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Growth without Governance

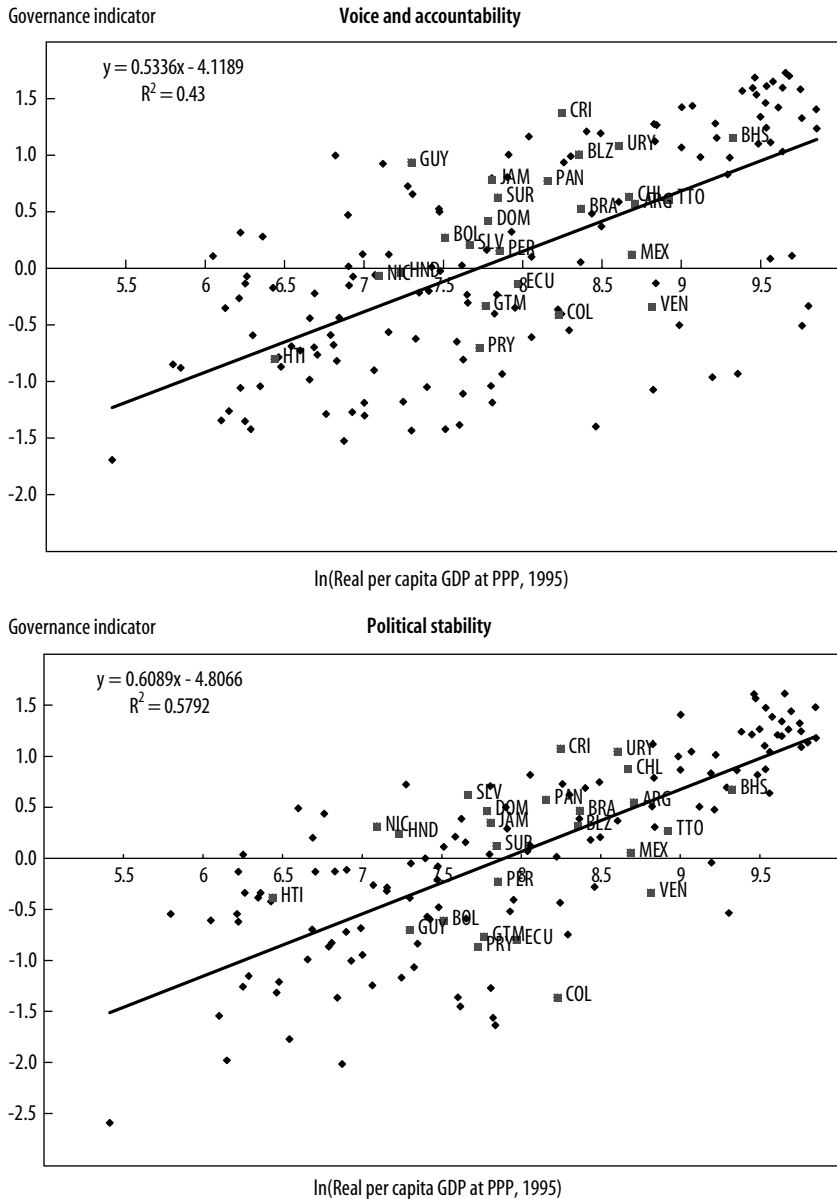
Per capita income and the quality of governance are strongly positively correlated across countries. We propose an empirical strategy that allows us to separate this correlation into two components: a strong positive causal effect running from better governance to higher per capita income and a weak and even negative causal effect running in the opposite direction from per capita income to governance. The first result confirms existing evidence on the importance of good governance for economic development. The second result is new and suggests the absence of virtuous circles in which higher incomes lead to further improvements in governance. This motivates our choice of title, “Growth without Governance.” We document this evidence using a newly updated set of worldwide governance indicators covering 173 countries for the period 2000–01, and we use the results to interpret the relationship between incomes and governance in Latin America and the Caribbean region. Finally, we speculate as to the potential importance of elite influence and state capture in accounting for the surprising negative effects of per capita income on governance, present evidence on such capture in some Latin American countries, and suggest priorities for actions to improve governance when such pernicious elite influence shapes public policy.

The starting point of the paper is the strong positive correlation between various measures of governance and per capita income. Figure 1 plots the relationship between governance (on the vertical axis) and log per capita

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We would like to thank our discussants, Eduardo Lora and Lant Pritchett, as well as Antonio Estache, Joel Hellman, Daniel Lederman, Guillermo Perry, Maurice Schiff, Roberto Steiner, and Jaime Ventura, for helpful comments and Massimo Mastruzzi and Erin Farnand for assistance. The data used in this paper are available at www.worldbank.org/wbi/governance/govdata2001.htm. The views expressed here are the authors', and do not necessarily reflect those of the World Bank, its Executive Directors, or the countries they represent.

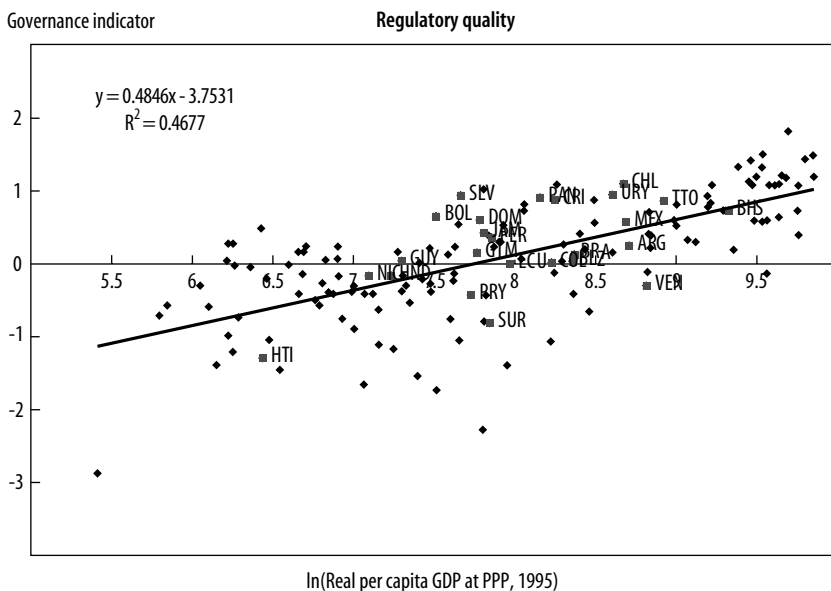
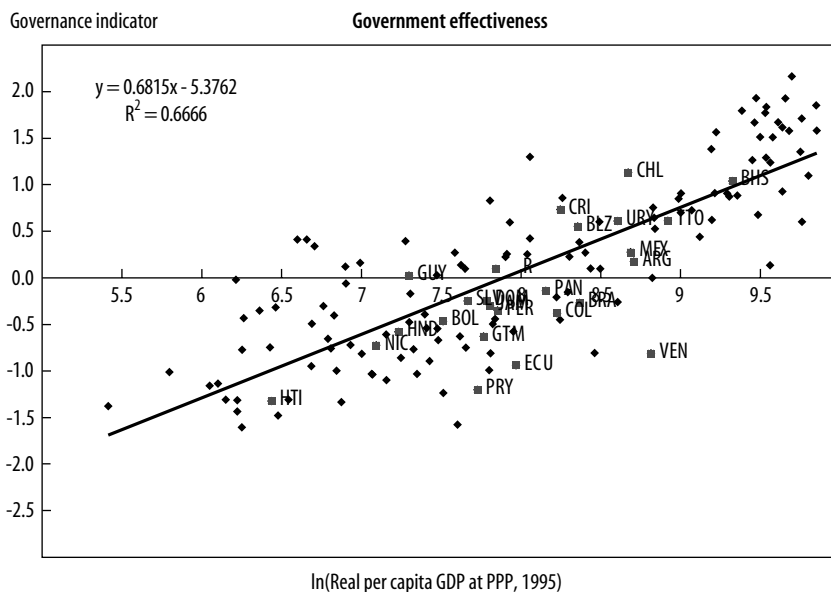
FIGURE 1. Governance and per Capita Incomes in Latin America and the Caribbean^a



Source: Authors' calculations, as described in text.

a. The governance ratings on the vertical axis are based on subjective assessments from a variety of sources and are subject to substantial margins of error; they in no way reflect the official view of the World Bank, its Executive Directors, or the countries they represent.

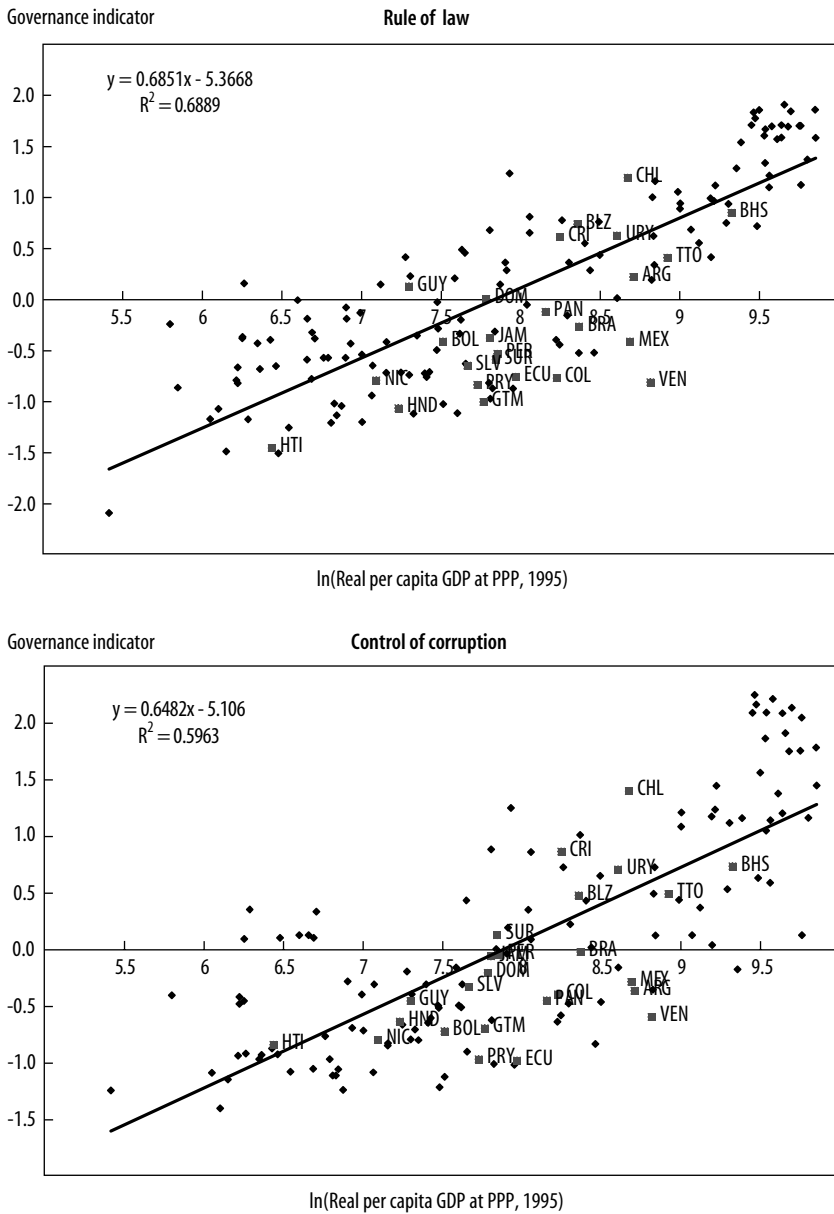
FIGURE 1. Governance and per Capita Incomes in Latin America and the Caribbean^a (continued)



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FIGURE 1. Governance and per Capita Incomes in Latin America and the Caribbean^a (continued)



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income (on the horizontal axis) in a large sample of countries, for six different dimensions of governance. Per capita incomes are measured in 1995, in 1985 U.S. dollars adjusted for differences in purchasing power; the governance indicators refer to the period 2000–01. Since initial incomes in the distant past are not very different across countries, the current dispersion in per capita incomes on the vertical axis reflects differences in growth across countries in the very long run. Figure 1 can thus also be interpreted as illustrating the relationship between growth in the very long run and current institutional quality.

