

POLICY RESEARCH WORKING PAPER

wps 2475

2475

# Industrial Growth and the Quality of Institutions

## What Do (Transition) Economies Have to Gain from the Rule of Law?

*David A. Grigorian*  
*Albert Martinez*

Developing the legal and regulatory framework, improving contract enforcement, and reducing administrative barriers in the business environment increases the amount of investment and improves the efficiency of resource allocation.



## Summary findings

Grigorian and Martinez empirically test the link between industrial growth and indicators of institutional quality. They find significant evidence that institutional quality affects industrial growth in 27 Asian and Latin American countries.

Their results suggest that the development of the legal and regulatory framework works its way to industrial growth through both investment and total factor productivity.

The implications for policymakers in transition economies: Institution building should complement

privatization, public and private investment in education, research and development, and measures to promote foreign direct investment.

Specifically, policymakers should try to reduce corruption, eliminate bureaucratic barriers, and improve the legal environment and contract enforcement. Special attention should also be given to measures to deepen financial intermediation, improve the financial sector infrastructure, and increase the efficiency of financial transactions.

---

This paper—a product of the Private and Financial Sectors Development Unit, Europe and Central Asia Region—is part of a larger effort in the region to study the determinants of private sector growth in transition economies. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Anne Nelson, room H6-393, telephone 202-473-7117, fax 202-522-0073, email address [anelson@worldbank.org](mailto:anelson@worldbank.org). Policy Research Working Papers are also posted on the Web at [www.worldbank.org/research/workingpapers](http://www.worldbank.org/research/workingpapers). The authors may be contacted at [dgrigorian@worldbank.org](mailto:dgrigorian@worldbank.org) or [amartinez2@worldbank.org](mailto:amartinez2@worldbank.org). November 2000. (20 pages)

*The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the view of the World Bank, its Executive Directors, or the countries they represent.*

# **INDUSTRIAL GROWTH AND QUALITY OF INSTITUTIONS: WHAT DO (TRANSITION) ECONOMIES HAVE TO GAIN FROM THE RULE OF LAW?**

David A. Grigorian<sup>1</sup>      and      Albert Martinez

Private and Financial Sector Development Unit  
Europe and Central Asia Region  
World Bank

JEL classification: O11, O40, L50.

Keywords: Economic Development, Industrial Policy, Quality of Institutions.

---

<sup>1</sup> Corresponding author. Comments can be forwarded to [Dgrigorian@worldbank.org](mailto:Dgrigorian@worldbank.org). An extended version of this paper was furnished as a background paper for Kazakhstan Industrial Policy Review. The authors would like to thank David Dollar, Philip Keefer, Steve Knack, and Lev Freinkman of the World Bank, an anonymous referee, and conference participants in St. Louis, Missouri for many valuable comments and suggestions.



## **I. Introduction**

The pre-transition industrial structure in Eastern Europe and the former Soviet Union was primarily driven by a raw material base, influenced by central planning decisions and rarely based on comparative advantage considerations. In the Soviet Union in particular, enterprises were highly integrated into an industrial network and thus were largely dependent on supplies of raw materials from other parts of the region. Following the collapse of the socialist system and the resolution of CMEA, the trade and supply links broke up virtually overnight and what might have been an economically viable production network – a very strong assumption to make concerning soviet-era industrial giants – turned out to be making huge losses on public accounts. Industrial enterprises which were almost never involved in marketing and distribution of their products suddenly found themselves in an environment where they had to make their own production decisions and adjust to new economic conditions. These developments coupled with deteriorating macroeconomic conditions drastically changed the enabling environment for industrial sector enterprises.

From the initial years of transition, countries of Eastern Europe and former Soviet Union have faced the challenge of industrial restructuring and growth. Various sub-sector programs defining ‘strategic directions’ of development were designed and put in place. Yet quite often policy responses were limited to protectionist measures aimed at preserving output and/or employment of (mostly still state owned) industrial enterprises. Bearing in mind the political importance of large industrial firms, in most cases governments were reluctant to liquidate them, hence effectively allowing them to continue running losses. Moreover, in cases where enterprises were considered important, direct state subsidies and credits were made available. This resulted in

situations where state owned enterprises were subjected to very little or no financial discipline – an unlikely goal of any industrial policy in the region.

Here we do not intend to discuss specific details of any industrial policy in transition economies. Neither do we focus on the role the conventional determinants of industrial policy (e.g. trade and exchange rate regimes, investment and capital accumulation, etc.) played in shaping the outcomes of those policies. Our intention here is to introduce yet another channel through which industrial policymakers In Transition Economies are likely to be able to affect industrial growth.

