Investment Climate and Manufacturing Performance in Ethiopia

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Abstract

The objectives of the study is to show the effects of investment climate variables on the operation of manufacturing firms with emphasis on small scale producers in Ethiopia. Investment Climate Survey dataset of World Bank (2006) is used. The findings are complemented from other recent survey based studies and annual reports of Central Statistical Authority to cross check the relevance of the data soruce and timing. The data is analyzed through descriptive and econometric techniques. The descriptive analysis shows that infrastructural costs share to the yearly sales account 52% in the small size firms. The quality of infrastructures are also not adequate. Access to formal sources of finance is not easy due to requirement of high value collaterals. Taxes and tax administrations are macropolicy related major constraints to the small size firms. Instituions services more specifically that of the municipal are not satisfactory. The institutional aspect doesn't necessarily hold for the recent conditions due to BPR implementations. Education status of workers and manager, under capacity use and low involvment in R&D are observed especially in small size firms. The econometric result is also consistent with the descriptive evidence. A significant labor variable is one indicator of size advantage. Alternatively, firm size dummies are used and found with the expected signs. A negative significant for power interruption dummy unveils the effects of poor infrastructures. Value of collateral requirement and access to overdraft facility are finance related variables that affect the performance of firms. In sum one can say that the investment climate is at least not attractive and measures need to be taken to improve infrastructures cost and quality, revisiting collateral value in the formal credit markets to address financial constraints. Supports in the form of training opportunities and market search are advantageous especially to the smaller firms.

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Introduction

Manufacturing is defined as physical or chemical transformation of material components into new products (ISIC Rev 4, 2008). The definition also includes the assembly of component parts of manufactured products as a manufacturing activity whether the production is done at factory or home, sold at retail or wholesale, and whether power driven machine is used or not. Success experiences of developed countries show that manufacturing is the pillar behind a sustained growth.

The contribution of Ethiopian manufacturing sector to the economy is low. Its average share of GDP in the years 2005-2009 was 4.85% (Table 1.1). The share to total manufacturing export stood at 7.31%. These performance statistics are among the lowest when compared to other countries or regions. The share to GDP was below half of the other countries/regions under consideration (see Table 1.1). The share to total merchandise export was below one fourth of the averages of Sub-Saharan African countries and other regions. The average growth rate is, however, encouraging. The weak performance despite the higher growth rate of the subsector is probably the weak manufacturing base since the Derg regime and the increased share of the service sector[2].

Table 1.1**:** The Performance of Manufacturing Sector during 2005-2009 (average in %)

Country/Region	Share of Manufacturing value added from GDP	Share of manufacturing exports from total merchandise exports	Annual growth rate of manufacturing value added
Ethiopia	4.85	7.31	10.63
Kenya	12.01	8.27	5.23
SSA (all)	13.23	31.87	2.79
Low income	12.62	49.19	6.64
South Asia	16.25	69.55	9.21

WDI (2010)

[2] The share of service sector has increased over time (see NBE, 2007/08)

The manufacturing subsector of Ethiopia is dominated by the low technology, consumer good production, and small sized firms (Admasu, 2005, Getnet and Admit, 2005). About 57.3% of food and beverage, and 72.4% of wood and wood products, 46.3% of leather and footwear were small sized in the years 1996-2002 (Admasu, 2005). The lower capital per worker is a major reason for the lower level of technology in the subsector (Admasu, 2005; Getnet and Admit, 2005).

One major question at this issue is why the manufacturing sector is contributing a low level to the overall economy? The answer to this question is not straight forward. It requires studying the factors that affect the operation of firms who are engaging in manufacturing activities. Macro level studies give limited insight about the root problems of the sector. With regard to this, Smith and Driemier (2005) argued that aggregate indicators offer limited insights about the effect of different institutional arrangement on firm's investment decision. Smith and Driemier (2005) further emphasized that economic analysis from a microeconomic perspective is a new frontier that focus on the firm as a lever of growth, instead of aggregate numbers.

There have been increasing emphases to the roles of investment climate in the study of factors affecting manufacturing firms. Micro level study offers better opportunities to gather information from the firms about their major constraints especially about the investment climates. This helps to trace the impact of the investment climate variables on the decision to invest at firm level. It also enables to study the factors affecting different types of firms such as small and large scale manufacturing. This is because the effect of investment climate does not necessarily be similar for different size firms. It is expected that small size firms are likely to suffer more compared to the large size firms. This is particularly important to Ethiopia due to the large number of small size firms.

Though there are many studies on the manufacturing sectors of Ethiopia, comparative analysis of the effect of investment climate variables among small, medium and large sized industries are scant. The smaller sized firms are particularly ignored. Productivity, efficiency, source of growth and export intensity are some aspects of manufacturing focused in the previous studies (see Admasu, 2005; Getnet and Admit, 2005; Kefyalew and Tsegabirhan, 2010).

This study aims to contribute on the effect of investment climate on the performance of manufacturing sectors of Ethiopia. Some of the performance indicators include the costs of infrastructures to annual

sales, capacity utilization and the returns to input uses (Vachon, and Klassen, 2005). The returns to inputs can be estimated through a multivariate regression. The study gives emphasis for comparing the large, medium and small scale manufacturing firms. This helps to examine the magnitude of different constraints for each firm size type and to recommend policies accordingly.

The study uses the Investment Climate Survey Data of World Bank (2006). The survey covered wide range of issues including firm size, infrastructural and institutional variables, R&D, employment and capital for the fiscal year 2004/05. The data is collected from food, beverage, textile, garment, leather and leather products, wood and furniture, and others [3]. It enables to use descriptive as well as econometric techniques. The rest of this study is organized as follows; section 2 reviews related literatures and section 3 addresses the data presentation and analysis and finally section 5 concludes the study.

Review of Literature

Finding a precise definition of investment climate is difficult (World Bank, 2003). Its definitions vary from one literature to another. But the central elements of the different definitions are more or less similar and centering on policy, institutions and regulatory factors that affect the incentives and opportunities of private investors. For example, Smith and Driemeir (2005) defined iinvestment climates as set of factors that affect incentives and opportunities for firm investment and growth. Similarly, Stern (2002) as cited in Mahmood (2006) defined investment climate as *"policy, institutional, and behavioral environment, both present and expected, that influences the returns, and risks, associated with investment"*. Three important elements in investment climate are macroeconomic environment, governance or institutions and infrastructures (Mahmood, 2006; World Bank, 2003). World Bank (2003) mentioned the issues under each of these three elements as follows;

> *"Macroeconomic (or country-level) factors include such issues as fiscal, monetary, and exchange rate policies and political stability. Governance relates to government interactions with business, which typically mean regulation and corruption. Infrastructure refers to the quality and quantity of physical infrastructure (such as power, transport, and*

[3] Others include sectors such as printing and coffee roasting which account 5% of the total samples.

telecommunications). More broadly, it can also refer to financial infrastructure (such as banking)—or access to finance."

