



## **The Fourteenth Dubrovnik Economic Conference**

Organized by the Croatian National Bank



**Simon Commander and Katrin Tinn**

### **Explaining the Performance of Countries and Firms: What Role Does the Business Environment Play?**

Hotel "Grand Villa Argentina",  
Dubrovnik  
June 25 - June 28, 2008

Draft version

Please do not quote



**CROATIAN NATIONAL BANK**

**Explaining the performance of countries and firms:  
what role does the business environment play?**

**Simon Commander and Katrin Tinn<sup>1</sup>**

---

<sup>1</sup> EBRD and London Business School; Stockholm School of Economics respectively. Authors' contact details: [commanders@ebrd.com](mailto:commanders@ebrd.com) and [katrin.tinn@hhs.se](mailto:katrin.tinn@hhs.se)

## **Introduction**

It is widely accepted that the business environment - encompassing features of the legal, regulatory, financial, and institutional system of a country – has an impact on the performance of firms. As barriers to doing business appear to vary widely across regions and countries, it is also widely held that the business environment affects aggregate performance. As such, empirical investigation of these conjectures can proceed at both firm and country levels. This has been enabled by the large scale collection of firm level datasets by organisations such as the EBRD, as well as the collection of country level datasets that attempt to measure dimensions of the business environment; such as those put together by Heritage Foundation, the Global Competitiveness Report or the World Bank’s annual ‘Doing Business’ survey. Simply stated, the common underlying assumption of all these exercises appears to be the belief that countries and firms facing ‘better’ business environments can be expected to perform better<sup>2</sup>. There is also now a growing volume of empirical studies that have in turn used these various datasets to verify this basic conjecture. The bulk of this literature has concluded that there is an identifiable and robust association between performance and the nature and extent of constraints that countries and firms face.

This paper attempts to evaluate the robustness of these conclusions using two, complementary types of data. The first is a country level dataset, namely the World Bank’s annual ‘Doing Business’ survey that covers 175 countries. For this survey, a questionnaire organised around a hypothetical business case is administered to a range of expert respondents in each country. The full set of Doing Business indicators are then put together in an aggregate ranking that aims to summarise a country’s ease of doing business. While this survey has relatively few observations over time – data collection only started in 2003 – it has large country coverage and has already been widely used in cross-country analysis. In this paper, the Doing Business measures are primarily used to try and establish whether there is any link from country-level measures of the business environment to country-level performance.

---

<sup>2</sup> For example, Djankov et al (2006) argue that when using a simple average of country rankings from ‘Doing Business’ as an aggregate measure of the business environment, an improvement in a country’s indicators from being in the lowest quartile to the best would imply a 2.3% improvement in annual growth.

The second comprises a large firm level dataset – the 2002 and 2005 rounds of the Business Environment and Enterprise Performance Survey (henceforth BEEPS)<sup>3</sup> - that includes measures of firm performance, variables relating to ownership, competition and export orientation as well as perceptions of the business environment. The dataset covers between 6-9,000 firms in 26 transition countries. As the two rounds of the survey provide data on firms over a six year period, they allow examination of the relationship over time between performance and a range of explanatory variables, including the business environment. They can also throw light on the links from constraints to actions, like restructuring and product innovation.

The paper is organised as follows. Section 2 provides an overview of the recent literature – theoretical and empirical - on the business environment. Section 3 proceeds at country level and asks whether the Doing Business indicators can help explain differences in performance across countries. Section 4 then turns in detail to analysis of the BEEPS firm-level dataset. As we find that both the country and firm level findings provide scant support for the view that the business environment exerts a strong and measurable impact on performance, Section 5 asks why this might be the case. Section 6 examines the possible implications for policy and Section 7 concludes.

## **2. Business environment and performance: a literature review**

The theoretical literature identifies differences in institutions as one of the key sources of differences in gross country income and growth rates. Most generally, Parente and Prescott (1994) argue that broadly defined institutional barriers increase the cost of technology adoption and hence reduce long-term income per capita. Other authors have focussed more on the relationship between performance and specific frictions such as, credit constraints (for example, Gertler and Rogoff, 1990, Banerjee, et. al, 1993, Aghion et. al., 2003 and 2005), contract enforceability (for example, Quintin, 2003, Acemoglu et. al. 2006), investor protection (for example, Rui et al. 2004) and entry costs (for example, Marimon and Quadrini, 2006, Aghion et. al., 2006). However, while in general this body of work holds that worse institutions should imply worse performance, the literature also suggests that such relationships are not necessarily linear and monotonic.

---

<sup>3</sup> The dataset is collected by EBRD and the World Bank and has had three rounds, 1999, 2002 and 2005. A fourth round is being implemented in 2008.

The links between institutions and performance have also been analysed in a large and growing empirical literature. However, the bulk of the research relies on country-level proxy indicators of the business environment, such as governance (for example, Kaufmann et al., 1999, 2002, 2006), regulatory constraints (for example, Djankov et al., 2002, and Botero et al. 2004), competitiveness (for example, the World Economic Forum's Global Competitiveness Report), transparency (for example, the country ratings produced by Transparency International), bureaucratic quality, corruption and law and order (for example, the work of Political Risk Services), strength of the legal system (Durnev and Kim, 2005), and the level of economic freedom in an economy (for example, the Heritage Foundation's Annual Report). Knack and Keefer (1995) and Hall and Jones (1999) also find a correlation between measures of property rights and GDP per capita.

A feature common in much of the country level research is that most of the aggregate proxies used in the research contain relatively little or no variation over time and are hence largely indistinguishable from country-, sector- or region-specific effects that may reflect other features than the business environment. Moreover, these aggregate studies usually estimate the association between features of business environment and macroeconomic performance rather than identify the causal effects of the environment on performance (for example, Levine and Zervos, 1998; Rajan and Zingales, 1998 and others). However, Acemoglu, Johnson and Robinson (2001) try to establish a causal relationship by using mortality rates of European colonialists as an instrument for current institutions. Acemoglu and Johnson (2005) further try to separate the effect of property rights institutions from that of contracting institutions. They find that the former have a first-order effect on performance, while the latter matter only through their impact on financial intermediation.

A further body of empirical research relies primarily on industry or firm level survey data to try and look at the links between performance and constraints. Industry level studies (for example, Rajan and Zingales (1998), Klapper et al (2004)) can control for country and industry effects but have the disadvantage that they use a benchmark country where the optimal value of the business environment has to be assumed. In many developing countries, industry level evidence is lacking.

At the firm level, data collection using specifically designed surveys has been widely adopted. For example, the World Bank has implemented over 135 surveys in over 70 countries between 1999 and 2005. In most instances, these surveys ask firm

respondents in considerable detail about the sort of constraints that they commonly face and the perceived intensity of those constraints. They often try to order perceptions of the strength and the relative importance of particular constraints for particular firms. These surveys also ask in detail about firm level performance over specific reference periods.

A range of studies using these firm level surveys has now claimed to find a strong link between the variation in performance and perceived constraints (for example, Beck et al (2005), Ayagari et al (2005), Hallward-Driemeier et al (2006). Yet, looking at the links from the business environment to performance in this literature raises a number of methodological considerations concerning the possibility of biased estimates due to errors in variables, omitted variables and the endogeneity of regressors.

Common to all these studies, whether conducted at country, industry or firm level, has been the desire, first, to measure the principal constraints on a country, industry or firms' performance and then to measure the size of the effect of a constraint, whether with respect to an individual constraint or a set of constraints, on performance. Underlying this approach is the obvious idea that understanding the type and consequences of constraints helps in the formulation of appropriate policy for addressing those constraints. Indeed, the analysis of these data series has also been linked to explicit policy conclusions (for example, World Development Report (2000)).

### **3. Country level analysis**

For the country level analysis, the dataset that is used is the World Bank's Doing Business survey. Doing Business employs a template questionnaire targeted at local professionals in a variety of fields, including lawyers, officials and consultants. The questionnaire is organised around a hypothetical business case and then administered to a range of expert respondents in each country. It has now been administered up to five times between 2003 and 2007. In 2007 over 5000 experts were contacted in 175 countries. Information on ten indicators - namely, starting a business; employment regulation; enforcing contracts; getting credit; closing a business; registering property; protecting investors; dealing with licenses; paying taxes and trading across borders - was collected in 2007. However, information on only five sets of indicators has been

collected for all years since 2003<sup>4</sup>. The full set of Doing Business indicators are also put together in an aggregate ranking that aims to summarise a country's ease of doing business.