Interestingly, the countries in the Latin American and Caribbean region display striking differences in performance on different measures of institutional quality relative to their per capita incomes. In terms of the institutions of political accountability, countries in Latin America and the Caribbean fare well relative to their per capita incomes, in the sense that a strong majority of countries in the region lie above the simple ordinary least squares (OLS) regression line of the voice and accountability measure on per capita income. In contrast, most countries in the region fare surprisingly poorly on three other dimensions of governance (namely, government effectiveness, rule of law, and control of corruption). Finally, for the last two dimensions of governance that we consider (political stability and regulatory quality), countries in Latin America and the Caribbean are fairly evenly distributed above and below the OLS regression line. Table 1 summarizes these patterns by indicating the proportion of the twenty-six countries in the region for which we have data that fall above and below the regression line. The last column also reports the p value associated with the null hypothesis of a sign test that countries in Latin America and the Caribbean are evenly distributed above and below the regression line for the entire sample. For the first four indicators we mention, the noted patterns are strongly statistically significant at conventional levels, with Latin America and the Caribbean faring well in the first indicator (political accountability), but poorly in the following three (government effectiveness, rule of law, and control of corruption).

This paper provides an interpretation of the strong positive correlation between governance and per capita income shown in figure 1. The following section describes how we constructed the governance indicators for 2000–01 used in figure 1 as part of an ongoing project to measure governance worldwide, drawing on a wide variety of sources of data on perceptions of governance and a consistent aggregation methodology. In addition

TABLE 1. Governance and per Capita Incomes in Latin America and the Caribbean^a
 Number of countries, unless otherwise indicated

<i>Measure of institutional quality</i>	<i>Position relative to OLS regression line</i>		<i>P value</i>
	<i>Below</i>	<i>Above</i>	
Voice and accountability	8	18	0.05
Political stability	11	15	0.43
Government effectiveness	19	7	0.02
Regulatory quality	10	16	0.24
Rule of law	20	6	0.01
Control of corruption	20	6	0.01
Overall governance	16	10	0.24

a. The first two columns summarize the location of countries in Latin America and the Caribbean relative to the regression line in a simple OLS regression of the indicated measure of governance on log per capita GDP at purchasing power parity (PPP) in 1995. The final column reports the *p* value associated with a sign test of the hypothesis that the proportions of countries in Latin America and the Caribbean falling above and below the regression line are equal.

to allowing us to construct a set of governance indicators covering a very large sample of countries, our methodology allows the construction of measures of the precision of these governance indicators. As we have found in previous work, the standard errors associated with estimates of governance are large relative to the units in which governance is measured, suggesting that simple country rankings can be misleading and underscoring the need for caution in making precise comparisons of the quality of governance across countries using this type of data.

The next section turns to an interpretation of the positive correlations between per capita income and governance presented in figure 1. This correlation can, in principle, reflect some combination of (a) causal effects running from better governance to higher per capita income, (b) reverse causation or feedback from higher per capita income to better governance, and (c) omitted variables which improve both governance and per capita income. A recent body of literature identifies large causal effects running from governance to per capita income, using deep historical determinants of institutional quality as instruments. Our contribution is to provide evidence on the feedback from incomes to governance, which is important for a variety of reasons. First, it sheds light on the often-heard argument that good governance is a luxury that only rich countries can afford. More practically, because aid is increasingly allocated based on the quality of governance, understanding the effects of income on governance is important for determining whether poor countries should receive special treatment in such allocation rules. Finally, understanding the extent of

feedback from per capita income to governance is crucial for interpreting the governance performance of countries in Latin America and the Caribbean documented in figure 1.

Despite its importance, this channel of reverse causation has not been subject to much empirical scrutiny, at least partly because the required convincing instruments for per capita income in a cross section of countries are very scarce. Our identification strategy, however, relies not on success in the search for such elusive instruments, but on the use of non-sample information. In particular, we show that the information on the precision or accuracy of our governance indicators and some judicious assumptions regarding the extent of measurement error in per capita income and the importance of omitted variables are sufficient to identify the causal effects running from per capita income to governance.

Based on this empirical strategy, our rather surprising finding in this section is a lack of evidence on a positive effect of incomes on the quality of governance. Using our estimates of the (substantial) imprecision of the governance indicators, we find that the data are consistent with a strong negative feedback from per capita income to governance. The assumptions required to negate such results are unrealistic: the only way that it would be possible to identify positive feedback from per capita income to governance is to assume that either measurement error in governance is implausibly large or, as implausibly, there are important omitted variables are driving per capita income and governance in opposite directions. This finding of negative feedback from incomes to governance implies that without other interventions, higher incomes do not guarantee improved governance.

The empirical framework we use to identify the causal effects running from governance to income and vice versa is designed to capture effects in the very long run. As a result, our finding of negative feedback cannot be interpreted as implying that rapid growth over relatively short periods such as a decade should be associated with declines in governance. Nor can it be interpreted as implying that other shocks that are associated with temporarily higher growth should be associated with a deterioration in governance. Similarly, factors that are good for growth in the long run will not be negatively correlated with institutional quality, since most such variables are likely to have substantial direct positive effects on governance that outweigh any negative feedback effects through income. Finally, the finding of negative feedback from incomes to governance does

not imply a negative unconditional correlation between these two variables, since this correlation is dominated by the strong positive effects of governance on per capita income.

What, then, should we make of this finding of negative feedback? We underscore two implications. The first is rather obvious: negative feedback implies that improvements in institutional quality or governance are unlikely to occur merely as a consequence of economic development. It is important not to exaggerate the conventional wisdom that as countries become richer, higher incomes lead to demands for better institutional quality. The second follows from the first: in the absence of positive feedback, we should not expect to see virtuous circles from higher incomes to better institutions, which in turn support higher incomes in the very long run. This is, perhaps, not too surprising. It is not hard to think of a variety of reasons why entrenched elites in a country benefit from the status quo of misgovernance and can successfully resist demands for change even as incomes rise over very long periods of time. In the last section of the paper, we use recent evidence gathered through detailed governance diagnostic surveys at the country level to cast light on a mechanism through which influential elites can resist demands for improvement in governance—namely, the phenomenon of state capture. We then discuss the implications of this state capture hypothesis for strategies to improve governance.

Measuring Governance

This section summarizes our earlier work, in which we organize a large set of indicators of perceptions of governance into six clusters corresponding to six basic dimensions of governance.¹ We then describe the data sources and explain our methodology for combining the many indicators within each cluster into six aggregate governance indicators.

Governance Clusters

We construct six aggregate governance indicators, motivated by a broad definition of governance as the traditions and institutions by which authority is exercised in a country. This includes the process by which govern-

1. Kaufmann, Kraay, and Zoido-Lobaton (1999a, 1999b, 2002).

ments are selected, monitored, and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them. This classification of indicators into clusters corresponding to this definition of governance is not intended to be definitive. Rather, it reflects our own views of what constitutes a useful and interesting organization of the data that is consistent with prevailing notions of governance.

The first two governance clusters are intended to capture the first part of our definition of governance: the process by which those in authority are selected and replaced. We refer to the first of these as voice and (external) accountability; it includes a number of indicators measuring various aspects of the political process, civil liberties, and political rights. These indicators measure the extent to which citizens of a country are able to participate in the selection of governments. This category also encompasses indicators measuring the independence of the media, which serves an important role in monitoring those in authority and holding them accountable for their actions. The second governance cluster is labeled political stability. This index combines several indicators that measure perceptions of the likelihood that the government in power will be destabilized or overthrown by possibly unconstitutional or violent means, including terrorism. This index captures the idea that the quality of governance in a country is compromised by the likelihood of wrenching changes in government, which not only has a direct effect on the continuity of policies, but also undermines the ability of all citizens to peacefully select and replace those in power.

The next two clusters summarize various indicators of the government's ability to formulate and implement sound policies. In government effectiveness, we combine perceptions of the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies. The main focus of this index is on the inputs required for the government to be able to produce and implement good policies and deliver public goods. The second cluster, which we call regulatory quality, is more focused on the policies themselves. It includes measures of the incidence of market-unfriendly policies such as price controls or inadequate bank supervision, as well as perceptions of the burdens imposed by excessive regulation in areas such as foreign trade and business development.

The last two clusters summarize in broad terms the respect of citizens and the state for the institutions that govern their interactions. In rule of law, we include several indicators that measure the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of both violent and nonviolent crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. Together, these indicators measure a society's success in developing an environment in which fair and predictable rules form the basis for economic and social interactions. The final cluster, control of corruption, measures perceptions of corruption, conventionally defined as the exercise of public power for private gain. Despite this straightforward focus, the particular aspect of corruption measured by the various sources differs somewhat, ranging from the frequency of having to make additional payments to get things done, to the effects of corruption on the business environment, to measuring grand corruption in the political arena or in the tendency of elites to engage in state capture. The presence of corruption is often a manifestation of a lack of respect on the part of both the corrupter (typically a private citizen or firm) and the corrupted (typically a public official) for the rules that govern their interactions. It thus represents a failure of governance according to our definition.

Sources of Governance Data

This section describes the set of governance measures used to construct our six composite governance indicators for 2000–01. We rely on 194 different measures drawn from seventeen different sources of subjective governance data constructed by fifteen different organizations, as listed in table 2. These sources include international organizations, political and business risk rating agencies, think tanks, and nongovernmental organizations.² Four of these sources are included in the 2000–01 index for the first time, and the remaining are updates of sources included in the 1997–98 indicators.³ In this section, we provide an overview of some of the key fea-

2. For access to the full data set of governance indicators, background papers, and detailed explanations on its sources, visit www.worldbank.org/wbi/governance/govdata2001.htm.

3. Two of the sources we consider updates of existing sources are, in fact, new surveys that include questions similar to those in their previous incarnations. These are the World Bank's World Business Environment Survey, which is a follow-up to the 1997 World Development Report Survey, and the Gallup Millennium Survey, which we treat as a follow-up to

T A B L E 2 . Sources of Governance Data, 2000–01

<i>Source</i>	<i>Publication</i>	<i>Code</i>	<i>Type</i>	<i>Country coverage</i>	<i>Representative</i>	<i>New in 2000–01</i>
Business Environment Risk Intelligence	Business Risk Service	BRI	Poll	50		
Columbia University	State Capacity Project	CUD	Poll	109	x	x
Economist Intelligence Unit	Country Risk Service	EUU	Poll	115	x	
European Bank for Reconstruction and Development	Transition Report	EBRD	Poll	26		
Freedom House	Nations in Transition	FHT	Poll	27		
Freedom House	Freedom in the World	FRH	Poll	192	x	
Gallup International	Gallup Millennium Survey	GMS	Survey	60		
Heritage Foundation/Wall Street Journal	Economic Freedom Index	HWJ	Poll	161	x	
Institute for Management and Development	World Competitiveness Yearbook	WCY	Survey	49		
Latinobarómetro	Latinobarómetro Surveys	LBO	Survey	17		x
Political Economic Risk Consultancy	Asia Intelligence	PRC	Survey	14		
Political Risk Services	International Country Risk Guide	PRS	Poll	140	x	
PricewaterhouseCoopers	Opacity Index	PWC	Survey	35		x
Standard and Poor's DRI McGraw-Hill	Country Risk Review	DRI	Poll	111	x	
World Bank	Business Enterprise Environment Survey	BPS	Survey	18		x
World Bank	World Business Environment Survey	WBS	Survey	81	x	
World Economic Forum	Global Competitiveness Report	GCS	Survey	75		

tures of these sources. A previous paper presents a detailed description of each of the sources.⁴

We focus on a set of indicators that measures subjective perceptions regarding the quality of governance across countries. We do not attempt to compile or present the wide array of available quantitative and descriptive data on cross-country differences in political and social institutions.⁵ While these are certainly important determinants of the cross-country differences in the quality of governance, our focus centers on measuring the reporting of various stakeholders—residents of a country, entrepreneurs, foreign investors, and civil society at large—regarding the quality of governance in a country. This kind of data is inherently subjective, but it is useful for at least two reasons. First, for many issues such as the prevalence of corruption, objective data are almost by definition extremely difficult to obtain, and few alternatives to subjective indicators are available for measuring these aspects of governance. Second, perceptions of the quality of governance may often be as important as objective differences in institutions across countries. While a country may nominally enjoy a set of sound institutions according to certain standards, the country's residents must have confidence in these institutions if they are to contribute to good governance.⁶

the Gallup 50th Anniversary Survey included in our previous paper. Sources also overlap somewhat. A portion of the World Bank's Business Environment and Enterprise Performance Survey (BPS, see www.worldbank.org/wbi/governance/beepsinteractive.htm) was used in the World Business Environment Survey; we refer to the former as a distinct source only when we use questions that appear only in that survey. Also, in 1997 we used data from the Global Competitiveness Survey for Africa as a separate source. In 2000, with the exception of the questions on state capture for transition economies, its questionnaire coincided with that of the World Business Environment Survey, so we include it in the latter source. Finally, one source we used in 1997–98 is no longer published (Central European Economic Review), so that we are unable to update this source.

