Macroeconomic Determinants of the Labour Market in Nigeria

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Abstract

This paper investigates the determinants of labour market in Nigeria arising from the economic transformation in recent years, and how public policy affects in particular labour market outcomes. A two-equation model for Nigeria’s labour demand and supply was estimated using the Seemingly Unrelated Regression (SUR). On the supply side, labour force participation is largely determined by its own backward looking expectation and demand elasticities while real minimum wage and population growth were insignificant but positively related to labour force participation. The results also showed that demand was negatively related to labour force supply and the level of the working age population, while capacity utilization and real minimum wage though not significant had positive relationships with demand for labour. Own elasticity was significant and has a positive impact on the demand for labour. It is evident from the results that to fix the disequilibrium in the Nigeria’s labour market, macroeconomic stability is needed to sustain prices at levels that will drive labour market activities to optimal levels.

JEL Classification Codes: C13, C39, J21, J22, J23

Keywords: Labour market, Seemingly Unrelated Regression, Nigeria

Labour market outcomes are microcosm of aggregate economic activities. A strong GDP growth, for instance, could translate into high employment since labour and capital are the major inputs in the production process. Canlas (2008) showed that a combination of these factors of production with policy rules of the government as well as external environment tend to influence people’s entry-exit decisions in the labour market and whether or not investments in human and physical capital are to be undertaken. Firms will also align their decisions with these dynamics and could trigger different implications for the labour market.

Overview of the Nigerian economy have shown that in spite of the several years of economic reforms dating back to the early 1980s, growth has remained sluggish averaging

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2.8 percent in the decade of 1990s, while growth in the first decade of the 21st century growth has averaged an impressive 6.2 per cent. The minuscule growth was neutralized by a concomitant growth in population leaving per capita incomes at precariously low levels. Nigeria’s Second National Economic Empowerment and Development Strategy (NEEDS 2, 2007) clearly indicates that with the rate of growth of the population estimated at 2.4 per cent, only about 3.3 percent growth was achieved between 1999 and 2003, netting a marginal 0.9 per cent per capita income. The poor growth performance no doubt raises developmental challenges including macroeconomic volatility impacting negatively on investment; low per capita GDP; and high level of unemployment (NEEDS, 2004: 7-9, NEEDS2, 2007).

Anecdotal evidence points to the fact that the volatility and lull in growth could account for the slow progress in expanding employment, the capacity to improve incomes and to fight poverty. The economy has been characterized by episodes of oil price shocks and world commodity prices which have caused a dysfunction in economic policy and tended to create structural imbalances including the labour market. There was a gradual diversion to the oil sector with the oil boom from agriculture which provided the bulk of employment.

To achieve the Millennium Development Goals (MDGs) and reduce poverty by half in 2015 as well as become one of the 20th largest economies in the world by the year 2020, analysts suggest, a growth rate of about 10 percent (Goldman Sacks, 2004; NEEDS, 2004). Soludo (2006) underscored that Nigeria has adequate capacity to achieve this growth potential. He stated that barely 40 percent of Nigeria’s arable land is under cultivation. With over 100 tertiary institutions producing more than 200,000 graduates annually, the basic human capital for progress was adequate. Abundant solid mineral had been largely untapped and it is estimated that over 5 million Nigerians live outside of Nigeria, with tens of thousands as world class medical doctors and leading professionals in other fields.

Paradoxically, however, high unemployment still abounds and growth has not attained the threshold to stimulate adequate investment and enhance the employment generation capacity. There are rekindle hopes of high growth at the beginning of the 21st century which is expected to speed up the country’s slow structural transformation; however, the jury is still out on whether demand for labour has kept pace with the growth of the labour force in a country that has one of the largest populations in Sub-Saharan Africa and one of the highest population growth rates in the world (Soludo, 2006). The inadequate employment situation has a number of far reaching socio-economic, political and moral implications.

The failure to utilize labour, a factor of production limits economic growth and the Nigerian labour market is an important source of risk and potential for a vicious circle of poverty. Ogwumike, Adubi and Agba (2002) showed that those in paid employment and
those with inadequate skills are the most vulnerable when a shock occurs on the labour market. Soon with high level of unemployment and low returns to labour, households will face a choice of either sending their children to school or some other informal income earning activities.

However, it is not clear in the literature whether macroeconomic factors are the consequences and determinants of labour force participation in Nigeria. It is therefore important to identify some of the macroeconomic factors that affect entry into the labour market, which more often than not put people at the risk of poverty and inequality. Policy formulation intended at reducing poverty and inequality in Nigeria still show a disconnection with labour market outcomes.

Various studies with a good deal of empirical exertion have been devoted to explaining the causes of unemployment and its variability across countries and regions. Early literature including (Blanchard and Katz, 1992; and Agnor, 1995) applied cross-sectional or pooled cross-sectional data on indicators of labour market performance and labour market institutions to explain unemployment differentials across countries. However, later studies including, Morgan and Mourougane (2001) have attempted to explain unemployment differentials across countries by relating macroeconomic shocks to labour market institutions.

Other studies, including Higgins and Fitzgerald (1973), Valentine (1975), Gregory and Sheehan (1973), Clark (1976), Gruen(1979), Holmes(1979) and Sheehan, Derody and Rosendale (1979) have found that labour market institutions and regulations significantly affect employment decisions of firms and by extension affect unemployment.

