

CHAPTER ONE

INTRODUCTION

1.1 STATEMENT OF THE PROBLEM

Minimum wage legislations are generally viewed as means of enhancing welfare of workers, particularly the unskilled category. Its origin dates back to the late nineteenth century as a response to public demands for socially acceptable level of wages among workers (Cunningham, 2007). Since then, minimum wage has been used as an economic, social and political tool by governments. Early studies of the impact of minimum wage on welfare and employment found that it constitutes dis-employment effects and as such it may not be poverty-reducing.¹ These results are in consonance with the classical model of minimum wage imposition in a perfect competitive labour market.

Card and Krueger (1994) marked a turning point on the widely held view that a rise in minimum wage reduces employment. The study finds no evidence that the rise in New Jersey's minimum wage reduced employment at fast food restaurants in the state. Other studies also found evidence that minimum wages do not have a negative impact on welfare.² Such results have been interpreted in many economic circles as empirical evidence in support of the monopsonist case (Jones, 1997). This topic still generates debate in developing countries where minimum wage is believed to be a key means of improving welfare of workers.

The Nigerian wage fixing system is characterised by infrequent and ad hoc application of the cost of living index, there has been no ascertainable principle underlying wage reviews (Yesufu, 1982). Kwanashie (1988) points out that despite the importance of factor prices in resource allocation, Nigeria has not articulated and

¹ See Browning and Johnson (1983)

² Mincy (1990) and Holland *et al* (2006) are some of these studies

maintained any consistent wage policy. This irregular wage fixing system is persistent, with adverse effect on the real wage in the country.

Further, the minimum wage in Nigeria does not seem to fulfil the social criteria of a living wage. For example, the current minimum wage of ₦18,000 (\$116) per month may not adequately support a family of five.³ Based on the international poverty benchmark of \$1.25 daily per person, a family of five would require a minimum of ₦29,000 (\$188) per month to live above the poverty line. The ₦29,000 budget covers only food items, it excludes spending on housing and other amenities.

Also, minimum wage as a political tool has continued to dominate the Nigerian wage system and possibly undermine the worth of wages. This trait manifests in political parties promising and sometimes eventually granting wage increase to win political support of the electorates. The Obasanjo government which came into office in 1999 promised welfare improvement for workers during electioneering campaigns and subsequently, the minimum wage was increased from ₦3,500 to ₦7,500 per month in 2000. Similarly, President Goodluck Jonathan signed the National Minimum Wage Amendment Act of 2011 which increased minimum wage to ₦18,000 per month in March 2011, barely few weeks to the general election. These actions were not unprecedented, as the civilian government under the leadership of Shehu Shagari in 1981 also increased the monthly minimum wage to ₦125 monthly from ₦60.

Consequently, rising income inequality and deteriorating workers' welfare have continued to question the efficacy of minimum wage legislations in the country. Data from the World Bank show that the Gini index increased from 34.18 in 1980 to 42.9 and 48.8 in 2004 and 2010, respectively. Similarly, low skilled workers' wages as a share of high skilled workers declined from 29% in 1991 to 11% in 2007. As evidenced in the annual abstract of statistics (1999), the welfare of minimum wage workers (grade level 01 workers) in the public sector deteriorated between 1980 and 1998, as real monthly wages declined from ₦248 to just ₦90 despite two minimum wage increases during this period. The welfare of the lowest category of workers in the

³ The national average household size in Nigeria was given as five persons by the Nigeria National Bureau of Statistics (NBS) in 2010. See National Manpower Stock and Employment Generation Survey (2010)

public sector improved temporarily with the rise in the minimum wage to ₦7,500 in 2000. This was however short-lived, as the real wages declined from ₦7,339 per month in 2003 to ₦4,724 in 2007.

Massive retrenchments which usually accompany wage increases in the country have also worsened workers' welfare. For example, when the minimum wage was increased from ₦3,500 to ₦7,500 monthly in 2000, one of the immediate responses was massive retrenchment across the nation. Between June 1999 and December 2000, about 58,056 persons lost their jobs. The major reasons for losing jobs were retrenchment (70.51%), retirement (24.12%) and others (including resignation, dismissal and termination, 5.37%). This job downsizing (retrenchment) affected all categories of employers - federal, state and local government, as well as the private sector (Anyanwu, 2004).

There are evidences that poverty incidence also increased from 27.2% in 1980 to 64.2% in 2004 despite upward minimum wage reviews during the period, it was 62.6% in 2010 according to the World Bank. Based on the data on poverty incidence and minimum wage in Nigeria, we can observe a tandem movement, suggesting that as minimum wage rises, poverty levels deteriorated. For example, poverty headcount jumped from 27.2% in 1980 to 42.7% in 1992, regardless of the over 300% rise in minimum wage during this period. Similarly, poverty level increased from 42.7% in 1992 to 64.2% in 2004, despite the increase in minimum wage from ₦363 per month in 1993, to ₦3,500 in 1998, and to ₦7,500 per month in 2000.

