Journal of Emerging Issues in Economics, Finance and Banking (JEIEFB)
An Online International Monthly Journal (ISSN: 2306-367X)
2014 Vol: 3 Issue 1

The Influence of Services on Firm Productivity in sub-Saharan Africa

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Abstract

Telecommunications finance and electric power services form a major share of goods and services production costs. Therefore, they are important determinants of productivity and growth. Using the latest World Bank Economic Survey data of 26 sub-Saharan African countries, I study how these services influence firm productivity. Services are divided into access and cost services. The former inhibits productivity by raising firm entry barriers whereas the latter increases firm marginal costs by driving down productivity. The aim of this study is to find out, which one most affects firm productivity in sub-Saharan Africa. Results show a significant relationship between the ownership of a generator, high power outages and productivity. In telecommunications services, the study finds a significant relationship between use of email, use of websites and productivity. For financial services, the relationship between productivity and the percentage of firms with lines of credit or loans was is significant. In conclusion, I find that the access-cost influence of services on productivity is dependent on the service under consideration.

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1. Introduction

Sub-Saharan Africa (SSA) is a concern for the world since it experiences one of the highest levels of poverty. According to Go, Nikitin, Wang and Zou (2007) while poverty levels worldwide nearly halved between 1981 and 2001 declining from 40 to 21 percent, the levels of poverty in sub-Saharan Africa increased from 41.6 to 46.4 percent. In SSA, the levels not only become more widespread but also deeper when compared with the rest of the world. The World Bank (2013) puts the poverty headcount ratio for sub-Saharan Africa at US$ 1.25 a day. This was despite the many initiatives launched with the hope of tackling the problem. Poverty Reduction Strategies (PRSs), Structural Adjustment Programs (SAPs), Millennium Development Goals (MDGs), building capabilities in education, health and in water and sanitation, pro-poor growth which included initiatives in agriculture, market and trade development, social protection and inclusion initiatives like statutory minimum wage and school feeding programmes and empowerment and anti-discrimination regulations to tackle inequality and social exclusion (Handley, Higgins, Sharma, Bird, & Cammack, 2009).

This then raises the question, what should be done to foster prosperity in SSA? According to Chandler, Amatori and Hikino (1997), the engine of economic growth is the managerially led large corporation. Wherever large corporations emerged to organize productive assets like raw materials, plant and equipment, labour et cetera, economic growth followed. Where firms were slower to develop, or where firms failed to develop, stagnated development or economic decline occurred. Since the 19th century, large firms have been able to take advantage of economies of scale, economies of scope, in investments, in R&D and in human resources to build long term capabilities. However, Fligstein (1998) disagrees. He denies the causal relationship suggested by Chandler and suggests the use econometric techniques to demonstrate these relationships. For him, economic growth can be explained as the outcome of the political and economic organization of societies. Making use of the argument by economists - wealth is created by markets that allocate scarce resources to maximise value through the price system. Economic growth then, is as a result of free markets where investment decisions about land, labour, and capital are utilised in the most productive way. Another argument he uses this time Marxist is that wealth is caused by the search for profits. Productivity is increased by technology which in turn produces more surplus value. These dynamics of capitalist accumulation therefore, are what lead to growth.

This paper seeks to contribute to this ongoing discussion. The study uses the World Bank's SSA Enterprise Survey data of manufacturing and services collected so as to capture business perceptions of the biggest obstacles of enterprise growth (World Bank, 2010). Due a selection bias by the Bank, large firms such as those mentioned by Chandler are captured; the average

age of firms in the dataset is 14 years and with a mean number of 57 employees. Solow's model forms the basis of growth models in economics and I use it to estimate productivity of firms in SSA. Solow finds that economic growth cannot be fully explained by the accumulation of production factors capital and labour, but by a residual known as the total factor productivity (TFP). He uses a Cobb-Douglas production function with two factors of production, capital and labour. Firm productivity is an input of endogenous economic growth necessary for sustained action in tackling poverty the problem of this study. The study modifies the Cobb-Douglas function to include intermediate goods in the specifications since omission according to Moro (2007) affects common measures of total factor productivity. This specification is given in equation (1) below.