Infrastructure

Infrastructure is one of the major factors for industrial development. Power, transport and communication are its key elements. It matters a lot for competitiveness of firms. Acquiring information, input procurement and getting market require more resources of the firm in countries of poor infrastructures (WB, 2003). It increases the cost of operation and reduces the degree of competitiveness and at a worst case it can be an entry barrier (Mahmood, 2006; WB, 2003).

Infrastructure affects firm performance both in a direct and in an indirect ways (Jiwattanakulpaisarn, 2008; Adenikinju, 2005; Haughwout, 2001). The direct effects are associated with the nature of infrastructure as an intermediate input in the production process. Therefore, its cost and quality affect the activity of firms directly. Infrastructure also induces overall productivity growth indirectly by improving the productivity other input. It also facilitates agglomeration and clustering and this has spillover effects between firms. Empirical studies show a strong links between infrastructure and manufacturing growth. Hulten, Bennathan and Srinivasan (2006) found a strong link between physical infrastructure and manufacturing productivity in India. Adenikinju, (2005) showed that the poor state of electricity supply imposed significant costs on the business sector in Nigeria. The study further showed that the small sale operators are heavily affected due poor financial position to deal with power interruptions. Escribano, Guasch and Pena (2008) found that 30-60% of the adverse effect on firm productivity in Africa is due to deficient infrastructure and the power sector account 40-80% of the infrastructural impact.

Finance

Cost – benefit analysis whether to invest or not works only in enterprises that have no credit constraint (WB, 2003). This depends on the development state of financial sectors. Mahmood (2006) stated health financial sector improves access to finance and by then allows expanding production as per the expected potential. Firms in developing countries suffer largely from shortage of finance. Harhoff and Korting (1998), Saibal (2007) argued that lack of external sources of finance is a major constraint for investment. Saibal (2007) listed

three major problems associated with the external sources; information asymmetry between lenders and borrowers, managerial agency problem[4], and high transaction costs. Gale and Hellwg (1986) also emphasized the problems of adverse selection and moral hazard as a cause for credit rationings. Binks and Ennew (1996) highlight the importance of collateral as a means of mitigating the information asymmetry to credit access at bank. In the case of Sub-Saharan Africa, Biggs (2007) argued collateral values and interest rates are very high and loan approval processes are inefficient. Mbekieani (2007) emphasized the inadequacy of trade finance as another constraint for exporter's capability. His study further emphasized high transaction costs, lack of expertise in financial markets and lack of information communication technologies is a feature of the financial markets in SSA.

Institutions

North (1990) defined institutions as constraints that are imposed by human beings themselves. This definition, however, lacks universal acceptance (Adebiyi and Obasa, 2004). Recent works defined institutions in a broader sense, linking different measures of institutional quality to development outcomes from various angles and disciplines (Johannes, 2003 in Adebiyi and Obasa, 2004). The institutional constraints arise due to interaction of firms with government to comply government regulations (World Bank, 2003). This has effects on the activities of firms like the infrastructure and financial constraints. The influence of institutions on economic development is highly acknowledged. Rodrik et al. (2002) finding shows that the direct effect of good institutions on income is positive and large. There indirect effects of institutions are also numerous. It can increase investment, manages conflicts and ethnic diversity and hence an incentive for higher productivity and efficiency (Baumol 1990).

Alaba (2006), Lyakurwa (2007), Biggs (2007) are among the studies on that showed the effect of poor institutions on the manufacturing sector in SSA. They found that delays associated with license and work permits, larger number of documentations and signature requirements are some of the features of institutions in SSA. Lyakurwa (2007) further stressed on the corruptions associated with the larger number of documentations and procedures.

[4] Differences between managers and owners goals

Firm Specific characteristics

Firm specific characteristics are other major impediments to firms' performance .Some of the firma specific characteristics include firm size, R&Ds, nationality of ownership, human resource, capacity utilization among others (see Biggs, 2007). These features are poor in developing countries and this in turn affects the operation of firms. Firm-size may represent the degree of horizontal or vertical integration which serves as a proxy for the variety of goods produced and economies of scale. This enables firms to acquire firm specific assets such as financial capital (Ryan, 2008). Ho, Tjahjapranata and Yap (2006) pointed out that R&D has strong effect on firms' growth opportunity especially in large sized firms. Ownership structure can be government, private, foreign or joint ventures. While the effects of foreign ownership on growth of firms are controversial, government owned firm growth is generally poor (Beck et al., 2005). The positive effect of human capital is confirmed in many studies. Almus (2002) found a significant effect of university degree or above on fast growing German firms. Poor education status of managers is a special human resource problem especially in technology adoption and selection (Maunda, 2005). Maunda (2005) further added that less educated managers face difficulty of considering consumer needs/preferences especially oversea markets.

Most the studies conducted in Ethiopian are consistent with other literatures. Kefyalew and Tsegabirhan (2010) show dissatisfaction of exporting firms with the quality of infrastructure, finance and institutional services. However, their study revealed modest improvements over time with the exception of power supply. The econometric result revealed a positive effect of R&D and foreign/joint venture ownership. Admasu (2005) examined the distribution of productivity with in an industry to determine whether patterns of firm entry, exit and survival are driven by efficiency differences. The study found that markets of Sub-Saharan Africa, as represented by Ethiopia, are efficient in selecting efficient firms and the tolerance of inefficient firms' declines with exposure to international market competition. Admit and Getnet (2002) showed that the main source of output growth in the medium and large scale industries is capital followed by labor.

Data and Analysis

Background on Firms

Table 3.1 Summarizes the characteristic of the firms under study. The survey was conducted to understand the effect of investment climate on business performance. The survey covered 360 manufacturing firms over 15 cities[5] of Amhara, Oromia, Tigray, SNNP, Addis Ababa and Diredawa. The sample sizes followed by World Bank are stratified and proportional to number of firms in each city. About 47% of the samples are from Addis Ababa alone. Mekele ranked second in terms of large numbers of samples with 10% share while other cities have a share below 10%. The small size firms have a largest share with 62% followed by medium and large size firms, respectively. In terms of nationality of ownership, 93% are owned by nationals while the remaining 7% are owned by joint venture/foreign ownership. The degree of export participation is low which is observed only in 8.8% of the firms. Majority of the exporters are large size firms.

Table 3.1: Background Information on manufacturing for the fiscal year 2004/05

Variable of interest	Firm Size
Total firms	360
Small sized firms (<50&>5 employees)	222
Medium sized firms (50-249 employees)	81
Large sized firms (250+ employees)	54
Domestically-owned firms	335
Foreign-owned firms	25
Exporting firms [a]	32
Non-exporters	328

Source: WB (2006)

Note: [a] direct export participation was observed in 28% large scale and 16% the medium scale while it was only 1.3% in the smaller firms (WB, 2006).

