POLICY BRIEF

Investment Climate Impact on Total Factor Productivity of Manufacturing Industries in Nigeria

Friday Ademola Ajagbe and *Joshua Olusegun Ajetomobi*

August 2020 / No. 687

Abstract

This study examines the influence of the investment climate on the productivity of manufacturing industries in Nigeria. The study is conducted in two phases: in the first phase, an econometric production function for Nigerian manufacturing industries is estimated to produce a measure of total factor productivity (TFP) for each firm; in the second stage, variation in TFP is statistically related to the indicators of investment climate as well as firm characteristics. The analyses use 2009 World Bank Enterprise survey data on Nigeria. The results show systematic variations in investment climate indicators across various industries in Nigeria. The indicators of poor investment climate – power outages, unofficial payments,

losses in transit due to breakage or spoilage and tax burdens – have significant negative effects on the TFP of manufacturing industries in Nigeria. Increasing power outages by one hour per month could reduce TFP by 0.06%, while a 1% rise in unofficial payments could lead to a decline in TFP of about 1.8%. Investment climate indicators, such as management time dealing with regulations, and percentage of firms owned by private domestic individuals, companies and organizations have a positive influence on the TFP of manufacturing industries.

Introduction

Globalization and expanding international markets in many developing countries offer opportunities for their producers to compete in emerging national and international markets. In this world of competition, producers from developing nations need to gain optimal control over production, trade and distribution in order to: (i) operate in a cost-effective way; and (ii) guarantee the quality and the value added to their products (Dolan and Humphrey, 2004). While some developing countries, such as China, India, and Brazil, take advantage of globalization and are doing well, the performance of manufacturing industries in African countries still lag behind. Many of the differences in industrial performance between Africa and other developing countries are linked to the business investment climate in Africa, including the physical, institutional and regulatory environment for private sector initiatives. In recent times, the cost of doing business in Africa is estimated to be between 20% and 40% above other developing nations. In Nigeria, evidence of lower productivity relative to other developing nations is well documented by Iarossi and Clarke (2011). They discovered that firms in Kenya were about 40 per cent more efficient than firms in Nigeria, firms in Russia were almost twice as productive, and firms in South Africa almost four times as productive. In various developing countries, such differences have been attributed to two main factors: first, internal factors such as technology, capital, labour, and marketing strategies. The second factor involves the investment climate, such as government policy and environment, in which the industries operate. Until now, very few studies have tried to find an explanation for the poor performance of manufacturing firms in Nigeria. Two major research projects that employed firm level data to explore performance of Nigerian manufacturing industries were those by Seker and Saliola (2018) and Iarossi and Clarke (2011). The former classified Nigeria among nations with low average TFP in the food, garment and chemical industries, while the latter merely described the extent of investment climate problems in Nigerian cities. Other studies (e.g., Chete and Adenikinju, 2002 and Ajetomobi, 2011) employed time series data. Chete and Adenikinju (2002) investigated the role of trade policies in fostering productivity growth in the Nigerian manufacturing sector between 1962 and 1985. They found a positive correlation between trade liberalization and productivity growth. Ajetomobi (2011) included Nigeria in his study of the total factor productivity of selected agricultural commodities in the Economic Community of West African

States (ECOWAS). The study showed better productivity for the nation's agricultural sector than when it was included in the estimates of agricultural productivity in Africa. Generally speaking, specific work on the firm level performance of manufacturing firms in developing nations is scarce. The closest so far have been those by Veeramani and Goldar (2004) on India; Escribano and Guasch (2005) on Guatemala, Hondura and Nicaragua; as well as Dollar et.al. (2005) and Bastor (2004). A major reason for this has been lack of reliable and adequate firm level data.