Following recent studies on economic growth, and in particular those exploring the link between institutional quality and *economic growth in general* (e.g. Knack and Keefer [1995], Clague *et al.* [1995]) we attempt to test the relationship between *industrial growth* and institutional quality indicators. Owing to the lack of sufficiently long time series and relatively poor quality of data, we did not base our analysis on transition economies. Instead we used a sample of 27 developing countries of Asia and Latin America containing data from 1982 to 1997 to derive our conclusions<sup>2</sup>. We present evidence of a strong effect of various indicators of institutional quality and financial development on industrial growth. We then hypothesize that the results obtained in the paper will hold for a wide range of transition/developing countries.

The paper is structured in the following way. Section II establishes the theoretical link between quality of institutions and growth. Section III goes on to describe the institutional quality indicators to be used in the study. We then outline the basic

---

<sup>2</sup> Latin American countries are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Jamaica, Mexico, Panama, Paraguay, Uruguay. Asian countries are: Bangladesh, China, Hong Kong (China), India, Indonesia, South Korea, Malaysia, Nepal, Philippines, Singapore, Sri Lanka, Thailand

econometric model and discuss regression results in Section IV. Finally, Section V contains concluding remarks and predictions.

## **II. Quality of Institutions and Economic Growth**

It is only relatively recently that economists have attempted to explain the fraction of growth otherwise unexplained by simple factor accumulation by emphasizing the importance of increasing returns to human capital (e.g. Lucas (1988), Romer (1986, 1988)), technological change (e.g. Solow (1956)), ownership (e.g. Morck *et al.* (1988), McConnell and Servaes (1990)), etc. On the other hand, Olson (1982), North (1990), Clague and Rausser (1991) among others reiterated the vitality of building up adequate legal infrastructure and proper functioning institutions in promoting economic growth. Arguments in favor of strong institutional structure are numerous: (1) transaction costs associated with running business are likely to increase in the presence of corruption and bureaucratic obstacles; (2) barriers to entry and exit might become very high without a clear and transparent legal and regulatory mechanisms governing entry and exit; and (3) gains from trade are easier to realize when transactions are carried out through efficiently functioning market mechanisms. On a similar note, Scully (1988) writes that “life, liberty and property are not additively separable attributes; the diminution of one diminishes all. Security of rights affects their value.” Clague *et al.* (1995) in turn emphasize irreversibility of commitments as essential for multiple-party contracts. Perhaps the grand summary argument brought forward in favor of a developed legal system and mechanisms of contract enforcement is that markets are less likely to exist when property rights and contract enforcement are absent or inadequate.

The quality of institutions and legal framework are also likely to affect growth through the ability of financial sector to channel resources to finance productive

activities. In the absence of an adequate regulatory framework and supervision the ability of domestic banks to mobilize funds will be strongly undermined by a lack of depositors' confidence. This will drift funds abroad and generally away from viable domestic investment opportunities. On the other hand, under inefficient property rights and an underdeveloped system of title registration, realizing liquidity from collateral can be quite costly. This has a potential of undermining financial institutions' ability to lend to the extent they could, had they faced better property rights legislation and enforcement. Exploring the link between quality of institutions and financial depth, La Porta *et al.* (1997) summarize: "To the extent that better legal protections enable the financiers to offer entrepreneurs money at better terms, ... countries with better legal protection should have more external finance in the form of both higher valued and broader capital markets".

A growing body of empirical literature has tried to incorporate various indicators of institutional quality, civil liberties and the legal framework into conventional growth equations. Kormendi and Meguire (1985), and Scully (1988) find a strong effect of the Gastil civil liberties index on rates of investment and economic growth. A World Bank study by Brunetti, Kisunko and Weder (1997) finds that the differences between institutional frameworks (as perceived by private sector agents) in Transition countries may account for differences in countries' relative economic performance. La Porta *et al.* (1997) find strong evidence that the legal environment (measured by an indicator of Rule of Law) and institutional quality have a significant effect on the size of capital markets for their sample of 49 countries.

It is rather simple to make a point about an even stronger link between institutional quality factors and *industrial* growth. Bearing in mind the nature of industrial technological process, few would disagree that the industrial sector on average requires



longer term contractual agreements, larger capital investments and more numerous supplier (and maybe even customer) links. Hence there is a stronger need for a more adequate legal and regulatory framework to enforce multiple-party and/or longer term contracts. Although being a public good by nature, it might perhaps be useful to look at quality of institutions and law enforcement as an input to production. Then our earlier point can be rephrased with “the more a production process relies upon suppliers, sources of credit, and technological innovations, the more *institutional-quality-intensive* the production process becomes.” Subsequently, scarcity of this one input makes it harder, sometimes even impossible, to invest and engage in productive activities the more institutional-quality-intensive the production process is. In what follows, the effect of developed institutions and contract enforcement on growth will be at least as pronounced in industry as it is in other sectors. Without testing the hypothesis of the relative importance of institutional quality on various sectors in the economy, the paper contributes to the empirical growth literature in that it establishes empirically the relationship between a broad range of institutional quality indicators and industrial growth.

