THE IMPACT OF SERVICES PRODUCTIVITY AND POLICIES ON MANUFACTURING EXPORT PERFORMANCE IN NIGERIA

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Abstract

This paper investigates the relationship among the services productivity, services policy and Nigeria's manufacturing export at firm and aggregate levels. We use data from the World Bank Enterprise Survey for selected firms in Nigeria. The study employs: design-weighted least squares (DWLS) regression to estimate the impact of services productivity on manufacturing productivity; logistic regression to assess the effects of services performance on manufactured exports at firm level; and gravity model to estimate the effects of restrictive services trade policies on manufactured goods exports in Nigeria. The results show that: there is a significant and positive relationship between firm productivity and service performance, an insignificant relationship exist between services performance and manufactured exports, while the overall restrictive services trade policies have insignificant effect on manufactured goods exports, but the mode 2 and mode 3 restrictive services trade policies have negative significant impact on manufactured goods exports in Nigeria. It is suggested that the governments should consider thoroughly the impact of the prevailing policies and regulation on the efficiency of producer services industries.

Introduction

As an input into the production process, services are playing an increasingly important role in manufacturing industries the world over. Services can not only be viewed as inputs, but also an output of manufacturers. As the increasing productivity characterises economic growth and development, a large fraction of productivity growth originates in the manufacturing sector (Van Ark et al., 2008)

Services, particularly the producer services are inputs into the production of other services and goods. Hence, their cost and quality are expected to affect the manufacturing industries which influences performance of the economy (Francois and Hoekman, 2010). An efficient financial sector ensures prompt and timely deployment of capital to places of highest returns. High-quality and cost-effective telecommunications services generate benefits, as both an intermediate input and information services. Correspondingly, efficient transport services enhance the distribution of goods within and between countries. The accounting and legal services (Business services) minimise the transaction costs in the financial markets and the enforcement of contracts. Retail and wholesale services (distribution services) link the producers and consumers, towards achieving the goals of the parties involved.

There are about four ways, through which services reform may affect the performance of manufacturing sectors: First, new services may become available through the entry of new and more sophisticated services providers, such as, new financial instruments and cash flow management tools, multi-modal transport services, or digital value-added services in telecommunications. The existence of these services may enhance manufacturing productivity. Second, services reform may boost services availability, for instance, internet access could be extended to the rural areas. This can enhance the performance of smaller or remotely located enterprises. Third, the reliability of existing services may improve as a result of reform. These improvements will then limit disruptions to production and lower operating costs in downstream manufacturing sectors. Fourth, reducing market power in services may enhance innovation incentives in downstream manufacturing if, prior to the reform, part of the innovation rent was

appropriated by upstream service providers (Bourlès et al. 2013; Arnold, et al. 2015).

The basic trade theory suggests that services sector policy in form of openness to intermediate services trade has impact on the manufacturing sector (Feenstra and Hanson 1996, 1999). It is expected that those manufacturing sectors that are more producer service intensive (the higher technology sectors) to systematically benefit from increased openness, not only directly, but also indirectly in the competition with other sectors in the economy for resources. Indeed, in general equilibrium, more service intensive sectors are expected to expand, and less service intensive sectors to contract.

Given the above on the importance of services productivity and policy to manufacturing productivity and export, coupled with the very little attention this concept has received in the empirical economic literature, especially at country specific level, this study intends to investigate: the impact of services productivity on manufacturing productivity, the effects of services performance on manufactured exports, and the effects of restrictive services trade policies on manufactured goods exports in Nigeria. The remaining parts of the paper are structured as follows: Section II provides some stylized facts on Nigerian services policies and trade. Section III discusses the review of literature. Sections IV and V showcase the methodology and the empirical results of the paper respectively. Finally, Section VI draws conclusions and outlines possible policy implications.

Identified facts

The share of the services sector of GDP during the period before the commencement of the General Agreement on Trade in Services (GATS: 1980-94) was an average of about 28.47 per cent. This average increased to 36.50 per cent in the post-GATS period, while the overall average for the entire study period was about 33.20 per cent. The trend of service sector contributions to GDP increased consistently, especially after the year 2000.

In the 1980s, up to the year 2009, the contribution of services to GDP hovered around 30%, and above. But, the services sector witnessed an impressive expansion, contributing a larger proportion to the Gross Domestic Product (GDP) after the year 2010. The sector's share of GDP amounted to over 50.0%. This was due to the rebasing of GDP (CBN, 2015).

