Good and bad institutions – is the debate over?
Cross-country firm-level evidence from the textile industry[*]

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Abstract:

Using firm-level data from nine developing countries we demonstrate that (a) certain institutions like restrictive labour market regulations that are considered to be bad for economic growth might be beneficial for production efficiency, whereas (b) good business environment which is considered to be beneficial for economic growth might have an adverse impact on production efficiency. We argue that our results suggest that there might be significant difference in the macro- and micro- impacts of institutional quality, such that the classification of institutions into "good" and "bad" might be premature.

Keywords: institutional quality, production efficiency, stochastic frontier model
JEL classification: D02, D23, D24

1. Introduction

It is now stylised that institutions have significant impact on economic performance. North (1991) argues that institutions – formal and informal – are created to reduce uncertainty about exchanges; property right is a textbook example (Demsetz, 1967; Alchian and Demsetz, 1973). As such, institutions can refer to both the governance structures that define the rules of the game and to the rules of the game themselves (Coase, 1937; Shubik, 1975; Williamson, 1975, 1985). Efficient institutions clearly define the boundaries within which economic agents can act, thereby enabling transactions at low cost. The logical outcome of efficient institutions, therefore, is better economic performance.

Over the past two decades, there has been a proliferation of papers that have examined various aspects of the relationship between institutional quality and economic performance. Researchers have demonstrated that governance characteristics that define the rules of the game have an impact on economy-wide development performance (Campos and Nugent, 1999), such that institutional quality, as opposed to factors such as geography and trade, is arguably the key determinant of economic growth (Rodrik, Subramanian and Trebbi, 2004). In particular, researchers have argued that the nature of property rights (Knack and Keefer, 1995; Acemoglu and Johnson, 2005), legal institutions (Levine, 1998), and labour market institutions (Nickell and Layard, 1999; Besley and Burgess, 2004) affect a country's (or region's) economic growth, investment and production efficiency.

However, the debate about the nature of institutions that improve economic performance is far from being over. For example, there is as yet no consensus about whether democracy or autocracy is better at generating economic growth. While property rights can be credibly guaranteed in a democracy (Olson, 1991), with the

attendant (positive) impact on economic growth, lobbying by groups with different interests, that is an integral part of a democracy, results in inefficient use of resources (Becker, 1983). To complicate matters further, it has been argued that political institutions may not influence economic growth significantly after all; growth instead is an outcome of economic policies pursued by government (Glaeser et al., 2004). Similarly, it has alternately been argued that corruption can be both transaction facilitating and therefore growth enhancing (Huntington, 1968; Lui, 1985), and transaction inhibiting and hence growth reducing (Shleifer and Vishny, 1993).[1]

More importantly, the focus of the literature has largely been macro performance of economies, as manifested in economic growth and its correlates like investment. Other than in the literature on corporate governance,[2] the impact of institutions on firm performance is largely ignored. The little evidence that is available is inconclusive. Using firm-level data on mostly Asian developing economies, Dollar, Hallward-Driemeier and Mengiste (2005) find that cross-country differences do affect firm performance, even after controlling for country fixed effects. By contrast, Commander and Svejnar (2011) find that the impact of institutional quality (or "business environment") on firm performance is limited in the post-socialist countries of Central and Eastern Europe.

In this paper, we contribute to this nascent literature by examining the institutional quality-firm performance relationship, using a unique cross-country

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[1] The literature on the impact of corruption on economic performance highlights the difficulties of such empirical exercises which require accurate measurement of "corruption", for example. To begin with, one has to address questions such as to whether corruption is largely a public sector phenomenon that is broadly synonymous with bureaucratic rent seeking, and whether corrupt activities are necessarily illegal (Bardhan, 1997). One may also have to distinguish between grand and petty corruption whose impact on economic activities may differ considerably (Rose-Ackerman, 1999). However, thorough reviews of the empirical literature on corruption and growth indicate that the choice of corruption indexes does not affect the results significantly (Campos, Dimova and Saleh, 2011).

[2] In the corporate governance literature, researchers have argued, for example, that a weak legal system and, correspondingly, weak enforceability of contracts lead to creation of family firms and concentration of equity in the hands of these families and this, in turn, has implications for the quality of corporate governance and firm performance.

micro data set to examine the impact of "formal" institutions on firm level efficiency.[3] We choose efficiency (with which inputs are converted into output) as our measure of firm performance because it is consistent with a key developmental concern, namely, the generation of economic growth using limited resources. We focus on firms in the textile industry in nine developing countries, textile being an industry in which developing countries have comparative advantage and a strong presence in the global market.[4] Further, as we shall discuss later, we concentrate on institutions such as economic freedom that define the rules of the game and thereby influence the ease with which transactions can take place in product and factor markets.

Our results indicate that institutions do indeed influence firm-level efficiency, after controlling for factors such as size and ownership, but not in the way that is suggested by conventional wisdom. Labour market institutions that provide greater social security benefits and employment rights *reduce* inefficiency in production. Better business environments *increase* such inefficiencies. Our results suggest that there is greater scope for research on the relationship between institutional quality and firm performance; the debate about this relationship is far from being over. While restrictive or low quality institutions may adversely affect outcomes such as firm entry rates, they might be beneficial for productive efficiencies of incumbent firms, such that blanket classification of institutions as "good" or "bad" might be too simplistic.

The rest of the paper is structured as follows: In Section 2, we discuss some areas of divergence between macro- and micro- impacts of institutional quality. The

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[3] We consider an institution to be "formal" when it is legally encoded and enforced.
[4] In the middle of the decade, even before the end of the quotas embedded in the Multi-Fibre Agreement, developing countries accounted for half the world's textile exports and three-quarters of the clothing exports (UNCTAD, 2005).

empirical strategy is discussed in Section 3. In Section 4, we discuss the data and specification. The results are discussed in Section 5. Finally, Section 6 concludes.

