



POLICY

The Impact of Business Regulations on Economic Performance of Small Firms: Empirical Evidence from Indian Manufacturing

**Manabu Furuta
Aradhna Aggarwal**

Furuta Manabu & Aradhna Aggarwal (2014) "The Impact of Business Regulations on Economic Performance of Small Firms: Empirical Evidence from Indian Manufacturing", Wadhvani Foundation Policy Research Center (WFPRC) Working Paper 001 (March), New Delhi.

Foreword

A dynamic private sector - with new firms entering the market, creating jobs, solving problems by introducing innovative products - is instrumental in economic acceleration and nation building. Governments set the rules that establish and clarify intellectual property rights, reduce the cost of doing business and resolving disputes and increase the predictability of economic transactions. These regulations play a crucial role in supporting a dynamic ecosystem for firms. However, regulations are an outcome of a complex political economic process and prone to be highly cumbersome and inhibiting. Poorly designed business regulations can pose severe roadblocks in starting and growing new firms and affect the dynamics of productivity and output by changing transaction costs and incentives. There is proliferation of literature on the impact of business regulations on entrepreneurship and performance. But such studies are still fairly scarce in developing countries where entrepreneurship is the key to economic acceleration. This study undertaken by the Policy Initiative of Wadhvani Foundation in collaboration with Manabu Furuta of Kobe University, shows how the current business regulations have been undermining the economics of micro and small firms that choose to register vis-à-vis the ones that are eligible but choose not to register. This has direct implication for the future growth of firms and efficiency emanating from economies of scale.

Wadhvani Foundation is committed to strengthening enabling conditions for the promotion of entrepreneurial culture in emerging economies. This evidence based study calls for substantially cutting business registration procedures and costs for micro and small firms in India. I hope this study will contribute to the debate on business regulation reforms in India. It will be followed by a more rigorous study on the roadblocks being faced by start-up, early stage, and matured small firms.

Ajay Kela

CEO, Wadhvani Foundation

Abstract*

This study examines the impact of business regulations on the performance of small firms in India. While doing so, it employs a novel methodology. In India, if an enterprise uses power and has more than 10 workers (or does not use power and employs 20 workers) it needs to register as a “Factory” under the Act. However, there are entrepreneurs and firms that decide not to register themselves in order to avoid regulations. This study investigates whether these firms are more or less efficient than the firms that are in the same size class but choose to register themselves. Our results show that firms that do not register are more productive than those that are registered, suggesting that cumbersome, poorly functioning business regulations increase the transaction costs and undermine the economic performance of firms.

Corresponding author: M.Furuta, Graduate School of Economics and Faculty of Economics, Kyoto University, Yoshida-hommachi, Sakyo-ku, Kyoto, 606-8501, Japan. Tel.: +81-774-33-1826.

E-mail address: furuta.manabu.78c@st.kyoto-u.ac.jp

Acknowledgment: We are deeply grateful to Kazuhiro Yuki whose comments and suggestions were immensely valuable throughout the course of our study. We would also like to thank Takahiro Sato and his students whose meticulous comments were an enormous help to us. Discussions with Deqiang Liu and Naoto Jinji have been insightful. Moreover, when we presented this paper on the workshop titled “Japanese Perspectives on India’s Economic Development” at NCAER, we received valuable comments from the participants, especially, from Bishwanath Goldar.

Contents

1. Introduction	1
2. Theoretical Framework and Existing Literature	2
3. Methodology	4
4. Data	7
5. Results	9
6. Conclusion	14
7. References	15

1. Introduction

Since the mid 1980s, there has been a proliferation of studies that have examined the relationship between business regulations and economic outcomes. The link between regulations and performance has also been analysed in a large and growing empirical literature. According to the World Bank (2014 p.30), “since 2003, 1,578 research articles using *Doing Business* data alone have been published in peer-reviewed academic journals and another 4,464 have been posted online”. In addition, there are studies based on the country ratings produced by Transparency International, Political Risk Services, and the Heritage Foundation (Economic Freedom). This large body of research supports the view that the cumbersome, poorly functioning regulatory business environments undermine entrepreneurship and economic performance. However, the bulk of this research relies on country-level proxy indicators of the regulations such as, regulatory constraints (Dall’Olio et al., 2013; Dutz et al., 2011; Djankov et al., 2002,2006, and Botero et al. 2004), governance (Kaufmann et al., 2000, 2002, 2006), strength of the legal system (Houston et al., 2010; Durnev and Kim, 2005), or the labor market rigidities (Dreher and Gassebner 2013; Amin 2009; Besley and Burgess, 2004). Economic outcomes are measured by total factor productivity (Barseghyan, 2008), labour productivity (Dall’Olio et al. 2013), entry rate (Dreher and Gassebner 2013), income per capita (Djankov, McLiesh and Ramalho 2006), corporate growth (Litov and Yeung 2008), exports (Portugal-Perez and Wilson 2011), or innovations (Dutz et al., 2011). A feature common in much of this research is that country level aggregate proxies are used for selected regulations to assess their association with country, industry or firm-level performance after controlling country and/or industry specific effects. However, there is realization that the cross-country regression based methodology has several limitations (Levine and Renelt, 1992; Levine and Zervos, 1993). According to Maddala (1999, p. 432), “One should not expect to draw too many policy conclusions from these cross-country regressions.” Hence, some studies have used natural experiments, in the spirit of randomized evaluations (Amiti and Khandelwal 2011; Bruhn 2013, 2011 among others). This methodology can yield more convincing results than the pure cross sectional studies. But in many cases, given the complexity of economic settings they may not establish causality between regulatory changes and outcomes of interest (World Bank, 2014; p. 30).