4. Kaufmann, Kraay, and Zoido-Lobaton (2002, appendix 1).

5. See for example Beck and others (2001) for a compilation of objective indicators of political systems across countries.

6. In this context, it is noteworthy that nowadays almost every country in the world has adequate anticorruption legislation, yet the actual variation in corruption control across countries is enormous. The debatable conceptual soundness of many of the supposedly objective governance measures being advanced is another weakness. It is unclear, for instance, whether a high number of jailed criminals per capita indicates a high or low level of rule of law (Russia and the United States are tied for first place in this indicator). This contrasts with subjective indicators emerging from polls of experts and surveys, in which the questions are a priori designed to capture the normative range between a bad and a good outcome.

We distinguish sources according to (1) whether they are polls of experts or surveys of businesspeople or citizens in general and (2) the extent to which the sample of countries included in the sources is representative of the world as a whole.⁷ These two types of sources of governance data have their advantages and disadvantages. The main advantage of polls of experts is that they are explicitly designed for cross-country comparability, and considerable effort is placed in the benchmarking process that ensures this. The difficulties with such measures are also clear, however. They are typically based on the opinions of only a few experts per country, and the quality of the country ratings depends to a great extent on the knowledge of experts regarding the countries they are assessing. The ratings are particularly prone to two types of feedback: countries with good economic outcomes may be more likely to receive favorable ratings, and country rankings by other organizations are frequently included as an input into the rating process of each organization. Country ratings may also be affected by the political or ideological agenda of the organization producing the ratings. Despite these difficulties, there are at least two reasons to think that, on average, such sources provide valuable information on governance. First, the indicators produced by such organizations generally correlate strongly with measures based on surveys of residents and entrepreneurs. Second, the fact that commercial rating organizations are consistently able to sell their assessments to commercial subscribers for considerable fees suggests that these sources are producing useful information.

The main advantage of surveys is that they reflect the opinions of a larger number of respondents who are more closely connected with the countries they are assessing. Nevertheless, they suffer from two disadvantages. First, survey questions can be interpreted in context- or culture-specific ways. For example, a response regarding the prevalence of “improper practices” is colored by country-specific perceptions of what is improper. This will hinder the cross-country comparability of responses to

7. In the 1997–98 version of the governance database, our sources consisted of eight polls of experts and seven surveys, and five of our sources were classified as representative. In the 2000–01 version, we have added two new surveys—namely, the World Bank’s Business Environment and Enterprise Performance Survey of firms in transition economies (BPS) and Latinobarómetro (LBO), a private survey conducted in seventeen Latin American countries—and two new polls of experts—the Columbia University State Capacity Study, covering 109 countries worldwide, and the PricewaterhouseCoopers Opacity Index, covering thirty-five countries.

otherwise identical questions. Second, cross-country surveys relating to governance are very costly to design and implement, and as a result they typically cover a much smaller set of countries than polls of experts.

Sources of governance data also vary with respect to the sample of countries they cover. A number of sources cover a very large sample of developed and developing countries, while in others the sample of countries is very narrowly focused. Furthermore, many of the poorest and smallest countries in the world are not covered by commercially oriented polls because they are relatively unattractive to foreign investors. Since there is a strong positive association across countries between governance and per capita income, this difference between sources makes it difficult to compare indicators from sources that cover sets of countries with very different income levels. Similarly, regional differences in governance may hamper comparisons across sources. For example, it is not clear how to compare a governance rating based only on transition economies with one based on a broad set of countries. As discussed in a previous paper, the methodology we use to construct aggregate governance indicators takes these differences in country coverage into account, as the data from individual sources are transformed into common units for aggregation across sources.⁸ This results in a set of aggregate governance indicators covering a very large cross section of countries, ranging from 159 to 173 depending on the measure of governance.

Aggregation Methodology

Implicit in our organization of the data is the view that within each cluster, the indicators measure a similar underlying basic concept of governance. Combining these related indicators into an aggregate governance indicator for each cluster offers considerable benefits. First, the aggregate indicators span a much larger set of countries than any individual source, permitting comparisons of governance across a broader set of countries than would be possible using any single source. Second, aggregate indicators can provide more precise measures of governance than individual indicators. Third, it is possible to construct quantitative measures of the precision of both the aggregate governance estimates for each country and their components. This allows formal testing of hypotheses regarding cross-country differences in governance. We also use the information on

8. Kaufmann, Kraay, and Zoido-Lobaton (1999a).

the precision of the governance indicators to help identify the effects of income on governance, as discussed in the following section.

For each cluster, we combine the component indicators into an aggregate governance indicator using the same methodology with which we calculated our first set of indicators.⁹ We use an extension of the standard unobserved components model, which expresses the observed data in each cluster as a linear function of the unobserved common component of governance, plus a disturbance term capturing perception errors and sampling variation in each indicator.¹⁰ In particular, we assume that we can write the observed score of country j on indicator k , $y(j, k)$, as a linear function of unobserved governance, $g(j)$, and a disturbance term, $\varepsilon(j, k)$, as follows:

$$(1) \quad y(j, k) = \alpha(k) + \beta(k) \cdot (g(j) + \varepsilon(j, k)),$$

where $\alpha(k)$ and $\beta(k)$ are unknown parameters that map unobserved governance, $g(j)$, into the observed data, $y(j, k)$. As a choice of units, we assume that $g(j)$ is a random variable with mean zero and variance one. We further assume that the error term has zero mean and a variance that is the same across countries, but differs across indicators, that is, $E[\varepsilon(j, k)^2] = \sigma_\varepsilon^2(k)$.

The disturbance term, $\varepsilon(j, k)$, captures two sources of uncertainty in the relationship between true governance and the observed indicators. First, the particular aspect of governance covered by indicator k is imperfectly measured in each country, reflecting either perception errors on the part of experts (in the case of polls of experts) or sampling variation (in the case of surveys of citizens or entrepreneurs). Second, the relationship between the particular concept measured by indicator k and the corresponding broader aspect of governance may be imperfect. For example, even if the particular aspect of graft covered by some indicator k (such as the prevalence of improper practices) is perfectly measured, it may be a noisy indicator of graft if countries exhibit differences in the perceived nature of improper practices. Both of these sources of uncertainty are reflected in the indicator-specific variance of the error term, $\sigma_\varepsilon^2(k)$.

Given estimates of the model's parameters, $\alpha(k)$, $\beta(k)$, and $\sigma_\varepsilon^2(k)$, we can compute estimates of governance for each country, as well as

9. This methodology is documented in detail in Kaufmann, Kraay, and Zoido-Lobaton (1999a).

10. Unobserved components models were pioneered in economics by Goldberger (1972); the closely related hierarchical and empirical Bayes models in statistics were developed by Efron and Morris (1971, 1972).

measures of the precision of these estimates. Formally, the estimate of governance for a country produced by the unobserved components model is the mean of the distribution of unobserved governance conditional on the $K(j)$ observed data points for that country. This conditional mean is the following weighted average of appropriately rescaled scores of each of the component indicators:

$$(2) \quad E[g(j) | y(j,1), \dots, y(j, K(j))] = \sum_{k=1}^{K(j)} w(k) \cdot \frac{y(j,k) - \alpha(k)}{\beta(k)},$$

where the weights applied to each source k ,

$$w(k) = \frac{\sigma_{\varepsilon}(k)^{-2}}{1 + \sum_{k=1}^{K(j)} \sigma_{\varepsilon}(k)^{-2}},$$

are inversely proportional to the variance of the error term of that source. We also report the standard deviation of this conditional distribution as an indicator of the confidence we can have in this estimate, which is

$$(3) \quad SD[g(j) | y(j,1), \dots, y(j, K(j))] = \left(1 + \sum_{k=1}^{K(j)} \sigma_{\varepsilon}(k)^{-2} \right)^{-\frac{1}{2}}.$$

This standard deviation is declining in the number of individual indicators in which a particular country appears, and it is increasing in the variance of the disturbance term on each of these indicators.

The assumptions of the unobserved components model ensure that the distribution of governance in each country is normal, conditional on the data for that country. Therefore, these conditional means and standard deviations for each country have a natural interpretation. For example, a useful interpretation of the reported estimates and standard deviations for each country is to note that there is a 90 percent probability that the “true” level of governance in a country is in an interval of plus or minus 1.64 times the reported standard deviation centered on the point estimate itself. We refer to such a range as a 90 percent confidence interval around the estimate of governance for a country.¹¹

11. This is a slight abuse of terminology, since these are not confidence intervals in the usual frequentist sense of a stochastically varying interval centered around a fixed unknown parameter. Rather, we treat governance as a random variable, and the 90 percent confidence

Implementing this approach requires estimates of all the unknown survey-specific parameters, $\alpha(k)$, $\beta(k)$, and $\sigma_{\varepsilon}^2(k)$. We do this in a two-stage procedure. First, we assume that governance and the error terms in equation 1 are jointly normally distributed, and we apply maximum likelihood methods using only the representative sources to retrieve the parameters of interest for each governance cluster. This is nothing more than a standard application of the unobserved components model. We cannot, however, include our many nonrepresentative sources in the first stage of the estimation procedure, because the distribution of unobserved governance in the subset of countries covered by these surveys is unlikely to be the same as that for the world as a whole, causing the maximum likelihood procedure to break down. Instead, in the second stage we use the initial governance estimates obtained from the representative sources as an observable proxy for governance. We obtain the parameters of interest for the nonrepresentative sources by regressing these indicators on observable governance, that is, by directly estimating equation 1.¹² We then use all the estimated parameters of the unobserved components model to construct a final set of governance estimates.

Our choice of units for governance ensures that the estimates of governance have a mean of zero and a standard deviation of one.¹³ Since we adopt the same choice of units for governance in each period, the indicators are not informative about a worldwide average trend in governance, although they are informative about how countries' relative positions change over time. The aggregate indicators are oriented such that higher values correspond to better governance outcomes. The point estimates of governance, the estimated standard errors, and the number of sources by country for each of six governance indicators in 2000–01 are available at www.worldbank.org/wbi/governance/govdata2001.htm. For reference, the corresponding information for the 1997–98 indicators is reported, as well.

interval is simply the fifth and ninety-fifth percentiles of the conditional distribution of governance given the observed data.

12. To get consistent estimates of the parameters of the nonrepresentative sources, we need to adjust for attenuation bias caused by the fact that our observable proxy for governance is a noisy indicator of true governance. Fortunately, we can use the information on the standard errors associated with the governance estimates obtained in the first stage to do this.

13. Since the estimates of governance are normally distributed, this implies that the vast majority of observations will fall between -2.5 and 2.5 .

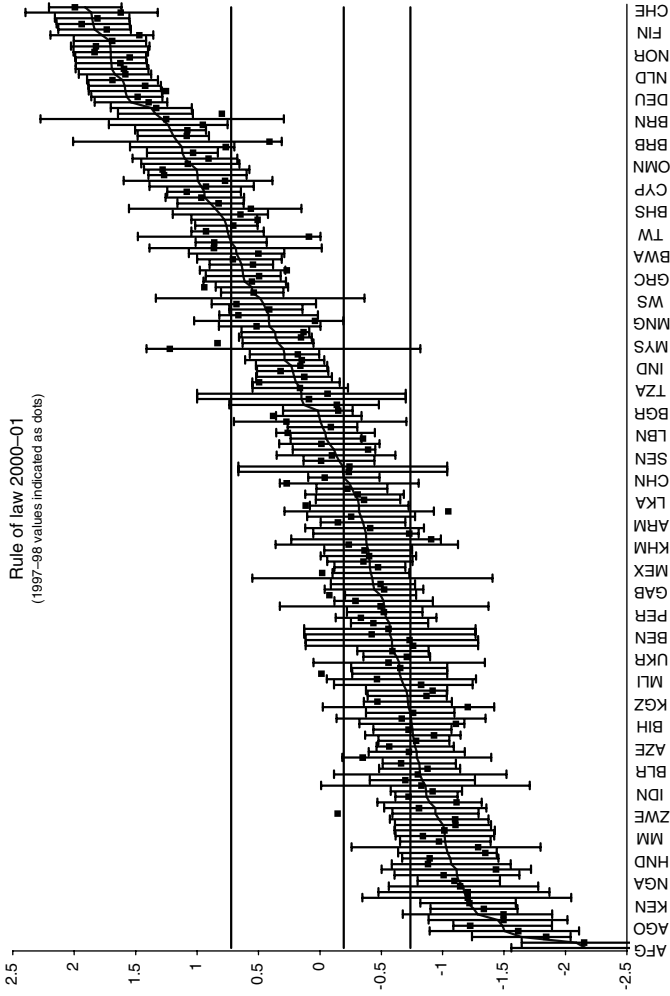
As emphasized in our previous work, we find that the six dimensions of governance are not very precisely measured, in the sense that the measured standard deviations are large relative to the units in which governance is measured. Figure 2 illustrates this point using the rule of law indicator. We list countries in ascending order according to their point estimates of governance on the horizontal axis, and on the vertical axis we plot the governance estimate and the associated 90 percent confidence interval described above. The size of the confidence intervals varies across countries, as different countries appear in different numbers of sources with different variances. The resulting confidence intervals are large relative to the units in which governance is measured. To emphasize this point, the horizontal lines in figure 2 delineate the quartiles of the distribution of governance estimates. While the differences between countries in the bottom and top quartiles are significant, relatively few countries have 90 percent confidence intervals that lie entirely within a given quartile.

