

Determinants of Export Diversification in Nigeria: Any Special Role for Foreign Direct Investment (FDI)?

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Abstract

The importance of export diversification is presently taking a center stage in trade literature. This paper contributed to the evolving literature by examining the extent of export diversification in Nigeria and also analyzed the impact of foreign direct investment on it. Two major methods of export diversification: export count (horizontal) and Herfindahl Index were used. Nigeria's exports flows based on 4-digit SICT product classification were used. The Generalized Moment Methods (GMM) was used to analyze our specified model. Empirical analysis showed that foreign direct investment discourages export diversification in Nigeria, while domestic investment promotes it. Exchange rate and democratic accountability are other factors that discourage export diversification in Nigeria. No evidence was found on the impact of per capita GDP, trade openness and natural resource.

Keywords: Export diversification, Herfindahl Index, Exports Counts

I. Introduction

Before the exploration of Nigeria's crude oil in the 1970s, Nigeria's production and exports of goods were dominated by the agricultural sector. In the three decades following, crude oil did not only become the main source of income, but also account for the highest proportion of exports. The adverse effects of the production and export of crude products has been emphasized in the literature. Export of primary products by the developing countries to the developed nations and import of manufactured products from them makes the developing countries susceptible to cyclical deterioration of terms of trade. The Prebisch-Singer¹ hypothesis states that inter-industry trade widens the income gap between developing and developed nations. This is because the primary products exported by the developing nations experience cyclical deterioration of terms of trade in the international market.

Nigeria, like other developing countries, has been making efforts to diversify her economy to other processing and manufacturing sectors in the recent time. In addition to reducing the dependence on crude products whose prices fluctuates in the international markets, diversification into other sectors, especially those more intensive in technology, is prone to trigger knowledge spillovers from the exposure to international markets, management and marketing practices, and production processes (Bebczuk and Berrettoni, 2005). The role played by foreign direct investment (FDI) in the export performance of developing countries has been analyzed in the literature of international trade. Studies have argued that the impact of FDI on the export performance of host countries varies according to the type (Dunning, 1988) and source of FDI (Kojima, 1973). However, an important aspect of the impact of FDI that has been ignored in the literature is the export-diversifying impact of FDI and export spillovers from FDI. This is part of the gap this paper sought to fill.

FDI may lead to diversification of the host country's exports, both directly and indirectly. It may not enter the traditional export sector, which is defined as the sector consisting of those industries whose share in world exports is high in the host country, but may enter the non-traditional exports sector, which is defined as the sector

¹ Prebisch (1950) and Singer (1950) alleged the long-term deterioration in the (net barter) terms of trade of developing countries.

consisting of those industries whose share in world exports is low. But in the non-traditional export sector, the presence of FDI may lead to higher exports. This is expected, because foreign firms possess certain ownership advantages (e.g., higher levels of technological skills, better marketing skills and international orientation) that make them more capable of exporting than the domestic firms in the same industry.

Indirectly, FDI can lead to diversification of exports through spillover effects, which occur if the presence of FDI in an industry raises the export intensity of the domestic firms in that industry. These spillover effects are expected to be stronger in the non-traditional export sector, because the presence of FDI in this sector may lower the fixed cost of introducing its products in the international market. The domestic firms may also learn from the export behavior of the foreign firms and become aware of foreign markets. Therefore, an increase in the export intensity of the domestic firms in this sector may lead to further diversification of the host country's exports.

This study seeks to examine the impact of foreign direct investment (among other factors) on export diversification drive of Nigeria. Studies are very scanty on export diversification as alluded previously. This paper used two methods of export diversification measures for the purpose of comparison. Section three presents the review of literature, while theoretical framework and methodology are contained in section four. Empirical analysis is made in section five and conclusions are in section six.