2. Impact of institutional quality: The macro-micro divide

Since estimates of private benefits and costs resulting from the existence of formal institutions are likely to differ from social benefits and cost, it is not surprising that the impact of such institutions may have different impact on the behaviour and performance of individual economic agents and on the society or economy as a whole. Consider, for example, corruption, which is widely accepted as a manifestation of weak institutional quality. For individuals and firms, corruption can add to the money cost of doing business (which can be interpreted as rent for scarce resources such as licences and permits), and also to the transactions cost of doing business as well, since implicit contracts based on bribes etc can always be renegotiated *ex post*. For the society as a whole, however, the impact of corruption is ambiguous and depends on the quality of other institutions (Aidt, Dutta and Sena, 2007; Meon and Weill, 2010). Further, the society can incur a deadweight loss that, by definition, cannot be assigned to individual economic agents. Specifically, if the corrupt practices are illegal as well, such that resources have to be used to keep these practices secret, and hence the deadweight loss (Shleifer and Vishny, 1993). In other words, there is a micro-macro divide in the way which corruption affects economic performance and behaviour.

This divide is also observed in other contexts. For example, the popular wisdom in the labour economics literature that labour market flexibility, with respect to both hiring and firing of labourers and also with respect to wages and other benefits, is desirable. It has been argued in the literature that labour market rigidities adversely affect macroeconomic performance. Eichengreen and Iversen (1999) argue

that as there was increase in the diversity of the quality of production, labour market rigidities in Europe acted as impediments to growth. Besley and Burgess (2004) demonstrate that output, employment, investment and productivity in the formal sector was lower in Indian states where the Industrial Disputes Act (which has direct implications for the ability of firms to hire and fire employees) was amended in favour of workers.

The bulk of the discussion about labour market rigidities focus on the impact of these rigidities on the (un)employment rate (Saint-Paul, 2004), one implication of high unemployment rate being under-utilisation of an important (and, in the case of developing countries, perhaps the most important) productive resource. Such rigidities may also lead to redistribution of workers from sectors that are more affected by labour laws and wage rigidities to those that are less affected by them (Solow, 2000). In the context of a developing country, labour market rigidities can increase allocation of the work force to the informal sector that is often less productive on account of factors such as absence of scale economies and difficulties in access to credit.

The literature that discusses the impact of labour market rigidities on macro variables such as growth and unemployment rate ignores the impact of these rigidities on the behaviour of firms and workers. Storm and Naastepad (2007) argue that curbs on hiring and firing can induce firms to invest in training and on-the-job learning, whose benefits can more than offset the loss of allocation efficiency. They demonstrate that the "rigid" labour market conditions promote long run labour productivity growth. Arulampalam and Booth (2002) demonstrate that part time employment and short term contracts, which are outcomes of labour market flexibility, are associated with significantly less work-related training. Available evidence also suggest that incentives such as employment security can improve

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employee commitment, and are also positively correlated with performance enhancing strategies like greater investment in R&D and new technology (Michie and Sheehan, 1999).

Indeed, an important implication of flexible labour markets, namely, the linkage between the wage rate and prevailing labour market conditions (mainly unemployment rate) has repeatedly been brought into question. The divergence between market-clearing wage and the wage that minimizes labour cost per efficiency unit of labour is well documented in the efficiency wage literature (Kazt, 1986; Table 1, pp. 251; Campbell III, 1993). Fehr and Falk (1999) have demonstrated that when labour contracts are incomplete, workers efforts are correlated to their wage, such that it would not be optimal for employers to accept low wage bids by potential workers even in weak labour market conditions (with high unemployment rate, for example).

Similarly, the popular wisdom that social safety nets such as significant and/or prolonged unemployment benefits are undesirable because of their adverse implications for magnitude and duration of unemployment (Katz and Meyer, 1990) do not take into consideration the impact of these measures on productivity of workers and x-efficiency.[5] It is now well understood that ability of workers to remain productive depends significantly on factors such as their nutrition status (Dasgupta, 1993). During spells of unemployment, in the absence of asset-related incomes (which is not unusual for a large proportion of labour force participants in developing countries), preservation of productivity levels may significantly depend on social

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[5] In any event, the popular view about the impact of social safety nets such as unemployment benefits is not always borne out by data. For example, Andolfatto and Gomme (1996) demonstrate that a significant increase in unemployment benefits in Canada in 1972 did not have a significant impact on the unemployment rate, but these measures increased labour market turnover, aside from having the expected positive impact on social welfare.

security benefits such as unemployment insurance.[6] These benefits also enable out-of-work labourers to bear the search cost of finding employment that are consistent with their skills, thereby enhancing post-employment x-efficiency. Indeed, Acemoglu and Shimer (2000) demonstrate that an increase in unemployment insurance increases labour productivity by encouraging labourers to look for high productivity jobs and also by encouraging firms to create such jobs. Similarly, Kumar (2002) demonstrates that in labour markets where the firm-employer has monopsony power, absence of unemployment benefits leads to an inefficiently low level of capital investment, even as unemployment rate is low in equilibrium. Output, therefore, is maximised at a positive level of unemployment benefits, even when the workers are risk neutral.[7]

Building on the argument of Agell (1999), it is also possible to argue that social safety nets, and the associated phenomenon of wage compression, may also facilitate efficiency gains. In the presence of significant wage risk, risk averse workers will seek appropriate insurance contracts that private markets will often not underwrite, especially in developing countries. If then governments provide insurance by way of social safety nets, workers might be willing to accept a lower average wage, thereby raising the (dollar) efficiency of the firms that employ these workers. The efficiency gains will be even more pronounced if a reduction in wage risk also results in greater investment in human capital.

Differences in the impact of institutions (and allied policies) that promote flexibility of firms and the economy as a whole can be observed in non-labour market

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[6] For a discussion of the social investment aspect of labour market policies such as unemployment benefits, see Bonoli (2009).