Against that background, the present study adopts a novel approach. With a focus on India, we examine the effect of regulations on firms’ performance by assessing the difference in the economic performance between the informal¹ sector firms which qualify for the formal sector but do not get registered with the formal sector, and their counterpart firms (those in the same size class but choose to register) in the formal sector. A firm’s performance is measured by its total factor productivity (TFP).

Under the Factories Act, 1947, in India, any enterprise that uses power and has more than 10 workers (or more than 20 workers without using power) needs to register as a “Factory” under the Act. Enterprises that do not meet this criterion, need not register². If an enterprise crosses the threshold level of employment and doesn’t register under the law, this enterprise remains in the informal sector “unlawfully”. Since the Factories Act requires formal enterprises to comply with employment and other regulations, by not registering under the Act the firm avoids compliance with the regulatory mechanism. The present study adopts the novel approach by focusing on the performance of uniquely sampled firms in the formal and informal sectors which face very different regulatory institutions at a given point in time, and conducts a comparative analysis of their performance. Econometric exercises in this study reveal that the firms that choose not to get registered are more efficient than their counterpart firms in the formal sector. In economic terms, the difference between the formal and informal sectors is a matter of regulation. Business regulations define the rules of the game and thereby influence the ease with which transactions can take place in product and factor markets in the formal economy. On the other hand, informal-sector entrepreneurs tend not to be directly affected by formal business laws. Specifically, the informal sector refers to parts of the economy that are not taxed, regulated, or monitored. As barriers to doing business vary widely across formal and informal sectors, it is expected that the difference in the performance of the two sets of selected firms across these sectors can be attributed to the quality of business regulations after controlling for other firm-specific factors.

This paper is organized as follows. Section 2 describes the theoretical framework and reviews the existing literature. Section 3 explains the methodology and the data. The results on comparison of total factor productivity between the formal and informal sectors are provided in Section 4, while the robustness checks of those results are presented in Section 5. Section 6 concludes.

2. Theoretical Framework and Existing Literature

Conventionally, business regulations are expected to facilitate business. They shape the incentives of key economic actors in society; are created to reduce uncertainty about exchanges (Coase, 1937; Shubik, 1975; Williamson, 1975, 1985); and enhance predictability. They also reduce transaction costs that arise in economic activities from the separation of buyers and sellers and ensuing information problems. Moreover, the formal firms can benefit by having access to public goods, enforcement of property rights and contract, which could cut their transaction costs involved in inefficient contractual relations. In addition, the firms can benefit from access to formal credit, and sufficiently scale up their capacity. This may have an affirmative impact on the firms’ performance. But the possibility that formal institutions might well constrain

the economic freedom of formal-sector actors, thus reducing firms' efficiency cannot be ruled out. Informal sector firms may thus be more entrepreneurial and dynamic as they are not likely to face the inefficient business regulations.

A distinction thus needs to be made between the efficient and inefficient regulations. Efficient regulations clearly define the rules of the game and boundaries within which economic agents can act, thereby enabling transactions at low cost. The logical outcome of efficient regulations, therefore, is better economic performance. Bad regulations on the other hand constrain firms' efficiency by increasing entry costs disproportionately, denying economic freedom to do business, and constraining the entry of dynamic enterprises and exit of sick businesses.

Business regulations may exert two opposite forces on economic outcomes: affirmatively, they allow the firm more economic freedom in terms of entry, exit, employment and tax payments; and negatively, it denies the firm the economy of scale advantage and access to the formal sector credit, public services, infrastructure, and public support schemes, and it may impose on the firm, high transaction costs.

Our hypothesis is as under.

The enterprises that cross the formal sector threshold but avoid formal regulations by not registering themselves under the Factories' Act are more dynamic and entrepreneurial than their counterpart firms in the same size class in the formal sector.

We test this hypothesis by matching the informal sector firms that qualify for the formal sector but avoid the formal sector registration, with their counterpart firms in the formal sector. Formal firms are those firms that are registered under the Factories Act while the informal ones remain unregistered. For registration under the Factories Act, as many as forty-three registrations are required with various agencies related to labor, tax³, health, safety and others (Garg 2001, for detailed regulations).⁴ In addition, several approvals and licenses are to be acquired including approval for the building plan and environmental clearance. Not only does this delay the startup of a business but compliance with these rules and regulations may also impose a heavy burden on entrepreneurs. For instance, if an employee works over 48 hours per week, his/her employer has to pay twice the normal wage for time exceeding the 48 hours. Furthermore, this law also specifies rules regarding work-time for women and children. The owner has to improve facilities for safety, sanitation and welfare. When an enterprise doesn't obey the law, the owner has to pay a fine of Rs.100,000 or less, or serve a sentence of two years' penal servitude. Lack of transparency in rules, weak governance and corruption increase the costs of entry and compliance several fold. An annual registration fee as determined by the number of workers and horsepower increases the cost further. Finally, there is little flexibility to withdraw once an investment is undertaken in a venture (Aggarwal and Sato, 2011).

