Corruption and Economic Growth: An Econometric Survey of the Evidence

by

Nauro F. Campos, Ralitza Dimova, and Ahmad Saleh*

Received March 23, 2012; accepted September 26, 2015

Does corruption grease or sand the wheels of economic growth? This paper provides a systematic evaluation of the effect of corruption on growth, using meta-analysis techniques for 460 estimates from 41 studies. We find that publication bias, albeit acute, does not dissipate the genuine and negative effect of corruption on growth. Among the main factors explaining the variation in the estimated effects, we find that taking account of (a) trade openness and institutions and (b) authors with academic affiliations (as opposed to think tanks and international organizations) seems to help generate less negative effects of corruption on growth. (JEL: O1, P3)

1 *Introduction*

Although corruption is much more common in poor than in rich countries, it is also clear that it is not restricted to specific regions or levels of economic development (Abed and Gupta (eds.), 2002). The most pressing research questions are how severe it actually is as a constraint on economic activity and what are the mechanisms used by corruption to exert these effects (Basu, 2006; Pande, 2008).

One of the defining debates in the literature on the macroeconomic consequences of corruption has been whether it *greases* or *sands* the wheels of economic growth and development. Those in favor of the greasing hypothesis argue that corruption facilitates trade that would not have happened otherwise and promotes efficiency by allowing private-sector agents to circumvent cumbersome regulations (Leff, 1964; Huntington, 1968). Numerous examples support this view, showing that in highly restrictive regulatory environments, corruption can enhance economic growth by stimulating entrepreneurship and efficiency (De Soto, 1990; Egger and Winner, 2005; Levy, 2007).

* Nauro F. Campos (corresponding author): Brunel University London, United Kingdom, ETH Zurich, Switzerland, and IZA Bonn, Germany; Ralitza Dimova: University of Manchester, United Kingdom, and IZA; Ahmad Saleh: Brunel University London. We would like to thank various seminar participants at CSAE (Oxford), Royal Economic Society, and Middle Eastern Economic Association conferences as well as two anonymous referees for comments on previous versions. The responsibility for all remaining errors is entirely ours.

Opponents of this view have constructed a solid rebuttal by arguing that the *greasing* effect of corruption is only possible as a second-best option in a malfunctioning institutional setting. Thus, in order to properly evaluate the effects of corruption one has to recognize its endogeneity with respect to institutions (Aidt, 2009). Theoretical analyses supporting this view abound suggests that corruption *sands* the wheels of growth. Rock and Bonnett (2004) argue that corruption reduces investment in most developing countries and particularly in small open economies. Reinikka and Svensson (2004, 2005) find that it has detrimental effects on human-capital accumulation. Concerning its magnitude, Fisman and Svensson (2007) estimate that a 1-percent increase in corruption leads to a 3-percent reduction in firm growth. This body of evidence informs the position of key international policy actors and the ever increasing number of anticorruption agencies and campaigns at both national and international fora (Méon and Weill, 2010).

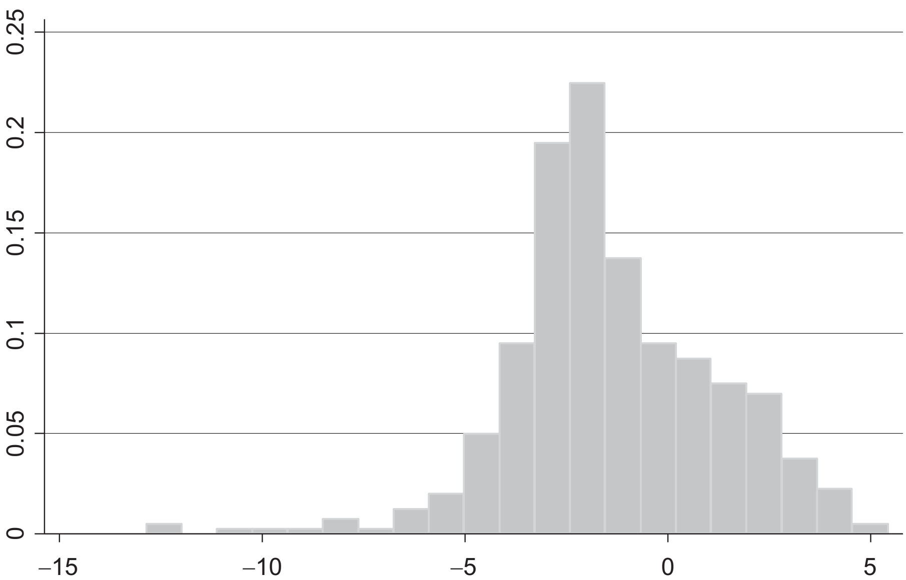
Yet the body of empirical evidence on the economic consequences of corruption is not conclusive (Svensson, 2005; Aidt, 2009). For example, the literature provides support to phenomena such as the so-called Asian paradox (a positive correlation between corruption and growth in a number of fairly successful Asian economies, including China) even after allowing for the effect of institutions, which shape the more recent versions of the greasing-the-wheels hypothesis (Wedeman, 2002; Rock and Bonnett, 2004; Li and Wu, 2007; Vial and Hanoteau, 2010). This is a very interesting result in view of the recent literature on technological traps, which highlights corruption as one of the primary constraints on emerging economic giants like China and India in their aspirations toward reaching the world technological frontier (Nunn, 2007; Nunn and Trefler, 2010). More recently, Swaleheen argues that "In our detailed review of the current literature, we find that the conclusions on the effect of corruption on the rate of growth of an economy are hesitant and qualified at best" (Swaleheen, 2011, p. 23).

The inconclusiveness of the evidence on the relationship between corruption and growth can be explained by several factors. Econometrically, regressions that attempt to infer a causal relationship between corruption and growth are often fraught with reverse-causality and omitted-variable problems, which have so far not found a satisfactory resolution (Aidt, 2009). In addition, the most popular measures of corruption in the empirical literature are based on expert opinions, which are often loaded with ideological bias and generate a corruption ranking of countries heavily biased towards general perceptions of current or past politicoeconomic performance (Razafindrakoto and Roubaud, 2010). The inconclusiveness can also be driven by publication bias: although it is understandable that not all econometric results are reported, their very selection for reporting purposes may be affected by either the preferences of journal editors or the agendas of the various international development institutions (interestingly, we find in this paper that such biases are significantly smaller in peer-reviewed publications). Finally, as is well known, for instance, from the empirical literature on inequality and growth, cross-country correlations in the growth-related literature are generally clouded in data-quality and other problems that tend to hide the welfare implications of any economic phenomena or policy (Ravallion, 2001).

The objective of this paper is to provide a rigorous and systematic survey of the empirical literature on the effects of corruption on economic growth.[1] Here we try to (1) uncover whether there is a genuine relationship between corruption and growth, (2) evaluate the direction of this relationship, and (3) identify the main factors or determinants that may help explain the variation in the estimated effects of corruption on growth. For these purposes, we put together a unique data set comprising a total of 460 empirical estimates of the effect of corruption on growth from 41 different studies (listed in appendix section A.1).

Figure 1 contains the histogram of the t-values of all coefficients of corruption on economic growth that we collected. The mean t-value for the corruption effect on economic growth is -1.32, with a standard deviation 2.59, indicating that on average the effect of corruption on growth is negative and (marginally) significant. However, a closer look at the distribution shows that about 32 percent of these estimates support not only a negative, but also a significant, effect of corruption on growth, and 62 percent suggest a statistically insignificant relationship, while only approximately 6 percent support a positive and significant relation. On this account alone, although one may be tempted to argue that the support for the sanding hypothesis is greater than that for the greasing hypothesis, the vast majority of the results support the view that the evidence is not conclusive. Why is that so? This paper uses meta-analysis and meta-regression techniques to establish the depth and extent of this inconclusiveness and try to identify the main reasons for it.

