

Department of Economics Working Paper Series

### **Corruption and Growth Under Weak Identification**

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Working Paper 2006-17

September 2006

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This working paper is indexed on RePEc, http://repec.org/

### Abstract

The goal of this paper is to revisit the influential work of Mauro [1995] focusing on the strength of his results under weak identification. He finds a negative impact of corruption on investment and economic growth that appears to be robust to endogeneity when using two-stage least squares (2SLS). Since the inception of Mauro [1995], much literature has focused on 2SLS methods revealing the dangers of estimation and thus inference under weak identification. We reproduce the original results of Mauro [1995] with a high level of confidence and show that the instrument used in the original work is in fact 'weak' as defined by Staiger and Stock [1997]. Thus we update the analysis using a test statistic robust to weak instruments. Our results suggest that under Mauro's original model there is a high probability that the parameters of interest are locally almost unidentified in multivariate specifications. To address this problem, we also investigate other instruments commonly used in the corruption literature and obtain similar results.

#### Journal of Economic Literature Classification: C31, D73

Keywords: Corruption, Growth, Weak Identification, LAU

The authors would like to thank Paulo Mauro, Gautam Tripathi, Nicholas Shunda, Christian Zimmermann, and Francis Ahking for comments and suggestions. We would also like to thank the contributing participants of the Sixth Annual Missouri Economics Conference for their valuable feedback.

### 1 Introduction

The purpose of this paper is to revisit Mauro (1995) and examine the validity of his results as a consequence of recent research that cautions against making inference in the presence of weak instruments. Early work done by Nelson and Startz (1990b, 1990a) demonstrate that the distribution of the 2SLS estimator and the t-statistic is poorly approximated by the asymptotic representation when instruments are weak. Later, Staiger and Stock (1997) find that, in nonlinear GMM, weak instruments correspond to weak identification of some or all of the unknown parameters. They prove that, even in large samples, weak identification leads to test statistics with non-normal distributions, thus making conventional 2SLS or GMM inferences misleading. Staiger and Stock (1997) suggest a firststage F-statistic of 10 on the excluded instruments as an indication of acceptable instruments. Further, Cruz and Moreira (2005) show that the finite sample bias inherent in 2SLS estimator is exacerbated when using weak instruments. We therefore attempt to reproduce Mauro's results and analyze them in light of these recent findings.

From the early work of Leff (1964) and Huntington (1968) corruption in government has been of great interest to economists. These studies argue that corruption could be positively correlated with economic performance in the presence of a thick and cumbersome bureaucracy. Corruption in this view "greases the wheels" of bureaucracy, thus increasing the efficiency in which transactions occur, leading to a positive effect on the economic performance of a country.

On the other hand Rose-Ackerman (1978), Murphy, Shleifer, and Vishny (1991, 1993), and Shleifer and Vishny (1993) provide theoretical arguments that corrup-

tion deteriorates economic growth through the misallocation of talent and other resources.

Mauro (1995) contributes to this debate by examining empirically the relationship between two measures of corruption and investment and economic growth. His results suggest that corruption has a negative impact on investment and economic growth. The significance of his results varies with model specifications but the results appear to be robust when correcting for the potential endogeneity of corruption. Using the ethnolinguistic fractionalization (ELF) index as an instrumental variable (IV), he employs 2SLS estimation to correct for endogeneity created by the two measures of corruption.

The impact of Mauro (1995)'s work can be gauged by looking at the numerous citations the paper has received since it was published. According to one ranking, the paper is among the top citeasnound papers in economics.<sup>1</sup> This paper has had a profound influence on the direction of research in corruption as well as policy making. This requires us to examine it closely and ensure the validity of its results using methods unavailable to researchers at the time.

This paper is organized as follows: Section 2 describes our methodology including the test statistic that is robust to weak identification. Section 3 we review the data used in our analysis spending some time on the instrument used by Mauro and another instrument commonly used in the corruption literature. We then review our findings in section 4 and finally conclude.