Francois and Hoekman (2010) discover that the performances of service sectors and services policies are important determinants of trade volumes affecting overall patterns of economic growth and development. A previous study of transition economies by Eschenbach and Hoekman (2006) determines that a major share of the total production costs of goods and services is contributed by finance, telecommunications, transport and power services. Therefore they conclude that services policies are important determinants of growth performance since they enhance economic growth and efficiency, eventually impacting on the competitiveness of a country. However, they fail to lag explanatory variables in their models. Hence, the OLS estimates they obtain from their regressions are not reliable. Another study of Eastern European economies during the 1997-2004 period by Fernandes (2009) shows that an efficient services sector also has indirect growth consequences emanating from the efficiency of other sectors in the economy. The finding illustrates the role played by the service sector in driving economic growth is beyond doubt. Nonetheless, the model used in the study proxies Foreign Direct Investment (FDI) to growth ignoring the role of domestic investments. Although justifiable in the short term to capture capital flows in transition economies, it is difficult to defend an exogenously driven growth model in the long term.

Since the study by Arnold, Mattoo & Narciso (2008) finds a positive relationship between firm productivity and service performance of electric power, telecommunications and financial services, I decide to investigate this further since the distinction between cost and access indicators is not clear in literature. Intuitionally, the former suppresses productivity by raising marginal costs of production, the latter by erecting entry barriers. The objective of the study is to find out which of the two affects the productivity of SSA firms most. Results of the study will benefit policy makers enabling them to design beneficial service sector liberalization policies to enhance economic growth and efficiency of a country. The Czech Republic introduced far reaching reforms in services industries during the 1990s in its accession to the European Union

(EU). In their study of these reforms, Arnold, Javorcik and Mattoo (2011) find a positive association between the liberalization of services industries and the productivity of manufacturing firms using services inputs yet results of the study are limited to one country.

Infrastructure is a key ingredient of the economic growth of any country but more so for African countries which have yet to attain middle income status. Now more than before, information and telecommunications technology is playing a vital role in the economic development of these countries. A lot of economic activity in the world today relies on information technology. Studies establish that increasing access to telecommunications services through regulation lowers prices. For instance, in Africa a 1% increase in mobile phone access translates to a 0.5% increase in real GDP per capital (Djiofack-Zebaze & Keck, 2009). However, the investigation uses macroeconomic variables such as GDP which are noisy and don't always relate well with firm productivity. The study conducted by Beuermann, McKelvey & Vakis (2012) in rural Peru, shows that increased access to mobile phones results in real household consumption boost of 11%. Additionally, poverty incidence decreases by 8% and extreme poverty by 5.4%. Chavula (2013) ascertains that fixed telephony, mobile telephony and Internet usage positively affect growth in upper-middle-income African countries. Still, these studies cover the influence of mobiles on household income rather than on firm productivity. Arnold (2008) et al demonstrate that accessibility of telecommunications services affects productivity of manufacturing firms. However, they do not explore the role of costs of telecommunications on firm productivity. Previous literature of how telecommunication costs influences productivity has not been conclusive either. Using time series data of 45 countries, Dedrick, Kraemer and Shih (2013) report investment in telecommunications has only been associated with significant productivity gains for developed countries but not for developing countries. This is despite the fact that developing countries have continued their rapid investment in IT. This apparent disconnect, necessitates further research to ascertain whether IT investment has begun to pay off in greater productivity for developing countries. Besides, the research is not representative of SSA constituting only data for South Africa.

