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The transition of corruption: From poverty to honesty

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Abstract

Prehistoric measures of biogeography are used as instruments for modern income levels. We find that our instrumented incomes explain the cross-country pattern of corruption just as well as actual incomes, so the long-run causality appears to be entirely from income to corruption.

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1. Introduction

Measures of corruption and income are highly correlated across countries, but no agreement has been reached in the literature about the main direction of causality. Lambsdorff (2007) claims that corruption is a vice causing low growth, so causality is mainly from corruption to long-run income. Treisman (2000) and Paldam (2001, 2002) claim that corruption is a poverty driven disease that vanishes when countries develop, so causality is mainly from income to corruption. The empirical problem is that the available series of corruption perceptions are rather short and contain much autocorrelation. We have summarized the empirical findings till now in Paldam and Gundlach (2008). The purpose of the present paper is to provide a new test of the long-run direction of causality between income and corruption.

Given that all countries experienced fairly similar average income levels until 200 years ago, actual income levels reveal cross-country differences in the long-run growth rate. So regressing measures of corruption on levels of income will identify the long-run income effect if the possible reverse causality from corruption to income can be controlled for. We instrument the actual incomes with a set of prehistoric measures of biogeography compiled by Olsson and Hibbs (2005). We find that our instrumented incomes explain the cross-country pattern of corruption just as well as the actual incomes: hence the transition of corruption with rising levels of development.

Section 2 explains the logic of our test. Section 3 presents our results, and Section 4 concludes. We are brief since a parallel study on the relation between democracy and income (see Gundlach and Paldam 2008a and b) provides a more detailed discussion of our empirical model and of the literature that motivates our empirical strategy. All variables used are defined in the appendix.

2. Logic of the test

We compare two regression estimates. One is an OLS-estimate that explains corruption with income. The other is the corresponding instrumental variables (IV) regression estimate, where income is instrumented by measures of biogeography that are necessarily exogenous to the current pattern of income. The link between our instruments and actual incomes is justified by two theories:

(i) Diamond (1997) argues that the diversity of prehistoric biological and geographic conditions explains the differences in early economic development across different regions of the world, which resulted in different sizes of regional populations at average income levels not far above the subsistence level.

(ii) Galor (2005) develops a unified growth theory that captures in one model the Malthusian era of constant per capita income *and* the era of modern growth with persistently rising per capita income. His theory is supported by historical facts about slow but steady changes in the composition of the English population that ultimately allowed for the take off to modern growth (Clark 2007).

This combined empirical-theoretical argument suggests to us that the actual cross-country incomes may be instrumented by prehistoric measures of biogeography. Hence our basic estimation equation is given by

$$\kappa_i = \alpha + \beta y_i + \mathrm{X}_i^{'}\gamma + \varepsilon_i \, , \qquad (1)$$

where κ_i is the degree of corruption in country i as measured by the Transparency International (TI) index, income y_i is measured by the natural logarithm of GDP per capita in constant international dollars, $\mathrm{X}_i^{'}$ is a matrix of other covariates that may be included, α is a regression constant, ε is an error term, and β is the coefficient of interest that measures the long-run effect of income on corruption once income is appropriately instrumented. Our preferred representation of the instruments is the first principal components of two measures of prehistoric biology and four measures of geography, as compiled by Olsson and Hibbs (2005).

3. Empirical results

The empirical results are reported in Table 1. Our measure of biogeography passes the Cragg-Donald test for weak instruments and the Sargan test for overidentification. All estimates of the income coefficient are statistically significant. An estimate of the long-run effect of income on corruption of 1.5 as in column (1) implies that the difference between the 10th percentile (6.61) and the 90th percentile (9.93) of (log) income is predicted to result in a $3.3 \times 1.5 = 4.95$ corruption-point difference in our sample of countries. The actual difference between two sample countries that are close to the 10th percentile and the 90th percentile, Haiti and Finland, is 7.85 corruption points, so our estimate explains about 60 percent of the observed difference in the corruption index of the two countries. The key result from column (1) is that the IV-estimate does not differ significantly from the corresponding OLS-estimate, so there appears to be no upward bias due to reverse causality.[2]