<sup>&</sup>lt;sup>1</sup>http://ideas.repec.org/top/top.item.nbciteasnouns.html

### 2 Methodology

Mauro (1995) follows a typical estimation procedure for cross-country analysis, averaging investment share and per-capita GDP growth over 1960-1985. While averaging across countries may seem inferior to a panel approach, recent work by Hauk and Wacziarg (2004) finds that the averaging methodology performs best in the presence of endogeneity or measurement error compared to fixed-effects, random-effects, and Arellano-Bond estimators. Mauro (1995) uses the following setup to examine the relationship between corruption and long-run investment and growth of per-capita GDP :

$$y_1 = X\beta_0 + \beta_1 y_2 + u \quad \text{where} \quad EX'u = 0 \text{ and} \quad Ey'_2 u \neq 0 \tag{1}$$

Here X is an  $n \times K$  matrix of control variables often used in cross-country growth regressions found in Barro (1991) or Levine and Renelt (1992).  $y_1$  is an  $n \times 1$  vector containing data on investment share or per-capita growth, and  $y_2$  is an  $n \times 1$  vector containing data on either corruption or bureaucratic efficiency. The reduced form equation for  $y_2$  is:

$$y_2 = X\delta_0 + Z\delta_1 + v \tag{2}$$

 $\tilde{Z}$  is an  $n \times k$  matrix of IVs s.t.  $E\tilde{Z}'u = 0$  and  $cov(\tilde{Z}, y_2) \neq 0$ .

When the instruments are weakly correlated with the endogenous variable problems arise under 2SLS estimation. Under the assumption of normal errors, Cruz and Moreira (2005) describe methods that lead to more reliable test statistics and confidence intervals when confronted with weak identification.

We employ Cruz and Moreira (2005)'s conditional likelihood ratio (CLR) test

 $statistic:^2$ 

$$CLR = \frac{1}{2} \left[ \bar{S}'\bar{S} - \bar{T}'\bar{T} + \sqrt{[\bar{S}'\bar{S} + \bar{T}\bar{T}]^2 - 4[\bar{S}'\bar{S} \cdot \bar{T}'\bar{T} - (\bar{S}'\bar{T})^2]} \right]$$
(3)

where:

$$\bar{S} = (b'\Omega b \cdot Z'Z)^{-1/2} Z'Yb$$

$$\bar{T} = (a'\Omega^{-1}a \cdot Z'Z)^{-1/2} Z'Y\Omega^{-1}a$$

$$Y = [y_1 y_2]$$

$$b = [1 - \beta_{NULL}]'$$

$$a = [\beta_{NULL} 1]'$$

$$Z = (I - X(X'X)^{-1}X')\tilde{Z}$$

where  $\Omega$  is the variance-covariance matrix to be estimated. The conditional nature of the CLR test comes from the fact that the critical value is calculated via simulations.<sup>3</sup> Although there are other test statistics that are valid under weak identification, Andrews et al. (2006) demonstrate that the CLR test has the correct null rejection probability when identification is weak and it dominates similar test statistics, including the Lagrange multiplier (LM) and the Anderson-Rubin (AR) statistics in power comparisons. Even though the assumption of normal errors seems rather restrictive, Andrews et al. (2006) show that the power of the CLR test can be unaffected even with nonnormal errors. Because the CLR test is centered around the limited information maximum likelihood (LIML) estimator,

 $<sup>^2 {\</sup>rm See \ http://post.economics.harvard.edu/faculty/moreira/software$ simulations.html for the CLR test code.

<sup>&</sup>lt;sup>3</sup>For a detailed description of this process see Andrews, Moreira, and Stock (2006).

we report the LIML estimates in our results.

## **3** Data Description

The data we use derives from multiple sources including Summers and Heston (1988), Barro (1991) and directly from Mauro (1995).<sup>4</sup> The ethnolinguistic fractionalization (ELF), corruption and bureaucratic efficiency indices are from the appendix of Mauro (1995). The original source of the ELF index is Taylor and Hudson (1972). The data for legal origins (LO) is from the World Bank.<sup>5</sup>

Tables 1 through 4 show that our regressions match those of Mauro (1995) very closely in size of the coefficients and significance levels in both univariate and multivariate OLS. Since our data set seems to match the original data set well, we feel comfortable extending our results to those found in Mauro (1995).