[7] In a related study, Gordon (1995) argues that there is little evidence to suggest that there is a trade-off between unemployment (which is often associated with components of the social safety net such as unemployment benefit) and productivity. Gordon finds that the rapid productivity growth in Europe in the 1980s, relative to the United States, can be explained by convergence (or catching up), and has little to do with persistently high unemployment rates in European countries. The deceleration of productivity growth in Europe in the 1990s, on the other hand, is in part an outcome of a slowdown in the convergence process, and in part explained by a slower rate of capital accumulation in Europe.

contexts as well. While available evidence is mixed, broadly speaking, it suggests that enhancing economic freedom, which generally implies that private economic agents operate in environments in which property rights and where market forces are not reined in or pre-empted by governments, is positively correlated with economic growth (de Haan and Siermann, 1998; Carlsson and Lundstrom, 2002). The positive impact of economic freedom on economic growth operates primarily through an improvement in allocational efficiency. However, given that foresight is necessarily imperfect, firms can make suboptimal decisions about capacity expansion, investment in fixed assets etc, which may have adverse implications for their efficiency and productivity. Evidence of such over-investment has been found in the Indian manufacturing sector during the nineties (Uchikawa, 2001, 2002), coinciding with the significant increase in economic freedom on account of the post-1991 reforms, and is consistent with the evidence about a substantial decline in average firm-level efficiency in the Indian manufacturing sector over during the last decade of the twentieth century (Bhaumik and Kumbhakar, 2010).

To summarize, there is evidence to suggest that the impact of institutional quality on macro- variables such as economic growth and micro- variables such as measures of firm-performance may be quite different. Much of the discussion about the impact of institutional quality focuses on its macro- impact, and institutions such as labour market flexibility are labelled "good" or "bad" based on their impact on macro- variables such as unemployment rate. Given the differences between the macro- and micro- impacts of institutions, however, there is a need to better understand the micro- impacts of institutional quality as well, before any labelling exercise, thereby raising the importance of empirical research on the micro- impact of institutional quality. This remains the focus of the rest of this paper.

3. Empirical strategy: Modelling firm efficiency

The neo-classical production theory implicitly assumes that all production activities take place on the frontier of a feasible production set (subject to random errors). The frontier itself is defined as of the maximum possible output that is technically attainable for the given inputs (output-oriented measure), or as the observed output level that can be produced using least amounts of inputs (input-oriented measure). The production efficiency literature, however, relaxes the assumption, and considers the possibility that production activities might take place inside the frontier due to technical inefficiency. Technical inefficiency can be *output-oriented* if actual output produced is less than the frontier output for a given amount of input (subject to random errors). Alternatively, it can be *input oriented* if the amount of inputs actually used is more than the minimum required to produce a given level of output. These are two ways of examining inefficiency. Graphically, the inefficient production plans are located below the production frontier.

<center>**<INSERT Figure 1 about here>**</center>

In Figure 1, $f(x)$ is the production frontier, and point A is an inefficient production point. There are two ways to see why the production plan in A is inefficient. The first way is to see that at the current level of input usage ($x = $ ON) maximum possible output that can be produced is OA, given the technology. Thus, the distance AB shows the amount of output that is lost due to technical inefficiency, and it forms the basis from which the output-oriented (OO) technical inefficiency is measured. The other way to see why point A is inefficient is to recognize that the same level of output can be produced using less inputs, which means that the production point can move to the frontier by reducing inputs. Thus, the distance AC

measures the amount by which the input can be reduced without reducing output. Since this move is associated with reducing inputs, the horizontal distance AC forms the basis to measure input-oriented (IO) technical inefficiency.

Mathematically, we can write the production relationship as

$$y = X\beta + (v - u) \tag{1}$$

where X is a vector of factor inputs, v is the *iid* error term which follows a normal distribution with a zero mean and positive variance, and u is the non-negative inefficiency term that has a half normal distribution (see Kumbhakar and Lovell, 2000). Inefficiency (at the firm-level, for example) itself can then be modelled as

$$u = Z\delta \tag{2}$$

where Z is a vector of explanatory variables (Battese and Coelli, 1995). The two equations are estimated simultaneously using the maximum likelihood method, and the resultant estimates are unbiased and efficient.

In our paper, we adopt the Battese and Coelli (1995) approach to modelling output and efficiency. In keeping with the literature, we model output as a translog function of material inputs, labour and capital:

$$\ln y = \beta_0 + \beta_1 \ln m + \beta_2 \ln l + \beta_3 \ln k + {}^1\!/_2 [\beta_4 \ln m^2 + \beta_5 \ln l^2 + \beta_6 \ln k^2]$$
$$+ \beta_7 (\ln m \times \ln l) + \beta_8 (\ln m \times \ln k) + \beta_9 (\ln l \times \ln k) + v - u \tag{3}$$

when y is sales, m is cost of materials used for production, l is the cost of labour, k is capital stock, u is the half-normally distributed inefficiency term, and v is the *iid* error term.

We model firm level inefficiency as a function of firm level characteristics like size (scale efficiency), ownership[8] and institutional variables that characterise the

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[8] There is a large literature on the impact of ownership on firm performance, in particular on the beneficial impact of private and foreign ownership on firm performance (Djankov and Murrell, 2002).

environment in which the firms operate.[9] The inefficiency equation, therefore, brings together firm-level and country-level variables, and is specified as follows:

$$u = \delta_0 + \delta_1 \; Firm \; size + \delta_2 \; Ownership + \delta_3 \; Labour \; market \; institution$$

$$\delta_4 \; Business \; environment + e \tag{4}$$

To recapitulate, we are interested in the impact of institutions on firm efficiency, and hence the focus of our analysis is the sign and significance of the δ_3 and δ_4. We discuss the specific measures of variables in the next section.

4. Data

For the empirical exercise, we bring together data from three different sources. The firm-level data on measures of output and input, size and ownership are obtained from the World Bank Enterprise Surveys which collect data from manufacturing sector firms from around the world. The surveys use standardised survey instruments, making data from different countries comparable. We pool together cross-section data sets from countries that were surveyed between 2002 and 2005. Nominal variables used for the estimation of the production function were converted into real US dollars, thereby making them comparable across the countries.