The global financial crisis peaked in 2008 served as an illustration of how financial services can impact the productivity of a country. When agents have no access to credit, economic activity can be seriously undermined. From a macroeconomic perspective economic growth is influenced by, trade policy, foreign direct investment and availability of credit. However, macroeconomic factors rely on industry level performance factors for effectiveness. Prevailing interest rates determine the level of economic growth through credit. The time it takes banks to clear foreign/domestic wires has an impact on the velocity and on the level of growth. These

few examples illustrate the importance of service provision of lending institutions to firms. In literature, the conclusions by Wu, Hou, & Cheng (2010) support this view. In their study of 13 countries in the European Union, they discover that a long-run equilibrium relationship in the financial services industry is crucial to long-run economic growth. These findings inform banking and financial markets economic policy but give no guidance of the productivity at the firm level. Gatti and Love (2008) using cross-sectional data of Bulgarian firms determine that access to credit is positively and strongly associated with productivity. However what is not clear is to what extent the Bulgarian experience generalizes for sub-Saharan Africa. Although, the investigation focuses on how credit affects industry productivity, how this happens at a regional level remains unexplored. There is the likelihood of selection bias as the authors test for the presence of credit by firms; yet it is those firms that obtain credit that are bound to be productive hence the results are questionable. This gap in literature needs addressing as access to credit exhibits regional as well as than industry sector variation. Levine (2005) reveals that although finance can influence long-run growth through its impact on savings, investments, and innovation, evidence of how this causes growth is not clearly understood. Gatti and Love's (2008) study remedies this situation through an empirical study regrettably though, they do not take regional variation of credit into account. This study contributes to the further understanding of the channels through which credit affects productivity at the micro-level. This is because I control for large firms that would necessarily be more productive because they are likely to have access to credit, and also because labour market conditions are likely to improve firm productivity by relocating workers from below to above average productive firms as suggested by Van Biesebroeck (2005).

Although literature on the causal relationship between electricity and economic growth is inconclusive (Payne, 2010), electricity is an important driver of economic growth as no country in modern times has achieved development without it. The role of electricity is vital, as it influences the production and consumption of goods and services in any modern economy. Rosnes & Vennemo (2012) estimate the cost of providing electricity to sub-Saharan Africa over a 10 year period to be between 160 billion and 215 billion US dollars. In order to understand the relationship between electricity consumption and productivity, Payne (2010) in a survey on existing empirical studies concludes that the causal relationship between electricity consumption and economic growth is incomplete. Only 22.95% of studies analysed support a unidirectional causality from electricity consumption to economic growth. In examining this relationship, this study made use of a production model as advised by Payne. However, Payne only surveys studies that estimate productivity from national accounts. In this study, productivity is estimated using firm level data and according to Bartelsman, and Doms (2000),

this approach is better for the proper development of microeconomic foundations. Research on the electricity consumption and productivity with respect to sub-Saharan Africa using firm level data is still void in the literature, hence the necessity of this study. The only existing study by Arnold (2008) et al investigates how access to electricity affects firm productivity but it does not investigate how the cost of electricity affects productivity.

The outline of the article is as follows. Section 2 presents the data sources and reviews concerns and empirical difficulties of the study. Section 3 reports the empirical results - how finance, electric power and telecommunications indicators influence firm productivity. Section 4 concludes.

2. Data and Empirical Strategy

Data is sourced from the World Bank (World Bank, 2010) which maintains a publicly available database of firm data (See Table 4 for details of the 26 countries that constitute the dataset collected between 2009 and 2012 depending on country). The data covers 10,000 firms, comprising 96 distinct regions in 26 East, Central, Southern and West African SSA countries. Output, capital, labour and intermediate goods are calculated from the firm level data which are used to estimate the total factor productivity of firms.

The study makes use of many more indicators than earlier studies a total of 11 indicators (5 for electric power, 3 for telecommunications services and 3 for financial services). Electric power indicators are: the number of days it takes to obtain electric connection, the number of power outages, the percentage of firms with a generator, average duration of power outage and loss of annual sales due to power outage. Telecommunications indicators: the number of days to obtain telephone connection, the number of firms using email and number of firms with websites. Financial services indicators: percentage of firms with lines of credit or loans, the percentage firms with loans that require collateral, the average loan or line of credit interest rate.

