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IMPORT COMPETITION AND NIGERIA'S MANUFACTURING SECTOR: ANALYSES OF THE EMPLOYMENT EFFECTS OF TRADE[1]

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INTRODUCTION

Trade among the countries of the world has assumed tremendous importance and dimensions over time. These have partly been in the context of whether trade should or should not be inhibited by policy as well as in respect of the contribution of trade to economic development. Thus, many countries have altered trade policies to suit particular development objectives. For instance, Nigeria, as a general policy, shifted from protectionism, adopted trade liberalisation policy in the form of import liberalisation and export promotion that became major components of economic structural reforms beginning from 1986.

Prior to this period, import substitution industrialisation strategy (ISIS) constituted the dominant trade policy. It resulted from the concerns over the sustainability of import bills, and the desire for Nigeria to become an exporter, if not net, of industrial goods in the long term, in addition to being a net exporter of traditional primary products such as cocoa, palm oil, beniseed, rubber and groundnut. In effect, infant manufacturing industries were protected under high tariffs, import quotas and restrictions through import licensing and non-tariff barriers (NTBs) to encourage industrial growth. For instance, by 1983, due to the non-abatement of chronic balance of payments problems, the number of goods which required import licenses of various categories were increased from about 235 items in 1982 to 387. In addition, industrial raw materials and many other goods were brought under Specific Import License (SIL) from Open General License (OGL).

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The oil boom of the early 1970s changed the structure of Nigeria's external trade by altering significantly the import and export shares of manufactures and primary commodities as a proportion of total trade. This is in addition to prompting the Dutch disease syndrome that manifested in the neglect of traditional agricultural goods production and in the shift of agricultural human capacity. In effect, large quantity of labour shifted from the agricultural sector into the informal and the manufacturing sectors. At this time, the alteration in the trade structure did not appear to prompt employment problems, as displaced labour seemed easily absorbed in these other booming sectors.

Import liberalisation became the policy focus in 1986 despite the balance of payments problems at the time. Overall deficit position of $0.24 billion in 1986 increased to a value of $3.32 billion in 1992 while total imports rose from $1.78 billion in 1986 to $7.28 billion in 1992. Import liberalisation policy was nevertheless adopted due to the conviction that high levels of import restriction fuelled economic stagnation and fostered inefficiency in resource allocation and utilisation. The elements of the policy include the abolition of the import licensing system, reduction of the number of banned goods and those under SIL, as well as the establishment of the Customs and Excise, Tariffs (Consolidated) Decree (in operation between January 1, 1988 to December 31, 1994). Almost simultaneously, the Export Processing Zones (EPZ) were established through Decree 31 of 1991 and an implementation authority, Nigerian Export Processing Zone Authority (NEPZA) put in place.

These mutually reinforcing policies assume that surplus labour displaced by import liberalisation would be absorbed in growing export-oriented firms. In addition, they assumed away the competitiveness of domestic final products despite that industrial firms operate under the influence of rising cost of imported inputs resulting from naira depreciation, high cost of infrastructural provision (for example, private industrial electricity), and financial liberalisation-induced high cost of capital. In principle, the increasing imported capital costs induced by exchange rate depreciation policy was expected to enhance resource reallocation in favour of labour intensive industrial production. However, apart from the slow pace of adjustment of export-based firms to export promotion policies and incentives, also due to similar environmental constraints on import competing firms, domestic final products appeared to have lost competitiveness relative to their imported counterparts. This has impinged on the realisation of resource reallocation towards labour intensity.

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One reason that can be attributed to this development is the gradual removal of the hitherto imposed tariffs on the border prices of imported final goods, which thus rendered these goods more competitive. Second, hitherto protected firms that appeared to have created and sustained employment growth were those which had scale economies and earned a level of profit which increased competition would wipe off (Rodrik, 1992). Third, the rate of substitution of labour for capital seems to be low, given that capital investment often has the characteristics of lumpiness and irreversibility or sunk costs (Pindyck, 1991) thus elongating the time horizon of this possibility. In addition, the response of domestic firms (old and new) to competition may be to reduce the use of labour in the production process in order to remain technologically relevant. Decreasing capacity utilisation in the sector particularly in the face of rising competitive imports of light consumer goods implies that manufacturing labour is increasingly depleted. Capacity utilisation rate fell from over 60 per cent in 1983 to an average of 40 per cent between 1986 and 1992 (CBN, 1994). In principle, import liberalisation should not endanger domestic manufacturing and employment. But it will engender the use of labour-saving production techniques if domestic firms respond to competition by exploiting the greater access to foreign technology.

In effect, this study seeks answers to the following questions: Is import liberalisation consistent with employment generation and expansion in the manufacturing sector? What constitutes the employment implication of firms' response to import liberalisation? Is manufacturing labour more productive sequel to liberalised trade? These questions become germane for two reasons. One, trade theories emphasise adequately competitive productive capacity for any economy to trade, and two, policy makers in developing countries need to understand the resource endowment and utilisation in their countries, given the other determinants, as important requirement to gainful trade.

This study aims to provide an evaluation of the implications of trade on resource use in the manufacturing sector. Specifically, it seeks to describe the Nigerian labour market with particular reference to the manufacturing sector; review trade policies and how these relate to manufacturing activities; and investigate the effects of import competition on manufacturing employment. The rest of the study is therefore structured as follows. Section 2 reviews trade policy episodes in Nigeria, the structure and features of the Nigerian labour market and the modalities of wage rate determination over time. Section 3 provides a review of the relevant literature, which includes views on the labour market, wage rate determination, and the nexus of trade and employment. Section 4 presents the theoretical framework and the

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empirical model, including the scope, data requirements and sources, and variables measurement. In section 5, the empirical findings are discussed. Finally, section 6 concludes.

TRADE POLICIES AND THE NIGERIAN LABOUR MARKET

Nigeria's trade policy stance since the 1960s was characterised by both tariff and non-tariff trade restrictions. Trade barriers such as import quotas, licenses (both OGL and SIL), exchange control, supervisions, restrictions, prohibitions, direct importation and outright bans constitute the non-tariff, while tariff barriers are in form of import duties and excise duties. The objectives of Nigeria's trade regimes have been to discourage dumping, support the import substitution industrialisation strategy (SIS) of the early 1960s, control adverse movement in the balance of payments (BOP), conserve foreign exchange resources and generate revenue for the government.

Nigeria's trade regime in the 1960-69 period was aimed at supporting the ISIS of the time, and can be described as highly restrictive due to the coverage of items the importation of which were either totally banned, restricted, or attracting high import duties. The high tariffs had to be lowered by the end of the civil war and quantitative restrictions on the importation of spare parts, agricultural equipment and machinery were removed. The liberal regime lasted till 1976 after which, in 1977, a wide range of imported finished goods were either put under import licensing requirements or duties on them raised or outright banned. This restrictive import policy was reinforced between 1978 and 1980, essentially to combat the BOP problems that emerged in the period. In effect, increases in duties of a wide range of commodities were applied and 82 items were banned while 25 were placed under import licenses in 1979.