[5] These cities are Addis ababa , Gondar, adwa , awasa, bahir dar, bishoftu , dire dawa, shashemen, mekele, adigrat nazareth , harar, modjo, wonji, dilla

Cost and Quality of Infrastructures

The survey shows that infrastructural facilities are generally inadequate. The problem is worse in especially in the power sector. Power rationing and interruptions are common features of the power sector in Ethiopia especially in recent periods (CSA, 2009). This is despite the huge potential of hydroelectric power in the country. Though the efforts of production and distribution are improving, the existing level has not been enough. The actual use of the potential is by far below the demand for power in the country. The smaller firms are more likely to be exposed to power problems. The survey shows that 86.43% of the small sized firms have not been using generators. The corresponding figures for medium and large sized firms were 63% and 42%, respectively. This is an important indicator of the larger effect of power problems on smaller compared to the larger firms.

Table3.2: Average Annual costs of Public electric grid, communication and fuel including generators in Birr (2004/05)

Type of service	Firm size		
	Small sized	Medium sized	Large sized firms
Power from Public grid	111,969.00	582,317.30	1,511, 378.00
Communication (telephone)	143,530.00	193,279.00	7,888,179.00
Fuel including generators	213,664.00	233,939.00	4,434,188.00
Transporting goods and workers (excluding fuel)	25,349.00	194,960.00	1,849,700.00
Annual Revenue	936,540.80	11,082,210.00	66,608,230.00
Infrastructural Costs to Annual Revenue (in %)	52.80	10.87	23.55

Source: WB (2006)

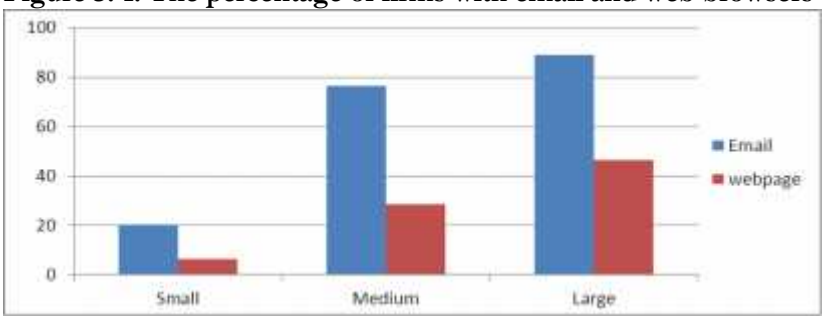
The cost of public electric power is very high in absolute as well as relative terms compared to other costs. On average the annual cost of public grid ranges from 111,969 Birr in small sized firms to 1.51 Million Birr in large size firms (see Table 3.2). Some firms also use generators as a substitute to deal with power interruptions and rationings. Thus the cost of fuel adds simply to firms' expenditure. This affects the profitability and competitiveness. The costs of major

infrastructures are exceptionally high in the case of small scale manufacturing firms. Power, communication, fuel and transport costs account more than 50% of the total annual revenue of small size firms while it is 21.28% and 10.87% in the large and medium size firms, respectively. The challenge of expensive electric power on business performance is also reported in recent years. CSA (2009) show that cost of electric power is has been introducing challenges on the working environment of 51% large and medium establishments for the year 2009/10. This supports the increases in the power related problems over years.

In the large size firms, communication cost has large share out of total revenue averaging 11.8% of their total revenue while transport and electricity together account 5% on average in 2004/05 (Table 3.2). This is probably due to larger networks of larger firms than the medium and small scales. Further disaggregation of cost of communication by exporter-non exporter category shows that exporters average annual cost for communication is about 13.2million Birr, which is very high, while that of non-exporters is 230,000 Birr (WB, 2006).

The adoption of communication systems such as email and webpage are low especially in the small size firms. About 43.3% of the total firms have used email and it was 17.5% in webpage (WB, 2006). The comparable figure of SSA was 22% in the same time period (WB, 2006). Exporting firms are better in use of information and communication technologies. All of them have been using email and 88% of them have webpage (WB, 2006). Out of the total small size firms, only 20% of them have email and 6% have webpage. Thus the small size firms are less adaptive to information communication technologies. Figure 3.1 shows the percentage of each firm size group that uses email and webpage services.

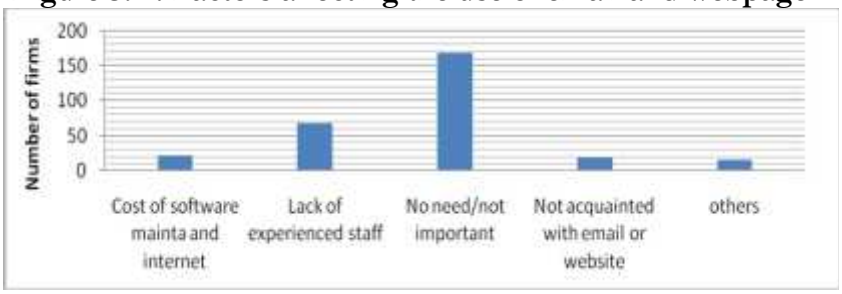
Figure 3. 1: The percentage of firms with email and web browsers



Source: World Bank (2006)

The major reason for not using latest information technologies is that the perception that it is not important for the activities. About 70% of the small size firms replied that the services are not important to their activities (WB, 2006). This shows how the smaller firms are poorly integrated in input and product markets. The second important factor is the lack of skilled manpower and it accounted 21% in the smaller firms (WB, 2006). The problems are similar in the medium and large scale firms. Figure 3.2 displays the different factors affecting use of email and webpage in the total firms.

Figure 3. 2: Factors affecting the use of email and webpage



Source: WB (2006)

Transport is a third important infrastructure like power and communication. Though it is improving over time, the road density of Ethiopia is low when compared to other regions/countries. Ethiopian's road network in 2000 was 29,571 km, which was below half of Kenya's road network of 63,942 km in the year (WDI, 2006). The road density has been increasing and stood at 42,429 km in 2007 (WDI, 2010). This is a good trend but not enough for given Ethiopia's large area and fragmented urban and rural areas. The low road density limits access to efficient and cheap transport means especially to large size (see Table 3.2). The small sized firms cost of transport is relatively low may be due to the poor integrations in input and product markets.

The quality of infrastructures affects the business activities like the costs. Annex-1 shows the perception of firms about power, transport and communication services quality constraint. Large number of firms dissatisfied with electric power services. It is a major constraint in 22% of smaller firms, 24% of medium and 20% of larger firms. Kefyalew and Tsegabirhan (2010) also found high degree of dissatisfaction on exporters of manufactured and non-traditional primary products for the fiscal year 2007/08. CSA (2009) quarterly business survey on large and medium scale industries found that power interruption affects the business environment of 82.7 percent of the establishments negatively. The report further pointed out that 81% of the under capacity utilization was due to power shortage. These recent evidences unleash the deteriorating trend in the power supply in Ethiopia.