The export of goods and services is relatively higher than import over the years with an average of about $33.45 billion worth of export and $25.74 billion worth of goods and services imported. Nigeria's export is dominated by goods export, accounting for over 90% of total export, while services account for the remaining percentage. This can be connected to the country's reliance on petroleum, which is the major source of revenue to the government. However, the contribution of services in Nigeria's import is relatively higher constituting about 25% of the total import, but it can be observed to be at an increasing rate. The total export that was about $27.07 billion, consisting of about $25.94 billion worth of goods, and $1.13 billion worth of services in the year 1980, rose to about $86.44 billion in 2014, out of which $84.08 billion was goods export, while about $2.36 billion of services was exported. Conversely, the total import that was $20.01 billion, comprising $16.66 billion goods, and $3.35 billion worth of services, import in the year 1980, increased to $59.05 billion, with about $40.19 billion goods and $18.86 billion worth of services in the year 2014. The amount of goods and services export and import reached their peak in the year 2011, while the least of the export and import were recorded in the 1998 and 1990 respectively (UNCTADstat, 2015).

Trade in services involves other modes of service delivery, apart from cross border trade, that is peculiar to trade in goods. The exports and imports of services by modes of supply, namely: mode 1, cross border supply; mode 2, consumption abroad; mode 3, commercial presence; and mode 4, presence of natural persons. The mode 1 is cross border supply that involves supplying services from abroad which is similar to trade in goods in terms of mode of delivery; mode 2 means consumption abroad which necessitates movement of consumers to the service providers; mode 3 refers to commercial presence which has to with establishing a local branch by a Foreign Service providers within the consumer's country; and mode 4 is the presence of natural persons that encompasses services provided through workers' movement between countries.

The General Agreement on Trade in Services (GATS) reached in 1995 signed by WTO members, has remained the single most important global instrument of opening up of multilateral trade in key services sectors. This is due to its widely acclaimed methodology of selective services trade liberalization adjudged development oriented. Also, countries made liberalization commitments in line with their development aspirations. Therefore, Nigeria's

services sector was featured as one of the sectors that the country made some liberalization commitments.

Before the advent of GATS in 1995, that encouraged multilateral trade liberalization of services. Trade in services was regulated through bilateral and regional schemes, where each country regulated relations across countries with respect to specific services, such as aviation, shipping, finance, and communications. A lot of efforts had been made by the Nigerian government towards services trade liberalization, among which were, the economic reforms in 1986 that resulted in a series of trade and investment laws and regulations in Nigeria's services sector. Specifically, two decrees were introduced to eliminate peculiar restrictions on private investment, especially those of foreign origin. These were; the Nigerian Investment Promotion Commission (NIPC) Decree No. 16 of 1995 and the Foreign Exchange Monitoring and Miscellaneous Provisions (FEMMP) Decree No. 17 of 1995. A further attempt was the multilateral liberalization that led to Nigeria's commitment in the Uruguay round, covering Communication, Finance, Tourism and travel related, as well as Transport services.

Literature review

Several theoretical links from services liberalization to growth in productivity have been explained in the literature. Increased specialization of producer services brings about gains from trade in services owing to increased variety and expanded markets (Markusen, 1989). Lower price, better quality, and wider choice of services allow more complex organization of a manufacturing firm through further fragmentation of production activities. Sequentially, fragmentation of production requires support from internationally competitive transportation, communication, professional and financial services providers (Deardorff, 2001). Higher variety of services also generates knowledge, increase its diffusion and exchange (Burgess and Venables, 2004). Outsourcing of services by productive firms in non-stagnant sectors results in more efficient factor allocation that expands output and production (Oulton, 2001) Francois (1990a) also makes a theoretical contribution that the growth of intermediation services is an important determinant of overall economic growth.

The inputs (which the producer services also constitute) affect among other things, a firm's ability to invest in new business opportunities and better production technology, to exploit economies of scale by concentrating

production in fewer locations, to efficiently manage inventories, and to make coordinated decisions with their suppliers and consumers. Ethier (1982) presents the theoretical justification for the argument, that access to a greater variety of inputs results in higher productivity among downstream industries. The significance of intermediate inputs to productivity growth has also been underscored in the theoretical contributions of Grossman and Helpman (1991). Jones (2010) emphasises how linkages between firms through intermediate inputs result in a multiplier similar to the one associated with capital in a neoclassical growth model. This multiplier is large because of a high share of intermediates in output and thus helps account for differences in incomes across countries. The trade in services, and the general openness of the producer service sectors, is playing an important role in the relative efficiency of manufacturing industries. Certainly, this has been established in the theoretical literature on trade in services (Markusen 1989; Francois 1990b; van Marrewijk et al. 1997; Markusen et al. 2005).