### 3.1 Instruments

The first instrument we examine, the ethnolinguistic fractionalization (ELF) index, has the following form:

$$ELF = 1 - \sum_{i=1}^{I} \left(\frac{n_i}{N}\right)^2 \tag{4}$$

where I is the number of ethnolinguistic groups in a country,  $n_i$  is the number of people in the *i*th group, and N is the total population of the country. Therefore, the higher the index, the more fragmented the country. Mauro (1995) draws on simple correlations between the ELF index, corruption, and bureaucratic efficiency

 $<sup>^4{\</sup>rm These}$  data constructed by Barro (1991) and Summers and Heston (1988) can be found at http://www.worldbank.org/research/growth/ddlevren.htm

<sup>&</sup>lt;sup>5</sup>http://econ.worldbank.org/

arguing that greater fragmentation leads to higher levels of corruption as a result of bureaucrats favoring their own ethnolinguistic group. The use of the ELF index as an instrument for corruption is not limited to Mauro (1995) but has also been used by Neeman, Paserman, and Simhon (2004), Dreher and Schneider (2006), Mocan (2004) and Mauro (1996). The exogeneity of the ELF index is an assumption made in Mauro (1995) and will not be addressed in this paper. The main focus of the paper is to address the quality of the instrument in terms of its ability to successfully identify the structural relationship corruption has with growth and investment share.

Legal origins (LO) is another instrument commonly used for corruption as found in Pellegrini and Gerlagh (2004), Fredriksson and Svensson (2003), Dreher and Schneider (2006), and Neeman et al. (2004). The papers argue strongly that 'legal origins' is a sufficient instrument for corruption offering the empirical results of La Porta, Lopez-de Silanes, Shleifer, and Vishny (1999) as support. The variable is a dummy indicating whether a country has French, English, Scandinavian, or German legal origin. The justification for using LO as an instrument is its relationship with institutional efficiency as well as with the level of government intervention. La Porta et al. (1999) argue that more interventionist governments and less efficient bureaucracies should have higher levels of corruption. For example, countries founded on English common law focus less on government intervention and place more emphasis on the protection of individual rights and should therefore have lower levels of corruption. La Porta et al. (1999) also argue that LO are exogenous to economic variables because they are mainly determined by historical factors. We examine legal origins as a potential instrument for bureaucratic efficiency and corruption to offer an alternative to the ELF index. In our attempt to find a strong instrument we construct religious and geographical indices using a multitude of variable combinations. We create generated regressors and various interactions of the variables listed in the appendix. However, after an intense search we are unable to offer an instrument with sufficient strength that alters our results.

### 4 Results

Table 5 shows the results under 2SLS compared to Mauro (1995)'s using both LO and the ELF index as IVs. Once again, the results compare well in both the size of the coefficients and significance levels. Table 5 shows that the first-stage F-stats on the ELF index are 4.72 and 5.91, and 4.72 and 2.60 for LO. These are well below the 10 needed to draw valid inferences as shown by Staiger and Stock (1997). Using the methodology of Cruz and Moreira (2005), we create confidence intervals robust to weak instruments using the CLR test in Equation 3 under  $\beta_{NULL} = 0$ . The results suggest that the findings in Mauro (1995) are valid under weak instruments in the univariate 2SLS estimation. The 95% confidence intervals clearly exclude zero, suggesting that both corruption and bureaucratic efficiency have a significant impact on investment share under the model specifications presented in Table 5. This is true using both the ELF index and LO as instruments.

Table 5 shows that the CLR confidence regions have similar lower bounds but much larger upper bounds than the traditional Wald-type intervals reported. This implies that it is possible for corruption and bureaucratic efficiency to have a much larger impact on investment share than the mean effect reported in Mauro (1995). We report the J-stat for the overidentification restrictions on legal origins which suggests the exogeneity of legal origins at very reasonable significance levels.