Investment climate

A general list of various quantitative measures of the investment climate collected by the survey is presented in the Table below. The list sometimes contains multiple indicators covering a similar theme. For example, access to finance is made up of information on use of overdraft facilities as well as the share of firms that have a bank loan, while electricity includes duration of power outages in number of hours per month, percentage of electricity from a generator, and losses due to power outages measured as a percentage of total sales. Within the same theme, the correlation among the indicators is very strong. Thus, insignificant variables are dropped in the empirical analysis. The overall list of indicators in the survey are: duration of power outages, losses due to power outage as a percentage of total sales, percentage of electricity generated from generators, access to land, loss in transit due to breakage and spoilage as a percentage of sales, cost of security, management time in dealing with regulation, unofficial payments, days to register a phone line, water from public sources, inspection time, taxes, overdraft facilities and shares made up of bank loans.

The table indicates that there is a high rate of power outage in Nigeria. The high level of power outages means that Nigerian industries need standby generators for effective business operations. In respect of duration of power outages in number of hours per month, chemical and other industries are the worst hit (281.4 and 293), followed by food and beverage (255.8), and garments (242.5). The figures translate to more than 10 days per month of power outages in those industries. While it is expected that large firms in any location will have their own power generators, for small and medium enterprises (SMEs), which constitute the largest proportion of various manufacturing industries in Nigeria, the cost of maintaining a power generator might be quite high and worrisome. Thus, another measure of reliable power supply is the proportion of firms operating with their own generators. Apart from the electronic industry, more than 60 per cent of total electrical utilization by Nigerian manufacturing industries does not come from the public grid, but from their own generators. For machineries, chemical and other industries, the proportion is more than three quarters. In terms of losses due to power outages as a percentage of sales, the food and beverage industries have the greatest loss, followed by the chemical industry. This shows that electricity is more important to the food and beverage industry than other industries in Nigeria.

After electricity, the next greatest concern is access to finance, and the survey provided information about the financial products used by manufacturing industries as well as their perceptions about access to and cost of finance. The table shows that the three industries with the biggest overdraft facilities are textiles, food and beverages, and chemicals. The share of firms with a loan from a bank or financial institution also varies quite a bit across the manufacturing industries. The responses range from a low of 0% in electronics, to 12.3% in chemicals and 5.2% in food and beverages. A major reason for the low share might be high demand for collateral security. The collateral requirement as a percentage of the loan is as high as 282.8% for the food and beverage industries.

Another question that relates to the investment climate indicator is how many days it took to secure a phone line. The results show that this appears to be good for all manufacturing industries, apart from wood (less than 16 days). An obvious reason for this success might be the privatization of the Nigerian telecommunication industry, which attracts competition among various service providers and hence leads to an improvement in efficiencies. The survey also asked how many times per year the firms are visited by government inspectors. The key issue is the extent to which this varies across the manufacturing industries within the country. The table indicates that the reported number of inspections is generally low. However, it is higher in the food and beverage industries (3.7 per year) and in China (28) than in other industries or areas. A related question is how much time management spends dealing with government regulations. Here the responses provide a rather different picture. The chemical industries have the highest reported time, 3.7% of management time, compared to 4.9% in chemical, and 4.6% in food and beverages. The survey also includes questions about corruption in terms of unofficial payments. The highest indicator of corruption is reported by the textile industries (6%) followed by other manufacturing industries (5.4%) and electronics (5%). The lowest is reported in the garment industry.

In summary, there is very significant variation in many of the investment climate measures across Nigerian manufacturing industries, so the potential is there to explain differences in the performance of the industries based on variations in the investment climate.

