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Regulation and growth

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Abstract

Using objective measures of business regulations in 135 countries, we establish that countries with better regulations grow faster. Improving from the worst quartile of business regulations to the best implies a 2.3 percentage point increase in annual growth.

Keywords: Economic growth; Business regulations

JEL classification: O12; O17; O50; P48

1. Introduction

Why some countries grow faster than others is one of the most important questions in economics. Solving this puzzle has the obvious appeal of improving the living standards for a significant proportion of the world population. We go further towards answering this question by studying a major determinant of growth: regulations governing business activity.

Hall and Jones (1999) and Acemoglu et al. (2001), among others,[1] show that institutions are a major determinant of wealth and long-term growth. Countries that had better political and economic institutions in the past are richer today. We add to the literature on institutions and growth by introducing a new measure of institutional quality. The analysis focuses on a particular type of institution: business

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[1] For instance, North (1981), Djankov et al. (2003a,b), and Rodrik (1999).

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regulations. We use a new country-level data set to establish the relationship between the burden of business regulations and growth.

2. Data

We use a new database of business regulations created by the World Bank: the Doing Business database available at www.doingbusiness.org. The indicators measure how regulations help or hinder

Table 1
Description of the variables from the doing business data set

Topic	Variable	Description
Starting a business	Entry procedures	Number of procedures that are officially required for an entrepreneur to start up an industrial or commercial business.
	Entry days	Number of calendar days required to complete all procedures that are officially required for an entrepreneur to start up an industrial or commercial business.
	Entry cost	Cost as percentage of income per capita associated with completing all procedures that are officially required for an entrepreneur to start up an industrial or commercial business.
	Entry minimum capital	Minimum capital officially required for an entrepreneur to start up an industrial or commercial business, expressed as a percentage of income per capita.
Hiring and firing	Labor regulation rigidity	Measures the rigidity of three specific components of employment law: difficulty of hiring, hours of work, and difficulty of firing.
	Labor firing cost	Measures the cost of advance notice requirements, severance payments and penalties due when firing a worker, expressed in terms of weekly wages.
Registering property	Property procedures	Number of procedures that are legally required for registering property transfers.
	Property days	Number of calendar days necessary for completing all procedures that are legally required for registering property transfers.
	Property cost	Cost as percentage of the property value associated with completing all procedures that are legally required for registering property.
Getting credit	Legal rights	Measures whether collateral and bankruptcy laws provide for 10 features that facilitate lending.
	Credit information	Measures rules affecting the scope, access and quality of credit information available through either public or private credit registries.
Protecting investors	Disclosure index	Measures whether laws and regulations provide for seven ways of enhancing company disclosure of ownership and financial statements.
Enforcing contracts	Contract procedures	Number of procedures mandated by law or court regulation for enforcement of commercial contracts through the courts.
	Contract days	Number of calendar days necessary for completing all procedures mandated by law or court regulation for enforcement of commercial contracts through the courts.
	Contract cost	Cost as percentage of the contract value associated with completing all procedures mandated by law or court regulation for enforcement of contracts through the courts.
Closing a business	Recovery rate	Measures the efficiency of foreclosure or bankruptcy procedures by estimating how many cents on the dollar claimants–creditors, tax authorities, and employees–recover from a bankrupt firm.

Source: World Bank Doing Business database, available at www.doingbusiness.org. Data on the starting a business, hiring and firing, and enforcing contracts are constructed based on the methodology in Djankov et al. (2002), Botero et al. (2004) and Djankov et al. (2003a,b), respectively.

business performance in 135 countries and in seven regulatory areas: starting a business, hiring and firing workers, registering property, getting bank credit, protecting equity investors, enforcing contracts in the courts, and closing a business. The data are based on studies of laws and regulations and surveys of local lawyers, providing a more precise and objective measure of the business environment than other available perceptions-based measures of institutions.

We develop an aggregate index of business regulations by taking the simple average of country rankings (from 1 to 135) in each of the seven topics in the database. We then normalize this index to vary between zero and one. The ranking for each topic is the simple average of rankings for each of the component indicators (Table 1). For example the "starting a business" ranking is the simple average of country rankings on the procedures, time, cost and minimum capital requirements to register a business. Higher values indicate more business-friendly regulations. New Zealand, the United States, Singapore, Hong Kong (China), Australia and Norway score highest. The Democratic Republic of Congo, Burkina Faso, Chad, Laos, Cambodia and Angola score lowest. Brazil, Egypt, and India are also in the lowest quartile.