The general objective of this paper is to investigate the macroeconomic determinants of the labour market in Nigeria, and how public policy affects the market; in particular, the labour market outcomes. In this paper we use time series data to depict labour market developments in Nigeria over the last two and a half decades. We also develop a two-equation model for Nigeria’s labour demand and supply using the Seemingly Unrelated Regression (SUR) which allows for contemporaneous correlations in the error terms to be captured and supports the inclusion of dynamic adjustment effects as well as the testing of parameter restrictions.

The rest of the paper is structured as follows: Part II reviews relevant literature on the labour market. Part III presents an overview of Nigeria’s labour market, while part IV adumbrates the modeling strategy. Part V discusses the empirical results and Part VI contains some concluding remarks.
LITERATURE REVIEW

The demand for labour is a derived demand since labour is demanded because of a demand for goods. Demand for labour is directly affected by the cost of labour and the productivity. There is an inverse relationship between the demand for labour and the wage rate. Law of diminishing marginal product states that as successive units of one input (labour) are added to a fixed amount of another input (capital), a level of total production is reached beyond which the marginal product of labour declines. The short-run demand for labour is determined by the marginal revenue product for labour curve.

Economic theory postulates that labour demand in the long run is driven by output, the (relative) cost of labour and capacity utilization. When output increases, more units of the inputs have to be used. If the production structure is fixed, inputs will grow at the same rate as output, so that each input remains a constant ratio to output. Additionally, employment can also be determined by the (relative) price of labour and capacity utilization. Although an increase in output is usually linked to an increase in inputs, this is only necessary but not sufficient condition. For instance, it is likely that agriculture might not get bigger in production to meet additional demand, but rather redirect output to an expanding domestic market. An industry that is already operating at full capacity might just find it impracticable to increase production.

In a well-functioning labour market, the demand of labour is inversely related to its price. The higher the price of labour, the lower its demand, the relative price of labour (the price of labour relative to that of other inputs such as capital), can also change the demand for labour by inspiring the more concentrated use of the relatively cheapest input. In other words, relatively cheap capital will prompt firms to be more capital-intensive, while relatively cheap labour will necessitate more labour-intensity.

Equally, firms will rather use more of the comparatively cheap skill category, which means that a change in the comparative wages of different skills categories might also cause a change in the blend of skills utilized by firms. For instance, if increased unionization among unskilled or semi-skilled workers causes their wages to increase moderately more than that of skilled or highly skilled workers, firms might decide to use less unskilled and semi-skilled labour and more highly skilled labour.

Nevertheless, it is not only the direct cost of labour that influences the demand for labour, but also the indirect costs. The increased labour market inflexibility raises the indirect cost of labour for firms, since more time and money have to be spent negotiating with unions, and an increasing amount of time and money is lost due to strikes. High indirect costs may warrant a substitution of labour with capital, which means that labour will grow slower than output.
Nigeria is experiencing a declining employment coefficient (degree of responsiveness of employment to changes in economic growth) and also jobless growth (employment declining during periods of economic growth). The percentage of new entrants to the labour force in the formal sector has fallen rapidly, since in the mid 1980s.

Conceptually, the literature categorizes the labour market in developing countries into three distinct sectors, namely, the rural sector, informal urban sector and formal urban sector. The rural sector usually has a large share of self-employed and unpaid family workers. An informal urban sector is characterised by small privately owned enterprises producing mainly services and other non-tradable goods and relying (in addition to their own input) on paid labour without any formal wage and employment contract. The formal urban sector consists of large enterprises that hire employees both skilled and unskilled according to formal contracts and are subject to various labour regulations.

Various labour market models have suggested a nexus between the existence of these sectors and labour market segmentation; workers with similar productive skills receive different wage depending on their sector of employment. The migration model by Harris and Todaro in 1970 (Todaro, 1982) provided one of the best explanations of this linkage. The model postulates the persistence of rural to urban migration, despite the existence of widespread urban unemployment in developing countries. The underpinning of the authors’ assertions was hinged on the view that migrants from the rural areas are attracted to the urban formal sector by expectations of higher wages, even if they are unlikely to find jobs in the formal sector immediately.

Under the circumstance, restoration of equilibrium in the labour market could be precipitated by an increase in the urban wage and a concomitant jump in urban unemployment. It follows that an increase in labour demand raises urban wage and is likely to induce more migration, and hence worsen urban unemployment. However, critics of the Harris-Todaro model including Gillis et al. (1996) argue that the equilibrium conditions specified by the model are seldom attained given that in reality migration do not close the gap between the urban wage and the rural wage.

In addition to migration, public sector employment policy also plays an important role in the level of market segmentation. According to Demekas and Kontolemis (1999) reductions in public sector employment in the formal sector (or reduction in recruiting rates) have led in some countries to higher employment in the informal sector. In most countries employment and wage decisions are made differently clearly resulting in segmentation in terms of treatment of public sector employees and their counterparts in the private sector. Similarly, Kraay and Rijcheghem (1995) provided strong evidence that government wages are positively correlated with the level of government resources, and negatively correlated with the level of private sector employment. Moreover, in many countries there appears to be some evidence of persistent public/private wage differentials (Agenor, 1995).
Tait (1983) find a positive wage differential between public and private sector in developing countries in a cross-country study, although the evidence for OECD countries is weaker.