Figure 1
Histogram of the t-Values of the Coefficients of Corruption on Growth ($n = 465$)



[1] There are various excellent surveys of the literature on the causes and effects of corruption, for example Bardhan (1997), Svensson (2005), Lambsdorff (2006), Pande (2008), Aidt (2003, 2009), and Treisman (2007). However, ours is, to the best of our knowledge, the first quantitative survey of the econometric evidence on the corruption–growth nexus.

What are the main factors that help to explain the variation we observe in Figure 1? We find that these are authors' affiliation (academics systematically report smaller and less negative effects), the use of fixed effects (which tends to increase the negative effect of corruption on growth, possibly on account of the fact that fixed effects "purge" the vast cross-country heterogeneity in the data), the type of corruption measure, the presence of Middle East and North Africa (MENA) countries in the sample (which also tends to increase the overall negative effect), and the inclusion in the model of trade and institutions, which both tend to deflate the negative effect of corruption on economic growth. We also find that although publication bias seems to be severe in this literature, there is plenty of evidence supporting a genuine (on average negative) effect of corruption on growth.

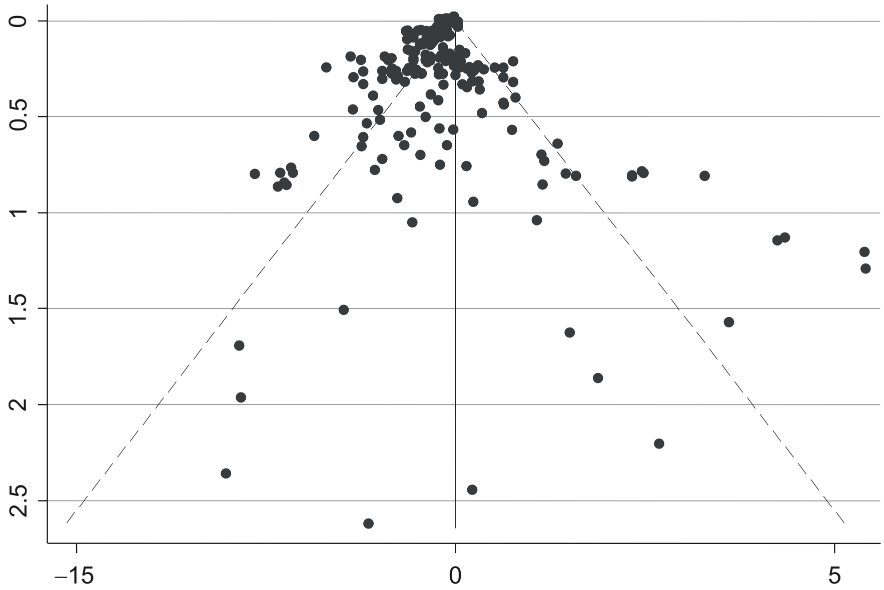
The rest of the paper is organized as follows. In section 2 we examine whether there is evidence for a genuine relation between corruption and growth, as well as for the existence and severity of reporting bias. In section 3 we present the data set we constructed, covering a large number of factors that can potentially explain the variation in these existing results. In section 4, we use meta-regression analysis techniques to investigate the main determinants of the variation in the corruption–growth effects. Section 5 concludes.

2 Is there a Genuine Relationship between Corruption and Growth?

For this paper, we put together a hand-collected data set comprising 460 estimated effects (that is, coefficients) of corruption on economic growth from 41 different empirical studies (the studies are listed in appendix section A.1). The selection criteria we used are as follows. In order to be included, a paper has to investigate econometrically the relationship between corruption and economic growth across countries, and it has to report regression coefficients and their t-values or standard errors. In addition, it has to report the number of observations and/or degrees of freedom and to report sufficient information to allow us to create the explanatory variables we require (listed in appendix section A.2, Table A1). We also include in the data set all reported regression results from each study, as opposed to selecting one set of results as representative or preferred. This is because very few authors single out a set of preferred results. Notice that among the excluded studies are those that deal with only one country ("case studies") and those focusing on the effect of corruption on various macroeconomic variables other than economic growth (such as FDI, investment, inflation, government expenditures, aid, and income inequality).

One explanation for the existence of bias in the literature is the alleged tendency for the evidence in academic papers to lean towards statistically significant results. The simplest and most often used method to detect such bias is the informal examination of a funnel graph. This is a scatterplot of the size of the treatment effect (e.g., the coefficient in a regression analysis) against a measure of its precision (Stanley, 2005; Doucouliagos and Ulubaşoğlu, 2008). Since, in the absence of publication selection, estimates will vary randomly (or symmetrically) around the "true" effect, the funnel

Figure 2
Funnel Plot: Estimated Effect of Corruption on Economic Growth ($n = 460$)



plot's asymmetry is the key for identifying publication bias.[2] Figure 2 shows the funnel plot for our data, which is clearly asymmetric, and thus pointing to the existence of bias. Given that visual inspections are subjective and potentially misleading, we next use meta-regression analysis to answer whether there is a genuine association between corruption and growth in a more rigorous fashion.

Stanley (2001, 2005) argues that if there is a genuine association between two variables, there should be a positive relationship between the natural logarithm of the absolute value of the t-statistic and the natural logarithm of the number of degrees of freedom (df) in the regression. This is known as a *meta-significance test* (MST). The idea behind this is simple and based on the well-known property of statistical power. The magnitude of the standardized test will vary positively with df only if there is an overall genuine empirical effect. Card and Krueger (1995) impose a specific functional form of the relationship as follows:

$$\ln|t_i| = \alpha_0 + \alpha_1 \ln df_i + \varepsilon_i, \tag{1}$$

where t_i and df_i denote the t-statistics and number of degrees of freedom in study i, respectively. Stanley (2001, 2005) also develops a MST and shows that the value of the slope coefficient in equation (1) contains information on the extent of a publication bias and on the existence of a genuine effect. If the slope coefficient is less than zero, it is concluded that the evidence is contaminated by publication bias and there is no genuine association between the two variables. If the slope is larger than zero, there is a genuine association between the variables. If the slope belongs to the interval $0 < \alpha_1 < 0.5$,

[2] The intuition is that studies with a smaller sample size should have larger sampling error, while studies with a larger sample size should have lower sampling errors.

there is a genuine association between the two variables, despite the existence of a bias (Stanley, 2005, p. 329; Doucouliagos, 2005).

Given that random, large-sample misspecification biases may cause the MST to identify a genuine effect too frequently, Stanley (2008) recommends complementing the MST with a FAT (funnel asymmetry test) and a PET (precision effect test). This amounts to regressing the t-statistics of the estimated effects on the reciprocals of their standard errors (Egger et al., 1997):

$$t_i = \beta_0 + \beta_1 \frac{1}{Se_i} + u_i, \qquad (2)$$

where Se_i denotes the standard error of the estimated coefficients and t_i denotes the t-statistics. Testing for the statistical significance of the intercept coefficient represents a test of publication bias. This is a direct and more rigorous test of funnel-plot asymmetry. Moreover, Egger et al. (1997) argue that the sign of the intercept also indicates the direction of the bias. A significant slope coefficient, on the other hand, points to the existence of a genuine effect, irrespective of the possible publication bias (Stanley, 2008).