It is clear from the figure that many of the small differences in governance estimates across countries are not likely to be statistically significant. For many applications, therefore, it is more useful to focus on the range of possible governance values for each country (as summarized in the 90 percent confidence intervals shown in figure 2) rather than merely observing the point estimates. The differences in governance are clearly significant between two countries that lie at opposite ends of the governance scale and whose 90 percent confidence intervals do not overlap. One should be much more circumspect about the significance of estimated differences in governance between two countries that lie closer together and whose 90 percent confidence intervals overlap (which can also be seen in figure 2). The same is true for changes over time in the governance indicator. To illustrate this, figure 2 also plots the 1997–98 estimate for each country (as a solid dot). For most countries, the 90 percent confidence interval around the 2000–01 score also encompasses the governance estimate for 1997–98. This emphasizes that many (though not all) of the changes over time in our governance indicators over this very short term are unlikely to be statistically significant at conventional levels.

In a recent paper, we provide a more detailed analysis of the sources of the changes over time in our governance indicators.¹⁴ Mechanically, changes over time in the governance indicators are due to a combination

14. Kaufmann, Kraay, and Zoido-Lobaton (2002).

FIGURE 2. Imprecision of Governance Estimates*



Source: Authors' calculations, as described in text.

a. This graph shows estimates of the indicated dimension of governance (on the vertical axis) for all countries for which data are available (on the horizontal axis) for 2000-01. The vertical bars show the statistically likely range of values of governance for each country, with the midpoint of each bar corresponding to the best single estimate. The length of these bars varies with the amount of information available for each country and the extent to which information from different sources corresponds with each other. Estimates of governance for 1997-98 are indicated as dots. Selected countries are indicated on the horizontal axis. As emphasized in the text, the ranking of countries along the horizontal axis is subject to significant margins of error, and this ordering in no way reflects the official view of the World Bank, its Executive Directors, or the countries they represent.

of three factors: changes in governance perceptions as reported by the individual underlying sources; changes in the weights that the aggregation procedure assigns to the individual underlying sources; and changes in the set of underlying sources used to construct the aggregate governance indicators. For four of our six indicators, we find that changes in the country ratings of underlying sources account for more than three-quarters of the variance in changes over time in observed governance. However, for the rule of law and control of corruption indicators, we find that roughly half of the variance of changes over time stems from changes in weights assigned by the aggregation procedure, as well as from changes over time in the available sources for individual countries. This points to a further reason for caution in interpreting changes over time in these governance indicators.

Causation from Governance to Income and from Income to Governance

In this section, we present an empirical framework that allows us to identify causal effects running in both directions between governance and per capita income. A rapidly growing literature identifies the causation from better governance to higher per capita income. Our contribution here is to propose a strategy of using nonsample information to identify causation in the opposite direction, from per capita income to governance. When we implement this strategy, we find no evidence of positive feedback from higher per capita income to better governance outcomes, unless we make rather implausible assumptions on this nonsample information.

Identifying Causal Effects

Several papers identify the causal effects running from better governance to higher per capita income in the very long run, using instrumental variables (IV) regressions on a cross section of countries.¹⁵ Underlying all these papers is the following empirical model:

$$(4) \quad y_j = \alpha + \beta \cdot g_j + e_j,$$

15. Hall and Jones (1999); Kaufmann, Kraay, and Zoido-Lobato (1999b); Acemoglu, Johnson, and Robinson (2001); Easterly and Levine (2002).

$$(5) \quad g_j = \mu + \gamma \cdot y_j + \delta \cdot x_j + v_j,$$

$$(6) \quad y_j^* = y_j + w_j, \text{ and}$$

$$(7) \quad g_j^* = g_j + u_j.$$

Equation 4 says that log per capita income, y , depends on governance, g , and other factors outside this very parsimonious specification, e . Under the assumptions that initial incomes in the distant past are not too different across countries and that governance does not change too much over time (so that current observed levels of governance are a reasonable proxy for their “initial” values), equation 4 can be interpreted as capturing the effects of governance on growth in the very long run.

Equation 5 says that governance depends on incomes, some other observed variable, x , and other factors outside the model, v . The dependence of governance on incomes could be interpreted as reflecting a demand for better formal institutions in richer and more complex environments. Institutional quality also depends on a variety of other factors included in x ; as discussed below, cross-country variation in such variables allows identification of the effects of governance on incomes in equation 4. Finally, equations 6 and 7 simply state that observed income, y^* , and observed governance, g^* , are noisy measures of actual income and governance, with measurement error w and u , respectively.

To complete the description of the model, we assume that the disturbances have zero mean and variances σ_i^2 , $i = e, v, u, w$. We also assume that measurement error is classical in the sense that w and u are uncorrelated with e , v , and x . We also assume that the omitted variables in equation 5 are uncorrelated with x , but they may be correlated with the omitted variables in equation 4, that is, $E[e \cdot v] = \rho \cdot \sigma_e \cdot \sigma_v$. This captures the possibility that there may be other variables outside the simple model that affect both governance and per capita income. Finally, we assume that the error term in equation 4 is uncorrelated with x , which allows us to use x as an instrument to estimate equation 4.

Existing papers focus primarily on finding the magnitude of the effect of governance on per capita income, that is, β . This can be done by estimating equation 4 by instrumental variables, using x as an instrument. The search for good instruments has led many researchers in the direction of deep historical determinants of institutions. For example, Acemoglu,

Johnson, and Robinson use settler mortality in the eighteenth and nineteenth centuries as instruments, arguing that colonial powers had weak incentives to establish the institutions of good governance in colonies where a permanent European presence was unlikely to take root.¹⁶ This is essentially a nuanced interpretation of the simple instruments for colonial origin proposed by Hall and Jones.¹⁷ Another strand of the literature emphasizes the importance of natural resource endowments in determining the development of good institutions, and Easterly and Levine provide a recent cross-country empirical implementation of this view.¹⁸

In view of the popularity of such historically motivated instruments, we often use the shorthand of referring to x as “history.” These papers go to considerable lengths to justify the assumption that x is a valid instrument in the sense that it is strongly correlated with governance and is uncorrelated with the error term in equation 4. We do not repeat their arguments here, but simply proceed under the assumption that this is a reasonable instrumentation strategy. We refer the reader to these other papers for details.

Our contribution in this section is to focus on equation 5, which tells us about the feedback from higher incomes to better governance, g . This is obviously relevant for policy. For example, when allocating aid, should multilaterals give poor countries a misgovernance discount, based, in part, on the quality of their institutions? Does development itself bring about improvements in governance without direct interventions to help build institutions? More crudely, is good governance a luxury that only richer countries can afford? Finally, identifying g is useful because it allows us to understand the relative importance of history versus income in determining observed levels of governance today.

In principle, one can estimate equation 5 given a suitable instrument, that is, a variable that belongs in equation 4 but not in equation 5. This is hard to do in practice, however, since it is difficult to identify very convincing instruments for income, that is, variables that are correlated with income but have no effects on governance other than through their effects on income. Many of the likely deep determinants of long-run cross-country income differences, such as favorable geographical location,

16. Acemoglu, Johnson, and Robinson (2001).

17. Hall and Jones (1999).

18. Engerman and Sokoloff (1997, in this volume); Easterly and Levine (2002).

good natural resource endowments, temperate climates, or colonial history, plausibly exert a direct effect on institutional quality as well, disqualifying such variables as instruments in this application.

Instead of searching for instruments for income, we adopt the other (but less commonly used) textbook solution to the problem of identification: namely, the use of nonsample information. To identify the effects of income on governance, that is, γ in equation 5, we need to come up with three pieces of nonsample information—the variance of measurement error in incomes and governance (σ_v^2 and σ_u^2), and the correlation between the error terms in equations 4 and 5, ρ . As we discuss below, our assumptions about measurement error in per capita income will not matter much for the results. This means that we only need to come up with two additional pieces of information in order to identify the model in equations 4 through 7. Our strategy is to use our estimates of the standard errors associated with the governance indicators to pin down the measurement error in governance, and then to consider a range of plausible values for the correlation between the error terms in the two structural equations. With these two nonsample pieces of information in hand, we have a system of equations linking the parameters of the model with the observed sample moments in the data, which we can solve for the remaining parameters of interest.¹⁹ We provide details of the identification procedure in the appendix.

To develop some intuitions for the role of our assumptions about these two key parameters, we note that all the papers mentioned above find that the instrumented estimates of the effects of governance on per capita income in equation 4 are larger than the OLS estimates of the same equation. With some manipulation of equations 4 through 7, one can show that this implies that

$$(8) \quad \gamma + \rho \cdot \frac{\sigma_v}{\sigma_e} < \beta \cdot (1 - \gamma \cdot \beta) \cdot \left(\frac{\sigma_u}{\sigma_e} \right).$$

Suppose that there is no measurement error in governance, that is, $\sigma_u = 0$, so that the right-hand side of equations 8 is zero. Then the only way there can be positive feedback from incomes to governance, that is, $\gamma > 0$,

19. Both Hall and Jones (1999) and Acemoglu, Johnson, and Robinson (2001) use the difference between their OLS and IV estimates to make inferences about the importance of measurement error in governance. Since we have direct estimates of this measurement error, we can go one step further and use this information to estimate the feedback from per capita income to governance.

is if there are omitted variables in equations 4 and 5 that move income and governance in opposite directions, that is, $\rho < 0$.

In the absence of such variables, the only other way that there can be positive feedback from incomes to governance is if there is substantial measurement error in governance, $\sigma_u > 0$. In this case, the IV estimates are larger than the OLS estimates simply because they are eliminating the usual attenuation bias caused by measurement error in the dependent variable.²⁰ The key question is whether there is enough measurement error in the data to allow for the possibility of positive feedback from per capita income to governance, that is, $\gamma > 0$. We investigate this question in the remainder of this section.

Results

To implement this exercise, we begin by estimating equation 4. We measure per capita income using real per capita gross domestic product (GDP) from the Summers and Heston Penn World Tables, version 5.6, which we extend into the 1990s using constant local currency growth rates.²¹ We measure governance using the rule of law index discussed in the previous section. We focus on this particular dimension of governance for two reasons. First, it corresponds most closely to the concept of protection of property rights that has been widely used in this literature. Second, as discussed in the introduction, this is one of the dimensions of governance for which simple OLS regressions suggest that countries in Latin America appear to do relatively poorly given their per capita incomes. Since rule of law is highly correlated with both corruption and government effectiveness, we can view this one dimension of governance as representative of the broader areas in which the quality of governance appears relatively poor in Latin America and the Caribbean.

Our preferred instrument for governance is the settler mortality measure introduced by Acemoglu, Johnson, and Robinson.²² While it is only available for sixty-eight countries, empirically it is strongly correlated with both tropical location (as measured by distance from the equator) and colonial origins (as measured by the fractions of the population speaking English or a major European language). To expand the size of the sample,

20. Throughout, we assume that the stability condition, $\gamma \cdot \beta < 1$, holds.

21. Heston and Summers (1991).

22. Acemoglu, Johnson, and Robinson (2001).

we use these last three variables to impute the missing values of settler mortality for all of the countries for which we have data on per capita income and governance. This results in a sample of 153 countries for which we have data on y , g , and x . We do, however, obtain similar results if we restrict attention to the smaller sample of sixty-eight countries for which the original settler mortality instrument is available, or if we use the linguistic origins variables directly as instruments, as do Hall and Jones.²³

Table 3 reports the OLS and IV estimates of equation 4, together with the corresponding first-stage regression of governance on the instrument. Consistent with the existing literature discussed above, we find a strong causal effect running from governance to per capita income. The estimated coefficient of 1.37 implies that a one-standard-deviation improvement in the governance measure raises per capita income nearly fourfold in the very long run. We also find the same phenomenon in the literature, in which the instrumented estimate of the coefficient on per capita income is substantially larger than the OLS estimate of 0.999.²⁴

Although this paper focuses on the rule of law indicator, the pattern of substantially larger IV estimates relative to their OLS counterparts consistently holds across all six governance indicators. Table 4 reports the OLS and IV estimates of the slope coefficient in equation 4, using the five other measures of governance and the same settler mortality variable as an instrument. Since we do not have distinct instruments for each of the six dimensions of governance, we cannot interpret the results in tables 3 and 4 as capturing the partial effects of each of these variables. However, to the extent that each of these is a proxy for some broad notion of governance, these estimates can be interpreted as providing a range of estimates of the effect of governance broadly construed on per capita income in the very long run. We return to this point in more detail below.