Transport is a major problem especially in large sized firms (Annex-2). About 22% of large sized firms reported that it is their major constraint. The figures for small and medium scale firms on transport as major problem were 8% and 12%, respectively. The degree of dissatisfaction is roughly equal in all of the three different size firms. Quality of communication poorly rated in the medium scale with about 18% respondents.

In sum, costs of infrastructures per unit of annual sales are very high in the small size relative to the large and medium size firms. Communication is expensive with in the large size firms compared to transport and electricity. The percentage of firms that evaluate power supply as poor are roughly equal in firm size groups. This show suggests the seriousness of power supply for business environment in all types of firms with no exception. Transport and communication services are rated poorly in the large and medium size, respectively. This does not necessarily imply that the small firms are satisfied with these services. It is highly associated with their small scale operations and limited market integrations than the large and medium size firms.

Financial Services

The study revealed interesting aspects in the financial structures. Most of the small size firms rely on retained earnings than the medium and large size firms (Table 3.3). From the smaller firms, about 94% haven't taken any credit from state owned banks and 77% of them haven't get access to in private commercial banks. The disengagement from state owned banks were 61% and 75% in the medium size firms and 72% and 61% in the large size firms (Table 3.3).

Table 3.3: The Disengagement of firms from Formal Banks

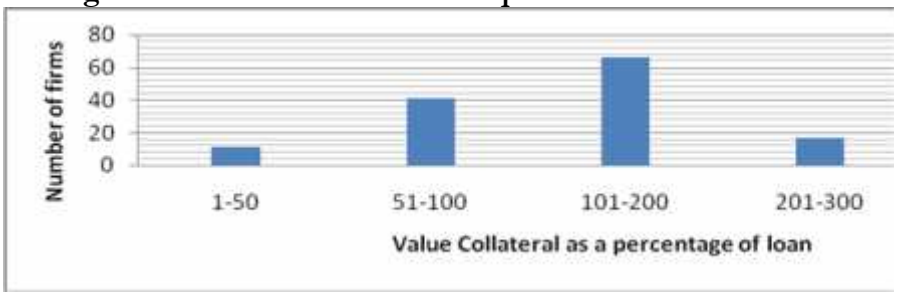
Source of finance	Small	Medium	Large
Retained earnings	5.86	18.52	16.67
Private Commercial Banks	77.03	61.73	72.22
State owned Banks	94.14	75.31	61.11

WB (2006)

It might be not good to argue that the smaller firms are rationed out of the formal credit market just by looking at the rates of disengagement. This might be due to the lower demand of smaller firms from the formal sector and may be using family saving for it or other alternative sources. But the credit market itself is not attractive to the firms[6]. The required values of collateral are larger than the size of loans with an average of 179% of the loans (Figure 3.3). It is larger compared to the SSA and South Asian average of 140% and 95.2%, respectively (Lyakurwa, 2007). In such scenarios, firms are reluctant to take risks that may result personal property loss and unable to take advantages of opportunities created by changes in the market. In addition the loan size will be very small and thus unable to change production and marketing decisions significantly (Lyakurwa, 2007).

[6] The government indeed has also allocated substantial amount of finance for investors who would be engaged in this manufacturing sector especially in export oriented products. There is an incentive to finance up to 70% of the total project cost with a loan agreement provided that the investors have made 30% of the total. This incentive is, however, not without limitations. Given the high cost of doing business in Ethiopia, much of the investors are less likely to take such risks on the 30% requirement.

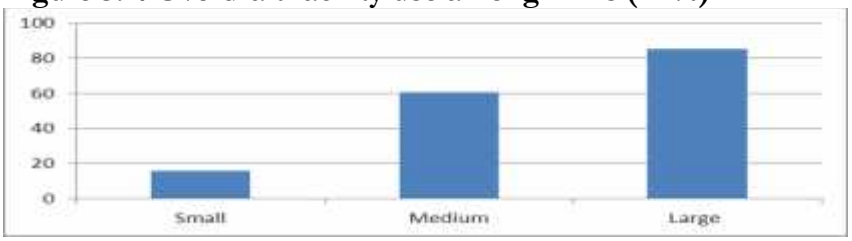
Figure 3. 3: Value of collateral required as % of the loan value



Source: WB (2006)

Lack of modernization is another feature of Ethiopian financial sector. Modern systems of payments like visa cards are at early stages and available in few banks and branches. Overdraft facilities are among the useful services in periods of cases temporary cash shortages. The small sized firms have a lower participation in this facility while more than 80% of larger firms have access to overdraft (Figure 3.4).

Figure 3. 4 Overdraft facility use among firms (in %)



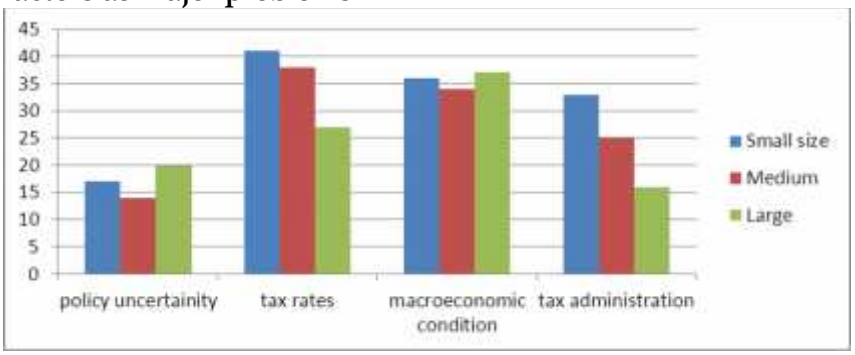
Source: WB (2006)

Macroeconomic Factors

Macroeconomic factors include among others policy uncertainty, tax rates and administrations, and macroeconomic conditions such as inflation. These variables affect the production and marketing decisions in many ways. The qualitative evidence shows that tax rates and macroeconomic conditions are major problems for a roughly about 35% of the total firms. Tax administrations are also major problems for nearly 30% of the firms. The problem with policy uncertainty is stated as major problem in less than 20% of the firms (WB, 2006). Disaggregation by firm size reveals that both tax rates and

tax administrations are relatively high constraint on the small size firms (see Figure 3.5). This could be attributed to arbitrariness of tax rates as most activities of small business are less likely to have formal accounting records.

Figure 3. 5: Percentages of firms who report macroeconomic factors as major problems



Source: World Bank (2006)

Institutions

Firms ranking of service delivery shows poor ranking of the institutions. The data is, however, before the implementation of the business process re-engineering (BPR)[7]. The study is reserved from concluding about the current institutional services. The study is unable to get survey data to complement the evidence with the changes after the BPR implementation. It should be noted that an immediate change might not happen even with the BPR. It takes time to adjust the new system accordingly. The evidences from this survey can also be useful to examine the changes in institutional service delivery in another time when survey data is available.