The BOP reached a surplus of N2,406.2 million in 1980, but subsequent high level of importation led to a worsening of the BOP at the end of 1981 which induced the promulgation of the Economic Stabilisation (Emergency Provision) Act in April 1982. The tariff increases were strengthened between 1983 and 1985, by placing 152 items under SIL, and promulgating foreign exchange laws. The Structural Adjustment Programme (SAP) adopted in 1986 informed the reduction of banned items from 74 to 16, the abolition of export duties and the 30 per cent import levy introduced in January of that year. Deregulation of the exchange rate through the Second Tier Foreign Exchange Market (SFEM) was also introduced. The abrogated consolidated import levy was reintroduced in form of 6.02 per cent import

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surcharge in 1987, with advance payment of import duty reduced to 25 per cent from 100 per cent.

In 1988, a comprehensive tariff structure (designed to last for seven years) was adopted to protect local industries. This has been said to imply a return to ISIS (Ajakaiye and Soyibo, 1995) as the effective rate of protection which had fallen from 33 per cent to 23 per cent in 1986 rose to 28 per cent in 1988. In effect, though the rate of protection were below pre-1986 level, non-essential goods were prohibited, anti-dumping tariffs were introduced. Duties were regularly reduced on imported raw materials and spare parts during 1988-93 through regular modification of the Customs, Excise Tariff etc (Miscellaneous Provision) Decree of 1988 and its revised versions No.13 and 25 of 1992 especially on CKD components and spare parts for commercial vehicles, cement, inputs used in cement manufacturing and fully built up units of commercial vehicles. These measures were retained throughout 1996. Apart from the exchange rate policy "shock" in March 1992 and the exchange rate deregulation reversal in 1994[1], there has been a departure from fixed exchange rate regime to a managed float regime.

From the foregoing policy exposition, Nigeria's trade regime can be classified broadly into two: import substitution, and import and export liberalisation[2]. However, considerable overlap exists in the conduct of either of these regimes as policy swings to correct BOP problems and to achieve other objectives such as revenue generation, protection of local industries, and lowering of inflation. Therefore, notable episodes of trade liberalisation using, the trend in import-GDP ratio, a measure of trade intensity depicted in Figure 3a, are 1969-71, 1974-78, 1979-81, 1984-1987, and 1989-1993. These episodes are confirmed by the trend of the import penetration ratios[3] for Nigeria. A conventional preliminary evaluation of the trade-employment linkage is conducted by correlating the import penetration ratios with the share of manufacturing in GDP. The correlation analysis result is shown on Table 1 while their trends are provided in Figure 2, which shows that import penetration is inversely related to manufacturing share of GDP, thus pointing up the former as a possible explanation of manufacturing employment.

Also, the trend of the relative prices, an incidence measure of trade liberalisation (Figure 3b) shows that a rising competitiveness of domestically manufactured goods, suggesting that despite liberalisation, a measure of domestic protection is enjoyed by local manufacturers such that employment is expected to rise. Further, Figure 1 indicates that rising employment corresponds with the era of ISIS while falling manufacturing employment was pronounced in the trade liberalisation period.

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Figure 1: Employment per Manufacturing Firm

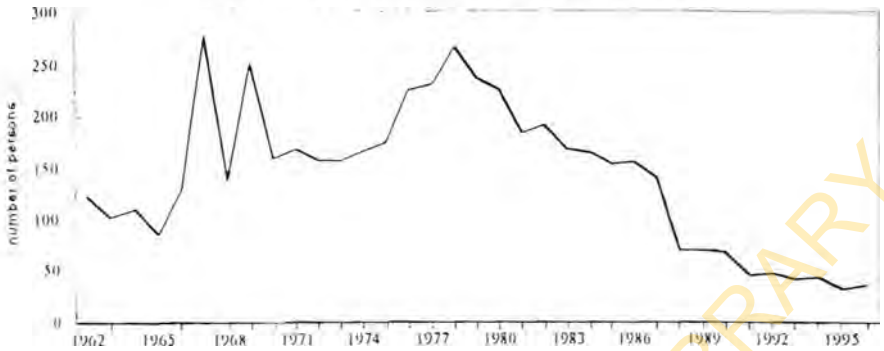

Table 1: Correlation Matrix: Import Penetration and Share of Manufacturing in GDP

1960-1985	0.4112
1986-1996	-0.7561
1960-1996	-0.1902

The Nigerian Labour Market: Structure and Features

The Nigerian labour market is a composite one as it is made up of a multitude of labour markets which approximates the "institutional market" model wherein the policies of unions, employers and government are substituted for the traditional action of the market forces as the significant source of wage movements (Okoroafor, 1990:59). The wage level is a consequence of policy (of unions, employer groups and consumers) rather than market forces. In addition, the Nigerian labour market is market-specific (by region), highly immobile and political (Ikpeze, 1996:159; Okigbo, 1991). These suggest that wages cannot adjust, as predicted by the classical competitive market model, to equate supply and demand. For reasons of conceptual and definitional problems as well as difficulties in data collection, it has not been possible to obtain an accurate size of the Nigerian labour force (Fapohunda, 1979). Rough estimates are derived from the 1963 population census and 1976 labour force sample survey which show that 57.7 per cent (18.3million) and 62.3 per cent (aged 15-55 years) of the population respectively were economically active (Okoroafor, 1990).

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One outstanding characteristic of the employment situation in Nigeria is the disproportionate share of employment that is accounted for by wage/salary earners. The majority of the employed persons are self-paid (own-account workers) while unpaid household workers also account for a relatively significant group. Most of the self-paid workers are in the agricultural sector (comprising forestry, fishing and natural crop production) which provides more employment than any other sector of the economy. Over the years, the proportion of labour in agriculture has been falling due to increasing level of rural-urban migration of young and active labour. Manufacturing employment registered some downward trend due to the declining profits of firms, a result of the serious balance of payments problems confronting the country beginning from late 1981. The mining industry (largest foreign exchange earner and biggest source of Federal Government revenue), is very capital intensive and so its labour absorptive capacity is limited.

Wage Determination in Nigeria

Wages can be determined by the process of collective bargaining, regulated by custom and decree, or be fixed by fluctuating labour market forces (Fapohunda, 1979). In Nigeria, modern sector wages are regulated by the administrative decisions of government via Wage Commissions and prices and incomes policies while the traditional (rural and informal) and intermediate sector wages are influenced to a great extent by market forces and to a lesser extent by wage levels in government establishments.

The use of wage commissions in Nigeria to determine wage levels is a colonial legacy. The colonial government encouraged collective bargaining with minimal government interventions and recognised trade unions as a legal institution but failed to require employers to recognise or bargain collectively with unions (Trade Union Ordinance, 1938). Nonetheless, the three unions in operation prior to 1938 -the Nigerian Civil Service Union, the Nigerian Union of Teachers and the Railway Workers' Union-- rose to about eighty-five in 1953 with a total membership of over 27,000.