Table 1 shows the results from the FAT–PET and MST (equations (1) and (2), respectively).[3] The coefficient of the degrees-of-freedom variable in the MST regression is statistically significant, with a value lying between zero and 0.5, indicating that despite the presence of a publication bias, there is evidence for a genuine relationship between corruption and growth. The intercept coefficient in the FAT–PET regression is also statistically significant, thus confirming the presence of a publication bias. Moreover, the negative sign of this coefficient suggests that the bias is negative, indicating that the "true" corruption–growth relationship is less negative than that commonly reported in the literature. However, we observe a nonsignificant slope coefficient in the FAT–PET regression (Table 1, columns [3] and [4]) which casts doubt on the strength of a genuine effect in the corruption–growth literature. In order to explore this relationship further, we separate our sample into published and unpublished research and reestimate the FAT–PET equation. Notice that out of the 41 studies in our data set, 20 are published in peer-reviewed academic journals, while 21 are working or policy papers, or reports. These results, reported in Table 2, indicate that the slope coefficient is statistically insignificant only in the unpublished research sample, while it is significant at the 1% level in the published research sample. This suggests a genuine relationship between corruption and growth in published research, as well as the absence of such a relationship in unpublished studies. This is a very important result, because it raises the possibility that unpublished studies (which may be more policy-oriented) tend to tolerate, substantially more than published studies, a bias towards a more negative and significant link between corruption and growth. Putting it differently, the data shows that peer-reviewed papers are systematically more likely to report a genuine effect of corruption on growth than that of the literature as a whole. In what follows, we further

[3] These results also obtain in a (much less standard) multivariate regression analysis (adding further study characteristics to the specification). Details are available from the authors upon request.

investigate this issue, but first we present the full database we put together to try to understand the variation we find in these corruption–growth effects.

Table 1
Tests for Genuine Effect and Reporting Bias (MST and FAT–PET tests)

	[1] $\ln\|t\|$	[2] $\ln\|t\|^\wedge$	[3] t	[4] $t^\wedge$
Log d.f.	0.144	0.144		
	(2.54)*	(2.68)**		
$1/Se$			0.0000463	0.0000463
			(1.41)	(0.11)
Constant	−0.042	−0.042	−1.403	−1.403
	(−1.17)	(−0.18)	(−11.63)***	(−7.70)***
Observations	460	460	460	460
R^2	0.01	0.0145	0.21	0.1912

Notes: Absolute values of t-statistics in parentheses. * Significant at 5%, ** significant at 1%; ^bootstrap to derive robust standard errors with 1000 replications.

Table 2
Tests for Genuine Effect and Reporting Bias in Published and Unpublished Papers (MST and FAT–PET tests)

	Published [1] t	Published, bootstrap [2] $t^\wedge$	Unpublished [3] t	Unpublished, bootstrap [4] $t^\wedge$
$1/Se$	0.000794	0.000720	0.0000172	0.0000219
	(4.39)***	(4.48)***	(0.57)	(0.73)
Constant	−1.720	−1.448	−1.339	−1.523
	(−8.99)***	(−8.04)***	(−8.82)***	(−9.47)***
Observations	228	203	232	207
R^2	0.078	0.091	0.001	0.003

Notes: Absolute value of t-statistics in parentheses. * Significant at 5%, ** significant at 1%; ^bootstrap to derive robust standard errors with 1000 replications.

3 What does the "Average" Corruption–Growth Study Look Like?

The preceding analysis suggests that the body of evidence exploring the relationship between corruption and economic growth may be biased and that this bias may be negative. Existing studies are systematically more likely to report negative and statistically significant estimates. We do find evidence that despite the bias, the message that the broad literature on corruption and growth conveys is genuine. If anything, there seems to be greater bias among unpublished papers and reports in favor of (on average) reporting negative results than among published peer-reviewed academic manuscripts.

While our results are fairly instructive, a more rigorous view of the quality of the message conveyed by the existing literature on corruption and growth is needed. In keeping with the MRA literature, we attribute potential differences in these results to either differences in the research process (e.g., differences in specification, measurement, and methodology) or differences in real-world factors (e.g., regional and time differences) (Babecký and Campos, 2011). The variables we construct to capture these differences are described in appendix section A.2, Table A1; their basic statistics are reported in Table A2.

In order to describe the differences in econometric methodology, we construct dummy variables, taking the value of 1 if the coefficients originate from a cross-sectional model (0 if from panel), if fixed effects are used (0 otherwise), if there is an attempt to correct for endogeneity (0 otherwise), if the focus of the paper is exclusively on one region (0 otherwise), and if the paper has been published in an academic journal (0 otherwise).[4] Given that the approach and potential ideological bias may differ across researchers belonging to academic and nonacademic environments, we also include a dummy variable that takes the value zero if there is at least one author whose affiliation is not in academia.

We find that academic authors wrote 25 of the papers in our sample, providing 378 estimates, thus representing 82% of the total. The regressions for only one region represent just 36 observations and 7.74% of the total. Slightly more than half of the estimates in our data set were obtained using cross-sectional data (54%), while the remaining ones use panel data. In 151 regressions, accounting for 32.47% of the total, there is an explicit attempt to correct for endogeneity through the use of IV, 2SLS, 3SLS, or GMM techniques. Moreover, fixed effects were used in 160 regressions, that is, in 34.41% of the total. About half of the estimates are reported in journal articles, and the other half in working papers, 43% of these latter being working papers of policy-oriented institutions such as the World Bank and the IMF.

Measurement is an important issue, especially in light of the growing literature that questions the validity of global corruption indicators based on the perceptions of so-called experts (Razafindrakoto and Roubaud, 2010). In order to assess whether results on the effect of corruption on growth are significantly driven by the choice among measures of corruption, we construct dummy variables that take into account the differences in corruption indexes used in each study or model. The most widely used measure is from Transparency International (the Corruption Perception Index, CPI),[5] which has been used in about 36 percent of the cases (for 165 estimates). The index has been

[4] One of the problems encountered in the MRA literature is that many of the observations used in a regression analysis are not statistically independent. In meta-analysis, empirical estimates are considered statistically independent if they are reported by different authors, or if the same author reporting them uses different samples. Doucouliagos (2005) recommends the use of the bootstrap to address the statistical dependence problem (reported below).

[5] One difficulty is that the Transparency International index has been improved over time. In other words, there have been various changes in the underlying methodology, and although these changes are vastly and carefully documented, they do generate difficulties in comparing

available since 1995 and covers approximately 150 countries. The CPI score is an expert-perception measure, reflecting the degree of corruption perceived by businesspersons and country analysts. It ranges from 10 ("highly clean") to 0 ("highly corrupt"). The second most popular measure of corruption is from the International Country Risk Guide (ICRG) of the Political Risk Group, which is used in about 28% of the regressions in our sample (130 cases). This index gives lower values for higher levels of corruption. It has monthly frequency and has been available since 1984. The CTC (Control for Corruption) index of the World Bank is used in 43 cases (9.68% of the total) and ranges from -2.5 (high corruption) to 2.5 (low corruption) (see Kaufmann, Kraay, and Mastruzzi, 2006). The COMB variable captures the use of a mixture of different measures constructed by different organizations (WB, ICRG, and TI).[6] It was used in 16 cases, representing 3.44% of the total. The CPC variable captures whether or not corruption is measured by a composite indicator, constructed by principal-component analysis. The remaining measurement variable, OTHER, proxies measures not covered by the above categories. It was used in 94 cases, accounting for 20% of our sample.[7]

In so far as econometric specification issues are concerned, our choice is driven by the importance of controlling for a robust set of growth determinants so that the corruption effects are not unduly affected by omitted-variable problems. This also allows us to investigate the relative importance of various potential channels. To this end, dummy variables were constructed taking the value 1 if trade or trade openness is present in the model (0 otherwise), if institutional variables are included in the model (0 otherwise), and similarly for human capital, investment, political institutions (or democracy), and government expenditures or consumption. Trade or openness variables are included in 32 percent of the cases (i.e., in 149 regressions), and various institutional quality variables are used in 43 estimations accounting for only 9.25% of the total. Human-capital or population variables are used in 337 estimations of the corruption effect, which represent 72.63% of our sample. Investment is included in 155 estimations (33.3%). Political institutions (or democracy) are included 84 times, that is, in 18% of our sample. Government spending or consumption is included 185 times (40% of our sample). Finally, we also create a dummy variable for whether initial conditions are included in the model specification and find that they are in 361 regressions representing 77.63% of the sample.

In order to capture the geographical focus of these corruption effects on growth, a series of dummy variables are constructed that take the value 1 if the coefficient comes from a regression that contains transition countries (0 otherwise), and similarly for Latin America (LAC), Middle East (MENA), Asia (ASIA) and Sub-Saharan Africa (AFR). Note that these variables are meant to capture sample composition, and not whether a study is based on a single region. Transition countries were included in 401

studies that use different "vintages" or "cohorts" of the CPI. We have explored this matter through interactions with a time trend, and it does not qualitatively affect our main results. For more details see http://www.transparency.org/policy_research/surveys_indices/cpi.