There are a few studies that have analysed the productivity differential between the formal and informal sector firms. La Porta and Shleifer (2010) for instance, discuss the impact of firms in the informal sector to economic growth using cross-country data, including India. Using data from World Bank firm-level surveys including India, they find that informal firms are small and extremely unproductive, even when compared to small formal firms, and especially so, relative to larger formal firms. They conclude that informal firms do not contribute to economic growth, which is driven by the efficient formal firms, and disappear over time. Kathuria and Sen (2012) compared the productivity between informal and formal enterprises in India using data from the Annual Survey of Industry and National Sample Survey. They use the stochastic frontier approach to measure total factor productivity (TFP) and conclude that formal enterprises are more efficient than informal ones. Those papers, however, disregard the heterogeneity of firms in the informal and formal sectors. They ignore the fact that the informal sector itself comprises of two sub-sectors: one that consists of those enterprises which under the law cannot not be formal enterprises and the other, that is populated by enterprises that qualify to be in the formal sector but decide to stay in the informal sector. Similarly, the formal sector comprises of enterprises that range from those with employment as low as 10 workers to those with more than 1000 workers. Thus, by combining large representative surveys of informal firms (which essentially comprises of micro enterprises) with the census of formal firm, these studies are likely to give an upward bias to the efficiency of the formal sector firms. We match the informal sector firms that are eligible to be in the formal sector but choose not to get registered with their counterpart firms in the registered sector and compare their performance.

3. Methodology

Our methodology involves four steps.

Step 1: Measuring TFP

In step 1, we estimate total factor productivity (TFP) of a firm. To measure TFP, we use two approaches: one, the production function approach; two, the TFP index approach.

Measuring TFP by estimation from production function: We use the Cobb-Douglas production function to estimate TFP, which is described by the following equation,

$$TFP = \frac{y}{k^{\alpha}l^{\beta}} \quad (3.1).$$

Where y is gross value added, k is gross fixed assets, and l is total number of workers. α and β

which represent the output elasticity of capital or labor are estimated by following estimation equation,

$$\ln y = \rho + \alpha \ln k + \beta \ln l + \mu \quad (3.2).$$

ρ is a constant term, and μ is the stochastic error term. Column 1 of Appendix Table A1 shows the estimated output elasticity of capital, α and of labor, β .

Measuring TFP by using TFP index: The TFP index is developed by Caves et al. (1982) and improved by Good et al. (1998). It is measured using the following equation

$$\text{TFP INDEX} = \ln y - \overline{\ln y} - \left[\frac{1}{2} (w_k + \overline{w_k}) (\ln k - \overline{\ln k}) + \frac{1}{2} (w_L + \overline{w_L}) (\ln l - \overline{\ln l}) \right] \quad (3.3).$$

Where, w_k or w_L is cost share of capital or labor. $\overline{\ln y}$, $\overline{\ln k}$, $\overline{\ln l}$, $\overline{w_k}$ and $\overline{w_L}$ are means of each variable. It assumes a constant return to scale, because w_k is calculated by $1 - w_L$. To guarantee that comparisons between any two enterprises are transitive, the index expresses each enterprise's inputs and outputs as deviations from a single reference point. As the reference point the "Caves, Christensen, and Diewert multilateral index" uses the hypothetical average enterprise with input revenue shares equal to the arithmetic mean of revenue shares over all observations and output and input levels that equal the geometric mean of output and the inputs over all observations. Each enterprise's output, inputs, and thus productivity is measured relative to this hypothetical enterprise (Aw et al., 2000).

Step 2: Comparison of TFP between informal and formal enterprises by Kernel density estimation

In step 2, TFP measured by the above approaches is compared between the two selected sets of enterprises in the formal and informal sectors by Kernel density estimation. This approach shows the difference in TFP distributions between two groups.

Step 3: Comparison of TFP between informal and formal enterprises using the OLS estimation

In this step we regress the firm-specific productivity measure on a dummy variable that captures whether the firm belongs to the formal or informal sector after controlling industry, type of ownership and so on. More specifically, we use the following specification

$$\ln TFP (\text{or TFP index}) = a + b \text{Formal} + X'c + e \quad (3.4).$$

a is a constant term, and e is the stochastic error whereas *Formal* is a formal dummy. Table 1 summarizes the definition of the explanatory variables used in the OLS estimation.

Table 1: Definition of Dependent Variables Used in OLS Estimation

Variable	Description
<i>Formal</i>	1 = formal, 0 = informal
<i>Industry</i>	1 = concerned industry, 0 = otherwise
<i>District</i>	1 = concerned district, 0 = otherwise
<i>Urban</i>	1 = urban area, 0 = rural area
<i>Individual</i>	1 = individual proprietorship, 0 = otherwise
<i>Family</i>	1 = joint family or partnership, 0 = otherwise
<i>Co-operative</i>	1 = co-operative society, 0 = otherwise
<i>Others</i>	1 = others(including enterprises owned by government or state), 0 = otherwise

Source: As conceptualised by the author

If an enterprise operates in different locations, the TFP may vary because of the difference in infrastructure, degree of firm’s accumulation or the economic situation. The difference in TFP caused by location is controlled by a district dummy⁵. Since the production technology may be different between industries, this aspect is controlled by an industry dummy. According to NIC 2-digit code, 22 industries are classified. The reference group is the food production industry. The urban dummy controls the difference in infrastructure or production market. Type of ownership (*Individual, Family, Co-operative, Others*) may affect TFP because the incentive of owners is different between individually-owned, government-owned, co-operative society-owned, and market-based enterprises. The reference group consists of public limited enterprises.