The existence of labour market institutions and regulations as well as mismatch between job seekers and vacancies also represent important sources of labour market segmentation. A number of studies have been conducted to evaluate the impact of labour market institutions on employment across countries. According to Agenor (1995), trade union activism and the rise of the various types of employee protections have reformed the legal framework of the labour market. While rigid wage differentials and union activities are known to have slowed down resource shifts between formal and informal sectors (despite a generally high geographical mobility of the labour market), in several countries employment-protecting measures have made firms reluctant to expand their labour force. Morgan and Mourougane (2001) articulate similar arguments. In their study of the impact of labour market institutions and other structural factors on unemployment in Europe, they find that labour market institutions significantly have an influence on employment decisions of the firms and thus affect unemployment.

One of the factors that appear to have a significant impact on wages and employment growth is minimum wage. There is clearly a potential role for minimum wages to push up overall wages. The imposition of a minimum wage raises the incomes of those who would otherwise be earning below the minimum threshold but it is also likely to have some impact on higher levels of income as attempts to, at least partially, restore pay differentials. Thus, minimum wage appears as a form of labour market inefficiency if wages are not determined by demand and supply.

Empirical evidence on the impact of union on real wages in developing countries is somewhat limited and mixed. Jones (1994) suggests that in Latin America, unions have caused wages to rise above the opportunity cost of labour through a combination of union pressures, minimum wage legislation, and wage policies in the public sector. According to Farber (1986) trade union strength leads to higher wages and higher unemployment. Empirically, union strength is often proxy by measures of union density or by the proportion of workers covered by union contracts. In existing empirical studies, these proxies appear to increase unemployment, although this effect seems to be mitigated when unions and firms coordinate their bargaining activity (Nickell, 1997).

Generally, unemployment benefit may be expected to put an upward pressure on wages and thereby give rise to unemployment. Similarly, Nickell (1997) and Sheldon (1993) argue that higher unemployment benefits (in terms of both replacement rates and duration) result in higher unemployment and lower job creation in most theoretical models of the labour market, and have been found to be empirically associated with higher unemployment. The upward pressure on wages and hence, unemployment could be accentuated by employment security which refer to the individual’s ability to maintain employment within a particular
firm or organization. This ultimately creates what Morgan and Mourougane (2001) refer to as ‘insider-outsider’ problem. The incumbent workers (insiders) with their strong positions are able to bid up wages despite the existence of a large number of potential new employees. Thus, employment security makes it easier for insiders to secure higher wages and associated with this effect is unemployment.

Another important consideration for labour market decisions is the wedge between wages paid by employers and that received by employees. Morgan and Mourougane (2001) notes that wedge comprises the purchasing power effect, and the direct tax effect. While, the first takes into account real wages in terms of consumer prices, the second explains the gap between labour costs paid by the firms and workers’ compensation (wages) by way of measuring all direct tax such as income tax and social security compensations. The effect of these factors on unemployment depends on who bears the burden of these charges in the long run. If the burden falls on employees, it will not have any significant effect on the labour compensation (wages). However, if the burden falls on the employers it will lead to higher compensation paid by employers and hence lower the likelihood of additional employment.

Morghadam (1993) notes that the existence of high tax wedge both for workers and employers appears as a disincentive on the part of both the employee to seek jobs and employer to seek additional labour. This is an obstacle to employment and stimulates an expanding black market for labour. Black market for labour implies employment without compliance with labour laws or policies laid down by employment agencies or tax authorities. Daveri and Tabellini (2000) argue that on both theoretical and empirical grounds higher taxes lead to higher unemployment and lower output growth.

Several studies including Moghadam (1993); De Masi and Henry (1996); Morgan and Mourougane (2001) have identified the mismatch between job seekers and vacant positions as being of influence labour market participation. These studies seem to show that measures of mismatch have a clear positive association with structural unemployment.

Apart from labour market institutions a large number of studies have focused on analyzing economic variables such as real wages, output and economic growth and their impact on the labour market. On the impact of real wages, Agenor (1995) suggests an ambiguous effect on labour mobility. A fall in the wage will encourage out-migration because working in the region is relatively lower. On the other hand, the lower wage will increase labour demand and encourage in-migration. Sheehan, et al., (1979) find little evidence of a significant relationship between employment and real wages. Other earlier labour market studies, including Higgins and Fitzgerald (1973), Valentine (1975), Gregory and Sheehan (1973) and Clark (1976) could not find a significant role for real wages in the employment decision. But a critique by Gruen (1979) and Holmes (1979) argue that the work of Sheehan, et al.
Gregory and Duncan (1979) examined the post-1974 relationship between output and employment. Their finding showed that productivity growth actually slowed following the rise in real wages in the early 1970s. This led them to conclude that the key to growth in employment at that time was stronger growth in output.

Revenga and Bentolia (1995) note a clear positive relationship between changes in output and changes in the employment rate. They examine a sample of 11 OECD countries and find the link between employment and output to differ significantly across countries. Output-employment elasticity varied across OECD countries, as high as 0.57 for United Kingdom, to as low as 0.01, for Japan. Further, their result imply that some structural and institutional factors such as wage bargaining by trade unions, unemployment benefit, the degree of competition in the product market did affect this relationship. Freebairn (1977), in a survey of the Australian literature, finds significant role for both output and real wages in employment equations.