[6] This measure is used, for instance, by Rock and Bonnett (2004).

[7] For example, Ehrlich and Lui (1999) and Mauro (1995) use measures from Business International (BI), now incorporated into *The Economist Intelligence Unit*.

regressions accounting for 86% of the total. Latin American countries were included 430 times, representing 92.5% of the total. Middle East and North African countries were included in 401 regressions representing 86% of the total. Asian countries were included 431 times (92.7%), and African countries were included in 424 estimations (91% of the total). The variable OTHERS is used for estimations containing other country groupings (or different ways of splitting samples), such as OECD countries; it is used 403 times, that is, in 86.7% of the cases. Finally, the midpoint of the time period covered by each study is calculated to try to capture time effects.[8]

We observe that the simple pairwise correlation between corruption and growth, reported in the literature, is negative both in itself and across different types of methodologies, specifications, measurement choices, regions, and time periods included in the underlying econometric studies. There is also a positive correlation between the length of the time window of the study and the growth–corruption relationship.

What would a typical piece of empirical research on the effect of corruption on economic growth look like using our data set? Firstly, the typical study is likely to be written by authors in academia. The time window it covers is somewhat short, with an average of nine and a half years. The typical paper does not control for endogeneity, nor include country dummy variables or fixed effects. There is an almost equal chance to use panel or cross-sectional data. Yet the typical paper would favor Transparency International as its main corruption measure. It is also likely to use a large multiregion sample and have human capital among its explanatory variables. Variables controlling for institutional quality are among those least likely to be found in a typical study, which is a serious omission in light of the attention this factor receives in attempts to assess the grease-versus-sand debate in the corruption-and-growth literature (Méon and Weill, 2010).

4 What Explains the Variation in the Estimated Effect of Corruption on Growth?

Many believe that the empirical literature on the effects of corruption on growth is inconclusive. Indeed, Figure 1 seems to support such views: there is an awful lot of variation within the set of empirical estimates the literature has made available, and there are a large number of insignificant results. Yet standard meta-analysis tests discussed above show that although the underlying relationship seems to be genuine, the available empirical evidence seems biased towards (on average) reporting negative effects of corruption on growth. This makes it even more pressing to try to pinpoint the factors that are most important in explaining the variation in the underlying corruption–growth effects.

[8] We have also tried to deal with the difficult issue of paper quality. We collected data on the number of Google Scholar citations (excluding self-citations). It ranges from zero to 3816 (for Mauro, 1995). We used it in our empirical analysis below as the yearly average number of citations and did not find it to be a robust factor (that is, it seems that the rest of our set of explanatory variables does a good job of capturing the key elements of paper quality). These results are available upon request.

In order to do so, we estimate the following baseline equation:

$$Y_i = \delta_0 + \delta_1 X_i + \varepsilon_i, \tag{3}$$

where Y_i is the partial correlation between corruption and economic growth and X_i is a vector of explanatory variables, which were described in section 3 above.[9]

In keeping with the MRA literature, we estimate both a fixed-effects and a random-effects version of equation (3). The fixed-effects model assumes that the heterogeneity in results is due to systematic differences across studies and to sampling error, while the random-effects model assumes, in addition, that there are unobserved factors that cannot be captured by the set of explanatory variables.[10] We also estimate a weighted least-squares (WLS) model, attaching greater weights to observations with higher precision (see Longhi, Nijkamp, and Poot, 2005). Finally, as indicated earlier, we use standard-error bootstrapping to take account of the interdependence between observations in each study (Doucouliagos, 2005). The main results from our empirical analysis are reported in Table 3 (and Table 4 provides further confirmation of these main results). Column (1) shows the fixed-effects estimates, column (2) has the OLS Bootstrap estimates, the WLS estimates are reported in column (3), and the random-effects (RE) estimates are in column (4). Results using the general-to-specific method on the WLS and RE estimators are reported in columns (5) and (6).

Table 3 identifies that the main factors that help explain the observable variation in the corruption–growth effects are the following (in parentheses are the respective coefficients taken from Table 3, column 6): the affiliation of the authors (0.14), control for endogeneity (0.07), the use of fixed effects (−0.21), the source or type of the corruption measure, the presence of MENA countries in the sample (−0.25), the inclusion of trade variables in the model (0.16), and controlling for institutions in the econometric specification (0.23). Let us now interpret these findings.

The positive and significant coefficient of the authors' affiliation variable across the different specifications indicates that nonacademic authors tend to find the effect of corruption on growth to be more harmful than do academic authors, all else the same. This is an important result and is consistent with our finding that unpublished papers, about half of which are policy papers, tend to be more averse to reporting nonnegative corruption–growth estimates. Also notice that the coefficient on publication type carries the expected sign (the reported effects of corruption on growth are systematically smaller, or more negative, than those reported in peer-reviewed publications), but, in contrast with the coefficient on authors' affiliation, this conclusion is not robust across the different estimators.

We also find that econometric models that try to control for the endogeneity of corruption with respect to economic growth tend to report more positive results than

[9] For the advantages of using partial correlation as dependent variable in meta-regression analysis, see Rosenthal (1991) and Meyer and Sinani (2009).

[10] The tests developed in Higgins and Thompson (2002) point to the appropriateness of the random- over the fixed-effects model in this case. For sensitivity purposes, we report both models.

Table 3
Meta-Regression Analysis of the Effect of Corruption on Economic Growth

Variables	(1) OLS	(2) Bootstrap SEs	(3) WLS	(4) MR-RE	(5) WLS GSpecific	(6) MR-RE GSpecific
pubtype	0.0229	0.0229	−0.0845**	−0.0215	−0.0797*	
	(0.0511)	(0.0509)	(0.0429)	(0.0404)	(0.0411)	
Authors	0.133**	0.133***	0.161***	0.134***	0.160***	0.145***
	(0.0593)	(0.0405)	(0.0466)	(0.0453)	(0.0462)	(0.0390)
Countryregion	−0.104	−0.104	−0.0820	−0.0118		
	(0.156)	(0.137)	(0.1000)	(0.126)		
Panel	−0.0513	−0.0513	−0.0369	−0.0468	−0.0353	−0.0355
	(0.0477)	(0.0364)	(0.0341)	(0.0364)	(0.0342)	(0.0298)
endo	0.0612	0.0612**	0.0708**	0.0685**	0.0732**	0.0703**
	(0.0419)	(0.0305)	(0.0313)	(0.0318)	(0.0308)	(0.0290)
fixed	−0.101**	−0.101	−0.308***	−0.205***	−0.309***	−0.210***
	(0.0491)	(0.0720)	(0.0464)	(0.0423)	(0.0461)	(0.0346)
mid	−0.00247	−0.00247	0.00545**	0.00274	0.00571**	0.00274
	(0.00305)	(0.00352)	(0.00268)	(0.00251)	(0.00269)	(0.00244)
wb	−0.0674	−0.0674	−0.0514	−0.0456		
	(0.253)	(0.195)	(0.189)	(0.196)		
icrg	−0.229	−0.229	−0.242	−0.250	−0.202**	−0.106***
	(0.242)	(0.184)	(0.171)	(0.188)	(0.0857)	(0.0356)
ticpi	−0.292	−0.292	−0.283	−0.266	−0.236***	−0.124***
	(0.242)	(0.189)	(0.173)	(0.188)	(0.0872)	(0.0348)
comb	−0.333	−0.333*	−0.290*	−0.327	−0.253**	−0.198**
	(0.257)	(0.188)	(0.175)	(0.200)	(0.110)	(0.0838)
other	−0.172	−0.172	−0.236	−0.158	−0.197**	
	(0.242)	(0.186)	(0.174)	(0.188)	(0.0967)	
ctc	−0.0178	−0.0178	−0.132	−0.134	−0.158	
	(0.282)	(0.230)	(0.195)	(0.222)	(0.105)	
cpc	−0.184	−0.184	−0.219*	−0.195**	−0.209*	−0.206**
	(0.123)	(0.114)	(0.132)	(0.0935)	(0.124)	(0.0855)
initcond	−0.0443	−0.0443	−0.138***	−0.0926*	−0.137***	−0.0869*
	(0.0650)	(0.0589)	(0.0501)	(0.0504)	(0.0492)	(0.0454)
transit	0.0542	0.0542	−0.102	−0.00532	−0.113*	
	(0.0814)	(0.0746)	(0.0653)	(0.0627)	(0.0626)	
lac	0.175	0.175	0.111	0.0668		
	(0.370)	(0.224)	(0.198)	(0.330)		
mena	−0.285**	−0.285*	−0.341**	−0.273***	−0.342**	−0.254**
	(0.131)	(0.163)	(0.161)	(0.103)	(0.157)	(0.0997)
asia	0.286	0.286**	0.391***	0.328	0.498***	0.363***
	(0.353)	(0.124)	(0.129)	(0.315)	(0.170)	(0.103)