Data on average annual growth of GDP per capita between 1993 and 2002 come from the World Bank's World Development Indicators (WDI). We use the WDI because it covers a larger set of countries than the Penn World Tables used by Hall and Jones (1999) and Sala-i-Martin et al. (2004). All other control variables are also from the WDI, with the exception of civil conflict. This binary variable equals 1 if there was any civil conflict[2] in the period 1993 to 2002, according to the data in Doyle and Sambanis (2000).

3. Results

We first establish that business regulations are an important determinant of growth, then quantify this result and compare it with other determinants of growth. Following Barro (1991), we test the relation between business regulations and growth using the model below:

$$\text{Growth} = \alpha + \beta \text{business\_regulations} + \gamma \text{Ln}(\text{GDPpc93}) + \delta X + \varepsilon,$$

where X is a set of control variables[3] and Growth is the annual average GDP per capita growth rate between 1993 and 2002 in percentage. The results are presented in Table 2 (Panel A). The business regulations index and growth are consistently and positively correlated. Countries with less burdensome business regulations grow faster. We include other commonly used measures of institutional quality from International Country Risk Guide (ICRG) and Transparency International (TI) to verify the robustness of this result. Our main result remains significant after the inclusion of these measures of institutional

[2] Defined as an internal conflict causing at least 1000 deaths.

[3] The set of control variables includes: primary and secondary school enrollment in the initial period, absolute deviation from average GDP deflator in initial period, a binary variable for civil conflict, 3 regional dummies (Sub Saharan Africa, Latin America, East Asia), and average government consumption as percentage of GDP over the 10-year growth period. We differ from the specification included in Barro (1991) by including civil conflict instead of assassinations and revolutions, including a dummy for East Asia (which is present in Barro, 1996), and excluding average investment as percentage of GDP over the 10-year growth period (which is also treated separately in Barro, 1996).

Table 2
GDP per capita growth regressions

Independent variables	Dependent variable: GDP growth rate (average 1993–2002)											
	Panel A: OLS				Panel B: Measures of institutional quality				Panel C: 2SLS			
	(A1)	(A2)	(A3)	(A4)	(B1)	(B2)	(B3)	(B4)	(C1)	(C2)	(C3)	(C4)
Business regulations index	4.5499[a] (1.138)	3.6523[a] (1.155)	3.3290[a] (1.066)	2.8989[a] (1.120)	2.3950[b] (1.324)	2.5878[c] (1.159)	2.5565[c] (1.196)	2.9417[a] (1.135)	5.6375[a] (2.070)	4.8858[c] (1.969)	3.3585[b] (1.939)	4.8474[b] (2.580)
ICRG—corruption					0.1833 (0.246)							
ICRG—law and order						0.1504 (0.228)						
ICRG—democratic accountability							0.1485 (0.163)					
TI—corruption								−0.0514 (0.082)				
Log of GDP per capita 1993	−0.5688[b] (0.290)	−0.8669[c] (0.368)	−0.8887[b] (0.493)	−0.8425 (0.608)	−1.2210[c] (0.597)	−1.1820[b] (0.626)	−1.1109[b] (0.625)	−0.8255 (0.611)	−0.6844 (0.431)	−1.1655[c] (0.525)	−1.7681[c] (0.688)	−2.0007[c] (0.799)
Primary school enrollment 1993			−0.0033 (0.0136)	−0.0061 (0.0147)	−0.0085 (0.016)	−0.0089 (0.015)	−0.0095 (0.016)	−0.0070 (0.015)			−0.0183 (0.0162)	−0.0171 (0.0169)
Secondary school enrollment 1993			0.0088 (0.0145)	0.0099 (0.0168)	0.0178 (0.018)	0.0174 (0.016)	0.0148 (0.019)	0.0103 (0.017)			0.0402[c] (0.0192)	0.0364[b] (0.0186)
Deviation from average deflator 1993			−0.0007[b] (0.0004)	−0.0004 (0.0003)	−0.0004 (0.001)	−0.0004 (0.001)	−0.0003 (0.001)	−0.0004 (0.000)			0.0004 (0.0008)	0.0008 (0.0009)
Civil conflict		−0.7389 (0.595)	−0.4925 (0.620)	−0.8186 (0.668)	−0.8142 (0.702)	−0.7347 (0.728)	−0.8339 (0.705)	−0.8070 (0.676)		−0.2624 (0.619)	−0.4298 (0.595)	−0.5497 (0.658)
Africa		−1.7182[c] (0.778)	−1.4646[c] (0.722)	−1.7393[c] (0.799)	−2.2028[a] (0.838)	−2.0114[c] (0.859)	−2.1122[c] (0.829)	−1.7206[c] (0.805)		−2.1831[c] (1.037)	−1.8658[c] (0.897)	−2.3562[c] (1.095)
East Asia		0.9862 (0.761)	1.3956 (0.849)	0.9425 (0.880)	0.7034 (0.962)	0.7705 (0.977)	0.8208 (1.007)	0.9750 (0.892)		0.4746 (0.932)	1.5375 (1.006)	0.8629 (1.065)
Latin America		−0.8532 (0.550)	−0.6416 (0.578)	−0.8238 (0.771)	−1.0247 (0.823)	−0.8286 (0.828)	−1.1449 (0.833)	−0.8107 (0.774)		−1.1474[b] (0.618)	−0.4215 (0.583)	−0.7654 (0.828)
Government consumption (as % of GDP)				−0.0849[a] (0.0308)	−0.0833[a] (0.031)	−0.0802[c] (0.032)	−0.0816[a] (0.031)	−0.0848[a] (0.031)				−0.0701[c] (0.0322)
Constant	4.1538[c] (2.088)	7.6757[a] (2.911)	7.8087[b] (4.066)	9.4828[b] (5.067)	12.2790[c] (5.003)	11.6745[c] (5.016)	11.3551[c] (5.346)	9.5885[b] (5.110)	4.4614 (2.824)	9.7066[c] (4.042)	14.4984[c] (5.666)	17.2290[a] (6.433)
Obs	133	133	131	106	95	95	95	106	104	104	103	84
R^2	0.09	0.19	0.22	0.26	0.30	0.30	0.30	0.27	0.13	0.23	0.30	0.36