### **III. Institutional Quality Variables**

The dataset containing measures of institutional quality and contract enforcement to be used in our study was assembled by the IRIS Center of the University of Maryland from the International Country Risk Guide - a monthly publication of Political Risk Services (PRS). The five PRS indicators used in the study are Government Repudiation of Contracts, Risk of Expropriation, Corruption, Rule of Law, and Bureaucratic Quality. For all five measures, the lower (higher) values indicate worse (better) standing.

<i>Indicator</i>	<i>Scale</i>	<i>Notation</i>
Government repudiation of contracts	0-10	<b><i>PRS1</i></b>
Risk of expropriation	0-10	<b><i>PRS2</i></b>
Corruption	0-6	<b><i>PRS3</i></b>
Rule of Law	0-6	<b><i>PRS4</i></b>
Bureaucratic quality	0-6	<b><i>PRS5</i></b>

*Government repudiation of contracts* is an indicator of institutional quality which addresses the possibility that foreign businesses, contractors, and consultants face the risk of a modification in a contract taking the form of repudiation, postponement, or scaling down. A country may initiate contract modification with a foreign business because of an income drop, budget cuts, political pressure, or a change in government economic and social priorities. *Risk of expropriation* of private foreign investments assesses the likelihood of confiscation or nationalization. Both indicators proxy the government's ability to enforce contracts and not to renege on its promises. Even if private agents engage in mutual beneficial exchange or investment, it is worth noting that at least in theory they still face the risk of the government expropriating the results of their exchange. The channel through which we expect repudiation and expropriation risks to affect investment and growth is straightforward: should the likelihood of repudiations and expropriations be high, rational private agents will discount the future streams of income from investment at a higher rate which *ceteris paribus* could lead to lower aggregate investment and slower economic growth.

The PRS indicators of *Corruption* and *Bureaucratic Quality* are intended to measure the corruption and strength of bureaucratic apparatus of the government respectively. Corruption and bureaucratic quality are viewed as impediments to investment and growth primarily because they have a potential of distorting the economic and financial environment by increasing the transaction costs faced by economic agents.

The most common forms of corruption and bureaucratic barriers met directly by firms are demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans. Such corruption can make it difficult to conduct business effectively, and in some cases may force the withdrawal or withholding of investments.

*The Rule of Law* indicator measures the soundness of political institutions, strength of court system, and provisions for an orderly succession of power. This indicator reflects the extent to which economic agents are willing to accept the established institutions to make and implement laws and arbitrate disputes. A high risk point total means that there is a strong law and order tradition, while a low risk point total means there is a tradition of depending on physical force or illegal means to settle claims. The country distribution of PRS indicators is presented in Table 1.

#### **IV. The Model**

Assuming an endogenous growth model, Barro (1991) and Keefer and Knack (1995) define their cross-country growth regression equation as follows:

$$\ln\left(\frac{y_{it}}{y_{i0}}\right) = \beta_0 + \beta_1 \ln(y_{i0}) + \beta_2 \ln(educ_i) + \varepsilon_i \quad (1)$$

where  $\ln(y_0)$  is (logarithm of) initial level of per capita output, and  $\ln(educ)$  is (logarithm of) average education indicator. Including a measure of initial per capita output intends to capture the phenomenon of declining marginal product (assumed for a conventional neoclassical production function) which is instrumental in establishing the (conditional) convergence to a steady-state output per capita across countries. Replacing general economic output with industrial value added and introducing institutional quality indicators to Equation 1 yields:

$$\ln\left(\frac{IVA97_i}{IVA82_i}\right) = \beta_0 + \beta_1 \ln(IVA82_i) + \beta_2 \ln(educ_i) + \beta_3 PRS_i + \varepsilon_i \quad (2)$$

where  $\ln(IVA97)$  and  $\ln(IVA82)$  are (natural logarithms of) per capita industrial value added in 1997 and 1982 respectively,  $PRS$  is Institutional Quality indicator, and  $\varepsilon$  is the error term. (Subscript  $i$  indicates country).

### ***OLS Result***

Yet the above equations suffer from a major drawback: they are derived under a simplifying assumption that rates of factor accumulation are the same across countries (see Keefer and Knack (1995) for a discussion). Following Mankiw *et al.* (1992) and bearing in mind that under certain assumptions the rate of growth of capital and investment rate are linearly related, we include the ratio of investment to GDP to proxy the rate of capital accumulation<sup>3</sup>. Yet we believe there is another rationale behind including investment to GDP ratio into Equation 2. Treating investment as a forward looking measure of investment confidence, we believe that by the introduction of investment rate we also capture other institutional quality related phenomena, which are not necessarily reflected in the above PSR indicators (such as expected changes in investment climate, investor confidence, etc.). Below we use total economy-wide investment to proxy for investments into industrial sector, differences in savings habits, and (expected) investment climate across countries. Thus including investment rate in Equation 2 generates:

---

<sup>3</sup> It can be shown that the per capita capital stock evolves in a following way:

$$\Delta\kappa/\kappa = \gamma/\mu + n - \delta$$

where  $\gamma$  - investment to output ratio ( $I/Y$ ),  $\mu$  - capital to output ratio ( $K/Y$ ),  $n$  - rate of population growth, and  $\delta$  - average rate of depreciation in the economy. So under the assumption of a fixed capital to output ratio, there exists a linear relationship between the rate of growth of per capita capital stock and the investment rate.

$$\ln\left(\frac{IVA97_i}{IVA82_i}\right) = \beta_0 + \beta_1 \ln(IVA82_i) + \beta_2 \ln(edu_i) + \beta_3 \ln(I_i / GDP_i) + \beta_4 PRS_i + \varepsilon_i \quad (3)$$

where  $\ln(I/GDP)$  is the (natural logarithm of the) ratio of aggregate gross fixed investment to GDP. Estimates based on the above equation are reported in Table 2. Specifications 1 through 6 contain PRS variables 1 through 5 and a composite measure of those indexes in each respective equation<sup>4</sup>. With the exception of Institutional Quality indicators, all other variables used in the analysis are from the Statistical Information Management and Analysis (SIMA) database of the World Bank.

The coefficients of primary interest are all positive and comfortably significant. The coefficients on the (logarithm of the) investment rate are positive and significant, rejecting the hypothesis that the rate of capital accumulation are identical across countries. The choice of measure of human capital (or education) turned out to be a crucial one here. We hypothesized that unlike the case of economic growth in general, higher education is more important for industrial growth than secondary education. The results support our proposition. In most regressions the average Secondary School Enrollment ratio failed to provide the signs (and significance) of coefficients predicted by theory<sup>5</sup>. Owing to the lack of reliable data on High Education we included the (logarithm of the) Tertiary Enrollment rate as an explanatory variable to capture the effect of human

---

<sup>4</sup> The composite measure of PRS variables included in the 6<sup>th</sup> regression is a simple average of PRS variables 1 through 5. Note that including the PRS Composite measure in an equation is identical to including all 5 PRS variables into the regression and restricting their coefficients to be the same for all 5 variables.

<sup>5</sup> In another attempt to improve the “performance” of educational indicators, we included Government Educational Expenses (reported by UNESCO) as an explanatory variable. Doing so improved the results but only marginally. The probable cause, we believe, is that (in poor countries in particular) educational expenses might be somewhat biased towards Secondary Education (and against Higher Education and subsequently R&D). Should this be the case the educational expenses would only give us very limited information about the true distribution of Education in the country and thus will not be able to capture the true effect of education on industrial growth.

capital. The results suggest that post-secondary Education (measured here by Tertiary Enrollment) is at least as important as Secondary Education. Overall, four independent variables included in each regression were able to explain from 62 to 75 percent of variations in the explanatory variable.

### ***Two Stage Approach***

However, it might be argued that Equation 3 suffers from a simultaneity problem introduced by the possible endogeneity of investment with respect to (industrial) growth<sup>6</sup>. We utilize the Two-Stage (2SLS) estimation procedure to account for the potential endogeneity of the investment rate. To emphasize the importance of institutional quality variables for investment in the long run, we chose initial (1982) values of PRS indicators as instruments to explain the average rate of investment<sup>7</sup>. We call so-estimated/instrumented values of investment rate the *institutional component* of the investment rate<sup>8</sup>. We then used the institutional component of investment rate in the second stage regression. Results of the second stage estimation are reported in Table 3<sup>9</sup>.

---

<sup>6</sup> Yet we argue that the extent of potential bias is lessened in our regressions because of the fact that we use economy-wide investment (as opposed to investment into industrial sector alone) in the equations.

<sup>7</sup> It can be shown that even if the explanatory variable is not endogenous by itself, averaging both dependent and independent variables across time biases OLS estimates of coefficients and standard errors. This also imposes a limitation on the choice of instruments in cases where the variable to be instrumented is time averaged – instruments used in first-stage regression thus cannot be time averaged.

<sup>8</sup> The first stage regression of the (logarithm of the) average investment-to-GDP ratio on initial values of all 5 PRS indicators provided a remarkable fit: R-squared equals 0.51, indicating that over 50 percent of variation in investment ratio (in the long run) is explained by the institutional quality variables alone. F-statistic of zero slopes in the 1<sup>st</sup> stage regression is 4.22, with critical value F [5,21] for 5 percent confidence level being just below 2.7.

<sup>9</sup> A skeptical reader could argue for potential multicollinearity (introduced by use of averaged PRS indicators in a specification where the investment rate is instrumented with initial values of PRS). To argue against any serious bias as a result, we run a second

We focus on the most important ones here. It becomes clear that the signs and significance of the coefficients on institutional quality variables are robust with respect to the estimation procedure: all coefficients are significant at least on a 5 percent confidence level with the exception of coefficient on corruption, in which case the  $t$  statistic is only slightly below the 5 percent critical value. Coefficients on Tertiary Education appear significant and imply somewhat larger returns on education than in previous regressions. The above specification predicts a larger rate of conversion to a common cross-country steady state of per capita industrial output than that suggested by previous specifications.