Table 3
(continued)

Variables	(1) OLS	(2) Bootstrap SEs	(3) WLS	(4) MR-RE	(5) WLS GSpecific	(6) MR-RE GSpecific
afr	0.0840	0.0840	0.232**	0.172*	0.229**	0.164*
	(0.120)	(0.114)	(0.104)	(0.0939)	(0.104)	(0.0879)
others	−0.168**	−0.168	−0.181*	−0.157***	−0.181*	−0.153***
	(0.0694)	(0.103)	(0.100)	(0.0605)	(0.0945)	(0.0578)
trade	0.129**	0.129***	0.198***	0.158***	0.198***	0.161***
	(0.0526)	(0.0434)	(0.0353)	(0.0398)	(0.0349)	(0.0371)
instit	0.219***	0.219***	0.223***	0.220***	0.237***	0.235***
	(0.0816)	(0.0563)	(0.0538)	(0.0620)	(0.0497)	(0.0550)
human	−0.0475	−0.0475	−0.0546	−0.0496	−0.0482	−0.0521
	(0.0529)	(0.0334)	(0.0346)	(0.0407)	(0.0333)	(0.0392)
invest	0.0326	0.0326	0.0238	0.00530		0.00424
	(0.0454)	(0.0537)	(0.0430)	(0.0363)		(0.0331)
political	−0.0855	−0.0855	−0.0983*	−0.0742	−0.0907	−0.0905**
	(0.0594)	(0.0662)	(0.0581)	(0.0462)	(0.0572)	(0.0416)
gov	−0.0706	−0.0706	−0.0361	−0.0412	−0.0399	−0.0406
	(0.0493)	(0.0549)	(0.0431)	(0.0387)	(0.0405)	(0.0363)
Constant	−0.0837	−0.0837	−0.0236	−0.0696	−0.0545	−0.226***
	(0.271)	(0.207)	(0.207)	(0.210)	(0.142)	(0.0839)
Observations	460	460	438	460	438	460
R^2	0.185	0.185	0.448		0.447	

Notes: Dependent variable is partial correlation coefficient between corruption and growth. The bootstrap is to derive robust standard errors, with 1000 replications. WLS is weighted least squares with weights given by the reciprocal of the standard error. MR-RE is for random effects. Gspecific refers to results obtained using the general-to-specific method. Standard errors in parentheses with *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All estimations carried out through the metareg routine in STATA.

studies that do not take endogeneity into account. This suggests that the negative bias in this literature may be indeed driven by confusing correlation and causality. By contrast, studies that control for unobserved heterogeneity with the use of fixed effects tend to report more negative effects than studies that do not. Wherever significant, the signs of the measures of corruption variables are negative, which may be explained by expert perceptions being unduly driven by ideological biases (Razafindrakoto and Roubaud, 2010), translating into a larger negative reported correlation between corruption and growth.

Possibly one of the most interesting effects meta-analysis allows one to explore is that of the *channel* variables, in this case trade or trade openness, institutional quality,

Table 4

Meta-Regression Analysis the Effect of Corruption on Economic Growth: Sensitivity Analysis

Variables	(1) OLS	(2) Bootstrap SEs	(3) WLS	(4) MR-RE	(5) OLS	(6) Bootstrap	(7) WLS	(8) MR-RE	(9) OLS	(10) Bootstrap	(11) WLS	(12) ME-RE
pubtype	0.00192	0.00192	−0.0821**	−0.0247								
	(0.0405)	(0.0361)	(0.0387)	(0.0324)								
authors	0.208***	0.208***	0.196***	0.197***								
	(0.0470)	(0.0321)	(0.0359)	(0.0369)								
countryregion	0.0496	0.0496	0.0441	0.0540								
	(0.0751)	(0.0542)	(0.0567)	(0.0591)								
panel	0.0262	0.0262	0.0626*	0.0430								
	(0.0360)	(0.0315)	(0.0332)	(0.0286)								
endo	−0.000778	−0.000778	0.0382	0.0171								
	(0.0388)	(0.0298)	(0.0311)	(0.0306)								
fixed	−0.150***	−0.150***	−0.318***	−0.206***								
	(0.0381)	(0.0468)	(0.0496)	(0.0318)								
mid	−0.00147	−0.00147	0.00564*	0.00107								
	(0.00279)	(0.00271)	0.00317)	(0.00221)								
wb					0.00755	0.00755	0.0362	0.0167				
					(0.259)	(0.196)	(0.185)	(0.210)				
icrg					−0.260	−0.260	−0.319**	−0.310				
					(0.243)	(0.180)	(0.161)	(0.198)				
ticpi					−0.313	−0.313*	−0.379**	−0.330*				
					(0.243)	(0.175)	(0.161)	(0.197)				
comb					−0.554**	−0.554***	−0.595***	−0.568***				
					(0.256)	(0.175)	(0.161)	(0.208)				
other					−0.225	−0.225	−0.471***	−0.249				
					(0.244)	(0.179)	(0.180)	(0.198)				
ctc					−0.0640	−0.0640	−0.109	−0.0946				
					(0.247)	(0.178)	(0.163)	(0.200)				
cpc					−0.0347	−0.0347	0.0893	−0.00380				
					(0.0943)	(0.0977)	(0.143)	(0.0742)				

Table 4
(continued)

Variables	(1) OLS	(2) Bootstrap SEs	(3) WLS	(4) MR-RE	(5) OLS	(6) Bootstrap	(7) WLS	(8) MR-RE	(9) OLS	(10) Bootstrap	(11) WLS	(12) ME-RE
initcond									−0.0520	−0.0520	−0.0474	−0.0342
									(0.0502)	(0.0393)	(0.0379)	(0.0404)
transit									0.0367	0.0367	0.0444	0.0277
									(0.0615)	(0.0482)	(0.0538)	(0.0483)
lac									0.299	0.299	0.395*	0.261
									(0.366)	(0.200)	(0.210)	(0.337)
mena									−0.261**	−0.261*	−0.358**	−0.252**
									(0.129)	(0.151)	(0.155)	(0.106)
asia									0.175	0.175	0.167	0.182
									(0.357)	(0.109)	(0.105)	(0.327)
afr									0.0256	0.0256	0.0880	0.0451
									(0.117)	(0.104)	(0.0971)	(0.0935)
others									−0.179***	−0.179*	−0.233**	−0.175***
									(0.0663)	(0.104)	(0.100)	(0.0618)
trade									0.156***	0.156***	0.265***	0.179***
									(0.0445)	(0.0366)	(0.0423)	(0.0354)
instit									0.177***	0.177***	0.232***	0.172***
									(0.0609)	(0.0619)	(0.0660)	(0.0494)
human									−0.0684	−0.0684*	−0.153***	−0.0981**
									(0.0482)	(0.0354)	(0.0377)	(0.0389)
invest									−0.00659	−0.00659	0.00578	−0.0233
									(0.0416)	(0.0488)	(0.0411)	(0.0343)
political									0.0187	0.0187	−0.0780	0.00857
									(0.0513)	(0.0570)	(0.0581)	(0.0414)
gov									−0.155***	−0.155***	−0.184***	−0.154***
									(0.0411)	(0.0397)	(0.0357)	(0.0333)
Constant	−0.265***	−0.265***	−0.307***	−0.284***	0.114	0.114	0.139	0.123	−0.172	−0.172*	−0.189*	−0.172*
	(0.0593)	(0.0381)	(0.0431)	(0.0461)	(0.241)	(0.173)	(0.160)	(0.196)	(0.112)	(0.0997)	(0.101)	(0.0904)
Observations	460	460	438	460	460	460	438	460	460	460	438	460
R^2	0.071	0.071	0.264		0.082	0.082	0.144		0.116	0.116	0.302	

