The presence of corruption inflicts substantial economic costs on an economy. Corruption is a double edged sword; it reduces both the volume and efficiency of investment and thus economic growth. This note identifies a simple concept of the macroeconomic efficiency of investment, establishes its linkage with corruption and estimates the relationship between them. The efficiency of investment variables computed by the authors and Transparency International’s Corruption Perception Indices are used as data. The note concludes that substantial gains in terms of economic growth could be achieved if corruption is reduced.

Corruption is popularly defined as the abuse of public power for private benefit. The act often consists of paying bribes to public officials by private beneficiaries as compensation for the abuse. However, not all acts of corruption result in the payment of bribes. A powerful minister can locate a new investment project in his home town unsuitable for that particular activity or he could influence the sanctioning of big business loans to his cronies and friends and still not take any direct bribe. A review of various forms of corruption, their causes and consequences can be found in Tanzi (1998), Rose Ackerman (1996) and Treisman (1999). However, irrespective of the types or forms of corruption, it needs no argument that as the act involves subjective misuse of power, it is both bad and illegal. In addition, the act distorts the purpose for which the discretionary power was given to the person who abuses it. These distortions inflict considerable costs on the economy.

In the recent past there have been a number of studies that have reported quantitative results on the effect of corruption on economic variables. These studies have used cross-section analysis of available corruption indices and relevant economic...
indicators. The pioneering effort in this area was the study by Mauro (1995) who found that corruption lowers investment and thereby economic growth. Later, the study by Tanzi and Davoodi (1997) further extended and elaborated this line of causality by showing that corruption increases public investment while reducing its productivity. Productivity of public investment was measured through physical indicators such as the quality of roads, e.g. paved roads in good condition as a percentage of total paved roads.

In this paper we present some empirical evidence on the impact of corruption on the macroeconomic efficiency of investment. Efficiency of investment (EII) during any period under investigation is defined as the ratio of the annual average growth of real GDP to the annual average growth of real investment. The variable EII for a particular country represents the efficiency (productivity) of total investment during a period in generating value added and depends on how total investible resources are allocated between various sectors of the economy and the sectoral incremental output capital ratios. The latter can be taken as a measure of sectoral rates of return in a macro sense; higher values signifying higher returns and thus higher productivity of investment.

**LINKAGES BETWEEN EFFICIENCY OF INVESTMENT AND CORRUPTION**

Two broad presumptions can be made regarding the effect of corruption on the efficiency of investment (EII). First, corruption distorts the sectoral allocation of investible resources by diverting resources from potentially productive sectors to unproductive sectors and thereby decreasing the overall output-generating capacity of the investment. A good example of the phenomenon in recent times has been the acquisition of large volumes of loans by many entrepreneurs in South-East Asian countries by colluding with bank officials. These resources, sometimes obtained by fraudulent means, were often invested in unproductive sectors or activities and which contributed to the increase in non-performing loans and the eventual contraction of GDP during the recent Asian economic crisis.1 Rose Ackerman (1996) also notes that for business people in Eastern Europe and the Russian Federation payoffs are often necessary to obtain credit. Thus investments are made not on the basis of their rates of return but on the capacity of the entrepreneur to pay bribes.

Second, bribes which are often the major part in any act of corruption increase the cost of production which ultimately gets reflected in a higher output price increase, reduction in demand and the eventual reduction in the incremental output capital ratio for the activity. Rose-Ackerman (1996) notes that a corrupt firm may bribe officials

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to win a contract and once selected it may pay again for the opportunity to charge an inflated price or to skimp on quality. Recovering the cost incurred in bribing officials by charging a higher output price is a very common phenomenon in the business world, although this would only be possible in a non-competitive market segment. Also, when firms and entrepreneurs are selected to undertake investment projects on the basis of their ability to establish crony contacts and pay bribes there is no guarantee that the most efficient firm will be chosen; in fact, the efficient but scrupulous entrepreneurs will almost always be rejected. Inefficiency and unfairness as the costs of corruption has been ably discussed by Rose-Ackerman (1996). Ultimately, the inefficiency will manifest itself as an output price increase and lead to a reduction of the incremental output capital ratio of the activity or sector. The above discussion lead us to formulate the following hypothesis: an increase in corruption will lower the efficiency of investment.

THE EMPIRICAL STUDY AND RESULTS

For testing the hypothesis regarding the effect of corruption on the efficiency of investment we have estimated cross-section regression equations with efficiency of investment (EII) during the period 1986-1996 as the dependent variable and Transparency International’s 1999 Corruption Perception Index (CPI) for 87 countries as the independent variable. Annual indexes of perceived corruption (for 1996, 1997, 1998 and 1999) have been prepared by the organization Transparency International. The lowest level of corruption corresponds to an index 10 and the highest level being designated as 0. These indices are based on a “poll of polls” compiled by a team of researchers at Göttingen University. The questions asked to selected business people and the local population included “improper practices (such as bribing or corruption) in the public sphere”, “level of corruption”, “spread and amount of corruption in public and private business”, “estimated losses caused by corruption”, “likeliness to demand special and illegal payments in high and low levels of government”, “degree of misuse of public power to private benefits”, “cases of corruption of politicians, public officials, policeman and judges”, “frequency of irregular additional payments connected with import and export permits, business licenses, tax assessments, police protection or loan application”.