Table 1. The effect of income on corruption: IV and OLS regressions

	Dependent variable: κ (average TI index for 1995-2006), inverted scale					
	(1)	(2)	(3)	(4)	(5)	(6)
No. of obs. (countries)	98	98	98	98	98	39
y (IV) in 2003	1.49 (0.16)	1.42 (0.14)	1.46 (0.15)	1.59 (0.17)	1.42 (0.16)	2.03 (0.41)
prot		3.18 (0.54)				
romcat			-0.83 (0.35)			
loeng				0.66 (0.30)		
lofre					-0.57 (0.25)	
suicide						0.06 (0.02)
First stage partial R^2	0.43	0.42	0.50	0.41	0.42	0.39
CD F-statistic	35.86	34.54	46.29	33.27	34.69	11.23
Sargan test (p-value)	1.45 (0.23)	0.92 (0.34)	0.00 (0.97)	0.01 (0.92)	0.09 (0.77)	0.52 (0.47)
y (OLS) in 2003	1.36 (0.11)	1.26 (0.09)	1.41 (0.11)	1.41 (0.11)	1.33 (0.11)	2.09 (0.26)
Adjusted R^2	0.62	0.73	0.64	0.63	0.64	0.74

Notes: The selected combination of variables and years maximizes the number of available observations. The results are unchanged (available upon request) if both the income variable and TI index refer to 2003, or if the average κ-index is explained with the 1995 income levels. First principal components of prehistoric measures of biogeography as instruments for income. Standard errors in parentheses. All specifications include a constant term (not reported). A Cragg-Donald (CD) F-statistic below the critical value of 19.93 indicates weak instruments for a 10 percent maximal test size (8.25 for a 20 percent maximal test size). The Sargan test for overidentification tests the joint null hypothesis that the instruments are valid and correctly excluded from the estimated equation.

One major objection is that our estimates are biased due to omitted variables. We check the robustness of our estimate of the income effect by adding alternative control variables one by one to avoid multicollinearity. We speculate that our control variables have an effect on corruption which may either be independent of the income effect or may even dominate the presumed income effect.[3]

2. We also used as instruments: the averages of the measures of biography, individual measures of biology and geography, and alternative measures of geography. We found an average income effect of about 1.4. Detailed results are available upon request.
3. For our purpose, it is less important whether the additional control variables are actually exogenous. We are mainly interested in the robustness of our estimated income coefficient.

We find that the share of the population with protestant religious belief (*prot*) decreases and the share with catholic religious belief (*romcat*) increases the degree of corruption for a given level of income (see also Paldam 2001). Similarly, an English origin of commercial and company laws (*loeng*) is associated with a lower and a French origin (*lofre*) is associated with a higher degree of corruption for a given level of income. In addition, we find that the suicide rate (*suicide*) is statistically significantly correlated with the degree of corruption once the level of income is controlled for.[4]

With the inclusion of the control variables, our estimate of the size of the income effect remains unchanged. An income coefficient of 1.5 is within the 95 percent confidence interval of all IV- and OLS-estimates, and there is no statistically significant difference between the IV- and the corresponding OLS-estimates. Hence we conclude that the long-run causality is apparently entirely from income to corruption.

4. The Transition of Corruption

Simon Kuznets (1965) and many later researchers have argued that cross-country *levels* of income provide the best information about cross-country differences in *long-run* development as well. Consequently, the cross-country levels of income are used to explain the long-run causality from income to corruption. The problem of reverse causality is handled by a unique set of prehistoric measures of biogeography, which passes the statistical tests for weak instruments.

Our main results are: The cross-country pattern of corruption can be fully explained by the cross-country pattern of income. To the extent that there is short-run interaction between corruption and income – as there may very well be – it is irrelevant for the long-run effect. The long-run causality is entirely from income to corruption. Corruption vanishes as countries get rich, and there is a transition from poverty to honesty.

4. We have also included proxy variables for rent seeking, distributional conflict, individual violence, ethnic fractionalization, and Muslim religious belief. For all these variables we could not find a statistically significant independent effect on corruption, whereas the income effect remained unchanged. Detailed results are available upon request.

Appendix: Definitions and sources of variables

Dependent variable and main explanatory variable	
κ	Corruption/honesty index, inverted scale from 0 (honesty) to 10 (corruption). Source: Transparency International homepage.
y	Natural logarithm of GDP per capita in 1990 PPP-$. Source: Maddison homepage.
Instrumental variables	
biofpc	The first principal components of two country-specific measures of biology: the number of domesticable big mammals in prehistory and the number of domesticable wild grasses in prehistory. Source: Olsson and Hibbs (2005).
geofpc	The first principal components of four country-specific measures of geography: climatic conditions favorable for agriculture, latitude, relative East-West orientation, and size of the landmass to which a country belongs. Source: Olsson and Hibbs (2005).
Control variables	
loeng	Dummy for English origin of commercial and company laws. Source: La Porta et al. 1998
lofre	Dummy for French origin of commercial and company laws. Source: La Porta et al. 1998
prot	Share of the population with protestant religious belief. Source: La Porta et al. (1998).
romcat	Share of the population with roman-catholic religious belief. Source: La Porta et al. (1998).
suicide	Total number of suicides per 100,000 population. Source: Parker (1997).

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