Another set of findings is worth paying special attention to: the results above suggest that developed legal and regulatory framework positively influences industrial growth both through investment and total factor productivity. To put it differently, the fact that after controlling for an estimated rate of investment, coefficients on PRS indicators remain strong (see Table 3), suggests that institutional quality affects both the amount of investment in the economy as well as the efficiency of resource allocation (at least in the industrial sector).

It can be inferred from the regression results that *ceteris paribus* a one percent increase in per capita industrial value added can be achieved by either a 7.7 percent increase in the level of Tertiary Enrollment or a 2.2 percent increase in the rate of investment<sup>10</sup>. Our findings are not significantly different from those of Mankiw *et al.* (1992) who report the elasticity of per capita output growth with respect to the investment

---

stage regression without including PRS indicators. The outcome of the regression is summarized below:

$$\text{Dep. Var.} = -1.6 - 0.16*\text{Log}(\text{Initial}) + 0.8*\text{Log}(\text{TerEdu}) + 0.092*\text{Est. Log}(I/\text{GDP}); R^2 = 0.45$$

(-2.31) (-2.32) (0.86) (3.08)

The results are consistent with those reported in Table 3 and if contrasted with the latter can hardly be viewed as indicative of multicollinearity.

<sup>10</sup> Reported elasticities are based on the sixth specification, i.e. where the PRS Composite measure is used.

rate for their sample of 98 non-oil producing countries to be around 0.5. Finally, including all five institutional quality variables and restricting their coefficients to be the same improves the regression fit (see equation 6).

At this stage we foresee arguments against using contemporaneous values of institutional quality measures to explain the variations in the industrial growth. This is the same as saying that industrial growth in turn may be causing improvements in the underlying institutional quality measures. Although we formally account for possible endogeneity of these variables below, we dismiss these arguments (at least partially) based on the fact that (albeit correlated with general economic growth) industrial growth alone is unlikely to generate major changes in the legal system, contract enforcement and level of corruption. To check for possible endogeneity in the institutional quality variables, a robustness test of the results with respect to the (timing of the) institutional variables was conducted. We did so by including initial (1982) values of PRS indicators in the above specification, which does not change the qualitative importance of the results and changes the magnitudes and significance pattern of the coefficients only marginally<sup>11</sup>.

To check the robustness of our results with respect to different measures of Institutional Quality, we introduced yet another measure of institutional quality – the Contract-Intensive Money ratio. Introduced by Clague *et al.* (1995) as the ratio of non-cash balances within M2<sup>12</sup>, the measure intends to quantify contract enforcement and property rights. We report these results in Table 4. They appear to go along the lines of

---

<sup>11</sup> The results of those regressions are available from the authors upon request.

<sup>12</sup> The ratio is defined as  $(M2-Cash)/M2$ . Cash (Currency in circulation outside of banks) is line 14a of IMF's International Financial Statistics. M2 is the summation of line 34 (Money) and line 35 (Quasi-Money) of IMF's International Financial Statistics.



our earlier findings where PRS indicators were used as regressors. The rate of conversion to a common steady state is greater when CIM is being controlled for.

## V. Conclusion

Using the experience of 27 Developing countries of Asia and Latin America, we attempted to answer the question posed in the title of this paper. We found significant evidence of the effect of institutional quality and legal indicators on industrial growth in Asian and Latin American countries included in the sample. Measures of Institutional Quality turned out to have a very strong positive effect on the rate of industrial growth. In addition, we found that a developed legal and regulatory framework, good enforcement and low administrative barriers affect the industrial growth not only by increasing the amount of investments made available in the economy but also by improving the efficiency of resource allocation. It is important to note that our findings are robust to controlling for possible endogeneity of the rate of investment. Most importantly, results are independent of the type of Institutional Quality measures used in the analysis. Qualitative conclusions are also unchanged when initial (rather than time averaged) values of institutional quality variables are used as explanatory variables.

Having documented this, we turn to the policy implications of our results. Empirical and anecdotal evidence from developing countries suggest that governments seldom lack the capacity to design and implement full-fledged industrial policies using traditional determinants such as trade, tax and foreign exchange regimes without introducing major distortions, generating sizable costs and providing disincentives for entrepreneurs to engage in productive activities in some areas. Instead of going as far as rejecting the merits of those policies, we propose using a *complementary* set of measures that can be applied universally and with minimum distortions across various sectors in

the economy and industrial sector in particular. Our research suggests that policy makers should devote resources and efforts to reducing corruption, eliminating bureaucratic barriers, improving contract enforcement and the legal environment. Separate attention should be given to measures which are capable of deepening the financial sector, improving financial sector infrastructure and increasing the efficiency of financial transactions.