A word of caution however. With such small first-stage F-stats, the power of the overidentification restrictions test is questionable. Furthermore, according to Cruz and Moreira (2005), weak instruments exacerbate the finite sample bias of 2SLS estimators. Thus, there could be substantial bias in the estimates in Table 5, especially if the ELF index is endogenous in the structural equation. This point should be kept in mind throughout the analysis as it is relevant in both the univariate and multivariate specifications.

Table 6 shows results from specifications including additional controls. Columns 1 and 4 show our attempt to replicate the results of Mauro (1995) using the ELF index as an instrument. The coefficient on bureaucratic efficiency does not match well, however the remaining coefficients are similar in magnitude and significance levels, including the coefficient on corruption. Examining the first-stage F-statistic, we see that both instruments are very weak. With a first-stage F-stat of 2.84 and 3 for the ELF index, and 0.62 and 0.04 for LO in the bureaucratic efficiency and corruption regressions, respectively, we employ the CLR test to construct valid confidence intervals robust to weak instruments.

The results are disconcerting as the intervals at the 95% level are unbounded using both IVs. This is consistent with the theoretical results of Dufour (1997), who shows that under local almost unidentification (LAU), [e.g. weak instruments], valid confidence intervals will be unbounded with *at least* probability  $(1 - \alpha)$ , where  $(1 - \alpha)$  represents the level of the confidence interval constructed. Dufour (1997) also proves that, under LAU, confidence regions which are bounded with probability one, such as the Wald-type, will have zero coverage probability. Thus, the probability that the true coefficient lies within the traditional Wald-type intervals is zero. Moreover, in his later work, Dufour (2003, p.19) concludes that "[u]nbounded sets are highly likely when the model is not identified, so they point to lack of identification." Nelson, Startz, and Zivot (1996) show analytically for various test statistics valid to weak instruments, that unboundedness is a result of near unidentification. They also show using Monte Carlo simulations that with high levels of endogeneity and weak instruments the structural parameter is in fact excluded from intervals created by inverted t-statistics as we have done in Table 6.

With such a low correlation between our measures of corruption and the instruments, it is highly likely that parameters of the equation are unidentified. Since we have reproduced Mauro (1995)'s results with a high level of confidence, one should view the results of Mauro (1995) as uninformative.

Thus, if bureaucratic efficiency and corruption are in fact endogenous in the specifications presented in Table 6, as Mauro (1995) suggests, then the estimation procedure fails to identify the coefficients due to weakness of the ELF index. This conclusion is also true when using the LO variable as an IV.

Table 7 shows the impact corruption has on long-run growth compared to Mauro (1995). Using the ELF index as an instrument suggests that both corruption and bureaucratic efficiency are significant at the 5% level, as found in the original paper. Neither bureaucratic efficiency nor corruption are statistically significant when using LO as an instrument. Interestingly, the valid intervals constructed using the CLR test become unbounded for the coefficient on corruption in univariate growth regressions. Thus these intervals have correct size but offer uninformative results.

We present the 2SLS multivariate growth regressions compared to Mauro (1995)'s results in Table 8. The first-stage F-stats on the instruments are identical to those in Table 6 as expected, so we report the confidence regions constructed using the CLR test. We find unbounded confidence intervals for the coefficients on bureaucratic efficiency and corruption when using the ELF index or LO as IVs. The findings imply that, when using the ELF index and LO as instruments, the effect of corruption and bureaucratic efficiency on growth cannot be identified under the specifications presented in Table 8.

Again with such a low correlation between our measures of corruption and the instruments, it is highly likely that parameters of the equation are unidentified. Thus, making conclusions about corruption's impact on per-capita growth based on the results presented in Table 8 would be deceptive.

### 5 Conclusion

Our paper reexamines a key study in the corruption literature under weak identification. We find that the instrument used by Mauro (1995), the ethnolinguistic fractionalization (ELF) index, is not useful in identifying the parameters of interest in all multivariate 2SLS specifications. Using legal origins, an instrument commonly used in empirical work on corruption, we show that our main results do not change. Therefore, if corruption is endogenous in the multivariate regressions presented in Mauro (1995), as the literature suggests, neither the ELF index nor legal origins serve as valid instruments. Due to the widespread use of both instruments in applied studies on corruption, caution should be exercised when interpreting their results, unless proper techniques, as laid out in this paper, have been used.

