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**Does the Evidence on Corruption Depend on how it is measured? Results
from a Cross Country Study on Micro Data sets^{*}**

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Abstract

This study compares the evidence on corruption between alternative data sets. These include the Corruption Perceptions Indices (CPI) that are conventionally used and the micro data sets from the International Crime Victim Surveys (ICVS) and the World Bank Enterprise Surveys (WBES) that have been used in recent applications. While a comparison between the evidence from the CPI and WBES constitutes a comparison of perception versus reality, the comparison of evidence from ICVS and WBES can be construed as a comparison of individual with business corruption. The study finds several similarities and differences between the pictures on corruption yielded by the alternative data sets. For example, while in case of low income countries, perception of business corruption seems to be worse than that based on firms' actual experience of doing business there, the reverse is true for high income countries. The magnitude of individual corruption is consistently lower than that of business corruption, with the gap between the two forms of corruption closing only for high income countries. As a country develops and commercial transactions increase, the mix of corruption changes in favour of business corruption. While the study finds evidence of a negative association between per capita GNP and corruption rates, none of the three data sets provides any evidence of negative association between growth and corruption rates. The study also finds that while improvement in human development indicators such as literacy are effective instruments in controlling individual corruption, the strengthening of institutions such as the legal system and the regulatory mechanism are likely to be more effective in combating business corruption. The strengthening of trust, whether via improved literacy and development of social networks or via a strong legal system, and an effective and transparent regulatory mechanism is the key to combating both forms of corruption. A methodological contribution of this study is the combination of the information of the characteristics of the respondent with the country level indicators in analysing the determinants of corruption. A significant difference between the two forms of corruption is that, after controlling for the respondent's attributes and the country indicators, while individual corruption showed an increase over time, this was not the case with business corruption. The importance of introducing the country effects is seen from the sign reversal of the time coefficient estimate that occurs in case of both individual and business corruption once we control for the effects of the country of residence of the respondent. The overall message of this study is that the authorities need to distinguish between different forms of corruption in devising policy intervention. As the mix of individual and business corruption changes with economic development, so should the mix of policy instruments in tackling corruption. The results also underline the need to undertake more studies that investigate the sensitivity of the evidence on corruption to alternative data sets.

Key words: Business Corruption, Kernel density graphs, Social Network, Human Development Indicator, Regulatory Mechanism

JEL Classification Codes: C13, D03, D73, D78.

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1. Introduction.

Corruption has existed in one form or another for a very long time. As Bardhan (1997) quoting from Kautilya's treatise on public administration in India in the fourth century BC points out, corruption dates back to very ancient times. However, the subject has attracted considerable attention from social scientists, especially economists, only recently with a proliferation of papers and monographs on the causes and effects of corruption. A key factor behind the economists' interest in corruption has been the influential paper by Mauro (1995) who found that corruption had a detrimental effect on economic development by reducing a country's growth rate.¹ Surveys of the literature on the economics of corruption can be found in Bardhan (1997), Rose-Ackerman (1999), Jain (2001) and Mishra (2005).

The proliferating literature on corruption must be set against a background of increasing concern in the donor countries that the effectiveness of aid to developing countries was being severely curtailed by endemic corruption in many of the poorest aid recipients. The concern was echoed by the then World Bank President, James Wolfensohn, who in his Foreword to the WDR, 1997 [World Bank (1997)], argued for the need to "provide restraint to check existing and corrupt behaviour" (p. iii). The principal questions that the empirical literature on corruption has tried to address are: what are the principal determinants of corruption? What are the economic consequences of corruption?

The earlier studies on corruption used the perception based measures of corruption. A prominent example is Mauro (1995)'s study which used the Business International Index (BI) of corruption which was based on standard questionnaires completed by BI correspondents in about seventy countries. The other perception based measure, which has been more widely used, is Transparency International's Corruption Perception Index (CPI). The CPI has, generally, been favoured over the BI since, unlike the latter it does not rely on a single data source but combines alternative indices of bureaucratic honesty.² Nevertheless, both these indices share the limitations of the perception based measures in suffering from the biases of the respondents in their evaluation of corruption in a country. For example, until recently, in case of many of the poorer countries the CPI was based on the subjective beliefs of Western businessmen who did not reside in the country they were evaluating. This introduces cultural and other biases that are likely to influence the results.

¹ Shaw, Katsaiti and Jurgilas (2006) show however that Mauro's results suffer from non robustness and that "after identifying an instrument with sufficient strength [they] fail to reject a zero effect on investment and economic growth".

² Lambsdorff (2006) contains a detailed description and review of the Corruption Perception Index published by the Transparency International. See, also, the other contributions in Sampford, et. al. (2006) for a wider perspective on the issues in the measurement of corruption.

The concern over the biases in the perception based measures of corruption has led to the use of micro data sets that provide cardinal scores of corruption based on survey data. Recent examples include Swamy, et. al. (2001), Svensson (2003), Dabla-Norris, et. al. (2008), and Mocan (2008). These data sets, which include the International Crime Victim Surveys (ICVS) and the World Bank Enterprise Surveys (WBES), consist of unit records containing the response of individuals and firms to questions on whether they were asked for bribes. Besides being more objective than the perception based measures used in the earlier literature, the micro data sets allow an examination of the role of the individual or the firm's characteristics in explaining the behavioural unit's experience on corruption in a manner that was not possible with the earlier perception based aggregate responses. Consequently, while the earlier studies could not go beyond the country level determinants of corruption, the recent micro data based literature provides richer insights into the determinants of corruption. However, even micro data sets such as ICVS and WBES have their limitations since their questionnaires were not specifically designed to obtain information on corruption. Consequently, there has been a further move in recent studies [see, for example, Olken (2007, 2008), Cameron, et. al. (2007)] to use data from experiments that are specifically designed to elicit the participant's attitude to corruption. These data sets also suffer from biases that result from the selection of individuals for the experiments, the subjective and cultural biases of the persons designing the experiments and from the typically small sample sizes and limited variation in the sample characteristics.

The empirical evidence on corruption supports the concern of the donor countries in pointing to several adverse social and economic consequences of corruption. Mauro (1995) found that corruption has a negative impact on economic growth by lowering investment. Mauro's results were confirmed by Li, et. al. (2000), though they found the negative effect of corruption on growth to be much weaker. Shaw, et. al. (2006) go a step further and observe that, with the use of stronger instruments than the ethnolinguistic fractionalisation (ELF) that Mauro (1995) uses to tackle the endogeneity issue, the adverse effect of corruption on growth and investment disappears completely. Gupta et. al. (2002) found that high corruption increases inequality and poverty. In a contradictory result, Li. et. al. (2000) find that there is an inverted U shaped relationship between corruption and income inequality with high corruption countries having low inequality. In contrast to both these studies, You and Khagram (2005) find that the causal link runs from inequality to corruption rather than the other way with inequality increasing the level of corruption. This study is part of a large literature mostly based on the Transparency International's Corruption Perception Index that analyses the determinants of corruption on cross country data. This literature includes the studies of Treisman (2000), Paldam (2002), Fisman and Gatti (2002), and Montinola and Jackman (2002). The results establish the significance of a variety of factors as determinants of corruption. For example, Montinola and Jackman (2002) find a non linear relationship between corruption and political competition, with democratic practices inhibiting corruption only beyond a threshold level. Fisman and Gatti (2002) found that fiscal decentralisation leads to lower corruption. There is general agreement in the literature that as a country develops and becomes richer it experiences less corruption.

While the overall thrust of these findings is that corruption is an evil which constrains economic development and is itself the product of an underdeveloped economy, there is a general lack of robustness in the findings and in the precise nature of the relationships between corruption and its country level determinants. This raises the question posed in the title of this paper of whether the evidence on the magnitude, determinants and consequences of corruption is sensitive to the measure or data used. This question has assumed significance in the wake of concern over the use of perception based measures of corruption that has led to the increased use of micro data sets and data from specially designed experiments that monitor the subjects' attitude to corruption. Olken (2008) provides a different example of divergence between perception and reality by noting that a villager's perception of corruption on a particular road project in Indonesia differs from the general corruption in the village. Olken's study confirms the presence of biases in reported perceptions and his "findings illustrate the limitations of relying solely on corruption perceptions".

The principal motivation of this study is to compare the evidence on corruption obtained from the CPI, ICVS and the WBES data sets. To our knowledge, a systematic comparison between the data sets on corruption in terms of the pictures they portray on corruption has not been attempted in the literature. The results assume practical significance since the robustness of the evidence needs to be established before policy conclusions are drawn on a subject of immense developmental importance. While the comparison between the summary features of the Transparency International's data and the micro data sets throws light on the issue of perception versus reality, a comparison between the ICVS and WBES data sets provides an answer to the question whether individual corruption that the former measures is fundamentally distinct from firm level or business corruption that the latter provides information on³. The empirical literature has not drawn a distinction between the two types of corruption though from a policy view point this distinction, if empirically supported, is important. This study provides alternative ways of evaluating the differences between the pictures on corruption that emerge from the three data sets. This study also attempts a comparative static exercise by presenting evidence on how the distribution of corruption across countries has changed over time and comparing the pictures on the temporal changes in world corruption that emerge from the data sets. This is done by drawing the kernel density graphs of corruption distribution for different years and making temporal comparisons between the density graphs yielded by the alternative data sets. This study also re-examines the widely held view that corruption constrains economic growth by investigating if this is equally true of individual and business corruption.

The plan for the rest of the paper is as follows. Section 2 describes the three data sets that have been used in this study. Section 3 reports and compares their summary features. Section 4 presents the results of estimation of the determinants of corruption on the two micro data sets and draws attention to some of the similarities and differences in the estimates. Section 5

³ In this paper, we use the term "individual corruption" to refer to the exposure of an individual to bribe demands in the advancement of her/his personal interests, and "business corruption" to refer to similar exposure of a firm to bribery in connection with business transactions.

widens the discussion to the issue of the causal links, if any, between a nation's living standards as measured by its per capita GNP/ growth rates and corruption besides other factors. The robustness of Mauro's result is re-examined on the two micro data sets. The issue that we examine in this Section is not simply whether the use of a different set of instruments will alter Mauro (1995)'s principal result of a negative relationship between growth rates and corruption, as some studies have done recently, but also if his result on the corruption perceptions data is robust to the use of other, notably micro, data sets. In keeping with the spirit of this study, the discussion of this section focuses on a comparison between the econometric evidence from the ICVS and WBES data sets. Section 6 summarises the principal results and concludes the paper.

2. Data Description⁴

The Transparency International (TI) Corruption Index is an initiative taken by the Berlin-based International non-governmental organisation, together with Dr. Johann Graf Lambsdorff, an economist with the University of Pessau in Germany. The annual Corruption Perceptions Index (CPI), first released in 1995, is the best known of Transparency International's tools. It has been widely credited with putting the issue of corruption on the international policy agenda. The CPI measures the perceived levels of public sector corruption in a given country and is a composite index, drawing on different expert and business surveys. The CPI scores countries on a scale from zero (highly corrupt) to ten (highly clean) by their perceived levels of corruption, as determined by expert assessments and opinion surveys. In order to maintain consistency with the micro data sets, we have reversed the ordering so that the scores range from zero (highly clean) to ten (highly corrupt).

The CPI is a 'poll of polls', representing the average scores which individual countries have been given by international businessmen and financial journalists when polled in a variety of contexts. Evaluation of the extent of corruption is done by country experts, non residents and residents, non-resident business leaders from developed countries, and resident business leaders. To determine the mean value for a country, standardisation is carried out via a matching percentiles technique. This uses the ranks of countries reported for each individual source. This method is useful for combining sources that have a different distribution. While there is some information loss in this technique, it allows all reported scores to remain within the bounds of the CPI, i.e. between 0 and 10. Notwithstanding the scientific manner in which the individual scores are combined to provide an aggregate score for a country, the CPI is a subjective measure based on the perceptions of a limited set of respondents, mainly business people. Many of these respondents do not reside in the country that is being evaluated introducing a cultural bias which adds to the element of subjectivity in the CPI scores.

⁴ The data descriptions have been taken from the websites, www.transparency.org, www.unicri.it and www.enterprisesurveys.org. The reader is referred to these websites for further details.

The second data set, which provides information on civilian corruption in the context of dealings with public or government officials, came from the International Crime Victim Surveys (ICVS) that is collected by the United Nations Interregional Crime and Justice Research Institute (UNICRI). The ICVS project started in 1989. A standard set of data analysis tools has been developed over the years to ensure that choice of data analysis that have been made in the past are applied over time and also between countries. Two types of methodologies have been developed over the years, Cati methodology for the countries with high telephone penetration, and face to face methodology for the countries with low telephone penetration. In most cases, the latter are restricted to the capital city. This introduces a city bias in the responses to questions on crime and corruption in the case of many of the developing countries. If, as seems likely, crime and corruption in many less developed countries are largely restricted to the cities and the urban metropolitan centres, the ICVS scores are likely to suffer from an upward bias in case of the poorer countries. This is analogous to the cultural bias in case of the CPI scores of developing countries which is also likely to introduce an upward bias in corruption perception in such countries. In case of the industrialised countries, the response rates have shown a steady improvement over the years, up from a 43 % response rate in 1989 to a 67 % response rate in 1996. UNICRI was responsible for the face to face questionnaire and monitoring of the ICVS in the developing and transition countries. In 1996, the response rates in developing countries were on average 95 %, ranging from a minimum of 86 % in Botswana to a maximum of 99 % in South Africa, the Philippines and Bolivia.

The ICVS data on corruption was based on the individual's response to the question: [*During the past year*] *has any government official, for instance a customs officer, police officer or inspector in your own country, asked you or expected you to pay a bribe for his services?* The responses, combined with a host of personal and household information, constituted the ICVS data set for this study. This information was supplemented by a set of country level characteristics that have been listed (with scores) in Appendix C of the paper by Dabla-Norris, Gradstein and Inchauste (2008) and in Table 4 of the study by Mocan (2008).