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[9] Specifications in which firm and country level variables are used simultaneously are fairly common in the literature on firm performance in which firm-level variables such as innovation and managerial quality are used together with industry-level variables such as import penetration, scale of presence of foreign/multinational firms etc (Keller and Yeaple, 2009). Some papers have also pooled together firm-level variables and measures of regional characteristics such as unemployment rate and legislative quality (Bhaumik and Estrin, 2007). It is sometimes argued that estimation of multilevel models require the use of the iterative generalized least square technique which is widely used in the health and education literature (Goldstein, 1995). An advantage of using a multi-level approach is that it allows not only estimation of national-level fixed effects but also random effects, and to determine what portion of the total variance in enterprise level performance is due to within country variation in enterprise level characteristics, and what proportion is due to differences in the national context. But in the economics literature this technique is used sparingly, and it is stylised to use standard cross-section or panel data estimation techniques such as difference in difference models (Bhaumik and Estrin, 2007; Djankov and Murrell, 2002) and stochastic frontier models (e.g., Adkins and Moomaw, 2003; Beccalli, 2004).

The firm level data set also gives us our measure of firm size is a categorical variable that ranks firms on a 5-point scale. The categories themselves are based on the number of employees. It also gives us our control for ownership. We have continuous data for proportion of a firm that is owned by the state, domestic private investors and foreign investors. However, with a few exceptions, the largest shareholder of each firm − whether the state, domestic private or foreign − owned close to 100 percent of the shares. Hence, instead of using the continuous variables, we use dummy variables to indicate the type of the controlling owner. Since fewer than 2 percent of domestic firms are state owned, it is meaningless to distinguish between state-owned and privately-owned firms.[10] We, therefore, control for foreign ownership alone. In our sample, 4.5 percent of the firms are foreign owned.

In keeping with our discussion in section 2, we are interested in indexes that capture both the flexibility of the economic environment at large and the flexibility of institution that affect the recruitment of labourers by the firms and the performance of the recruited workers. Note however that even the most widely used indexes to capture these two different aspects of the economic and labour market environment tend to be highly correlated. Indeed, the correlation matrix reported in Table 1 indicates that there is a high level of correlation between the widely used Botero et al. (2004) measures of labour market institutions and other commonly used measures of institutional quality. Given these correlation coefficients, we choose for our specification the Botero et al. (2004) measure of "social security" − which captures the extent of protection provided to employees against old age, death and disability, sickness and healthcare coverage, and unemployment benefits − that has low level of

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[10] We nevertheless experimented with a dummy for state ownership in the specification for the inefficiency equation. However, the state ownership dummy was insignificant and was dropped form the specification.

correlation with the other indices of institutional quality. Note that, by construction, the extent of social security increases with the value of the index.

< INSERT Table 1 about here>

Finally, as a measure of the quality of the business environment, we use the indices of institutional quality provided by the Heritage Foundation (see Johnson, Kaufman and Zoido-Lobaton, 1998; Klapper, Laeven and Rajan, 2004).[11] The index ranges in value from 0 to 100, with institutional quality or quality of business environment increasing in the value of the index. As we shall see later, we experiment with three different measures of institutional quality or business environment: Our narrow measure of institutional quality is the quality of property rights, whose role as an important determinant of firm performance is well documented in the literature (Alchian, 1965; de Alessi, 1980). Our intermediate measure of institutional quality is the index for business freedom which measures the ease with which firms can enter and exit the market, and is therefore related to allocative efficiency. Finally, our wide measure of institutional quality is overall economic freedom that encompasses not just property rights and business freedom, but also factors such as labour market flexibility, openness of the economy to international trade, and the ease with which firms can make their own investment decisions. These indices are highly correlated with each other, as well as with other measures of institutional quality such as the Corruption Perception Index published by Transparency International. Therefore, we

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[11] All numerical measures of institutional quality are *ad hoc* to an extent, and are highly correlated. For example, Ochel and Rohn (2006) demonstrate that the Spearman rank correlation coefficient of the competitiveness indices of the World Economic Forum and the International Institute for Management Development, and the indices of economic freedom of the Fraser Institute and the Heritage Foundation vary between 0.63 and 0.87. In one of the few studies of its kind, Edwards (1998) demonstrates that the estimate of the relationship between openness and total factor productivity is robust to the choice of alternative measures of openness, including the measure of trade freedom constructed by the Heritage Foundation. Hence, we use the Heritage Foundation indices that are most commonly used in the literature.

consider these to be alternative composite measures of the ease with which firms can make business decisions and the incentives they have to maximise firm performance.

Our data are limited in part because of missing information in the World Bank Enterprise Survey data, and in part because the Botero et al. (2004) paper does not provide measures of labour market institutions for all countries. An outcome of this limitation is that for most individual industries we either have relatively small samples, or little cross-sectional variation with respect to countries. Since the focus of our analysis is the impact of institutional quality on firm performance, and given that measures of institutional quality are only available at the country level, our sample has to be spread across a fair number of countries. At the same time, it is stylised in the literature to estimate production functions separately for individual industries, based on the reasonable assumption that the marginal impact of factor inputs on output vary across industries, such that we require a reasonably large sample for each industry that is analysed. Only one industry – textiles and garments – meet both these criteria. It gives us a cross-section of 1625 firms, spread across nine developing countries: Brazil, China, Egypt, India, Indonesia, Malawi, Pakistan, South Africa and Zambia.