The analysis works for the earlier period only and for comparing the services at that time with the SSA. In the case of customs authority, the average days to clear exports and imports in 2004/05 were 4.3 and 14.06, respectively. The comparative figure for SSA in the same time period was 5.14 and 8.74 days (WB, 2006). The survey has only 32 exporting firms and less likely to represent exporters. But exporting and non-exporting are dependent on imported inputs and raw materials in production though there exists a variation in the

[7] Government organizations have now adopted BPR and are delivering services based on the new system. For example, on average it used to take 26 working steps and 35days for a firm to secure a trade license in the Ministry of Trade and Industry. After the BPR, it takes 6 steps and 34 minutes to get the trade license. For others see http://www.grips.ac.jp/forum/af-growth/support_ethiopia/document/May09_berihu_bpr.pdf

magnitude of dependency import dependency. The import clearance is not an easy service. The delays of import clearance caused 13% of the firms to cancel their sales due to failure to deliver shipments on time. Cost of custom clearance is as high as 10% of average consignment value (WB, 2006).

Reported delays in different institutions are also large especially on the municipality (Table 3.4). On average, it takes more than eight months to acquire land. The lease cost for land acquisition was expensive with an average of 1 million Birr and the average upfront payment was 24.1% (WB, 2006). This is a big entry barrier to new entrants in the manufacturing business. Number of days taken to get access to telephone, power and construction permits are larger than the SSA average while water connection, import license and operating license are below the average of SSA.

Table 3.4: Delays (in number of days) reported at various government institutions in 2004/05

No of days taken	Number of firms who reported delay (Out of a total of firms)						
	Land acquisition	Telephone connection	Electric connection	Water connection	Construction permits	Import license	Operating license
<=90	26	123	69	55	48	34	61
91-300	15	5	6	1	4	0	0
301-600	14	4	0	0	3	0	0
>600	6	3	1	0	0	0	0
Average	240	58.51	44.22	19.44	61.36	13.85	11.35
SSA	-	54.14	38.21	42.24	54.35	14.30	15.40

Source: WB (2006)

Firms' level of satisfaction/dissatisfaction is also tabulated in Table 3.5. Large numbers of firms reported that the municipality service is the worst followed by the Inland Revenue. The municipal case is due to the too bureaucratic process of land access. The Inland Revenue is associated with discontent of requirements such as filling out tax form, audits and related activities to meet their obligations. These have tradeoffs with the managers' and other employees' work time. It is found that on average 4.5% of the senior management weekly work time is used for addressing issues relating to government regulations (WB, 2006).

Table 3. 5: Evaluation of the services given by different organizations in 2004/05

	Very Good	Good	Fairly Good	Bad	Fairly Bad	Worst
Inland Revenue	41	103	99	31	12	16
Customs authority	22	65	62	17	4	9
Ethiopian Electric Power Co.	76	164	63	31	16	10
Telecommunication Co.	68	152	80	41	10	9
Water and Sewerage	54	140	88	29	9	11
Ministry of Trade and Industry	83	160	71	8	4	1
Municipal Administration	36	95	112	44	23	29

Source: WB (2006)

Firm Specific Characteristics

Firm specific characteristics are other major impediments to firms' performance. Some of the firm specific characteristics include experience and education status of managers, and employees; access to work related trainings, capacity utilization, R&D (Biggs, 2007; Yoshino, 2007). It is found that 20.5% of firms are run by managers with education status of below secondary and 28.3% by secondary school completed managers. Managers with BA and above qualification are few. The disaggregation of managers' education status by status shows that most of the small size firms are again with less educated managers (Table 3.6).

Table 3. 6: Education Status of Top managers

Education Status	Small	Medium	large
Below secondary	31.53	4.90	1.85
Secondary school	39.2	14.81	3.7
Vocational training	13.06	8.64	1.85
Some university training	7.2	8.64	9.26
Graduate Degree (BA, BSc., etc)	7.66	55.56	51.85
Masters Degree and Above	1.35	7.40	31.48

Source: WB (2006)

Education profile of employees is also low like the managers. Majority of them are secondary school and below and only few firms have employees with Vocational and University degree (see Table 3.7). Industry level trainings to employees are important to enhance productivity. The available opportunities of trainings are few in the firms under consideration. In-house trainings to skilled workers were offered only in 23% of the total firms and only few portion of the employees got the training (WB, 2006). Possible reasons might be resource constraints, labor turnover and lack of awareness.

Table 3. 7: Average educational status of skilled production workers in 2004/05 (%)

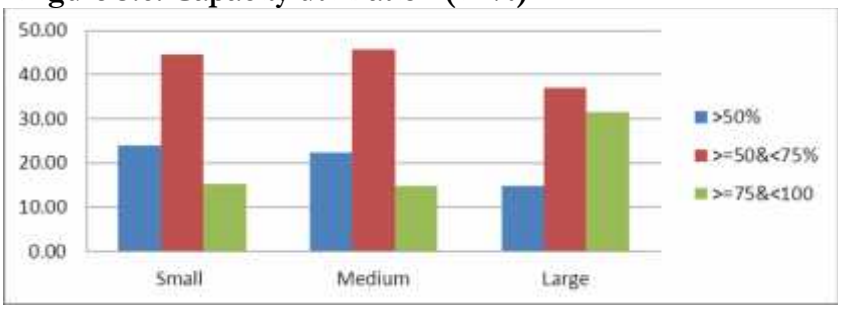
Education status	Firm size		
	Small	Medium	Large
0-3 years of education	5.87	0	1.85
4-6 years of education	8.56	4.94	12.96
7-12 years of education	65.32	66.67	51.84
13 years and above of education	4.05	11.11	11.11
vocational school training	9.01	17.28	22.22

Source: WB (2006)

Below capacity utilization and lower R&D are also investigated. About 36.4 % of the total firms operated below 50% and those that operated at full capacity are only 16.6%. The capacity use by firm size shows most of the small and medium size firms are using below 75% of their capacity (Figure 3.6). The large size firms are better in the capacity use

as expected. The causes of under capacity use are shortages of demand, working capital, raw materials and intermediate inputs in the order of importance. Out of the total firms, 32.8% reported demand constraint and 16% of them attribute to the shortage of working capital, and 11.7% of them to the shortage of raw material and intermediate inputs. The factors behind under capacity utilization in the recent periods are changed. The significance of demand and raw materials has declined and it is attributed to electric power at a large degree. Kefyalew and Tsegabirhan (2010) also found that power problem is a major reason for under capacity utilization in about 41% of the firms for the fiscal year 2007/08. And a more recent report by CSA (2009) shows that about 81% of large and medium establishment's under capacity use is caused by electric power shortage in 2009/10.