Doing Business stresses that use of a template enables cross country comparison. It has also been claimed that expert opinion is able to provide representative information superior or equivalent to information generated by firm surveys. However, given that most expert respondents are based in the major urban centre(s) and are likely to deal with particular types of firms, this is open to question. Certainly, for large countries – like Brazil or India – to have unique indicators seems a heroic assumption. There are also a number of quite restrictive assumptions made about the representative firm.

A further assumption in Doing Business is that there are underlying linear and monotonic relationships. For example, the Doing Business indicators could be expected to be positively related to performance when included additively in a regression. Further, institutional frictions appear to be expected to have a similar impact irrespective of the country's general level of development and sectoral specialisation. Assumptions of linearity clearly motivate the construction of most of the doing business indicators. For example, the “strength of investors’ protection index” is a simple average of the “extent of disclosure index”, the “extent of director liability index” and the “ease of shareholders’ suit index”. The “extent of disclosure index” is itself the sum of binary indicators such as: disclosure of family ownership, disclosure of voting arrangements, availability of ownership and financial information publicly available etc. Such linearity may, however, be questionable.

The philosophy behind Doing Business has causality running from institutions to performance. Identifying these effects raises obvious issues of endogeneity. Nevertheless, it has been claimed that improvements in country level indicators tend to be associated with improvements in a country's performance<sup>5</sup>. Further, while performance can be summarised by country level growth, there is evidently a set of hypothesised relationships between the Doing Business indicators and intermediate outcomes. These are indicated in *Table 1*. For example, improvement in the “credit

---

<sup>4</sup> Starting a business, employment regulation; enforcing contracts; getting credit and closing a business.

<sup>5</sup> For example, Djankov et al (2006) using a simple average of country rankings argue that an improvement in a country's indicators from being in the lowest quartile to being in the top quartile would imply around a 2.3% improvement in annual growth.

information index” could be expected to increase domestic credit. Higher domestic credit could in turn be expected to yield higher growth<sup>6</sup>.

### 3.1 Business environment and country performance

This section first looks at the relationship between country-level performance and the Doing Business indicators. The relationship between intermediate outcomes and performance is then analysed. The country level analysis is done in the spirit of the cross-country growth analysis of Barro and Sala-i-Martin(1998). However, due to limited availability of data, only the relationship between growth over the period 2003-2005 and the Doing Business indicators available for 2003 can be explored. Equation 1 is estimated;

$$Growth = \ln(GDP_{2005} / GDP_{2003}) = \alpha + \beta \ln(GDP_{pc,2003}) + \gamma DB_{2003} + \delta X + \varepsilon \quad (1)$$

in which the growth measure is the log difference of real PPP adjusted GDP. On the right hand side of the equation are included the log of PPP adjusted GDP in 2003, the Doing Business indicators available for 2003 and an additional set of controls  $X$ . These are secondary school enrolment and government expenditure to GDP; the latter being a measure of the size of government. The procedure is to run separate regressions that include the Doing Business variables from each of the four available categories - starting a business, employing workers, enforcing contracts and closing a business – which are entered separately (Columns 1-4) and then jointly (Column 5). *Table 2* reports the results. No statistically significant association with the expected sign can be found. The coefficients on procedures to start and time to close a business are weakly significant but wrongly signed.

Yet, the existence of a relationship between institutions identified by Doing Business and growth cannot be completely ruled out. For a start, it is only possible to look at the growth rate over a very short period of time that could have been affected by business cycles. Second, the impact of institutions on growth is far more likely to be a longer term phenomenon and might not affect performance immediately. Third, only a subset of the Doing Business indicators was available for 2003. It is also not possible to address the issues arising from potential reverse causality due to the

---

<sup>6</sup> The positive relationship between credit and growth is supported by a large theoretical and empirical literature (see Levine, 2004 for a literature review in this area).



absence of suitable instruments. The countries that have a potential to grow faster may have more incentives to develop institutions. However, this would likely result in overestimating the strength of relationship between the Doing Business indicators and growth. As there is no association, the importance of this is unlikely to be critical.

Turning to the second component of the analysis, as the Doing Business indicators might affect growth through their impact on intermediate outcomes, similar regressions relating intermediate outcomes to the indicators are reported. The most recent available data on the intermediate indicators are related to the contemporaneous Doing Business indicators. The estimates also use as controls the log of PPP adjusted GDP, government expenditure to GDP and secondary school enrolment. These results are reported in *Table 3*. The results in the first column include only one relevant group of Doing Business indicators. The second column reports results when Doing Business indicators from all relevant categories are jointly included. Exceptions are stock market capitalisation and the stock turnover ratio where the second column gives the impact of the overall investor protection index and first column gives the impact of subcomponents of the investor protection index individually.

*Table 3* shows that there are some - but very few - statistically significant associations. Better legal rights are positively associated with private credit, capital inflows and FDI. However, these relationships are absent for private bank credit, where it might have been expected to be stronger than with the broader measure of private credit. Legal rights are also found not to be associated with higher investment. Better private and public registry coverage appears to be positively associated with higher private credit and private registries with private bank credit when only the 'Getting Credit' indicators are included. However, the significance disappears when all potentially relevant indicators are included in the regression. The same applies for the recovery rate when closing a business and bank credit, as well as for procedures for registering property and enforcing contracts and the broader private credit measure. Better investor protection is associated with higher stock market capitalization but not with stock market liquidity as measured by the stock market turnover ratio. Note that it is hard to argue that the causality of these statistically significant relationships runs from institutions to better credit and stock market development, as the development of these markets will have naturally created a need for better regulation. Other relationships appear even weaker. For example, there are

no significant and predictably signed associations with registering property indicators and construction, export and import with the trading across borders indicators, informal economy and starting business, employing workers and enforcing contracts and unemployment with employment indicators. Investment is unrelated to most Doing Business indicators, while there is a weak association with procedures to deal with licences and enforcing contracts.

### **3.2. Country and firm level measures: how correlated?**

The Doing Business indicators are meant to represent the obstacles to an average firm in a given country. But do such indicators and firm level measures of obstacles appear to give broadly consistent responses? While laws and regulations – the indicators collected by Doing Business - may well differ from what actually exists on the ground, it seems generally likely that they will be correlated.

For the analysis, firm level evidence from a very large set of surveys collected by the World Bank is used. The World Bank Enterprise Surveys dataset contains over 30,000 firm level observations for at least 75 countries with information relating to the period from 1999-2006. The survey instruments that have been applied in the different countries have significant overlapping questions that allow for comparison. Our procedure is to relate the Doing Business measures to those responses in the firm level surveys that are their closest match.

*Table 4* reports the regression results using either ordinary least squares or ordered probit, as appropriate. They are estimated for the full sample as well as by country income categories. In the baseline estimates, controls for industry, firm size, age of the firm and the shares of the workforce with secondary education are included. In addition, GDP is controlled for using the lag of PPP adjusted GDP per capita and this is reported separately. The Doing Business indicators are entered individually. The table reports the sign of the coefficients on the relevant Doing Business measures when they are significant at a 5% or greater level (-- otherwise). It is evident from the base run for the sample as a whole that there is some correlation consistent with the underlying conjecture but that it is far from complete. Indeed, there are instances where the sign is perverse or where any association is absent, for example in the case of confidence in the legal system and dealing with licenses. And some of the more objective variables that might be expected to be tightly linked –

such as the trading across borders indicators and the time to import or export responses – are actually largely uncorrelated.

When looking at the income categories, what stands out is that predictable – viz., correctly signed – associations are present but mostly in the minority of cases. For example, for the high income countries, the firm survey questions relating to customs and trade regulation are positively and predictably associated with the four Doing Business indicators. But in the case of confidence in the legal system for enforcing contracts and the two Doing Business indicators for dealing with licenses, there is no association. The table also shows that there is no particular pattern across income groups: the association between the survey questions and the Doing Business indicators for the high and upper middle category is very similar to the low income category. When adding the GDP per capita control it appears that in a significant number of cases the signs often change and are not stable. Moreover, when estimated jointly many coefficients lose significance or switch sign.

In short, it appears that there is no tight association between the Doing Business measures and firm level survey responses. This may be attributed to a number of factors. For instance, in the firm level data there is large variation *within* countries – the standard deviations are large with the exception of a few indicators – and there is more variation within-industry than between-industry<sup>7</sup>. This suggests much variation in subjective responses. Given that we cannot control for individual respondents' attributes, this variation is hard to explain<sup>8</sup>. What is not clear is whether the country level indicators represent an improvement or dis-improvement in the measurement of constraints. At this point, all that can be said is that there are major discrepancies between the two approaches that are difficult to understand, let alone explain.