< INSERT Figure 2 about here>

The textiles and garments industry however has characteristics that are quite suitable for our analysis. To begin with, it is an industry in which developing countries have comparative advantage. Recent estimates suggest that the ratio of the share of textiles and garments in exports of individual developing countries to the ratio of textiles and garments in world exports is significantly greater than one for many developing countries (see Figure 2), indicating that developing countries have a comparative advantage in these products (Nordas, 2004). Further, the textiles and

garments industry has not witnessed significant technical progress in the recent past, certainly not since the turn of the century.[12] Hence, productivity in the industry is driven not so much by technical progress but by efficiency gains, the latter being our measure of firm performance in the stochastic frontier paradigm.[13]

< INSERT Table 2 about here>

At the same time, the nine countries in our sample are not only very different from a macroeconomic perspective but also, as reported in Table 2, they also have quite different levels of institutional quality. For example, at one extreme we have a country like South Africa with an index of economic freedom that is 67.1, very close to the threshold of 70 for "mostly free" countries, and at the other end we have India with an index value of 51.2, just above the threshold of 50 below which lie the "repressed" countries. Similarly, the index for labour institutions indicate that we have, at the one extreme, countries like Zambia (0.32) which do not provide much protection to employees and, at the other extreme, countries like China (2.24) and Egypt (2.22) that provide a fair degree of protection.

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[12] For example, there was no evidence of technological progress in the Chinese textile industry as early as 1990-94 (Kong, Marks and Wang, 1999). Even in a technologically advanced economy such as the United States, the extent of average annual technical progress for the textiles and apparel industries, for the 1993-2001 period, may have been 1.3 percent and 1.6 percent, respectively (Datta and Christoffersen, 2005). This evidence does not rule out productivity growth in some developing country firms by way of catching up with the international technological frontier, nor productivity growth by way of innovation in design etc. However, the former largely takes place through upgrading of capital stock rather than through neutral technical progress, and the latter is generally less of an issue in developing countries that were, until recently, associated much more with bulk production of textile products, often as part of global supply chains, than with cutting edge advances in design and allied innovation.

[13] Note that our choice of methodology would remain appropriate so long as technical efficiency -- which, along with technical progress and scale efficiency drives overall productivity growth (Ray and Desli, 1997) -- continues to explain a significant proportion of productivity growth. In other words, subject to availability of data, our methodological approach can be extended to all mature industries where technological progress is sporadic and where gain in technical efficiency is an important driver of productivity growth. If, however, productivity growth is almost entirely determined by technological progress, it might be more appropriate to regress growth in total factor productivity on firm-level characteristics and country- or region-level institutional variables, perhaps within a multilevel framework. To the extent that competition and labour quality explain total factor productivity (see Bhaumik and Estrin, 2007), our analytical approach which links labour protecting institutions (which have implications for labour quality) and economic and business freedom (which has implications for competition) with firm performance could still provide interesting insights.

Hence, while results based on one industry may not be conclusive, we feel that our results, discussed in the next section, provide *prima facie* evidence that has relevance for the debate about the importance of institutional quality, especially for developing countries that are routinely exhorted to improve the quality of their institutions to improve economic performance.

5. Regression results

The regression results are reported in Table 3. The specification of the (translog) production function is the same across the columns, but there are differences in the specification for the inefficiency equation. In column (1), we report the specification with the broad measure of institutional quality, namely, index of economic freedom. In column (2), we report the specification with the intermediate measure of institutional quality, namely, index of business freedom. And in column (3), we report the specification with the narrow measure of business environment, namely, index of property rights. The statistical significance of the parameter γ indicates that there is indeed inefficiency in the production relationship such that ordinary least squares (OLS) would not have been the appropriate method to estimate the production function.[14]

<div align="center"><INSERT Figures 3 and 4 here></div>

Since the focus of our analysis is the impact of institutional quality on firm-level inefficiency, we do not discuss the coefficient estimates of the production function itself, and proceed to a discussion of the estimates of firm-level inefficiency and its determinants. However, we report the distribution of technical efficiency across firms and across countries, in Figures 3 and 4, respectively. Figure 3 shows

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[14] If the null hypothesis of $\gamma = 0$ cannot be rejected, then $\sigma_u = 0$, and the inefficiency term u should then be removed from equation (3).

that most of the firms are quite close to the frontier; a large majority of them has technical efficiency between 0.65 and 0.95. The average technical efficiency is 0.78 and the median is 0.80. This can be expected in a competitive globalised industry where production efficiency might be the key to sustained export capabilities. Figure 4 indicates that the average firm-level efficiency varies significantly across countries. In keeping with expectations, it is much higher in major exporters like China and India than in countries like Malawi and Zambia. These results are robust to the choice of the measure of business environment in the inefficiency equation.

<center>**<INSERT Table 3 here>**</center>

The coefficient estimates of the inefficiency equation indicates the following: (a) inefficiency decreases with firm size, (b) foreign ownership *increases* firm level inefficiency, (c) labour market institutions that protect employees reduce inefficiency, and (d) an improvement in the overall economic freedom or business environment i*ncreases* firm level inefficiency. The qualitative result about the impact of business environment on firm-level inefficiency is robust to the choice of the measure of business environment. It is easy to explain the estimated impact of firm size on inefficiency: economies of scale matters. The performance enhancing (i.e., inefficiency reducing) effect of restrictive labour market institutions, and the inefficiency enhancing impact of the different measures of economic freedom or business environment too are consistent with our discussion earlier in this paper. Interestingly, in our results, the extent of the impact of business environment on firm-level efficiency increases with the broadness of the measure; it is small (0.01) and weakly significant (at the 10 percent level) for the index of property rights, and large (0.30) and strongly significant (at the 1 percent level) for the index of economic freedom. In other words, while things like property rights have a very limited impact

on production inefficiency – as one would expect – greater economic freedom that both raises prospects of future growth and provide greater access to factor inputs might result in greater inefficiency, as experienced by the Indian manufacturing sector, on account of over-investment in capacity.