I aggregate the data to ensure uniformity of variables across all countries in the dataset. Identification of firms from Nigeria is by questionnaire identification numbers since firm identification codes were not captured. For Congo Republic, Gabon, Liberia and Sierra Leone, the investigation relies on the net book value of the machinery instead of machinery market value as this information is not captured by the survey. Table 5 and Table 6 give descriptions of the database variables and how they are matched.

Firm sales measure firm output, the repurchase value (market value) for machinery, vehicles and equipment measures capital, total compensation of workers including wages, salaries, bonuses and social security payments measures labour and to measure intermediate goods, the cost of raw materials and intermediate materials. I convert these figures to US

dollars using the aggregate prevailing yearly exchange rates as published by the World Bank afterwards deflating them to 2005 US dollars.

However, as Hallward-Driemeier, Iarossi and Sokolo (2002) point out, estimation of productivity is not as straight forward due to the unobserved plant-specific effects that can only be recovered from an estimated production function as the difference between actual and predicted output. Furthermore such an approach would raise econometric issues regarding the possible bias of coefficients on input variables due to simultaneity bias. Of concern is how the productivity of the firm affects input decisions, introducing correlation between the plant effect and the input coefficients. Therefore, due to this simultaneity bias, simply running OLS firm by firm will lead to biased estimates of the input coefficients. There are approaches that correct for this, notably, the use of instrumental variables and an approach advanced by Olley-Pakes (1996) but modified by Levinsohn -Petrin (2000).

$$y_i = \propto_i + \beta_s \cdot l_i + \gamma_s \cdot k_i + \delta_s \cdot m_i + \mu_i \quad (1)$$

Even so, in this paper I use OLS since in the study by Arnold et al (2008), the overall results obtained by OLS and Olley-Pakes (1996) were comparable. The specification used is given by equation (1) where y_i represents real firm output, l_i labor, k_i capital and m_i intermediate inputs. Estimated coefficients vary at the manufacturing industry level s. Thereafter, I take logs of all values converting the problem into a linear model that can be easily estimated.

Arnold et al (2008) explain that endogeneity problems arise if a firm's performance is made to relate to its own perceptions of or even its own measurable experiences with, service firms. This is because perceptions are likely to be influenced by success, and a more efficient firm may be more efficient due to particular characteristics that also affect the treatment it receives from service providers, like the resourcefulness of the manager. They argue that these issues make a one-to-one juxtaposition at the level of the firm an unattractive empirical strategy.

Regional aggregation of services avoids this endogeneity problem by reducing the influence on productivity of a single firm. It is also convenient to note that although firm productivity reveals industry, country as well as regional variation, studies of firm productivity at regional level are largely unexplored in literature. This empirical strategy has the extra advantage of not only avoiding the endogeneity problems arising from simultaneity but also allows productivity analyses at regional level to be carried out. This involves aggregating to regional averages of service firm responses. These regional service performance averages are then used on the right hand side of equation (2) instead of the individual firm responses.

Thereafter total factor productivity (TFP) is regressed on regional average performance measures. Export status, firm size (firms with more than 50 employees), ownership (foreign or domestic - IMF definition of considering firms of more than 10% foreign capital share as

foreign firms) are controlled for by a vector of co-variates X. Export status, firm size and ownership are recognized in literature as relevant factors that influence firm size.

$$\mu_i = +\varphi + \lambda \cdot service\_performance_{region} + \pi \cdot X + D_{country} \cdot K + D_{industry} \cdot \vartheta + \epsilon_i \quad (2)$$

3. Results

3.1 Electric Power

This section describes results of Table 1

3.1.1 Power outages

This measure is defined as the number of times a firm experienced power outages in a given month. Power outages raise marginal costs by depressing the productivity of incumbent firms thereby lowering the entry barriers for challenger firms.

