inspectors working at the Istituto Nazionale della Previdenza Sociale (the national social-security body), have significantly

<sup>18</sup> This classification is for simplicity, as monitoring inputs can be seen as a way to provide formal incentives. An accessible survey of the literature on incentives applied to government is Jean Tirole, 'The internal organization of government', *Oxford Economic Papers*, (1994), 1–29, on whom part of this section draws. See also Bengt Holmstrom and Jean Tirole, 'The Theory of the Firm', in R. Schmalensee and R. Willig (eds), *Handbook of Industrial Organization* (Amsterdam, North Holland, 1989).

<sup>19</sup> Reported in *Business Week*, 6 December (1993).

improved the collection of social security contributions motivated by performance related bonuses, which in 1993 added \$8,000 a head in salaries.<sup>20</sup>

In general, however, a multiplicity of objectives characterizes government activities. At the defence ministry, for example, procurement officers are supposed to be discreet when advertising their operations so as not to circulate sensitive information to the country's enemies, while obtaining goods of a certain quality/price ratio.<sup>21</sup> A complete formal contract directed at providing incentives for such a multiplicity of objectives can at times be difficult, if not prohibitively costly, to write. As a result of this, defence procurement is one of the areas most prone to corruption. One extreme example of this is the Pentagon's procurement procedures, where pursuance of the secrecy objective led to ordinary screws being bought at 100 times the price at which members of the public can buy them.<sup>22</sup>

The most usual proposal to control corruption involves using formal incentives by simply paying a very high fixed wage to bureaucrats with the possibility of committing corrupt acts. The logic of paying a high wage *in every state of the world* to prevent corruption stems from the fact that if there is probability of malfeasance detection, and an associated penalty, say a fine or employment at a lower wage, then honest actions are incentive compatible for the government bureaucrat. This proposal, originally due to Becker and Stigler,<sup>23</sup> has rarely been observed in practice, although one of the most honest countries in the world, Singapore, pays exceptionally high wages to government officials.<sup>24</sup>

To provide some empirical content to this hypothesis, we collected data on the relative remunerations of comparable bureaucrats across countries. Table 3 provides some interesting comparisons.

Though no definite conclusions should be drawn on such a narrow set of countries, we note that the correlation coefficient between column (1) and the level of corruption in 1990 (with US = 100) is close to zero, though excluding Japan brings it close to  $-0.5$ .

In a sense, pension privileges to elected officials perform a similar role as high wages during their time in office. Pensions are particularly important for elected politicians, who may have a short employment horizon and hence may give too little weight to the transitory wage income and too much weight to corrupt income.

The idea of paying very high wages or pensions to prevent corruption is attractive, though not always feasible. For example, some trade unions limit the

<sup>20</sup> Reported in *The Economist*, 28 January (1995).

<sup>21</sup> Another even more conflicting objective in the defence industry is usually the desire to encourage technological innovation. The usual way to achieve this is by allowing firms in the defence industry to keep a healthy profit. As Rogerson puts it, the set of regulations in the US Department of Defense establish that '*contracting officers negotiating with a sole source are instructed that their job is not to obtain the lowest price*' (emphasis in the original). William Rogerson, 'Economic incentives and the defense procurement process', *Journal of Economic Perspectives*, 8(4) (1994), 65–90, p. 69.

<sup>22</sup> J. Stiglitz, *The Economics of the Public Sector* (Prentice-Hall, 1986).

<sup>23</sup> Becker and Stigler, 'Law enforcement, malfeasance and the compensation of enforcers'.

<sup>24</sup> In 1994, the annual salary of Goh Chok Tong, Singapore's prime minister, was \$780,000, almost four times that of Bill Clinton. Starting annual salaries for cabinet ministers were \$419,285 (over three times that of the British premier), and were raised by 25% in 1995. Reported in *The Economist*, 26 November (1994).