This paper serves as an example of the problematic nature of weak instruments as first noted by Nelson and Startz (1990b, 1990a). Broadly speaking, empirical researchers should always report the first-stage F-stat (on the the instrument(s)) to avoid making erroneous inference.

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	[1]	[2]	[3]	[4]
	SKJ	Mauro	SKJ	Mauro
Independent Variables	(2006)	(1995)	(2006)	(1995)
Constant	0.059	0.059	0.087	0.086
	[2.69]	[2.74]	[4.07]	[4.14]
Bureaucratic	0.022	0.022		
efficiency	[7.34]	[7.47]		
Corruption			0.018	0.018
			[6.32]	[6.43]
Estimation method	OLS	OLS	OLS	OLS
$R^2$	0.46	0.46	0.40	0.40
	N=58	N=58	N=58	N=58

Table 1: Investment on Corruption, Bureaucratic Efficiency Dependent Variable: Investment/GDP (1960-1985 Average)

	[1]	[2]	[3]	[4]
	SKJ	Mauro	SKJ	Mauro
Independent Variables	(2006)	(1995)	(2006)	(1995)
Constant	0.104	0.104	0.114	0.114
	[2.89]	[3.03]	[3.04]	[3.18]
GDP in 1960	-0.008	-0.008	-0.006	-0.006
	[-1.25]	[-1.31]	[-0.61]	[-0.81]
Secondary	0.06	0.06	0.111	0.111
education in 1960	[0.93]	[0.97]	[1.61]	[1.68]
Population	-1.373	-1.373	-0.62	-0.62
growth	[-1.32]	[-1.38]	[-0.58]	[-0.61]
Bureaucratic	0.019	0.019		
efficiency	[3.86]	[4.04]		
Corruption			0.013	0.013
			[2.81]	[2.94]
Estimation method	OLS	OLS	OLS	OLS
$R^2$	0.51	0.51	0.47	0.47
	N=58	N=58	N=58	N=58

Table 2: Investment on Corruption, Bureaucratic Efficiency Dependent Variable: Investment/GDP (1960-1985 Average)

	[1]	[2]	[3]	[4]
	SKJ	Mauro	SKJ	Mauro
Independent Variables	(2006)	(1995)	(2006)	(1995)
Constant	0.05	0.05	0.012	0.012
	[0.62]	[0.63]	[1.61]	[1.63]
Bureaucratic	0.003	0.003		
efficiency	[2.53]	[2.58]		
Corruption			0.002	0.002
			[1.93]	[1.97]
Estimation method	OLS	OLS	OLS	OLS
$R^2$	0.13	0.13	0.07	0.07
	N=58	N = 58	N=58	N=58

Table 3: Growth on Corruption, Bureaucratic Efficiency Dependent Variable: Per Capita GDP growth (1960-1985 Average)

	[1]	[2]	[3]	[4]
	SKJ	Mauro	SKJ	Mauro
Independent Variables	(2006)	(1995)	(2006)	(1995)
Constant	0.010	0.012	0.017	0.019
	[0.94]	[1.26]	[1.59]	[1.86]
GDP in $1960$	-0.008	-0.008	-0.007	-0.007
	[-4.74]	[-4.87]	[-3.77]	[-3.88]
Secondary	0.011	0.011	0.031	0.031
education in 1960	[0.83]	[0.81]	[2.33]	[2.40]
Population	-0.571	-0.654	-0.341	-0.395
growth	[-2.32]	[-2.85]	[-1.42]	[-1.88]
Bureaucratic	0.006	0.006		
efficiency	[3.08]	[3.09]		
Corruption			0.003	0.003
			[1.93]	[1.91]
Estimation method	OLS	OLS	OLS	OLS
$R^2$	0.38	0.38	0.26	0.27
	N=58	N=58	N=58	N=58

Table 4: Growth on Corruption, Bureaucratic Efficiency Dependent Variable: Per Capita GDP growth (1960-1985 Average)