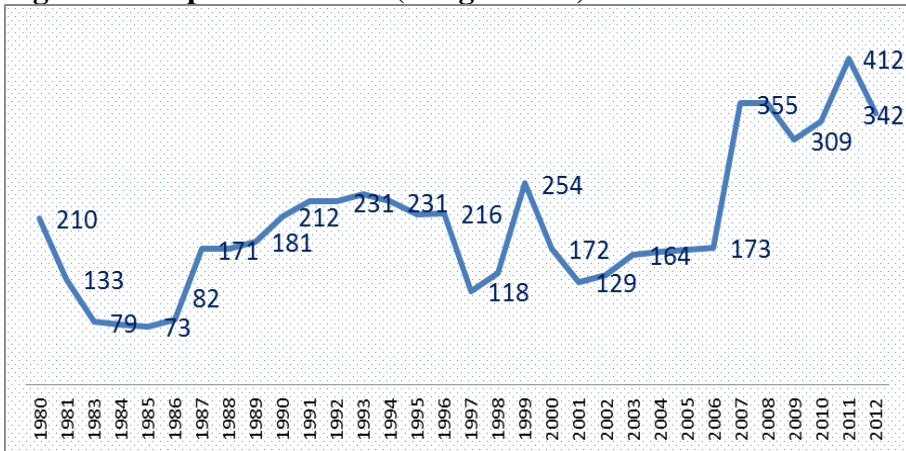
II. Stylized facts on Nigeria's foreign direct income (FDI), exports of goods

A formal definition of export diversification should include both, the broadening of economic export activities and the degree to which each sector contributes to the overall country's export. Two major methods have been employed in the literature for measuring export diversification. They include Horizontal method and the Herfindahl Export Concentration Index method. Taylor (2007) and Matthee and Naudé (2007) define horizontal export diversification as an increase in the number of export sectors. This study used the two methods to measure export diversification for Nigeria.

2.1 Horizontal Method

In order to measure horizontal export diversification, the number of export sectors classified by the Standard International Trade Classification (SITC) at the four-digit level is used. This measure is computed for the period of 1980 to 2012 using the United Nations dataset (COMTRADE). Figure 1 shows the changes in the number of Nigeria export sectors during this period, and it reveals a modest upward trend.

Fig. no. 1: Exports Count in (4-digit SITC)



Between 1965 and the early 1980s there was little change in the number of export sectors, with the number oscillating between 120 and 140. From the mid-1980s onwards, and as a result of the public export promotion policies implemented after the economic crisis in the early 1980s, the number of export sectors increased to a new higher level ranging from 140 to over 160 export sectors. This structural change will be analyzed later in more detail.

2.2 Herfindahl Export Concentration Index Method

We first calculate the Herfindahl index of export shares in the country based on data at SITC 4 digit level. A measure of export concentration, the² Herfindahl Export Concentration Index, is presented

² The Herfindahl index often applied to measure industry concentration. When the index value approaches hundred, it means that a country has a greater reliance on a limited group of exports, while a value closer to zero represents a higher degree of export diversification.

to be contrasted with the two measures of export diversification, and it is computed as follows:

$$H_t = \left\{ \left(\frac{\sqrt{\sum_{i=1}^n \left(\frac{x_{it}}{X_t}\right)^2} - \sqrt{1/n}}{1 - \sqrt{1/n}} \right) * 100 \right\}$$

where:

H_t is the concentration index in year t ,

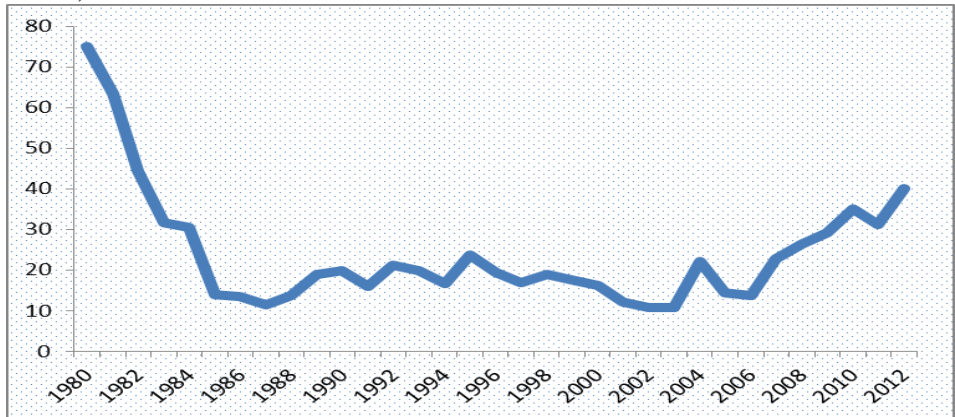
x_{it} is the value of exports from sector i in year t ,

n is number of export sectors, and

$$X_t = \sum_{i=1}^n x_{it}$$

Next, using the index, we calculate the export diversification (ED) index: $ED = (100 - Herfindahl_t)$. The ED index takes the range 0 to 100. The greater the value of ED index, the more diversify the country's export basket is. In other words, export diversification means no reliance on a particular commodity for export.