Table: Sample means of investment climate indicators

Industry	Food	Garments	Textiles	Mach.	Chem.	Elect.	Non-metal	Wood	Metal	Other
Power outage	255.8 (235)	254.4 (166)	195.5 (13)	242.5 (12)	281.4 (28)	54.0 (2)	222.8 (162)	238.4 (401)	231.5 (250)	293.1 (216)
Mgt time	4.6 (242)	3.7 (169)	1.9 (14)	4.9 (13)	7.0 (29)	3.0 (2)	2.9 (210)	3.5 (414)	3.7 (263)	5.2 (233)
Loss in power outage	6.9 (173)	3.6 (113)	4.6 (12)	3.7 (10)	6.5 (17)	1.0 (2)	4.4 (131)	3.2 (308)	4.1 (201)	4.5 (156)
Land Process	104.2 (15)	92.8 (5)	. 0	105.0 (2)	59.6 (5)	.0	97.0 (18)	110.6 (34)	111.2 (19)	125.1 (22)
Have generator	67.6 (226)	62.7 (139)	53.1 (13)	78.4 (11)	76.5 (29)	50.0 (2)	73.3 (162)	65.8 (317)	69.5 (210)	73.7 (211)
Loss in transit	2.4 (242)	0.6 (168)	1.4 (14)	1.7 (13)	3.5 (30)	1.0 (2)	3.9 (210)	1.3 (414)	0.8 (263)	1.4 (233)
Loss to thieves	4.3 (36)	5.0 (8)	. 0	2.6 (2)	8.0 (2)	.0	4.9 (15)	4.3 (31)	5.2 (14)	4.3 (21)
Security cost	3.4 (47)	4.3 (19)	0.1 (2)	4.8 (3)	2.7 (7)	.0	4.1 (20)	3.3 (27)	2.6 (19)	2.2 (35)
Unofficial payment	3.6 (196)	2.2 (145)	6.0 (13)	4.6 (10)	4.3 (22)	5.0 (2)	4.0 (181)	3.5 (354)	3.2 (223)	5.4 (195)
Days to phone	15.8 (242)	24 (169)	0 (14)	12 (13)	11.8 (30)	15 (2)	31.7 (210)	12.7 (414)	4.6 (263)	14.6 (233)
Public water	28.3 (49)	31.8 (37)	8.1 (8)	47.0 (5)	32.5 (20)	60.0 (1)	27.2 (182}	29.6 (99)	28.9 (65)	32.5 (118)
Inspection	3.7 (215)	3.5 (136)	2.1 (13)	1.7 (11)	3.5 (28)	2.0 (1)	2.7 (184)	3.3 (343)	3.4 (202)	3.5 (183)
Taxation	72.7 (242)	72.2 (169)	74.4 (14)	70.8 (13)	73.6 (30)	65.0 (2)	68.2 (210)	67.7 (414)	66.4 (263)	71.0 (233)
Overdraft facility	26.6 (241)	4.1 (169)	57.1 (14)	7.7 (13)	46.7 (30)	0 (2)	11.9 (210)	9.9 (413)	13.7 (263)	16.7 (233)
Bank loan	5.2 (242)	0.6 (169)	8.2 (14)	2.3 (13)	12.3 (30)	0.0 (2)	1.2 (210)	1.8 (414)	3.3 (263)	2.9 (233)

Source: Author.

Note: Power outage is measured in number of hours/month; mgt time is management time in dealing with regulation; loss in power outage is the share of such loss in total sales; land process is the number of days to process landed property; have generator is the proportion of firms using a generator; loss in transit and loss to thieves is the percentage of a shipment lost due to spoilage and thieves, respectively; security costs and unofficial payments and taxation are shares of each variable in total sales; days to phone are number of days to obtain a phone line; public water is the proportion of firms with access to public water; inspection means number of times visited by government officials; overdraft facility means using an overdraft facility or not; and bank loan refers to the proportion of total financing from a bank loan.

Conclusion and recommendations

This study examined the influence of investment climate on the total factor productivity (TFP) of manufacturing industries in Nigeria. The study was conducted in two phases, namely: (i) an estimation of industry and firm-level productivity measures was carried out; and (ii) differences in TFP across firms was statistically related to indicators of investment climate, taking into consideration firm characteristics. The analyses used 2009 World Bank Enterprise survey data on Nigeria. In terms of firm level productivity, it was found that the chemical industry was more productive than others. The results show that the empirical relationship between investment climate indicators and firm performance is robust when including industry dummies, which reveals that there is significant variation in the investment climate across manufacturing industries in the country. Therefore, it can be concluded that industrial policy planning is important.