Step 4: Robustness check:

For robustness check, in step 4 we assume that production technology is different between industries. To consider technological difference between industries, we use three approaches.

In the first approach we categorize enterprises included in the sample into two types of industries: labor-intensive and capital-intensive. We assume that they possess different production technologies and compare the TFP of the informal and formal enterprises obtained by estimating their production functions separately. Following Hasan, Jandoc and Robert (2010) the enterprises in Beverages and Tobacco, Textile Products, Wood/Wood Products, Leather/Leather Products, and Nonmetallic Products industry are classified as labor-intensive industries, and those in Machinery, Electrical Machinery, Transport, Metals and Alloys, Rubber/Plastic/Petroleum/Coal,

and Paper/Paper Products industry as capital-intensive industries⁶. Columns 2 and 3 of the Appendix Table A1 show each industry's estimated output elasticity of capital, α and of labor, β .

The second approach assumes that each industry (NIC 2-digit 22 industries) has a different production function. Here we assume that all 22 industries of NIC 2-digit code have different technologies. Under this assumption, we estimate following equation,

$$\ln y = \rho + \alpha \ln k + \beta \ln l + \sum_{i=1}^{21} \gamma_i D_{industry,i} + \sum_{i=1}^{21} \delta_i D_{industry,i} \times \ln k + \sum_{i=1}^{21} \theta_i D_{industry,i} \times \ln l + \mu \quad (5.1).$$

$D_{industry,i}$ is a dummy variable of industry i . We use $\alpha + \delta_i D_{industry,i}$ as the elasticity of capital and $\beta + \theta_i D_{industry,i}$ as the elasticity of labor. If δ_i or θ_i is accepted under significant level 5% of t-test, the value is regarded as 0⁷.

The third approach is that the production functions of the informal and formal enterprises are estimated separately to estimate their productivity. Columns 2 and 3 of the Appendix Table A1 show each sector's estimated output elasticity of capital, α and of labor, β .

4. Data

We use unit level data for the formal and informal manufacturing sectors for 2000-01. For the informal sector, we use the National Sample Survey (NSS) Organization firm-level surveys on the informal manufacturing sector (that is, those firms which are not registered under the Indian Factories Act of 1948). Data on the formal manufacturing sector is drawn from the Annual Survey of Industries (ASI), undertaken by the Central Statistical Organization (CSO), which is the annual census-cum-sample survey of all the formal manufacturing units for all the industries across all the states. The two sets of data are described as under.

- The NSS survey is undertaken quinquennially using a stratified sampling procedure. This survey is conducted every 5 years. This paper uses the data of 2000-01 (56th round). Conceptually, NSS should include enterprises hiring less than 10 (20 if power is not used) workers because as mentioned above, enterprises that cross this threshold are required to be registered under the Factories Act and are covered by ASI. However, in reality NSS is found to comprise of enterprises hiring more than 10 workers (20 workers without using power) and upto 50 workers. Those enterprises stay in the informal sector "unlawfully". This study focuses on these enterprises that "unlawfully" stay in informal sector. Therefore, the

sub-sample from NSS is composed of enterprises that hire more than 10 workers using power (20 workers without using power) and less than 50 workers. We call this sub-sample IE (Informal Enterprises). NSS includes seasonal enterprises, which only operate in specific seasons. Those enterprises are dropped from the analysis as ASI consists of those enterprises that are not seasonal

- The ASI data cover two sets of surveys: census and sample. The census survey, which captures all enterprises, includes those enterprises that hire more than 100 workers, and the sample survey includes enterprises that hire less than 100 workers. Enterprises in the sample survey are selected by stratified multi-stage sampling that is, sampling one third of the enterprises listed. We select a sub-sample from the sample survey of ASI which comprises of enterprises with less than 50 workers and more than 10 workers if using power (20 workers if not using power), the same size as IE firms. We call this sub-sample FE (Formal Enterprises)

Table 2 shows the characteristics of the two sets of enterprises in terms of output, capital, labor, capital-intensity, labor cost, and borrowing. We use gross value added as output, gross fixed asset as capital, and total average hiring worker in a day as labor. Capital-intensity is defined as gross fixed asset divided by total average worker in a day. Labor cost is sum of wages, bonus, and welfare. And borrowing is represented by outstanding loan. From this table, it is evident that the gross value added of IE is on average, 2.07 times higher than FE. On the contrary, gross fixed asset of FE is on average 6.02 times higher than IE. Capital-intensity of FE is apparently higher than that of IE; FE is 4.22 times higher than IE on average. Moreover, FE has easier access to the financial market than IE; FE's outstanding loan is only 24.21 times higher than IE on average. This indicates that it is easy to win the confidence of financial institutions and to borrow money, since enterprises that have the status of formal enterprises have an advantage. Labor cost of IE is on average 4.16 times higher than that of FE.