Fig. no. 2: Computed Nigeria's Exports Diversification (Herfindahl index)



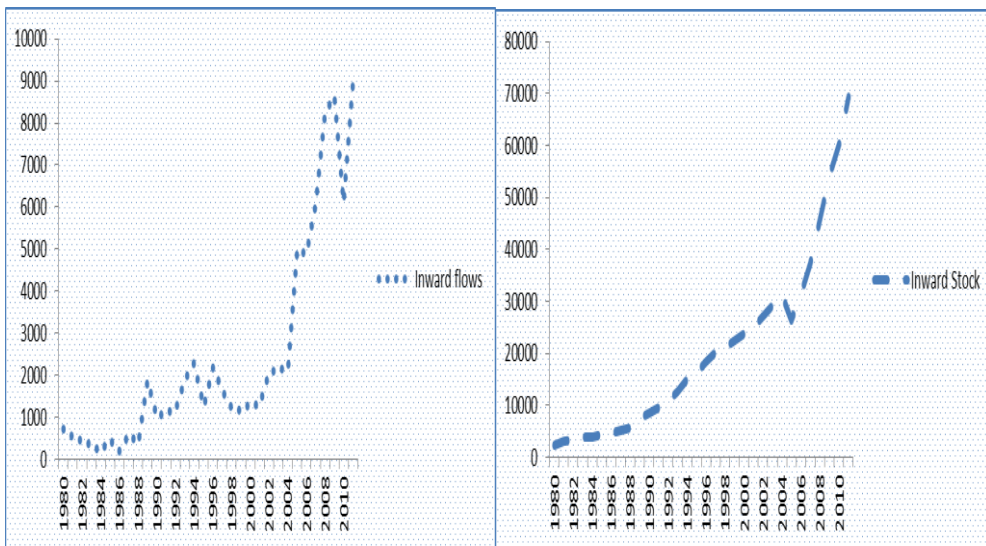
There is consistence in the two methods of export diversification used in this study. The computed Herfindahl index is presented in figure 2. It shows that Nigeria's export diversification was high in the early

1980s, the oil discovery around the period must have accounted for the decline in the extent of export diversification in the country. Export diversification fluctuated between 20% and 30% between the period 1985 and 2005. It remarkable to stress that the country's export diversification has been improving in the six years as it has increased to about 40%.

2.3 Performance of Foreign Direct Investment in Nigeria

Figure 3 depicts Nigeria's inward flows of foreign direct investment between 1980 and 2011. The FDI flow in Nigeria declined between 1980 and 1984, although it increased thereafter, the increase is not sustained as there was another downward trend between 1996 and 1999. It increased from \$189.2 million in 1984 to \$485.6 million in the following year. There was a persistent increase in the country's FDI between 1990 and 2008. Nigeria recorded a very sharp decline in her FDI in 2009; the reason for this is obvious. The World economic meltdown really affected most of the developed countries, which are usually the sources of Nigeria's FDI. A surge was however noted in the country's FDI after the World financial meltdown.

Fig. no. 3: Nigeria's Inward Flows and Stock Foreign Direct Investment (1980-2011)



This section presents literature review on the role FDI plays in promoting export diversification across the World. To start with, Banga (2006) examined the export-diversifying impact of Japanese and US foreign direct investments in the Indian manufacturing. The study confirmed that FDI may lead to export diversification in the host country if it affects the export intensity of industries that have a low share in world exports positively. Indirectly, FDI may encourage export diversification through spillover effects: that is, the presence of FDI in an industry may increase the export intensity of domestic firms.

Tadesse and Shukralla (2011) examined the effect of FDI on horizontal export diversification of 131 countries with the number of products exported by each country. They used parametric (quantile) and semi-parametric econometric methods to quantify the effects. The study concluded that an increase in the stock of FDI improve the horizontal export diversification. Furthermore, they specified that the actual magnitude of the effect varies greatly across countries depending on the existing stock of FDI and stage of diversification, giving rise to an almost inverted U-shaped relationship.

Kamuganga (2012) examined the question: what drives Africa's export diversification? He found that intra-Africa regional trade cooperation enhances the likelihood of an African nation exporting across the new-product, new-market margin. The study also confirmed that infrastructure related trade frictions such as export costs; time to export; procedures to export as well as weak export supporting institutions have a negative effect on African export diversification. Similarly, macroeconomic developments particularly exchange rate volatility, financial underdevelopments and inappropriate foreign direct investments hurt African nation's chances to diversify its exports. Iwamoto and Nabeshima (2012) investigated the impact of FDI inflow and stock on the level of export diversification and sophistication in host country's export baskets. They make use of the dynamic panel data model in their study. They found that the five year lagged FDI inflow has positive correlation with both export diversification and sophistication, and FDI stock contribute positively to export sophistication. Prasanna (2010), using India export sector explores the impact of FDI inflows on the export performance. The study found that the impact of FDI inflows on export diversification is significantly positive.