**TABLE 3.** Remunerations of Comparable Bureaucrats across Countries

	Top bureaucrat (1)	Chief Executive Officer (2)
Australia	82	35
Canada	149	56
France	78	45
Germany	116	47
Ireland	87	20
Japan	160	31
Netherlands	97	35
Sweden	63	27
UK	155	43
US	100	100

*Note:* (1) Relative to the US, based on OECD figures for 1990. *Source:* Michael Dynes, *The Times*, 29 December (1994). Figures correspond to the maximum salary and may differ slightly due to rounding. (2) Purchasing power US CEO = 100, data for 1989. *Source:* World Total Remuneration, World Competitiveness Report.

wage that can be paid to the trade union leader to the wage earned by the highest paid member of the union.<sup>25</sup> Politicians are seldom paid relative to the importance of their post as they are subject to severe public scrutiny. It is perhaps not unrelated that public opinion polls systematically rank politicians and trade union officers as more corrupt than other professions, particularly businessmen. It is ironic that those who are supposed to be more socially motivated are perceived to be more corrupt than those who are supposed to be purely profit motivated.

Another social constraint that may increase the level of corruption is the ability to use the statement of wealth as a corruption controlling device. In many countries politicians are obliged to sign a sworn declaration of their wealth when they start office. This can be of extreme help in controlling corruption.<sup>26</sup> Some countries, such as the UK, do not enforce this type of regulation as it is judged to invade the privacy of the politicians.<sup>27</sup> As a policy matter, it is difficult to promote changes in habits that are considered essential to a way of life, like the right to privacy of British politicians; but in countries where these social norms do not have such a strong grip, policies directed at raising the level of pay earned by public sector employees and directed at

<sup>25</sup> The United Electric Workers (163,000 members) in the US paid its top official \$14,618 in 1972. Compare this with the head of the teamsters (2.5 million members) who earned \$125,000, or the head of the National Maritime Union (36,000 members) who was paid \$92,200. Reported in *Business Week*, 18 August (1972).

<sup>26</sup> A large number of solved cases in corruption are related to audits following signs of unexpected wealth by public servants. An extraordinary case is the former police chief of Mexico City, who had 1,200 servants in his house while on a \$1,000 a month salary. As with many examples of Mexican corruption, the numbers sound at least one order of magnitude wrong. Reported in *The Economist*, 7 April (1984).

<sup>27</sup> In the UK, members of Parliament are only required to declare which topics will present them with a conflict of interest. This declaration is included in the Register of the Members' Interest, and it has a very weak effect in preventing ethically dubious votes. Members of the House of Lords are not required to state their interests.

making extensive the use of the statement of wealth would be a positive influence on that country's general level of honesty.

### *Informal incentives*

Informal incentives usually take the form of career concerns in agents whose future jobs and income depend on the reputation they develop while they are in office. Holmstrom,<sup>28</sup> formalizing an argument made by Fama,<sup>29</sup> showed under which circumstances the labour market for managers provided incentives for incumbent managers to exert effort. By working hard, the manager in Holmstrom's model attempts to fool observers in the labour market about his ability to perform his task. In the final equilibrium, managers end up working hard just to prevent an adverse evaluation.

The implications of such arguments for corruption control, especially for elected officials such as trade union officers and politicians, have not been explored but one could conjecture that a related mechanism may prevent corruption when political competition is intense.<sup>30</sup> Based on this basic model, informal incentives work well only if voters observe the performance of the official, if the official's performance in the present task is informative about his ability for future tasks and if the government official is not too impatient. This last condition can be stated somewhat differently. Assume there is an agent with some amount of discretion to commit a corrupt act. If the act is observable but unverifiable (in court), or if the only fine that can be imposed is dismissal from his job, then the existence of a last period guarantees corruption. Deterrence can only be exercised if the agent has something to look forward to, like a pension or the reputation of having been a (not-dismissed-in-the-last-period) politician. Thus, reputations can act like a bond posted by cash-constrained politicians with their employers (the public) and which can be confiscated in the event of any wrong doing during their time in office.<sup>31</sup> This can be seen as a rationalization for the public's preference for politicians with a prestigious or valuable background.<sup>32</sup> If this interpretation of the politician's reputation as a bond is taken seriously, then libel laws when viewed as anti-corruption instruments have at least two conflicting objectives to achieve: they are supposed to be lax to encourage the cheap production of information and they are supposed to be strict to protect the reputations of politicians from short term electoral attacks.