#### **4. Firm level analysis**

For this part of the analysis, information from the 2002 and 2005 rounds of the BEEPS is used<sup>9</sup>. The BEEPS is a stratified random sample of firms in 26 transition countries. Around 90 per cent of the BEEPS sample in both years comprised small

---

<sup>7</sup> There are no obvious patterns when controlling for the size of firm or ownership.

<sup>8</sup> Of course, such variation will tend to average out over a large population

<sup>9</sup> For a more detailed analysis, see Commander and Svejnar (2008)

and medium enterprises. Most firms had been privatised or were always private<sup>10</sup>. The 2002 round of the BEEPS surveyed over 6,100 firms while the 2005 round covered nearly 9,100 firms in the same countries. *Table 5* provides some simple descriptive statistics. The average age of the firms in the sample was around 15 years. Average firm size in employment ranged between 105 and 143. The value of sales increased significantly between 2002 and 2005 although the average value of fixed assets declined in the same period. Changes in labour productivity were positive in both reference periods and of similar magnitudes. Exports also grew in both periods and comprised, on average, between 9-11% of total sales. The lower part of *Table 5* also reports the average scores and standard deviations for the constraints where 1 indicates no obstacle and 4 is a major obstacle. Each firm's top manager was asked to provide their perception of the constraints. Tax rates and administration, uncertainty about regulatory policies and the cost of financing were clearly viewed as important obstacles with scores in excess of 2.5. There is substantial variation in mean values across perceived constraints and the standard deviations are large in almost all instances.

To analyse the determinants of the efficiency with which the firms generate sales revenue from inputs, an augmented Cobb Douglas revenue function is used:

$$\ln y_{it} = \beta_0 + \sum_k \beta_k \ln x_{ikt} + \rho Z_{it} + \delta I_{it} + \theta C + \zeta T_t + \varepsilon_{it}, \quad (2)$$

where  $y_{it}$  represents the revenue of firm  $i$  in period  $t$ ,  $x$ 's represent the capital and labour inputs,  $Z_{it}$  is a vector of the business environment and structural variables (business constraints, export orientation of the firm, extent of product market competition and firm ownership), the  $I$ 's,  $C$ 's and  $T$ 's denote a set of dummy variables for industries, countries and years, respectively, and  $\varepsilon_{it}$  is an independently distributed error term. Equation (2) allows efficiency to vary across institutional and structural variables, industries, countries and time.

When estimating (2), an obvious issue is how best to control for the potential endogeneity/selection issues related to some of the explanatory variables. To deal

---

<sup>10</sup> Quota sampling was used for foreign owned and state-owned companies and set at 10 per cent of the total sample for each category. The distribution between manufacturing and service sectors was according to their relative contribution to GDP in each country. Firms subject to government price regulation and prudential supervision were excluded, as were firms with 10,000 employees or more were also excluded as well as firms that started operations in 2002-2004.

with this, an instrumental variables (IV) approach is used. For several key variables, lagged three-year differences can be used as instruments. For each year in each firm, there are also data on the number of workers with university and secondary education and the ratio of these two inputs (skill ratio) is also used as an instrument<sup>11</sup> The use of a skill ratio relies on the exogeneity of the ratio of wages of the more and less educated workers at the firm-level, and on variation in this wage ratio across regions and countries.

Equation (2) is estimated in levels on the pooled 2002 and 2005 samples of firms containing between 5624 and 5897 observations. The IVs are the age and location of the firm, the skill ratio interacted with the three main regions covered by the data,<sup>12</sup> the skill ratio interacted with firm age and the three regions, a three-year lagged number of full time employees, the change in fixed assets in the preceding three years, and the change in the export share over the preceding three years. These variables have been used as instruments for the levels of the capital and labour inputs, categories of ownership and the export orientation of the firm. The IVs are found to be good predictors of all the potentially endogenous variables and pass the J (Sargan) over-identification test. The extent of competition in the firm's product market is viewed as exogenous to a given firm.

Finally, in order to assess the robustness of the results with respect to the business environment, an average value of each constraint is used. The average has been based on responses either by all other firms in a given industry in each country and year, or by all other firms of a given size in a given industry in each country and year. The standard errors of all estimates are clustered by year, country, industry and firm size.

Commander and Svejnar (2008) reports the full set of baseline IV estimates without the explanatory variables capturing the business environment constraints. They show that the labour and capital coefficients are both positive and statistically significant, and their sum approaches unity. The coefficients on both the privatised and new private firms are negative and, in the latter case, marginally significant in most specifications. By contrast, foreign ownership has a large and positive coefficient that is significant at the 1% level. The positive effect of foreign ownership

---

<sup>11</sup> The rationale for this instrument comes from an assumed exogeneity of input prices (wages); see Marschak and Andrews (1944).

<sup>12</sup> The regions are (a) Central Europe and Baltics, (b) the Commonwealth of Independent States (CIS), and (c) Southeastern Europe.

is maintained but the significance of the negative effect of new private ownership disappears when the export share and competition variables are entered. Interestingly, when controlling for ownership, the export share variable loses all significance. When most or all of the explanatory variables are entered simultaneously, competition has a small, positive and significant (at 10% level) impact on performance, with foreign ownership exerting a strong and positive impact on performance as well. Being privatised or being a new private firm remains negatively signed but insignificant relative to state-owned firms. These augmented specifications also generate acceptable values of the J and F tests related to the selection of IVs in the first stage of estimation. The preferred (all-encompassing) specification signals the importance of foreign ownership and, to a lesser extent, competition on performance.

The next stage is to consider directly the impact of business environment constraints on firm performance. For each constraint, the average of responses of other firms in the same 2 digit sector, firm size (small, medium and large), country and year are used. Most constraints are actually not highly correlated, for those that display high pair-wise correlation only one of constraint variables is entered. This leaves nine constraints whose effects are now analysed.

In keeping with much of the literature and despite the obvious omitted variable problem, the nine constraints are included in the performance regression, individually, as an average of all nine constraints and with all constraints entered together without country, year and sector fixed effects<sup>13</sup>. When entered individually, all except one of the constraints enter negatively and most are significant at 1% or 5% levels. These specifications appear to replicate the conventional wisdom that the business/institutional environment matters. The regression with the average value of all nine constraints also yields a negative and statistically significant coefficient. When all the constraints are entered simultaneously in the IV estimation, the infrastructure and, to a lesser extent, tax rate and macro instability constraints remain negative and significant, but others lose significance or become positive and significant. Hence, correcting - at least in part - for the possible omitted variables problem, the negative effect of most business environment constraints on performance disappears.

---

<sup>13</sup> See Commander and Svejnar (2008) for full results. Note that this model appears to be mis-specified compared to one that includes these fixed effects as the labour coefficient is small and insignificant, and the p values on the J test are very small

*Table 6* includes country, year and sector fixed effects whose omission may have biased the estimates<sup>14</sup>. But while most of the constraint terms entered individually retain their negative sign, only one – corruption -- is significant. The effect of the average of all constraints is statistically insignificant, as are all the constraint coefficients when they are entered simultaneously. It is the country as well as country *cum* year fixed effects in particular that serve to knock out the significance of the individual constraints. Hence, controlling for country-wide differences in the ‘business environment’, the negative effects of most constraints disappear.

The analysis was extended by also looking at the possible impact that interactions of constraints might have on performance, in line with recent explorations in the literature (see, for example, Aghion et al., 2005, 2006). The intuition here is that, say, corruption may or may not have a direct impact itself, but may exert an effect through its association with other constraints related to government policies and regulations, such as the functioning of the judiciary, uncertainty about regulatory policies, labour regulations, business licensing, and tax administration and tax rates. However, neither when the interactions were entered one at a time, nor when all were entered simultaneously, were statistically significant results found.

One important result from the analysis is that country differences, presumably in the overall business environment, but also in other aspects, matter for firm performance while the within-country cross-firm differences do not. Closer inspection of the country fixed effects reveals that the rankings are not stable and have a number of unexpected features, suggesting that the country effects are also capturing other sources of heterogeneity. For these reasons, it is desirable to control for country effects as they capture many features of heterogeneity, rather than excluding them or attributing the cross-country heterogeneity to just a single factor, such as an aspect of the business environment.

In view of the findings based on manager perceptions of the business environment, it is interesting to ask whether other measures of the business environment produce similar results. To this end, the firm-level data were also merged with the Doing Business indicators that have been used in the first part of this paper<sup>15</sup>.