In an earlier study, Schelde-Andersen (1980), using cross-section evidence for a range of industries, finds that both output and real wages play an important role in determining the level of employment. He concludes that output and real wage elasticities are of the same order of magnitude but of opposite sign. The long-run elasticity of employment with respect to output in a number of the studies surveyed ranges between 0.65 and 0.70, while the long run wage elasticity is around -0.5; implying that a 1 percent increase in the wage bill will decrease labour demand by 0.5 percent.

Overall, studies on labour market in developing countries are often constrained by limited data availability. Thus the effects of labour market institutions and regulations may appear to have an ambiguous effect on the demand and supply for labour. Agenor (1995) and Onwioduokit (2008) state that published data on unemployment in developing countries are often incomplete. They also opine that standard labour market concepts used in the individual countries (such as employment and unemployment) do not necessarily have the same meaning and must be interpreted with caution.

Gbosis (1996) opined that regulation in its broader sense, means the imposition of restrictions on the various sectors of an economy. For example, prior to 1986, regulatory controls were the main approach to macroeconomic management in Nigeria. On the contrary, deregulation aims at the removal of controls, thereby enhancing competition and efficiency in the allocation of resources in the economy. Since 1987, deregulation has been the central framework for macroeconomic management in Nigeria. It is often argued that deregulation is associated with high levels of unemployment. Available data show that
Nigeria’s unemployment rate declined marginally under deregulation as opposed to regulation. Despite this development, unemployment still remains a critical issue in Nigeria today.

Ogwumike, et al. (2002) showed that the structure of the labour market has a significant consequence on employment status and it served as an important determinant of household income and welfare. The paper analyses, among other things, the distribution and structure of main job earnings, determinants and income inequality in the Nigerian labour market. The study descriptive statistics, Gini Coefficient, Theil’s Entropy Index, Ordinary Least Squares technique, Heckman’s two-stage selectivity bias correction procedure and Tobit analytical technique. Findings from the study show that inequality was more evident in paid employment than in self-employed segment of the Nigerian labour force. It was generally higher in the rural areas than in the urban areas. The paper noted that necessary and adequate steps to optimally address the various sources of labour market and earnings inequality in Nigeria will pave the way for the opportunities in the Nigerian labour market to be optimally utilized by all participants.

OVERVIEW OF NIGERIA’S Labour Market

Labour Force

Over the past four decades, the growth in Nigeria’s labour force has been mixed. During 1970s, the labour force grew on average by around 3.3 percent but it slowed down to around 2.5 percent in the early 1980s. In the mid 1980s the labour force growth picked up substantially. However, the political crisis of 1987, triggered a large emigration of both skilled and unskilled labour, the growth in labour force contracted to around 0.8 percent in 1988. During, the early 1990s growth in the labour force recovered to average around 3.0 percent per annum as emigration numbers dropped. However, much of the late 1990s and early 2000s experienced slower growth in labour force participation.
Figure 1: Labour Force Participation in Nigeria

Source: National Bureau of Statistics, Nigeria

Unemployment

The unemployment rate averaged around 5-6 percent during the period under review. The most significant increase in the unemployment rate was observed in 1987 and 2005 when the rate reached over 13.6 percent. The immediate aftermath of the two coups resulted in large labour redundancies and fewer new jobs, as firms were operating below capacity and as a result resorted to shutting down or downsizing their operations.

In the late 1980s to mid 1990s, unemployment fell to moderate levels as the economy recovered, through a series of measures implemented by authorities to promote economic growth. Among such measures was the devaluation of the Nigeria naira, and export promotion policies. However, subdued public and private investments in employment creation relative to the growth in the number of job seekers (school leavers and new graduates) contributed to high unemployment in the late 1990s.
During the review period, employment (both in the formal and informal sectors) grew on an average by around 1.8 percent per annum. Employment in the two sectors is negatively correlated. This suggests that there exist a high mobility of labour between the two sectors. Since Nigeria has a relatively high literacy rate, around 53 percent, this enables informal sector workers to reach efficiency levels (through education and training) and to some extent develop skills equivalent to formal sector workers over a short period of time.

In the early 1970s, formal employment growth was at its peak of around 27.1 percent resulting from the establishment of number of new ventures. The manufacturing sector in particular, was largely driven by Nigeria’s import substitution policies (high tariff protection, import licensing and quotas). Formal employment growth was also supported by high public sector investments in infrastructure developments. On the other hand, the informal sector experienced a negative employment growth of 11.1 percent. This indicates that majority of informal sector workers who quit informal employment entered the formal sector.

However, from the early 1980s to late 1990s formal sector employment growth slowed as the economy contracted gradually, resulting from a slow down in the oil industry following the collapse of oil prices in the international markets, coupled with the weak performance of inefficient import substitution industries and reduced public and private investments. In addition, decaying infrastructure, including epileptic power supply and the political crisis of 1990s resulted in a further decline in production and labour redundancies in many industries in the formal sector of the economy. These drove huge number of workers back to the informal sector resulting in growth of informal employment.
From the late 1980s to mid 1990s, formal sector employment levels recovered as the government re-focused its trade policy from import substitution to export promotion. Government in its effort to encourage export industries set up tax-free factory/zone schemes particularly aimed at the production and export of garments, textiles and footwear. The success of this schemes resulted from a notable increase in private investments.