<sup>28</sup> Bengt Holmstrom, 'Managerial incentive problems: a dynamic perspective', in *Essays in Economics and Management in Honour of Lars Wahlbeck* (Helsinki, Swedish School of Economics, 1982).

<sup>29</sup> Eugene Fama, 'Agency problems and the theory of the firm', *Journal of Political Economy*, 88 (1980), 288–307.

<sup>30</sup> Note that when other responsibilities are given to the manager, like an investment decision, career concerns may give rise to inefficiencies, Bengt Holmstrom and J. Ricart i Costa, 'Managerial incentives and capital management', *Quarterly Journal of Economics*, 101 (1986), 835–860.

<sup>31</sup> The idea of posting a bond to deter malfeasance (which subsequently became known as the bonding critique to efficiency wages) was already noted in Becker and Stigler, 'Law enforcement, malfeasance and the compensation of enforcers'. Note that firms entering contractual relationships with the state could be asked to post bonds that would be confiscated if the firm engaged in any wrongdoing. In fact, the relatively light punishment for firms found guilty of bribing public officials is one of the puzzles of corruption deterrence.

<sup>32</sup> In a sense artists turned politicians, such as Ronald Reagan or Palito Ortega, are posting a bond (their popularity) when entering politics.

*Monitoring inputs*

The third and final way to provide incentives against corruption is to collect information about the activities of the bureaucrats and then prosecute any dishonest behaviour that is detected. The traditional way to do it is by directly monitoring bureaucrats to spot any deviations as they occur or to audit the outcome of their work. However, information obtained in this way is sometimes difficult to use in a court of law.

The lawyer's approach to combat corruption is illustrated by the proposals of judge Antonio Di Pietro, in charge of Italy's recent corruption investigations, who favours a reform of the judiciary system to allow for plea bargaining and to allow judges to grant immunity from prosecution to those that cooperate with the investigations. Some of the most successful and celebrated anti-corruption campaigns have complemented monitoring and auditing efforts with quite drastic measures on the use that can be given to the information thus obtained. For example, the Prevention of Bribery ordinance passed by the government of Hong Kong in 1971,<sup>33</sup> allowed the burden of the proof to be shifted so that those accused of corruption should demonstrate their innocence. The agents working for the ICAC (Independent Commission Against Corruption) created in Hong Kong in 1973, had the power of search and seizure without need for a legal warrant. This is not always an acceptable alternative in politically more open societies.

One of the conditions for an anti-corruption agency of this sort to be effective is its independent nature. The idea behind this requirement of independence is that it is the only way the public will have confidence in such a body and will contribute with information and support to its success. However, the experience of the Australian state of New South Wales is interesting in this respect. The state governor, who set up one of the first ICACs in the world, was falsely accused by the head of the ICAC of corruption charges (actually quite minor charges). The independence of the ICAC was never questioned and the governor resigned. Again a dilemma arises. For the ICAC to be fully effective it must operate independently from other government agencies. However, the ICAC has to be set up by a branch of government, typically the executive, which will be reluctant to do so if it could also face investigation.