Notes: Dependent variable is partial correlation coefficient between corruption and growth. The bootstrap is to derive robust standard errors, with 1000 replications. WLS is weighted least squares with weights given by the reciprocal of the standard error. MR-RE is for random effects. Standard errors in parentheses with *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All estimations carried out through the metareg routine in STATA.

human capital, investment, political/democracy effects and government consumption. The inclusion of these variables produces coefficients of corruption that measure its direct effect on growth. On the other hand, the exclusion of these variables results in the corruption variable measuring its total effect on growth. In other words, if the channel variable has a negative (positive) sign, the direct effect of corruption on growth would be smaller (larger) than the total effect (Doucouliagos and Paldam, 2006; Doucouliagos and Ulubaşoğlu, 2008). The coefficients of the trade openness and institutions variables are consistently positive and significant. For the direct effect of these variables on growth to be larger than the total, we would need the indirect effect between corruption and these two variables to be negative. In other words, if trade openness and institutions have a positive effect on growth, corruption undermines this positive effect.[11] This evidence is especially interesting in light of innovations in the literature on technological traps and barriers that corruption poses to emerging markets that attempt to use trade and foreign direct investments effectively to reach the world technological frontier (Nunn and Trefler, 2010; Nunn, 2007).

Finally, we examine the effect of the regional variables in our MRA analysis of the effects of corruption on growth effects. The most consistent result across specifications is that of a negative and significant effect of the MENA region on the relationship between corruption and growth and, to a somewhat lesser extent, that of a positive and significant effect of the ASIA region. This implies that corruption has a more negative effect on growth in MENA and a more positive effect on growth in ASIA. The latter result is consistent with the Asia paradox in the corruption–growth literature.

For sensitivity purposes, we reestimate all four MRA models for each group of variables separately (Table 4). The results are mostly consistent with those in Table 3, except that the presence of a government expenditures variable is now significant and that the coefficients on controlling for endogeneity and the Asian variable are no longer significant.

5 *Concluding Remarks*

This paper has tried to provide a rigorous assessment of the relationship between corruption and economic growth, using a data set comprising 460 estimates of this effect from 41 different econometric studies. We use this unique data set to carry out an econometric survey and try to throw light on the role of differences in estimation methods, econometric specification, measurement issues, and factors like regional focus and time periods, in determining the distribution of the overall effect of corruption on economic growth.

Maybe unsurprisingly to some, we detect a bias in the literature towards reporting (on average) negative effects of corruption on growth. However, we also find evidence of a genuine effect of corruption on growth, which seems to be stronger in academic

[11] Note that the opposite is true for the democracy variable. However, this variable is negative and significant in only two specifications. Our results for all other channels are even less conclusive.

than in nonacademic studies. Further, the large degree of heterogeneity in the available corruption–growth results seems to be driven by whether the authors are affiliated with academic institutions and whether the underlying econometric model controls for potential endogeneity and uses fixed effects. The "sanding the wheels of growth" view of corruption is supported by the evidence that corruption undermines the positive effect of institutions and trade openness on growth. This gives support to the view that the technological threat of emerging giants like China and India in the world economy may be undermined by corruption and other institutional failures. Indeed, while we do find some evidence in favor of the Asian paradox, it does not survive further sensitivity tests. At the same time, countries in the Middle East and North Africa region are likely to experience more negative effect of corruption on growth than countries elsewhere.

Our results have important implications for future research. Firstly, we cannot find enough convincing evidence supporting the view that corruption, on its own, is capable of greasing the wheels of economic growth and development. While the true relationship between corruption and growth may be less negative than that prevailing in the literature, nonacademic authors seem systematically more likely to report a negative effect than academic authors. This effect seems to go beyond whether or not the study is published in a peer-reviewed journal and, unfortunately, generates a powerful bias in this body of empirical evidence. We also conclude that the application of more rigorous econometric methodologies may be needed to sort out the debate in this literature. In particular, we would greatly welcome studies that combine controls for endogeneity and fixed effects with specifications encompassing various institutional and structural reforms dimensions. If these become the norm in the future, we think that this will contribute substantially to the improvement our understanding of the broad economic implications of corruption.

Appendix

A.1 Econometric Studies of the Effect of Corruption on Economic Growth

1. Abdiweli, M. A. (2006), "Institutional Differences as Sources of Growth Differences," *Atlantic Economic Journal*, 31(4), 348–362.
2. Abed, G. T., and H. R. Davoodi (2000), "Corruption, Structural Reforms, and Economic Performance in the Transition Economies," Working Paper 00/132, International Monetary Fund (IMF), Washington (DC).
3. Ahlin, C., and J. Pang (2007), "Are Financial Development and Corruption Control Substitutes in Promoting Growth?" Working Paper 07-W09, Department of Economics, Vanderbilt University.
4. Aidt, T., J. Dutta, and V. Sena (2005), "Growth, Governance and Corruption in the Presence of Threshold Effects Theory and Evidence," Working Paper CWPE 0540, Cambridge University.
5. Anoruo, E., and H. Braha (2005), "Corruption and Economic Growth: The African Experience," Mimeo, Coppin State University, Baltimore (MD).

6. Åslund, A., and N. Jenish (2006), "The Eurasian Growth Paradox," Working Paper 06-5, Institute for International Economics, Washington (DC).
7. Barro, R. J. (1996), "Determinants of Economic Growth: A Cross-Country Empirical Study," Working Paper 5698, National Bureau of Economic Research (NBER), Cambridge (MA).
8. Brunetti, A., G. Kisunko, and B. Weder (1999), "Economic Growth with 'Incredible' Rules: Evidence from a Worldwide Survey of the Private Sector," Policy Research Working Paper 1760, The World Bank, Washington (DC).
9. Butkiewicz, J. L., and H. Yanikkaya (2006), "Institutional Quality and Economic Growth: Maintenance of the Rule of Law or Democratic Institutions, or Both?" *Economic Modelling*, 23(4), 648–661.
10. Cole, M. A. (2007), "Corruption, Income and the Environment: An Empirical Analysis," *Ecological Economics*, 62(3–4), 637–647.
11. Dreher, A., and T. Herzfeld (2005), "The Economic Costs of Corruption: A Survey and New Evidence," Public Economics Working Paper 0506001, http://econwpa.repec.org/eps/pe/papers/0506/0506001.
12. Drury, A. C., J. Krieckhaus, and M. Lusztig (2006), "Corruption, Democracy, and Economic Growth," *International Political Science Review (IPSR/RISP)*, 27(2), 121–136.
13. Edison, H. J., R. Levine, L. Ricci, and T. Sløk (2002), "International Financial Integration and Economic Growth," *Journal of International Money and Finance*, 21(6), 749–776.
14. Ehrlich, I., and F. T. Lui (1999), "Bureaucratic Corruption and Endogenous Economic Growth," *Journal of Political Economy*, 107(S6), S270–S293.
15. Fitzsimons, V. (2003), "The Hidden Economy and the Growth of Corruption in Transition Economies: Causes and Consequences," Paper presented at The Athenian Policy Forum (APF) conference, Homerton College, Cambridge, September 3–6.
16. Gupta, S., H. Davoodi, and R. Alonso-Terme (2002), "Does Corruption Affect Income Inequality and Poverty?" *Economics of Governance*, 3(1), 23–45.
17. Gyimah-Brempong, K. (2002), "Corruption, Economic Growth, and Income Inequality in Africa," *Economics of Governance*, 3(3), 183–209.
18. — and S. Munoz de Camacho (2006), "Corruption, Growth, and Income Distribution: Are there Regional Differences?" *Economics of Governance*, 7(3), 245–269.
19. Haile, D., A. Sadrieh, and H. A. A. Verbon (2003), "Self-Serving Dictators and Economic Growth," Working Paper 1105, CESifo Group, Munich.
20. Hakura, D. S. (2004), "Growth in the Middle East and North Africa," Working Paper WP/04/56, International Monetary Fund (IMF), Washington (DC).
21. Isham, J., M. Woolcock, L. Pritchett, and G. Busby (2005), "The Varieties of Resource Experience: Natural Resource Export Structures and the Political Economy of Economic Growth," *The World Bank Economic Review*, 19(2), 141–174.