Robust standard errors in parentheses. The Instrumental Variables regressions use the following variables as instruments for business regulations: legal origin (English, French, German, Nordic, and Socialist), principal religion in the country (Catholic, Muslim, Protestant, Other), percentage of English speaking population, initial GDP per capita and absolute latitude.

[a] Significant at the 1% level.

[b] Significant at the 10% level.

[c] Significant at the 5% level.

quality,[4] as shown in Table 2 (Panel B). The business regulations index differs from these variables in two ways. First, it focus on a particular area of institutional quality. Second, it is based on objective measures (number of procedures, number of days, etc.), while the other variables are perceptions-based.

From the results in Table 2 (Panel A), we cannot distinguish from three possible scenarios to establish causality. First, countries may have higher growth rates because of better business regulation. Second, countries that grow more may have more available resources to improve business regulations. Third, there may be another variable that makes business regulations and growth move together. To examine the causal link between regulations and growth we use two-stage least regressions. Following La Porta et al. (1998), we instrument business regulations with the legal origin of a country's commercial code or company law, absolute latitude, initial GDP per capita, religion and language. Legal origin has the characteristics of a good instrument for business regulations. It defines substantive and procedural aspects of the law, and therefore is linked to the complexity of business regulations. And it is reasonable to assume that legal origin, established centuries ago, does not have a direct impact on growth over the last decade. The same applies with the geography and culture variables. Table 2 (Panel C) presents the results. The effect of more business-friendly regulations on growth remains positive and significant in 2SLS regressions, although weaker than in OLS analysis. Tests of over-identifying restrictions are accepted, showing that the legal origin, geography and culture variables are not correlated with ε, and that these variables do not explain growth through some mechanism other than business regulation.

We check the robustness of our results by including several other control variables in the regressions reported in Table 2 (Panel A). Our results remain significant when controlling for trade, initial period investment, ethnolinguistic fractionalization, latitude, and landlocked countries. Also our results are robust to including the country's primary religion and language as control variables instead of as instruments. We also try using 5-, 15- and 20-year growth rates as well as GDP levels as the dependent variable and our results remain.[5] Analyzing data from the Penn World Tables[6] as used by Barro (1991), Hall and Jones (1999) and Sala-i-Martin et al. (2004) does not alter our results, nor does replacing the WDI education data with the one introduced by Barro and Lee (1996).