Depending on the nature of data, several estimation techniques have being used in the literature to estimate the relationship among services policy, services productivity, manufacturing productivity and manufacturing exports, such as: Ordinary least square (OLS) estimator and the semi- parametric estimator suggested by Olley and Pakes (1996) (Arnold et al. 2008, 2011): Panel regression (Banga and Goldar, 2007, Duggan, et al. 2013, Arnold, 2015, Beverelli et al. 2017); 2SLS regression (Francois and Woerz, 2008); OLS regression, GMM estimator and Gravity model approach (Bas, 2013, Hoekman and Shepherd, 2015); Ordinary least square (OLS) and Probit regression (Kelle, 2013); as well as Pooled OLS and Fractional Tobit regression (Lodefalk, 2013). The manufacturing and services sectors are interrelated (Pilat and Wölfl, 2005). This is because, services make significant contributions to production, mainly through their direct contribution to total output and final demand, but to some extent also through their indirect contribution via other industries. However, services depend less on other industries than the manufacturing sector. Services sector supplies most inputs required to produce more services. Moreover, their role as providers of intermediate inputs to other industries is not yet as strong as that of the manufacturing sector.

There exists a positive relationship between services sector reform and the performance of domestic firms in downstream manufacturing sectors. Allowing foreign entry into services industries appears to be the key channel through

which services liberalization contributes to improved performance of manufacturing sectors (Arnold et al. 2011). There are significant and strong positive effects from increased business service openness (i.e. greater levels of imports) on industries like machinery, motor vehicles, chemicals and electric equipment, supporting the notion that off-shoring of business services may promote the competitiveness of the most skill and technology intensive industries in the OECD. Conversely, also there is evidence of negative general equilibrium effects for sectors that are less service intensive (Francois and Woerz, 2008)

Arnold (2015) find that banking, telecommunications, insurance and transport reforms all had significant positive effects on the productivity of manufacturing firms. Services reforms benefited both foreign and locally-owned manufacturing firms, but the effects on foreign firms tended to be stronger. They also find that banking, telecommunications, insurance and transport reforms all had significant positive effects on the productivity of manufacturing firms. Services reforms benefited both foreign and locally-owned manufacturing firms, but the effects on foreign firms tended to be stronger.

The results of the study by Banga and Goldar (2007) show that the contribution of services input to output and productivity growth in manufacturing (organised) has increased substantially in the 1990s. One of the major causes for this is found to be the trade reforms undertaken in the post-1990s. Also, Arnold (2008) presents a significant and positive relationship between firm productivity and service performance in all three services sectors analysed. Thus, provides support for the argument that improvements in services industries contribute to enhancing the performance of downstream economic activities, and are essential element of a strategy for promoting growth and reducing poverty.

There is a strong linkage between services and manufacturing performance. The linkage between services productivity and manufacturing productivity is stronger for firms that use services inputs more intensively. Also, services trade restrictiveness index (STRI) measures of prevailing services trade policies are a statistically significant determinant of increase in manufacturing exports. Hoekman and Shepherd (2015)

The methodology
This section presents, the specification of model, and the sources of data used in this paper.

Model Specification
There are three econometric models specified in this study. The first is used to estimate the impact of services productivity on manufacturing productivity, the second assesses the effects of services performance on manufactured exports at the firm level, while the third focuses on examining the effects of restrictive services trade policies on manufactured goods exports at the country level.

In a complex survey, the random-error terms are often no longer independent of one another because of features of the sample design. Thus, confidence intervals and tests of hypotheses may be misleading. Though, a number of authors have addressed these issues (Fuller, 1975; Holt, et al. 1980; Pfeffermann and Nathan, 1981 and Lee, et al. 2006). But, they do not agree on a single approach to the analysis, but they all conclude that the use of OLS as the estimation methodology can be inappropriate. As a result, this study applies the design-weighted least squares (DWLS) regression, because it covers the widest range of situations. The first model uses regression of the form:

$$\log(Labour productivity_{ft}) = \beta_1 \log(services productivity_{ft}) + \sum_i b_i X_{ft}^i + \varepsilon_{ft} \qquad (1)$$

Where the dependent variable, where f indexes firms, and t signifies time. Labour productivity (sales per worker) in manufacturing, measured at the firm level, is the dependent variable. The main independent variable (services productivity), is calculated by taking the average by subnational region of the firm-level labour productivity in services sectors. The X variables refer to firm-level controls. The first group includes size (number of employees), capital intensity and dummy variables for different types of firm organisation. The second group includes data on capacity utilisation and the top manager's number of years of experience in the sector as proxies for management competence.