23. Hall and Jones (1999).

24. Interestingly, the bivariate scatterplot of rule of law against log per capita income visually suggests a nonlinear effect of governance on per capita income, with a weaker effect (that is, a lower slope) in poor countries than in rich countries. While this is qualitatively true, we did not find this nonlinearity to be statistically significant. Moreover, given our pattern of IV estimates that are larger than OLS estimates, and given the weaker performance of the instrument in the first-stage regression for the poorest half of the sample, we also cannot discount the possibility that the difference in slopes in the two samples is simply driven by the problem of weak instruments (which would bias the IV estimates toward the OLS estimates in the poor country sample).

TABLE 3. Regression Results^a

<i>Regressor</i>	<i>OLS</i>	<i>IV</i>	<i>First-stage</i>
Intercept	7.867 (0.051)	7.845 (0.058)	2.445 (0.284)
Governance (rule of law)	0.999 (0.055)	1.370 (0.095)	
Imputed settler mortality			-0.547 (0.064)
Standard deviation (residual)	0.630	0.820	0.741
<i>Summary statistic</i>			
No. observations	153	153	153
R^2	0.69	0.69	0.37

a. This table summarizes the results of estimating equation 4 by OLS and IV (columns 1 and 2) and the corresponding first-stage regression (column 3). The dependent variable in the OLS and IV estimations is $\ln(\text{per capita GDP})$; in the first-stage regression it is governance. Standard errors are in parentheses.

Figure 3 plots the estimated effects of governance on per capita income (in the top panel) and the first-stage regression (in the bottom panel), with countries in Latin America and the Caribbean highlighted and labeled. When considering this causal channel from governance to per capita income, the striking feature among the Latin American and Caribbean countries is that the majority of them lie above the instrumented regression line. In fact, we find only six out of twenty-six countries below the regression line (namely, Chile, Uruguay, Belize, Costa Rica, Guyana, and the Dominican Republic). One interpretation of this is that most countries in Latin America and the Caribbean have been surprisingly successful in raising living standards without the benefit of good governance. A less optimistic interpretation is that the (relatively) high income levels observed in many countries in Latin America and the Caribbean are inherently fragile because they are unsupported by sound institutions.²⁵

The bottom panel of figure 3 illustrates where countries in Latin America and the Caribbean fall in the first-stage regression of governance on

25. This interpretation is consistent with both anecdotal and more systematic evidence that countries that are hit by large adverse shocks suffer disproportionately more if the quality of their institutions is poor. See, for example, Johnson and others (2000), who argue that declines in asset prices during the Asian crisis were larger in countries with weak corporate governance. More systematically, Rodrik (1999) shows that countries lacking institutions to manage social conflict suffered deeper declines in output in response to the oil shocks of the 1970s.

TABLE 4. Regression Results Using Other Dimensions of Governance^a

<i>Regressor</i>	<i>OLS</i>	<i>IV</i>	<i>No. observations</i>
Voice and accountability	0.806 (0.074)	1.495 (0.151)	158
Political stability	0.951 (0.068)	1.546 (0.156)	146
Government effectiveness	0.978 (0.058)	1.389 (0.121)	144
Regulatory quality	0.966 (0.084)	2.242 (0.301)	152
Control of corruption	0.920 (0.063)	1.412 (0.139)	145

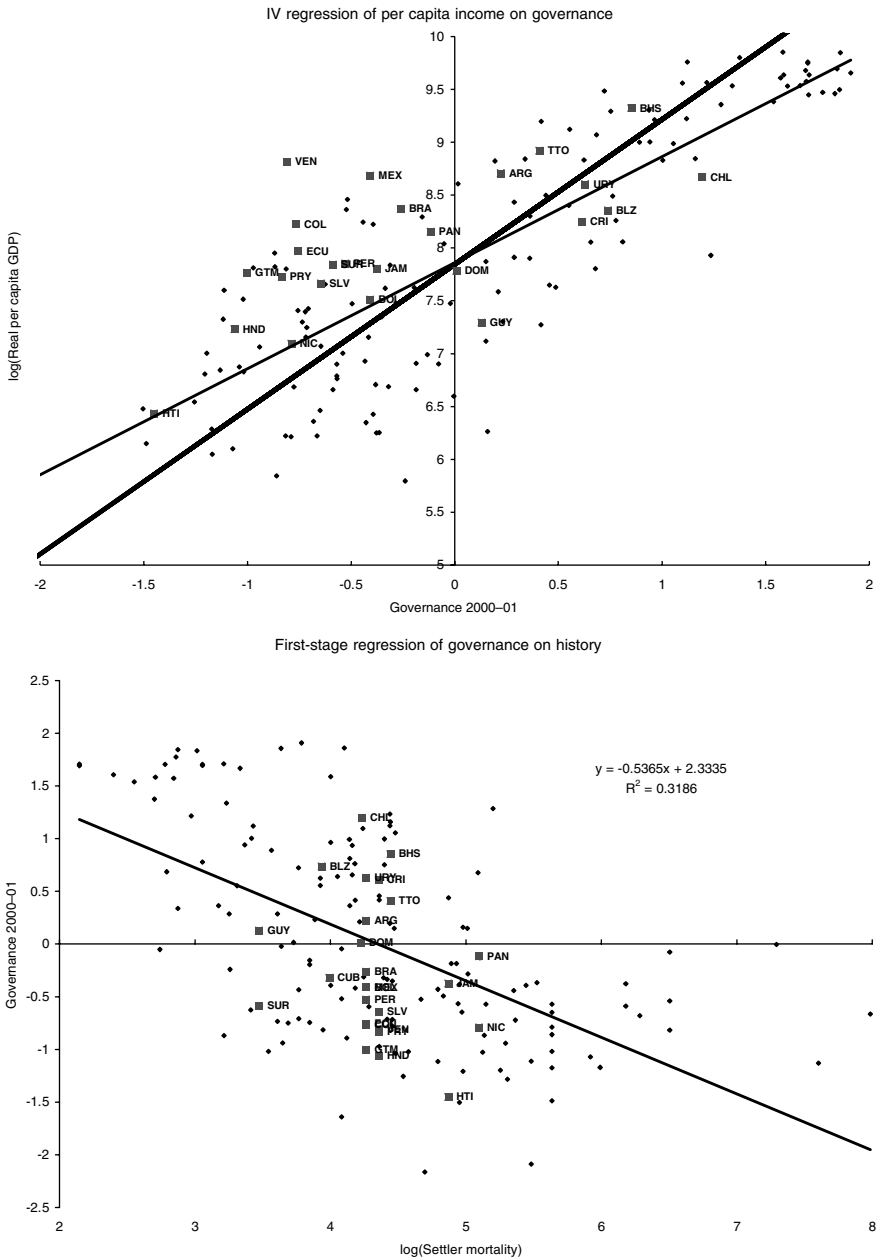
a. This table summarizes the results of estimating equation 4 by OLS and IV for five other dimensions of governance. For reasons of space, only the estimated slope coefficients and the number of observations are reported. The dependent variable is ln(per capita GDP). Standard errors are in parentheses.

“history.” Countries in the region are clustered surprisingly tightly around the middle of the distribution of (in some cases imputed) settler mortality. Only four countries stand out as having particularly inhospitable climates for settlers—Jamaica, Haiti, Panama, and Nicaragua. Moreover, countries in Latin America and the Caribbean are scattered quite evenly above and below the first-stage regression line, suggesting that the effect of history on current institutions is not significantly different in Latin America and the Caribbean relative to the rest of the world. Taken together, these two observations suggest that “bad history” alone cannot account for the relatively low rule of law ratings for countries in Latin America and the Caribbean that we noted in the introduction.²⁶

We now turn to our estimates of equation 5, which captures the reverse causation from income to governance, as well as the effects of history on governance. Our estimates of the parameters of equation 5 depend on our assumptions about the three additional pieces of nonsample information required to identify this equation. Our results are not at all sensitive to our

26. For the region as a whole, this low explanatory power of history as a determinant of misgovernance is plausible, given that these countries attained independence almost two centuries ago and on the whole the colonizers did not exert the same destructive institutional influence as in other settings (such as certain parts of Africa). The contrasting cases of Argentina and Chile offer a poignant illustration of the limits of history in explaining the quality of governance today: these neighboring countries share historical, cultural, location, climatic, and linguistic commonalities, but they have taken widely divergent paths in terms of institutional quality.

FIGURE 3. Causal Effects of Governance on per Capita Incomes^a



Source: Authors' calculations, as described in text.

a. The bold and solid lines in the top panel represent the IV and OLS regression lines, respectively. The governance ratings are based on subjective assessments from a variety of sources and are subject to substantial margins of error; they in no way reflect the official view of the World Bank, its Executive Directors, or the countries they represent.

assumptions about the variance of measurement error in per capita income. We therefore just assume that $\sigma_w = 0.2$, which implies that a 95 percent confidence interval for per capita income of a country runs from 50 percent to 150 percent of observed income. Given the difficulties in measuring GDP and purchasing power parity adjustments, this does not seem to be an implausible estimate of the extent of measurement error in this variable.

In contrast, our estimates of the effects of income on governance depend a great deal on our assumptions about measurement error in governance, σ_u , and the correlation between the error terms in equations 4 and 5, ρ . Table 5 presents the range of estimates of the parameters of equation 5 that we obtain, for a range of values for σ_u and ρ . In the top panel, we set $\rho = 0$ and consider a range of values of measurement error in governance. In the bottom panel, we fix the measurement error in governance and consider a range of values for ρ .

We use the information in the standard errors of the rule of law index described in the previous section to anchor the range of estimates for measurement error in governance. In particular, we begin with a value of $\sigma_u = 0.27$, which is the average across countries of the standard errors obtained from the unobserved components model used to construct the aggregate governance indicator. This captures the extent to which the governance measure is a noisy indicator of the true rule of law within a country. As we discussed in the previous section, these estimated standard errors are already large relative to the units in which rule of law is measured.

We then consider several higher values up to a maximum of $\sigma_u = 0.54$, or twice the initial level. One way to rationalize substantially higher measurement error such as this is to note that good rule of law is just one of many dimensions of good governance or institutional quality. Thus the extent to which rule of law is itself an imperfect indicator of broader notions of good governance that matter for economic growth in the very long run can also be thought of as measurement error. A rough way to calibrate the importance of this type of measurement error is to consider the simple correlations, r , of the rule of law indicator with the other five dimensions of governance discussed in the previous section, which range from $r = 0.76$ (voice and accountability) to $r = 0.93$ (government effectiveness), and average $r = 0.85$ across all governance components. Under the assumption that each of these indicators is a noisy measure of the

TABLE 5. Identifying the Effects of Income on Governance

Estimated parameter	Value assigned to σ_u ($\rho = 0$)						
	0.27	0.30	0.35	0.40	0.45	0.50	0.54
γ	-1.28	-1.15	-0.90	-0.62	-0.29	0.07	0.39
δ	-1.51	-1.41	-1.22	-1.01	-0.77	-0.49	-0.25
σ_v	1.68	1.56	1.35	1.10	0.81	0.49	0.21
	Value assigned to ρ ($\sigma_u = 0.27$)						
	-0.20	-0.10	0.00	0.10	0.20		
γ	-0.48	-0.78	-1.28	-2.27	-5.32		
δ	-0.90	-1.14	-1.51	-2.25	-4.54		
σ_v	1.03	1.27	1.68	2.51	5.14		

a. This table reports estimates of the effect of per capita incomes and history on governance (γ and δ , respectively), and the variance of the error term in equation 5 (σ_v), for the indicated assumptions on measurement error in governance (σ_u) and the correlation between the errors in equations 4 and 5 (ρ).

broadest possible concept of good governance, a straightforward calculation shows that σ_u ranges from 0.27 to 0.48 under this interpretation.²⁷

For the benchmark level of measurement error of $\sigma_u = 0.27$ (based on the actual rule of law standard errors discussed above), we find that income has a surprisingly large negative effect on governance, with a coefficient of -1.28 . This implies that an exogenous doubling of per capita income in the very long run leads to an estimated decline in governance of $-1.28 \times 0.7 = -0.90$, or nearly one standard deviation of the governance index. Moving across the columns in table 5 shows that the estimated feedback from per capita income to governance is positive only if the measurement error in governance is very high, for values of $\sigma_u \geq 0.50$. In addition, as measurement error in governance becomes larger, the effects of history on current institutions, δ , becomes smaller in absolute value and the variance in the error term in equation 5 becomes smaller. The lower panel of table 5 shows the effects of assumptions regarding the correlation

27. Suppose that $g_i^* = g + u_i$, $i = 1, \dots, N$ are N noisy indicators of g , with $E[u_i] = 0$, $E[u_i^2] = \sigma_u^2$, and $E[u_i \cdot u_j] = 0$ for all i and j . Then the correlation between any two indicators is $r_{ij} = \frac{\sigma_g^2}{\sigma_g^2 + \sigma_u^2}$. One minus the minimum and maximum correlation across all pairs i and j provide upper and lower bounds, respectively, on the ratio of the variance of measurement error relative to the variance of the observed variable, $\frac{\sigma_u^2}{\sigma_g^2 + \sigma_u^2}$.

between the error terms in equations 4 and 5. The larger is this correlation (as it moves from negative to positive values), the smaller (more negative) is the estimated magnitude of the reverse causation from income to governance, and the larger (in absolute value) are the effects of history and the variance of the error term.