Auditing is an important anti-corruption weapon in its own sake. However, the exact form of the auditing procedure may introduce important inefficiencies in the operation being audited. Rogerson reports the effects of the key law regulating the government's procedures when auditing defence contractors in the United States (the Truth in Negotiations Act).<sup>34</sup> Its precise objective is to prevent a form of cost padding involving firms submitting inaccurate cost estimates when they are negotiating a contract. However the effect is that if firms achieve an unexpected cost reduction they increase the risk of prosecution. This leads to slack in cost reducing effort whenever there is a favourable cost shock. As Rogerson remarks, this essentially turns a fixed price contract into a cost reimbursement contract.

<sup>33</sup> See Robert Klitgaard, *Controlling Corruption* (University of California Press, 1988), p. 104.

<sup>34</sup> Rogerson, 'Economic incentives and the defense procurement process'.

### B. The Market Structure

While bureaucrats may receive incentives to act in line with the public's objectives, they do not operate in a vacuum. Indeed, recent research has emphasized that both the decision to give bribes and the amount of the bribe depends on the market structure in which both bribers and recipients of bribes operate.

#### *Bureaucratic market structures*

The first to emphasize the effect of bureaucratic market structure on corruption was Rose-Ackerman when she introduced what is sometimes called the *principle of overlapping jurisdictions* (or Gresham's law in reverse).<sup>35</sup> Rose-Ackerman analysed the effects of competitive pressures on a corrupt bureaucracy dispensing a scarce benefit. In this case, competition can be introduced by allowing benefit applicants to reapply in other departments if they are asked for bribes. If the cost of reapplication is low enough, the existence of some honest officials could drive bribes to zero.<sup>36</sup>

In a similar vein, Shleifer and Vishny present a simple model to examine how the structure of government institutions and of the political process determine the level of corruption.<sup>37</sup> They consider the case in which the state has the monopoly on the provision of a government produced good, such as a passport, or an import license. The good is sold for the government by an official, who has the opportunity to restrict the quantity of the good that is sold.

Specifically, the official can deny a private agent the passport or the import license. For simplicity, it is assumed that the official can restrict supply without any risk of detection or punishment. Also, it is assumed that provision of the good costs nothing to the official, except for the official price for the good  $p$  that he must turn in to the government.

If the official cannot discriminate between buyers, he will simply set the marginal revenue equal to the marginal cost  $p$  of providing the good. For a downward sloping demand for the government good, the total price with the bribe always exceed the official price.

Shleifer and Vishny also examine the case in which the state acts as a joint monopolist agency that sets the cum bribe prices  $p_1$  and  $p_2$  for *two* complementary government goods. The extension is interesting because, in many cases, a private agent might need several complementary government permits to conduct business. For example, an importer might need permits to unload, transport and sell a government good, obtainable from different agencies. The different agencies that supply the complementary good might collude, sell the different goods independently, or even compete in the provision of the public goods. It turns out that these different bureaucratic market structures have important implications for the extent of corruption.

Let  $x_1$  and  $x_2$  be the quantities of these goods sold. Let the official prices, equal to the monopolist's marginal costs, be denoted  $MC_1$  and  $MC_2$ . The per unit bribes are then  $p_1 - MC_1$  and  $p_2 - MC_2$ . If agencies *collude* (acting as a joint monopolist), the joint monopolist will set  $p_1$  at which

$$MR_1 + MR_2 \frac{dx_2}{dx_1} = MC_1$$

<sup>35</sup> Rose-Ackerman, *Corruption*.

<sup>36</sup> Admittedly, this sort of competition involves some duplication of costs.

<sup>37</sup> Shleifer and Vishny, 'Corruption'.

where  $MR_1$  and  $MR_2$  denote marginal revenues for the sale of goods 1 and 2, respectively. When the two goods are complements, at the optimum  $MR_1 < MC_1$ . In other words, the joint monopolist keeps the bribe on good 1 down to expand the demand for the complementary good 2 and thus raise profits from bribes on good 2. For the same reason, the agency keeps down the price of good 2.