The concept of minimum wages in Nigeria can be traced to the Wages Board Act of 1955 whose underlying philosophy was the colonial government's official policy of collective bargaining. By 1964 the Nigerian government had set minimum wages on nine occasions for trades and occupation in Lagos, Jos minefield and the Benin rubber industry. Despite the emphasis of official labour policy on collective bargaining, actions of colonial government relating to labour side-stepped this policy, setting up instead ad hoc commissions to consider bonuses or wage revisions during periods of labour discontent. These

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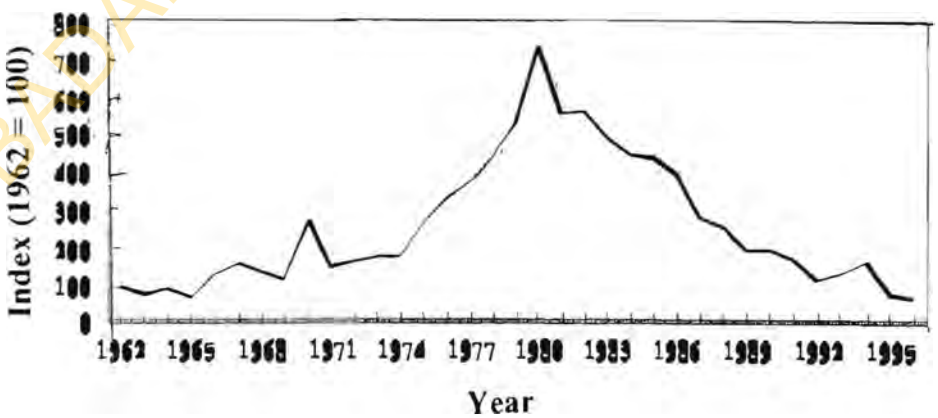
commissions gradually acquired an institutional character (Fapohunda, 1979) and had totalled ten by 1982.

Apart from these wage commissions which utilised changes in cost of living index for granting sizable wage increases, private sector unions use public sector awards as the basis for wage negotiation. A Productivity, Income and Wages Analysis Agency was established as a permanent institution to collect and analyse statistics on wages, income and price changes in both the private and public sectors in 1977. Wage freezes by the government also characterised Nigeria's labour market leading to frequent strikes, paltry increases in the minimum wage and fringe benefits. A redefinition in 1991 of the national minimum wage to embrace total emolument and the jettisoning of the universal applicability of minimum wage to all public agencies which was replaced with their ability to pay implies that public enterprises now attract different wage payments.

The trend in real manufacturing wages in Nigeria suggests a combined influence of trade union activities, government intervention and employers' perception of the wage-productivity link. The trend of real manufacturing wage per worker shows slight variability over time whether it is on the rise, or falling (Figure 2). It peaked in 1980, at the height of the oil boom, fell continuously from 1981 when Nigeria's severe balance of payments and subsequent macroeconomic problems became apparent, and assumed a more pronounced downward trend from 1986 to a record low level in 1996.

Fig. 2: Trend of Average Real Wages Per Manufacturing Firm



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LITERATURE REVIEW

Trade and the Labour Market

Two polarised opinions exist in the literature regarding the structure of labour markets, especially in less developing economies (LDCs) implementing structural reforms, and real and or money wages of manufacturing workers. One is the belief that labour markets, (that is, supply, employment and wages), in LDCs are highly inflexible (Bhattacherjee and Chaudhuri, 1994). The other, empirically motivated, maintains that there is considerable real wage flexibility, sectoral labour reallocations, and subtle trade union effects (Horton *et al*, 1991). The union effect is explained by the nature of industrial relations structure (whether there exists substantial government intervention and control in the wage negotiation process) and the nature of unionism whereby unions distinguish between issues of "right" and "interest". The implication is that the wage function includes union activity and strength variables in addition to money wages, prices, and labour productivity.

The efficiency wage models (nutritional, shirking, turnover, sociological and adverse selection[4] models {see for example, Calvo, 1979; Stiglitz, 1974; Salop, 1979; Akerloff, 1982; Weiss, 1980}) explain that persistent real wage rigidity in the presence of involuntary unemployment is due to firms' endogenisation of the wage rate such that firms will choose a profit maximising wage, not the wage equated to a worker's marginal product. That is, a wage that minimises the average cost of an efficiency unit of labour rather than the physical unit. Thus, important factors analysed in the literature as affecting labour market (in)flexibility or (non-) rigidity include the nature of formal mechanisms of wage indexation such as minimum wage laws, labour market institutions, wage behaviour of the public sector, and the strength, structure and activities of labour unions (or the structure of industrial relations) which could be centralised or plant - specific affiliated unions.

Essentially, economies pursuing the IS policy appear relatively more closed and the net effect of all the controls put in place provides an indication of the degree of protection. Trade liberalisation is therefore a policy that facilitates the reduction of tariffs, tariffication of NTBs, and a reduction in the number of goods under restrictions which can be captured by such trade liberalisation variables as the nominal and effective rates of protection, share of imports in total domestic demand, coverage of import licenses and official reference prices (as a share of domestic production), and average nominal tariffs (Weiss, 1992).

Trade liberalisation and devaluation with exchange rate unification are vital elements targeted at outward orientation and to ensure availability of

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competitive imports. In effect, classical advocates of free trade (for example, Ricardo, 1817; Viner, 1952; and Haberler, 1959) consider, in the main, availability of cheap imported consumer goods as well as high wages in export firms as vital trade gains. Indeed, lessons of successful outward orientation have been documented (Balassa, 1989; Bruton 1989; Romer, 1989; Pack, 1988; Baumol *et al*, 1989, Norman, 1990; Edwards, 1991, Adenikinju and Chete, 1996). These studies emphasised potential gains and the growth in total factor productivity resulting from trade.

Positive aggregate growth effects may, however, coexist with adverse conditions within sectors, particularly in industrial production, which may indicate dissimilar trends. Rodrik (1992), indeed analysed that import expansion can lead to the output of hitherto protected sectors, especially manufacturing, getting compressed through the effects of volume of trade, excess profits, scale efficiency and technical efficiency. This happens because it is the protected sectors which often have excess profits and unexplored scale economies. If these sectors are squeezed through import expansion it will lead to welfare losses. In addition, since protection allows domestic prices rather than domestic marginal costs to rise higher than world prices, the scale efficiency consequences of liberalisation may be quite ambiguous.

The technical efficiency effects may also be indeterminate, because as trade protection can enhance or impede technological efforts so can trade liberalisation (Rodrik, 1988b; 1992). Indeed, the loss in market share of import competing firms implies that the marginal benefit of technological effort, equivalent to lower unit production costs, will fall. Empirically, Rodrik (1991a) found that scale and technical efficiency deteriorated in many Chilean industries between 1967 and 1979 due to drastic trade reform. Under the assumption of perfect competition, Dotsie *et al* (1996), found that industry, which is the protected sector in the adopted computable general equilibrium framework (CGEM) contracts, following a reduction in taxes on imports.