---

<sup>14</sup> The significance of the coefficients on inputs, ownership, exports and competition correspond to those in the base estimations

<sup>15</sup> These are, the number of procedures to register a business, time to register a business, cost of registering a business, rigidity of employment regulations, restrictions on firing workers, cost of firing a worker, number of procedures to enforce a contract payment after default, time to enforce a contract

When entering the Doing Business indicators individually into the IV regressions in a specification with country, industry and year fixed effects, only four of the twelve indicators generated the expected negative coefficients. In the IV regressions without fixed effects, only two of the twelve indicators had negative effects. Moreover, the indicators with the negative coefficients were not the same ones across specifications. In other words, widely used country-level indicators of the business/institutional environment do not provide strong evidence of a negative relationship between the constraining environment and firm performance.

### **5. Why does the business environment explain so little?**

The analysis above suggests that neither at country nor firm level do measures of the business environment appear to have significant explanatory power when relating constraints to performance. This section asks why that is the case.

Potential explanations fall into four broad categories. The first is that the various indicators may simply be mis-measured. The second is that the indicators may be incomplete and/or too specific. The third is that the underlying relationships may be more complex and the fourth is that the identification strategy is incorrect.

With respect to the country level indicators in Doing Business, the objective of looking at an average representative firm is likely to be problematic. First, there is the issue of how a representative business is defined. Second, focusing on an average firm obviously ignores heterogeneity among firms as well as sectoral specialisation in a country. The higher correlation of the Doing Business indicators observed in high income countries might suggest that the templates are best designed for a representative firm in a high income country. If firms in less developed countries are engaged in substantially different production activities, the constraints they face are likely to be very different.

Similar sample selection issues are likely to affect the responses of firms more generally. If there are many obstacles in the business environment, only agents with the best entrepreneurial and/or managerial talent may be active. Further, it is unclear what entrepreneurial or managerial talent actually means in a poor business environment. For example, it may be that these entrepreneurs have the best ability for

---

payment after default, cost of enforcing a contract payment after default, time to effectuate bankruptcy, cost of effectuating bankruptcy, and recovery rate in a bankruptcy.



dealing with corruption rather than being the most dynamic in other more productive areas. Nevertheless, such issues are likely to create bias in firm responses.

Both the Doing Business indicators and firm level responses are ultimately subjective. Responses can be affected by the mood and personality of the respondent as well as by respondents adapting to the business environment. While the first effect is likely to average out in the firm level surveys, it does not necessarily average out in a small number of expert opinions, as in Doing Business. To the extent that questions in Doing Business are more objective by trying to measure constraints more specifically – such as the time to enforce contracts – they may suffer from less possible bias than firm level surveys. The issue of adaptation is also a problem when evaluating the business environment using firm level subjective responses. In this instance, it will not average out irrespective of the number of responses.

Additional explanations for the lack of explanatory power could be that the variables and indicators that are collected are too specific. Take the example of credit and enforcing contracts in Doing Business. The theoretical literature often models this as the probability of avoiding repayment to the creditor (for example, Hart and Moore, 1994, Marimon and Quadrini 2006, Aghion et al., 2003). There is no direct measure of this in the Doing Business indicators, while there are several proxies such as the time, procedures and cost of enforcing contracts. There are also important variables and indicators missing in both firm and country level surveys. For example, R&D and technology adoption are likely to be major sources of growth and incentives to innovate are likely to be affected by intellectual property rights (Parente and Prescott, 1994). The incompleteness of the existing measures is likely to be a problem.

Then there is the validity of the assumption of a monotonic relationship between country level indicators and economic performance. For example, the correlation of the Doing Business indicators with GDP and with several intermediate outcomes appears to decline with income. This result is probably not surprising. For example, investor protection is likely to be important in countries that have formal equity markets. In the absence of these markets, differences in minority shareholder protection are unlikely to affect performance. Another example concerns the substantial differences in the availability of skilled labour among countries. The technology that is appropriate in countries that are abundant in skilled labour may not be appropriate in countries that are not (Acemoglu, 2002). As a result, the constraints

to productive activity in high vs. low income countries may be different depending on the availability of skilled labour. This suggests the presence of thresholds of income per capita or other indicators, such as labour force or size of equity markets, at which constraints will matter or not.

Finally, there is the issue of the identification strategy. In the context of firm level evidence, Carlin et al (2006) argue that the parameter estimates from an equation relating a measure of performance to particular constraints can be biased for several reasons. The first is that many of the measures of constraints that have been collected may in fact be more in the nature of public goods that are an input into private production. As such, the issue of the endogeneity of public good supply will exist, as better performing countries will generally have better levels of supply. Second, with respect to the demand for public goods, better performing firms will tend to demand better public goods provision. In other words, there may be a problem of reverse causality<sup>16</sup>. Yet, the analysis in Commander and Svejnar (2008) and in this paper of the firm level evidence has used an instrumental variables approach in order to avoid these pitfalls and still has been unable to find robust evidence of constraints having an impact on performance.

## **6. Measures of the business environment and policy**

It has been claimed that indicators of the business environment – such as Doing Business - allow countries to sort out reform priorities and act on them. It has also been suggested that benchmarking to other countries helps motivate reform. Indeed, while our analysis has raised a set of questions concerning the ability of country level indicators to measure institutional frictions and their impact on economic performance, it can still be argued that collecting these indicators can be helpful in giving countries further incentives to improve their institutions, especially in the absence of better measures.

*Table 7* summarizes the direction of the policy changes in countries in the period from 2003 to 2006. The numbers reported are the percentage of countries in a country group where a particular Doing Business indicator has improved in the reference period. First, all the indicators have improved in a substantial proportion of

---

<sup>16</sup> More generally, in firm surveys the information on performance and constraints are raised simultaneously creating obvious problems.

countries in all regions. Negative changes are significantly less frequent. Only in the cases of rigidity in employing workers and the time to close a business have these indicators worsened in a number of countries. Second, the improvements have been most frequent in lower-middle income countries.

An obvious issue concerns the consistency of changes within and between indicators. *Table 8* looks at changes for two sets of Doing Business indicators - enforcing contracts and starting a business - and finds that countries that reform improve on both time and procedure counts. The only case where the time has decreased while the number of procedures has increased is Kenya. Furthermore, given the potential linkages between starting business and enforcing contracts, the reduction in time has occurred simultaneously in 16 % of cases for the overall sample, in 10% of cases for the high income countries, 9% for upper-middle, 32% for lower-middle and 16% for low income countries.

Improvements of institutions in less developed countries could of course be explained by the fact the potential for improvement in these countries is higher. As the indicators lack an adequate time dimension and the impact of improvements could be expected to come with a lag, it is difficult, if not impossible, to analyse the relationship between any of these apparent improvements and economic performance<sup>17</sup>. It is, of course, possible - despite the lack of cross-sectional correlation between income per capita and several Doing Business indicators - that these improvements will have an effect on future economic performance.

It is also hard to analyse whether - and to what extent - these improvements have been triggered by the incentives created by publishing the Doing Business indicators. In addition to being potentially driven by the endogenous choice of local policy makers, these improvements could also be due to other factors, such as the introduction or development of new technology. For example, switching to use of computers could allow a reduction in time, and possibly procedures, required for any regulatory process without any underlying changes in policy.

From a policy perspective, measures of the business environment, such as Doing Business, could have several advantages. The measures are generally quite specific and understandable - as for example reducing the 'number of procedures required to start a business'- compared to improving a broader measure, such as an

---

<sup>17</sup> An attempt is made in Eifert (2007) using four data points, 2003-2006. However, the lack of an adequate temporal dimension makes drawing conclusions very problematic.

index of regulatory quality. Yet, there are also a number of concerns regarding the use of country rankings to identify reform priorities.

First, with any measure in a cross-country ranking, it is questionable whether a bad ranking really means a particular institution being bad in absolute terms. Suppose that in most countries, the time and procedures to pay taxes is not an important obstacle. This should not imply that being ranking badly in this category will make improving this particular institution a main priority. While clearly a hard task, identifying a 'desirable level' of time and procedures in this category would be more helpful.

Second, there are further concerns about which institutions are more important. As discussed by Marimon and Quadrini (2005), start-up costs may be a more important obstacle than enforcing contracts. So even if a country scores relatively poorly in the latter, the former should remain a priority. Yet promoting the reduction in start-up costs and foreign entry in a country that is far from technological frontier could actually be harmful for technology adoption (Aghion et. al. 2006). An even bigger risk is that by overlooking potential non-monotonic relationships, a particular reform could even have a negative impact on performance if pursued in the wrong context. This suggests that more detailed analysis of country specific conditions will be important before giving priority to a particular reform.