Arguably, the most significant result we report is that labour market institutions that protect employees reduce inefficiency. This has significant implications for the debate about the welfare state. Our result suggests that there was considerable truth in the Abramovitz's (1981) argument that "[t]he enlargement of the government's economic role, including its support of income minima, health care, social insurance, and other elements of the welfare state, was, therefore -- at least up to a point -- not just a question of compassionate regard for the unfortunate, and not just a question of reducing inequalities of outcome and opportunity .... It was, and is -- up to a point -- a part of the productivity growth process itself" (pp. 2-3). It also ties in well with the argument that the absence of an European-style welfare state in the United States, which is also reflected in differences in labour market institutions across the Atlantic, is not explained well by economic factors, and is explained much better by the political structure of United States and racial fragmentation in that country (Alesina, Glaeser and Sacerdote, 2001). Taken together, these results suggest that unless there is strong evidence about substantial impact of labour market policies that protect employees on unemployment rate and duration of unemployment in a given context, it might be difficult to argue against the existence of these institutions on economic grounds.

One shortcoming of our data set is the small number of observations for relatively small countries, especially when we work at the sectoral level. For example, in the case of Malawi, there are only 12 observations in textiles and 3 in garments,

while in the case of Zambia there are 23 observations for textiles and 0 in garments. As a robustness check we therefore drop these samples and re-estimate our regressions. As indicated in Table 4, with the exception of the size variable, which loses its significance, our results are qualitatively the same.

<center>< **Insert Table 4 about here**></center>

Our results raise questions about the popular wisdom that greater labour market flexibility is necessarily good. They also suggest that the implications of greater economic freedom have to be carefully thought through. Indeed, our result regarding the impact of economic freedom or business environment is stronger than that of Commander and Svejnar (2011) who find that cross-country differences in the measure of business environment do not have significant impact on firm performance, in the transition country context.

6. Conclusion

It is generally argued that institutional quality is a key factor determining economic growth, as well as covariates of growth like market entry by firms and employment generation. Institutional quality is also believed to add to firm performance, when measured in terms of sales growth, investment growth and profitability. However, some recent studies suggest that, while better institutional quality may have beneficial macro implications, it may not have positive implications for firm performance. More generally, the macro- and micro- impacts of institutional quality may be different, such that labelling institutions as "good" or "bad" on the basis of their macro- impact may be premature.

We use cross-country firm-level data from nine developing countries to examine this issue. We use production efficiency as our measure of firm performance

because in a developing country context efficient use of limited resources has greater developmental implications than sales growth or profitability. We find that certain restrictive institutions like greater protection of employee rights, which are believed to have negative implications for macro variables like employment growth, may actually enhance production efficiency. By contrast, better business environment may actually be detrimental for production efficiency. Our results suggest that indeed the debate about the implications of institutions and the classification of institutions into "good" and "bad" is far from being over, and there is need to examine this issue further.

To the extent that less flexible labour markets and less economic freedom are correlated with the extent of government intervention in the economy through appropriate industrial policy, including facilitation of training of the workforce, it is feasible that our results reflect the impact of these unobserved industrial policies. However, since such government interventions take many forms, it would be very difficult to formulate ordinal measures of industrial policy that are comparable across countries. An interesting way to extend this research would therefore be to undertake country-level case studies or empirical research to examine both the relationship between market orientation of institutions and government policy interventions in the industrial sector, as well as the interaction between these policies and interventions in affecting firm (or micro) performance.

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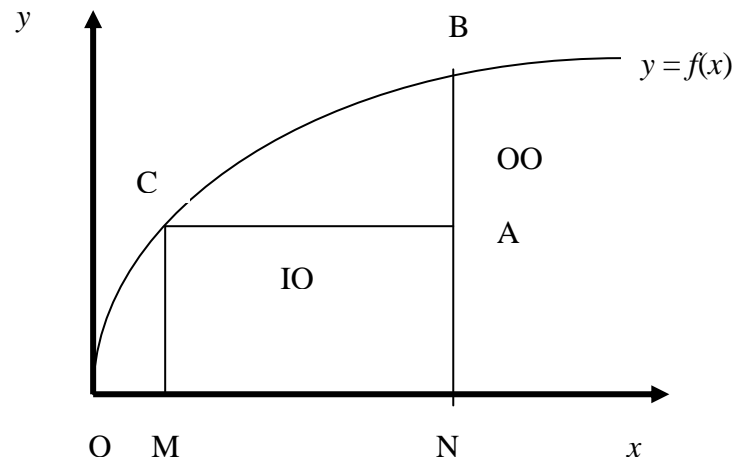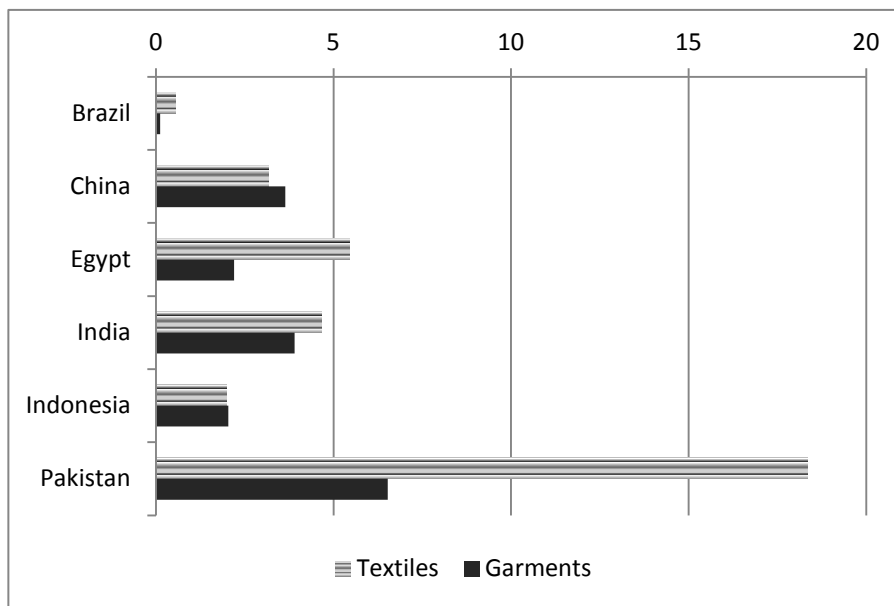
Figure 1: Technical efficiency