This resulted in workers moving back to the formal sector to fill in the newly created positions. The late 1980s experienced a slowdown in formal employment as the economy contracted once again due to subdued private and public investments coupled with a military misrule. This slowdown enhanced further following the political upheaval of 1993, which triggered higher levels of emigration of professional/technical workers and capital outflows suppressing local investments (dampering prospects for job creation). However, there was a slight increase in informal sector employment indicating that some redundant workers from the formal sector joined the informal sector to stay in employment.

**Economic Growth and Employment**

Labour market developments in Nigeria suggest a clear positive correlation between economic growth and employment. This relationship between these two variables is derived from the economic theory, which states that the primary sources of economic growth are land, labour and capital. Generally, we find that during times of economic growth, employment increases, while in periods of an economic contraction, employment falls. Looking at the past trend in economic growth and employment it is clearly evident that on an average the relationship between the two variables is also contemporaneous. This means that if GDP increases in a particular year, then employment also increases in that year.
Figure 3: Level of Employment and Growth in Nigeria

Source: National Bureau of Statistics, Nigeria

Wages

Nigeria’s wage growth has been very uneven over the past three and a half decades. Wage growth picked up sharply in the mid 1970s reaching a peak of nearly 30 percent in 1976. However, wage growth declined through much of the late 1980s and by mid-1990s wages were growing very slowly. In the late 1980s wages fell, while growth was rapid in the late 1990s, averaging a little over 7 percent per year following the unprecedented upward review of salaries in the formal sector beginning late-1990s.

A variety of wage regulations have underpinned the evolution of wages since the 1970s. Regulated wage policies were introduced in Nigeria after an agreement was signed in 1977 between the Government, Nigerian Labour Congress (NLC), and the Nigeria Employers Association to establish the Tripartite Forum. Under this centralized wage setting system, wages were set in reference to a variety of other economic variables. Prior to the tripartite forum, wage agreements used to be worked out on an ad hoc basis, which was under constant threat of strikes and lockouts.
During the 1990s and early 2000, wages outcomes have been heavily impacted by centralized policy decisions. Following the lifting of wage freeze imposed in the 1980s, new wage setting guidelines were introduced in 1986. Wages were adjusted according to a weighted average of movements in the terms of trade, productivity, and the CPI.

THEORETICAL FRAMEWORK

In the neo-classical framework the labour market like other markets has its theoretical underpinning rooted in the forces of supply and demand. This interaction is germane to the determination of price (the wage rate) and quantity (the number of people employed). Intuition will show that people are not physical goods typical of the goods market. Even if there is a wage increase, supply cannot be adjusted instantaneously. Two key frictions are evident: first, additional people cannot be manufactured in response to a wage rate rise; second, the number of hours worked per day cannot be extended beyond natural levels should there be a rise in the wage rate. The income effect will postulate that an upward review of overall wages will not concomitantly result in more supply of labour; it may cause a decline in supply of labour and an increase in leisure activities. Although, the substitution effect will predict that a higher wage might cause people to increase their hours at work as the opportunity cost to work less is greater than it was prior to the increase, the income and substitution effects may be offsetting.
It should also be noted that in a typical neo-classical framework, the labour market unlike other markets a non-clearing market. The point of equilibrium hardly exists and unemployment is expected to be persistent. Anecdotal evidence suggest that without laws, labour unions or large multinational corporations, labour markets can closely resemble perfectly competitive market. This competitive edge provides the bedrock for workers to earn their marginal product of labour.

**Labour Supply Equation**

The supply side of labour market describes the size of the labour force and is influenced by exogenous factors including population growth, and endogenous variables such as unemployment rate and real wages. Mathematically, the general labour force supply function can be expressed as:

\[
lfp = f(Z, X)
\]  

(1)

Where \( lfp \) is the labour force participation, \( X \) is a set of other endogenous variables, while \( Z \) defines a vector of exogenous variables. The endogenous variables in particular, the real wage rate is a useful signpost for potential workers to take the decision on whether or not to enter the labour market if employed.

Specifically, an increase in the real wage rate motivates households to increase labour supply. Conversely, a fall in the real wage rate would reduce the supply of labour. The other important endogenous variable, the unemployment rate, has 2-sided effect on labour supply. The *discouragement effect* tends to discourage workers to participate in the workforce when unemployment levels are high because the probability of getting a job is low. At lower levels of unemployment workers are encourage to participate in the workforce.

Turning to exogenous variable, the working age population growth is also an important determinant of the labour supply. Working age population growth rate has an expected positive relationship with labour supply. However, it takes a long time to manifest its effect on labour supply. Lagged labour force is also added to the equation as an adjustment factor since cost of entry to and exit from the labour force often make the current labour force depend on its magnitude.

**Labour Demand Equation**

On the demand side, the demand for labour is derived from the firm’s profit maximization objective. Rational firms would increase their demand for workers and expands production if it will cost them less in wages than additional revenue that will accrue. The employment function can be expressed as:
\[ N = f(Z, X) \]  

(2)

Where \( N \) represents employment, \( X \) is other endogenous variables and \( Z \) is a vector of exogenous variables.