Ferreira (2009) examined the impact of expansion and diversification of the Costa Rican export supply on economic growth. Export diversification in Costa Rica is characterized by weak linkages between multinational corporations, operating in the free trade zones, and the rest of the economy. Using bounds test for cointegration within a distributed lag (ARDL) framework and a dynamic OLS (DOLS) model, it was gathered that export diversification had no long-run effect on economic growth during the period of study. In a similar study, the export-led growth (ELG) hypothesis was tested using a modified version of the Wald test for three different models for the period of 1960 to 2007 and 1965 to 2006. The ELG hypothesis was confirmed only when imports were included in the estimation. Granger-causality was also found running from imports to exports likely due to large amounts of imported inputs for multinational firms.

Kugler (2006) contributed to the literature about the determinants of exporting behavior of Venezuelan manufacturers. He assessed whether MNC subsidiaries stimulate exports at both, the extensive and intensive margins. The specification allows for export know how diffusion to be both vertical, across sectors via supply chains, and horizontal, within sectors. He also explored the export promotion effect of better input availability induced potentially by both MNC demand and supply. The analysis was conducted using a panel data set constructed for the period 1995 to 2001 from the Annual Venezuelan Manufacturing Survey. The data permitted the estimation of the production function and exploration of the determinants of export behavior in relation to the sectoral distribution of foreign direct investment.

At the regional level, Matthee and Naudé (2007) found that South African regions with more diversified export supplies experienced higher economic growth rates and contributed more to the nation's overall exports. Furthermore, it was horizontal diversification, and not vertical diversification per se, that was associated with higher economic growth. In other words, an increase in the range of products exported had a positive effect on growth.

IV. Theoretical framework and methodology

4.1. Theoretical framework

This paper intends to establish the role of FDI in enhancing export diversification, it is therefore appropriate to start with the underlying theories studying the determinants of exports performance. The theoretical foundations for the empirical studies on exports are among the conventional trade theories based on the Heckscher-Ohlin (H-O) framework, new trade theories, and endogenous growth theories (Liu and Shu, 2003). Based on the H-O theory, a country should export those products that it has comparative advantages in both, production and exports. The new trade theories consider imperfect competition, economies of scale and trade costs, important factors affecting export performance.

Due to the rapid globalization that had led to high flow of investment especially from developed countries to developing countries, Markusen and Venables (1998) incorporated FDI into their general equilibrium trade models. Furthermore, endogenous growth theories have emphasized the role of innovation, and as a result, technological characteristics of an industry are considered as a key factor to export performance (Liu and Shu, 2003). Given that no single theory could by itself account for export performance for developing countries (Liu and Shu, 2003), we construct an empirical model taking into account a number of factors with special attention on FDI.

FDI is an attractive source of economic growth as it can bring additional capital and create new employment, and it is relatively stable compared to other capital flows. In addition, and perhaps more importantly, multinational corporations (MNCs) bring with them the fruits of their R&D, advanced physical equipment, efficient marketing and management know-how, as well as other assets across national borders.

4.2. Model, estimation techniques and data

Based on the theoretical underpin above, this paper specify the model of export diversification as follows:

$$\text{herfin}_t = \text{gdpcap}_t + \text{fdi}_t + \text{di}_t + \text{exr}_t + \text{resendow}_t + \text{open}_t + \text{democa}_t + \varepsilon_t \quad (1)$$

$$\text{exportco}_t = \text{gdpcap}_t + \text{fdi}_t + \text{di}_t + \text{exr}_t + \text{resendow}_t + \text{open}_t + \text{democa}_t + \varepsilon_t \quad (2)$$

where:

The dependent variables are:

herfin: Herfindahl Index (a measure of export concentration).

exportco: the count of exports based on 4-digit SICT product classification

The explanatory variables are:

gdpcap: is the GDP per capita in current U.S. dollars.

fdi: foreign direct investment net inflows as % of GDP. Thanks to spillovers effects FDI can be an engine of export diversification. Thus the sign expected of this variable is negative.

di (domestic investment): approximated by Gross fixed capital formation as % of GDP.

exr (exchange rate): real exchange rate

resendow: this variable measures the natural resource endowments of a country. It is approximated by energy production (Kt of oil equivalent).

open: is the trade openness approximated by the sum of merchandise exports and imports divided by the value of GDP.

democa (democratic accountability): is a proxy of the quality of governance and institution.