This contrasts sharply with the case in which agencies act independently. Each agency then takes the other's output as given, and in particular,  $dx_1/dx_2$  is set to zero. At the independent agency's optimum,  $MR_1 = MC_1$ . Hence, the per unit bribe is higher and the output is lower.

The final case is one in which each agency is allowed to provide either good. In this case, both agencies will effectively compete for the provision of the good, as when different agencies or cities in the US can provide a passport. It is straightforward to see that price competition between the providers will drive the bribes to zero.

Thus, the level of bribes is lowest in the case in which agents are induced to compete for the provision of a public good, intermediate in the case where the official acts as a joint monopolist agency (collusion), and highest when the briber acts independently. This is formally close to the analysis of the extraction of renewable resources by competing players in the classical fishing game.<sup>38</sup>

#### *The briber's market structure*

Bureaucrats' actions are valuable to firms. For example, the decision by a bureaucrat to apply a regulation aimed at providing pollution control can be very costly for the firms affected. These actions will affect the firm's marginal or average costs, and therefore have an impact on its profits. In general, the value of the bureaucrat's action will depend on the market structure of the industry to be regulated.

Consider, for example, a standard Cournot equilibrium with linear demand (with intercept  $A$  and unit slope) constant, marginal cost  $c$ , and  $n$  firms. At the margin, the benefit for each firm from having lower marginal costs is given by  $2(A - c)/(n + 1)^2$ , which is decreasing in  $n$ . If firms could pay regulators a bribe in exchange for a more lenient application of regulations to reduce their  $MC$ , the incentive to do so would be decreasing in  $n$ .

Thus, in general, the lack of product market competition can not only benefit the firms in the industry, but can potentially also benefit tax inspectors, regulators, suppliers and other agents with some control rights over those firms. The reason is that as competition decreases, the value of their control rights increase, so it becomes more profitable to exchange them for bribes.<sup>39</sup>

<sup>38</sup> D. Fudenberg and J. Tirole, *Game Theory* (Cambridge MA, MIT Press, 1991).

<sup>39</sup> Rose-Ackerman stressed the need for further research on this aspect of corruption when she stated that 'the role of competitive pressures in preventing corruption may be an important aspect of a strategy to deter bribery of low-level officials, but requires a broad-based exploration of the impact of both organizational and market structure on the incentives for corruption facing both bureaucrats and their clients.' Susan Rose-Ackerman, 'Bribery', in J. Eatwell, M. Milgate and P. Newman (eds), *The New Palgrave: a Dictionary of Economics* (1988).

To fix ideas, we develop a simple model that focuses on the regulatory power as the type of political control right enjoyed by the bureaucrat. There are three players in this model: the public, the bureaucrat and the firm. The public has discretion over a policy instrument  $k$ , that controls the degree of product market competition in the economy. The use of  $k$  may respond to public concerns over too little employment under free trade, so that  $k$  would be the amount of protection imposed through tariff or non-tariff barriers. Alternatively,  $k$  may reflect the public's concern over too little investment in R&D when there is too much entry into a certain industry, so that  $k$  would reflect restrictions on the number of firms allowed to operate based on these 'Schumpeterian' considerations.<sup>40</sup> In general, we do not require these policy choices to lead to efficient outcomes.

The bureaucrat, who has no power to affect  $k$  directly, has certain control rights over a firm that operates within his area of political influence. For example, he might have discretion over the application of certain regulatory controls on the firm (such as those that apply to fire safety or pollution), resulting in a reduction of the firm's profits. There is a continuum of firms in the unit interval. Before regulation, aggregate and average rents in the economy are given by  $\pi(k)$ , with  $\pi_k(\cdot) > 0$ . After the bureaucrat exercises his control right and a tough regulation is enforced, profits are zero. Thus, the value of the politician's discretion is equal to  $\pi(k)$ , and this value is increasing in  $k$ .

We assume that the bureaucrat is not under any sort of optimal contract that prevents him from pursuing his own interests.<sup>41</sup> We simply assume that the bureaucrat is paid the ongoing wage in the economy  $w$ , regardless of whether he enforces a tough or a soft regulation.