Table 2: Descriptive Statistics of Main Variables

Informal enterprises						
	Gross Value Added	Gross Fixed Asset	No. of workers	Capital intensity	Labor Cost	Outstanding Loan
	(Rs.)	(Rs.)	(men)	(Rs./man)	(Rs.)	(Rs.)
NOB	1,910	1,910	1,910	1,816	1,909	1,816
Mean	7,123,929	955,056	18	58,636	3,948,034	170,953
SD	13,600,000	2,186,405	7	102,695	3,106,077	901,566
Minimum	184,440	4,450	11	587	108,000	0
Maximum	622,000,000	103,000,000	49	4,119,915	44,600,000	24,700,000
Formal enterprises						
	(Rs.)	(Rs.)	(men)	(Rs./man)	(Rs.)	(Rs.)
NOB	9,774	9,774	9,774	9,774	9,774	7,933
Mean	3,439,057	5,746,723	22	247,556	948,378	4,138,835
SD	13,600,000	17,300,000	10	636,803	1,006,678	12,100,000
Minimum	998	106	10	3	12,150	0
Maximum	830,000,000	1,040,000,000	49	28,000,000	42,000,000	748,000,000

Source: Authors' Calculations

5. Results

Average productivity comparisons

Table 3 shows the statistical comparison of TFP and TFP index between the selected groups of informal and formal enterprises. This result suggests that TFP of the former group is on average 3.73 times higher than the latter. This table also indicates that the IE's TFP index is, on average, much higher than that of FE's.

Table 3: Statistical Comparison of TFP & TFP Index

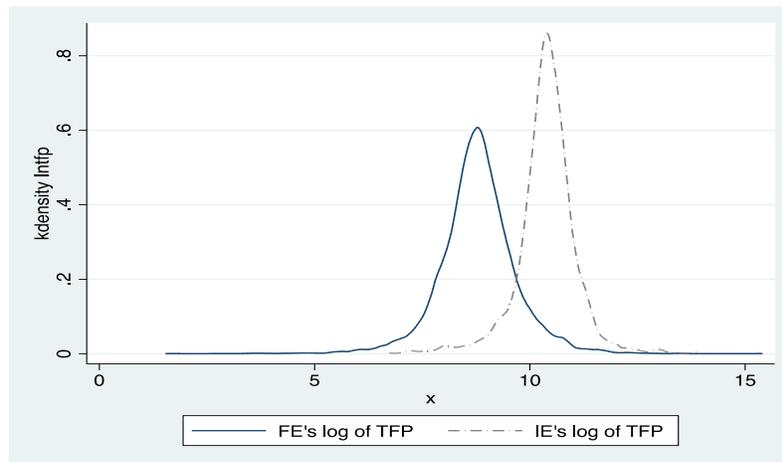
Statistical comparison of TFP					
	NOB	Mean	SD	Minimum	Maximum
IE's TFP	1910	35229.45	46027.79	690.92	934168.70
FE's TFP	9774	8898.22	44236.31	3.96	4055317.00
Statistical comparison of TFP index					
	NOB	Mean	SD	Minimum	Maximum
IE's TFP index	1909	-0.0365	0.6861	-4.2730	5.1078
FE's TFP index	9729	-1.8155	0.8743	-12.2929	16.2578

Source: Authors calculations

Comparison of TFP: Kernel density estimation

Measuring TFP by estimation of production function: Figure 1 shows the distributions of log of TFP. The real line is the density of formal enterprises, and the dotted line is the density of informal enterprises. This figure indicates that IE's TFP distribution is on the right side of FE's.

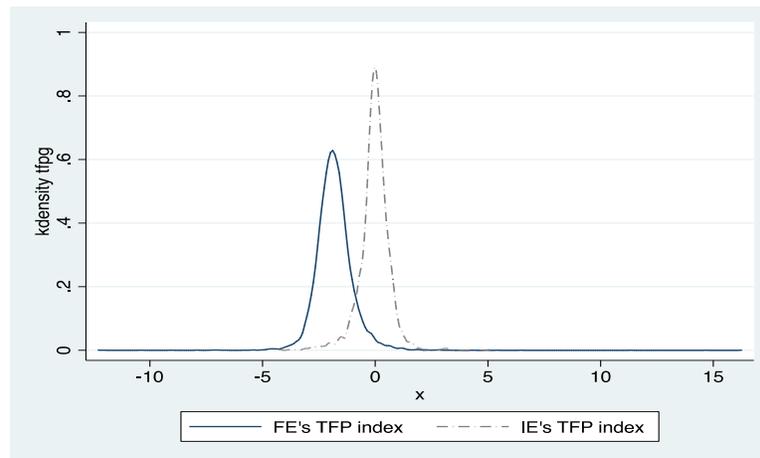
Figure 1: Kernel Density Estimation of log of TFP



Source: Authors' estimation based on ASI and NSS data

TFP index: Figure 2 shows distributions of IE's and FE's TFP index. The solid line is the density of FE, and the dotted line is the density of IE. Like the distribution of TFP measured by production function, this figure also indicates that IE's TFP index distribution is on the right side of FE's.

Figure 2: Kernel Density Estimation of TFP Index



Source: Authors' estimation based on ASI and NSS data

Comparisons of productivity: The OLS approach

TFP as the dependent variable: The above results show that the firms that stay “unlawfully” in the informal sector are more efficient than those that choose to get registered. But that approach does not take into account other factors affecting TFP, for example, location, industry and so on. Table 4 shows the results that log of TFP obtained by estimating production function is used as the dependent variable⁸. In column (1), formal-sector dummy alone is included as explanatory variable. In other words, other factors affecting TFP are not controlled. This estimation indicates the coefficient of formal dummy is significantly negative. In column (2), ownership dummy and urban dummy are added to the estimates. The coefficient of formal dummy is still significantly negative and the magnitude does not change as much. This estimation also shows that the coefficients of the following ownership dummies: *Individual*, *Family*, and *Co-operative Society*, are significantly negative. The reason may be that the capital intensity of private limited enterprises is higher than that of those enterprises: on average, private limited enterprises is 3.03, 2.33 and 1.45 times higher than *Individual*, *Family* and *Co-operative Society*, respectively. The coefficient of *Others* is not significant. This type of ownership contains the enterprise that is state-owned or protected by government, and the mean of capital intensity is almost the same as that of private limited enterprises. (The mean is 103% of private limited enterprises.) Moreover, the coefficient of urban dummy is significantly positive. This may reflect the fact that infrastructure of urban areas is better than that of rural areas. In column (3) industry dummy is added, and in column (4), district dummy is added. The results still indicate that the informal enterprises are more efficient than formal enterprises with the same size, that is, the coefficient of formal dummy is significantly negative. And the results of urban and ownership dummy are qualitatively the same as column (2).