Contrary to what we would expect, results show a significant relationship between the number of power outages and productivity. This is to say that firm productivity rises with increased power outages. However, this is a counter intuitive result that requires further research. Firms report an average of 17 monthly power outages.

Table 1: Electric power

Cost indicators					Access indicators	
Ann. avg no of power outages	0.004** [0.001]				Days to obtain electricity conn.	-0.000 [0.000]
Pct. of firms with generator		0.009*** [0.001]				
Dur. of power outages			0.002 [0.002]			
Power losses as pct. of ann. sales				0.003 [0.003]		
Size of the firm	0.428*** [0.027]	0.434*** [0.027]	0.449*** [0.027]	0.442*** [0.027]		0.428*** [0.027]
Exporter	0.161*** [0.034]	0.171*** [0.033]	0.162*** [0.034]	0.170*** [0.034]		0.160*** [0.034]
Foreign owned	0.078*** [0.028]	0.069** [0.028]	0.077*** [0.028]	0.078*** [0.028]		0.078*** [0.029]
Firms with gen.	0.082*** [0.022]	- -	0.082*** [0.023]			0.082*** [0.022]
Country dumm.	Yes	Yes	Yes	Yes		Yes
Industry dumm.	Yes	Yes	Yes	Yes		Yes
Observations	10,008	10,014	10,016	9,897		9,921
Adjusted R-sqd	0.076	0.080	0.075	0.074		0.074

Robust standard errors in parenthesis. *, **, *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. The services related variables are used in their regional averages.

3.1.2 Days to obtain electric connection

Measures the number of days it took to obtain an electric connection from the day of the application to the when the service was received. The coefficient was not significant (See Table 1).

Large firms, export processing firms and foreign owned firms are more resilient to bad electricity services. This could be because they have the muscle to demand better services when other firms flounder or simply because they are already connected to the grid and therefore are not adversely affected by poor electrical services.

3.1.3 Percentage of firms with generator

Ownership of a generator is critical for productivity. There is a significant relationship between ownership of a generator and productivity. Power from the grid is likely to be cheaper due to scale economies than power generated by the firm (See Table 1). Data analysis reveals that 58% of the firms used generators.

3.1.4 Duration of power outage

Measures the duration of power outage in hours but the relationship with productivity is not significant.

3.1.5 Losses of power outage as a percentage of annual sales

This indicator is computed as losses incurred as a percentage of total annual sales. The relationship with productivity is not significant. However, for all the electrical power specifications I find that with respect to the covariates: foreign owned firms, firm size and foreign ownership the relationship with productivity is positive and significant.

3.2 Telecommunications

Results for this section are presented in Table 2

3.2.1 Days to obtain a telephone connection

The measure indicates the duration in days that a firm had to wait for a telephone connection from the time of application. The coefficient is not significant. We would expect access to telephone connection to positively impact firm productivity as firms are enabled to carry out more business. The average waiting period for connection is 23 days with most firms reporting connection in less than a day.

3.2.2 Email

Firms had to respond to the question whether they used e-mail to communicate with clients or suppliers. The relationship is positive and significant suggesting that firms that use email are more productive. Of the more than 10,000 firms in the dataset only half affirmed using email.

3.2.3 Website

The World Wide Web presents firms with an opportunity to be visible both within the country and abroad. Data gathered was in response to whether firms used websites. Investment in websites increases firm marginal costs and the investment and is justifiable only if firm productivity rises.

The results reveal a significant and positive relationship between the use of websites and productivity. Although both email and websites return a significant relationship with productivity, fewer firms (2,200) use websites.