The investigation of the specific effects of trade on manufacturing employment commenced with Leontief's (1954, 1956) pioneering work on the United States which investigated the sectoral skill coefficients embedded in trade. Other researchers have analysed same for their countries (Keesing, 1966; Hong, 1974; Baldwin, 1976; Syrquin and Urata, 1986; de Grauwe *et al*, 1979; and Ohno, 1988). The contribution of changes in the degree of import competition to employment changes in an industry has also been analysed, using accounting-identity technique, by Cable (1977), Frank (1977), Krueger (1980), and Wolter (1977).

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These authors relate the growth rates of the inverse of domestic share of manufacturing or import penetration ratio, labour productivity and consumption, to the growth rate of labour and conclude that growing import competition has not been an important factor explaining sluggish or even negative sectoral employment growth. This result was criticised based on the fact that import competition may have led to increased labour productivity, involve lags, and induce reduction in an industry's output price (Grossman, 1982a). Indeed, despite that estimates of job losses resulting from trade is small in studies such as Baldwin (1980), or that net employment change was zero in Deardoff and Stern (1979), employment in several industries[5] has been found to decrease from a significant multilateral tariff cut (Jones and Kenen, 1984).

Deardorff and Staiger (1988); Borjas, *et. al.* (1992); Sachs and Shatz (1994); Revanga (1992, 1997); Lawrence and Slaughter (1993); and Wood (1991a, 1991b) constitute recent studies that indicate renewed interests in the issue. These studies are based on factor content and price effect analyses with the conclusion that increased import penetration reduced manufacturing employment or wages.

The factor content of trade approach views the net effect of trade as the difference between the labour requirements that are used in the production of exports and those that would have been utilised to produce domestically some goods but which are imported. Though theoretically sound, the approach is limited in application due to large data requirements, definition and scope of sectors to include, and the use of input-output tables which may not be standardised. Wood (1995), however argues that standard factor content analysis understates the effects of trade on employment due to the fact that LDCs export different and non-competing goods within sectors. Also, that trade induces large labour-saving technological change, which is defensive in nature, in the sense that it imposes the need for domestic firms to adopt capital or skill intensive technology, in low-skill industries which further reduces the demand for less-skilled labour. This labour-saving technological change also spills over to the non-traded sectors where most non-skilled workers are employed. Considering these issues, he found that the trade with LDCs accounted for the entire rise in wage inequality in the US (and all of the unemployment in Europe). This implies that trade accounts for 100 per cent of unemployment in the manufacturing sector of these countries.

Revanga (1992) improved on the measurement methods of trade effect on manufacturing employment by considering other factors responsible for imports and domestic conditions such as increased wages, technology, domestic labour market forces and macroeconomic expansion by using exchange rates

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as the factor causing trade flows. The author concludes that trade induced unemployment is not markedly different from when trade is treated exogenously, that is, unemployment increases with rising import penetration. Similar results were obtained, though not of the same degree, by Grossman (1982a).

In Nigeria, much of the studies have concentrated on the trade-growth nexus, and have confirmed the positive linkage between the two, especially the export component of trade (Hensley, 1971; Fajana, 1979; Oyejide, 1986; Egwaikhide, 1989; Ekpo and Egwaikhide, 1994 and Ekpo, 1995). Though these studies have demonstrated a positive relationship between trade and growth most appear to have done so on an aggregative basis in the context of lumping trade variables to include both oil and non-oil sectors. With the overwhelming impact of the proportion of oil exports on total exports the result that trade, especially the export component, leads to growth need not be over-emphasised. In Nigeria, studies are required on the trade effects of employment to:

(i) provide insights into how the welfare losses of displaced labour can be minimised, as well as draw attention to the fact that the reallocative effects of trade between labour and capital require assistance from government, especially regarding the time horizon of adjustments to these effects; and

(ii) properly manage its increasing trade links with Europe, North America and the newly industrialising economies (NICs). These become necessary in the absence of *a priori* expectation regarding the transitory unemployment which trade flows may create (Wood, 1991).

The approaches through which trade liberalisation episodes can be identified and measured have been classified by Collier *et al* (1994) into three: policy account and or incidence measures, changes in relative prices, and changes in quantity. The policy aspect of the first approach involves the non-computational exposition of temporal changes in trade policy while the incidence measures utilise measures of non-tariff barriers as a proportion of Standard International Trade Classification (SITC) line items. Indication of changes in relative prices are obtained by computing such measures as the implicit tariff index, ratio of domestic to world terms of trade and the parallel market premium. Trade intensity measures, changes in factor use and import counterfactuals provide an indication of changes in quantity or volume of trade. According to Ajakaiye and Soyibo (1995), none of these trade liberalisation indicators is perfect and the calculation and use of all of them may not be mutually reinforcing. Therefore, the choice of any one indicator will be

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determined by availability of data, feasibility and relevance to a particular economy.

THEORETICAL FRAMEWORK

Model of Firm's Demand for Labour in Nigeria's Manufacturing Sector

To model the foregoing characteristics of Nigeria's manufacturing sector, we assume a Cobb-Douglas production function, similar to Currie and Harisson (1997) and Borkakoti (1994) which has labour, capital, and intermediate inputs[6] as factors.

$$Q = AL^{\alpha}K^{\beta}I^{\theta} \quad (1)$$

where, $A = A_o e^{\sigma}$; $\sigma = \sigma_o + \sigma_1 T$;

therefore, $A = A_o e^{(\sigma_o + \sigma_1 T)}$ (1b)

The firm's maximisation problem is thus:

$$\text{Max } \Pi = \Pi(Q, P, w, r, c)$$

Subject to:

$$TC = wL + rK + cI$$

Thus, $\Pi = P(Q)Q - TC$ (2)

$$\Pi = P(Q)Q - wL - rK - cI \quad (3)$$

where:

Π is profit function, TC is total cost, Q is gross output, A is efficiency parameter, P is price of output, w is wage rate, c is price of intermediate input, r is rental price of capital, L is labour input, K is capital input, I is intermediate input, σ is technological change parameter, β, α, and θ are scale parameters. β, α, and θ are each less than 1 but their sum may exceed one to characterise increasing returns to scale[7]. To ensure that the firm's total cost is less than total revenue, we impose the following critical limits on the sum of α, β and θ: $\alpha+\beta+\theta < \eta/(\eta-1)$. Given that $\eta = f(\xi)$[8] and $f'(\xi) > 0$, thus $\eta/(\eta-1)$ approaches 1 as n approaches infinity. This implies that as competition becomes intensified,

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imperfection gradually disappears and the sum of the factors' shares tends towards unity