The World Bank Enterprise Surveys (WBES), which provided the third data set used in this study, collect information (from the firm level surveys) about the business environment, how it is perceived by individual firms, how it changes over time, and about the various constraints to firm performance and growth. The present study is based on the responses to the question whether the firm made gift payments within the past year. Since this is similar to the question asked of individuals in the ICVS data set, this sets up a direct comparison between the corruption measures constructed from the ICVS and WBES. Given the nature of the questions in the ICVS and WBES, a comparison between a country's corruption rates from these two micro data sets can be construed as a comparison between individual corruption (ICVS) and business corruption (WBES).

The earliest WBES available data is from 2002 and the latest is from 2008. The 2002-06 data asked the following questions relating to bribe payments. [*Did you make a*] *gift payment to obtain mainline telephone, electrical or water connection, construction permit, import license and operating license?* [*Was a gift/informal payment requested*] *by tax inspectorate, by*

*[agencies for] labour and social security, fire and building safety, sanitary/epidemic safety, environmental safety and by all [other] agencies? The 2006-08 data asked the following questions: Was an informal gift requested when you applied for a telephone, electrical or water connection, when you applied for an import license, operating license or a construction-related permit, or [during] tax inspections?*⁵

Since the TI's CPI and the WBES are both based on the opinions and experiences of business people, their corruption rates are likely to be closer to one another than to those of the ICVS, a feature that is confirmed by the results reported below. However, since the WBES information, being based on the firm's experience, is less subjective than the perception based CPI, wide differences are still likely to persist between these two measures.

3. Comparison of the Summary Evidence from the Alternative Data Sets on Corruption

The following points need to be kept in mind before comparing the summary evidence on corruption provided by the three data sets. The Corruption Perception Index, as reported by Transparency International, scores a country on a scale of 0-10 in descending order of corruption, with 10 denoting the least corrupt country and 0 the most corrupt. For consistency with the ICVS and WBES data sets where the respondent's answer is binary with 1 indicating a bribe demand and 0 otherwise, the CPI score was modified to (10 - CPI score for that country) so that a higher modified CPI score indicates higher corruption. Moreover, for easy comparability with the country averages of corruption rates from the two micro data sets, the modified CPI scores were rescaled by dividing by the maximum modified CPI score so that the scores lie between 0 and 1. Note, however, that while the country averages from the ICVS, and WBES data sets denote the percentages of individuals and firms, respectively, that are exposed to corruption in a country, no such interpretation can be given to the modified CPI scores. The corruption distributions of countries from the three data sets are comparable since they are based on ordinal intervals of corruption.

The average rates of corruption, calculated by country and year from the ICVS and WBES data sets, are presented in the Appendix tables A1 and A2 respectively. A quick glance at these tables indicates that civilian or individual corruption, that the ICVS measures, is generally much lower in magnitude than firm level or business corruption. Both these micro data sets generally agree that poorer and less developed countries report greater prevalence of corruption than the more affluent and developed countries. The cross country variation in the corruption statistics is, however, much smaller in case of individual corruption (ICVS) than for business corruption (WBES). There is no clear picture in either data set on temporal changes in the magnitude of corruption.

⁵ When running regressions on WBES data, we use the 2002-05 dataset in order to maintain consistency on the definition of the dependant variable (corruption) within the WBES data. Also, for purpose of comparison among corruption measures, the 2002-05 WBES dataset is closer to the ICVS data under study.

The scatter points⁶ and the quadratic fits between the country scores in the three data sets are presented in Figures 1-3, with each scatter point representing a combination of corruption scores for a particular country. To ensure that the correlation magnitudes are true measures of association between the country scores in the data sets, the scatter points relate to a particular year in case of Figure 1 (CPI vs. WBES) and Figure 2 (CPI vs. ICVS). Due to the non overlapping periods of their data sets, proximate years were used for a comparison between the ICVS and WBES country scores in Figure 3. There is generally a positive association between the country scores in the three data sets. A significant exception is the downward sloping segment of the U shaped curve in Figure 3. The association is at its strongest between WBES and CPI ($r^2 = 0.7688$) and at its weakest between ICVS and WBES ($r^2 = 0.4605$). This makes intuitive sense since, unlike the ICVS, both the CPI and the WBES country scores are based on the responses of business people and entrepreneurs. The Figures also show that the countries fare much worse on the responses of business people (CPI, WBES) than on individual responses (ICVS) to the corruption question. This is seen from Figure 2 where all the scatter points lie above the 45° line and, still more clearly, from Figure 3 where all the scatter points lie below the 45° line. The latter suggests that in all the countries that appear in both the micro data sets, the WBES based corruption rates exceed those based on the ICVS, often by a large margin.

Fig 1: Quadratic Fit between Corruption scores from CPI and WBES 2005

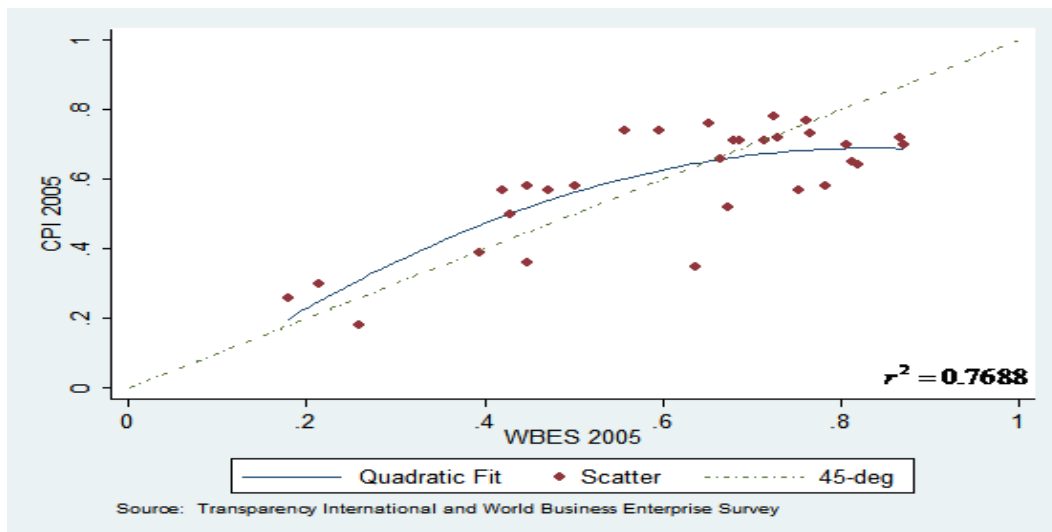


Fig 2: Quadratic Fit between Corruption scores from CPI and ICVS 1999

⁶ STATA 9™ has been used to generate all graphs and all estimation results.

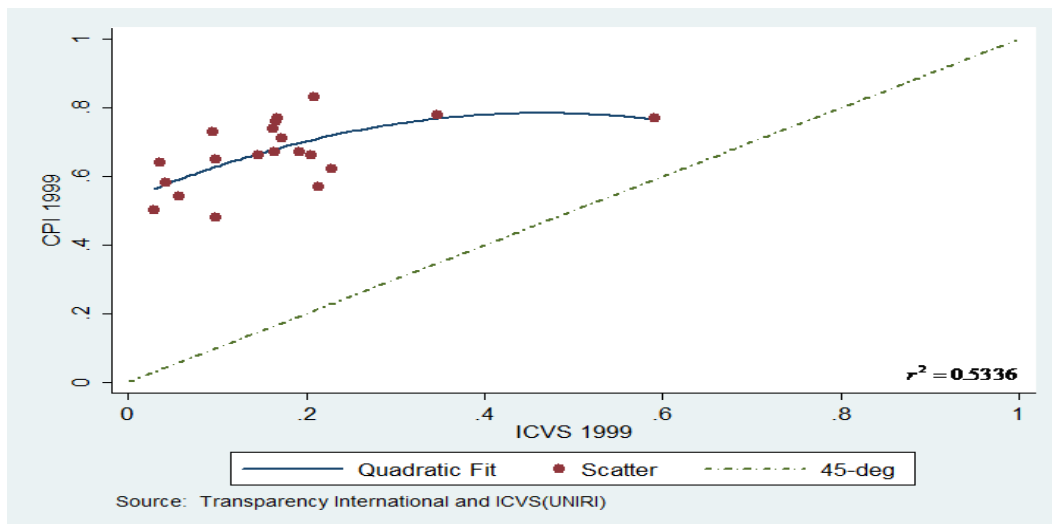
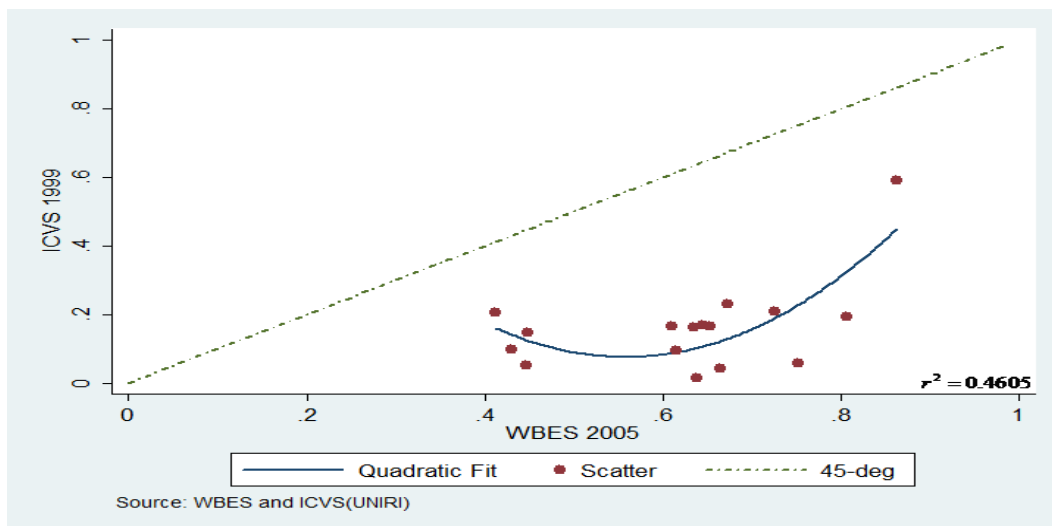


Fig 3: Quadratic Fit between Corruption scores from ICVS and WBES

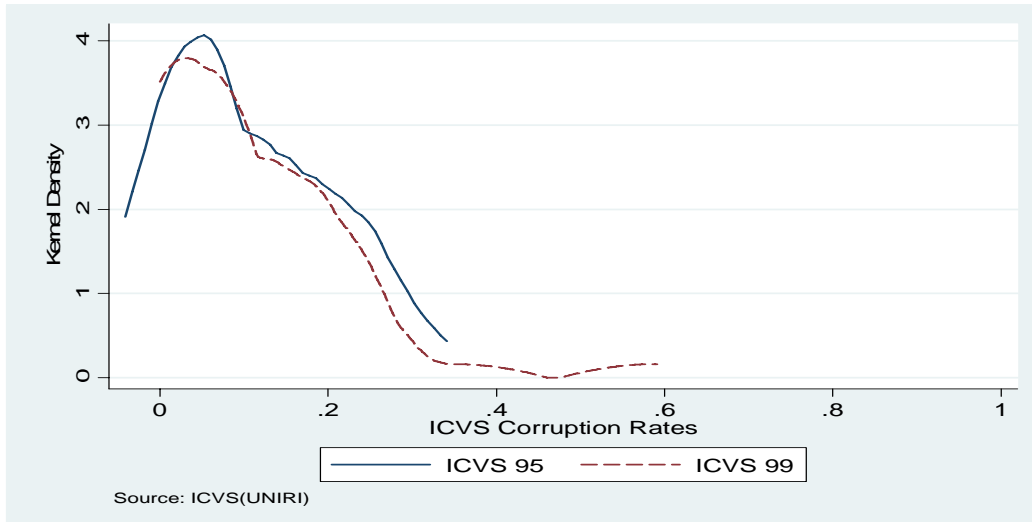


Further insights into the cross country comparisons on corruption can be obtained from Figures 4-6 which plot the kernel densities of the corruption distribution of countries corresponding to ICVS, WBES and the modified CPI, respectively. These graphs also show how the distribution has changed over time. The figures below the graphs give the principal statistics of these distributions. If we take the median as a summary measure of world corruption, then the three data sets differ on how corruption has changed over time. While the ICVS records a marginal decline in world corruption between 1995 and 1999, the modified CPI records a sharp increase during this period. The latter records a further increase in world corruption between 1999 and 2006 notwithstanding a marginal decline between 1999 and 2005. In contrast, the WBES records a continuous decline in world corruption during the period 2002-2006.⁷ Though some of the temporal movement in the measures could be attributed to the fact that the CPI was constructed from the corruption perception of a wider selection of respondents [see Lambsdorff (2006)] and that the WBES was based on a more

⁷ The choice of the years for Kernel density analysis is based on the years which have the higher number of observations (1995 and 1999 for ICVS and 2002, 2005 and 2006 for WBES).

limited set of questions on gift payments in the later years, it is not unreasonable to conclude that the three measures differ fundamentally on temporal changes in the magnitude of severity of world corruption. The kernel distributions show much greater temporal movement in case of the WBES than the modified CPI, and the least movement in case of the ICVS data set.