It would be of interest to describe some salient features of the Corruption Perception Index (CPI) of Transparency International for the year 1999. The highest value (lowest corruption) of CPI score was assigned to Denmark (10 i.e. perfectly clean) and lowest (highest corruption) was assigned to Cameroon (1.5). Among the

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developing countries of the Asia Pacific region, Singapore was found as the least corrupt country with a score of 9.1 and Indonesia was assigned the lowest score of 1.7.

The computation of countrywise EII as the ratio of average annual growth rate of real GDP in constant United States dollars and average annual growth rates of real investment (in constant United States dollars) was performed from data provided by United Nations (Statistical Yearbook on CD ROM). It is noted that whereas the dependent variable EII is based on average annual growth rates during the period 1986-1996, CPI for only one year (1999) was used. The reasons are as follows. CPI numbers are available from 1996 up to 1999 but country coverage has been different; later year’s data covered more countries. Also, the correlation between the indices corresponding to different years has been very high; more than 0.95 (Treisman 1999). This high correlation shows that perceptions on corruption based on which the index (CPI) is computed are formed over a period and do not change in any significant manner in the short run. The above arguments justify the use of 1999 CPI.

The cross-country regression of efficiency of investment (EII) on the Corruption Perception Index (CPI) of 87 countries is estimated as follows.\(^3\)

\[
EII = -3.319920 + 1.127249 \cdot (\text{CPI}), \quad R \text{ squared} = .06 \\
(t = 2.24)
\]

The above result shows that when CPI increases or the level of corruption decreases there is a significant (with a probability of more than 95 per cent) increase in the efficiency of investment. Although a low explanatory power of a single variable cross-section regression is not unexpected because of a large number of missing variables, the present sample of 87 countries and areas needs special explanation. First of all it is very well known that the variables (i.e. growth rates of GDP and investment) used for computing EII are only indirectly related to the level of corruption. There are many direct supply and demand side economic variables (used in standard econometric equations explaining GDP and investment growth rates) which have not been incorporated in equation 1. Apart from this, it should be noted from the list given in the footnote that the countries are extremely heterogenous with respect to non-economic variables which are known to have a strong influence on both the GDP

\(^3\) The 87 countries and areas are Albania, Austria, Azerbaijan, Belarus, Belgium, Bolivia, Botswana, Brazil, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Côte d’voire, Czech Republic, Denmark, Ecuador, Egypt, El Salvador, Estonia, France, Germany, Ghana, Greece, Guatemala, Haiti, Hong Kong, China, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malawi, Malaysia, Mauritius, Mexico, Mongolia, Morocco, Mozambique, Namibia, Netherlands, Nicaragua, Nigeria, Norway, Pakistan, Paraguay, Peru, Philippines, Poland, Portugal, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Senegal, Singapore, Slovakia, Slovenia, South Africa, Spain, Switzerland, Thailand, Tunisia, Turkey, Uganda, Ukraine, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, United States of America, Uruguay, Uzbekistan, Venezuela, Viet Nam, Zambia, Zimbabwe.
rate and investment growth rates but cannot be easily quantified. These include geographical characteristics, climate, cultural factors, the law and order situation, political and macroeconomic regime, to name only a few. The sample contains such disparate countries ranging from Nigeria, Ghana, Latvia, Slovenia to the United States, Denmark and Singapore. In this situation a very low $R^2$ is only to be expected. However, a highly significant t value associated with the coefficient of CPI shows the importance of this variable in determining the investment efficiency of a country.

A big improvement in the explanatory power as well as in the associated significance took place when a double log specification of equation 1 was estimated. The result was as follows.

\[(2) \quad \text{Log (EII)} = -1.896902 + 1.055554 \text{ (log (CPI))}, \quad R^2 = 0.24 \quad (t = 4.96)\]

In the above equation the coefficient (1.0555) associated with log of CPI is an estimate of the elasticity of the efficiency of investment with respect to the Corruption Perception Index. A 1 per cent increase in CPI (signifying decrease in corruption) would result in a more than one (1.0555) per cent increase in the efficiency of investment under the assumption that all other direct and indirect variables which have any influence on the efficiency of investment remain at the same level.

**FUTURE RESEARCH AGENDA**

Corruption is clearly a double-edged sword. As stated at the beginning of this note its existence lowers investment (Mauro 1995) as well as the efficiency of investment. If corruption is reduced, both the volume and productivity of investment will increase. Resources spent on this area can be expected to yield rich dividends in the form of enhanced economic performance. However, there is no comprehensive study on the practical modalities for reducing corruption, especially in the Asia Pacific context. Such a study would require a very wide coverage of variables (economic, social, political and institutional) and could thus form a rich agenda for future research on issues related to governance and its impact on economic performance.
REFERENCES