Combining the first order conditions of profit maximisation[9] of equation 3 with a specification of the firm's demand curve[10] $Q = a(\xi)P^{\eta(\xi)}$; $\partial Q/\partial \xi<0$, $\partial \eta/\partial \xi>0$ where ξ is the level of competition (Oum and Zhang, 1995), and the firm's wage equation $W = (w^u)^t(w^A)^{(1-t)}$, we obtain equation (5) as the estimable equation for each sector of Nigeria's manufacturing[11] as

$$\log L_{it} = \phi_0 + \phi_1 \log w^A_{it} + \phi_2 \log w^u_{it} + \phi_3 \log a(\xi)_{it} + \phi_4 \log Q^*_{it} + \phi_5 T_{it} + \phi_6 \log r_{it} + \phi_7 \log c_{it} + \mu_{it} \quad (5)$$

Expected Results

The theoretical expectation is that labour demand is positively related to capital cost, and negatively related to both own and alternative wages, and intermediate input cost. The intermediate input costs embed aspects of trade policy through tariff and exchange rate policy on raw material imports, which constitute major proportion of intermediate inputs. Thus, the domestic price of intermediate input will alter if its foreign price remains constant while there is variation in the exchange rate and tariff level. The coefficients of the fourth and fifth terms on the right hand side of equation (5) explicitly measure the impact of foreign competition on employment. Labour demand is expected to fall as the demand for the product of the domestic firm falls due to rising competition. We adopt the nominal rate of protection (NRP)[12] as the empirical measure of foreign competition. The coefficient of the NRP is theoretically expected to be positive. As the NRP decreases, domestic firms are exposed to more foreign competition, and if they lose market share, output falls and employment also falls. The sign of the coefficient of T is ambiguous, depending on the nature of the technological progress; it may be capital-saving or labour-saving. T is measured as total factor productivity (TFP) growth traceable to sectoral openness, where openness, is defined as sectoral (export + import)/gross domestic manufacturing product.

Equation 5 is estimated through the OLS technique subsequent on the evaluation of the time series characteristics of variables and equations. This methodology implied the use of Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF) tests to evaluate whether variables possess unit roots. The Engle-Granger (EG) two step procedure for testing for cointegration is used to assess the existence of long run relationships between variables. Part of the rationale for the choice of the EG method of testing for cointegration is its suitability for single equations. Each of the subsectors of the Nigerian

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manufacturing sector is here treated independently of the other as each faces different degree of protection. The other part of the rationale is that, according to Gonzalo and Lee (1998), the EG is more robust than the Johansen LR tests due to the fact that mis-specifications of the long memory components of variables affect their correlation structure more than their variances. In statistics and econometrics in general, and particularly in cointegration analysis, it is observed that most methods are based on the minimisation of certain variances or the maximisation of certain correlations. The EG method is a variant of the former while Johansen's is encapsulated in the latter. Thus, in cases which Gonzalo and Lee (1988) investigated, they attributed the superiority of the EG method to the Johansen LR tests to this reason.

Data were obtained from the Central Bank of Nigeria (CBN) and Federal Office of Statistics (FOS). Manufacturing industry data were sourced from the survey of manufacturing industries conducted by FOS for 1962 to 1996, the period of the study. For sectoral analysis, the manufacturing sector is divided into nine broad subsectors using the SITC code, applying concordance mechanism provided by Trade Analysis and Information System (TRAINS) software. These subsectors are Food, Beverages and Tobacco; Textiles, Wearing Apparels and Leather industries; Wood and Wood Products; Paper and Paper Products; Chemicals, Petroleum and Rubber; Non-metallic Mineral Products; Metal, Machinery and Equipment; Electrical Products; and other manufacturing firms. SITC Revision 1 codes were mapped into ISIC Revision 2 to conform trade data to industrial classification data.

Measures of relevant variables are as follows: manufacturing employment is the average number of persons employed per manufacturing firm in subsector i such as the Food, Beverages and Tobacco subsector; Q^*_{it} is measured as the average actual output per firm in subsector i assumed equal to its demand, r_{it} is the average rental cost of capital (which includes profits)[13] and measured as value-added minus compensation to labour; C_{it} is calculated as the average cost of intermediate inputs; w^u_{it} is the average wage paid per firm in subsector i, and w^A_{it} is alternative wage available to firm i's employees. This is calculated for subsector i as the average wage paid to employees in other subsectors than the one under consideration. TFP_t is measured as the residual of subsector i's production function while T is obtained by regressing this residual on factors affecting it, which include among others, the openness variable.

We then scale the predicted TFP series with the coefficient of the openness variable, to obtain a series of the proportion of TFP traceable to trade liberalisation. Capital stock in the production function was generated using the perpetual inventory method (Adenikinju and Chete, 1996) but

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using original book value of fixed assets of sampled firms available periodically from 1964. Total subsector data for a particular year are divided by the number of respondent firms to obtain their average values. The implicit price deflator for the manufacturing sector is used to deflate all variables to obtain their real values[14]. Data for 1979, 1986 and 1987 are not available and are obtained by averaging the data of the border years.

EMPIRICAL FINDINGS

The DF and the ADF tests to evaluate whether variables possess unit roots indicate that very few of the variables are stationary at their levels. Most of the firm level data are stationary at their first and second differences. Cointegration tests were applied to the employment equations of the nine identified manufacturing subsectors as well as to total manufacturing sector's employment equation. The residuals of each static long run employment equation were then tested for unit roots. Only the residual of the employment equations of "other manufacturing" sector was explicitly stationary at its level. For the other subsectors, the test was inconclusive as shown in Table 2. This implies, therefore, that the equations of other subsectors should be modelled either as over-parameterised autoregressive distributed lag (ADL) or in their differenced form. The latter option is applied to aid comparison with the equation that has cointegrating relationship which is, by definition, modelled in differenced form but including the error-correction term to tie the impact to the long run proportionality between dependent and independent variables. However, due to the inconclusive evidence regarding cointegration in other subsectors, error-correction terms are included in some of the equations to improve the robustness of the results. Indeed the error-correction variables are significant and have the negative sign where they are included.

Table 3 shows the result of the static long run employment equations for the subsectors of Nigerian manufacturing. Interpreting this Table along the rows, the coefficient of real cost of capital variable has the right positive sign for three of the subsectors, namely; Wood and Wood products, Paper and Paper Products, and Metal Products, though not significant in the last two. The negative sign for this variable's coefficient in the other six subsectors implies that capital input is complementary to labour input; and this complementarity appears very strong in such sectors as Food, Beverage and Tobacco Products, Non-metal Mineral Products, and Electrical Products. For the whole manufacturing sector, the coefficient has a negative sign but it is statistically insignificant.