TFP index as the dependent variable: Table 4 (columns 5-8) also shows the results of OLS estimation using TFP index as the dependent variable. Formal dummy is significantly negative under any specification, as shown in Table 4. Ownership dummies are not significant (except for *Others* in column (8)). Those results indicate that even after controlling other factors affecting TFP, IE is more efficient than FE. This result is not consistent with Kathuria and Sen (2012). This may be because they did not consider the heterogeneity of firms in the informal sector.

Table 4: OLS Estimation using log of TFP as Dependent Variable & OLS Estimation using log of TFP Index as Dependent Variable

OLS estimation using log of TFP as dependent variable					OLS estimation using log of TFP index as dependent variable			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Formal</i>	-1.550***	-1.461***	-1.517***	-1.614***	-1.756***	-1.912***	-1.946***	-2.109***
	(0.039)	(0.044)	(0.047)	(0.053)	(0.039)	(0.139)	(0.159)	(0.154)
<i>Individual</i>		-0.272***	-0.216***	-0.160***		-0.159	-0.203	-0.190
		(0.028)	(0.028)	(0.027)		(0.138)	(0.155)	(0.153)
<i>Family</i>		-0.117***	-0.0605**	-0.028		-0.123	-0.132	-0.196
		(0.024)	(0.024)	(0.024)		(0.197)	(0.202)	(0.198)
<i>Co-operative</i>		-0.314***	-0.288***	-0.224**		-0.090	-0.131	-0.113
		(0.103)	(0.109)	(0.105)		(0.162)	(0.165)	(0.165)
<i>Others</i>		-0.060	-0.081	-0.002		-0.289	-0.306	-0.895*
		(0.101)	(0.104)	(0.104)		(0.473)	(0.507)	(0.492)
<i>Urban</i>		0.182***	0.0926***	0.0867***		0.269***	0.201***	0.204***
		(0.025)	(0.028)	(0.026)		(0.021)	(0.022)	(0.028)
<i>Industry</i>			YES	YES			YES	YES
<i>District</i>				YES				YES
<i>Constant</i>	10.30***	10.20***	10.15***	9.457***	-0.0779**	-0.103	-0.091	-0.678***
	(0.038)	(0.044)	(0.052)	(0.407)	(0.037)	(0.139)	(0.163)	(0.240)
<i>Observations</i>	11684	11590	11590	11590	11638	11545	11545	11545
<i>R-squared</i>	0.364	0.380	0.401	0.483	0.097	0.115	0.137	0.237

Note: Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors estimation

Comparison of TFP: Robustness Check

Table 5 shows that “unlawful” informal enterprises are more efficient than formal enterprises of the same size, even though, in the specifications, different production technologies are assumed between capital and labor intensive industries (column 1); each NIC industry (column 2); or IE and

FEs (column 3), as discussed above.

This shows that our results that “unlawful” informal enterprises are more efficient than formal enterprises of the same size are robust.

Table 5: OLS Estimation Taking into Account Technology Gap

	(1)	(2)	(3)
<i>Formal</i>	-1.709*** (0.240)	-2.011*** (0.157)	-2.249*** (0.061)
<i>Individual</i>	-0.224 (0.224)	-0.352** (0.157)	0.029 (0.027)
<i>Family</i>	-0.333 (0.247)	-0.367** (0.183)	0.122*** (0.024)
<i>Co-operative</i>	-0.177 (0.330)	-0.237 (0.188)	-0.156 (0.104)
<i>Others</i>	1.398* (0.722)	-1.157** (0.507)	0.045 (0.104)
<i>Urban</i>	0.134*** (0.035)	0.111*** (0.026)	0.132*** (0.026)
<i>Industry</i>	YES	YES	YES
<i>District</i>	YES	YES	YES
<i>Constant</i>	8.917*** (0.357)	8.563*** (0.259)	8.265*** (0.229)
<i>Observations</i>	6325.000	11590.000	11590.000
<i>R-squared</i>	0.281	0.666	0.264

Note: Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors estimation

Our results indicate that the firms which choose not to register are more dynamic and perform well. Clearly, poorly functioning and cumbersome business regulations can hamper economic performance of firms. Our results are consistent with the existing studies. Barseghyan (2008) for instance shows that higher entry costs significantly reduce output per worker by lowering total factor productivity. Similarly, Dall’Olio et al (2013) provide evidence that improvements in the *Doing Business* indicators are positively associated with increased labor productivity in manufacturing and services in EU-15 and EU-12 countries.