The main message from table 5 is that measurement error in governance needs to be implausibly large to admit the possibility of positive feedback from per capita income to governance. We have already pointed to the basic intuition for this result in the discussion of equation 8 above. In the absence of measurement error in governance, the substantially larger IV estimates of equation 4 relative to the OLS estimates must reflect the fact that the instrument is either removing negative feedback from per capita income to governance or removing the effect of omitted variables that are uncorrelated with the instrument but that move governance and per capita income in opposite directions.

Table 5 adds to this basic intuition the quantitative observation that for all but very high assumptions regarding measurement error in governance, the attenuation bias in the OLS estimates is insufficient to rule out negative feedback from per capita income to governance. In fact, the only way to get positive feedback from per capita income to governance is to assume either that measurement error in governance is very large or that there are some omitted variables that move governance and income strongly in opposite directions—and it is hard to think of plausible candidates for such omitted variables. Otherwise, this very standard empirical model, together with the data we use, is inconsistent with the notion that there is positive feedback from per capita income to governance. Rather, the model suggests that feedback from incomes to governance is, if anything, negative.

The estimates of the other two parameters of equation 5—namely, the effects of history on governance and the variance of the residual—also have interesting interpretations. Note first that the direct effects of history on governance in equation 5 are smaller the larger we assume measurement error in governance to be. The reason for this is as follows. As measurement error in governance becomes larger, the estimated feedback from per capita income to governance becomes less negative. If this feedback effect were to become positive and large, better values of the history variable only need to have small effects in order to trigger a very powerful virtuous circle of better governance leading to higher incomes leading to better governance. Therefore, the coefficient on the history variable in

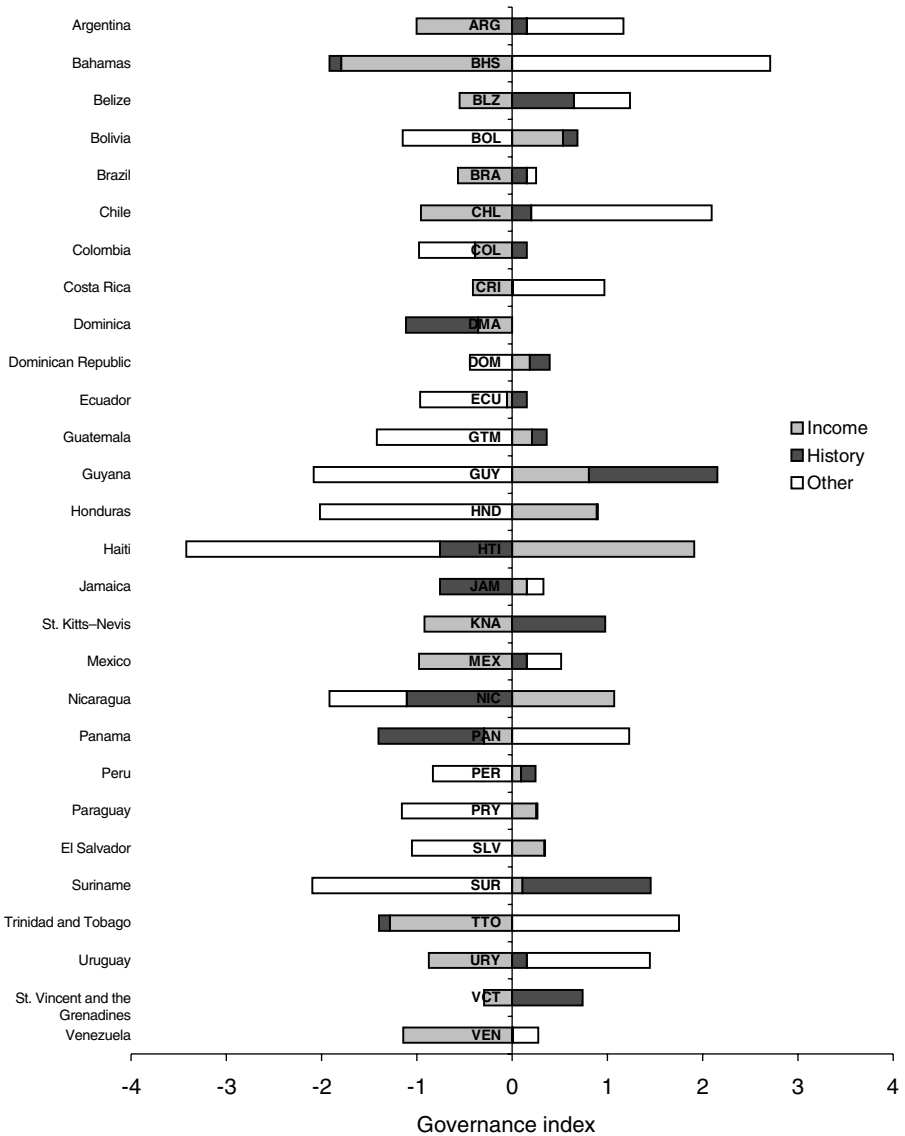
equation 5 would not need to be very large to match the observed correlation between history and per capita income today. In contrast, if measurement error in governance is small and feedback from incomes to governance is negative, then history needs to exert a large direct effect on governance in the absence of such virtuous circles.

Table 5 also shows that if we assume measurement error in governance to be very large, the variance of the error term in equation 5 becomes small. This is because we choose this parameter to match the observed fit of the first-stage regression of governance on history. If we assume that there is very large measurement error in the dependent variable (governance) in equation 5, then the only way we can match the good fit of the first-stage regression is if the variances of the errors in the two structural equations are small. Thus, if we assume that measurement error in governance is unrealistically very large, our estimates of equation 5 indicate that most of the variation in governance is accounted for by only two variables—income and history. For more reasonable values of measurement error in governance, income and history play a smaller role in understanding cross-country differences in governance.

Figure 4 more systematically illustrates the relative importance of income, history, and other factors in determining institutions for the countries in Latin America and the Caribbean, under the benchmark assumption that $\sigma_u = 0.27$. Consider first the importance of history. As already shown in figure 3, the Latin American and Caribbean countries all fall close to the mean of the world distribution of the history instrument. The contribution of history to deviations between governance in Latin America and the Caribbean and the rest of the world is therefore small. In contrast, the effects of income on institutions in Latin America and the Caribbean are large in absolute value for all countries. Given our finding of negative feedback, the contribution of income levels to governance tends to be positive in the poorer countries and negative in the richer countries of the region. Finally, under the realistic benchmark assumption of the measurement error in governance, we find a substantial unexplained component of governance in Latin America and the Caribbean, which is roughly evenly dispersed between positive and negative values.

This means that the fact that countries in Latin America and the Caribbean tend to fall below the OLS regression line of per capita income on rule of law (as discussed in the introduction) should not necessarily be interpreted as evidence that governance in the region is surprisingly bad

FIGURE 4. Determinants of Governance in Latin America and the Caribbean^a



Source: Authors' calculations, as described in text.

a. The governance ratings on the vertical axis are based on subjective assessments from a variety of sources and are subject to substantial margins of error; they in no way reflect the official view of the World Bank, its Executive Directors, or the countries they represent.

given its income levels. In fact, once we take into account the negative effect of incomes on governance, as well as the (small) effects of history, countries in Latin America and the Caribbean do not appear to have systematically good or bad governance relative to their income levels. Only if we assume that measurement error in governance is very large do we find sufficient evidence of positive feedback from per capita income to governance to justify the idea that governance in Latin America and the Caribbean is systematically worse than would be expected given its income levels.

Interpreting Negative Feedback from Incomes to Governance

The remainder of this section discusses and interprets the rather surprising finding of negative feedback from incomes to governance. Our first point is that the negative or zero feedback result is quite robust, in the sense that the degree of measurement error required to overturn it is very large indeed. For instance, if σ_u were equal to its high-end value of 0.54, then the 90 percent confidence intervals for governance would be twice as large as those shown in figure 2 (based on actual data). These confidence intervals based on the high-end value are so large as to make the aggregate rule of law indicator virtually meaningless: they imply that rule of law in Mexico (which ranks near the middle of countries in Latin America and the Caribbean) is not statistically significantly different from that in either Haiti (the country with the lowest score in the region) or Chile (the country with the highest score). Since we do think that the country rankings in the governance indicators are informative, we find this degree of measurement error to be implausibly high.

Even if we took the broader interpretation of measurement error, in which rule of law itself is only a proxy for more general notions of institutional quality, we would still be forced to the conclusion that our rule of law index is virtually uninformative about cross-country differences in broader conceptions of governance—a conclusion we find extreme. Finally, if—as is plausible—there are omitted variables in equations 4 and 5 that drive income and governance in the same direction, then the measurement errors would have to be even larger than the high-end ones suggested above in order to find positive feedback from per capita income to governance. All of these factors suggest that the extent of measurement

error required to deliver positive feedback from per capita income to governance is implausibly large.

Our second point is that our cross-sectional empirical framework of levels of income and governance is designed to capture the interactions between these variables in the very long run. This means that our finding of negative feedback does not have a short-run time-series interpretation along the lines of “rapid growth in country *X* over the next five years is likely to worsen governance.” Nor does our finding of negative feedback imply a negative unconditional cross-sectional correlation between incomes and governance. After all, the observed positive cross-sectional correlation between levels of incomes and governance is dominated by the strong causal effects of governance on per capita income in the very long run. Rather, our finding of negative feedback says that we should only expect to find a negative partial correlation (controlling for history) between governance and purely exogenous factors associated with higher income levels in a cross section of countries.

This, however, brings us to our third point: it is difficult to observe direct evidence of this negative feedback in the form of some variable that is correlated positively with incomes and negatively with governance in a cross section of countries. This is because it is difficult to find convincing examples of purely exogenous variables that would affect incomes and growth in the long run but have no direct effects on institutional quality, such that their correlation with governance would purely reflect the negative feedback. In fact, were such variables (affecting incomes but not governance) to exist, they would be natural instruments for directly identifying the effects of per capita income on governance in equation 5. But again, convincing instruments for income levels in a cross section of countries are scarce, and this is what motivates our indirect approach to identifying feedback from income to governance. It is more likely that variables that matter for income levels in the long run (such as favorable geographical location, political stability, natural resource abundance, and enlightened policymaking) are also positively correlated with institutional quality through a variety of other mechanisms. As long as these direct effects are sufficiently large, it will not be possible to observe a negative correlation between these variables and governance driven by the indirect negative feedback that we have identified. Thus while our negative feedback result is quite robust, it is also difficult to observe directly in the form

of a positive cross-sectional correlation between some variable and income and a negative correlation between that same variable and institutional quality.

How, then, should we interpret this finding of negative feedback? First, negative feedback implies that improvements in institutional quality or governance are unlikely to occur merely as a consequence of economic development. As countries become richer, higher incomes do not necessarily lead to demands for better institutional quality, despite conventional wisdom to the contrary. In fact, just the opposite might occur. As long as the established elites within a country reap private benefits from the status quo of low-quality institutions, there is little reason to expect that higher incomes will lead to demands for better governance. The phenomena of crony capitalism in East Asia, of elite influence, cronyism, and regulatory capture in Latin America, and of state capture in transition economies provide vivid examples of the conflict between the interests of the elite and the need for better institutional quality.