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Table 2: Unit Root Tests on Long Run Static Employment Equations

	DF	ADF	Optimal Lag	Critical Values
FBTECM	-3.90	-2.54	3	-2.96
TXLECM	-4.48	-1.36	5	-2.97
WWPECM	-5.45	-2.57	2	-2.96
PAPECM	-4.28	-1.66	5	-2.97
CRPECM	-3.13	-1.88	2	-2.96
NMETECM	-3.95	-1.56	4	-2.96
METECM	-5.53	-1.97	1	-2.96
ETEECM	-6.22	-2.31	2	-2.97
OMECM	-5.05	-2.56	2	-2.96
TFMECM	-1.68	-0.69	5	-2.97

Note: ECM =Error Correction Mechanism

The output or demand elasticity of employment has the right positive sign in Food, Beverage and Tobacco, Chemical and Rubber Products, and Electrical Products subsectors. However, it is statistically significant in the first of the three sectors. Among the sectors in which the coefficient has the wrong sign but is statistically significant are Wood and Wood Products and Non-metal Mineral Products. The coefficient is also wrongly signed in the Total Manufacturing sector, and is again not statistically significant.

The impact of intermediate cost is negative, thus having the right sign, in four of the subsectors which are Food, Beverage and Tobacco Products, Chemical and Rubber Products, Wood and Wood Products, and Other Manufacturing products as well as in the Total Manufacturing sector. It is statistically significant in only Wood and Wood Products subsector. The coefficient is wrongly signed in the other subsectors but is significant in Metal, and Textiles and Leather Products subsectors.

The negative sign of the coefficient of the technological change (TFPG) variable in such subsectors as Food, Beverages and Tobacco, Chemical and Rubber Products, Other Manufacturing, and Textiles and Leather, suggests that technological progress in these subsectors is labour-saving. The coefficient is both positive and statistically significant in Non-Metal Mineral Products and Wood and Wood Products indicating a capital-saving technological progress.

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Table 3: Static Long run Employment Equations

Sector Independent Variables	Food, Beverage & Tobacco.	Textile & Leather Pdcts.	Wood &Wood Pdcts.	Paper & Paper Pdcts.	Chemical & Rubber Pdcts	N0n-Metal Mineral Pdcts.	Metal Pdcts.	Electrical Pdcts.	Other Manufac turing Pdcts.	Total Manufact uring
C	-1.65	0.60	-1.56	-3.04	-1.58	5.49	1.28	-1.93	-1.01	1.28
	(-1.28)	(0.56)	(-2.07)*	(-0.69)	(-1.96)**	(4.74)*	(0.65)	(-2.12)*	(-1.43)	(0.51)
CC	-0.80	-0.12	0.28	0.47	-0.01	-0.27	0.08	-0.28	-0.04	-1.15
	(-2.97)*	(-.75)	(2.59)*	(1.27)	(-0.05)	(-3.273)*	(0.41)	(-2.44)*	(-0.78)	(-0.75)
Q*	1.06	-0.28	-0.75	-0.16	0.06	-0.51	-0.74	0.16	-0.11	-1.21
	(1.90)**	(-1.36)	(-4.48)*	(-0.09)	(0.22)	(-2.35)*	(-1.11)	(0.92)	(-0.83)	(-0.72)
IC	-0.46	0.73	-0.53	0.72	-0.37	0.12	1.10	0.06	-0.02	-0.12
	(-1.50)	(2.90)*	(-3.29)*	(0.63)	(-1.59)	(0.67)	(1.98)**	(0.34)	(-0.27)	(-0.09)
TFPG	-1.04	-0.99	12.14	6.15	-21.35	23.86	9.45	23.56	-0.69	4.14
	(-2.26)*	(-0.39)	(2.66)*	(0.69	(-0.30)	(2.39)*	(0.98)	(1.05)	(-1.08)	(0.51)
WAG	0.45	0.82	1.57	-0.63	0.40	-0.01	0.60	0.83	1.03	3.16
	(1.09)	(6.05)*	(10.08)*	(-1.61	(1.91)**	(-0.07)	(4.78)*	(3.37)*	(4.33)*	(5.82)*
AW	0.17	-0.54	-0.09	0.80	0.46	0.24	-0.31	-0.01	-0.37	
	(0.94)	(-3.15)*	(-0.47)	(1.42)	(1.83)**	(2.66)*	(-1.95)**	(-0.04)	(-2.10)*	
NRP	-0.10	0.18	0.09	0.20	-0.13	-0.09	0.01	-0.01	0.25	0.79
	(-0.51)	(1.82)**	(1.11)	(0.77)	(-1.46)	(-1.54)	(0.07)	(-0.09)	(2.51)*	(1.89)**
Adj.R^2	0.32	0.86	0.82	0.45	0.66	0.68	0.88	0.72	0.85	0.59
D.W.	1.32	1.44	1.96	1.50	0.92	1.28	1.82	2.22	1.82	0.70
F-STAT	3.24	31.15	22.31	4.87	10.35	11.14	34.25	27.22	13.25	8.82

Note: a) t-values are in parentheses. b) * and ** denotes 5 per cent and 10 per cent levels of significance respectively.

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The coefficient on own wage rate has the *a priori* negative sign in Paper and Paper Products, and Non-Metal Mineral Products subsectors. In other subsectors and the Total Manufacturing sector the efficiency wage theory appears relevant. The own wage variable is statistically significant in all the subsectors except in Food, Beverages and Tobacco, Non-Metal Mineral Products, and Paper and Paper Products. The alternative wage coefficient has the theoretically expected negative sign in five of the subsectors, namely: Electrical Products, Wood and Wood Products, Textiles and Leather Products, Other Manufacturing and Metal Products; and it is statistically significant in only the latter three.

The nominal rate of protection has the expected positive relationship in five of the subsectors (Metal Products, Other Manufacturing, Paper and Paper Products, Textiles and Leather Products, and Wood and Wood Products) and in the Total Manufacturing sector. However, it is statistically significant in two of the subsectors (Textile and Leather and Other Manufacturing) and in the Total Manufacturing sector. The implication of the negative sign in the other subsectors is that import tariff appears to hurt labour employment, albeit mildly, since the associated coefficients are not statistically significant.

The result of the short run employment equations is presented in Table 4. The coefficient of real capital cost variable has the *a prori* positive sign in seven subsectors and it is statistically significant in five. This latter set of subsectors comprises Textiles and Leather Products, Metal Products, Food, Beverages and Tobacco, Electrical Products, and Chemical and Rubber Products. The positive sign suggests that an increase in the quantity of fixed assets gives rise to a measure of increase in labour employed in those subsectors.

The output/demand coefficient has the right positive sign in seven subsectors and in the Total Manufacturing sector. It is found to be significant in four of the subsectors and these are Paper and Paper Products, Chemical and Rubber Products, Food, Beverages and Tobacco, and Non-Metal Mineral Products.

The efficiency wage theory is confirmed, with the positive sign of the coefficient of own wage variable, in six of the subsectors and the Total Manufacturing sector as a whole. In the Food, Beverages and Tobacco, as well as Textile and Leather Products, Paper and Paper Products subsectors, employment is negatively related to average real wages. With regards to the alternative wage variable, there exists expected inverse relationship between it and labour employment in Paper and Paper Products, Wood and Wood Products, Other Manufacturing, and Metal Products.