Since the politician cares about bribes, regulating the firm is not efficient (for the bureaucrat/firm coalition). In a Coasian spirit, we allow the bureaucrat and the firm to bargain over bribes to avoid regulation and, thus, restore efficiency. With probability  $\theta$ , corrupt deals become public (as when opposition parties or the press uncover them) and the bureaucrat is fired under corruption accusations.

The corrupt politician's income is given by his wage  $w$  plus the bribes  $b$  that he takes. When a corrupt politician is fired, he immediately obtains employment in the private sector at the ongoing wage  $w$ , but suffers a utility loss with monetary value of  $m$ .<sup>42</sup> Thus, his utility is given by

$$U_b = (1 - \theta)(w + b) + \theta(w - m) \quad (3)$$

<sup>40</sup> Notice that  $k$  may also lead to inaction, as when a society does not build trading infrastructure or does not contribute to the solution of market imperfections that enable some agents to enjoy market power.

<sup>41</sup> The effect of product market competition on managerial slack is theoretically ambiguous. Competition may improve incentives by providing comparative performance information, but may also reduce the value to the principal of inducing desired behaviour from the agent. But see the varying findings of Oliver Hart, 'The market as an incentive scheme', *Bell Journal of Economics*, 14(2) (1983); D. Scharfstein, 'Product market competition and managerial slack', *Rand Journal of Economics*, 19 (1988), 147–155; Benjamin E. Hermalin, 'The effects of competition on executive behaviour', *Rand Journal of Economics*, 23(3) (1992) and specially Klaus M. Schmidt, 'Managerial incentives and product market competition', University of Bonn Working Paper (1994).

<sup>42</sup> Reputation, retraining or moral costs can be counted in this category. The model would remain essentially the same if we assumed heterogeneity in terms of different outside options.

If the manager is caught offering bribes, his firm leaves the industry to earn normal returns (zero profits with certainty). The manager's utility is given by

$$U_m = (1 - \theta)(\pi - b) \quad (4)$$

The bureaucrat and the firm bargain over bribes. The disagreement point for the bureaucrat is simply his wage  $w$  and the disagreement point for the firm is zero profits. The Nash bargaining solution maximizes

$$\text{Max}_b [((1 - \theta)(w + b) + \theta(w - m)) - w][(1 - \theta)(\pi - b)] \quad (5)$$

which solves for

$$b^* = \frac{1}{2} \left[ \pi + m \frac{\theta}{1 - \theta} \right] \quad (6)$$

Then the condition for observing corruption in the economy is equivalent to the condition that the bureaucrat wishes to exercise his control rights over the firm. This amounts to

$$m \leq \frac{1 - \theta}{\theta} \pi \quad (7)$$

Call  $m_i^*$  the value of  $m$  that obtains equation (5) above with equality in country  $i$ . Assume that  $m$  is distributed according to the cumulative function  $F(\cdot)$ . Then, the fraction of bureaucrats in country  $i$  that are corrupt is given by

$$p(m < m_i^*) = F[m^*(\theta_i, \pi(k_i))] \quad (8)$$

Equation (6) shows the level of corruption in country  $i$  as a function of the exogenous probability  $\theta_i$  and of  $\pi$ . It is quite straightforward to see that  $p(\cdot)$  is decreasing in  $\theta$  and increasing in  $\pi$  (or  $k$ ). The expression can be interpreted as the fraction of politicians or transactions with public employees in country  $i$  that involve corruption or questionable payments. This interpretation closely matches the definition of the corruption indices used in this paper. The model thus provides a very direct theoretical framework to examine the effects of monopoly power on the incentives faced by politicians to engage in corrupt activities.