Figure 2: Comparative advantage of the countries in textiles and garments

Source: Nordas (2004)

Table 1: Correlation matrix of institutional variables

	Heritage Foundation			Transparency International	Botero et al. (2004)		
	Economic freedom	Business freedom	Property rights	Corruption perception	Labour flexibility	Industrial relations	Social security
Economic freedom	1.00						
Business freedom	0.93	1.00					
Property rights	0.51	0.63	1.00				
Corruption perception	0.66	0.78	0.77	1.00			
Labour flexibility	0.68	0.78	0.56	0.63	1.00		
Industrial relations	0.64	0.77	0.78	0.93	0.76	1.00	
Social Security	0.11	0.22	0.34	0.64	0.20	0.69	1.00

Table 2: Institutional quality across the countries

Country	Index of Economic Freedom	Index of Business Freedom	Index of Property Rights	Social Security Index
Brazil	63.4	70	50	1.65
China	52.6	55	30	2.24
Egypt	55.5	55	50	2.22
India	51.2	55	50	1.20
Indonesia	55.8	55	30	0.53
Malawi	54.7	55	50	0
Pakistan	55.8	55	30	1.39
South Africa	67.1	70	50	1.69
Zambia	59.6	55	50	0.32

Figure 3: Distribution of technical efficiency across firms
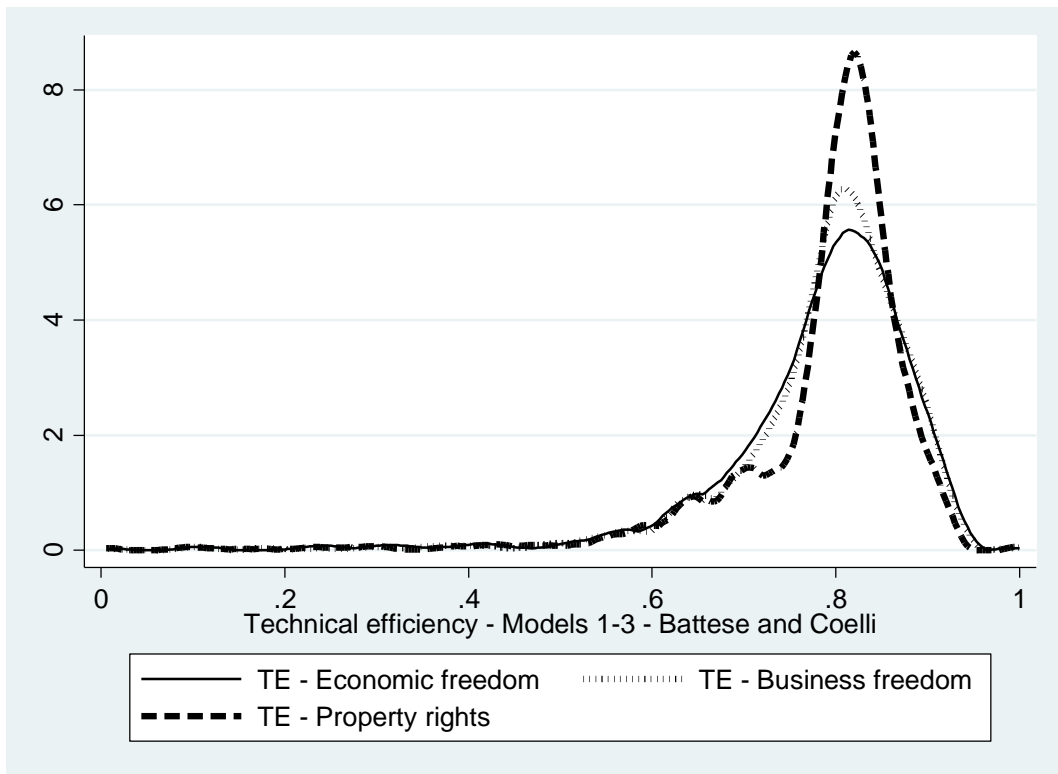
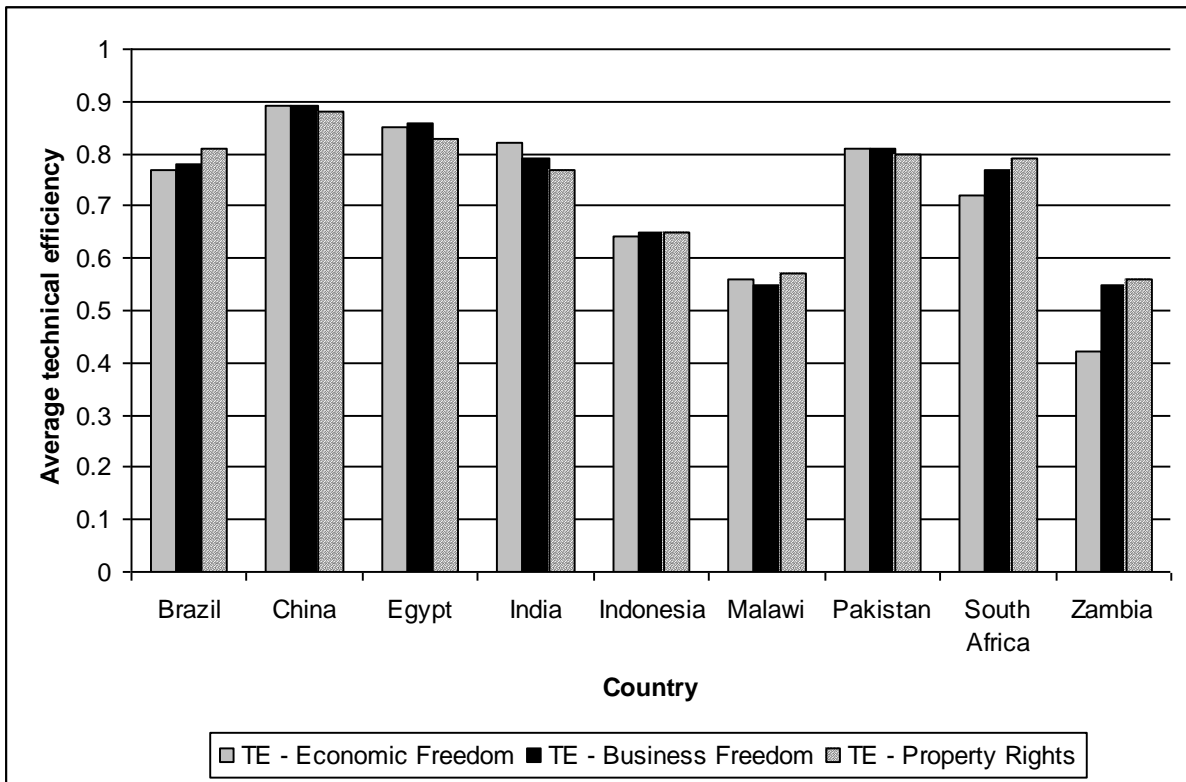**Figure 4: Variation in technical efficiency across countries**