22. Jayasuriya, R., and Q. Wodon (2005), "Measuring and Explaining the Impact of Productive Efficiency on Economic Development," *The World Bank Economic Review*, 19(1), 121–140.
23. Knack, S. (2006), "Governance and Growth," Mimeo, The World Bank, Washington (DC).
24. Li, H., L. C. Xu, and H.-f. Zou (2000), "Corruption, Income Distribution, and Growth," *Economics & Politics*, 12(2), 155–181.
25. Mamoon, D., and S. M. Murshed (2005), "Are Institutions More Important than Integration?" Working Paper 416, Institute of Social Studies, The Hague.
26. Mauro, P. (1995), "Corruption and Growth," *The Quarterly Journal of Economics*, 110(3), 681–712.
27. — (1996), "The Effects of Corruption on Growth, Investment, and Government Expenditure," Working Paper 96/98, International Monetary Fund (IMF), Washington (DC).
28. Mendéz, F., and F. Sepúlveda (2006), "Corruption, Growth and Political Regimes: Cross Country Evidence," *European Journal of Political Economy*, 22(1), 82–98.
29. Méon, P., and K. Sekkat (2005), "Does Corruption Grease or Sand the Wheels of Growth?" *Public Choice*, 122(1/2), 69–97.
30. Mironov, M. (2005), "Bad Corruption, Good Corruption and Growth," Graduate School of Business, University of Chicago, available at http://www.mironov.fm/research/corruption.pdf.
31. Mo, P. H. (2001), "Corruption and Economic Growth," *Journal of Comparative Economics*, 29(1), 66–79.
32. Neeman, Z., M. D. Paserman, and A. Simhon (2003), "Corruption and Openness," Discussion Paper DP4057, Centre for Economic Policy Research (CEPR), London.
33. Papyrakis, E., and R. Gerlagh (2004), "The Resource Curse Hypothesis and its Transmission Channels," *Journal of Comparative Economics*, 32(1), 181–193.
34. Pellegrini, L., and R. Gerlagh (2004), "Corruption's Effect on Growth and its Transmission Channels," *Kyklos*, 57(3), 429–456.
35. Poirson, H. (1998), "Economic Security, Private Investment, and Growth in Developing Countries," Working Paper WP/98/4, International Monetary Fund (IMF), Washington (DC).
36. Rahman, A., G. Kisunko, and K. Kapoor (2000), "Estimating the Effects of Corruption: Implications for Bangladesh," Policy Research Working Paper 2479, The World Bank, Washington (DC).
37. Rock, M. T., and H. Bonnett (2004), "The Comparative Politics of Corruption: Accounting for the East Asian Paradox in Empirical Studies of Corruption, Growth and Investment," *World Development*, 32(6), 999–1017.
38. Shaw, P., M. Katsaiti, and M. Jurgilas (2006), "Corruption and Growth under Weak Identification," Working Paper 2006-17, Department of Economics, University of Connecticut.

39. Tanzi, V., and H. R. Davoodi (2000), “Corruption, Growth, and Public Finances,” Working Paper 00/182, International Monetary Fund (IMF), Washington (DC).

40. Toatu, T. (2004), “Corruption, Public Investment and Economic Growth: Evidence from Pacific Island Countries,” PIAS-DG Governance Program Working Paper, The University of the South Pacific, Suva, Fiji, https://www.usp.ac.fj/fileadmin/files/Institutes/piasdg/governance_papers/toatu_corruption.pdf, last accessed March 18, 2016.

41. Welsch, H. (2004), “Corruption, Growth, and the Environment: A Cross-Country Analysis,” *Environment and Development Economics*, 9(05), 663–693.

A.2 Additional Tables

Table A1
Definitions of Variables

Variable name	Definition
authors	Dummy, =1 if all authors are from academia
panel	Dummy, =1 if model uses cross-sectional data
endo	Dummy, =1 if model controls for endogeneity
fixed	Dummy, =1 if model accounts for fixed effects or country dummy
pubtype	Dummy, =1 if study is published in a refereed journal
wb	Dummy, =1 if model uses World Bank corruption measure
icrg	Dummy, =1 if model uses International Country Risk Guide measure of corruption
ticpi	Dummy, =1 if model uses Transparency International measure
comb	Dummy, =1 if model uses combined corruption measure (WB, ICRG, TI)
other	Dummy, =1 if model uses other corruption measures
ctc.	Dummy, =1 if model uses control-to-corruption measure
cpc	Dummy, =1 if model uses corruption measure constructed by principal components
trade	Dummy, =1 if model contains trade or openness variable
instit	Dummy, =1 if model contains institutional variable
human	Dummy, =1 if model contains human-capital or population variable
invest	Dummy, =1 if model contains investment variable
political	Dummy, =1 if model contains political or democracy variable
gov	Dummy, =1 if model contains government expenditures variable
transit	Dummy, =1 if study contains transition countries
lac	Dummy, =1 if study contains Latin American countries
mena	Dummy, =1 if study contains Middle East and North African countries
asia	Dummy, =1 if study contains Asian countries
afr	Dummy, =1 if study contains African countries
others	Dummy, =1 if study contains other countries not specified above
initcond	Dummy, =1 if initial conditions are included in the regression

Table A2
Descriptive Statistics

Variable name	Definition						
	Obs.	Mean	St. dev.	Min.	Max.	Freq.	Percent
df	460	101.37	173.06	0	1498	–	–
authors	460	0.82	0.38	0	1	378	82.00
countryregion	460	0.07	0.26	0	1	36	7.74
panel	460	0.53	0.50	0	1	249	53.55
endo	460	0.33	0.47	0	1	151	32.47
fixed	460	0.35	0.48	0	1	160	34.41
mid	460	9.54	6.21	0	20	–	–
pubtype	460	0.50	0.50	0	1	228	49.03
wb	460	0.03	0.17	0	1	13	2.8
icrg	460	0.28	0.45	0	1	130	27.96
ticpi	460	0.36	0.48	0	1	165	35.48
comb	460	0.03	0.18	0	1	16	3.44
other	460	0.20	0.40	0	1	94	20.22
ctc.	460	0.09	0.29	0	1	45	9.68
cpc	460	0.03	0.17	0	1	14	3.01
trade	460	0.32	0.47	0	1	149	32.04
instit	460	0.09	0.29	0	1	43	9.25
human	460	0.73	0.45	0	1	337	72.63
invest	460	0.33	0.47	0	1	155	33.33
political	460	0.18	0.39	0	1	84	18.06
gov	460	0.40	0.49	0	1	185	39.78
transit	460	0.86	0.34	0	1	401	86.24
lac	460	0.93	0.26	0	1	430	92.47
mena	460	0.86	0.34	0	1	401	86.24
asia	460	0.93	0.26	0	1	431	92.69
afr	460	0.91	0.28	0	1	424	91.18
others	460	0.87	0.34	0	1	403	86.67
initcond	460	0.78	0.41	0	1	361	77.63

References

Abed, G. T., and S. Gupta (eds.) (2002), *Governance, Corruption, & Economic Performance,* International Monetary Fund (IMF), Washington (DC).