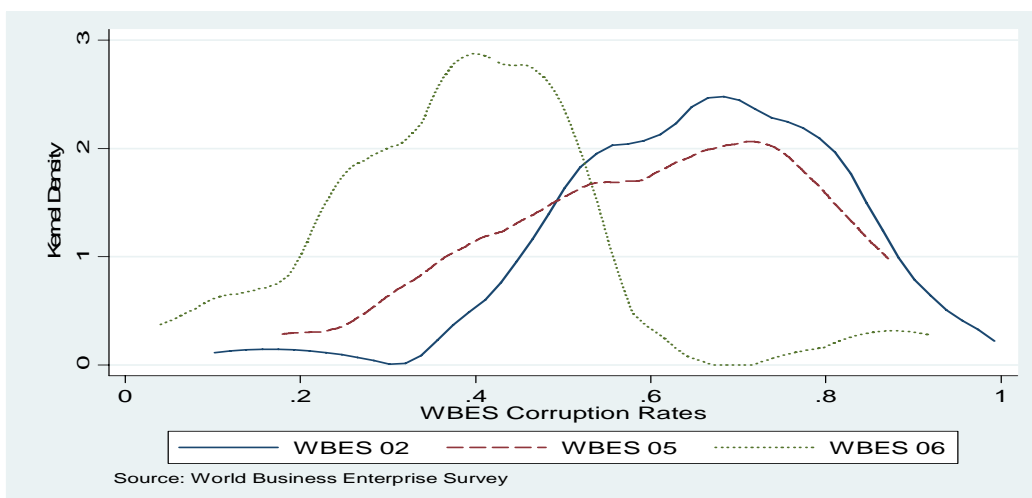
Fig 4: Corruption Distribution: ICVS Kernel Densities, 1995 and 1999



Summary Statistics of ICVS Corruption Distribution

ICVS	No. of Obs	Mean	Max	Min	Range	Standard Deviation	Variance	Median	Skewness	Kurtosis
ICVS, 1995	32	0.106	0.299	0.001	0.298	0.094	0.009	0.078	5.24E-01	2.045
ICVS, 1999	41	0.100	0.591	0.000	0.591	0.119	0.014	0.055	1.95E+00	8.331

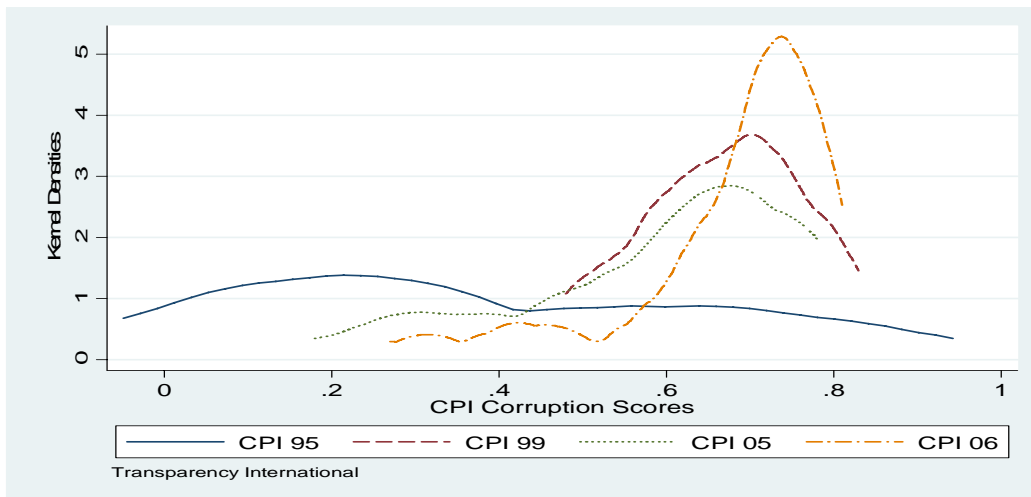
Fig 5: Corruption Distribution: WBES Kernel Densities, 2002, 2005, 2006



Summary Statistics of WBES Corruption Distribution

WBES	No. of Obs	Mean	Max	Min	Range	Standard Deviation	Variance	Median	Skewness	Kurtosis
WBES, 2002	37	0.658	0.929	0.165	0.765	0.152	0.023	0.676	-7.64E-01	4.274
WBES, 2005	42	0.602	0.871	0.180	0.691	0.179	0.032	0.636	-4.99E-01	2.526
WBES, 2006	35	0.387	0.918	0.040	0.878	0.175	0.031	0.408	7.82E-01	4.986

Fig 6: Corruption Distribution: CPI Kernel Densities, 1995, 1999, 2005, 2006



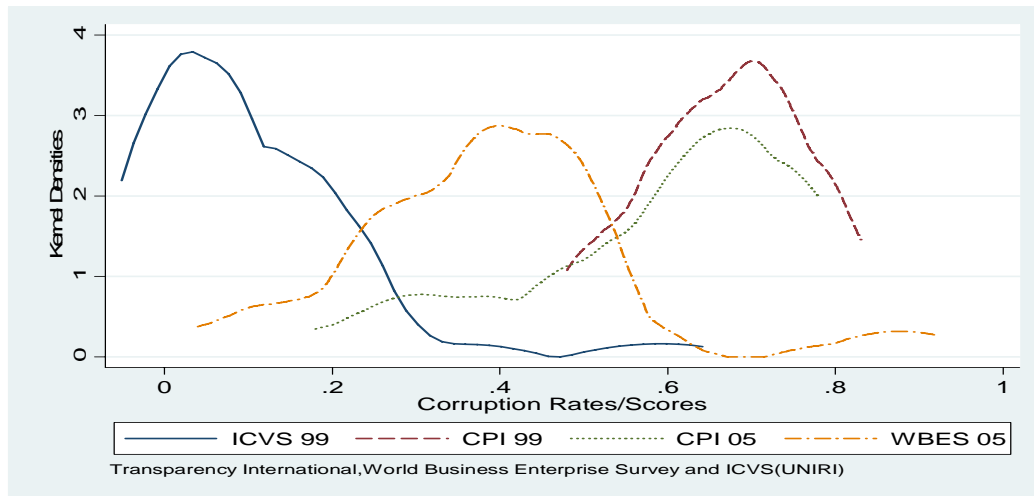
Summary Statistics of CPI Corruption Distribution

CPI	No. of Obs	Mean	Max	Min	Range	Standard Deviation	Variance	Median	Skewness	Kurtosis
CPI, 1995	16	0.375	0.806	0.088	0.718	0.264	0.070	0.294	4.18E-01	1.593
CPI, 1999	20	0.667	0.830	0.480	0.350	0.097	0.009	0.665	-3.05E-01	2.242
CPI, 2005	30	0.592	0.780	0.180	0.600	0.166	0.028	0.645	-9.82E-01	2.902
CPI, 2006	31	0.675	0.810	0.270	0.540	0.129	0.017	0.730	-1.72E+00	5.295

Figure 7 allows a ready comparison of the corruption distribution of countries between the alternative data sets by plotting the kernel densities in the same Figure. The corruption distribution of countries implied by the WBES and the modified CPI measures are closer to one another than to that corresponding to the ICVS. Figure 7 confirms that the evidence on corruption based on the individuals' responses in the ICVS data points to a less pessimistic picture than those based on the responses of the business people. For example, according to the ICVS, 1999, on median based average, 5.5 % of individuals globally were asked to pay a bribe while, according to the WBES, 2005, the comparable figure for firms is 63.6%. The two rates of corruption are not necessarily inconsistent. For example, an individual is much less likely to be exposed to bribe requests to advance her/his personal interests than a firm will be in business transactions. A comparison of the modified CPI density graphs in 1999 and 2005 confirms the decrease in the perception of corruption in the early years of the 21st century. A comparison of the kernel density graphs of the WBES and CPI in 2005 reinforces the view

that the business people’s perception of corruption is worse than the actual experience of corruption by the resident firms in those countries.

Fig 7: Comparison of Corruption Distributions from ICVS, WBES and CPI

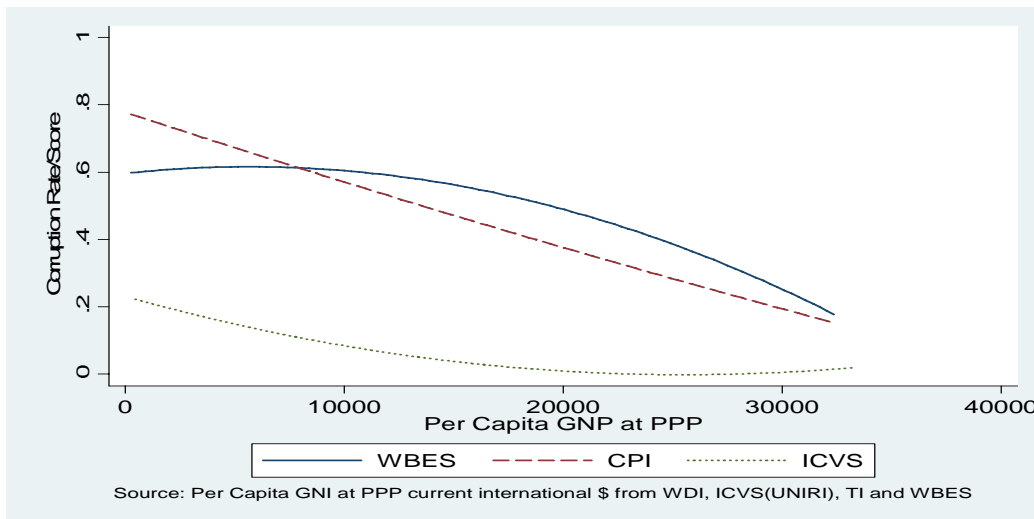


Comparative Summary Statistics of Corruption Distribution

Corruption	No. of Obs	Mean	Max	Min	Range	Standard Deviation	Variance	Median	Skewness	Kurtosis
ICVS, 1999	41	0.100	0.591	0.000	0.591	0.119	0.014	0.055	1.95E+00	8.331
CPI, 1999	20	0.667	0.830	0.480	0.350	0.097	0.009	0.665	-3.05E-01	2.242
CPI, 2005	30	0.592	0.780	0.180	0.600	0.166	0.028	0.645	-9.82E-01	2.902
WBES, 2005	42	0.602	0.871	0.180	0.691	0.179	0.032	0.636	-4.99E-01	2.526

Does corruption decline as a country becomes more affluent, and her regulatory and detection mechanisms display greater sophistication? Figure 8 provides comparative evidence on this issue from the three data sets by plotting the country scores against their per capita GNP at purchasing power parity. While the three measures generally agree that corruption decreases as a country gets richer, there are differences between the graphs on the nature and extent of the decline. The modified CPI registers a steady and sharp decline throughout the process of economic development unlike the more objective measures based on the micro data sets. The WBES graph shows that, after a very marginal decline in corruption in the early stages of economic development, the rate of decline increases for middle income countries and exceeds the rate of decline shown by the modified CPI measure for high income countries. The ICVS based corruption measure behaves quite differently. Much of the decline takes place in the early stages of economic development but, then, the graph flattens out with individual corruption becoming virtually nonexistent in the more advanced countries. Figure 8 is consistent with the kernel density graphs of Figure 7 in confirming that the evidence on corruption from the CPI and WBES are closer to one another than to that from the ICVS. This is further confirmation that business corruption is more serious and of higher order than individual corruption. The empirical literature on corruption does not usually distinguish between the two though the present evidence points to the need to do so.

Fig 8: Quadratic Fit between a country's Corruption Rate/Score and GNP



Figures 9 – 12 provide further insights by plotting the relationship between the corruption scores and per capita GNP at PPP separately for the four quartile groups in the corruption distribution of countries reported earlier. The figures correspond to the quartiles in increasing order, with Figure 9 referring to the least corrupt countries and Figure 12 the most corrupt countries. It is interesting to note that none of the ICVS scatter points appears in Figure 9 though, overall, ICVS points to lower world corruption than the modified CPI and WBES based measures. These figures show that the decline in corruption with economic development is largely restricted to countries in quartile 1, i.e. the least corrupt countries. There is not much evidence of an inverse relation between corruption and per capita GNP for the most corrupt countries. Figures 11 and 12 show a reversal of the graphs corresponding to the modified CPI and WBES. Corruption perception, that the modified CPI quantifies, is worse than corruption experience, that the WBES quantifies, in the moderately corrupt countries of quartile 3 shown in Figure 11, but the reverse is the case for the most corrupt countries of quartile 4 shown in Figure 12.

Fig 9: Quadratic Fit between a country's Corruption Rate/Score and GNP for Quartile 1

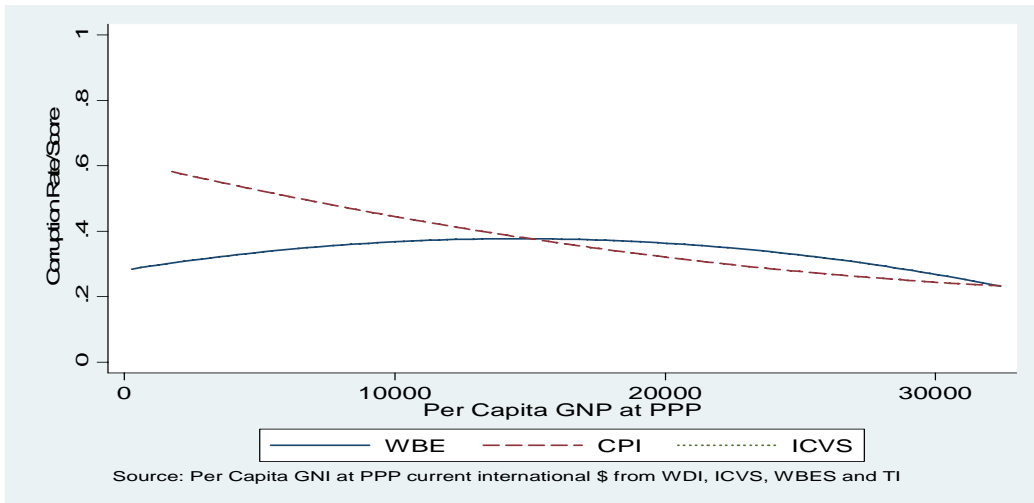


Fig 10: Quadratic Fit between a country's Corruption Rate/Score and GNP for Quartile 2

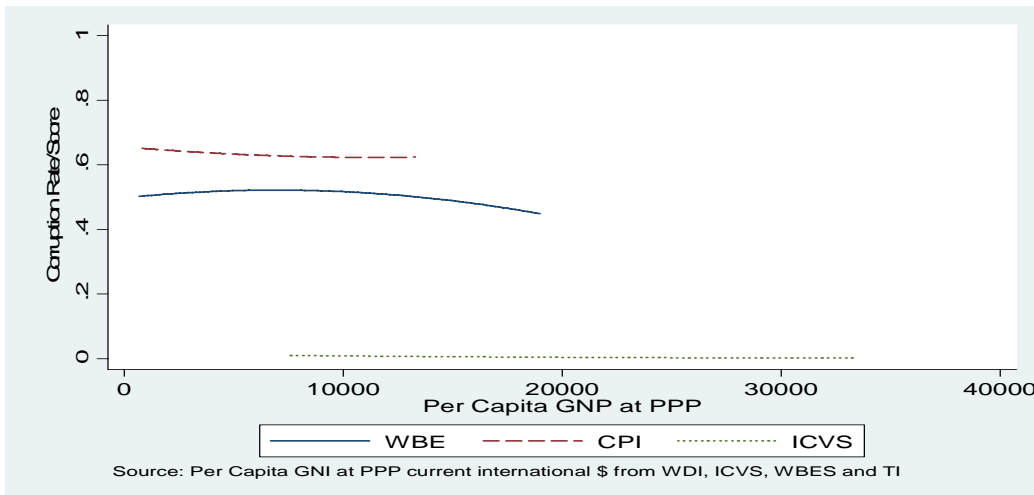


Fig 11: Quadratic Fit between a country's Corruption Rate/Score and GNP for Quartile 3