The logistic regression is a binary regression analysis that has the ability to incorporate a larger number of explanatory variables, including continuous variables (DeMaris, 1992; 1989; Liao, 1994 and Lee, et al. 2006). The second model adopts logit regression of the form:

$$\log(Export_{ft}) = \alpha_1 \log(Labourproductivity_{ft}) + \sum_i \alpha_i X^i_{ft} + \varepsilon_{ft} \qquad (2)$$

Where, the dependent variable is firm-level exports, and the independent variables are the same as in the first model, except that services productivity is replaced with each firm's own level of productivity (sales per worker).

The equation (3) is the gravity model that analyses the effects of restrictive services trade policies on manufactured goods exports in Nigeria. Following the Baier and Bergstrand (2009) and Hoekman and Shepherd (2015) approaches, the model estimated here is:

$$\ln trade_{ij} = b_0 + b_1 \ln STRI_i + b_2 OTRI + b_3 \ln dis\tan ce_{ij} + b_4 colony_{ij}$$
$$+ b_5 commonlanguage_{ij} + b_6 GDP_i + b_7 GDP_j + \varepsilon_{ij} \qquad (3)$$

where i signifies exporters, and j indexes importers; the study considered ten major Nigerian trade partner in Manufactured goods using WITS-COMTRADE database[1];STRI is the World Bank services trade restrictiveness index in the importer; OTRI is the World Bank overall trade restrictiveness index, as a proxy for tariff and non-tariff measures affecting manufactured goods trade directly; Distance is the geodesic distance between the exporter and the importer; colony is a dummy equal to one if one of the countries in the pair was once a colony of the other; common language is a dummy equal to one if the countries in the pair share a common language (ethnographic basis); GDP is gross domestic product in the importer and the exporter, respectively; and ε is an error term.

Data sources

The sources of data utilized for this study are classified into two based on the models of the analysis: 1) The data used to estimate the regression analyses of models 1 and 2 are obtained from World Bank Enterprise Surveys, 2014. 2) The data sources of the gravity model analysis are: The World Bank's services trade restrictiveness index (STRI). Data on Gross Domestic Product Per Capita, is obtained from the World Development Indicators (WDI) Database. The data on total exports of manufactured goods is from World Bank, World Integrated trade solution (WITS). While, data on Colony, distance and Languages are from CEP II.

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[1] The Nigerian manufactured goods trade partners are: Brazil, Spain, France, India, Netherlands, United Kingdom, South Africa, Italy, Indonesia, United States of America.

Empirical results

Estimation results for the first model are shown in Table 1. This depicts a positive and statistically significant relationship between services productivity and manufacturing productivity at the 1 per cent level. Also, a 10 per cent improvement in services productivity is associated with an increase in manufacturing productivity by 0.06 per cent. The result is consistent with some empirical studies in the literature (Arnold et al., 2011, 2015; Fernandes and Paunov, 2012; Duggan et al., 2013).

Table 1:   The impact of services productivity on manufacturing productivity

The design-weighted least squares (DWLS) regression results

Variable	Coefficient (Prob.)
SERVPROD	0.0591 (0.0000)*
SOLPROP	-0.0158 (0.2267)
PUBLICCOMP	0.0086 (0.6660)
PRIVCOMP	0.0111 (0.4522)
PARTNER	0.0153 (0.2469)
MANEXP	-0.0454 (0.0004)*
EMPLOYEE	-0.9621 (0.0000)*
CAPUTIL	-0.0091 (0.5631)
CAPINT	0.0023 (0.3190)
C	3.4239 (0.0000)*
Observations	2638
Weighted Statistics	
R-squared	0.8664
Adjusted R-squared	0.8659
F-statistic	1892.8210
Prob(F-statistic)	0.0000*
Unweighted Statistics	
R-squared	0.8664
Adjusted R-squared	0.8659

*Note: *, ** and *** denote 1%, 5% and 10% significance levels respectively.*
Source: Author's Estimation

The results of second model are shown in Table 2. The main variable of interest is firm-level labour productivity, instrumented by the local services variables: it has a negative and statistically insignificant coefficient. The inadequate infrastructural facilities and produer services could account for this result that negate the general assumption that, the productivity of local services firms positively affects the productivity of firms in manufacturing, which eventually brings about higher exports of manufactured goods.