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Table 4: Results of Dynamic Short Run Employment Equations

1. $\Delta FBTFL = 0.62 + 1.11\Delta CC + 0.12\Delta CC(-2) + 0.86\Delta Q - 0.13\Delta\Delta IC + 4.39TFPG - 0.09WAG - 0.09NRP(-1) - 0.48ECM(-1)$
(2.01)* (5.20)* (2.36)* (8.37)* (-3.44)* (5.95)* (-1.48) (-1.29) (-6.12)*
$R^2 = 0.89$ Adj. $R^2 = 0.85$ F-Stat. = 22.54 D.W = 1.95

2. $\Delta\Delta TXLL = -0.96 - 0.61\Delta\Delta TXLL(-1) - 0.46\Delta\Delta TXLL(-2) + 0.26CC - 0.16\Delta Q + 0.91\Delta IC - 5..68TFPG - 0.11\Delta\Delta WAG(-2) + 0.33\Delta\Delta AW + 0.43\Delta NRP(-1) - 0.51ECM(-1)$
(-2.17)* (-5.69)* (-5.04)* (2.99)* (-1.24) (3.85)* (-2.56)* (-1.72) (3.50)* (3.90)* (-2.81)*
$R^2 = 0.91$ Adj. $R^2 = 0.87$ F-Stat. = 20.54 D.W = 1.96

3. $\Delta WWPL = -0.01 + 0.24\Delta WWPL(-1) + 0.00074\Delta CC(-2) - 0.42\Delta Q + 0.09\Delta IC(-2) + 4.56\Delta TFPG + 0.99\Delta WAG - 0..27\Delta\Delta AW(-1) + 0.09\Delta\Delta NRP - 0.43ECM(-1)$
(-0.86) (1.72) (0.01) (-3.83)* (0.76) (2.56)* (4.88)* (-2.85)* (2.30)* (-2.34)
$R^2 = 0.73$ Adj. $R^2 = 0.62$ F-Stat. =6.36 D.W = 2.06

4. $\Delta\Delta PAPL = 0.02 + 0.03\Delta\Delta PAPL(-2)) - 0.43\Delta CC(-2) + 2.65\Delta\Delta Q(-2) + 0.27\Delta\Delta IC(-1)) - 8.24TFPG - 1..66\Delta WAG(-2) - 0.05\Delta\Delta AW(-2)) - 0.43\Delta NRP(-1) - 1.14ECM(-1$
(0.26) (0.24) (-1.47) (2.58)* (0.42) (-0.86) (-3.86)* (0.11) (-0.96) (-5.37)
$R^2 = 0.77$ Adj. $R^2 = 0.67$ F-Stat. =7.71 D.W = 2.13

5. $\Delta CRPL = -0.01 + 0.16\Delta CC) - 0.14\Delta Q(-1) + 0.21\Delta Q(-2) + 0.12\Delta\Delta IC - 87.72TFPG + 0.78\Delta\Delta WAG + 0.89\Delta\Delta WAG(-1) - 0.09\Delta\Delta NRP(-1)$
(-0.60) (2.13)* (-1.48) (2.00)* (1.12) (-1.54) (4.87)* (4.85)* (-2.31)*
$R^2 = 0.67$ Adj. $R^2 = 0.55$ F-Stat. = 5.78 D.W = 1.81

6. $\Delta NMETL = -0.01 - 0.11\Delta CC + 0.16\Delta Q(-2) + 0.22\Delta\Delta IC(-2) + 7.16\Delta TFPG(-1) + 0.26\Delta WAG(-1) + 0.09\Delta\Delta AW(-1) + 0.13\Delta\Delta AW(-2)$
(-0.91) (-3.34)* (1.94)** (4.80)* (1.94)** (3.88)* (1.52) (1.97)**
$R^2 = 0.61$ Adj. $R^2 = 0.48$ F-Stat. = 5.03 D.W = 1.61

7. $\Delta METL = -0.005 + 0.45\Delta METL(-1) + 0.54\Delta\Delta CC + 0.19\Delta Q + 0.12\Delta\Delta IC(-1) + 65.00TFPG - 52.86TFPG(-1) + 0.36\Delta WAG) - 0.12\Delta\Delta AW(-2) - 0.09\Delta\Delta NRP - 0.09\Delta\Delta NRP(-1) - 0.31ECM(-1)$
(-0.36) (5.05)* (7.76)* (1.53) (1.53) (9.83)* (7.99)* (5.41)* (-1.49) (-2.51)* (-2.38)* (-2.24)*
$R^2 = 0.98$ Adj. $R^2 = 0.96$ F-Stat. = 67.40 D.W = 2.52

8. $\Delta ETEL = 0.23 + 0.17\Delta ETEL(-2)) + 0.95\Delta CC + 0.06\Delta\Delta Q(-1) - 0.18\Delta\Delta IC - 223.70TFPG + 0.48\Delta\Delta WAG + 0.25\Delta\Delta WAG(-1) + 0.38\Delta\Delta AW + 0.18\Delta\Delta AW(-2) - 0.16NRP(-2)$
(2.43)* (1.98)** (8.98)** (1.51) (-2.73)* (9.22)* (4.97)* (2.27)* (4.33)* (1.93)** (-2.60)*
$R^2 = 0.97$ Adj. $R^2 = 0.95$ F-Stat. = 55.94 D.W = 1.92

9. $\Delta OML = -0.10 - 0.06\Delta CC(-1) + 0.001Q - 0.13\Delta IC(-1) - 2.14TFPG + 1.02\Delta WAG - 0.50\Delta\Delta AW - 0.55\Delta\Delta AW(-1) - 0.45\Delta\Delta AW(-2) + 0.31\Delta NRP(-2) - 0.85ECM(-1)$
(-0.03) (-2.06)* (0.05) (-2.71)* (-2.96)* (12.76)* (-3.74)* (-3.47)* (-3.59)* (2.96)* (-5.18)*

10 $\Delta\Delta TMF = -0.01 - 1.27\Delta\Delta TMF(-1) - 0.66\Delta\Delta TMF(-2) + 0.10\Delta\Delta CC(-1) + 0.34\Delta Q - 0.14\Delta\Delta IC + 3.72TFPG(-2) + 0.58\Delta\Delta WAG + 0.93\Delta\Delta WAG(-1) - 0.24\Delta NRP$
(-0.56) (9.26)* (-4.09)* (1.20) (1.39) (-0.99) (1.77)** (2.72)* (4.65)* (-1.79)**

Note: a) t-values are in parentheses. b) * and ** denote 5 per cent and 10 per cent levels of significance respectively.