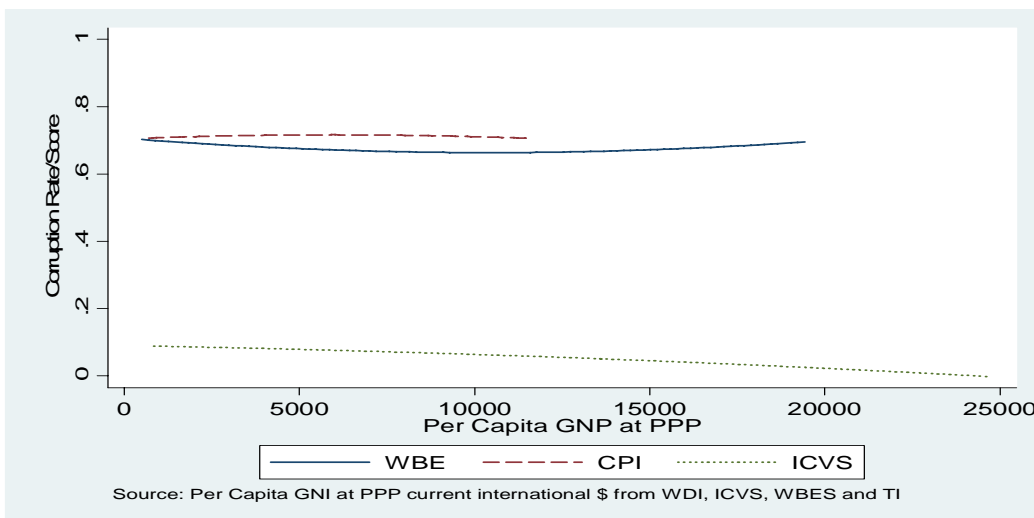
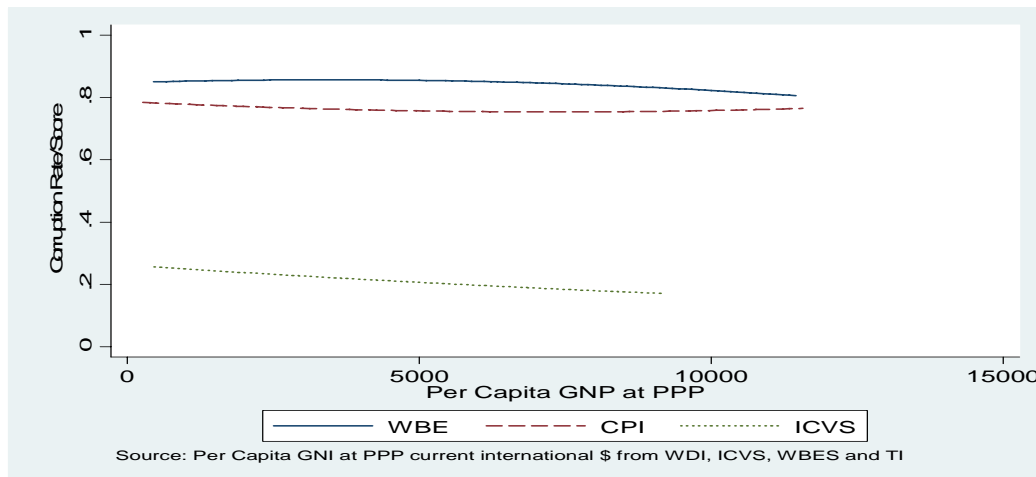


Fig 12: Quadratic Fit between a country's Corruption Rate/Score and GNP for Quartile 4



The overall message conveyed by the Figures is that the inverse relationship between corruption and living standards as measured by per capita GNP does not hold uniformly across countries in various stages of development nor is there uniformity in the portrayal of this relationship by the alternative measures. The widely held belief based on the CPI measure put out by Transparency International that corruption rates decline monotonically and sharply as a country develops is not supported by the evidence from the ICVS and the WBES data sets. Both the micro data sets suggest non monotonicity in this relationship but disagree on its shape. While ICVS suggests that the decline in the corruption rates as the country enjoys higher living standards occurs at the lower levels of development and then peters out and even registers a slight increase at very high income levels, the WBES based evidence suggests the reverse. Given the nature of the ICVS and the WBES data, an alternative interpretation of this result could be that as a country develops and witnesses higher living standards, corruption faced by the individuals in their dealings with public officials initially starts to decline followed by a decline in business corruption at the higher levels of development. This raises the question of whether the evidence on corruption acting as a constraint on economic development based on the CPI holds on the micro data sets. We visit this issue in the penultimate section where we report the results of regressing per capita income and growth on a host of determinants including the corruption rates on the micro data sets and focus attention on some key differences in the estimates.

4. Comparison of the Determinants of Individual and Business Corruption.

Tables 1 and 2 report the probit estimates of the corruption regression on the ICVS and WBES data sets, respectively, with a selection of the personal characteristics and characteristics of the country of residence of the respondent included as determinants of the respondent's probability of being asked to pay a bribe. A time variable was introduced to capture the effects of omitted variables that vary over time. The tables also report the probit coefficient estimates in the absence of the country indicator effects. While a comparison between the pseudo R^2 values in each table confirms the presence of significant country

effects in explaining corruption, the inclusion of the country variables leads to a loss of statistical significance in case of some of the respondent's characteristics due to the loss of observations. A comparison between Tables 1 and 2 allows an examination of possible differences between the determinants of individual and business corruption. Such a comparison, which is a significant point of departure of the present study from the previous literature, adds to the summary evidence presented in the previous section on key differences between the two types of corruption.

Table 1: Probit Coefficient Estimates from ICVS^a

Variables ^b	No Country Effects				With Country Effects			
	Coefficients ^c	Robust SE	z	P> z	Coefficients ^c	Robust SE	z	P> z
smalltown	-0.7064 *	0.0204	-34.58	0.000	-0.2257 *	0.0359	-6.29	0.0000
medtown	-0.0297 **	0.0150	-1.98	0.047	-0.1649 *	0.0328	-5.03	0.0000
male	0.2992 ***	0.0145	20.61	0.000	0.3326 *	0.0225	14.78	0.0000
age1	0.6191 ***	0.0346	17.91	0.000	0.5659 *	0.0547	10.34	0.0000
age2	0.3779 ***	0.0324	11.66	0.000	0.3559 *	0.0507	7.02	0.0000
single	0.4881 **	0.2381	2.05	0.040	4.3902 *	0.3652	12.02	0.0000
married	0.7054 *	0.2379	2.97	0.003	4.5172 *	0.3646	12.39	0.0000
livtog	0.6514 *	0.2395	2.72	0.007	4.4630 *	0.3679	12.13	0.0000
divorced	0.6318 *	0.2397	2.64	0.008	4.5140 *	0.3687	12.24	0.0000
widow	0.7854 *	0.2402	3.27	0.001	4.6127 *	0.3693	12.49	0.0000
working	-0.3892 *	0.0349	-11.14	0.000	-0.0380	0.0783	-0.49	0.6270
lookwork	-0.2588 *	0.0397	-6.51	0.000	0.0195	0.0845	0.23	0.8170
keephome	-0.3943 *	0.0403	-9.79	0.000	-0.1228	0.0855	-1.44	0.1510
retired	-0.6480 *	0.0456	-14.20	0.000	-0.2995 *	0.0894	-3.35	0.0010
atschool	-0.1067 **	0.0424	-2.52	0.012	-0.0915	0.0867	-1.05	0.2910
inc1	0.1677 *	0.0241	6.97	0.000	0.1871 *	0.0523	3.58	0.0000
inc2	0.0696 *	0.0239	2.91	0.004	0.0518	0.0516	1.00	0.3150
edu_yrs	0.0098 *	0.0018	5.50	0.000	0.0257 *	0.0027	9.47	0.0000
icvs_t	-0.0495 *	0.0036	-13.56	0.000	0.0335 *	0.0075	4.46	0.0000
reg_burden					-396.4677 *	34.6570	-11.44	0.0000
hdi					-10.7713 *	0.3133	-34.38	0.0000
literacy					-0.0789 *	0.0049	-15.98	0.0000
lpop					-0.0976 *	0.0100	-9.73	0.0000
unempl					-0.0065	0.0043	-1.52	0.1290
Deap					-0.2293 *	0.0479	-4.79	0.0000
Dla					0.6771 *	0.0428	15.80	0.0000
_cons	-1.9485 *	0.2454	-7.94	0.000	3.7394	.	.	.
Number of				91574	Number of obs			66922
Log Pseudolikelihood				-20612.644	Log Pseudolikelihood			-8416.7304
Pseudo R ²				0.105	Pseudo R ²			0.2518

a. ICVS is 1 if asked for a bribe, 0 otherwise. b. See Appendix Table A3 for meaning of the variable names.
c. *, ** and *** imply significance at 1%, 5% and 10% levels respectively.

Consistent with the results presented in Swamy, et. al. (2001) and Mocan (2008), Table1 shows that a male is more likely than a female to be asked for a bribe. Residents of the smaller towns and cities (i.e. with a population below 1 million) are less likely to receive bribe demands than those residing in the more populated areas. The smaller the place of residence the greater is the vulnerability of the individual to bribe demands. This is due to the fact that the residents of the smaller towns and cities have fewer contacts with government officials and are less reliant on civic authorities for their daily existence compared to the residents of the larger cities. Retired individuals are less likely to be exposed to bribes than

those working. These results have been explained by Hunt (2004) as reflecting the absence of informal networking and quid pro quo in case of residents of the more populated regions and the working individuals. As Hunt (2004) points out, the networking system can prevent corruption through the establishment of personalised contact and trust⁸ leading to the possibility of quid pro quo substituting bribery. Table 1 also reports that income and educational advancements increase the individual's exposure to bribe demands reflecting the fact that government officials are more likely to approach resource rich and more educated individuals with bribe demands rather than the poor or the less educated.

A striking feature of the results of Table 1 is the high significance recorded by nearly all the country variables in their effects on individual corruption. This is a result of immense policy significance for it points to effective policy instruments for reducing corruption. For example, an increase in the regulatory requirements in the respondent's country of residence leads to a sharp decrease in individual corruption. Improvements in the indicator of human development and in the literacy level of the respondent's country of residence also help to reduce individual corruption. This is a positive result since it shows that greater social awareness that results from increasing literacy and other aspects of human development sets up barriers to the spread of corruption. Consequently, as Table 1 reports, countries in the Asia Pacific region that have made impressive gains in the human development indicators have witnessed lower levels of individual corruption than elsewhere. The same cannot be said of the Latin American countries where the advances of the human development indicators have been far less impressive resulting in such countries witnessing greater levels of individual corruption than elsewhere. While population size has a strong negative effect on individual corruption, higher unemployment also tends to dampen the existence of individual corruption though the latter effect is much weaker in both size and significance. It is worth noting that the regulatory requirements, the human development indicator and the literacy level of the respondent's country of residence stand out among the country variables in regard to the size and significance of their effects in reducing the culture of individual corruption. The time variable is also highly significant suggesting that, after controlling for the other determinants, there has been an increase in individual corruption over the period considered for the ICVS surveys (1995-1999).

Table 2 extends the results of Dabla-Norris, et. al. (2008) on informal economic activity based on the WBES data to bribe demands. An increase in the education level of the top manager is likely to increase the firm's exposure to bribe payments, analogous to the result in Table 1 that higher education increases the citizen's susceptibility to individual corruption. However, unlike in the case of individuals in their dealings with public officials, an increase in the firm's income level reduces its exposure to bribery. The net working explanation of Hunt (2004) possibly holds here as well. Firms in the higher income groups are fewer in number and are better placed to form networks and cartels that reduce their exposure to corruption. Similarly, foreign owned firms who have less contacts and net works for quid pro

⁸ See, for example, Knack and Zak (2003) for a discussion of the positive role played by interpersonal trust in promoting economic growth and development.

quo in the country of business than the locally owned firms are more exposed to corruption. Increasing confidence by the firm in the country's judicial system reduces business corruption. A firm that views corruption as a severe constraint on the growth of its business or regulatory policy uncertainty as an impediment to its operations faces increased exposure to bribes. A firm that views the existing labour regulations as a severe constraint on its business operations is more vulnerable to bribe demands. Another interesting result is that a firm that takes a pessimistic view of macroeconomic uncertainty in its effect on the firm's business operations is less likely to face business corruption.