Third, some Doing Business indicators clearly depend on a country's location. As trade is always bilateral, improving the institutions to trade across borders is likely to have a more substantial effect if its trading partners have developed or are developing their institutions as well. This suggests that such reforms could be more beneficial if implemented in several countries simultaneously. Furthermore, local policy makers are likely to have incentives to improve their institutions for trade, if the country has a large share of foreign trade in their GDP rather than because they rank low in the Doing Business indicators. A similar argument applies for protecting investors. This indicator is important only if a country has achieved some development of its financial markets. This in turn could again depend on the willingness of international investors to invest in a particular country. This is likely to be affected by exogenous factors like a country's proximity to developed countries or even the size of the country.

Fourth, setting priorities in reform requires a clear sense of the underlying objective. As we have shown, the Doing Business indicators could be expected to

influence growth but also a set of intermediate outcomes. As such, it is not very obvious how to get a sense of where actual priority reforms lie. In this regard, the Doing Business indicators offer a type of laundry list of reforms relatively loosely connected by the underlying supposition that the creation and growth of businesses is good for a country's performance. But, as Hausmann et al (2005) have pointed out, eliminating all distortions is rarely, if ever, feasible while partial reforms may have consequences that are unintended and, in some instances, adverse. While they argue that emphasis should be placed on targeting the most binding constraints, for this to be plausible requires identifying not only the desired outcome variable – viz., growth – but also the constraints. This is, of course, a challenging task on both empirical and policy grounds. Even so, our more general point that the Doing Business indicators and rankings have no coherent way of organising priorities – and that the assumption that change in any indicator will always be beneficial - remains a valid critique.

Finally, if there are inconsistencies between different indicators of the business environment – as indicated above – due to problems of measurement, the potential for policy mistakes when trying to identify reform priorities will be even higher.

## **7. Conclusion**

This paper addresses an important issue; the part played by the business environment in explaining the performance of countries and firms. In recent years, it has become common to attribute a great deal to the business environment where 'bad' business environments – as measured by the extent of regulation or corruption – are argued to have a measurably adverse impact on performance. To explore whether this is warranted, the paper has used two types of datasets relating to countries and firms.

The first part of the paper looked explicitly at whether country level indicators of the business environment helped explain performance. It was not possible to find any evidence that the Doing Business indicators – an example of widely used country level measures - were robustly related to GDP growth, although there was some limited correlation between the indicators and intermediate outcomes at an aggregate level. Interestingly, there was fairly weak evidence that country and firm level measures of similar constraints were tightly correlated, suggesting that measurement error may be present.

Firm level data using the BEEPS were then analysed with a view to understanding the effects on performance of a firm's ownership of various factors, including the business environment. To minimise problems of endogeneity, instrumental variables were used, as well the average values of perceived constraints. The impact of the business environment variables was found, however, to be very limited. Few variables retained any explanatory power once entered simultaneously rather than singly or once country, year and sector fixed effects were introduced. The analysis showed that country effects – but not business environment constraints – mattered for performance. However, these country effects are clearly capturing other sources of cross-country heterogeneity, rather than a single factor, such as the institutional environment.

The paper then looked at possible explanations for why neither firm nor country level measures of the business environment appeared to explain performance with any degree of precision. These included mis-measurement – including bias arising from subjective evaluation - mis-specification, complexity and non-linearity. Reasons were given for why each of these factors might be relevant in explaining these largely absent associations.

Finally, the paper looked at whether measures of the business environment should be used to motivate and design policy. While it appears that there are some clear advantages from easily understandable indicators, including the ability to benchmark to other countries, it is not obvious how this should affect the ordering of reform priorities or the particular weights that should be attached to specific policy actions.

## References

- Acemoglu, D. and S. Johnson (2005), "Unbundling Institutions", *Journal of Political Economy*, 113, 949-995
- Acemoglu, D., Antras, P., Helpman, E. (2006) "Contracts and Technology Adoption", forthcoming in *American Economic Review*
- Acemoglu, D., Johnson, S. and J. A. Robinson (2001), "The Colonial Origins of Comparative Development: An Empirical Investigation" *American Economic Review*, 91, pp. 1369-1401.
- Acemoglu, D., Johnson, S. and J. A. Robinson (2005), "Institutions as the Fundamental Cause of Long-Run Growth", in Philippe Aghion and Steven Durlauf, eds. *Handbook of Economic Growth*. The Netherlands: Elsevier Science. 2005
- Aghion P and Howitt P (1992) "A Model of Growth through Creative Destruction", *Econometrica* 60(2): 323-351
- Aghion P., Angeletos, G. M. , Banerjee, A. and K. Manova (2005) "Volatility and Growth: Credit Constraints and Productivity-Enhancing Investment", Harvard University, unpublished
- Aghion, P. Howitt P. and D. Mayer-Foulkes (2003) "The Effect of Financial Development on Convergence: Theory and Evidence", Harvard University, unpublished
- Aghion, P., Blundell, R., Griffith, R., Howitt, P. and S. Prantl (2006) "The Effects of Entry on Incumbent Innovation and Productivity", Harvard University, unpublished
- Aghion, P., Blundell R., Bloom, N., Griffith R., and P. Howitt (2005), "Competition and Innovation: An Inverted U Relationship," *Quarterly Journal of Economics*, CXX (2), 701-728.
- Aitken, B. J. and Harrison, A., E. "Do domestic firms benefit from direct foreign investment? Evidence from Venezuela", *American Economic Review*, 1999, 89(3), pp. 605-618
- Ayyagari, M., A. Demirguc-Kunt and V. Maksimovic (2006), "How important are financing constraints? The role of finance in the business environment", World Bank Working Paper 3820.
- Banerjee, A and A. F. Newman (1993) "Occupational Choice and the Process of Development," *Journal of Political Economy*, 101, 274-298
- Barro and Sala-i-Martin (1998) *Economic Growth*. McGraw Hill

Beck, T., A. Demirguc-Kunt and V. Maksimovic (2005), "Financial and Legal Constraints to Growth: Does Firm Size Matter?", *Journal of Finance*, LX, 1, February, 137-177.

Bertrand, Marianne and Sendhil Mullainathan (2001), "Do People Mean What They Say? Implications for Subjective Survey Data", *American Economic Review*

Boogaard, H. (2007) "Response bias in BEEPS data", University of Michigan, unpublished

Botero, J, S. Djankov, R. La Porta, F. Lopez de Silanes, A. Shleifer, (2004), "The Regulation of Labor", *Quarterly Journal of Economics*, 1339-1382

Carlin, W., M. Schaffer and P. Seabright (2006), "Where are the real bottlenecks? A Lagrangian approach to identifying constraints on growth from subjective survey data", CEPR Discussion Paper 5719

Carlin, W., S. Fries, M. Schaffer and P. Seabright (2004), "A Minimum of Rivalry: Evidence from Transition Economies on the Importance of Competition for Innovation and Growth", *The B.E. Journal of Economic Analysis & Policy*, Vol. 3, No. 1, Article 17

Castro, R., Clementi, G. L. and G. MacDonald (2004), "Investor Protection, Optimal Incentives, and Economic Growth," *Quarterly Journal of Economics* CXIX:3, pp. 1131-1175

Claessens, S. and S. Djankov (1999a), "Enterprise performance and management turnover in the Czech Republic", *European Economic Review*, Vol. 43, Nos. 4-6, 1115-24.

Commander, Simon and J. Svejnar (2008) 'Do institutions, ownership, exporting and competition explain firm performance? EBRD and University of Michigan

Commander, Simon and Katrin Tinn, 'Evaluating Doing Business', paper prepared for the World Bank, IEG Working Paper, 2008

Djankov, S., La Porta, R., Lopez-de-Silanes, F. and A. Shleifer (2003) "Courts", *Quarterly Journal of Economics*, Vol 118, pp. 453-517.

Djankov, S., La Porta, R., Lopez-de-Silanes, F. and A. Shleifer (2004) "The Regulation of Entry", *Quarterly Journal of Economics*, Vol CXVII

Djankov, S., McLeish, C. and R. Ramalho (2006d) "Regulation and Growth", World Bank, unpublished

Dollar, D., M. Hallward-Driemeier and T. Mengistae (2005), "Investment climate and international integration", World Bank Working Paper, December.



Durnev, A. and H. Kim (2005), "To Steal or Not to Steal: Firm Attributes, Legal Environment, and Valuation," *Journal of Finance*, LX (3), 1461-93.