4. Interpretation

Our results indicate that government regulation of business is an important determinant of growth and a promising area for future research. The relationship between more business-friendly regulations and

[4] Corruption, rule of law and democratic accountability are highly correlated with the business regulations index. The pairwise correlation coefficient between the business regulations index and other measures of institutional quality is as follows: 0.6154 for ICRG—corruption; 0.5796 for ICRG—law and order; 0.4585 for ICRG—democratic accountability; 0.1485 for TI—corruption. The first three coefficients are significant at the 1% level. The last coefficient is significant at the 10% level. According to ICRG, the corruption variable is "an assessment of corruption within the political system; [..] actual or potential corruption in the form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding, and suspiciously close ties between politics and business". Law and order assesses both the strength and impartiality of the legal system and the popular observance of the law. Democratic accountability measures how responsive government is to its people. (www.icrgonline.com). According to the source, "the TI Corruption Perceptions Index (CPI) ranks countries in terms of the degree to which corruption is perceived to exist among public officials and politicians" (www.transparency.org).

[5] Although results are weaker for 5-year growth in the specifications that include regional dummies.

[6] Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.1, Center for International Comparisons at the University of Pennsylvania (CICUP), October 2002.

Table 3
GDP per capita growth regressions: regulations compared with other determinants of growth

Independent variables	Dependent variable: GDP growth rate (average 1993–2002)			
	(1)	(2)	(3)	(4)
First quartile of business regulations	−2.8557[a] (0.662)		−2.7697[a] (0.654)	−.3241[a] (0.649)
Second quartile of business regulations	−1.2614[b] (0.569)		−1.1830[b] (0.574)	−1.2631[b] (0.597)
Third quartile of business regulations	−1.9673[a] (0.521)		−1.9621[a] (0.535)	−1.8727[a] (0.590)
First quartile of primary schooling 1993		−0.8633 (0.685)	−0.7636 (0.656)	−0.5334 (0.646)
Second quartile of primary schooling 1993		−0.9685[c] (0.535)	−1.0293[c] (0.532)	−0.9454[c] (0.506)
Third quartile of primary schooling 1993		0.2744 (0.523)	0.1486 (0.503)	0.0965 (0.449)
Log of GDP per capita 1993	−0.4878[c] (0.254)	−0.0530 (0.197)	−0.6050[b] (0.248)	−0.9214[a] (0.298)
Civil conflict				−0.6942 (0.604)
Africa				−1.7878[b] (0.710)
East Asia				0.6247 (0.765)
Latin America				−1.0285[c] (0.564)
Constant	7.2401[a] (2.399)	2.4996 (1.788)	8.5690[a] (2.384)	11.6800[a] (2.944)
Obs	133	133	133	133
R^2	0.12	0.04	0.15	0.25

Robust standard errors in parentheses.
[a] Significant at the 1% level.
[b] Significant at the 5% level.
[c] Significant at the 10% level.

higher growth rates is consistently significant in various specifications of standard growth models, and more consistently so than other determinants commonly used in the growth literature.

The impact of improving regulations is large. In Table 3, we analyze the magnitude by including dummies for each quartile of the business regulation index in the OLS regressions. Improving from the worst (first) to the best (fourth) quartile of business regulations implies a 2.3 percentage point increase in average annual growth.

Table 3 also compares the impact of improving business regulations with another commonly used determinant of growth: primary school enrollment. Improving from the second worst to the best quartile of countries on primary school enrollment is associated with a 0.9 percentage point increase in growth rates, lower than the effect of business regulations. The effects of improvements in secondary education, inflation, and government consumption are also significantly lower than the effect of business regulations.

Our results also have significant implications for policy. They suggest that countries should put priority on reforming their business regulations when designing growth policies. Measures of institutions currently used in the growth literature indicate the extent of problems but not how to fix them. By contrast the indicators in the Doing Business database are directly linked to specific reforms. For example the procedures to register a business or property can be cut by combining them at a “one stop shop” for businesses. Establishing a credit bureau or reducing mandated severance pay for workers will also improve performance on the business regulations index. Our findings imply that identifying and implementing such reforms can accelerate economic growth.

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