Table 2: Probit Coefficient Estimates from WBES^a

Variables ^b	No Country Effects				With Country Effects			
	Coefficients ^c	Robust SE	z	P> z	Coefficients ^c	Robust SE	z	P> z
size	0.0661 **	0.0258	2.56	0.0100	0.0385	0.0350	1.1	0.2710
firmage	-0.0061 *	0.0012	-5.24	0.0000	-0.0023	0.0014	-1.64	0.1010
edu_topmng	0.0431 *	0.0115	3.74	0.0000	0.0590 *	0.0142	4.14	0.0000
female_pc	0.0015 *	0.0006	2.68	0.0070	-0.0006	0.0007	-0.77	0.4390
conf_justice	-0.0907 *	0.0110	-8.26	0.0000	-0.0428 *	0.0138	-3.09	0.0020
DEffGovt	-0.0862 **	0.0409	-2.11	0.0350	-0.1096 ***	0.0601	-1.82	0.0680
BClegalsyst	0.0311 **	0.0140	2.22	0.0260	0.0045	0.0184	0.24	0.8070
BCanticomp	-0.0125	0.0137	-0.92	0.3600	0.0284	0.0187	1.52	0.1280
BCcrime	-0.0516 *	0.0144	-3.59	0.0000	-0.0290	0.0190	-1.53	0.1260
BCcorrupt	0.1145 *	0.0151	7.57	0.0000	0.0889 *	0.0200	4.44	0.0000
BCinstable	-0.0752 *	0.0151	-4.97	0.0000	-0.0423 **	0.0205	-2.07	0.0390
BCpolicy	0.0584 *	0.0157	3.73	0.0000	0.0559 *	0.0208	2.7	0.0070
BClic	0.0896 *	0.0140	6.4	0.0000	0.0749 *	0.0178	4.21	0.0000
BClabregu	0.0188	0.0138	1.36	0.1720	0.0571 *	0.0187	3.05	0.0020
income	-0.5768 *	0.0315	-18.29	0.0000	-0.4412 *	0.0843	-5.23	0.0000
Dexport	0.1000 **	0.0412	2.42	0.0150	-0.0184	0.0525	-0.35	0.7260
Dforeign	0.0181	0.0529	0.34	0.7330	0.1559 **	0.0751	2.08	0.0380
wbes_t	0.2440 *	0.0265	9.2	0.0000	-0.2100 **	0.0995	-2.11	0.0350
Deap					-0.5451 *	0.1411	-3.86	0.0000
Dla					-1.1923 *	0.1575	-7.57	0.0000
rol					-0.0400	0.1931	-0.21	0.8360
hdi					0.2751	1.6332	0.17	0.8660
literacy					-0.0185 **	0.0077	-2.39	0.0170
lpop					0.0193	0.0324	0.6	0.5500
unempl					-0.0778 *	0.0146	-5.33	0.0000
_cons	-0.5103 *	0.0919	-5.55	0.000	0.8778	0.8669	1.01	0.3110
Number of obs				10016	Number of			7316
Log Pseudolikelihood				-3608.8416	Log Pseudolikelihood			-2229.1261
Pseudo R ²				0.1074	Pseudo R ²			0.1343

a. WBES is 1 if asked for a bribe, 0 otherwise. b. See Appendix Table A3 for meaning of the variable names. c. *, ** and *** imply significance at 1%, 5% and 10% levels respectively.

The policy message from Table 2 is clear: an effective way of reducing business corruption is by altering the perceptions of the key decision makers of the unit of operations. Greater transparency in dealing with corruption, convincing the firm that the authorities are determined to weed out corruption thus altering its views on corruption as a serious impediment to its activities, simpler regulatory mechanisms, and the reduction of uncertainty

can be effective in eliminating business corruption⁹. Unlike in the case of individual corruption, gender matters little in business corruption as is clear from the statistical insignificance of the estimated gender composition variable in the presence of the country effects. This is in sharp contrast to the significance of the gender coefficient estimate in Table 1. As with the results for individual corruption presented in Table 1, the nature and statistical significance of the effects of the respondent's characteristics are generally robust to the introduction of the country variables. Similar to the case of individual corruption, several country indicators are significant determinants of business corruption. Note however that the country effects are generally weaker and much less significant in case of business corruption than for individual corruption discussed earlier. An increase in the country's unemployment rate and in the literacy level of the firm's country of operations lead to declines in business corruption. An improvement in the country's human development indicator does not have any significant impact on business corruption in contrast to its role in reducing individual corruption. Another interesting contrast between the results in Tables 1 and 2 is that while the Latin American countries have experienced lower levels of business corruption than elsewhere, the reverse was seen to be the case for individual corruption. A possible explanation could be that the human development indicators where Latin American countries have shown less progress than elsewhere seem to matter much less in case of business corruption than in case of individual corruption. Note, also, that after controlling for the respondent's characteristics and the country variables, business corruption did not show any significant increase over time during the period of consideration for the WBES data sets (2002-2006) unlike the increase registered by individual corruption. It is interesting to note that, in case of both the micro data sets, the coefficient estimate of the time variable changes sign, though in reverse directions, once we introduce the country effects. For example, the decline in individual corruption recorded by the ICVS based summary measures reported below Figure 4 is merely the reflection of corruption declining as development proceeded and the countries became more affluent. Once these are controlled for, there was a net increase in individual corruption.

To sum up, Tables 1 and 2 reveal several similarities and contrasts between the determinants of government and business corruption. While both types of corruption can be tackled by improvement in a country's legal and regulatory mechanisms and in her literacy levels, other aspects of human development play a much greater role in reducing individual corruption than in controlling business corruption. A transparent regulatory policy that changes the firm's perception of corruption as an impediment to its operations can go a long way in controlling business corruption. In a perverse sort of way, increasing unemployment dampens business corruption but has little effect on individual corruption. In an era where developing countries are in need of greater investment by foreign firms, the present results suggest that policy initiatives should include encouraging such firms to develop local contacts and participate in local networks in order to reduce their greater exposure to bribe demands.

⁹ Shleifer and Vishny (1993) also emphasise the role of government institutions and regulatory mechanisms in controlling corruption.

The probit estimates in Tables 1 and 2 are likely to suffer from bias if one or more of the country variables are correlated with variables that, also, influence the respondent's answer to the question on bribery. To examine the robustness of the regression results presented so far, Tables 3 and 4 present the IV probit coefficient estimates. In case of the ICVS data set, the country variables, Regulatory burden, HDI and Literacy are instrumented, while in case of the WBES data, Rule of Law, HDI and Literacy are instrumented. These country indicators were instrumented by Freedom of Press, Economic Freedom and Female/Male ratio which are all available at the country level. The choice of these instrumental variables was guided by the prime consideration for a good instrument, namely, that they are correlated with the country variables that are potentially endogenous but they do not influence the respondent's exposure to corruption.

Table 3: IV Probit Coefficient Estimates from ICVS^a

Variables ^b	Coefficient ^c	Robust SE	z	P> z
reg_burden	-201.3896 ***	121.2927	-1.66	0.0970
hdi	-10.6694 *	0.3885	-27.46	0.0000
literacy	-0.1420 *	0.0128	-11.12	0.0000
smalltown	-0.3361 *	0.0461	-7.29	0.0000
medtown	-0.2592 *	0.0502	-5.16	0.0000
male	0.3321 *	0.0227	14.66	0.0000
age1	0.5890 *	0.0558	10.55	0.0000
age2	0.3719 *	0.0520	7.15	0.0000
single	4.4772 *	0.4084	10.96	0.0000
married	4.6000 *	0.4103	11.21	0.0000
livtog	4.5183 *	0.4150	10.89	0.0000
divorced	4.5790 *	0.4134	11.08	0.0000
widow	4.6850 *	0.4126	11.35	0.0000
working	-0.0701	0.0786	-0.89	0.3730
lookwork	0.0221	0.0844	0.26	0.7930
keephome	-0.1277	0.0868	-1.47	0.1410
retired	-0.3420 *	0.0910	-3.76	0.0000
atschool	-0.1285	0.0876	-1.47	0.1430
inc1	0.1782 *	0.0504	3.54	0.0000
inc2	0.0118	0.0505	0.23	0.8160
edu_yrs	0.0181 *	0.0031	5.81	0.0000
icvs_t	0.0232 *	0.0081	2.86	0.0040
lpop	-0.0796 *	0.0110	-7.21	0.0000
unempl	0.0024	0.0051	0.46	0.6450
Deap	-0.1357 **	0.0536	-2.53	0.0110
Dla	0.9060 *	0.0904	10.03	0.0000
_cons	3.5796 *	0.6470	5.53	0.0000
Number of obs				66922
Wald test of significance: χ^2 (26)				168328.44
Prob > χ^2				0.0000 *
Wald test of exogeneity: χ^2 (3)				38.87
Prob > χ^2				0.0000 *

a. ICVS is 1 if asked for a bribe, 0 otherwise. b. See Appendix Table A3 for meaning of the variable names. c. *, ** and *** imply significance at 1%, 5% and 10% levels respectively.

Tables 3 and 4 confirm that the qualitative pictures on the determinants of individual and business corruption are generally robust to the treatment of endogeneity. The Wald statistic rejects the assumption of exogeneity of the country indicators in both cases. Table 3 shows that improvements in the regulatory mechanism, advances in human development and increases in the literacy levels continue to exert significant downward pressures on individual

corruption, though the regulatory effect weakens in statistical significance on the use of IV estimation. Table 4 shows that the size and significance of the effect of the country's legal system in enforcing the rule of law on business corruption is strengthened on the use of IV estimation. Moreover, simpler compliance with labour regulation along with greater transparency and ease in the issue of operating licenses can be effective policy responses in curbing business corruption. These provide further support to the role of legal institutions and compliance mechanisms in reducing corruption, especially business corruption. The IV results also show that, in contrast, the social indicators, HDI and literacy, are much less effective in curbing business corruption than in reducing individual corruption. As with the earlier results for the non IV case, after controlling for the respondent's characteristics and the country indicators, while individual corruption shows a significant increase over time, this is not so for business corruption.

Table 4: IV Probit Coefficient Estimates from WBES^a

Variables ^b	Coefficient ^c	Robust SE	z	P> z
rol	-0.6692 *	0.2279	-2.94	0.0030
hdi	8.8412	5.7742	1.53	0.1260
literacy	-0.0095	0.0432	-0.22	0.8260
size	0.0560	0.0368	1.52	0.1290
firmage	-0.0018	0.0014	-1.26	0.2090
edu_topmng	0.0625 *	0.0149	4.19	0.0000
female_pc	-0.0017 **	0.0008	-2.11	0.0350
conf_justice	-0.0410 *	0.0152	-2.69	0.0070
DEffGovt	-0.1028	0.0628	-1.64	0.1020
BClegalsyst	-0.0053	0.0187	-0.28	0.7770
BCanticomp	0.0167	0.0188	0.89	0.3730
BCcrime	-0.0078	0.0200	-0.39	0.6950
BCcorrupt	0.0853 *	0.0207	4.12	0.0000
BCinstable	-0.0382 ***	0.0208	-1.83	0.0670
BCpolicy	0.0314	0.0227	1.38	0.1670
BClic	0.0843 *	0.0194	4.34	0.0000
BClabregu	0.0643 *	0.0197	3.26	0.0010
income	-0.6859 *	0.1574	-4.36	0.0000
Dexport	0.0098	0.0536	0.18	0.8560
Dforeign	0.1883 *	0.0733	2.57	0.0100
wbes_t	0.0312	0.1140	0.27	0.7850
Deap	-0.3011	0.3635	-0.83	0.4080
Dla	-1.1190 *	0.2281	-4.91	0.0000
lpop	-0.0888 **	0.0433	-2.05	0.0400
unempl	-0.0327 ***	0.0182	-1.8	0.0720
cons	-1.882326	4.156422	-0.45	0.651
No of Obs				7263
Wald test of significance: χ^2 (25)				533.4
Prob > χ^2				0.0000 *
Wald test of exogeneity: χ^2 (3)				22.16
Prob > χ^2				0.0001 *

a. WBES is 1 if asked for a bribe, 0 otherwise. b. See Appendix Table A3 for meaning of the variable names.

c. *, ** and *** imply significance at 1%, 5% and 10% levels respectively.

The central message from this discussion is that one needs to differentiate between the two forms of corruption in devising effective policy responses relying more on increasing social awareness and encouraging social networking in tackling individual corruption, and relying more on strengthening regulatory mechanisms and legal institutions and improving

transparency in tackling business corruption. The influence of the personal characteristics of the respondent, whether it is an individual dealing with a government official or a firm in business dealings, on the corruption exposure helps to paint the profile of an individual or a firm that is most vulnerable to bribery.

5. Comparative Evidence on the impact of Individual and Business Corruption on Living Standards.

The recent resurgence of interest in the subject of corruption in the economics literature was largely due to the influential paper by Mauro (1995) who using data on corruption and other indices prepared by Business International found that corruption lowered economic growth by lowering investment. While much of the recent literature has concentrated attention, as we have done in this study, on the determinants of corruption, there have been relatively few attempts¹⁰ to revisit Mauro's result and investigate its robustness on the other data sets that have become available. This is done in this penultimate section where we attempt to investigate on the micro data sets the question of whether corruption has an adverse impact on living standards. We do so through the use of two indicators of a nation's living standards, namely, her per capita GNP and her growth rate.¹¹ The use of the micro data sets, in conjunction with a range of country indicators obtained from a variety of data sources, allows us to compare the effects of individual and business corruption on living standards. The earlier discussion has established some key differences in their determinants. The present section extends that discussion to the original issue of the effects of corruption on living standards that triggered interest in the subject.

The results of IV estimation¹² of per capita GNP on a selection of country indicators besides the corruption rates calculated from the 2 micro data sets are presented in Table 5. The corruption rate variable was treated as potentially endogenous and was instrumented by a range of country indicators that were collected from a variety of sources including Wikipedia, WDI, HDR, UNDP, World Governance Indicators, 1996-2007, and Djankov, et. al.(2002). We used a selection from Ethno linguistic Fractionalization (ELF)¹³, Regulatory Burden, Unemployment and Literacy as the excluded instruments for corruption rates in the IV regressions of GNP, growth rate on the various determinants, including the corruption rates.

¹⁰ One such attempt is the study by Mendez and Sepulveda (2006) who found on ICRG data that, in contrast to Mauro (1995), "the growth maximising level of corruption is significantly greater than zero".

¹¹ While the per capita GNP is calculated at Purchasing Power Parity to get a better measure of living standards, growth is calculated as per the Atlas method as is the standard procedure.

¹² The Stata command `ivreg2`, constructed by [Baum, Schaffer and Stillman (2007)] is used for these estimations.

¹³ Mendez and Sepulveda (2006), and Shaw, et. al. (2006) have expressed concern over the use of ELF as an instrument of the corruption rate since they do not regard ELF as a strong instrument. However, the results reported here are robust to the omission of ELF as an instrument.