It should also be noted that we are far from suggesting that ongoing policies be put on hold in favor of new ones directed at improving measures of Institutional Quality. Instead, in the light of our results, we suggest that institution building in Transition Countries be viewed as an essential *complementary* measure to accompany large scale privatization, flow of public and private investments in education and R&D, and measures promoting Foreign Direct Investment<sup>13</sup>.

Finally, we hypothesize (without testing it here) that the marginal effect of institutional improvements on industrial growth might, in fact, be stronger in Transition economies (compared to Asian and Latin American countries), where traditions of market oriented business institutions were virtually absent for decades – a proposition that can be tested by further research.

---

<sup>13</sup> In cases when technology and research offer positive externalities - such as increasing returns to scale as presented by the new growth theories – we foresee space for a more active industrial policy focused on investments in education and R&D.

Table 1

Country Distribution of PRS Institutional Quality Indicators (averages for 1982-1995)

	<i>PRS1</i>	<i>PRS2</i>	<i>PRS3</i>	<i>PRS4</i>	<i>PRS5</i>
<b>Latin America</b>					
Argentina	4.9	5.9	3.6	3.2	3.0
Bolivia	4.6	5.0	1.7	1.3	1.1
Brazil	6.3	7.6	3.8	3.8	4.0
Chile	6.8	7.5	3.2	4.2	3.4
Colombia	7.0	6.9	3.0	1.3	4.0
Costa Rica	5.8	6.7	5.0	4.0	2.9
Dominican Rep.	3.9	6.0	3.0	3.1	3.0
Ecuador	5.2	6.6	3.1	4.0	3.0
El Salvador	4.7	4.7	2.2	1.4	1.1
Honduras	5.2	5.0	2.0	2.1	1.6
Jamaica	6.5	6.7	2.1	2.1	3.0
Mexico	6.6	7.3	2.9	3.2	2.9
Panama	5.1	5.7	2.1	2.1	1.1
Paraguay	7.6	6.9	1.3	2.7	1.8
Uruguay	7.3	6.6	3.0	3.0	2.0
<i>Average Latin America</i>	5.82	6.34	2.80	2.77	2.52
<b>Asia</b>					
Bangladesh	4.1	4.9	0.6	1.4	1.2
China	6.7	8.1	3.8	3.6	3.0
Hong Kong, China	8.8	8.3	5.1	4.9	4.1
India	6.1	7.8	2.8	2.5	3.8
Indonesia	6.1	7.2	1.3	2.4	1.5
Korea, Rep.	8.6	8.3	3.2	3.2	4.2
Malaysia	7.4	8.0	4.4	4.1	3.5
Nepal	-	-	-	-	-
Philippines	4.8	5.2	1.8	1.6	1.5
Singapore	8.9	9.3	4.9	5.1	5.1
Sri Lanka	5.3	6.1	3.0	1.1	3.0
Thailand	7.6	7.4	3.1	3.8	4.4
<i>Average Asia</i>	6.8	7.3	3.1	3.1	3.2
<b>Average All</b>	6.21	6.75	2.92	2.90	2.82

Table 2

## OLS Regression Estimates with Rate of Investment Included

<i>Dependent Variable: Log(IVA97) – Log(IVA82)</i>						
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Constant</b>	-0.95	-0.79	-0.85	-0.67	-0.86	-0.45
<b>Log(Initial)</b>	-0.14** (0.03)	-0.18** (0.06)	-0.15** (0.04)	-0.16** (0.04)	-0.12** (0.04)	-0.19** (0.059)
<b>Log(TerEdu)</b>	0.08 (0.067)	0.12** (0.05)	0.08 (0.07)	0.07 (0.07)	0.064 (0.077)	0.096* (0.056)
<b>Log(I/GDP)</b>	0.44** (0.12)	0.30** (0.15)	0.47** (0.14)	0.44** (0.16)	0.46** (0.16)	0.31** (0.16)
<b>Repudiation</b>	0.064** (0.029)					
<b>Expropriation</b>		0.12** (0.052)				
<b>Corruption</b>			0.09* (0.051)			
<b>Rule of Law</b>				0.09* (0.051)		
<b>Bureaucracy</b>					0.05 (0.038)	
<b>Composite</b>						0.11** (0.046)
<b>R<sup>2</sup></b>	0.66	0.75	0.67	0.66	0.62	0.74
<b>N</b>	23	23	23	23	23	23

\*\* - Indicates significance at 5% confidence level, and \* - significance at 10% confidence level. Standard errors in parenthesis. White's heteroskedasticity-consistent variance-covariance matrix was used to estimate standard errors.

IVA = Industrial Value Added,

I/GDP = Investment to GDP ratio,

TerEdu = Average Tertiary enrollment,

PRS1-5 = Values of PRS indicators 1 through 5, averaged for the period 1982-1995.