Durnev, A., K. Li, R. Morck and B. Yeung (2004), "Capital markets and capital allocation: implications for economies in transition", *Economics of Transition*, Vol. 12, No. 4, 593-634.

Eifert, B.P (2007) "The economic response to regulatory reforms, 2003-2006", University of California, Berkeley, Dept. of Economics, mimeo, September

Field E. and M. Torero (2006) "Do Property Titles Increase Credit Access Among the Urban Poor? Evidence from a Nationwide Titling Program", unpublished.

Franks, J and G. Loranth (2006) "A Study of Inefficient Going Concerns in Bankruptcy," with Julian Franks, CEPR DP 5035

Hallward-Driemeier, M., S.J. Wallstein and L.C. Xu, (2006) "Ownership, Investment Climate and Firm Performance", *Economics of Transition*, Vol. 14, No. 4 629-647.

Hausmann, R., D. Rodrik and A. Velasco (2004) "Growth diagnostics", Harvard University, Kennedy School, unpublished.

Johnson, S., J. McMillan and C. Woodruff (2002a), "Property Rights and Finance", *American Economic Review*, Vol. 92, No. 5, December.

Johnson, S., J. McMillan and C. Woodruff (2002b), "Courts and Relational Contracts", *Journal of Law, Economics and Organisation*, Vol. 18, No. 1, 221-277.

Kaufmann, D., (2002), "Governance Crossroads" in Global Competitiveness Report, 2002-2003, World Economic Forum, Oxford University Press

Kaufmann, D., A. Kraay and P. Ziodo-Lobaton (1999), "Governance Matters", World Bank Policy Research Working Paper 2196, World Bank, Washington DC, October

Kaufmann, D., Kraay, A., and M. Mastruzzi (2006), "Governance Matters V: Governance Indicators for 1996-2005", World Bank

Klapper, L., and I. Love, (2004), "Corporate Governance, Investor Protection and Performance in Emerging Markets", *Journal of Corporate Finance*, Vol. 10, No.5, November, 703-728.

Marimon, R. and Quadrini, V. (2006), "Competition, Innovation and Growth with Limited Commitment", Universitat Pompeu Fabra and University of Southern California, unpublished

Marschak, J. and W.H. Andrews (1944), "Random Simultaneous Equations and the Theory of Production", *Econometrica*, 12, 3-4, July-October, 143-205.

Nickell, S. (1999) "Competition and Corporate Performance," *Journal of Political Economy*, Vol. 105, August 724-46.

Parente, S. L. and Prescott, E. C., (1994) "Barriers to Technology Adoption and Development," *Journal of Political Economy*, Vol 102(2), pp 298-321

Rousseau P.L. and Wachtel, P (2005) "Economic growth and financial depth: is the relationship extinct already?" New York University, Stern Business School

Sachs, J. and A. Warner (1995), 'Economic Reforms and the Process of Global Integration', *Brookings Papers on Economic Activity*, 1, 1-118

Schmidt, P. (1988), "Estimation of a Fixed-Effect Cobb-Douglas System Using Panel Data," *Journal of Econometrics*, 37, 361-380.

World Bank (2000), '*World Development Report*', Washington, DC

**Table 1: Hypothesized relationships in Doing Business**

<b>Indicator</b>	<b>Intermediate outcome and expected sign of the relationship</b>	
<i>Constraints in starting a business</i>	Firm creation (-) Investments (-) Job creation (-) Informal economy (+)	Corruption (+) Efficiency of production (-) Tax revenues (-)
<i>Constraints in dealing with licences</i>	Construction sector (-) Cheaper offices (-) Cheaper warehouses (-)	Informal economy (+) Government expenditure (+)
<i>Rigidities in hiring and firing workers</i>	Productivity (-) Informal economy (+) Business costs (+) Adj. to new technologies (-)	Adj. to macroeconomic shocks (-) Adj. to migrant inflows (-) Benefits of trade liberalisation. (-)
<i>Constraints in registering property</i>	Property rights (-) Property market (-) Credit (-)	Investment (-) Corruption (+) Informal economy (+)
<i>Ease of getting credit</i>	Credit (+) Non-performing loans (-)	Investment (+) Small enterprises and women (+)
<i>Strength of protecting investors</i>	Equity investments (+) Entrepreneurship (+)	Investment (+) Size of stock market (+)
<i>Constraints in paying taxes</i>	Informal economy (+) Quality of public services (-) Corruption (+)	Government revenue (-) Investment (-)
<i>Constraints in trading across borders</i>	Trade (-) Corruption (+)	
<i>Constraints in enforcing contracts</i>	Bank credit (-) Interest rates (+) Entry of new firms (-)	Employment (-) Government expenditures (+) Integrity of court system (-)
<i>Constraints in closing a business</i>	Investments (-) Credit (-) Non-performing loans (+)	Entrepreneurship (-) Productivity (-) Job creation (-)

**Table 2: Country level growth regressions, 2003-2005: Coefficients on Doing Business indicators**

Indicators	(1)	(2)	(3)	(4)	(5)
Starting business: procedures	<b>0.0045*</b>				0.0039
Starting business: time	0.0001				0.0000
Starting business: cost	0.0000				0.0000
Employing workers: rigidity employment		-0.0002			-0.0003
Employing workers: firing cost		0.0000			0.0000
Enforcing contracts: procedures			0.0004		-0.0003
Enforcing contracts: time			0.0000		0.0000
Enforcing contracts: cost			0.0001		0.0001
Closing business: time				<b>0.0091*</b>	<b>0.0094*</b>
Closing business: recovery rate				0.0005	0.0001

Coefficients marked bold and with “\*” denote coefficients that are statistically significant at 10% P-value. None of the coefficients is significant at 5% level.

**Table 3: Intermediate outcomes and Doing Business indicators**

Left hand side variables and DB indicators	Regressions with one DB indicator category included	Regressions with all relevant DB indicators jointly entered
<b>• Private credit to GDP</b>		
Dealing with licences: procedures	-0.495	0.031
Dealing with licences: time	-0.073	-0.016
Dealing with licences: cost	0.002	0.001
Getting credit: legal rights	<b>5.020**</b>	<b>5.077*</b>
Getting credit: credit information	-0.034	0.720
Getting credit: public registries	<b>0.631*</b>	0.442
Getting credit: private registries	<b>0.527**</b>	0.236
Registering property: procedures	<b>-3.337**</b>	-1.386
Registering property: time	-0.079	-0.063
Registering property: cost	<b>1.732**</b>	1.060
Enforcing contracts: procedures	<b>-0.729*</b>	-0.090
Enforcing contracts: time	-0.002	0.005
Enforcing contracts: cost	0.077	0.032
Closing business: time	1.475	-0.372
Closing business: cost	0.522	0.272
Closing business: recovery rate	1.135	0.527
<b>• Private bank credit to GDP</b>		
Dealing with licences: procedures	-0.885	-0.585
Dealing with licences: time	-0.089	-0.084
Dealing with licences: cost	0.002	0.004
Getting credit: legal rights	3.443	5.122
Getting credit: credit information	0.229	0.555
Getting credit: public registries	0.675	0.530
Getting credit: private registries	<b>0.488**</b>	0.247

The coefficients marked bold and with “\*” indicated statistical significance at 10% level and with “\*\*” at 5% significance level.

**Table 3 (cont'd). Intermediate outcomes and Doing Business indicators**

Left hand side variables and DB indicators	Regressions with one DB indicator category included	Regressions with all relevant DB indicators jointly entered
Registering property: procedures	-1.771	0.252
Registering property: time	-0.102	-0.070
Registering property: cost	<b>1.648*</b>	1.355
<b>• Private credit to GDP</b>		
Enforcing contracts: procedures	-0.691	-0.031
Enforcing contracts: time	0.006	0.024
Enforcing contracts: cost	0.098	0.186
Closing business: time	1.533	-0.404
Closing business: cost	0.505	0.133
Closing business: recovery rate	<b>1.097**</b>	0.467
<b>• Construction to GDP</b>		
Registering property: procedures	0.162	
Registering property: time	0.008	
Registering property: cost	-0.007	
<b>• Gross fixed capital formation to GDP</b>		
Dealing with licences: procedures	<b>-0.214**</b>	-0.171
Dealing with licences: time	-0.008	-0.011
Dealing with licences: cost	-0.001	-0.001
Getting credit: legal rights	0.143	-0.072
Getting credit: credit information	-0.461	-0.655
Getting credit: public registries	0.023	0.001
Getting credit: private registries	-0.027	-0.027
Registering property: procedures	0.204	0.018
Registering property: time	0.000	-0.005
Registering property: cost	-0.089	0.039
Enforcing contracts: procedures	<b>-0.104*</b>	-0.103
Enforcing contracts: time	0.000	0.001
Enforcing contracts: cost	-0.031	-0.021
Protecting investors: investor protection	-0.201	-0.035
<b>• Gross private capital flows to GDP</b>		
Getting credit: legal rights	<b>13.920**</b>	<b>12.740**</b>
Enforcing contracts: procedures	-0.972	-0.391
Enforcing contracts: time	-0.025	-0.013
Enforcing contracts: cost	0.038	0.054
<b>• Net foreign direct investments to GDP</b>		
Getting credit: legal rights	<b>1.037**</b>	<b>1.034**</b>
Enforcing contracts: procedures	-0.039	-0.012
Enforcing contracts: time	-0.002	-0.001
Enforcing contracts: cost	-0.016	-0.020
<b>• Export to GDP</b>		
Trading across borders: documents export	-0.922	
Trading across borders: time export	0.082	

The coefficients marked bold and with “\*\*” indicated statistical significance at 10% level and with “\*\*\*” at 5% significance level.