		[9]	Mauro	(1995)	COR	-0.021	[-0.27]	0.033	[3.04]					ELF				N=57
lcy	ge)	[2]	SKJ	(2006)	COR	-0.037	[-0.51]	0.035	[3.43]	0.038	0.004	[0.015,  0.056]	[0.019,  0.171]	Legal Origins	1.90	0.386	2.60	N=57
ucratic Efficien	50-1985 Avera	[4]	SKJ	(2006)	COR	-0.021	[-0.25]	0.033	[2.86]	0.033	0.003	[0.01,  0.06]	[0.016,  0.12]	ELF			5.91	N=57
n, Burea	GDP (19	[3]	Mauro	(1995)	BE	-0.082	[-0.78]	0.043	[2.84]					ELF				N=57
nt on Corruptio	le: Investment/	[2]	SKJ	(2006)	BE	-0.003	[-0.05]	0.031	[4.17]	0.033	0.003	[0.016,  0.045]	[0.016,  0.066]	Legal Origins	3.581	0.167	4.72	N=57
ble 5: Investme	pendent Variab	[1]	SKJ	(2006)	BE	-0.08	[-0.77]	0.042	[2.80]	0.042	0.003	[0.012,  0.073]	[0.021,  0.288]	ELF			4.72	N=57
Ta	De			Independent Variables		Constant		$eta_{2SLS}$		$\beta_{LIML}$	Corrected P-value	Wald (95%)	$\operatorname{CLR}(95\%)$	Instrument $(s)$	J-stat	P-value	F-stat (first stage)	

	[9]	Mauro	(1995)	COR	0.039	[0.40]	-0.021	[-1.41]	0.017	[0.16]	-1.144	[-1.12]	0.034	[1.56]					ELF				N=57
	2	SKJ	(2006)	COR	-0.19	[0.20]	-0.06	[-0.35]	0.21	[1.05]	-2.60	[-0.39]	0.094	[0.36]	0.441	0.295	[-0.43, 0.62]	$(-\infty,\infty)$	Legal Origins	1.666	0.435	0.04	N=57
iency rage)	[4]	SKJ	(2006)	COR	0.039	[0.42]	-0.021	[-1.23]	0.017	[0.15]	-1.144	[-0.81]	0.034	[1.50]	0.034	0.081	[-0.012, 0.08]	$(-\infty, -0.126] \cup [-0.008, \infty)$	ELF			3.00	N=57
atic Effici 1985 Ave	[3]	Mauro	(1995)	BE	0.036	[0.42]	-0.026	[-1.57]	-0.078	[-0.56]	-2.574	[-1.84]	0.004	[1.76]					ELF				N=57
uption, Bureaucr ent/GDP (1960-	[2]	SKJ	(2006)	BE	0.017	[0.16]	-0.024	[-1.16]	-0.082	[-0.43]	-2.964	[-1.31]	0.048	[1.38]	0.069	0.361	[-0.022, 0.117]	$(-\infty, \infty)$	Legal Origins	1.037	0.596	0.62	N=57
Table 6: Investment on Corr Dependent Variable: Investm	[1]	SKJ	(2006)	BE	0.036	[0.40]	-0.023	[-1.34]	-0.078	[-0.48]	-2.75	[-1.43]	0.044	[1.59]	0.044	0.081	[-0.011, 0.1]	$(-\infty, -0.090] \cup [-0.015, \infty)$	ELF			2.84	N=57
			Independent Variables		Constant		GDP in 1960		Secondary	education in 1960	Population	$\operatorname{growth}$	$\beta_{2SLS}$		$\beta_{LIML}$	Corrected P-value	Wald $(95\%)$	CLR (95%)	Instrument $(s)$	<b>J</b> -stat	P-value	F-stat (first stage)	