Figure 3.6: Capacity utilization (in %)



Source: WB (2006)

Technology use, as measured by use of licensed technology from abroad or international recognized certification, is low and they are concentrated in the large scale ones. Out of the large scale firms, 11.11% of used licensed technology from abroad and 16.67% of them have international recognized certificate while the respective figures for the smaller firms are only 2.25% and 0.9%. The comparative figure of SSA for international recognized certificate was 11.9%. There are no changes in terms of technology from earlier periods. WB (2002) survey showed that about 13% of the firms were involved in small scale R&D for the 2000 fiscal year. UNCTAD (2002) study also showed that investments in R&D are more on imitation and copying. Kefyalew and Tsegabirhan (2010) found only 19% of the exporting firms engaging in R&D. This is mainly in concentrated in foreign owned flower exporters. This shows the lack of emphasis in developing R&D by national owned firms.

Table 3.8: Technology use among firms in 2004/05 (in %)

Technology indicators	Firm Size		
	Small	Medium	Large
Licensed technology from abroad	2.25	4.94	11.11
Internationally recognized certification	0.9	4.94	16.67

Source: World Bank (2006)

Econometric Evidences

Theoretical Model

The theoretical model is based on the theory of profit maximization. Bernard et al. (1999), Yoshino (2007) used such approach to develop a model for the decision to participate export of manufacturing firms. This study reformulate their approach in the sense that firms decide to produce in the short run if they expect positive net profit from their activities. Such models are based on restrictive assumption such as zero sunk costs. The decision to enter a business can be given as follows;

$$p_i q_i - c_i(X_i, q_i) > 0 \qquad 1$$

Where, p is the unit output price, q is the volume of production, c is the cost of producing q and x is vector of investment climate and firm level characteristics.

Applying Hottelling's lema[8] to the profit maximization problem yields the supply function of a firm given by equation 2 as follows;

$$q_i = f(p_i, x_i) \qquad 2$$

Though the profit maximization approach is mathematically plausible, it is argued that firms' are less likely to reveal their profit (Yoshino,

[8] Hotelling lema states that differentiating the profit function with respect to output price gives the output supply function

2007). The preferred way is therefore to use the annual sales, which is relatively less sensitive to tax and other government regulations. Therefore, the equation 2 can be modified as follows;

$$R_i = P_i q_i = f(x_i) \qquad 3$$

3.6.2 Empirical Model

Based on a Cobb-Douglass[9] specification of revenue and the set of firm specific and climate investment variables, the following model is specified for estimation;

$$\ln(R_i) = \beta_0 + \beta_1 \ln(K_i) + \beta_2 \ln(L_i) + \beta_3 ln(MGEXP_i)\, \beta_4(MGEDU_i) + \beta_5(RD_i) + \beta_6(CPU_i) + \beta_7 \ln(HRS_i) + \beta_8(INTSO_i) + \beta_9(MGTIME_i) + \beta_{10}(POWERI_i) + \beta_{11}(WEBPAGE_i) + \beta_{12}(COLLATERAL_i) + \beta_{13}(OVERDRAFT_i) + \varepsilon_i$$

Table 3. 9 Variable Definitions and Expected signs.

Variable Name	Variable Definition	Expected Sign
Ln(R)	total annual sales adjusted at 2000 prices in logarithm	
Error! Reference source not found.	the netbook value of buildings, machinery and equipment's in logarithm	+
ln(L)	the number of permanent employees in logarithm. It is used to denote the effect of firm size on productivity.	+
ln(MGEXP)	total number of years of manager's experience in logarithm (both within the firm and other employers)	+
MGEDU	Dummy for the education status of manager. It takes 1 if the manager has BA and above and zero otherwise	+
RD	Dummy that takes 1 if the firm invested on Research and Development and 0 otherwise.	+
CPU	Capacity Utilization in percent	+
ln(HRS)	Number of working hours of the firm per week in logarithm	+
INTSO	The percentage shares of internal sources of finance out of total working capital	+

[9] Cobb-Douglass production functions are criticised for assumptions of constant returns to scale and perfectly competitive assumptions. Though the alternative translog specifications are free from the assumption of constant returns to scale, the estimates suffer from such specifications suffer from multicollinearity. Therefore, the final model is reduced to Cobb-Douglass specification

MGTIME	The amount of managers time spent for government regulations in a week as a percentage of its total weekly working hour	-
POWERI	Dummy that takes 1 if the firm reported a power interruption over the year and zero otherwise	-
WEBPAGE	Dummy that takes 1 if the firm uses webpage and zero otherwise	+
COLLATERAL	the value of collateral as a percentage of loan size	-
OVERDRAFT	Dummy which is 1 if the firm has access to overdraft facility and 0 otherwise	+

Estimation and Discussion of Results

The necessary diagnostic tests are conducted. An attempt was made to use lagged values of labor and capital as instruments to deal with a possible endogeneity problem. The Hausman test of endogeneity shows that endogeneity is not a problem. Normality test statistics of the variables are presented in Annex 2. Breusch-pagan test of heteroscedasticity and mean VIF indicates that the estimated coefficients are free from heteroscedasticity and multicollinearity. Normality test statistics of the variables in the econometric model are reported in Annex 2. The estimation result is given in Table 3.10.

Most of the variables are significant and with the expected sign. A dummy for each size was created and used to account for size differences. The dummies are found to be highly collinear with the labor size[10]. Using both labor and firm size dummies would bring misleading results of the size indicator variables. This is because the classifications of the firms into small, medium and large sizes are based on the size of labor employment. In such instances labor input can serve as an indicator of size advantage. Therefore, labor size is an important candidate to show the effect of firm size on productivity. The number of full time workers is significant at 1%. It implies that firms that have larger employees have higher productivity. This is consistent with the descriptive analysis that show the small size firms operations are highly affected relative to the medium and large scale manufacturing. Temporary workers are excluded due to large number of missing values.

Another three alternative specifications are specified so as to explore the effect of firm size by in such a way that there is no collinearity

[10] Pairwise correlations of labor are -0.81 with small size dummy and 0.69 with large firm size dummy.

with labor (Annex-3). Model 1 shows a negative significant coefficient of dummy for small size firms. It suggests that the low size firms are less productive compared to the large size firms. In this model labor is insignificant which is due to its collinearity with size dummy. Similarly, model 2 dummy for small size is excluded and it brought insignificant coefficient for size dummies of medium and large size firms. Labor is significant in model 2. A third model is estimated by excluding labor from the model. It is found that size dummies of medium and large scale are significant and positive. It means large and medium size firms have better productivity in comparison to the small size firms. The other variables are more or less stable in all of the three different alternative models. Therefore, size of a firm matters for increased productivity.