Aidt, T. S. (2003), "Economic Analysis of Corruption: A Survey," *The Economic Journal*, 113(491), F632–F652.

— (2009), "Corruption, Institutions, and Economic Development," *Oxford Review of Economic Policy*, 25(2), 271–291.

Babecký, J., and N. F. Campos (2011), "Does Reform Work? An Econometric Survey of the Reform-Growth Puzzle," *Journal of Comparative Economics*, 39(2), 140–158.

Bardhan, P. (1997), "Corruption and Development: A Review of Issues," *Journal of Economic Literature*, 35(3), 1320–1346.

Basu, P. K. (2006), "Corruption: A Theoretical Perspective and Relevance for Economic Growth," *International Review of Business Research Papers*, 2(4), 59–68.

Card, D., and A. B. Krueger (1995), "Time-Series Minimum-Wage Studies: A Meta-Analysis," *The American Economic Review*, Papers and Proceedings, 85(2), 238–243.

De Soto, H. (1990), *The Other Path: The Invisible Revolution in the Third World*, Harper & Row, New York.

Doucouliagos, C. (2005), "Publication Bias in the Economic Freedom and Economic Growth Literature," *Journal of Economic Surveys*, 19(3), 367–387.

— and M. Paldam (2006), "Aid Effectiveness on Accumulation: A Meta Study," *Kyklos*, 59(2), 227–254.

— and M. A. Ulubaşoğlu (2008), "Democracy and Economic Growth: A Meta-Analysis," *American Journal of Political Science*, 52(1), 61–83.

Egger, M., G. D. Smith, M. Schneider, and C. Minder (1997), "Bias in Meta-Analysis Detected by a Simple, Graphical Test," *British Medical Journal (BMJ)*, 315(7109), 629–634.

Egger, P., and H. Winner (2005), "Evidence on Corruption as an Incentive for Foreign Direct Investment," *European Journal of Political Economy*, 21(4), 932–952.

Ehrlich, I., and F. T. Lui (1999), "Bureaucratic Corruption and Endogenous Economic Growth," *Journal of Political Economy*, 107(S6), S270–S293.

Fisman, R., and J. Svensson (2007), "Are Corruption and Taxation Really Harmful to Growth? Firm Level Evidence," *Journal of Development Economics*, 83(1), 63–75.

Higgins, J. P., and S. G. Thompson (2002), "Quantifying Heterogeneity in a Meta-Analysis," *Statistics in Medicine*, 21(11), 1539–1558.

Huntington, S. P. (1968), *Political Order in Changing Societies,* Yale University Press, New Heaven (CT) and London.

Kaufmann, D., A. Kraay, and M. Mastruzzi (2006), *Governance Matters V: Aggregate and Individual Governance Indicators for 1996–2005*, Working Paper WPS4012, The World Bank, Washington (DC).

Lambsdorff, J. G. (2006), "Causes and Consequences of Corruption: What do we Know from a Cross-Section of Countries?" in: S. Rose-Ackermann (ed.), *International Handbook on the Economics of Corruption*, Edward Elgar Publishing, Cheltenham, pp. 3–51.

Leff, N. H. (1964), "Economic Development through Bureaucratic Corruption," *American Behavioral Scientist (ABS)*, 8(3), 8–14.

Levy, D. (2007), "Price Adjustment under the Table: Evidence on Efficiency-Enhancing Corruption," *European Journal of Political Economy*, 23(2), 423–447.

Li, S., and J. Wu (2007), "Why China Thrives despite Corruption," *Far Eastern Economic Review*, 170(3), 24–28.

Longhi, S., P. Nijkamp, and J. Poot (2005), "A Meta-Analytic Assessment of the Effect of Immigration on Wages," *Journal of Economic Surveys*, 19(3), 451–477.

Mauro, P. (1995), "Corruption and Growth," *The Quarterly Journal of Economics*, 110(3), 681–712.

Méon, P., and L. Weill (2010), "Is Corruption an Efficient Grease?" *World Development*, 38(3), 244–259.

Meyer, K. E., and E. Sinani (2009), "When and Where does Foreign Direct Investment Generate Positive Spillovers?" *Journal of International Business Studies*, 40(7), 1075–1094.

Nunn, N. (2007), "Relationship-Specificity, Incomplete Contracts, and the Pattern of Trade," *The Quarterly Journal of Economics*, 122(2), 569–600.

— and D. Trefler (2010), "The Structure of Tariffs and Long-Term Growth," *American Economic Journal: Macroeconomics*, 2(4), 158–194.

Pande, R. (2008), "Understanding Political Corruption in Low Income Countries," in: T. P. Schultz and J. Strauss (eds.), *Handbook of Development Economics: Volume 4*, North-Holland, Amsterdam, pp. 3155–3247.

Ravallion, M. (2001), "Growth, Inequality and Poverty: Looking beyond Averages," *World Development*, 29(11), 1803–1815.

Razafindrakoto, M., and F. Roubaud (2010), "Are International Databases on Corruption Reliable? A Comparison of Expert Opinion Surveys and Household Surveys in Sub-Saharan Africa," *World Development*, 38(8), 1057–1069.

Reinikka, R., and J. Svensson (2004), "Local Capture Evidence from a Central Government Transfer Program in Uganda," *The Quarterly Journal of Economics*, 119(2), 679–705.

— and — (2005), "Fighting Corruption to Improve Schooling: Evidence from a Newspaper Campaign in Uganda," *Journal of the European Economic Association*, 3(2–3), 259–267.

Rock, M. T., and H. Bonnett (2004), "The Comparative Politics of Corruption: Accounting for the East Asian Paradox in Empirical Studies of Corruption, Growth and Investment," *World Development*, 32(6), 999–1017.

Rosenthal, R. (1991), *Meta-Analytic Procedures for Social Research*, Sage Publications, Newbury Park (CA).

Stanley, T. D. (2001), "Wheat from Chaff: Meta-Analysis as Quantitative Literature Review," *The Journal of Economic Perspectives*, 15(3), 131–150.

— (2005), "Beyond Publication Bias," *Journal of Economic Surveys*, 19(3), 309–345.

— (2008), "Meta-Regression Methods for Detecting and Estimating Empirical Effects in the Presence of Publication Selection," *Oxford Bulletin of Economics and Statistics*, 70(1), 103–127.

Svensson, J. (2005), "Eight Questions about Corruption," *The Journal of Economic Perspectives*, 19(3), 19–42.

Swaleheen, M. (2011), "Economic Growth with Endogenous Corruption: An Empirical Study," *Public Choice*, 146(1), 23–41.

Treisman, D. (2007), "What have we Learned about the Causes of Corruption from Ten Years of Cross-National Empirical Research?" *Annual Review of Political Science*, 10(1), 211–244.

Vial, V., and J. Hanoteau (2010), "Corruption, Manufacturing Plant Growth, and the Asian Paradox: Indonesian Evidence," *World Development*, 38(5), 693–705.

Wedeman, A. (2002), "Development and Corruption: The East Asian Paradox," in: E. T. Gomez (ed.), *Political Business in East Asia*, Routledge, London, pp. 34–61.

Nauro F. Campos
Brunel University
Kingston Lane
Uxbridge
Middlesex
UB8 3PH
United Kingdom
nauro.campos@brunel.ac.uk

Ralitza Dimova
Institute for Development
Policy and Management
University of Manchester
Oxford Road
M13 9PL
United Kingdom
ralitza.dimova@manchester.ac.uk

Ahmad Saleh
Brunel University
Kingston Lane
Uxbridge, Middlesex
UB8 3PH
United Kingdom
ahmad.saleh@brunel.ac.uk