	[0]	Mauro	(1995)	COR	-0.034	[-1.33]	0.008	[2.34]					ELF				N=57
	[2]	SKJ	(2006)	COR	-0.009	[-0.43]	0.005	[1.72]	0.007	0.069	[-0.0008, 0.011]	$(-\infty, -0.18] \cup [-0.001, \infty)$	Legal Origins	2.053	0.358	2.60	N=57
tic Efficiency 960-1985 Average	[4]	SKJ	(2006)	COR	-0.023	[-1.16]	0.008	[2.06]	0.008	0.003	[0.0002, 0.017]	[0.003, 0.043]	ELF			5.91	N=57
ureaucrat rowth (19	3	Mauro	(1995)	BE	-0.049	[-1.53]	0.011	[2.33]					ELF				N=57
1 on Corruption, B Per Capita GDP g	[2]	SKJ	(2006)	BE	-0.005	[-0.30]	0.004	[1.92]	0.005	0.08	[-0.0002,  0.0091]	[-0.001, 0.015]	Legal Origins	2.235	0.327	4.72	N=57
Table 7: Growth         andent Variable:	[1]	SKJ	(2006)	BE	-0.049	[-1.34]	0.011	[2.05]	0.011	0.003	[0.0002,  0.021]	[0.004, 0.101]	ELF			4.72	N=57
Depe			Independent Variables		Constant		$eta_{2SLS}$		$\beta_{LIML}$	Corrected P-value	Wald $(95\%)$	CLR (95%)	Instrument $(s)$	J-stat	P-value	F-stat (first stage)	

	[9]	Mauro	(1995)	COR	-0.010	[-0.32]	-0.012	[-2.53]	-0.001	[-0.03]	-0.564	[-1.66]	0.011	[1.49]					ELF				N=57
	[5]	SKJ	(2006)	COR	-0.166	[-0.29]	-0.040	[-0.39]	-0.168	[-0.27]	-1.547	[-0.39]	0.053	[0.35]	0.084	0.17	[-0.25,  0.36]	$(-\infty, \infty)$	Legal Origins	0.266	0.875	0.04	N=57
ency Average)	[4]	SKJ	(2006)	COR	-0.010	[-0.33]	-0.012	[-2.30]	-0.001	[-0.03]	-0.564	[-1.26]	0.011	[1.50]	0.011	0.06	$[-0.004, \ 0.026]$	$(-\infty, -0.05] \cup [-0.001, \infty)$	ELF			3.00	N=57
tic Efficie 960-1985	[]]	Mauro	(1995)	BE	-0.011	[-0.45]	-0.013	[-2.91]	-0.031	[-0.71]	-1.077	[-2.04]	0.014	[1.88]					ELF				N=57
tion, Bureaucra GDP growth (1	[2]	SKJ	(2006)	BE	-0.022	[-0.59]	-0.015	[-2.13]	-0.051	[-0.76]	-1.278	[-1.65]	0.018	[1.50]	0.022	0.19	[-0.004, 0.04]	$(-\infty, \infty)$	Legal Origins	2.165	0.339	0.62	N=57
Table 8: Growth on Corrup endent Variable: Per Capita		SK.J	(2006)	BE	-0.011	[-0.40]	-0.013	[-1.58]	-0.031	[-0.65]	-1.080	[-1.88]	0.014	[1.71]	0.014	0.06	[-0.002, 0.031]	$(-\infty, -0.033] \cup [-0.001, \infty)$	ELF			2.84	N=57
Dep			Independent Variables		Constant		GDP in 1960		Secondary	education in 1960	Population	$\operatorname{growth}$	$eta_{2SLS}$		$\beta_{LIML}$	Corrected P-value	Wald $(95\%)$	CLR (95%)	Instrument $(s)$	J-stat	P-value	F-stat (first stage)	

	Appendix: Investigated Instrument	.8
Religion	Geographical	Other
Atheist	Absolute latitude	Malaria rates
Belief in heaven and hell	Coastal area	Admin. and supreme court judge tenure
Budhist	Elevation	Degree of professionalism of judges and lawyers
Catholic	Land locked	
Christian	Mean temperature	
Hindu	Percent land area in geographical tropics	
Jewish	Percent of population in tropics	
Muslim	Polar coordinates	
Religious pluralism	Poportion of land withing a 100 Km of water	
	Settler mortality rates	
	Soil suitability	
	Subtropics	

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