6. Conclusion

This study measures total factor productivity of “unlawful” informal enterprises and formal enterprises in the same size class. Comparison of TFP between the two groups is conducted by non-parametric and parametric approaches. It shows that TFP of “unlawful” informal enterprises is, on average, higher than that of formal enterprises even after controlling the effects of location, industry, and type of ownership. Robustness check, conducted by assuming technological differences between industries or between informal and formal enterprises also confirms our results. This result suggests that entry costs to the formal sector are too high for enterprises that are small. The study is based on the data of 2000-01 but this does not discourage us from reporting the results to show how high regulation costs can affect the economic efficiency of firms.

The policy implication is that the regulatory costs should be lowered. If the entry costs are lowered, “unlawful” informal enterprises may be incentivized to enter the formal sector. Earlier studies also indicate that firms can be incentivized to register by relaxing business restrictions. For instance, Bruhn (2013) finds that business registration reform caused 14.9% of informal business owners with characteristics similar to those of formal business owners to shift to the formal economy in Mexico. Kaplan, Piedra and Seira (2011) also show that simplified entry regulations led 5% of informal firms to shift to the formal economy in Mexico. Bruhn (2011) shows that a reform that simplified business registration in Mexican municipalities increased registration by 5%. Providing information about registration or paying for it do not necessarily increase formalization, particularly when there are other barriers to it (de Mel, McKenzie and Woodruff 2013). Branstetter and others (2013) offer further evidence that simpler business registration helps create formal firms. There is also evidence that lowering of business regulations increase new firm entry (For instance, Branstetter and others 2013).

A very significant percentage of the economy in developing countries comes from the informal sector. For instance, India’s informal sector is rather large despite a high rate of economic growth and modernization of the economy. It generated 80% of employment in manufacturing and 31.7% of value added, in 2009-10 (NCEUS, 2010). A key input to development would be to bring businesses operating in the informal sector into the formal sector. The impact of reducing entry costs could enhance growth of manufacturing, and moreover, increase economic growth in India.

APPENDIX

Table A.1 Output elasticity

	All Samples	Capital-intensive	Labor-intensive	IE	FE
k	0.274*** (0.0060)	0.304*** (0.0093)	0.287*** (0.0162)	0.344*** (0.013)	0.337*** (0.005)
l	0.605*** (0.0230)	0.650*** (0.0337)	0.513*** (0.0640)	0.603*** (0.045)	0.758*** (0.021)
Constant	8.858*** (0.0896)	8.247*** (0.1370)	9.142*** (0.2550)	9.275*** (0.211)	7.232*** (0.082)
NOB	11,684	4,792	1,576	1910.000	9774.000
R ²	0.26	0.306	0.24	0.324	0.442

Absolute value of t-statistics in parentheses

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

¹ In India, the formal sector is called the “organized” sector, and the informal sector is the “unorganized” sector.

² This does not mean that enterprises of a lower scale cannot register themselves as a ‘Factory’ under the Factories Act.

³ If an enterprise registers as a corporate firm, it should pay income tax as per the Income-Tax Act, 1961.

⁴ <http://www.citehr.com/409015-all-form-under-factories-act-1948-application.html>

⁵ In 2001, there were 593 districts in India.

⁶ The other industries we deem as ambiguous and therefore cannot classify include Food Products, Textiles, Basic Chemicals, Metal Products, and Other Manufacturing.

⁷ This method avoids the distortion caused by insignificant large value of coefficient. However, the estimation result is not different.

⁸ We also measured TFP by estimation of translog production function. TFP is the residual of following equation, $\ln y = \alpha + \beta \ln k + \gamma \ln l + \frac{1}{2} \delta (\ln k)^2 + \frac{1}{2} \vartheta (\ln l)^2 + \rho (\ln k \times \ln l) + \epsilon$. Then, OLS estimation is conducted. The results are consistent with the results that TFP measured by estimation of the Cobb-Douglas production function or TFP index are used as dependent variables.

REFERENCES

Aggarwal, A. and Sato, T., 2011. Firm Dynamics and Productivity Growth in Indian Manufacturing: Evidence from Plant Level Panel Dataset, Discussion Paper Series DP2011-07, Research Institute for Economics & Business Administration, Kobe University

Amin M. (2009) Labour regulation and Employment in India’s Retail Stores.” *Journal of Comparative Economics* 37: 47–61.

Amiti, Mary, and Amit K. Khandelwal . 2011 Import competition and quality upgrading , *Review of Statistics and Economics* 95 (2): 476–90

Aterido, R., Hallward-Driemeier, M., & Pages, C., 2011. Big constraints to small firms’ growth? Business environment and employment growth across firms. *Economic Development and Cultural Change*, 59(3), 609-647.

Aw, B. Y., Chung, S., & Roberts, M. J., 2000. Productivity and turnover in the export market: micro-level evidence from the Republic of Korea and Taiwan (China). *The World Bank Economic Review*, 14(1), 65-90.