Table 3.10: The Estimated Result (OLS Regression)

Independent Variables	Coeff.	t-value
$\ln(K_i)$	0.137	3.08***
ln(L)	0.320	3.89***
ln(MGEXP)	0.080	0.87
MGEDU	0.467	2.33**
RD	0.160	0.78
CPU	0.824	2.67***
ln(HRS)	0.436	2.45**
INTSOU	0.07	3.04***
MGTIME	0.07	0.58
POWERI	-0.36	-1.9*
WEBPAGE	0.476	2.07**
COLLATERAL	-0.423	-2.85***
OVERDRAFT	0.555	2.20**
Constant	6.78	7.38
Number of obs=135 F(11,121) = 43.92 R-squared=0.7097		
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity chi(1) = 0.61[b]		
Mean VIF=1.39[c]		

Notes: [a]***, ** and * refers to significance at 1%, 5% and 10%, respectively

[b] The null hypothesis states that the residual has constant variance. Thus it cannot be rejected

[c] A common rule of thumb is that if VIF is greater than 10, then multicollinearity is high.

Capital input is also significant at 1%. This is as per expectations because better capital such as machinery, equipment and buildings are important tools for business growth. The percentage of capacity use

has higher elasticity compared to other firm specific characteristics. It indicates that firm's that use larger proportion of their capacity have higher revenue than those that operate at lower capacity. The number of working hours of the firms with in a week, which is closely related to capacity utilization, is also positive and significant. The extent of capacity use is associated with the competitiveness of the firm in the market and the extent of investment climate constraints. The descriptive analysis shows that most small scale firms operated at low level compared to the large and medium scale. The investment climate constraints are costly to the small scale in relative terms.

Higher educated managers have significant effect on productivity as expected. Higher education improves leadership and better know how to the manager. This increases the probability of competitiveness of the business. The experience of managers' is insignificant, meaning they are less likely to learn from past experiences. Though the survey has little to say, the problem might be associated with management frequent turnovers between different employers due to lack of proper incentives to managers. Research and Development is also insignificant. This could arise due to little attention to the R&D in the firms' side. A survey based study by Kefyalew and Tsegabirhan (2010) on manufacturing exporters showed that most firms, even those that have R&D, don't have dedicated personnel responsible for the research activity. Even those firms that have R&D unit are not serious in allocating a labor and other resources dedicated for R&D activity only. It is unlikely to benefit unless a due emphasis is given to the research and development.

Power interruptions and webpage use are among the infrastructural variables. Power has been a major problem in Ethiopia especially with the increases in industrialization and urbanization. Its trend has been deteriorating over time (see Kefyalew and Tsegabirhan, 2010; CSA, 2009). Therefore, the expected negative sing is a reflection of this severe constraint to business growth. Dummy for generator use was used but it was insignificant and excluded for parsimony purpose. The insignificance might be due to the poor qualities of generators used by most firms. Webpage dummy, to account for access to modern means of communications, is positive and significant. Access to modern information communication systems reduces transaction costs. The lower transaction cost implies that more transactions can be made, possibly both in local, regional and global. This increases the probability of business success and also the growth of the overall economy.

The collateral value as a percentage of loan has a negative effect on the productivity of firms. Though collateral requirement is appropriate to deal with moral hazard and adverse selection, the increase in the value of the collateral relative to the loan size drives out risk averse investors. Moreover, the small size firms are less likely to provide acceptable collateral relative to the large size firms and likely to suffer more from collateral constraints. Alternative sources of finance for firms are the retained earnings especially to the small scale. It is shown in the descriptive analysis that the small size firms' disengagement from the formal banks is very high than the large and medium sizes. Though the large and medium can got relative access to bank credit, the loan approval process is not efficient that require large number of visits (Kefyalew and Tsegabirhan, 2010). This would harm the progress of business activity. Therefore, internal sources of finance are more appropriate and safe that doesn't require bureaucracy to process and invest in the business. This is also confirmed by a positive coefficient of internal sources of finance as a share of total working capital. So the internal sources seem most important to such firms. This is also supported by the significant coefficient of internal sources of finance. Overdraft facility is a third finance related variable which is positively related to manufacturing productivity. This is an opportunity that allows businesses to withdraw beyond the amount they deposited in time of excess cash need at an agreed interest rate. This opportunity can help businesses a lot in time of temporary liquidity constraints.

Institutional variables, as stated in the literature, are among major restraints to businesses. The available proxies such as number of delays in different offices are, however, characterized by large number of non-response and this affect the degree of freedom of the econometric estimation. The only suitable variable with appropriate number of observations is the proportion of manager time spent for government regulations and it is insignificant. This does not necessarily imply institutions are efficient. It shows this variable is not a good proxy for institutions.

Conclusion and Policy Implications

The study shows the effects of investment climate constraints; infrastructural, financial, institutional, macroeconomic factors and firm specific characteristics on the performance of different size firms. It is found that power is a major infrastructural constraint to most firms. The costs of infrastructures as a percentage of annual sales are also high especially in small size firms with 52% in smaller firms while it was 21% in the large sized firms, especially in the small size firms. . The supply of power service has also been deteriorating over time over time (Kefyalew and Tsegabirhan, 2010; CSA, 2009). CSA (2009) reported that power shortage is a major cause for below capacity operation in 81 percent of the large and medium scale firms.

Adaptations to modern information communication services like email and web browsers is low. The quality of transport is a major constraint especially in large size firms. The values of collaterals are large relative to the loan size. Credit access from formal banks is low especially for small size firms. Major sources of working capital come from internal sources of finance. This might be associated with the values of collaterals and lack of acceptable collaterals. Tax rates as well as its administrations are macroeconomic factors that affect the small size firm. Firms experience institutional inefficiencies especially in getting access to land. The data predate, however, before the implementation of BPR. Not and more recent date are not available.

The firm specific variables also generated useful insights. Generally in the education status of manages and employees is low. And there are low levels of training and R&D. These problems are especially severe in the small size firms than them medium or large size firms. The econometric results are also consistent with the descriptive evidence. The significance of labor is one indicator of size advantage for business growth. Alternative regression models based on firm size dummies also unveil the effect of firm size on productivity. These suggest that being a large size is an advantage to improve productivity. Capital, Managers' education status, operation as a percentage of capacity, hours worked per week, and internal sources of finance are positive and significant. Value of required collateral and power outage are negative and significant. In sum, investment climate constraints affect the business activities negatively. The magnitudes of negative effects is high in the small size firms.