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The three major channels of the effect of import competition/trade liberalisation identified previously are that of the changes in intermediate input cost, trade-induced total factor productivity growth, and the nominal rate of protection (NRP). The first variable, which depends on domestic and foreign sources, has the right inverse relationship with employment in three subsectors (Food, Beverage and Tobacco, Electrical Products and Other Manufacturing) and Total Manufacturing sector. The sign of the coefficient of the variable is contrary to *a priori* expectation in the six other subsectors.

The NRP has a positive influence (which is statistically significant) on employment of labour in Textile and Leather Products, Wood and Wood Products, and Other Manufacturing Products subsectors. The variable has the contrary negative impact in other subsectors, but is not significant in such other subsectors as Paper and Paper Products and Food, Beverages and Tobacco Products. The coefficient of trade-induced technological progress variable is positively signed and significant in four subsectors (Food, Beverages and Tobacco, Wood and Wood Products, Non-Metal Mineral Products, and Metal Products, and in the Total Manufacturing sector). This suggests that the type of technological progress in these subsectors is capital saving. However, it is labour-saving in others and the coefficient of the variable is statistically significant in the other sectors except in Paper and Paper Products, and Chemical and Rubber Products.

Long run equilibrium relationship is confirmed between variables of the employment equations of Food, Beverages and Tobacco, Textile and Leather Products, Metal Products, Wood and Wood Products, and Other Manufacturing Products subsectors, with the speed of adjustment of 0.48, 0.51, 0.31, 0.43, and 0.85 respectively. The ECM is of the right sign and is again statistically significant in these subsectors. All the employment equations were tested for mis-specification errors and serial correlation using the Breusch-Godfrey Serial Correlation and the Auto Regressive Conditional Heteroskedasticity (ARCH) LM tests. The probability values showed the absence of both mis-specification and autocorrelation.

SUMMARY AND CONCLUSION

This study investigates the effects of import competition on employment of labour in the manufacturing subsectors and the entire manufacturing sector in Nigeria. The study shows that there is some linkage between import trade and the capacity of Nigeria's manufacturing sector to generate employment in the short and long run. However, this influence is shown to

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be through three different channels. These channels are those of intermediate input, foreign competition captured by the nominal rate of protection (NRP), and the adoption of new technology.

The results suggest that import competition over the years resulted in the adoption of capital-saving technology by three subsectors in the short run and these subsectors are Food, Beverages and Tobacco, Wood and Wood Products, and Non-Metal Mineral Products. However, in the long run it is only in the last two subsectors that the same result could be obtained. Labour-saving method of production prevailed in the short run in five of the other subsectors while in the long run it is only one subsector (Food Beverages and Tobacco) that registered the same method of production. These results in respect of the method of production suggest that it is only in Wood and Wood Products, and Non-Metal Mineral Products that foreign competition induced the adoption of a production method skewed towards the large labour endowment of the country.

The NRP bolstered labour employment in the short run in Wood and Wood Products, Textile and Leather and Other Manufacturing but in the long run only the last two and the entire manufacturing sector fared better in terms of employment generation. It is of interest to note that the industrial policy that held sway during the greater part of the study period was import substitution industrialisation (ISI) which was operationalised through the institution of tariff protection for domestic manufacturing firms. Against this background, the result of this study thus implies that the ISI policy stifled employment of labour in the majority of the nation's manufacturing subsectors. This implication is not unreasonable in view of the fact that ISI policy is usually geared towards meeting the limited domestic market demand which, of course, does not offer the sort of incentives for output expansion which more often than not characterises the target market of export/outward oriented industrialisation policy.

The study also shows that intermediate input cost relates to the employment of labour negatively in the short run in Food, Beverages and Tobacco Products, Electrical Products, Other Manufacturing Products subsectors and in the entire manufacturing sector while in the long run it is only Wood and Wood Products subsector that recorded the same result. Thus, employment losses in the manufacturing sector over the years cannot unequivocally be attributed to increases in the cost of the intermediate inputs used by the majority of the highly import dependent manufacturing subsectors.

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From the foregoing, the major policy implication of the study is that the ongoing import liberalisation policy in the country needs to be pursued to its logical conclusion as its long term benefits will most likely outweigh its short term adjustment costs as far as manufacturing employment is concerned. The experience in recent years might make this implication sound unpalatable but such unemployment might be unavoidable in the short run as senescent industries would have to give way to nascent industries. Again, the study implies that employment losses in the manufacturing sector cannot, to a very great extent, be blamed on import competition and it, therefore, follows that policy oriented research need be undertaken on other likely factors such as structure of the subsectors, sources and types of technologies and managerial problems, which are not the focus of this study.

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End Notes

[1] The CBN suddenly announced the unification of the official and parallel markets exchange rate on March 5, 1992 from N10=$1 to N18=$1, leading to serious pressure on the price level and subsequent removal of import duties affecting the transport and building sectors.

[2] Export promotion has also been focused since the adoption of the SAP by putting in place export promotion incentives which have witnessed various degrees of implementation (Adenikinju and Jerome, 1995).

[3] This is computed as the ratio of imports to total domestic consumption (or GDP plus imports).

[4] The nutritional model emphasises that higher wages enable workers meet nutritional needs leading to better health and higher productivity. In other models, the emphasis are respectively, the high cost of shirking, the cost of high labour turnover to firms, the differential in wages relative to those paid outside the firm, and the need to attract more and better applicants.

[5] For example, footwear, food utensils and pottery, and cutlery

[6] Intermediate inputs include raw materials, supplies, energy, etc.

[7] The assumption of increasing returns is equivalent to modelling of the underutilisation of installed plant capacity and the existence of economies of scale.

[8] See equations 16 and 17 below for clarification of this function.

[9] In the assumed imperfect market framework, a firm maximises its profit conditional on the behaviour of its competitor and its own reaction to that behaviour. Hence, the firm must accept a trade-off between price and quantity and by implication input demands corresponding to this trade-off. Thus, the factor, $[Q.\partial P/\partial Q.\ \partial Q/\partial L]$ is the reaction function of the firm in this market structure.

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[10] A constant elasticity demand function is assumed for simplicity within the relevant range of Q and P.

[11] The model is elaborately developed in the final report to AERC.

[12] A better measure of foreign competition is, perhaps, the effective rate of protection on sectoral basis. These rates were computed only for the period 1988-1994 by the Policy Analysis Department of the Ministry of Industries, which has since been disbanded.

[13] A survey of annual reports of Nigerian manufacturing companies indicates that value-added is defined as the difference between turnover and bought-in materials and services, while it is also equal to the sum of the compensation to employees, debenture interests, bank interests, depreciation and shareholders dividends, and retained profit. It is however impossible to disentangle profits from the survey data so that rental cost of capital can be used. Including profits as part of rental cost of capital therefore assumes that similar relationship exists between capital and employment as well as profits and employment.

[14] The implicit price deflators are not available for 1962-1980. These are however obtained by fitting a regression line of manufacturing implicit price deflator and Gross Domestic Product (GDP) deflator for 1981-1996, and applying the coefficient derived from this regression to the whole period data of GDP deflator.

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