Second, negative feedback is an indication of the absence of virtuous circles from higher incomes to better institutions which in turn support higher incomes in the very long run. Consequently, small interventions to improve institutional quality are unlikely to make much difference in the long run. Together, these two implications point to the urgency of improving governance in countries where it is weak. But cross-country analysis such as this provides neither guidance as to how this should be done nor possible explanations of results such as the negative feedback presented above. In the last section of this paper, we draw on experience with governance diagnostics within selected countries in Latin America to address both issues.

Improving Governance

The first result of this paper—that governance matters significantly for growth in the very long run—is not new, and it validates earlier such findings. The second result, however, is new. It suggests that improvements in governance will not occur automatically as the development process unfolds; no virtuous circle will suddenly begin to operate. These results suggest that interventions to improve governance are warranted. Unfortunately, however, the cross-country evidence presented thus far is not very

informative for policymakers intent on formulating and implementing specific strategies to improve governance in their countries.

In the past few years, the World Bank has designed and implemented detailed country diagnostic surveys that provide insights and help identify specific actions to improve governance. These governance and anticorruption diagnostics rely on in-depth, country-specific surveys of thousands of public-service users, firms, and public officials, in order to gather specific information about institutional vulnerabilities within a country. These separate surveys permit triangulation and consistency checks for the results across respondent categories, while probing in more detail into a broad array of governance issues within countries. So far, the surveys have been applied to a score of countries worldwide.²⁸

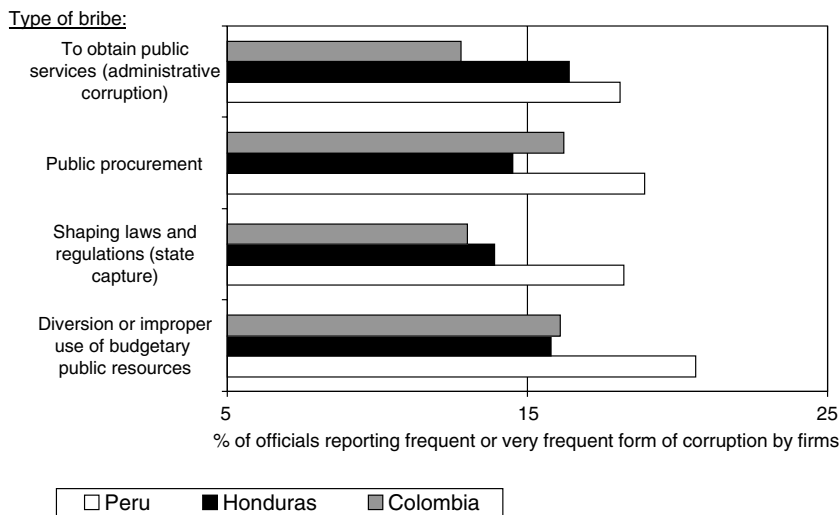
One of the innovations in these surveys has been their emphasis on unbundling governance and corruption into more specific dimensions. This has helped to highlight the causes, consequences, and costs of various forms of misgovernance, and it has shown how institutional quality can vary widely across institutions within a particular country.²⁹ The results from three recent country governance studies in Latin America are indicative of the multiple dimensions of corruption worldwide. Figure 5 summarizes evidence from Colombia, Honduras, and Peru on the prevalence of four distinct dimensions of corruption: the frequency of bribery in obtaining services, in public procurement, in the budget process, and in shaping the formation of the policy, legal, and regulatory framework.

This section focuses on the last form of corruption, which we call state capture. State capture is defined as the undue and illicit influence of the elite in shaping the laws, policies, and regulations of the state. In its emphasis on the formulation and shaping of state laws and regulations, state capture departs from the conventional view of corruption, which cen-

28. For details on governance diagnostic instruments and country reports, visit www.worldbank.org/wbi/governance/tools.htm.

29. These in-depth diagnostics, which complement insights from the composite governance indicators presented in earlier sections, can provide specific inputs for action programs at the country level by (i) unbundling governance and corruption into more detailed and specific dimensions and assessing the relative importance and prevalence of the unbundled components; (ii) assessing the quality of governance and performance of the key institutions within the country; (iii) assessing the costs of various forms of misgovernance (such as through the link to poverty or to the quality and extent of service delivery); (iv) identifying the most important factors affecting governance and performance (such as external versus internal accountability mechanisms, as well as issues of undue influence by the elite and state capture); and (v) identifying priorities for action (based on the above items).

FIGURE 5. Prevalence of Different Forms of Corruption in Colombia, Honduras, and Peru^a



Source: World Bank Institute (2001).

a. The graph shows the percent of public officials rating the indicated forms of bribery as being frequent or very frequent, based on a survey of public officials carried out in 2001.

ters on how bribery is used to influence the implementation of such laws and regulations. Recent research has identified state capture as a fundamental governance challenge in many transition economies, and emerging evidence from Latin America suggests the importance of capture in this region, as well.³⁰

State Capture

A possible explanation for the negative feedback from per capita income to governance is the phenomenon of state capture. If the fruits of income growth largely accrue to an elite that benefits from misgovernance, then any possible positive impact of income growth on governance could be offset by the effect of the elite’s negative influence. The recent in-depth

30. For details on recent research on state capture, see Hellman and others (2000); Hellman, Jones, and Kaufmann (2001); www.worldbank.org/wbi/governance/wp-statecapture.htm.

empirical research on transition economies finds that state capture is pervasive in many of these countries. Yet state capture clearly is not unique to this region in the past decade. Many other countries have gone through periods of illicit influence by powerful elites in their past; the influence of the so-called robber barons in the United States at the turn of the twentieth century is one such illustration. Other research focuses on crony capitalism in the Philippines under Marcos and on Mexico during the long era of dominance by the Partido Revolucionario Institucional (PRI).³¹ Such cronyism is often a somewhat subtler form of the coarse manifestations of capture by oligarchs found in the early years of transition to a market economy in the former Soviet Union, but nevertheless it is indicative of serious governance failures in the interface between the private and public sectors. Even the recent spate of scandals associated with lax regulatory and legislative oversight in the accounting practices by influential firms in the United States suggests yet another variant of this private-public misgovernance nexus.

The Business Environment and Enterprise Performance Survey (BPS) carried out in 1999 in twenty-four post-socialist economies provides insights on the phenomenon of state capture.³² This survey measured state capture by asking firms about the prevalence of illicit private “purchases” of laws, decrees, and regulations by firms, and about the impact of such purchases by other firms on their own enterprise. The survey measured not only the conventional types of bureaucratic and administrative corruption related to the implementation of the laws and regulations, but also undue and illegal influence in shaping such laws and regulations. The results from the BPS survey point to a high prevalence of state capture in transition economies. In countries such as Moldova, Russia, Ukraine, and Azerbaijan, well over 30 percent of the firms reported that they had been

31. See Haber (2001).

32. The Business Environment and Enterprise Performance Survey (BPS), developed jointly by the World Bank and the European Bank for Reconstruction and Development (EBRD), is a survey of over 4,000 firms in twenty-four transition countries carried out in 1999–2000, examining a wide range of interactions between firms and the state. Based on face-to-face interviews with firm managers and owners, BPS was designed to generate comparative measurements *inter alia* on corruption, state capture, lobbying, rule of law, and the quality of the business environment, which was then related via statistical analysis to specific firm characteristics and firm performance. For details, visit info.worldbank.org/governance/beeps/.

significantly (or very significantly) affected by the prevalence of state capture in their industry.³³

The econometric results based on this large multi-country enterprise survey indicated that captor firms (which engage in illicit activities to shape the state laws and regulations) do, in fact, derive very large benefits from such strategies. Captor firms exhibited much higher output and investment growth than their noncaptor counterparts, controlling for other factors. In contrast, firms that were coerced into paying bribes for administrative corruption derived little private benefit from these bribes. Yet while the captor firms benefit in terms of growth from their private purchase of policies, regulations, and law and order, public provision of rule of law is further undermined by these capture strategies. Indeed, the statistical evidence suggests that public protection of property rights for the overall enterprise sector was substantially lower in countries in which capture was prevalent. This evidence suggests a pattern in which the large private benefits derived from capture provide an insidious built-in incentive for the persistence of such capture, as the growing economic might of powerful captor firms supports even more capture and further deteriorations in overall governance.³⁴

Do similar patterns apply to Latin American countries? In contrast with the work already undertaken in transition economies, a comprehensive cross-country empirical investigation of the phenomenon of state capture has yet to be undertaken in the Latin American region, though it is part of the upcoming research agenda. At this stage, the empirical evidence is of a select nature; it is mainly derived from the recent country governance diagnostics in a small number of countries in the region. The results of these diagnostics suggest that the challenge of state capture is also present in Latin America.

The emerging results from diagnostics in Colombia, Honduras, and Peru point to capture by influential forces outside the state as a major gov-

33. The empirical analysis of this issue was made possible thanks to the BPS survey design. Yet the notion of state capture was far from alien for the media and politicians. One notable illustration was the statement by Russian President Vladimir Putin in his opening remarks to a roundtable of twenty-one top Russian companies and banks: "I only want to draw your attention to the fact that you have yourselves formed this very state, to a large extent through political and quasi-political structures under your control. So what you should do least of all is blame the mirror" (president.kremlin.ru/text/APPTemplAppearId10623.shtml [July 2000]).

34. Hellman, Jones, and Kaufmann (2001).

ernance challenge. Further details on the particular forms of state capture can be found in the responses of public officials and enterprise managers. For example, figure 6 summarizes results for Colombia and Peru as reported by the public officials survey, with enterprise managers reporting similar results independently (not shown). Both enterprises and public officials consistently point to pervasive capture of legal and judiciary institutions. In Peru, survey data collected in early 2001 indicated that powerful groups outside the public sector had an undue influence in shaping the policies, laws, and regulations of the state.

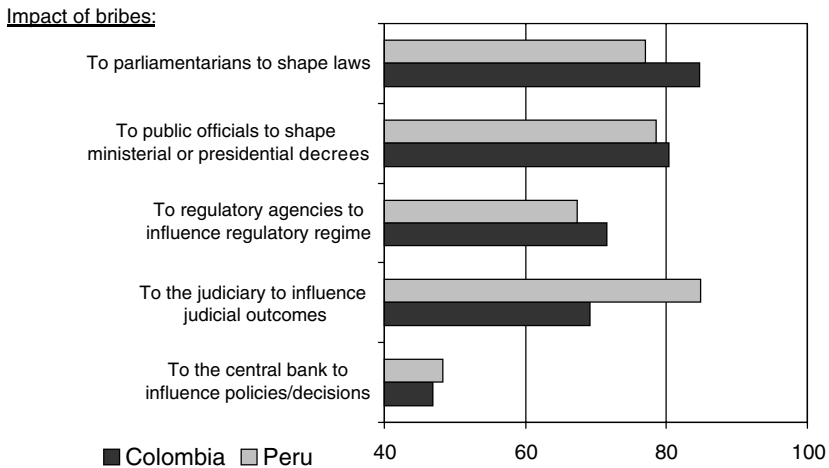
This incipient empirical evidence from some countries in Latin America, as well as the empirical results from other regions, permits us to speculate as to the role of capture in explaining the “growth-without-governance” puzzle. To the extent that state capture is important, higher incomes may be appropriated by the monopolistic captors or elites. This, in turn, can lead to additional demand for private purchase of laws and regulations ensuring the continued dominance of the elite. The net effect is to erode overall governance, particularly the public protection of property rights, the incidence of corruption, and, more broadly, rule of law.

This increasing demand for capture in a situation of economic growth may be further abetted by the fact that the *à la carte* supply of laws, regulations, and policies offered by politicians to powerful elites is less likely to be subject to checks and balances in such an environment. The widespread complacency about governance in economies with good performance contributes to relatively lax internal and external pressures to improve governance. This was the case in Indonesia under Suharto throughout the 1980s and much of the 1990s, but Indonesia is not alone. Argentina in the 1990s is another extreme illustration, while Mexico during the previous captured political era of crony capitalism serves as a more nuanced example.³⁵ Russia during different historical periods is also telling, as are the recent events related to major failures in corporate governance and regulatory oversight of very powerful U.S. companies.

Thus far, the links between state capture and the negative feedback between incomes and governance that we have documented are of a speculative nature, and they call for further research. As data become available on the degree of capture by elite interests in a large number of countries in

35. Haber (2001); Haber, Maurer, and Razo (2001). For a general treatment of the negative implications of crony capitalism for growth, see Krueger (2001).