The demand for labour equation is rooted in the typical Cobb-Douglas production function with the assumption of constant returns to scale. In the short run, the simple case Cobb-Douglas production function defines real output \( y \) as a function of labour input \( N \), with the level of capital stock and other inputs \( K \) remaining constant or vary in direct proportion to labour. The shape of the production function \( y (N; K) \) shows that as labour input increases, output also increases. This will continue up to a point where an additional labour input has no impact on output and \( y (N; K) \) becomes flat. Where the added labour result in a fall in output the function \( y (N; K) \) turns downwards. The described scenario is depicted by the slope of a line from the origin to any point on the production function and is referred to as the average product of labour (APL), or average labour productivity \( y/N \). Thus, as employment increases, the APL will first rise but fall thereafter.

The slope of the production function, \( \frac{\partial y}{\partial N} \), gives the marginal product of labour (MPL). The shape of the production function is convex initially, showing increasing returns, and then concave, showing diminishing returns. Consequently, the MPL will attain a maximum point at a certain labour input where the production function transforms to concave. As a firm increases employment, the resulting increase in output is given by MPL. For a firm in perfect competition, facing a given price level, the revenue increase from an increase in employment is given as:

\[ \Delta R = P \cdot \frac{\partial y}{\partial N} \Delta N \]  

(3)

Where \( P \cdot \frac{\partial y}{\partial N} \) is the marginal value product of labour, \( R \) is revenue. The increase in cost, \( \Delta C \), to the firm hiring an additional labour is simply the money wage rate times change in labour \((W \Delta N)\). The money wage rate can be written as:

\[ W = P \cdot \frac{\partial y}{\partial N} \]  

(4)

Where \( P \) is prices and \( w \) is real wage rate. This gives us the firm’s equilibrium employment condition and the demand-for-labour function. If an addition to the labour force is such
that $\Delta R > \Delta C$, a profit-maximizing firm will hire additional labour until $\Delta R = \Delta C$. The demand-for-labour function can also be interpreted as follow: if $W > P \left( \frac{\partial y}{\partial N} \right)$, the firm will hire additional labour.

If the direction of the inequality is reversed, firms will reduce the amount of labour hired. We are assuming that the monopolistic firm’s demand for labour will be qualitatively similar to that of the competitive firm.

**METHODOLOGY AND DATA**

**Empirical Model**

Following the above theoretical framework and Singh and Hussein (2003), the empirical model is specified for the supply and demand side of the labour market below.

**Labour Supply Equation**

Thus, equation 1 can be rewritten as an Autoregressive Distributed Lag (ADL) model of the form:

$$\log(lfp) = c_1 + c_2 \log(lfp(-1)) + c_3 \log(dlf) + c_4 \log(rmw) + c_5 \log(popg) + e_t$$  \hspace{1cm} \text{(5)}

Where $lfp$ is the labour force participation, $c_1$ is a constant, $dlf$ is an interaction variable to capture the demand for labour, $rmw$ is the real minimum wage, $popg$ is the population growth and $e_t$ is an error term. Equation (5) is the estimated equation.

**Labour Demand Equations**

Thus, a generalized Autoregressive Distributed Lag model of employment takes the form:

$$\log(dlf) = c_1 + c_6 \log(lfp) + c_7 \log(dlf(-1)) + c_8 \log(capu) + c_9 \log(rmw) + c_{10} \log(wap) + e_t$$  \hspace{1cm} \text{(6)}

Where $dlf$ represents employment, $c_1$ is a constant, $lfp$ is the labour force participation, $capu$ represents the capacity utilization as a proxy for real gross domestic product; $rmw$ represents real minimum wage and $e_t$ is an error term.

Equation (6) is used as a basis for our empirical estimation. Real GDP forms a proxy for economic activity variable for demand, and has an expected positive effect on employment. It is assumed that firms choose prices, output and employment on the basis of their
expectation of economic activity. Real wages has an expected negative effect on employment due to profit motives of firms through cost minimization.

In addition, the inclusion of employment adjustment effect is necessitated by the lagged response in employment, often caused by the presence of adjustment costs on labour inputs. When firms face cost of adjusting their employment such as hiring, training, and firing costs; their current employment decisions will depend on their past employment.

Estimation Technique

In this paper, a simple double-log 2-equation model of the labour market is estimated for the period 1980 to 2007 using the method of Seemingly Unrelated Regression (SUR). The model as developed by Arnold Zellner (1962) is a technique for analyzing a system of multiple equations with cross-equation parameter restrictions and contemporaneous correlations in the error terms. SUR models consist of several unrelated systems of equations.\(^{19}\)

The current estimation seeks to analyze the labour market in Nigeria and contains both the demand as well as supply equations which are seemingly independent of each other given well acknowledge frictions in the literature that leads to the persistence of unemployment following the mismatch of supply-demand side. Although it is assumed, the model is not estimating the same dependent variable per se with relatively different independent variables. There is a chance that the equations use the same data and the errors may be correlated across the equations.

According to Briguglio (1984) the presence of wage rigidity and the existence of non-competitive market forces indicate that the labour market may not always be characterized by equilibrium. Similarly, Rudebusch (1986) tested and rejected the hypothesis of labour market equilibrium. Using US Labour market data between 1930 and 1965 Bhaskara (1990) utilises disequilibrium labour market models to evaluate the equilibrium model developed by Lucas and Rapping (1969). The author concluded that neither the wage rate nor the level of employment adjust instantaneously. In addition, a satisfactory explanation of the unemployment rate could be inferred using excess supply of labour generated from a disequilibrium labour market model.