Table 2: Telecommunications

Cost indicators			Access indicators	
Email	0.009*** [0.003]		Days to obtain telephone connection	-0.001 [0.001]
Website		0.010*** [0.001]		
Size of the firm	0.421*** [0.027]	0.429*** [0.027]		0.444*** [0.027]
Exporter	0.166*** [0.033]	0.162*** [0.033]		0.157*** [0.034]
Foreign owned	0.075*** [0.028]	0.078*** [0.028]		0.079*** [0.029]
Country dumm.	Yes	Yes		Yes
Industry dumm.	Yes	Yes		Yes
Observations	10,016	10,016		9,563
Adjusted R-sqd	0.083	0.008		0.074

Robust standard errors in parenthesis. *, **, *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. The services related variables are used in their regional averages.

3.3 Financial Services

Table 3 shows the results for this section

3.3.1 Percentage of firms with lines of credit or loans

Lines of credit and loans are an important means of funding businesses operations. However, not all businesses are eligible for funding.

Results obtained show a significant relationship between firm productivity and access to loans or lines of credit

3.3.2 Percentage of recent loans or line of credit that required collateral

One of the hurdles of accessing financing is that often, collateral is required. This means that only established firms benefit from these services. In the data 2,100 firms reported access

to loans or lines of credit. A constant criticism of this situation is similar to offering food to the well fed but sending the starving away.

No statistically significant linear dependence of the mean of productivity on firms with access to loans or lines of credit is detected though.

3.3.3 Average interest rate of loan or lines of credit

This indicator measures the cost of credit. Sub-Saharan Africa jurisdictions are often regarded as high interest rate regimes. The mean interest rate according to data is 14%.

Table 3: Financial Indicators

Cost indicators		Access indicators		
Average interest rate of loan/loc	-0.003	Pct. of firms with loc or loans	- 0.003**	
	[0.004]		[0.002]	
		Pct. of recent loans or loc that collateral was required		0.000
				[0.001]
Size of the firm	0.449		0.441***	0.443***
	[0.028]		[0.027]	[0.027]
Exporter	0.201		0.169***	0.169***
	[0.035]		[0.033]	[0.033]
Foreign owned	0.050		0.083***	0.083***
	[0.029]		[0.028]	[0.028]
Country dumm.	Yes		Yes	Yes
Industry dumm.	Yes		Yes	Yes
Observations	9,314		10,016	10,006
Adjusted R-sqd	0.065		0.075	0.074

Robust standard errors in parenthesis. *, **, *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. The services related variables are used in their regional averages.

The coefficient of interest rate is not significant which is not what we would expect as firms with access to credit should have more resources available for increased productivity.

4. Conclusion

The study shows that the service access-cost influence of services on productivity is dependent on the service under consideration. For electrical power and telecommunications services, it is the marginal cost that influences productivity most, whereas for financial services it is the barriers erected by financial services that inhibit productivity most. Further study is needed to understand why the relationship between interest rates and productivity is not significant and why the relationship between average number of power outages and productivity is significant.

All covariates, firm size, foreign ownership and export status return a positive association with productivity in all the services specification. This validates what already is in the literature that these indicators are important for productivity.

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Appendix

Table 4: Firm sample number per country

	Type of survey	Country	Number of firms	Time of data collection
1	Full	Angola	360	June – Oct 2010
2	Indicator	Benin	150	18th May – 30th Sept 2009
3	Full	Botswana	268	June – Oct 2010
4	Full	Burkina Faso	394	15th May – 10th Oct 2009