The choice of instruments is always a vexed issue since the ideal instruments are not always available and those that are available are not all ideal. The Sargan statistic presented in Table 5 suggests that the validity of these instruments cannot be rejected at 1 %, thus, providing justification to the choice of instruments. Moreover, the Anderson test statistic indicates that, generally, the model is identified i.e. the excluded instruments are correlated with the endogenous regressor, namely, the corruption rate. Both the data sets agree that high corruption does have a negative effect on the country's per capita GNP, a feature that was conveyed by the graphs on the relationship between corruption and GNP presented earlier. However, there is some disagreement between the two data sets on the magnitude of this effect with individual corruption seen to exert a larger effect on per capita GNP than business corruption.

Table 5: IV Coefficient Estimates^a: Dependent Variable - Per Capita GNP

ICVS				WBES			
Variable ^b	Coefficient ^c	z	P> z	Variable ^b	Coefficient ^c	z	P> z
avg icvs	-22.4295 **	-2.55	0.0110	avg wbes	-1.9358 **	-2.54	0.0110
free	1.3492	1.28	0.2020	free	0.2662	1.16	0.2480
press	-0.9958 *	-2.57	0.0100	press	-0.0922	-1.19	0.2340
inflation	0.0186 **	2.2	0.0280	inflation	-0.0100	-0.66	0.5090
Dla	1.3942	1.64	0.1020	Dla	-0.0881	-0.74	0.4580
govinter	-0.6350 ***	-1.67	0.0940	Deuca	0.9109 *	2.95	0.0030
dlock	0.8981	1.46	0.1440	hdi	7.5582 *	8.37	0.0000
controlw	-0.4199	-0.98	0.3280	literacy	0.0166 *	3.01	0.0030
cons	10.5115 *	9.83	0.0000	cons	2.2819 *	2.73	0.0060
No. of Obs:			49	No. of Obs:			60
Sargan Stats:	χ^2 (1)	1.5580	0.2119	Sargan Stats:	χ^2 (1)	0.2010	0.6539
Anderson LM stats:	χ^2 (2) ***	5.8630	0.0533	Anderson LM stats:	χ^2 (2) *	10.1320	0.0063

a. ivreg2 module in Stata 9 is used here. b. See Appendix Table A3 for meaning of the variable names.
c. *, ** and *** imply significance at 1%, 5% and 10% levels respectively.

Table 6: IV Coefficient Estimates^a: Dependent Variable – Growth Rates

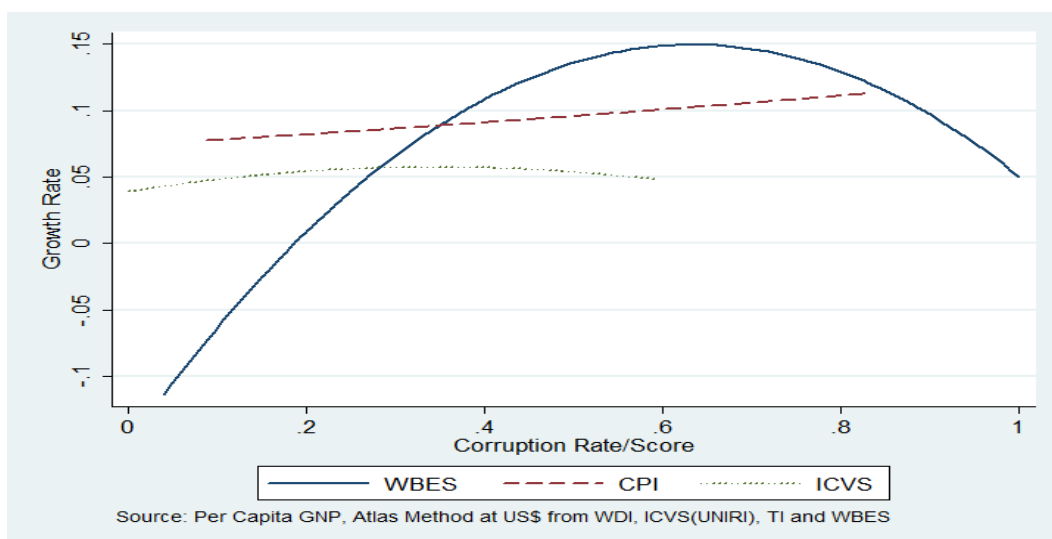
ICVS				WBES			
Variable	Coefficient ^c	z	P> z	Variable	Coefficient ^c	z	P> z
avg icvs	0.6026	1.06	0.2900	avg wbes	-0.3933	-1.63	0.1030
icvs2	0.3838	0.26	0.7930	wbes2	0.7328 **	2.17	0.0300
free	-0.0088	-0.35	0.7270	free	0.0186	0.47	0.6350
press	0.0312	1.2	0.2300	press	-0.0154	-0.81	0.4160
inflation	-0.0004	-1.49	0.1370	inflation	0.0013	0.61	0.5400
Dla	-0.0366	-1.53	0.1270	Dla	-0.0640 **	-2.54	0.0110
rol	0.0593 **	2.14	0.0330	govinter	-0.0160	-1.05	0.2930
				informal	0.0436 **	2.54	0.0110
lgnp95	-0.0357 **	-2.45	0.0140	controlw	-0.0208	-1.08	0.2780
cons	0.0281	0.18	0.8580	lgnp02	0.0399 *	2.97	0.0030
				cons	-0.2744 *	-1.72	0.0850
No. of Obs:			49	No. of Obs:			47
Sargan Stats:	χ^2 (2)	0.6800	0.8779	Sargan Stats:	χ^2 (1)	1.8020	0.8758
Anderson LM stats:	χ^2 (3) **	12.3740	0.0148	Anderson LM stats:	χ^2 (2) ***	11.6530	0.0702

a. ivreg2 module in Stata 9 is used here. b. See Appendix Table A3 for meaning of the variable names.
c. *, ** and *** imply significance at 1%, 5% and 10% levels respectively.

The results of the IV regressions, with growth rate as the dependent variable, have been presented in Table 6. They tell a different story. The celebrated adverse effect of corruption

on growth could not be reproduced on these data sets. In fact, there is weak evidence of a positive relationship between these variables on both the micro data sets. This is also clear from Figure 13 which plots the growth rate against corruption rates for both types of corruption, and finds little evidence of a negatively sloped curve¹⁴. The WBES based growth/corruption curve shows that business corruption has a negative impact on growth only beyond a very high threshold¹⁵ rate of corruption. Individual corruption, as Table 6 confirms, has little or no effect on growth rates. In line with much of the evidence presented earlier, Figure 13 indicates sensitivity of the economic growth/ corruption relationship to the data or measure used. Ceteris paribus, business corruption leads to lower growth rates than that associated with individual corruption, but the situation reverses itself at moderate to high levels of corruption.

Fig 13: Quadratic Fit between a country's Corruption Rate/Score and Growth Rate



6. Summary and Conclusions.

As the literature on corruption has grown over the past few years, so have the data sets containing information on corrupt practices by individuals and firms. Mauro (1995)'s results on corruption having a negative impact on growth by lowering investment, along with evidence on the adverse welfare and distributional consequences of increasing corruption, led to a revival of interest in a subject that has been around for a very long time. The recent empirical literature on corruption can be subdivided into two streams: one studies the determinants of corruption and the other its consequences. With increasing concern over the micro and macro economic consequences of widespread corruption in a society, it became

¹⁴ The WBES summary statistics that have been presented in Appendix, Table A2, show that the high growth countries such as Bangladesh, India and China also record high corruption rates.

¹⁵ Closer inspection showed, however, that the backward bend in the WBES based curve is due to a single country observation, an obvious outlier, and does not therefore constitute evidence of a negative association between corruption and growth rates.

necessary for policy purposes to profile an individual or firm that is particularly vulnerable to corruption and this provided the incentive for a rapidly expanding literature on the key variables that contribute to corrupt practices. Apart from an increased understanding of this phenomenon, the expanding empirical literature on corruption has also led to the availability of new and qualitatively superior data sets on corruption.

Much of the earlier empirical work on corruption that followed Mauro's study, including his own investigation, was conducted on the corruption perceptions data made available by the Transparency International and Business International. In recent years, there has been increasing concern over the use of perceptions based measures that introduce subjective and cultural biases in the information. Moreover, the country level information does not allow an investigation of the role of micro variables such as the individual or firm characteristics in explaining corrupt behaviour. This sets a serious constraint on the policy usefulness of the results. Consequently, there has been a move in recent years to the increasing use of micro data sets that contain responses to questions on a host of topics including corruption and the personal attributes of the respondent. Another related development has been the combination of information from the micro data sets with macro information obtained from country level indicators in the investigation of the causes and consequences of corruption. The present study follows this approach.

The increased availability of data sets on corruption along with the varied nature of that information sets up the chief motivation of this study, namely, a systematic comparison of the evidence on the causes and consequences of corruption provided by these alternative data sets. To our knowledge, such a comprehensive comparison has not been attempted in the literature to date. Since the data sets often capture different aspects of corruption, the comparison is not just about different ways of measuring corruption but also about different types of corruption.

The three data sets that we have considered in this comparative study, namely, the Corruption Perceptions Index (CPI) from Transparency International and the micro data sets from the ICVS and the WBES, which targeted individuals and firms, respectively, allowed us to examine (a) the sensitivity of the picture on corruption to the use of subjective versus objective measures, and (b) differences in the magnitude, cause and consequences of individual and business corruption. While (a) is performed by comparing the evidence on the perception of corruption by business people with micro based information on the actual experiences of individuals and firms, (b) is done by comparing the evidence from the ICVS and the WBES data sets. A comparison between the CPI and the WBES measures throws light on the issue of perception versus reality since both these data sets are based on the responses of business people. Since the ICVS contains information on the individual's response to bribe demands from public officials and the WBES contains information on corresponding responses from firms in their business dealings, a comparison of the evidence on these micro data sets can be interpreted as one between individual and business corruption.

The results show several significant differences and similarities between the results from the different data sets. Not surprisingly, the cross country picture on corruption from the Corruption Perceptions Index is closer to that from the WBES, since both are based on the responses of business people. Both these data sets paint a bleaker picture on corruption than is portrayed by the ICVS data set. Moreover, the shape of the relationship between corruption and living standards as measured by per capita GNP at PPP differs between the three data sets. This is also true of the picture on the temporal movement in the corruption rates as portrayed by the alternative data sets. For countries which figure in both the micro data sets, individual corruption is seen to be less severe than business corruption. As a country develops from low levels of per capita income, the individual corruption rates initially decline rapidly and fall to low levels for middle income countries and then remain static. As the country develops further, the business corruption rates then start to decline. Throughout the development process, business corruption rates exceed the individual corruption rates with the gap between the two corruption rates starting to close only at high per capita GNP levels. Alternatively, the mix of corruption between individual and business corruption shifts in favour of the latter as the country develops. Another significant difference between the ICVS and WBES data sets is that, while institutions such as the regulatory mechanism and the legal system are more effective in controlling business corruption, the role of the human development indicators such as literacy is of greater importance in controlling individual corruption. A common feature of these results is that they underline the importance of strengthening trust, developing social network, greater transparency and reduced uncertainty in devising policies to curb corruption. Another interesting result from our comparison exercise is that, for countries at low levels of development, perception of corruption by the business people tends to be worse than the actual experience of firms operating in the country concerned, but the situation is reversed for the high income countries. This can be interpreted as evidence of the cultural bias in the corruption perception index used in the earlier studies whereby non resident business people contributing to the CPI scores, and who typically resided in the developed countries, tended to take a more pessimistic view of the corruption scene in the low income, developing countries, where they did not reside, than is justified by reality. It is therefore not surprising that as we move to the middle income countries, i.e. closer to the residence of the corruption evaluators, the perception scores show a significant improvement in corruption and, for the more affluent countries, the perception of corruption actually becomes better than the reality of corruption based on the WBES measure.

Two points of agreement between the three indicators are: (a) as a country becomes more affluent, its corruption rate declines, and (b) there is no evidence of a negative relationship between growth rate and corruption rate. This suggests that while the evidence confirms that high corruption rates do characterise low income countries and may even be the cause of their low income levels, there is no evidence to support the proposition that corruption constrains growth. The absence of any negative association between growth and corruption rates, which is consistent with recent evidence from other studies but not with Mauro (1995)'s influential findings, is robust to the treatment of endogeneity of the corruption rate variable and to the choice of instruments. This result should, however, be treated with care. Growth rates are subject to large measurement errors. Moreover, in case of many of the poorer countries with a

sizeable informal economy and where most of the corruption prevails, the growth and corruption rates are unlikely to be true measures. The overall message of this study is the need to develop a differentiated policy in tackling the various forms of corruption.

The present study calls for further comparisons of the evidence on corruption and its different forms between the various data sets. With recent attempts to conduct studies on data from specially designed experiments for eliciting attitudes to corruption, a logical extension of the present study will be to compare the key differences between the use of experimental data and the more conventional data sets. The establishment of robustness in the qualitative results is essential before effective policies can be formulated in an area of considerable policy concern.

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Appendix.