In the same vein, Singh and Hussein (2003) estimated separate error correction equations for the supply and demand equations for labour market for Fiji. This application however

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\(^{19}\) Unrelated here implies that any variable, endogenous or exogenous, is present in only a single system.
differs from Singh and Hussein (2003) but applies SUR similar to Martin et al. (2007) which takes cognizance of the contemporaneous correlation among the residuals of different equations in the system usually not captured by the ordinary least squares (OLS).

Specifically, Martin et al. (2007) developed models of the demand for and supply of elective (non-emergency) surgery using a panel of quarterly data for 200 English hospitals over the period 1995-2002. According to them distinct measures of supply (outpatients seen and inpatient admissions) and demand (outpatient referrals and decisions to admit) are available for each observation. The availability of such data offered the opportunity to estimate separate empirical models of supply and demand using ordinary least squares (OLS) regression methods. They noted however, that the strong correlation between the residuals of these models suggests there was some merit in the deployment of seemingly unrelated regression (SUR) methods. Again acknowledging that both static and dynamic SUR estimations leave the results largely qualitatively unchanged, SUR estimation can have a considerable quantitative effect relative to the OLS results.

In another related study, Hammed et al. (2009) investigated a system of supply, demand, and price equations for Malaysian cocoa using annual data over the period 1975-2008. They noted that theoretically, in supply and demand models, the price variable should be treated as endogenous. They estimated the system of equations utilizing the Seemingly Unrelated Regression (SUR) estimation technique which according to them might be considered a more efficient estimator for supply and demand model of the Malaysian cocoa.

From the foregoing, there are two main motivations for the use of SUR. The first one is to gain efficiency in estimation by combining information on both the supply and demand side equations. The second motivation is to impose and/or test restrictions that involve parameters in different equations. The model for Nigeria uses current and lagged variables, such as employment, labour force and wages. The model contains variables designed to measure the supply and the demand for labour as well as their cross correlations.

Data Sources and Transformation

The empirical analysis was conducted using annual data from 1981 through 2007. Using the SUR, there were 27 included observations and total systems (balanced) observations of 54 using linear estimation after one-step weighting matrix. The data were obtained from the Central Bank of Nigeria, the IMF International Financial Statistics, and the Nigeria Bureau of Statistics. All variables, except for the unemployment rate, are in logs. The most important feature of the variables under consideration is their stationarity.

RESULTS

The model is estimated using Seemingly Unrelated Regression (SUR) with linear estimation after one-step weighting matrix.
Economic Interpretation of Results

The supply and demand equations for labour were estimated and results are reported in table 1. Although the results reveal a number of interesting outcomes, it should be interpreted with caution owing to data problems.

Explaining the Supply of Labour in Nigeria

On the supply side, labour force participation is largely determined by its own backward looking expectation and demand elasticities. In line with theoretical postulations labour force participation has positive but insignificant elasticities in relation to the real minimum wage and population growth.

The elasticity coefficient of the predetermined labour force participation suggests the ability of labour to sustain the momentum in the previous year based on backward looking expectations. Given that the elasticity is less than one ($\sigma < 1$) there is a significant degree of inertia associated with the change in the level of the labour force following preceding years labour force supply dynamics. Training to acquire new skills takes time to respond to demand for labour.

To support the above view, the impact coefficient of demand for labour shows that higher demand for skilled workers would probably not be accompanied by an increase in labour force participation. Only new qualifying candidates who took decisions to develop their skills begin to re-enter the labour market in the following year. Anecdotal evidence from stratified structure of educational attainment of registered unemployed illustrates this phenomenon. CBN (1997) reported that about 80.0 percent of the registered unemployed belong to the lower level workers. The number of this category of people registered with the Ministry of Employment, Labour and Productivity rose from 11,732 in 1970 to 23,239 in 1975 and 256,623 in 1980. The figure, however, plummeted thereafter. Contrary, the number of registered unemployed professionals which dropped from 518 in 1970, to a mere 135 in 1978, rose very remarkably from 1984. It rose from 2,514 in 1984 to 16,293, 22,206 and 32,942 in 1988, 1992 and 1995, respectively. This represents 1.8, 12.3, 19.7 and 28.7 percent of the total registered unemployed people, as opposed to an annual average of 1.7 percent between 1970 and 1978.

The import of the positive but insignificant relationship between labour force participation is the failure of the real minimum wage to compensate for leisure because the opportunity cost of work is leisure. With a positive relationship, the result points to a substitution effect requiring more hours of work as leisure become expensive. Currently, employers of labour demand for those with specialized kinds of skills meaning that if the wage level should go up, it is not likely that labour force participation will change much since few may have
those required skill and experience. Even if they do, they will be constrained by geographical mobility problems.

In terms of impact coefficient of population growth, although insignificant, the result confirms the postulation in economic theory of a positive correlation between unemployment and population growth. It shows that labour force participation will go up, the higher the growth rate of the population. Based on the recent population figures, projections would indicate that population could exceed 145 million by 2008 at an annual growth rate of 2.8 per cent. At this rate of growth, it can be argued that the high population growth rate has been an important determinant of the rapid growth of the labour force which is far outstripping the supply of jobs.