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Table 3: Impact of institutions on efficiency

	(1)	(2)	(3)
Production function (frontier)			
Constant	1.32 ***	1.35 ***	1.38 ***
	(0.12)	(0.13)	(0.12)
Ln material	0.29 ***	0.29 ***	0.28 ***
	(0.03)	(0.03)	(0.03)
½ Ln material sq.	0.07 ***	0.07 ***	0.07 ***
	(0.004)	(0.004)	(0.004)
Ln labour	0.49 ***	0.48 ***	0.45 ***
	(0.04)	(0.04)	(0.04)
½ Ln labour sq.	0.06 ***	0.06 ***	0.05 ***
	(0.003)	(0.003)	(0.003)
Ln capital	0.15 ***	0.16 ***	0.15 ***
	(0.03)	(0.03)	(0.03)
½ Ln capital sq.	- 0.004	- 0.003	- 0.002
	(0.003)	(0.004)	(0.003)
Ln material × Ln labour	- 0.14 ***	- 0.13 ***	- 0.13 ***
	(0.008)	(0.008)	(0.008)
Ln material × Ln capital	0.006	0.0007	- 0.002
	(0.007)	(0.007)	(0.007)
Ln labour × Ln capital	0.02 ***	0.02 ***	0.03 ***
	(0.009)	(0.009)	(0.009)
Inefficiency equation			
Constant	- 14.13 ***	- 7.20 ***	- 0.68
	(1.11)	(1.22)	(0.45)
Size	- 0.13 ***	- 0.16 ***	- 0.08
	(0.05)	(0.06)	(0.06)
Foreign stake	0.008 ***	0.008 ***	0.009 ***
	(0.002)	(0.002)	(0.002)
Social security legislation	- 3.76 ***	- 4.35 ***	- 4.79 ***
	(0.13)	(0.40)	(0.67)
Index of economic freedom	0.27 ***		
	(0.01)		
Index of business freedom		0.15 ***	
		(0.02)	
Index of property rights			0.01 *
			(0.008)
Log likelihood	- 1622.79	- 1625.16	- 1620.48
LR χ^2 (Prob > χ^2)	169.30 (0.00)	164.57 (0.00)	173.92 (0.00)
γ	0.77 ***	0.79 ***	0.85 ***
	(0.02)	(0.02)	(0.01)
No. of obs.	1625	1625	1625

Note: The values within parentheses are standard errors.
        ***, ** and * indicate significance at 1%, 5% and 10% levels.

Table 4: Robustness check: Countries with small samples excluded

	(1)	**(2)**	**(3)**
Production function (frontier)			
Constant	0.88***	0.87***	0.95***
	(0.09)	(0.09)	(0.09)
Ln material	0.36***	0.36***	0.38***
	(0.03)	(0.03)	(0.03)
½ Ln material sq.	0.07***	0.07***	0.08***
	(0.004)	(0.004)	(0.004)
Ln labour	0.62***	0.62***	0.58***
	(0.04)	(0.04)	(0.04)
½ Ln labour sq.	0.06***	0.06***	0.07***
	(0.01)	(0.01)	(0.01)
Ln capital	0.21***	0.21***	0.22***
	(0.03)	(0.03)	(0.03)
½ Ln capital sq.	- 0.01	- 0.01	- 0.010
	(0.004)	(0.004)	(0.003)
Ln material × Ln labour	- 0.16***	- 0.16***	- 0.17***
	(0.01)	(0.01)	(0.01)
Ln material × Ln capital	- 0.005	- 0.005	- 0.003
	(0.01)	(0.01)	(0.01)
Ln labour × Ln capital	0.02*	0.02*	- 0.02*
	(0.01)	(0.01)	(0.01)
Constant	- 0.95***	- 0.95***	- 0.98***
	(0.04)	(0.04)	(0.04)
Size	- 0.02	- 0.03	0.01
	(0.10)	(0.11)	(0.09)
Foreign stake	0.01***	0.01***	0.01***
	(0.003)	(0.003)	(0.003)
Social security legislation	- 3.52***	- 4.62***	- 2.81***
	(0.57)	(0.91)	(0.40)
Index of economic freedom	0.27***		
	(0.07)		
Index of business freedom		0.23***	
		(0.07)	
Index of property rights			0.08***
			(0.02)
Log likelihood	- 1586.92	- 1586.90	- 1589.84
LR χ^2 (Prob > χ^2)	31670.39 (0.00)	28658.99 (0.00)	30322.85 (0.00)
γ			
No. of obs.	1592	1592	1592

Note: The values within parentheses are standard errors.
***, ** and * indicate significance at 1%, 5% and 10% levels.