In Ades and Di Tella,<sup>43</sup> we examine the role of product market competition in determining corruption. Using corruption indexes from *Business International* and the *World Competitiveness Report*, we find that, controlling for the level of development and the degree of political competition, corruption is higher in countries with economies dominated by a small number of firms or where domestic firms are sheltered from foreign competition by high tariffs.<sup>44</sup> The results hold even after controlling for year and country fixed effects. We also correct for the possible endogeneity of market structure, as it might be that bureaucrats influence market structures or erect barriers to trade in order to later extract bribes, as in the rent-seeking literature. Using a series of

<sup>43</sup> Ades and Di Tella, 'Competition and corruption'.

<sup>44</sup> This negative effect of openness on corruption is quite robust as it has been reproduced in three different data sets.

instruments, we identify strong effects on corruption of exogenous changes in product market competition. Policy conclusions follow directly from the finding that protectionist or other policies directed at restricting the competitive pressures faced by domestic firms have the effect of fostering corruption. Rather than investing in mechanism design and auditing procedures, governments interested in curbing corruption should perhaps first consider opening up their economy to trade and making domestic markets more competitive.

In a similar spirit, Ades and Di Tella find strong positive effects of active industrial policy on corruption.<sup>45</sup> This result is especially relevant as many countries have developed a domestic demand for industrial policy, supposedly on the grounds that they can lead to faster capital accumulation and technological growth. But the evidence based on data from the WCR is that industrial policy is a positive and significant determinant of corruption. As corruption reduces investment, we can decompose the total effect of industrial policy on investment and R&D spending into a direct positive effect, and an indirect, negative, corruption induced effect. The data show that the total effect of industrial policy on investment can be as low as 56 per cent of the direct effect, with the remainder being dissipated by the positive effect on corruption. A similar decomposition on the effects of industrial policy on R&D spending yields a total effect that is only 59 per cent of the direct effect.

The data suggest that policy initiatives aimed at fostering the competitiveness of domestic industries through active industrial policies are doomed to yield only partial success. The magnitude of the negative effects found suggests that the consideration of corruption should not be absent from cost-benefit analyses of industrial policies.

### Controlling Corruption

The evidence of the effect of market structure on corruption is suggestive, though ideally we would like to know how it interacts with more traditional corruption controlling activities. In this final section, we attempt to provide an empirical assessment of the relative merits of two approaches to controlling corruption, namely the lawyer's emphasis on law enforcement *vis-à-vis* the economists's emphasis on control through product market competition. Indeed, most non-economists may claim that more traditional methods of crime prevention should be emphasized, such as increasing the autonomy and resources of judges undertaking corruption investigations or following judge Di Pietro's proposals regarding the possibility of introducing judiciary reforms such as plea bargaining.

We explore this possibility by analysing the interaction of openness (OPEN), measured by the share of imports in GDP, and the independence of the judiciary system (JUD), measured by a dummy variable that take the value 1 when the independence of the judiciary system in the country is above the mean of the sample. We use data from BI to measure both the degree of independence of the judiciary system and the level of corruption (CORR).

We regress corruption on these two variables and their interaction, and on a standard set of controls for the level of development of the country (income

<sup>45</sup> Alberto Ades and Rafael Di Tella, 'National champions and corruption: some unpleasant competitiveness arithmetic', *The Economic Journal*, 107 (1997), 1023–42.

per capita (GDP) and schooling (SCHOOL) and political competition (the Gastil index of political rights (POL)).<sup>46</sup> The focus of the test is the coefficient on the interaction term (OPENJUD) in the following equation

$$\begin{aligned} CORR_i = & 8.442 + 0.317 GDP_i - 0.196 SCHOOL_i - 0.113 POL_i \\ & (1.23) \quad (0.10) \quad (0.15) \quad (0.17) \\ & - 8.708 OPEN_i - 1.87 JUD_i + 7.104 OPENJUD_i \\ & (3.73) \quad (0.91) \quad (3.85) \end{aligned}$$

We find that corruption is high in economies that are closed to foreign competition as proxied by a low share of imports in GDP. We also find that corruption is higher in countries where judicial institutions are not well developed, or are not independent of political influence.