**Explaining the Demand for Labour**

On the demand side, coefficients of the labour force logarithmical equation allow the assessment of the impact of capacity utilization in the manufacturing sector, real minimum wage, the working age population as well as supply of labour on changes in the labour force demand. The results showed a negative relationship in labour force supply and the level of the working age population while capacity utilization and real minimum wage have insignificant but positive relationships on demand for labour. Own elasticity is significant and has a positive impact on the demand for labour.

Although, capacity utilization has a positive relationship with demand, it is insignificant, indicating that with the increase in capital input in the productive sectors of the economy, idle capacity would not permit the application of labour to produce at full capacity. For instance, energy and working capital constraints will reduce any incentives to hiring of additional labour and indeed cut down on labour force employees in these sectors. This is why even though excess capacity should inform hiring of labour the impact is insignificant. In addition, the size of the manufacturing sector in Nigeria is still developing as its overall contribution to the GDP is below 10.0 per cent and employs less than 1.0 per cent of the total labour force.

The impact of real minimum wage on demand for labour is insignificant but consistent with the view that at a higher wage rates the demand for labour is less and conforms to the marginal productivity of labour. The demand for labour is highly dependent on the productivity of the worker and of course contribution to the total productivity rises but declines after successive addition of the unit of labour.

Following from the earlier view that capacity utilization is low, demand for labour has not responded to changes in the real minimum wage in line a priori expectation. For the employer to hire additional labour, it will only be appropriate for the wage rate to remain lower to compensate for any shortfall to total revenue as a result of the extra worker. The
developments followed the impact of the dwindled fortunes resulting in unsustainable overbloated public sector and a private sector that lacked capacity to absorb all the new entrants into the labour market.

The deficiency in the private sector’s ability to perform creditably in terms of employment generation was partly attributed to government policies that crowded out the sector from the loans market. It was not until the late 1990s that the need for partnership became popular and some attention began to be paid to self-employment. Unemployment thus, became a pandemic problem as a result of the rural-urban shift in the urban areas. This was aggravated by the bouts of inflationary pressures which eroded the value of real incomes and as a consequence perpetuated the vicious cycle of unemployment.

**CONCLUSION**

This paper estimated a simple two-equation model using the seemingly Unrelated Regression to capture not only contemporaneous correlations in the errors, but also to reflect restrictions on the real minimum wage to a common coefficient. The model reflected economic variables that determine the demand and supply for labour in Nigeria in order to identify the relevant characteristics of Nigeria’s labour market and its response to exogenous innovations.

Although the results reveal a number of interesting outcomes, the findings should be viewed with caution. On the supply side, labour force participation is largely determined by its own backward looking expectation and demand elasticities while real minimum wage and population growth is insignificant but positively related to labour force participation. On the demand side, coefficients of the labour force logarithmical equation allow the assessment of the impact of capacity utilization in the manufacturing sector, real minimum wage, the working age population as well as supply of labour on changes in the labour force demand. The results showed a negative relationship in labour force supply and the level of the working age population while capacity utilization and real minimum wage have insignificant but positive relationships on demand for labour. Own elasticity is significant and has a positive impact on the demand for labour.

It is evident from the results that to fix the disequilibrium in the Nigeria’s labour market macroeconomic stability is needed to maintain prices at levels that will result in a real wage that will drive the pattern of labour market activities. Also, to boost capacity utilization, constraints to productivity such as credit availability and infrastructure must be eliminated through careful macroeconomic management as basis for reducing the unemployment pandemic by creating new jobs. We expect that this will realign educational structure to fit the drivers of growth.
### Table 1a: Model of Supply of Labour in Nigeria

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>Prob.</th>
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<tbody>
<tr>
<td>Intercept - C(1)</td>
<td>-4.491851</td>
<td>0.817507</td>
<td>0.03</td>
</tr>
<tr>
<td>Labour Force Supply (LFP_1)</td>
<td>0.598564</td>
<td>0.096001</td>
<td>0.01</td>
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<tr>
<td>Labour Force Demand (DLF)</td>
<td>-0.649667</td>
<td>0.148257</td>
<td>0.0001</td>
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<tr>
<td>Real Minimum Wage (RMW)</td>
<td>0.006858</td>
<td>0.009937</td>
<td>0.4938</td>
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<td>Population Growth (POPG)</td>
<td>0.017344</td>
<td>0.062131</td>
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<td>R-squared</td>
<td>0.664048</td>
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<tr>
<td>Adjusted R-squared</td>
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<td>S.E. of regression</td>
<td>0.048402</td>
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### Table 1b: Model of Demand for Labour in Nigeria

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<th>Coefficient</th>
<th>Std. Error</th>
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<tbody>
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<td>Intercept - C(1)</td>
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<td>0.817507</td>
<td>0.03</td>
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<td>Labour Force Supply (LFP_C(7))</td>
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<td>Labour Force Demand (DLF_1)</td>
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<td>Capacity Utilization (CAPU)</td>
<td>0.001107</td>
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<td>Real Minimum Wage (RMW)</td>
<td>0.003733</td>
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<tr>
<td>Working Age Population (WAP)</td>
<td>-0.207216</td>
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<tr>
<td>R-squared</td>
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<td>Adjusted R-squared</td>
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<td>S.E. of regression</td>
<td>0.032975</td>
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REFERENCES


Jones, E.B. (1994) “Union/non union differentials: Membership or coverage?”, *Journal of Human Resources* 17(2)