TABLE A1: Average Corruption rates by Country from ICVS data

Country	Year	No. of Obs	Average Corruption	Average Corruption (male)	Average Corruption (female)
Albania	1995	1200	0.128227	0.1334762	0.1226157
Albania	1999	1498	0.5907877	0.6022099	0.5801033
Argentina	1995	1000	0.2902198	0.3805029	0.2189946
Argentina	2000	8931	0.0480291	0.0777055	0.0220482
Austria	1995	1507	0.007209	0.0140337	0.0020047
Australia	1999	2005	0.0032528	0.0046452	0.0020482
Azerbaijan	1999	930	0.2080645	0.24748	0.1694876
Belgium	1999	2501	0.003497	0.0052555	0.0020359
Bulgaria	1996	1076	0.1913465	0.2562265	0.1385016
Bulgaria	1999	1505	0.1637465	0.20124	0.1330906
Bolivia	1995	999	0.2586832	0.3256653	0.2048799
Brazil	1995	1000	0.1785698	0.2899866	0.0748962
Botswana	1996	644	0.0289855	0.066513	0.0045445
Botswana	1999	1197	0.0083542	0.0054348	0.011041
Belarus	1996	999	0.1201213	0.1820983	0.0802182
Belarus	1999	1520	0.2057851	0.2797962	0.1593499
Canada	1995	2134	0.0039428	0.00425	0.003653
Canada	1999	2078	0.0039187	0.0068467	0.000928
Cambodia	2000	3155	0.2175843	0.2304108	0.2174378
Switzerland	1995	1000	0.002337	0.0042446	0.0006989
Colombia	1996	1000	0.1924827	0.2287588	0.1545746
Colombia	1999	1016	0.1722441	0.2047244	0.1397638
Costa Rica	1995	1000	0.0994962	0.1465004	0.0546953
Czech Republic	1995	1801	0.0786295	0.1069879	0.0541168
Czech Republic	1999	1500	0.0572155	0.0868463	0.0302989
Denmark	1999	3007	0.0027892	0.0055363	0.0003409
Estonia	1994	1173	0.0384317	0.0538509	0.0236055
Estonia	1999	1700	0.0517459	0.075554	0.028979
Finland	1995	3830	0.00129	0.0028008	0

TABLE A1: CONTINUED

Finland	1999	1782	0.0015798	0.003221	0
France	1995	1003	0.0070369	0.012358	0.0017475
France	1999	1000	0.012515	0.0169618	0.0089495
Georgia	1995	1137	0.2185932	0.2937793	0.1630657
Georgia	1999	1000	0.168	0.2346491	0.1121324
Great Britain	1995	5407	0.0025006	0.0030808	0.0019924
Great Britain	1999	5513	0.0006904	0.0009836	0.0004574
Croatia	1996	994	0.1603995	0.2043567	0.1237415
Croatia	1999	1532	0.094961	0.1670751	0.0482806
Hungary	1995	756	0.0387121	0.0569821	0.0252434
Hungary	1999	1513	0.0982331	0.1535499	0.0647025
Indonesia	1995	1400	0.2988933	0.3178846	0.2747227
India	1995	1200	0.2104783	0.2531873	0.1688932
Japan	1999	2211	0.0004218	0	0.0008195
Korea (Republic of)	1999	2043	0.0337739	0.0525794	0.0154589
Kyrgyzstan	1995	1750	0.2039211	0.2965001	0.1357727
Lesotho	1999	1010	0.1920792	0.2429907	0.1683599
Lithuania	1996	1176	0.1100574	0.1578499	0.0663126
Lithuania	1999	1526	0.2285781	0.3036536	0.1811239
Latvia	1995	1411	0.1352757	0.1905158	0.0990324
Latvia	1999	1201	0.1456806	0.1835272	0.1178425
Mongolia	1995	1200	0.0462369	0.0561117	0.036654
Mongolia	1999	944	0.2136447	0.2495402	0.1782027
Macedonia	1995	700	0.0772936	0.1025669	0.0523075
Mozambique	2001	993	0.305136	0.3636364	0.246988
Malta	1996	1000	0.0403518	0.0400238	0.0407883
Namibia	1999	1061	0.0546654	0.0882353	0.0267857
Nigeria	1997	1012	0.298419	0.32358	0.2645012
Netherlands	1995	2008	0.0054577	0.0086853	0.0026843
Netherlands	1999	2000	0.0040385	0.0039475	0.0041151
Panama	1999	902	0.1053215	0.1535181	0.0531178

TABLE A1: CONTINUED

Philippines	1995	1500	0.0436209	0.0703615	0.031719
Philippines	1999	1500	0.036	0.0717822	0.0228102
Poland	1991	2033	0.0531637	0.0730063	0.036013
Poland	1995	3483	0.0474604	0.0714246	0.028555
Poland	1999	6337	0.0424111	0.0621918	0.0267921
Portugal	1999	2000	0.013514	0.0247729	0.0073308
Paraguay	1995	587	0.1382671	0.201096	0.1019548
Romania	1995	1091	0.1139695	0.1656879	0.0728839
Romania	1999	1506	0.1919286	0.2014516	0.1837676
Sweden	1995	1000	0.002474	0.0021202	0.0027828
Sweden	1999	2001	0.000909	0	0.001716
Slovenia	1996	2053	0.0123391	0.0173403	0.0081811
Slovenia	2000	3885	0.0209208	0.0237722	0.0185419
Slovakia	1996	1105	0.1393661	0.1991179	0.0888913
Russia	1995	1018	0.1873054	0.2651906	0.1233532
Russia	1999	1500	0.1659668	0.2755719	0.1064282
Swaziland	1999	1006	0.1729622	0.2089552	0.1415094
Ukraine	1996	1000	0.1261116	0.1776644	0.0921705
Ukraine	1999	1509	0.1622425	0.236506	0.1140321
Uganda	1995	1197	0.2358992	0.3093645	0.1700016
Uganda	1999	998	0.3466934	0.4178499	0.2772277
United States	1995	1003	0.002655	0.006511	0
United States	1999	1000	0.002063	0.0050195	0
South Africa	1995	1006	0.0755096	0.1354769	0.0273637
South Africa	1999	1336	0.0291916	0.0426229	0.0183357
Zambia	1999	1047	0.0983763	0.097035	0.1119691
Zimbabwe	1995	1006	0.0718364	0.1170137	0.0418924
Catalonia	1999	2909	0.0024719	0.0017366	0.0029751
Yugoslavia	1995	1094	0.1742663	0.223691	0.1233744

Source: International Crime Victims Surveys, by United Nations Interregional Crime and Justice Research Institute, 1988-2001. (Authors' calculations)

TABLE A2: Average Corruption rates by Country from WBES data

Country	Year	No. Of Obs	Average Corruption	Average Corruption (small firms)	Average Corruption (medium firms)	Average Corruption (large firms)
Albania	2002	170	0.929412	0.918605	0.962963	0.9
Albania	2005	204	0.862745	0.865979	0.8888889	0.7692308
Armenia	2002	171	0.48538	0.523256	0.3541667	0.5675676
Armenia	2005	351	0.680912	0.677249	0.7542373	0.5
Angola	2006	850	0.321177	0.316327	0.3221476	0.5333334
Argentina	2006	2126	0.459078	0.444304	0.469697	0.4599628
Azarbaijan	2002	170	0.558824	0.658824	0.5348837	0.3902439
Azarbaijan	2005	350	0.725714	0.78	0.7251908	0.6086956
Bosnia and Herzegovina	2002	182	0.752747	0.683673	0.7941176	0.8571429
Bosnia and Herzegovina	2005	200	0.715	0.656566	0.6666667	0.9090909
Bangladesh	2002	1001	0.874126	0.776316	0.9038461	0.8707692
Burkina Faso	2006	278	0.460432	0.445	0.4754098	0.5625
Bulgaria	2002	250	0.744	0.736	0.880597	0.6034483
Bulgaria	2004	548	1	1	1	1
Bulgaria	2005	300	0.61	0.596591	0.6428571	0.6111111
Benin	2004	197	0.989848	0.985612	1	1
Bolivia	2006	1226	0.461664	0.422304	0.4875	0.5052083
Brazil	2003	1642	0.896468	0.898305	0.8905192	0.9076923
Burundi	2006	540	0.262963	0.244186	0.2967033	0.5263158
Botswana	2006	684	0.312866	0.304038	0.3181818	0.3448276
Belarus	2002	250	0.628	0.672727	0.6744186	0.462963
Belarus	2005	325	0.412308	0.467949	0.3944954	0.3
Belarus	2008	273	0.589744	0.561798	0.6701031	0.5176471
Cambodia	2003	503	0.954274	0.962428	0.9382716	0.9342105
Congo DR	2006	680	0.247059	0.229703	0.2980132	0.2608696
Chile	2004	948	0.298523	0.287926	0.3079179	0.2992958
Chile	2006	2034	0.322026	0.290375	0.328	0.3513011
Cameroon	2006	344	0.43314	0.428571	0.4528302	0.4
China	2002	1548	0.76615	0.712418	0.7357798	0.7952941
China	2003	2400	1	1	1	1
Colombia	2006	2000	0.428	0.408955	0.4464993	0.4495798
Costa Rica	2005	343	0.501458	0.509174	0.4705882	0.525

TABLE A2: CONTINUED

Cape Verde	2006	196	0.19898	0.217391	0.1454545	0.3333333
Czech Republic	2002	268	0.574627	0.563758	0.6296296	0.5538462
Czech Republic	2005	343	0.752187	0.763636	0.75	0.7142857
Germany	2005	1196	0.260034	0.207037	0.3993399	0.2402597
Dominican Republic	2005	225	0.871111	0.827068	0.9322034	0.9375
Algeria	2002	557	0.770198	0.788462	0.7836539	0.6619718
Ecuador	2003	453	0.644592	0.657534	0.635514	0.6419753
Ecuador	2006	1316	0.550912	0.520295	0.5769231	0.5582329
Estonia	2002	170	0.482353	0.483517	0.4791667	0.483871
Estonia	2005	219	0.447489	0.415254	0.5151515	0.4285714
Egypt	2004	977	0.735926	0.725119	0.7356948	0.7606383
Eritrea	2002	79	0.164557	0.15	0.1538462	0.2
Spain	2005	606	0.214522	0.201635	0.2635659	0.2
Ethiopia	2002	427	0.606557	0.596899	0.7594936	0.494382
Guinea	2006	446	0.408072	0.40665	0.3846154	0.5
Georgia	2002	174	0.862069	0.826531	0.9047619	0.9117647
Georgia	2005	200	0.645	0.673077	0.6315789	0.5897436
Georgia	2008	373	0.44504	0.453488	0.4814815	0.3278688
Ghana	2007	494	0.34413	0.324022	0.3627451	0.5
Gambia	2006	348	0.175287	0.149573	0.2061856	0.3529412
Guinea-Bissau	2006	159	0.836478	0.819549	0.9545454	0.75
Greece	2005	546	0.419414	0.414392	0.4634146	0.3934426
Guatemala	2003	455	0.923077	0.925373	0.9419355	0.8888889
Guatemala	2006	1044	0.450192	0.441975	0.4339152	0.4915966
Guyana	2004	163	0.361963	0.252874	0.4363636	0.6153846
Honduras	2003	450	0.802222	0.821739	0.7946429	0.7685185
Honduras	2006	872	0.511468	0.501272	0.5036765	0.5410628
Croatia	2002	187	0.647059	0.669811	0.6136364	0.6388889
Croatia	2005	236	0.614407	0.633333	0.6557377	0.5272727
Hungary	2002	250	0.476	0.414634	0.5217391	0.5614035
Hungary	2005	610	0.429508	0.432927	0.4315789	0.4130435
Indonesia	2003	713	0.706872	0.5	0.6204819	0.787062
Ireland	2005	501	0.179641	0.191223	0.1481481	0.1756757
India	2002	1827	0.789272	0.768603	0.8150183	0.8152611

TABLE A2: CONTINUED

India	2005	4234	0.600614	0.911765	0.7948718	0.6923077
Jamaica	2005	94	0.819149	0.05	0.0858586	0.056
Jordan	2006	503	0.065606	0.936709	0.9038461	0.9473684
Kenya	2003	284	0.922535	0.402667	0.2941177	0.4807692
South Korea	2005	598	0.394649	0.657895	0.7457627	0.7894737
Kyrgyzstan	2002	173	0.716763	0.764706	0.8292683	0.8888889
Kyrgyzstan	2003	102	0.823529	0.728395	0.7794118	0.7924528
Kyrgyzstan	2005	202	0.762376	0.494737	0.55	0.6363636
Kazakhstan	2002	250	0.548	0.545455	0.573604	0.5575221
Kazakhstan	2005	585	0.557265	0.915385	0.8975903	0.9824561
Lebanon	2006	354	0.918079	0.33913	0.5466667	0.5925926
Lao PDR	2006	246	0.45935	0.555556	0.6923077	0.5666667
Lesotho	2003	75	0.626667	0.583333	0.6229508	0.6976744
Lithuania	2002	200	0.62	0.546875	0.6030535	0.7209302
Lithuania	2004	239	0.610879	0.660194	0.7192982	0.6444445
Lithuania	2005	205	0.673171	0.5	0.7027027	0.6285715
Latvia	2002	176	0.568182	0.403101	0.5789474	0.4736842
Latvia	2005	205	0.448781	0.321918	0.4146982	0.5263158
Morocco	2004	850	0.441177	0.761905	0.8	0.7592593
Mauritius	2005	212	0.783019	0.831325	0.754717	0.8421053
Moldova	2002	174	0.810345	0.921053	0.8787879	0.96875
Moldova	2003	103	0.92233	0.607362	0.7272727	0.7922078
Moldova	2005	350	0.685714	0.841584	0.8956522	0.8571429
Madagascar	2005	293	0.866894	0.685714	0.796875	0.7307692
Mongolia	2004	195	0.728205	0.851852	0.8823529	0.7241379
Montenegro	2003	100	0.82	0.728155	0.59375	0.6176471
Macedonia	2002	170	0.676471	0.788618	0.7045454	0.7575758
Macedonia	2005	200	0.765	0.774194	0.9347826	0.7857143
Mali	2003	155	0.825806	0.268698	0.4040404	0.6428571
Mauritania	2006	474	0.308017	0.575758	0.5503356	0.6363636
Mozambique	2007	479	0.572025	0.4	0.7546012	0.8739496
Malawi	2005	320	0.75625	0.45411	0.4938957	0.4958124
Mexico	2006	2960	0.474662	0.525346	0.5300261	0.5714286
Malaysia	2002	902	0.543237	0.288591	0.3657143	0.25