The empirical results further indicated that the following investment climate factors are the most important bottlenecks affecting the productive performance of manufacturing industries in Nigeria: duration of power outages, time spent by management in dealing with state and federal government regulations, unofficial payments, inspections per year, percentage of electricity from generators, loss in transit due to breakage and spoilage, tax paid per year, and ownership of firm. As expected a priori, power outages, unofficial payments, tax and loss in transit due to breakage or spoilage negatively and significantly affect the TFP of manufacturing industries in Nigeria, while the influence of the other variables is positive and significant. The results show that there is scope for initiating policy measures to improve the dimensions of the relevant investment climate indicators. Hence, the following policies are suggested to enhance the competitiveness of Nigerian manufacturing industries: i). Ensure a stable and sufficient supply of power for industrial use. A roadmap for the currently passed power reform should be initiated. For example, the frequency and length of power outages could be reduced by improving the public grid through an increase in generation capacity and promotion of pricing and distributional efficiencies currently in use. In addition, clean energy generation through solar systems and inverters by private firms should be given maximum support through funding, at a single-digit interest rate. ii). Road infrastructure should be given adequate attention. One major issue with roads in Nigeria is that they are not strong enough for trucks moving raw materials and firms' products to various markets. This might be responsible for the significant loss in transit due to breakage and spoilage. While it is expedient for government to intensify its efforts in the construction of a modern railway system, road construction and repair should take into account the high number of trucks to enable the smooth running of the nation's industrial operations. iii). Appropriate measures should be put in place to reduce the rate of unofficial payments and tax disincentives in the country. For example, the Independent Corrupt Practices and Other Related Offences Commission (ICPC) and the Economic and Financial Crime

Commission (EFCC) should pay attention to the activities of the Corporate Affair Commission, ministries and the departments regulating the registration, operation and tax return activities of industries in Nigeria. The Manufacturing Association of Nigeria (MAN) should establish whistleblowing channels and legal procedures to stop facilitating unofficial payments to speed up performance.

References

Ajetomobi, J.O. 2011. Total Factor Productivity of Agricultural Commodities in the Economic Community of West Africa States: 1961–2005. AERC Research Paper No. 241. African Economic Research Consortium, Nairobi.

Chete L.N. and A.F. Adenikinju. 2002. Productivity Growth in Nigerian Manufacturing and its Correlation to Trade Policy Regimes/Indexes (1962–1985). AERC Research Paper No. 127. African Economic Research Consortium, Nairobi.

Dollar, D., M. Hallward-Dreimeier and T. Mengistae. 2005. "Investment climate and firm performance in developing countries." Economic Development and Cultural Change, 54(1): 1–31.

Escribano, A. and J.L. Guasch. 2005. "Assessing the impact of the investment climate on productivity using firm-level data: Methodology and the cases of Guatemala, Honduras and Nicaragua." Policy Research Working Paper No. 3621. World Bank, Washington, D.C., June. Available online at http://go.worldbank.org/F4W5VBGDR0.

Iarossi, G. and G.R.G. Clarke. 2011. "Nigeria 2011: An assessment of the investment climate in 26 states". African Finance and Private Sector Development (AFTFP), World Bank, Washington, D.C. Jorgenson, D.W., M.S. Ho and K.J. Stiroh. 2005. Productivity. Volume 3. Information Technology and the American Growth Resurgence. Cambridge and London: MIT Press.

Şeker, M. 2017. "Trade policies, investment climate, and export performance". Bogazici Journal: Review of Social, Economic & Administrative Studies, 31(2): 21–48.

Şeker, M. and F. Saliola. 2018. "A cross-country analysis of total factor productivity using microlevel data". Central Bank Review, 18(1): 13–27.

Veeramani, C. and B.N. Goldar. 200. "Investment climate and total factor productivity in manufacturing: Analysis of Indian states". Working Paper No. 127. Indian Council for Research on International Economic Relations, New Delhi, April.

Mission

To strengthen local capacity for conducting independent, rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research.

www.aercafrica.org

Learn More

www.facebook.com/aercafrica

www.instagram.com/aercafrica_official/

twitter.com/aercafrica

www.linkedin.com/school/aercafrica/

Contact Us
African Economic Research Consortium
Consortium pour la Recherche Economique en Afrique
Middle East Bank Towers,
3rd Floor, Jakaya Kikwete Road
Nairobi 00200, Kenya
Tel: +254 (0) 20 273 4150
communications@aercafrica.org