Table 2:   The effects of services performance on manufactured exports (firm level)

Logit regression results

Variable	Coefficient (Prob.)
LABPROD	-0.1094 (0.2490)
CAPINT	-0.1053 (0.0002)*
CAPUTIL	-0.9841 (0.0002)*
EMPLOYEE	0.0478 (0.6403)
MANEXP	0.2024 (0.2299)
PARTNER	0.1823 (0.2615)
PRIVCOMP	0.7356 (0.0000)*
PUBLICCOMP	-0.4541 (0.0158)**
SOLPROP	-0.2615 (0.0562)***
C	1.0078 (0.0324)**
McFadden R-squared	0.0301
LR statistic	76.1396
Prob(LR statistic)	0.0000*
Observations	2600

*Note: *, ** and *** denote 1%, 5% and 10% significance levels respectively.*
Source: Author's Estimation

Results for the gravity model appear in Table 3. Column 1 uses an STRI that aggregates (overall) trade restrictions across all sectors and modes. It has a negative and statistically insignificant coefficient.

The columns 2 and 3 of Table 3 use STRIs that still aggregate across all sectors, but cover only GATS mode 1 and mode 3, respectively. It is immediately apparent that although restrictions in both modes of supply are important, mode 3 has a considerably larger coefficient in absolute value. This finding provides some evidence that restrictions to services-related foreign investment might have a larger trade restrictive effect on trade in manufactured goods than restrictions on pure cross-border services trade. Also, the STRIs are negatively correlated with manufactured exports and play an independent (additional) role to merchandise trade barriers as a determinant of export performance.

Inasmuch as an increasing share of global trade in manufactures is organised through supply chains, with inputs being processed and value added by

specialised firms located in different countries that require access to a variety of producer services (including in particular efficient transport, distribution and logistics services), the productivity of such services will be a determinant of the ability of companies to participate in international production (Hoekman, 2014a).

Table 3: The effects of restrictive services trade policies on manufactured goods exports

Gravity model regression results

	(1)	(2)	(3)
Lnostri_1	0.4685(0.1462)		
Lnstri_2		-1.5057** (0.047)	
Lnstri_3			-0.61168(0.0822)
lngdppca_i	0.0740**(0.027)	0.0728(0.156)	0.0673**(0.058)
lngdppca_j	1.2007*(0.001)	2.6355*(0.000)	1.1526*(0.001)
Lang	0.1707(0.611)	-0.19549(0.678)	0.0982(0.779)
Lndist	-0.8385***(0.087)	-1.4486**(0.052)	-0.6916(0.115)
Colony	0.5995***(0.051)	-0.3153(0.610)	0.5262***(0.084)
Constant	-6.6837 (0.102)	-18.9625*(0.003)	-6.0298(0.140)
R^2	**0.2451(24.51%)**	**0.2385(23.85%)**	**0.2406(24.06%)**

Notes:

>   *(1)   Dependent Variable: export in all the categories*

>   *(2)   p-values are in parentheses below the parameter estimates*

*,** and *** signify 1%, 5% and 10% levels of significance respectively

Summary and Conclusion

This study investigates: the impact of services productivity on manufacturing productivity, the effects of services performance on manufactured exports at the firm level, as well as the impact of restrictive services trade policies on manufactured goods exports in Nigeria. After the introductory section, the paper is structured as follows: Section II provides some stylized facts on Nigerian services policies and trade. Section III discusses the review of literature. Sections IV and V showcase the methodology and the empirical results of the paper respectively. Finally, Section VI draws conclusions and outlines possible policy implications.

Though, the services productivity has positive statistically significant impact on manufacturing productivity. But, services performance has insignificant impact on manufactured exports at the firm level. While, the overall restrictive services trade policies have insignificant impact on manufactured goods exports, the mode 2 and mode 3 restrictive services trade policies have negative significant impact on manufactured goods exports in Nigeria.

It is suggested that the governments should consider thoroughly the impact of the prevailing policies and regulation on the efficiency of producer services industries, including measures that restrict the ability of foreign-owned suppliers to provide services. Specifically, the restrictions on establishment through FDI, which in practice continues to be a key channel through which to contest foreign markets and to serve clients.

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