Though the data used were a 6 years prior to the current analysis, attempts are made to complement analyses with other studies and reports to examine whether there exist major changes in investment

climates have occurred. Kefyalew and Tsegabirhan (2010) and CSA (2009) report on industry business survey to examine recent status of investment climates. The former study focused on exporters of manufacturing and cut flower for the fiscal year 2007/08. The later a quarterly is report for based on the large and medium scale manufacturing for the fiscal year 2009/10. Both studies show that there is little changes between 2004/2005 and 2009/2010 . There are even deteriorations especially in the power sector over in terms of cost and quality.. Therefore, the data from 2004/05 can inform policy . This dataset is particularly important as it shows the effects of investment climates on different size firms which the previous studies fail to give emphasis. The following are suggestions to improve the business environment especially for the small size firms;

There is a need to continue ongoing efforts on the supply of power to ensure stable supply of power ,communication and transport. Aside from quality, costs of infrastructures are too high especially for small sized firms. It will be advisable for the Ethiopian Electric Power Corporation and Ethiopian Telecommunication Corporations to work with industry associations to deal with tariff rates in a way that it is an incentivizes small size firms.

The information communication and telecommunication sectors should strengthen their links with the firms to facilitate the adoption of latest means of communications. The major reason for not adopting email and web browsers is the perception that the services are not necessary. This might be due to inadequate information about the services. Higher adoption rate reduces transaction costs and increases number of transactions.

BPR may already be improving service delivery of different public institutions. However, it is necessary to study changes in the quality of services after BPR. Revisiting collateral requirements; higher value of requested collaterals and problems associated with movable properties are major challenges. There is a need to visit the collateral values. Small size firms are also less likely to have an immovable property that serves as collateral due to high cost of monitoring movable collaterals. There has to be an improvement in the collateral issues for the movable properties.

Firms in general and small size firms in particular require access to basic training opportunities for managers and employees. Industry associations can do their part on this need. This is essential to deal with the problems rising from a less- educated labor force. Efforts to

link domestic firms with successful foreign firms can help the transfer of new technologies.

Market information support both for output and raw materials can serve to deal with below -capacity operation.

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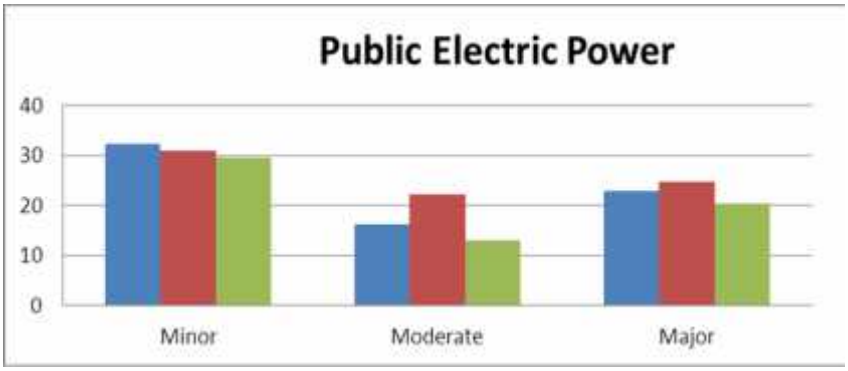
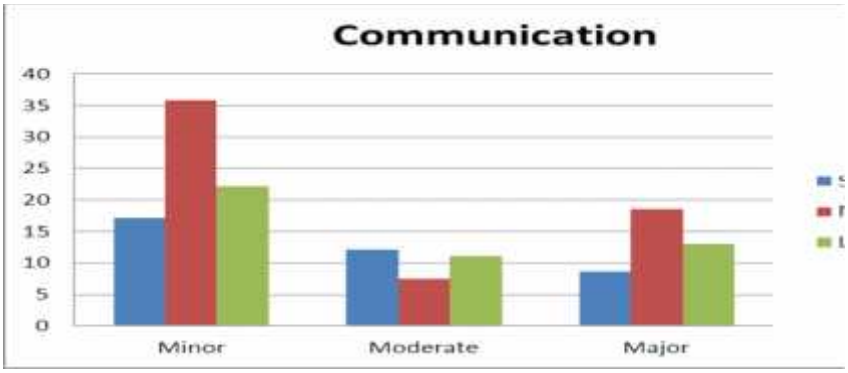
Annexes

Annex 1: Firms perception on the effects of infrastructures





Source: WB (2006)

Annex 2: Shapiro-Wilk W test for Normal Data

Variables	obs	W	V	z	prob
Revenue (in log)	357	0.9699	7.49	4.77	0.0000
$\ln(K_i)$	287	0.9896	2.13	1.77	0.0382
ln(L)	360	0.9539	11.54	5.79	0.0000
ln(MGEXP)	357	0.9623	9.38	5.30	0.0000
MGEDU	360	0.9945	1.39	0.77	0.2201
RD	359	0.9667	8.33	5.02	0.0000
CPU	360	0.9903	2.43	2.11	0.0176
ln(HRS)	360	0.8702	32.52	8.24	0.0000
INTSOU	360	0.9770	5.77	4.15	0.0000
MGTIME	356	0.7909	51.86	9.35	0.0000
POWERI	359	0.9940	1.50	0.96	0.1694
WEBPAGE	359	0.9782	5.45	4.01	0.0000
COLLATERAL	154	0.8722	15.21	6.18	0.0000
OVERDRAFT	354	0.9969	0.77	-0.63	0.7368

Annex 3: Regression Results of Alternative Models

	Model 1		Model 2		Model 3	
Independent Variables	Coeff.	t-value	Coeff	t-value	Coeff	t-value
$\ln(K_i)$	0.18	3.56***	0.18	3.57***	0.20	4.01***
ln(L)	0.23	1.61	0.25	1.7*	--	--
ln(MGEXP)	0.10	0.72	0.12	0.84	0.10	0.72
MGEDU	0.53	1.72*	0.50	1.64	0.59	1.92*
RD	0.17	0.55	0.16	0.55	0.21	0.72
CPU	1.16	2.55**	1.18	2.64***	1.24	2.76***
ln(HRS)	0.50	2.09**	0.51	2.14**	0.51	2.12**
INTSOU	0.01	2.55**	0.01	2.55**	0.01	2.46**
MGTIME	0.01	0.46	0.01	0.39	0.01	0.39
POWERI	-0.58	-2.15**	-0.53	2.01**	-0.54	-2.02**
WEBPAGE	0.64	2.16**	0.63	2.18**	0.68	2.35**
COLLATERAL	-0.55	5.33***	-0.55	-5.33***	-0.56	-5.37***
OVERDRAFT	0.61	1.96*	0.68	2.23**	0.79	2.63***
GENERATOR	-0.05	-0.16	0.00	0.00	0.00	-0.01
LOANRATE	0.02	0.31	0.04	0.57	0.03	0.34
FIRMSIZE1 (1 if small size)	-0.96	-1.67*	--	--	--	--
FIRMSIZE2 (1 if medium size)	-0.40	-1	0.50	1.38	0.78	2.4**
FIRMSIZE3 (1 if large size)	--	--	0.88	1.56	1.52	3.58***
Constant	2.97	1.79	1.69	1.24	2.35	1.79

Note: Model1: dummy for large size firms is excluded
Model 2: dummy for small size excluded
Model 3: dummy for small size and labor are excluded