PRS Composite = Unweighted average of PRS1-5 indicators

Table 3  
Two Stage Regression Estimates

<i>Dependent Variable: Log(IVA97) – Log(IVA82)</i>						
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Constant</b>	-1.27	-1.07	-1.07	-0.83	-1.23	-0.75
<b>Log(Initial)</b>	-0.22** (0.04)	-0.23** (0.05)	-0.21** (0.05)	-0.23** (0.052)	-0.21** (0.052)	-0.26** (0.047)
<b>Log(TerEdu)</b>	0.12* (0.066)	0.16** (0.05)	0.11 (0.09)	0.10 (0.09)	0.12* (0.066)	0.13** (0.056)
<b>Est. Log(I/GDP)</b>	0.60** (0.197)	0.41* (0.228)	0.62** (0.27)	0.57** (0.24)	0.66** (0.237)	0.45** (0.21)
<b>Repudiation</b>	0.086** (0.03)					
<b>Expropriation</b>		0.14** (0.044)				
<b>Corruption</b>			0.10* (0.05)			
<b>Rule of Law</b>				0.12** (0.046)		
<b>Bureaucracy</b>					0.10** (0.032)	
<b>PRS Composite</b>						0.125** (0.034)
<b>R<sup>2</sup></b>	0.63	0.75	0.58	0.60	0.65	0.75
<b>N</b>	23	23	23	23	23	23

\*\* - Indicates significance at 5% confidence level, and \* - significance at 10% confidence level. Standard errors in parenthesis. White's heteroskedasticity-consistent variance-covariance matrix was used to estimate standard errors.

IVA = Industrial Value Added,

Est. Log(I/GDP) = Instrumented value of ratio of Investment to GDP,

TerEdu = Average Tertiary enrollment,

PRS1-5 = Values of PRS indicators 1 through 5, averaged for the period 1982-1995.

PRS Composite = Unweighted average of PRS1-5 indicators

Table 4

## Summary Regression Results with CIM Ratio

<i>Dependent Variable: Log(IVA97) – Log(IVA82)</i>				
	(1)	(2)	(3)	(4)
<b>Constant</b>	-1.21	-1.60	-1.89	-2.74
<b>Log(Initial)</b>	-0.09** (0.04)	-0.16** (0.068)	-0.12** (0.046)	-0.18** (0.065)
<b>Log(TerEdu)</b>	0.056 (0.08)	0.092 (0.106)	0.065 (0.09)	0.091 (0.099)
<b>Log(I/GDP)</b>	0.58** (0.13)		0.54** (0.105)	
<b>Est. Log(I/GDP)</b>		0.80** (0.26)		0.77** (0.22)
<b>CIM Ratio</b>			1.16** (0.56)	1.64** (0.65)
<b>R<sup>2</sup></b>	0.59	0.45	0.63	0.55
<b>N</b>	24	23	24	23

\*\* - Indicates significance at 5% confidence level, and \* - significance at 10% confidence level. Standard errors in parenthesis. White's heteroskedasticity-consistent variance-covariance matrix was used to estimate standard errors.

IVA = Industrial Value Added,

TerEdu = Average Tertiary enrollment,

I/GDP = Average Investment to GDP ratio,

CIM = Contract Intensive Money ratio, (M2-Cash)/M2, averaged for 1982-1997.

## References

- Barro, Robert. 1991. "Economic Growth in a Cross Section of Countries", *Quarterly Journal of Economics* 106, 407-444.
- Brunetti, Aymo, Gregory Kisunko, and Beatrice Weder. 1997. Institutions in Transition: Reliability of Rules and Economic Performance in Former Socialist Countries. *World Bank Policy Research Working Paper No. 1809*.
- Clague, Christopher and Gordon Rausser. 1991. The Emergence of Market Economies in Eastern Europe, Cambridge, Massachusetts, Blackwell Publishers.
- Clague, Christopher, Phillip Keefer, Stephen Knack and Mancur Olson. 1995. Reprinted July 1999. "Contract-Intensive Money: Contract Enforcement, Property Rights, and Economic Performance", *Center for Institutional Reforms and Informal Sector*, University of Maryland, Working Paper No. 151
- Knack, Stephen and Keefer, Philip. 1995. "Institutions and Economic Performance: Empirical Tests using Alternative measures of Institutions", *Economics and Politics*, Vol. 7, No.3.
- Kormendi, Roger C., and Philip G. Meguire. 1985. "Macroeconomic Determinants of Growth: Cross-Country Evidence", *Journal of Monetary Economics* 16, 141-163.
- La Porta, Rafael, F. Lopez-de-Silanes, A. Shleifer and R. Vishny. 1997. Legal Determinants of External Finance', *The Journal of Finance*, Vol. LII, No. 3.
- Lucas, Robert E. Jr. 1988. "On the Mechanics of Economic Development", *Journal of Monetary Economics* XXII, pp. 3-42.
- Mankiw, N. Gregory, David Romer and David N. Weil. 1992. "A Contribution to the Empirics of Economic Growth", *Quarterly Journal of Economics* 107, 407-437.
- McConnell, John and Henri Servaes. 1990. "Additional Evidence on Equity Ownership and Corporate Value," *Journal of Financial Economics*, 27: 595-612.
- Morck, R., A. Shleifer and R. Vishny. 1988, "Management Ownership and Market Valuation: An Empirical Analysis," *Journal of Financial Economics* 20, 293-315.
- North, Douglas. 1991. "Institutions, Institutional Change and Economic Performance", Cambridge, New York, Cambridge University Press.
- Olson, Mancur. 1982. "The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities", New Haven, Yale University Press.
- Romer, Paul M..1986. "Increasing Returns to Long-Run Growth", *Journal of Political Economy* 94, No. 5, 1002-1037.
- \_\_\_\_\_. 1988. Endogenous Technological Change, University of Chicago Press.
- Scully, Gerald W. 1988. "The Institutional Framework and Economic Development", *Journal of Political Economy* 96, No.3, 652-662.
- Solow, Robert. 1956. "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economics*, LXX, 65-94.