TABLE A2: CONTINUED

Namibia	2006	658	0.306991	0.412903	0.3875	0.6666667
Niger	2005	250	0.42	0.83737	0.8828125	0.7428572
Nicaragua	2003	452	0.84292	0.438433	0.4702194	0.51
Nicaragua	2006	956	0.456067	0.287671	0.3352273	0.3076923
Oman	2003	337	0.317507	0.365964	0.4322917	0.4140127
Panama	2006	1208	0.394868	0.891304	0.8571429	1
Peru	2002	576	0.875	0.42616	0.4785847	0.4743083
Peru	2006	1264	0.45807	0.444444	0.6602871	0.7011952
Philippines	2003	716	0.610335	0.635328	0.7614314	0.7117117
Pakistan	2002	965	0.709845	0.775735	0.7272727	0.7641509
Poland	2002	500	0.762	0.647059	0.7941176	0.9130435
Poland	2003	108	0.75	0.662732	0.6975806	0.6119403
Poland	2005	975	0.664615	0.654971	0.6891892	0.5280899
Portugal	2005	505	0.637624	0.497504	0.5489796	0.5365854
Paraguay	2006	1226	0.523654	0.796296	0.75	0.8591549
Romania	2002	255	0.8	0.833333	0.7932692	0.7761194
Romania	2005	600	0.806667	0.103571	0.2523364	0.2162162
Rwanda	2006	424	0.150943	0.45	0.4722222	0.4375
Slovenia	2002	188	0.452128	0.401515	0.4042553	0.3636364
Slovenia	2005	223	0.394619	0.792683	0.75	0.6153846
Slovakia	2002	170	0.741177	0.508197	0.4716981	0.3777778
Slovakia	2005	220	0.472727	0.622807	0.8217822	0.8043478
Senegal	2003	262	0.732824	0.395408	0.4	0.4583333
Senegal	2007	506	0.39921	0.618644	0.6470588	0.5443038
Serbia	2002	250	0.596	0.706422	0.6216216	0.6225166
Serbia	2003	408	0.644608	0.709091	0.8245614	0.7051282
Serbia	2005	300	0.73	0.266667	0.3642384	0.5789474
Sri Lanka	2004	452	0.480089	0.539823	0.6503068	0.6034483
Russia	2002	506	0.590909	0.632727	0.6497175	0.6912752
Russia	2005	601	0.652246	0.611399	0.72	0.628866
El Salvador	2003	465	0.655914	0.415879	0.4678363	0.4156977
El Salvador	2006	1386	0.435065	0.301435	0.4049587	0.36
Swaziland	2006	614	0.32899	0.711191	0.8347458	0.8666667
Syria	2003	560	0.775	0.419355	0.5134615	0.5031133

TABLE A2: CONTINUED

Tailand	2004	1385	0.503249	0.868852	0.6268657	0.6170213
Tajikistan	2002	176	0.710227	0.847059	0.9375	0.6666667
Tajikistan	2003	107	0.850467	0.432836	0.6086956	0.4146341
Tajikistan	2005	200	0.51	0.476471	0.4615385	0.6363636
Tajikistan	2008	360	0.494444	0.637097	0.6387097	0.5135135
Turkey	2002	514	0.610895	0.56875	0.5436242	0.4545455
Turkey	2004	557	0.543986	0.819315	0.8202479	0.808554
Turkey	2005	1323	0.813303	0.71137	0.7191781	0.637931
Turkey	2008	1152	0.69184	0.769912	0.8823529	0.8301887
Tanzania	2003	276	0.818841	0.226263	0.3536585	0.4639175
Tanzania	2006	838	0.29117	0.748837	0.7142857	0.6388889
Ukraine	2002	463	0.712743	0.56129	0.729885	0.6909091
Ukraine	2005	594	0.63468	0.795107	0.8184819	0.8364486
Ukraine	2008	851	0.810811	0.66879	0.7525773	0.9565217
Uganda	2003	300	0.74	0.264256	0.3445122	0.3797468
Uganda	2006	1126	0.295737	0.342561	0.3622881	0.3582888
Uruguay	2006	1242	0.352657	0.522727	0.4347826	0.3559322
Uzbekistan	2002	260	0.461539	0.285714	0.3513514	0.2857143
Uzbekistan	2003	100	0.31	0.509091	0.4736842	0.5084746
Uzbekistan	2005	300	0.5	0.383459	0.5185185	0.5408163
Uzbekistan	2008	366	0.47541	0.450704	0.459144	0.3653846
Venezuela	2006	1000	0.444	0.55	0.6357466	0.6002747
Viet Nam	2005	1650	0.595152	0.327586	0.5555556	0.5454546
South Africa	2003	603	0.525705	0.782609	0.6969697	0.7631579
Zambia	2002	207	0.7343	0.043651	0.032	0.0416667
West Bank and Gaza	2006	401	0.0399	.	.	.

Source: World Bank Enterprise Survey, 2002-2008. (Authors' calculations)

TABLE A3: Variable Names and Sources

ICVS	Individual characteristics (A)	Definition (Source)	
icvs_binary	Bribe	Dummy variable (=1) if the respondent is asked for bribe, 0 otherwise	
smalltown	Small city	Dummy variable (=1) if the respondent is living in a town with a population of 50,000 or less	
medtown	Middle-size city	Dummy variable (=1) if the respondent is living in a town with a population of 50,000 to 1 million	
male	Male	Dummy variable (=1) if the respondent is male, 0 otherwise	
age1	Age 16–34	Dummy variable (=1) if the respondent is between ages 16 and 34, 0 otherwise	
age2		35–59	Dummy variable (=1) if the respondent is between ages 35 and 59, 0 otherwise
age3		60+	Dummy variable (=1) if the respondent is older than 60 yr, 0 otherwise
single	Marital Status Single	Dummy variable (=1) if the respondent is single, 0 otherwise	
married		Married	Dummy variable (=1) if the respondent is married, 0 otherwise
widow		Widowed	Dummy variable (=1) if the respondent is widowed, 0 otherwise
livtog		Living together	Dummy variable (=1) if the respondent is living together as a couple (but not married), 0 otherwise
divorced		Divorced	Dummy variable (=1) if the respondent is divorced, 0 otherwise
working	Occupation Status	Dummy variable (=1) if the respondent is working, 0 otherwise	
lookwork		Looking for job	Dummy variable (=1) if the respondent is looking for job, 0 otherwise
keephome		Home keeper	Dummy variable (=1) if the respondent is house keeper, 0 otherwise
retired		Retired/disabled	Dummy variable (=1) if the respondent is retired or disabled, 0 otherwise
atschool		Student	Dummy variable (=1) if the respondent is still at school, 0 otherwise
otherwork	Other	Dummy variable (=1) if the respondent is in other occupational position, 0 otherwise	
inc1	Income	Dummy variable (=1) if the family income is in the upper 50% of the country, 0 otherwise	
inc2		Lower income	Dummy variable (=1) if the family income is in the lower 50% of the country, 0 otherwise
icvs_t	Year of Survey	Takes the value 0 in base year 1988 and maximum value is 13 in 2001	
edu_yrs	Education	Years of education of the respondent	

TABLE A3: CONTINUED

WBES	Firm characteristics (G)	Definition (Source)
wbes_binary	Bribe	Dummy variable (=1) if the respondent is asked for bribe, 0 otherwise (G)
size	Firm size dummies	A firm is defined as small if it has between 5 and 50 employees, medium size if it has between 51 and 500 employees and large if it has more than 500 employees.
firmage	Age of Firm	Age of Firm at the survey year
edu_topmngr	Education of the Top Manager	Highest level of education of the top manager
female_pc	Percentage of Female workers	Percentage workers female in total workforce
conf_justice	Confidence in Judicial System	Dummy variable (=1) if the respondent answers "tend to agree", "mostly agree", or "fully agree" to the question: Confident judicial system will uphold property rights?, 0 otherwise
DEffGovt	Efficiency of government in delivering services	Dummy variable (=1) if the respondent answers "somewhat efficient", "efficient" or "very efficient" to the question: How would you generally rate the efficiency of central and local government in delivering services, 0 otherwise
BClegalsyst	Business constraint: legal system/conflict resolution	Dummy variable (=1) if the respondent answers "minor", "moderate", "major" or "very severe" to the question: How problematic is functioning of the judiciary for the operation and growth of your business, 0 otherwise
BCanticomp	Business constraint: anti-competitive/informal practices	Dummy variable (=1) if the respondent answers "minor", "moderate", "major" or "very severe" to the question: How problematic is anti-competitive/informal practices for the operation and growth of your business, 0 otherwise
BCcrime	Business constraint: crime, theft, disorder	Dummy variable (=1) if the respondent answers "minor", "moderate", "major" or "very severe" to the question: How problematic is crime, theft, disorder for the operation and growth of your business, 0 otherwise
BCcorrupt	Business constraint: corruption	Dummy variable (=1) if the respondent answers "minor", "moderate", "major" or "very severe" to the question: How problematic is corruption for the operation and growth of your business, 0 otherwise
BCinstable	Business constraint: macroeconomic instability (infl., exch. rate)	Dummy variable (=1) if the respondent answers "minor", "moderate", "major" or "very severe" to the question: How problematic is macroeconomic instability for the operation and growth of your business, 0 otherwise
BCpolicy	Business constraint: economic & regulatory policy uncertainty	Dummy variable (=1) if the respondent answers "minor", "moderate", "major" or "very severe" to the question: How problematic is economic & regulatory policy uncertainty for the operation and growth of your business, 0 otherwise

TABLE A3: CONTINUED

BClic	Business constraint: licensing and operating permits	Dummy variable (=1) if the respondent answers "minor", "moderate", "major" or "very severe" to the question: How problematic is licensing and operating permits for the operation and growth of your business, 0 otherwise
BClabregu	Business constraint: labour regulations	Dummy variable (=1) if the respondent answers "minor", "moderate", "major" or "very severe" to the question: How problematic is labour regulations for the operation and growth of your business, 0 otherwise
income	Income grouping for survey year	Firm Income = 1 if "low"; =2 if "lower-middle"; = 3 if "upper-middle" = 4 if "high"; = 5 if "high oecd"
Dexport	Exporter	Dummy variable (=1) if the firm is an exporter, 0 otherwise
Dforeign	Foreign	Dummy variable (=1) if the firm is of foreign ownership, 0 otherwise
wbes_t	Year of Survey	Takes the value 0 in base year 2002 and maximum value is 4 in 2006
Country Code	Country characteristics	Definition (Source)
avg_icvs	Average ICVS	Weighted (household) Average of the binary ICVS variable (A)
avg_wbes	Average WBES	Average of the binary WBES variable (G)
icvs2	Square of Average ICVS	Square of Average ICVS (A)
wbes2	Square of Average WBES	Square of Average WBES (G)
Deap	East Asia and Pacific	Dummy variable (=1) if the country is in East Asia and Pacific, 0 otherwise
Dla	Latin America and Caribbean	Dummy variable (=1) if the country is in Latin America and Caribbean, 0 otherwise
DSA	South Africa	Dummy variable (=1) if the country is in South Africa, 0 otherwise
DSSAf	Sub Saharan Africa	Dummy variable (=1) if the country is in Sub Saharan Africa, 0 otherwise
DNAm	United States, Canada, and Bermuda	Dummy variable (=1) if the country is in the United States, Canada, or Bermuda, 0 otherwise
DMENAF	Middle East and North Africa	Dummy variable (=1) if the country is in the Middle East and North Africa, 0 otherwise
DEuCA	Europe and Central Asia	Dummy variable (=1) if the country is in the Europe and Central Asia, 0 otherwise
dllock	Landlocked	Dummy variable (=1) if the country is landlocked (surrounded by land), 0 otherwise (B)
lpop	Log Population	Log of Population of the country in millions in the survey year (C)
literacy	Literacy rate	Literacy rate, adult total (% of people ages 15 and above) in the country in the survey year (C)
unempl	Unemployment rate	Unemployment, total (% of total labor force) (C)

TABLE A3: CONTINUED

reg_burden	Regulatory Burden	Cost and time involved in carrying out the procedures a start-up entrepreneur has to comply with in order to obtain a legal status, as a share of 1999 per capita GDP (E)
rol	Rule of law	Synthetic index, rescaled adding 4 points to the index to avoid negative values where a higher indicator denotes a higher quality rule of law (F)
hdi	Human Development Index	Human Development Indicator from UNDP, where higher values denote higher development (D)
lgnp	Log Gross National Income	Log of GNI per capita, PPP (current international \$) (C)
free	Economic Freedom	Heritage Index of : -1) limitations to trade, 2) fiscal burden, 3) government intervention, 4) monetary policy, 5) limitation to foreign investment, 6) limitations to banking, 7) Control of wages and prices, 8) limitations to property rights, 9) regulation, 10) international market (www.heritage.org) (H)
press	Freedom of Press	Index of restrictions on media content 1) laws and regulations (0-15 points), 2) political pressures and controls (0-15 points), 3) repressive actions (e.g. killing journalists, censorship) (0-5 points). More point means less freedom. Rated: 1 (free) to 3 (unfree) (Freedom House: Press Freedom Survey) (H)
inflation	Inflation	Inflation, consumer prices (annual %) (C)
govinter	Government Intervention	Index of: a) government consumption in % of economy, b) government ownership of business, c) share of government revenues from state-owned enterprises and property, d) economic output produced by government. Rated: 1 (free) to 5 (unfree) (www.heritage.org) (H)
controlw	Government Control of Wages and Prices	Index of: a) minimum wage laws, b) freedom to set prices, c) government price controls, d) extend to which government price controls are used, e) government subsidies to businesses that affect prices. Rated: 1 (free) to 5 (unfree) (www.heritage.org) (H)
informal	Informal Sector	Index of: a) smuggling, b) piracy of intellectual property in the informal market, c) agricultural production supplied by the informal market, d) manufacturing supplied by the informal market, e) services supplied on the informal market, f) transportation supplied on the informal market, g) labor supplied on the informal market. Rated: 1 (free) to 5 (unfree) (www.heritage.org) (H)
fem_male	Female to Male ratio	Ratio of Female Population, female (% of total) to male (% of total) (C)
elf85	Ethno Linguistic Fractionalisation	Ethnolinguistic Fractionalization (ELF) Indices, 1961 and 1985 computed by Philip G. Roeder (J)
Source:		
A	ICVS	http://www.unicri.it/wwd/analysis/icvs/index.php
B	Wikipedia	http://en.wikipedia.org/wiki/Landlocked
C	WDI	www.worldbank.org/data
D	HDR, UNDP	http://hdr.undp.org/en/
E	Djankov et al. (2002)	http://www.jstor.org/pss/2696481 (Table III pp 19-21)
F	World Governance Indicators 96-	http://info.worldbank.org/governance/wgi/index.asp
G	WBES	http://www.worldbank.org/wbi/governance/
H	World Database of Happiness	http://worlddatabaseofhappiness.eur.nl/statnat/statnat_fp.htm
I	Corruption Perception Index	http://www.transparency.org/
J	Ethno Linguistic Fractionalization	http://weber.ucsd.edu/~proeder/elf.htm