The Generalized Moment Methods (GMM) was used to estimate equation (1) and (2). This is with a view of dealing with the potential endogeneity problem of explanatory variables; hence instrumental variables will be used. Moreover tests of endogeneity and validity of instruments are carried out before regressions. Data for this paper was accessed from World Integrated Trade Solution (WITS) Database and World Development Indicator (WDI) 2013.

Empirical analysis

This section presents the estimated results of equations (1) and (2) to analyze the impact of FDI on the extent of export diversification in Nigeria. Two measures of export diversification were used as

dependent variable: Herfindahl index and export counts (horizontal export diversification). GMM estimator was used to examine the impact and the results of which are presented in table 1. The GMM was adopted because of the endogeneity problem that could arise in the estimation of the model (through some of the variables- foreign direct investment and domestic investment).

As regards the test for appropriateness of the instruments used in the estimation for both, the aggregate and sectoral analyses, we considered the J-test and obtained J-Statistics. The null hypothesis for J-Statistical test is that, the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. For the two estimations: Herfindahl index model and export counts model, the results showed that the null hypotheses are accepted.

This implies that our instrument variables are good and valid. In a similar vein, for the goodness of fit, the coefficient of the R-square ranged between 80.4 percent and 78.6 percent, this indicated that the independent variables are adequate to explain the variations in export diversification.

Table no. 1: Estimated Result of the Impact of FDI on Export Diversification (GMM)

Dependent Variable:	Herfin	ExportCo
Variable		
Fdi	-0.188 (1.96)**	-2.830 (-2.96)***
Di	0.525 (2.72)***	1.010 (2.00)**
Gdpcap	1.590 (0.44)	0.016 0.14
Exc	-0.018 (-2.70)***	-0.104 (-2.20)**
Resendow	1.990 (1.43)	0.983 (0.03)
Open	2.2081 (0.19)	3.565 (0.05)
Democa	-0.512 (-3.98)***	-1.061 (-2.89)***

_cons	190.1 (3.11)***	285.0 (3.27)***
Sample	1980-2012	1980-2012
No of observation	32	32
Adj. R²	0.8049	0.7860
F test	101.6***	346.60***
Hansen's J	3.65954 (p = 0.4540)	7.08112 (p = 0.1317)

Source: Authors Analysis

***, **, * represent 1%, 5%, and 10% significance level respectively

Starting with foreign direct investment, it is expected that it promotes export diversification drive of the government of countries. However, this paper found that foreign direct investment has negative but significant impact on export diversification in Nigeria. This result is consistent with Alaya (2012) who obtained negative impact of foreign direct investment on export diversification of MENA countries. For Nigeria, the negative impact of foreign direct investment on export diversification might not be surprising based on the fact that largest proportion of her inward foreign direct investment is in the Oil industry. The expected impact of the foreign direct investment will then worsen the mono-cultural nature of the economy.

Conversely, the impact of domestic investment on Nigeria's export diversification is positive and significant. This implies that domestic investment drives export diversification in Nigeria, while inward foreign direct investment does not. For both models that used different measures of export diversification, the impact of GDP per capita is positive but insignificant. This implies that the level of development in Nigeria does not promote diversification of the country's export. The impact of real exchange rate of Nigeria was found to hurt the export diversification drive of Nigeria. Trade openness has positive but insignificant impact on Nigeria's export diversification. The result is not equally surprising because even if a country opens its trade without increased productive capacity, there will be no effect on export diversification. Finally, the impact of democratic accountability on export diversification is negative but significant. This indicates that despite the democratic experience of the country in the last one and half decade, accountability of the government has not been promoting export diversification.

Summary and conclusion

This paper contributes to the evolving literature by examining the extent of export diversification in Nigeria and to analyze the impact of foreign direct investment on it. Two major methods of export diversification: export count (horizontal) and Herfindahl Index were used. Nigeria's exports flows based on 4-digit SICT product classification were used. Findings showed that Nigeria export diversification declined in the 1980s, remained low till 2000, but has since been improving. The Generalized Moment Methods (GMM) was used to analyze our specified model. Empirical analysis showed that foreign direct investment discourages export diversification in Nigeria while domestic investment promotes it. Exchange rate and democratic accountability are other factors that discourage export diversification in Nigeria.

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