5	Full	Cameroon	363	1st June – 15th Oct 2009
6	Indicator	Cape Verde	156	15th – 31st Nov 2009
7	Full	Central African Republic	150	June – July 2011
8	Indicator	Chad	150	24th June – 5th Sept 2009
9	Full	Cote d' Ivore	526	26th Oct 2008 – 20th Feb 2009
10	Indicator	Congo Brazzaville	151	15th Sept 2008 -13th Feb 2009
11	Full	DR Congo	359	June – Oct 2010
12	Full	Eritrea	179	4th Jul – 10th Aug 2009
13	Full	Ethiopia	644	July2011 – July 2012
14	Indicator	Gabon	179	15th Sept – 13th Feb 2009
15	Indicator	Lesotho	151	15th Sept 2008 – 13th Feb 2009
16	Indicator	Liberia	150	15th Sept 2008 – 13th Feb 2009
17	Full	Madagascar	445	15th Sept 2008 – 13th Feb 2009
18	Indicator	Malawi	150	12th May – 20th July 2009
19	Full	Mali	360	May – Nov 2010
20	Full	Mauritius	398	June 2008 – Feb 3009
21	Indicator	Niger	150	6th May – 16th Oct 2009
22	Full	Nigeria	3157	2009
23	Full	Rwanda	241	June 2011 – Feb 2012
24	Indicator	Sierra Leone	150	15th Sept – 13th February 2009
25	Indicator	Togo	155	18th July – 16th Oct 2009
26	Full	Zimbabwe	600	May 2011 – Feb 2012

Table 5: World Bank enterprise survey variables used in the study

Other SSA	idstd	a0	a1	a2	a3a	a4a	a4b	b2b	c4	c7	c8	c9a	c10
Nigeria	idquest	survey	country	city	reg	N/A	industry	b2b	i2b2	g1a2	gia3	gia4	g4a

Other SSA	c20	c22a	c22b	d2	d3a	k8	k13	afk10a	l1	n2a	n2e	n7a
Nigeria	i2a2	c4a	c4b	l1b	c6a	ng_k4a	ng_k4i2 ng_k4i1	ng_k4e2	j2a	l2b	l2a	l7

Table 6: Variable names and variable descriptions

Variable	Variable description	Variable	Variable description
	General		*Telecommunications*
a0	survey type	c20	days to obtain telephone connection
a1	country	c22a	email?
a2	city	c22b	website?
a3a	region		
a4a	sample sector		*Financial services*
a4b	industry	k8	% of firms with lines of credit or loans
b2b	foreign ownership	k13	% of loans that collateral was required
		afk10a	average interest rate of loan/line of credit
	Electric power		*Cobb Douglas*
c7	number of monthly power outages	d2	last year's total sales
c4	days to obtain electric connection	d3a	% of sales that were national sales
c8	duration of power outage (hrs)	l6	number of temporary full time workers
c10	% of firms that own a generator	n2a	total wages and salaries for last year
c9a	power outage losses as a % of sales	n2e	cost of materials & intermediate goods
		n7a	cost of machinery in current condition

Table 7: ISIC Industry Classification

No	Description
A – Agriculture hunting and forestry	
2	Forestry, logging and related service activities
D – Manufacturing	
15	Food products and beverages
16	Tobacco products
17	Textiles
18	Wearing apparel; dressing and dyeing of fur
19	Tanning and dressing of leather; manufacture of luggage, handbags ,etc
20	Wood and of products of wood and cork, except furniture
21	Paper and paper products
22	Publishing, printing and reproduction of recorded media

23	Manufacture of coke, refined petroleum products and nuclear fuel
24	Chemicals and chemical products
25	Rubber and plastics products
26	Other non-metallic mineral products
27	Basic metals
28	Fabricated metal products, except machinery and equipment
29	Machinery and equipment n.e.c
30	Office, accounting and computing machinery
31 & 32	Electrical machinery and apparatus n.e.c, radio, tv and comm. equipment
33	Medical, precision and optical instruments, watches and clocks
34	Motor vehicles, trailers and semi-trailers
35	Other transport equipment
36	Furniture; manufacturing n.e.c.
37	Recycling
F – Construction	
45	Construction
G –Wholesale and retail trade	
50	Sale, maintenance and repair of motor vehicles and motorcycles
51	Wholesale trade and commission trade, except of motor vehicles
52	Retail trade, except of motor vehicles and motorcycles
H – Hotels and restaurants	
55	Hotels and restaurants
I – Transport, storage and communications	
60 -64	Land transport; transport via pipelines, water transport, air transport, auxiliary transport activities and post and telecommunications
K – Real estate, renting and business activities	
72	Computer and related activities
74	Other business activities