FIGURE 6. Extent of State Capture in Colombia and Peru^a



% of firms reporting high impact of type of corruption or capture on business environment

Source: World Bank Institute (2001).

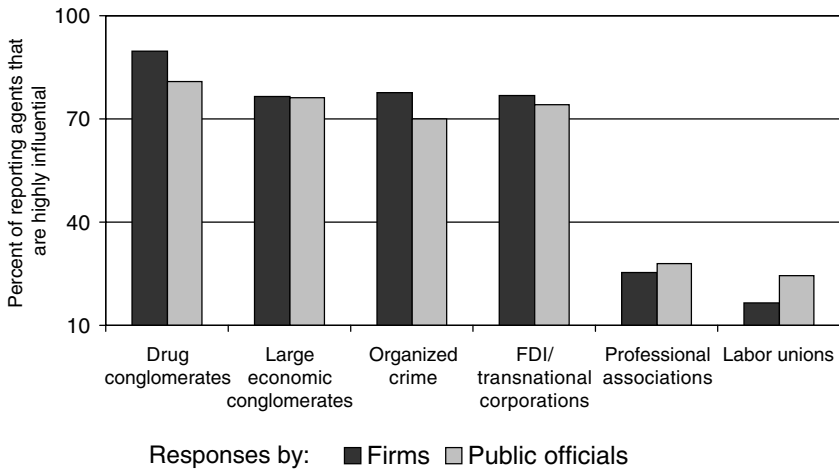
a. The graph reports the percentage of firms reporting a high impact of the indicated form of bribery on the business environment, based on a survey of firms carried out in 2001.

Latin America and other nontransition regions, it will be possible to put this preliminary hypothesis through further empirical tests. In particular, it will be possible to empirically investigate the socioeconomic costs of various dimensions of capture in Latin America, as has already been done among transition economies.³⁶

Implications for Reform

At a general level of strategy design, the empirical analysis of the governance diagnostics provides important country-specific inputs for action and reform. In many countries, these surveys have highlighted the variety of forms of corruption and identified institutions afflicted by misgovernance and in which corruption is particularly pervasive. Given the promi-

36. The media in Latin America are increasingly taking up the issue of state capture, as has been the case for years now in the former Soviet states. See, for instance, the editorial entitled “El Estado Capturado” in the leading Colombian newspaper, *El Tiempo*, 21 February 2002.

FIGURE 7. Sources of Undue Private Influence on the State in Peru^a

Source: World Bank Institute (2001).

a. The graph reports the fraction of respondents rating the indicated agents as being highly influential on the state, based on a survey of firms and public officials carried out in 2001.

nence we ascribe to state capture and related forms of influence by the elite in providing a plausible explanation of why growth may not translate into improved governance, then, strategies to improve governance and combat corruption ought to specifically address such undue influence and capture. This implies a strategy that departs from conventional public sector reform, which typically focuses on the internal management and functioning within government. The research on state capture for transition economies, as well as analysis of governance diagnostics in some Latin American countries, points to the importance of voice and external accountability mechanisms, of political contestability, and of transparency reforms (including media freedom, disclosure of votes by parliamentarians, declaration of assets by politicians, and regular monitoring through surveys and report cards). This necessitates a move toward collective-action modalities, including not only selected agencies in the executive, but reform throughout, including the parliament, civil society, and the private sector.³⁷

37. While the involvement of nongovernmental organizations and related civil society segments as agents to improve governance has become more prominent in recent years, the

Similar lessons emerge from an earlier governance diagnostic survey carried out in Bolivia, where over 1,200 public officials working in over one hundred public agencies were interviewed in depth on diverse dimensions of institutional performance and governance vulnerabilities. Figure 8 shows the relationship across government agencies in Bolivia between the reported prevalence of administrative forms of bribery (as well as state capture manifestations) (the vertical axis) and three possible reform dimensions (the horizontal axis): (i) transparency (with regard to budgets, personnel management, and administration); (ii) the existence of citizen feedback mechanisms (which are acted on by the agency); and (iii) their reported employee satisfaction with regard to pecuniary and non-pecuniary compensation. Each of these three possible reform dimensions is depicted in one of the panels in figure 8 on the horizontal axis.

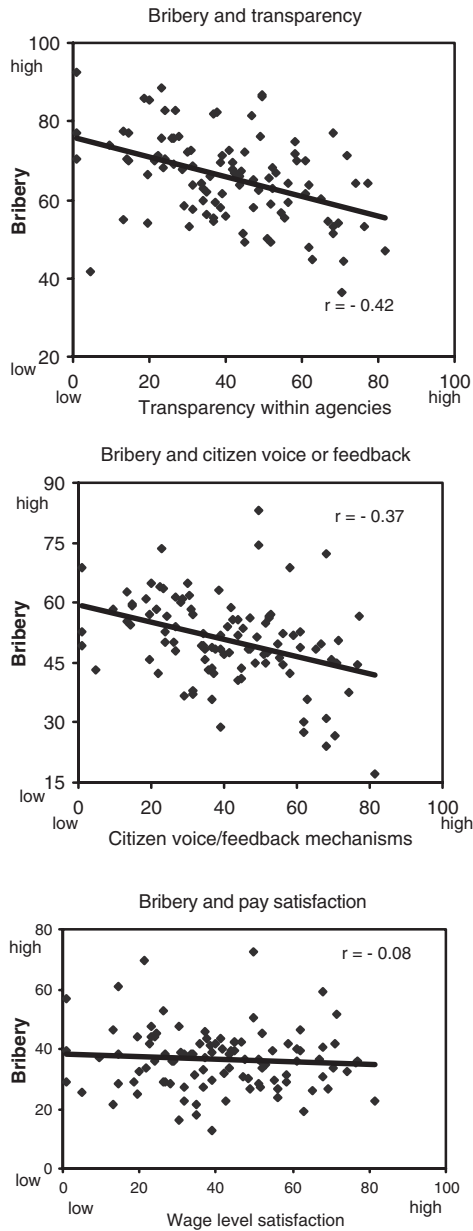
The first two panels show a clear association between transparency and external feedback mechanisms, on the one hand, and corruption (including state capture), on the other, controlling for other factors. In contrast, there is little if any association between the public officials' response on their perceived satisfaction with their pay and bribery or capture. While the structural relationship between determinants of corruption and capture and such governance outcomes is likely to vary across countries (as demonstrated by evidence emerging from different governance diagnostics), this type of evidence casts doubt on the traditional public sector management approach to anticorruption, which tends to focus uniformly on issues of pay and internal monitoring and supervision. Rather, these findings point to the importance of open access to information and effective external monitoring (inter alia through providing "voice" to the public service users) as an important factor in reducing corruption, improving governance, and mitigating state capture.³⁸

In sum, countries in Latin America and the Caribbean urgently need strategies to improve governance, given concerns about existing quality. Even when growth resumes in these countries, one should not expect automatic improvements in governance to occur without the implementation of substantial interventions. The design of governance and institutional

role of the competitive private sector (including associations of traders, exporters, and small and medium-sized enterprises) has been underemphasized.

38. Kaufmann, Mehrez, and Gurgur (2002) provide a more systematic analysis of these points and present the econometric results in detail.

FIGURE 8. Correlation between Bribery and Agency Attributes in Bolivia^a



Source: Kaufmann, Mehrez, and Gurgur (2002).

a. The graph reports the correlation across public agencies between the reported prevalence of administrative forms of bribery (as well as state capture manifestations) and the indicated agency attribute (on the horizontal axis), based on a survey of public officials in Bolivia. Transparency refers to the average of six questions relating to the openness of decisionmaking procedures and budgetary processes in each agency. Citizen voice or feedback refers to the average of four questions regarding the presence of formal feedback mechanisms available to users of the institution. Wage level satisfaction refers to the fraction of respondents who rated their official compensation as satisfactory.

reform strategies should rely on country-specific know-how and governance diagnostic tools to identify specific priorities. And understanding the political and economic forces shaping policymaking and lawmaking (which vary from setting to setting) is key to the identification of realistic and country-relevant strategic priorities.

Where state capture prevails, the governance quality of the growth dividend may be very low, if any. The vulnerability of sustained growth prospects is thus high, necessitating specific strategies to address such capture. Such strategies would need to consider political reforms, which have been underemphasized in the past. But conventional economic reforms may not be sustained without them, even if they are implemented in the first place. Furthermore, the specific institutional reforms need to depart from both a narrow focus on traditional public sector management and an excessive focus on legal fiat or on rules-based measures. Instead, much more emphasis must be placed on promoting domestic mechanisms of external accountability, voice, participation, and transparency.

Appendix: Details of the Identification Procedure

The reduced form of the system defined by equations 4 and 5 in terms of observables is

$$(A1) \quad g_j^* = (1 - \gamma \cdot \beta)^{-1} \cdot (\mu + \gamma \cdot \alpha + \delta \cdot x_j + \gamma \cdot e_j + v_j) + u_j \text{ and}$$

$$(A2) \quad y_j^* = (1 - \gamma \cdot \beta)^{-1} \cdot (\alpha + \beta \cdot \mu + \beta \cdot \delta \cdot x_j + e_j + \beta \cdot v_j) + w_j.$$

Equation 4 in terms of observables is

$$(A3) \quad y_j^* = \alpha + \beta \cdot g_j^* + e_j - \beta \cdot u_j + w_j.$$

The model in equations 4 through 7 has ten unknown parameters (α , β , μ , γ , δ , ρ , σ_e^2 , σ_v^2 , σ_u^2 , and σ_w^2). In the data, we have seven independent pieces of sample information. These are the estimated intercepts, slopes and variances of the residuals of the first- and second-stage regressions that deliver the two-stage least squares estimates of the effects of governance on income in equation 1, as well as the estimated OLS slope coefficient from a regression of per capita income on governance.

As discussed in the text, we augment this sample information with three assumptions that pin down the values of σ_u^2 (the variance of the measure-

ment error in governance), σ_u^2 (the variance of the measurement error in log per capita GDP), and ρ (the correlation between the error terms in equations 4 and 5). We assume throughout that the stability condition, $(1 - \gamma \cdot \beta) > 0$, holds. Note that this places an upper bound on the amount of feedback from per capita income to governance, that is, $\gamma < 1/\beta$.

With these three assumptions in hand, we solve the remaining seven equations, linking the seven pieces of sample information with the seven remaining parameters, as follows. The intercept and slope from the second-stage regression give us estimates of α and β . From Equation A3, the variance of the residuals in the second-stage regression is $\sigma_e^2 + \beta^2 \cdot \sigma_u^2 + \sigma_w^2$, which gives us an estimate of σ_e^2 . Note that the restriction that $\sigma_e > 0$ places an upper bound on our assumptions regarding the variance of measurement error in per capita income and governance.

Finally, we (numerically) solve the following three equations for δ , γ , and σ_v^2 :

$$(A4) \quad \hat{\pi}_1 = \frac{\delta}{1 - \gamma \cdot \beta},$$

$$(A5) \quad \hat{\sigma}_2^2 = \frac{\gamma^2 \cdot \sigma_e^2 + 2 \cdot \gamma \cdot \rho \cdot \sigma_e \cdot \sigma_v + \sigma_v^2}{1 - \gamma \cdot \beta} + \sigma_u^2, \text{ and}$$

$$(A6) \quad \hat{\beta}_{OLS} = \frac{\delta^2 \cdot \beta \cdot \sigma_x^2 + \gamma \cdot \sigma_e^2 + \beta \cdot \sigma_v^2 + (1 + \gamma \cdot \beta) \cdot \rho \cdot \sigma_e \cdot \sigma_v}{\delta^2 \cdot \sigma_x^2 + \gamma^2 \cdot \sigma_e^2 + \sigma_v^2 + 2 \cdot \gamma \cdot \rho \cdot \sigma_e \cdot \sigma_v + (1 - \gamma \cdot \beta)^2 \cdot \sigma_u^2},$$

where $\hat{\pi}_1$ and $\hat{\sigma}_2^2$ denote the slope coefficient and estimated variance of the residuals in the first-stage regression of governance on the instrument, x ; $\hat{\beta}_{OLS}$ denotes the slope coefficient from an OLS regression of log per capita GDP on governance; and σ_x^2 is just the variance of the instrument, x , which we estimate directly from the data. Finally, with these estimates in hand, we obtain μ from the estimated intercept in the first-stage regression,

$$\hat{\pi}_0 = \frac{\mu + \gamma \cdot \alpha}{1 - \gamma \cdot \beta}.$$