Barseghyan, Levon. 2008. “Entry Costs and cross country differences in productivity And output, *Journal of Economic growth* 13 (2): 145–67

-
- Besley, T., & Burgess, R., 2004. Can labor regulation hinder economic performance? Evidence from India. *The Quarterly Journal of Economics*, 119(1), 91-134.
- Botero, J. C., Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A., 2004. The regulation of labor. *The Quarterly Journal of Economics*, 119(4), 1339-1382.
- Branstetter, Lee G., Francisco Lima, Lowell J Taylor and Ana Venâncio. 2013 Do entry regulations deter entrepreneurship and job creation? Evidence from Portugal, *Economic Journal* (July 16). <http://onlinelibrary.wiley.com/doi/10.1111/eoj.12044/abstract>.
- Bruhn, Miriam. 2011. "License to Sell: The Effect of Business Registration Reform on Entrepreneurial Activity in Mexico." *Review of Economics and Statistics* 93 (1): 382–86.
- Bruhn, Miriam. 2013 Informal Business Owners in Mexico." *Journal of Development Economics* 103: 275–83
- Caves, D. W., Christensen, L. R., & Diewert, W. E., 1982. The economic theory of index numbers and the measurement of input, output, and productivity. *Econometrica: Journal of the Econometric Society*, 1393-1414.
- Coase, Ronald H., 1937. The Nature of the Firm, *Economica N.S.*, 4, 386-405. Reprinted in Oliver E. Williamson and Sidney Winter, eds., 1991. *The Nature of the Firm: Origins, Evolution, Development*. New York: Oxford University Press, 18-33.
- Dall’Olio, Andrea, Mariana Loopty, Naoto Ka neira and Federica Saliola. 2013. "Productivity growth in Europe Policy Research Working Paper 6425, World Bank, Washington DC
- de Mel, Suresh, David McKenzie and Christopher Woodruff. 2013. "The Demandfor, and Consequences of, Formalization among Informal Firms in Sri Lanka *American Economic Journal: Applied Economics* 5 (2): 122–50
- Djankov, Simeon, Caralee McLiesh and Rita Ramalho. 2006. "Regulation and Growth." *Economics Letters* 92: 395–401
- Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A., 2002. The regulation of entry. *The Quarterly Journal of Economics*, 117(1), 1-37.
- Dreher, Axel, and Martin Gassebner. 2013. Greasing the Wheels? The Impact of Regulations and Corruption on Firm Entry." *Public Choice* 155 (3–4): 413–32.
- Durnev, A., & Kim, E., 2005. To steal or not to steal: Firm attributes, legal environment, and valuation. *The Journal of Finance*, 60(3), 1461-1493.
- Dutz, Mark A., Ioannis Kessides, Stephen O’Connell and Robert D. Willig. 2011. "Competition and Innovation-Driven Inclusive Growth." *Policy Research Working Paper 5852, World Bank, Washington, DC*.
- Garg, A., 2001. *Labour Laws: One should Know*, New Delhi, Nabhi Publications
- Good, D. H., Nadiri, M. I., & Sickles, R. C., 1999. Index Number and Factor Demand approaches to the Estimation of Productivity. *Handbook of Applied Econometrics Volume II: Microeconomics*, 2, 14.
- Houston, Joel, Chen Lin, Ping Lin and Yue Ma. 2010. "Creditor Rights, Information Sharing, and Bank Risk Taking." *Journal of Financial Economics* 96 (3): 485–512.
- Hasan, R., Jandoc, L., & Robert, K., 2010. *The Distribution of Firm Size in India: What Can Survey Data Tell Us?* (No. 213). Asian Development Bank.
- Kaplan, David, Eduardo Piedra and Enrique Seira. 2011. "Entry Regulation and Business Start-ups: Evidence from Mexico." *Journal of Development Economics* 95: 1501–15.
- Kaufmann, D., Kraay, A., & Mastruzzi, M., 2006. *Governance Matters V: Aggregate and Individual Governance Indicators for 1996-2005*.
- Kaufmann, D. & Kraay, A., (2002). 'Growth without governance', *Economia* 3, 1: 169–229
- Kaufmann, D. & Kraay, A., & Zoido-Lobaton, P., (2000). Governance matters. *Finance & Development*, 37(2), 10.
- Kathuria, V., & Sen, K., 2012. The Effects of economic reforms on manufacturing dualism: evidence from India. *Journal of Comparative Economics*.

-
- La Porta, R., Shleifer, A., 2010. The Unofficial Economy and Economic Development. *Brookings Papers on Economic Activity: Fall 2008*, 275
- Levine, R., & Renelt, D., 1992. A sensitivity analysis of cross-country growth regressions. *The American Economic Review*, 942-963
- Levine, R., & Zervos, S. J., 1993. What we have learned about policy and growth from cross-country regressions? *The American Economic Review*, 83(2), 426-430.
- John, Kose, Lubomir Litov and Bernard Yeung. 2008. "Corporate Governance and Risk-Taking" *Journal of Finance* 53 (4):1679–1728.
- Maddala, G. S., 1999. On the use of panel data methods with cross-country data. *Annales d'Economie et de Statistique*, 429-448.
- National Commission for Enterprises in the Unorganised Sector (NCEUS), Government of India, 2010: Conditions of Work and Promotion of Livelihood in the Unorganized Sector. Report, Government of India, New Delhi.
- Portugal-Perez, Alberto and John S. Wilson. 2011. "Export Performance and Trade Facilitation Reform: Hard and Soft Infrastructure." *World Development* 40 (7):1295–1307.
- Shubik, M., 1975. On the Eight Basic Units of a Dynamic Economy Controlled by Financial Institutions. *Review of Income and Wealth*, 21(2), 183-201.
- Williamson, O. E., 1975. *Markets and Hierarchies: Antitrust Analysis and Implications*. New York: The Free Press.
- Williamson, O. E., 1985. *The Economic Institutions of Capitalism: Firms, Markets, Relational contracting*. Free Press.
- World Bank (2014) Research on the effects of business regulations in *Understanding Regulations for Small and Medium-Size Enterprises*, Doing Business Report 2014, World bank Washington DC.