**Policy Research Working Paper Series**

<b>Title</b>	<b>Author</b>	<b>Date</b>	<b>Contact for paper</b>
WPS2455 The Effects on Growth of Commodity Price Uncertainty and Shocks	Jan Dehn	September 2000	P. Varangis 33852
WPS2456 Geography and Development	J. Vernon Henderson Zmarak Shalizi Anthony J. Venables	September 2000	R. Yazigi 37176
WPS2457 Urban and Regional Dynamics in Poland	Uwe Deichmann Vernon Henderson	September 2000	R. Yazigi 37176
WPS2458 Choosing Rural Road Investments to Help Reduce Poverty	Dominique van de Walle	October 2000	H. Sladovich 37698
WPS2459 Short-Lived Shocks with Long-Lived Impacts? Household Income Dynamics in a Transition Economy	Michael Lokshin Martin Ravallion	October 2000	P. Sader 33902
WPS2460 Labor Redundancy, Retraining, and Outplacement during Privatization: The Experience of Brazil's Federal Railway	Antonio Estache Jose Antonio Schmitt de Azevedo Evelyn Sydenstricker	October 2000	G. Chenet-Smith 36370
WPS2461 Vertical Price Control and Parallel Imports: Theory and Evidence	Keith E. Maskus Yongmin Chen	October 2000	L. Tabada 36896
WPS2462 Foreign Entry in Turkey's Banking Sector, 1980-97	Cevdet Denizer	October 2000	I. Partola 35759
WPS2463 Personal Pension Plans and Stock Market Volatility	Max Alier Dimitri Vittas	October 2000	A. Yaptenco 31823
WPS2464 The Decumulation (Payout) Phase of Defined Contribution Pillars: Policy Issues in the Provision of Annuities and Other Benefits	Estelle James Dimitri Vittas	October 2000	A. Yaptenco 31823
WPS2465 Reforming Tax Expenditure Programs in Poland	Carlos B. Cavalcanti Zhicheng Li	October 2000	A. Correa 38949
WPS2466 El Niño or El Peso? Crisis, Poverty, And Income Distribution in the Philippines	Gaurav Datt Hans Hoogeveen	October 2000	T. Mailei 87347
WPS2467 Does Financial Liberalization Relax Financing Constraints on Firms?	Luc Laeven	October 2000	R. Vo 33722

### Policy Research Working Paper Series

	<b>Title</b>	<b>Author</b>	<b>Date</b>	<b>Contact for paper</b>
WPS2468	Pricing, Subsidies, and the Poor: Demand for Improved Water Services in Central America	Ian Walker Fidel Ordoñez Pedro Serrano Jonathan Halpern	November 2000	S. Delgado 37840
WPS2469	Risk Shifting and Long-Term Contracts: Evidence from the Ras Gas Project	Mansoor Dailami Robert Hauswald	November 2000	W. Nedrow 31585
WPS2470	Are Larger Countries Really More Corrupt?	Stephen Knack Omar Azfar	November 2000	P. Sintim-Aboagye 38526
WPS2471	Validating Operational Food Insecurity Indicators against a Dynamic Benchmark: Evidence from Mali	Luc J. Christiaensen Richard N. Boisvert John Hoddinott	November 2000	L. Christiaensen 81463
WPS2472	Uzbekistan and Kazakhstan: A Tale of Two Transition Paths	Asad Alam Arup Banerji	November 2000	L. Henson 84026
WPS2473	Banking Risks around the World: The Implicit Safety Net Subsidy Approach	Luc Laeven	November 2000	R. Vo 33722
WPS2474	Exports and Information Spillovers	Alessandro Nicita Marcelo Olarreaga	November 2000	L. Tabada 36896

11/10