**Table 3 (cont'd). Intermediate outcomes and Doing Business indicators**

Left hand side variables and DB indicators	Regressions with one DB indicator category included	Regressions with all relevant DB indicators jointly entered
<b>• Import to GDP</b>		
Trading across borders: documents import	-0.509	
Trading across borders: time import	-0.135	
<b>• Stock market capitalization to GDP</b>		
Protecting investors: disclosure	<b>7.579**</b>	
Protecting investors: director liability	<b>14.024**</b>	
Protecting investors: shareholder suits	-0.046	
Protecting investors: investor protection		<b>21.757**</b>
<b>• Stock market turnover ratio</b>		
Protecting investors: disclosure	0.823	
Protecting investors: director liability	5.643	
Protecting investors: shareholder suits	-2.406	
Protecting investors: investor protection		3.417
<b>• Size of informal economy</b>		
Starting business: procedures	<b>0.888*</b>	0.690
Starting business: time	-0.012	0.034
Starting business: cost	-0.028	-0.034
Employing workers: rigidity	0.059	0.087
Employing workers: non-wage cost	0.069	0.005
Employing workers: firing cost	0.002	-0.024
Enforcing contracts: procedures	0.049	-0.011
Enforcing contracts: time	0.004	0.003
Enforcing contracts: cost	-0.071	-0.089
<b>• Size of informal economy</b>		
Employing workers: rigidity	0.069	
Employing workers: firing cost	0.016	

The coefficients marked bold and with “\*” indicated statistical significance at 10% level and with “\*\*” at 5% significance level.

**Table 4: Consistency of Doing Business indicators and firm survey responses**

Additional controls	Baseline					GDP per capita			
	Conjectured sign	All countries	High and upper middle	Lower middle	Low	All countries	High and upper middle	Lower middle	Low
Question and DB indicator									
<b>• How severe obstacle is tax administration</b>									
Paying taxes: payments	+	+	+	-	+	-	+	-	-
Paying taxes: time	+	+	..	+	-	+	..	+	-
<b>• How severe obstacle is custom and trade regulation</b>									
Trading across borders: doc. Export	+	+	+	-	..	-	..	-	..
Trading across borders: time export	+	..	+	-	-	-	-	-	-
Trading across borders: doc. Import	+	+	+	-	-	-	+	-	-
Trading across borders: time import	+	+	+	-	-	-	..	-	-
<b>• How severe obstacle is labour regulation</b>									
Employing workers: difficulty of hiring	+	+	+	+	+	+	+	+	+
Employing workers: rigidity hours	+	+	..	+	+	+	-	+	..
Employing workers: difficulty of firing	+	-	..	-	-	-	..	-	..
Employing workers: rigidity employment	+	+	..	+	+	+	..	+	+
<b>• How severe obstacle is business licensing and operating permits</b>									
Dealing with licences: procedures	+	+	+	..	+	+	+	..	+
Dealing with licences: time	+	+	+	+	+	+	+	+	+
Starting business: procedures	+	+	-	+	..	+	-	+	-
Starting business: time	+	+	-	+	..	+	-	+	..
<b>• How severe obstacle is access to financing</b>									
Getting credit: legal rights	-	-	-	-	+	-	-	-	..
Getting credit: credit information	-	..	..	+	-	+	+	+	+
Getting credit: public registry coverage	-	+	..	+	+	+	+	+	+
Getting credit: private bureau coverage	-	-	-	+	-	+	..	+	-
Registering property: procedures	+	+	+	+	..	+	..	+	-
Registering property: time	+	+	+	..	+	+	+	..	..
Enforcing contracts: procedures	+	+	+	+	-	+	+	+	-
Enforcing contracts: time	+	-	+	..	-	-	+	..	-

“+” and “-” indicate the sign of statistically significant coefficients.”..” means a coefficient is not significant at the 5% level or above

**Table 4: Consistency of Doing Business indicators and firm survey responses (continued)**

Additional controls	Baseline					GDP per capita			
Question and DB indicator	Conjectured sign	All countries	High and upper middle	Lower middle	Low	All countries	High and upper middle	Lower middle	Low
<b>• How severe obstacle is legal system and conflict resolution</b>									
Enforcing contracts: procedures	+	+	+	+	+	+	+	+	+
Enforcing contracts: time	+	+	..	..	+	..	..	..	+
<b>• How many days to import from the point of entry</b>									
Trading across borders: doc. import	+	..	+	-	-	-	+	-	-
Trading across borders: time import	+	+	+	..	..	..	+	..	..
<b>• How many days to export from the point of entry</b>									
Trading across borders: doc. export	+	..	+	+	-	..	+	+	-
Trading across borders: time export	+	..	+	-	-	..	+	-	-
<b>• How much senior management time is spent on tax, customs, labour, licensing and other regulation</b>									
Dealing with licences: procedures	+	+	+	-	+	+	..	-	+
Dealing with licences: time	+	+	..	..	+	+	-	+	+
Employing workers: difficulty of hiring	+	+	+	+	+	+	+	+	+
Employing workers: rigidity hours	+	-	-	+	..	-	-	+	..
Employing workers: difficulty of firing	+	+	-	+	+	+	-	+	+
Employing workers: rigidity employment	+	+	-	+	+	+	-	+	+
Registering property: procedures	+	+	+	+	..	+	..	+	..
Registering property: time	+	-	-	-	-	-	-	..	-
Paying taxes: payments	+	+	..	-	-	-	-	-	-
Paying taxes: time	+	..	..	+	-	..	..	+	-
Trading across borders: doc. import	+	+	+	+	..	+	+	+	..
Trading across borders: time import	+	+	+	-	-	-	+	-	-
Trading across borders: doc. export	+	+	+	-	..	+	+	-	..
Trading across borders: time export	+	+	+	..	-	..	+	..	-
Enforcing contracts: procedures	+	+	..	+	+	+	-	+	+
Enforcing contracts: time	+	+	..	..	+	+	..	..	+
<b>• Confidence in legal system enforcing contracts and property rights</b>									
Enforcing contracts: procedures	-	..	..	-	+	+	+	-	-
Enforcing contracts: time	-	+	..	..	+	+	..	..	+

“+” and “-” indicate the sign of statistically significant coefficients.”..” means a coefficient is not significant at the 5% level or above