But, even more importantly, the positive sign on the interaction term indicates that opening up an economy to foreign trade is particularly important in countries where institutions are not yet fully developed. In a country where the judicial system is relatively independent (above the mean) a one standard deviation increase in openness reduces corruption by 0.15 of a standard deviation. In countries with judiciary systems below the mean, a one standard deviation increase in openness reduces corruption by 2.09 points, some 0.81 standard deviations in the corruption index. Thus, competition is much more effective in controlling corruption in countries where the judicial system is not well developed.

### Conclusion

The availability of subjective data on corruption has finally provided the field of the economics of corruption with the empirical discipline that is essential to turn its fertile theorizing into policy recommendations.

In this survey, we have reviewed the literature organized into two broad themes: theories of corruption and theories of the effects of corruption. We show that the new empirical approach has helped to shed light on a controversy regarding the effects of corruption on investment and growth that have continued since the 1960s. We show that the data suggest that there is a negative effect of corruption on investments, and that this effect is less severe in countries with particularly obtrusive bureaucracies, though this difference with low red-tape countries is only mildly significant.

Our main aim is to review theories of the causes of corruption and their policy implications. Broadly speaking, we analyse theories that blame corruption on poorly designed incentive contracts or monitoring devices, and theories that blame corruption on the lack of competition in the bureaucracy and/or the product market. We test the relative merits of two practical policy proposals: controlling corruption through tighter enforcement of laws or through increases in product market competition. The evidence suggests that both have negative and significant effects on a country's level of corruption. But, more significantly, the interaction term is positive, indicating that opening up the economy to foreign trade is particularly important in countries where institutions are not yet

<sup>46</sup> All variables are averages of their 1981–1983 observations, except schooling that is the 1980 observation.

fully developed. In a country where the judicial system is relatively independent, the effectiveness of competition in reducing corruption is less than a fifth of the effectiveness it has in countries with judicial systems below the mean.

Though the recent empirical contributions represent a major step forward in establishing the field of corruption as a progressive research programme, much work remains to be done. Progress will be constrained by data availability, and our guess is that data improvements will come in two fronts. First, cross-country data from risk analysis is now available for a reasonably long time series (almost 16 years), though at quite high commercial rates. Secondly, cross-industry studies of corruption based on the work of large accounting firms would finally allow research into the micro foundations of corruption to begin. With this data at hand, future research could tackle questions such as what are the effects of corruption? What are the causes of corruption? What is its relationship with variables such as growth, inequality, political competition, inflation or product market competition? What are the mechanisms involved? Which industries and which professions are more prone to corruption? Does corruption distort specialization in trade? Is corruption pro-cyclical? If corrupt payments are tax deductible, who ends up paying for corruption? What are the true effects of anti-corruption laws, such as the American Foreign Corrupt Practices Act of 1977?

### Appendix

TABLE A1. Summary Statistics

Variable	Obs	Mean	Std. Dev	Minimum	Maximum
CORR	55	2.99	2.54	0	9
BURO	55	0.51	0.50	0	1
GDP, US\$000	55	6.21	4.38	0.45	15.00
GOV	55	15.30	5.85	7.71	37.04
INV	55	22.93	7.05	4.28	42.00
JUD	55	0.53	0.50	0	1
OPEN	55	0.26	0.24	0.08	1.68
PPI 1980	55	102.6	41.76	24.42	229.9
POL	55	2.88	1.98	1	6
REV	55	0.14	0.18	0	0.73
SCHOOL 1980	55	5.75	2.87	1.74	12.14

*Note:* All variables are averages of their 1981 to 1983 observations, except PP180 and SCHOOL, which correspond to the 1980 observations. The BURO and JUD dummies take a value of 1 in countries with an average value above the sample mean.