**Table 5: Descriptive Statistics**

	2002			2005		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
<i>Panel A: Summary Statistics</i>						
Sales	4504	2290	10428	6665	3376	17503
Employment	6122	143	505	9097	105	364
Fixed Assets	3388	2384	33893	4637	1622	10582
Number of Competitors	6029	0.82	0.39	8479	0.82	0.39
Ownership [Privatization]	6153	0.15	0.36	9098	0.14	0.35
Ownership [New Private]	6153	0.55	0.50	9098	0.66	0.47
Ownership [State]	6153	0.14	0.35	9098	0.09	0.28
Ownership [Other]	6153	0.02	0.12	9098	0.01	0.09
Ownership [Foreign]	6153	0.14	0.35	9098	0.10	0.30
Exports as % of Sales	6055	11.16	25.05	9039	8.76	22.34
Workforce Ratio: University / Secondary Education	5289	1.36	4.67	6930	1.24	3.83
Company Age	6153	14.70	18.70	9090	15.55	17.46
University / Secondary Education x Age	5289	19.47	114.49	6925	22.84	124.76
Permanent Employment 3 years ago	6066	134.73	501.85	8967	101.51	405.07
Parttime Employment 3 Years ago	5872	6.96	44.21	8873	5.65	31.70
% change in Fixed Assets (3 year period)	5717	16.30	46.66	8787	11.90	32.17
% change in Exports (3 year period)	6026	5.44	33.76	9030	4.44	29.81
% change in Employment (3 year period)	6059	34.89	135.99	8967	30.30	133.53
% change in Sales (3 year period)	5832	21.69	62.74	8764	12.99	39.25
% change in Sales per Worker (3 year period)	5753	14.69	74.90	8645	12.35	89.17
<i>Panel B: Average constraints</i>						
Access to financing	5810	2.33	1.16	8647	2.26	1.14
Cost of financing	5864	2.53	1.13	8698	2.51	1.13
Tax rates	6060	2.76	1.11	8951	2.75	1.10
Tax administration	5953	2.54	1.14	8895	2.47	1.13
Custom/foreign trade regulations	5649	2.04	1.12	8267	1.91	1.07
Business licencing & permit	5906	2.02	1.08	8776	1.98	1.04
Labour regulations	5946	1.74	0.94	8886	1.87	0.98
Uncertainty about regulatory policies	6000	2.85	1.09	8819	2.53	1.12
Macroeconomic instability	5998	2.76	1.11	8823	2.52	1.12
Functioning of the judiciary	5728	2.06	1.08	8417	2.06	1.10
Corruption	5713	2.24	1.16	8497	2.16	1.14
Street crime theft & disorder	5857	1.96	1.07	8661	1.82	1.01
Organised crime mafia	5663	1.81	1.09	8394	1.64	0.97
Anti-competitive practices	5871	2.25	1.11	8739	2.30	1.11
Infrastructure	6122	1.54	0.70	9043	1.54	0.73
Average of all constraints	6134	2.24	0.67	9064	2.17	0.66

**Table 6: Revenue Efficiency - Impact of Individual Constraints  
(IV Estimation with Year, Country and Sector Fixed Effects)**

	1	2	3	4	5	6	7	8	9	10	11
Log Employment	0.586 [0.190]***	0.590 [0.184]***	0.608 [0.177]***	0.604 [0.184]***	0.541 [0.192]***	0.512 [0.195]***	0.540 [0.201]***	0.605 [0.182]***	0.585 [0.183]***	0.592 [0.185]***	0.458 [0.221]**
Log Fixed Assets	0.369 [0.204]*	0.367 [0.195]*	0.349 [0.187]*	0.361 [0.191]*	0.422 [0.201]**	0.462 [0.201]**	0.397 [0.216]*	0.341 [0.198]*	0.368 [0.195]*	0.365 [0.197]*	0.511 [0.228]**
Ownership [Privatized]	-0.237 [0.387]	-0.422 [0.426]	-0.411 [0.422]	-0.407 [0.440]	-0.379 [0.469]	-0.337 [0.486]	-0.414 [0.444]	-0.413 [0.406]	-0.446 [0.429]	-0.306 [0.375]	-0.327 [0.527]
Ownership [New Private]	-0.489 [0.273]*	-0.530 [0.261]**	-0.518 [0.256]**	-0.493 [0.263]*	-0.496 [0.276]*	-0.448 [0.272]*	-0.597 [0.275]**	-0.517 [0.257]**	-0.543 [0.261]**	-0.486 [0.252]*	-0.478 [0.306]
Ownership [Foreign]	1.765 [0.516]***	1.577 [0.538]***	1.560 [0.526]***	1.479 [0.520]***	1.514 [0.571]***	1.504 [0.596]**	1.644 [0.545]***	1.591 [0.502]***	1.556 [0.546]***	1.699 [0.492]***	1.508 [0.636]**
Log (1 + Export / Sales)	-0.385 [0.528]	-0.250 [0.543]	-0.237 [0.534]	-0.146 [0.531]	-0.219 [0.568]	-0.116 [0.561]	-0.167 [0.565]	-0.103 [0.504]	-0.193 [0.552]	-0.339 [0.514]	-0.163 [0.633]
More than 3 Competitors	0.091 [0.051]*	0.092 [0.051]*	0.094 [0.050]*	0.090 [0.050]*	0.096 [0.052]*	0.099 [0.052]*	0.117 [0.055]**	0.092 [0.049]*	0.096 [0.051]*	0.090 [0.051]*	0.118 [0.059]**
Cost of Financing	0.009 [0.032]										0.024 [0.041]
Infrastructure		-0.035 [0.049]									-0.024 [0.066]
Tax Rates			-0.019 [0.031]								0.002 [0.043]
Customs / Foreign Trade Regulations				-0.002 [0.032]							0.069 [0.047]
Business Licencing & Permits					-0.056 [0.037]						-0.072 [0.046]
Macroeconomic Instability						-0.012 [0.037]					0.004 [0.043]
Corruption							-0.062 [0.035]*				-0.053 [0.050]
Street Crime, Theft & Disorder								-0.053 [0.035]			0.015 [0.059]
Anti-competitive Practices									-0.034 [0.041]		-0.054 [0.053]
Average of all Constraints										-0.055 [0.055]	
Constant	1.470 [0.436]***	1.585 [0.388]***	1.601 [0.404]***	1.482 [0.392]***	1.559 [0.402]***	1.373 [0.402]***	1.742 [0.436]***	1.680 [0.436]***	1.603 [0.374]***	1.616 [0.402]***	1.481 [0.453]***
Observations	4992	5121	5091	4741	4968	5059	4843	4938	4981	5127	4305
J-Test	0.95	0.76	0.71	0.34	0.59	0.68	0.90	0.45	0.79	0.95	0.79
p-value	0.329	0.385	0.399	0.560	0.444	0.409	0.342	0.501	0.374	0.331	0.373
First stage F-tests											
Log Employment	88.55	93.33	93.98	85.51	92.10	93.40	91.99	89.96	91.48	93.75	78.81
Log Assets	35.66	38.42	37.92	34.58	37.45	37.77	36.53	36.35	37.79	38.27	29.71
Ownership [Privatized]	18.39	18.74	18.61	17.86	18.67	18.38	18.52	19.02	20.67	18.69	17.86
Ownership [New Private]	56.54	58.75	59.08	54.54	58.58	59.26	57.07	56.92	58.21	59.27	49.83
Ownership [Foreign]	9.83	10.16	10.19	9.86	10.13	9.89	9.72	9.79	10.02	10.24	8.83
Log (1 + Export / Sales)	15.03	15.59	15.52	14.57	15.08	14.79	14.00	14.32	15.10	15.31	12.55
Durbin-Wu-Hausman Test	8.89	9.78	9.40	9.55	9.59	9.63	10.85	10.41	10.11	9.36	9.78
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Robust standard errors, clustered by year, country, industry and firm size (small, medium and large) in brackets

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Note: All models were estimated using IVs for Log Employment, Log Assets, Log (1 + Export/Sales) and three Ownership Dummies. The IVs are: Firm's age, skill ratio (college/high school), skill ratio - age interaction, location (city), % change in fixed assets in previous period, % change in exports in previous period, full time employees in previous period. The skill ratio and the skill ratio - age interaction were also interacted with regional (CEB, SEE and CIS) dummies. The constraint variables at the firm level represent the average of the constraint reported by the other firms in the same year, country, 2-digit sector and firm size (small, medium, large). The average of all constraints is based on all 15 constraints in the BEEPS survey.

**Table 7: Share of countries where Doing Business indicators have improved or worsened**

	Starting business		Employing workers	Enforcing contracts		Closing business
	procedures	time	rigidity index	procedures	time	time
<b>All</b>						
improved	32	57	53	8	22	5
worsened	1	1	16	0	0	9
<b>High income</b>						
improved	23	47	53	0	13	3
worsened	0	0	10	0	0	13
<b>Upper-middle</b>						
improved	36	50	41	9	18	0
worsened	0	0	27	0	0	9
<b>Lower-middle</b>						
improved	41	73	61	15	34	7
worsened	0	2	15	0	0	10
<b>Low</b>						
improved	26	53	50	5	18	9
worsened	3	0	13	0	0	6

**Table 8: Starting a business and enforcing contracts: share of countries where both indicators have improved or worsened**

	Starting business			Enforcing contracts		
	both improved	both worsened	opposite change	both improved	both worsened	opposite change
All	31	0	1	8	0	0
High income	23	0	0	0	0	0
Upper-middle	32	0	0	9	0	0
Lower-middle	39	0	0	15	0	0
Low	26	0	3	5	0	0