The rapid depreciation of the naira against the dollar has also undermined the worth of wages. For example, the naira depreciated significantly by 25,700% between 1981 and 2013. The minimum wage of ₦125 per month in 1981 was equivalent to \$204 US dollars, while the minimum wage of ₦18,000 per month in 2013 was \$114. Since the country depends largely on imported manufactured goods, capital goods (machineries) and even food, it is expected that this naira depreciation impacted negatively on workers' welfare. If the US dollar equivalent of minimum wage in the covered sector fell as sharply as this, the welfare deterioration in the informal sector would have been worse, coupled with the sharp rise in unemployment.

Also, worrisome is the exclusion of workers in the informal sector, part-time

and seasonal workers from the minimum wage coverage. The exclusion of the rapidly growing informal sector (size estimated at 57.9% of GNP in 2000; Schneider, 2005) could have been partly responsible for the poor condition of low-income households in the country.

The influx of workers into the informal sector is being hastened by the heightened poverty incidence and unemployment rate in the country. Further, it seems that the minimum wage reviews in the country has failed to bridge the widening income gap between the rich and the poor. This is not in consonance with the envisaged goal of minimum wage laws, to redistribute earnings to low paid workers and to lift the working poor out of poverty (DPRU, 2008).⁴

The literature reveals that the primary focus of a minimum wage legislation is to reduce poverty, and enhance welfare.⁵ Since the target groups of a minimum wage policy are the unskilled workers⁶, it is often emphasised that such a programme will raise wages, reduce income inequality and consequently improve welfare. Meanwhile, there is a concern that the series of wage increases may not have been welfare-enhancing. Contrary to some views in the literature on the welfare-increasing and poverty-reducing effect of minimum wage (see Mincy (1990) and Addison and Blackburn (1999)), poverty incidence has been trending upwards in the economy.

Despite the relevance of this topic to developmental issues, it has not received adequate attention in the Nigerian literature. Existing studies on the minimum wage in Nigeria are few and hold different views on the efficacy of the policy. The only study on the welfare effects of the minimum wage, (Falokun, 2011) did not incorporate the informal sector, adopted an aggregated labour and household. The latter made it impossible to capture the distributional effects of the minimum wage. Jones (1997) asserted that any detailed work on the minimum wage in developing countries should take account of informal sector workers. By leaving out the informal sector workers,

⁴ Minimum Wages, Employment and Household Poverty: Investigating the Impact of Sectoral Determinants. Development Policy Research Unit, School of Economics, University of Capetown.

⁵ See Stigler (1946)

⁶ It is widely believed that unskilled workers are members of poor households.

Falokun (2011) did not capture the indirect effects of the minimum wage on other actors in the labour force who are not direct beneficiaries of the policy but could be affected by it. As a result, the study did not give a comprehensive welfare analysis of the minimum wage. Similarly, no study has examined the distributional effect of the minimum wage on households in Nigeria.

The studies on the minimum wage in Nigeria assumed that labour is homogenous, thus adopting a perfect competitive labour market structure. Similarly, they assumed perfect substitution among labour categories and non-complementary factors. This assumption is too restrictive for the Nigerian labour market, in which labour is heterogenous and there is imperfect substitution among labour categories. Adopting a perfect competitive framework and a perfect labour substitution may underplay the dis-employment effect that may arise when a minimum wage is reviewed.

The pertinent research questions are: does minimum wage increases impact positively on the welfare of Nigerians under the assumption of an imperfect labour substitution and heterogenous labour/monopsonistic competitive framework? What is the re-distributional effect of minimum wage increases in Nigeria? What is the indirect impact of minimum wage increases on informal sector workers? What are the macroeconomic effects of minimum wage increases in Nigeria?

1.2 OBJECTIVES OF THE STUDY

Broadly, the focus of this study is to examine the effects of minimum wage on welfare and income distribution in Nigeria. The specific objectives of the study include to:

- i) examine the impact of minimum wage increase on households' welfare in Nigeria under the assumption of a monopsonistic competitive framework.
- ii) highlight the employment, consumption demand, and macroeconomic effects of the minimum wage; and
- iii) determine the resulting income distribution pattern arising from minimum wage increases.

- iv) examine the indirect effects of minimum wage increases on workers in the informal sector.

1.3 JUSTIFICATION FOR THE STUDY

The literature is replete with studies on the impact of minimum wage on workers' welfare.⁷ Although, empirical results are mixed, bulk of the studies have shown that minimum wage increase may not be welfare enhancing and effective in redistributing income to poor households as widely believed.⁸

The dissenting views among authors can be traced to the choice of methodology, data and assumptions. The general equilibrium method as opposed to the partial equilibrium approach, incorporates direct and indirect effects of minimum wage, and thus welfare and poverty effect differs significantly (DPRU, 2008). Since the computable general equilibrium method takes account of impact and spillover effects, thus accommodating factor elasticity of substitution, and interrelationship among economic agents made possible through its data base; the Social Accounting Matrix (SAM), it gives more robust and comprehensive results. Findings from studies which have used this method are also not conclusive (see Folawewo, 2009 and Falokun, 2011). Different assumptions, choice of elasticity of substitution parameter, and disaggregation of the SAM are some of the reasons for this divergence.

Regardless of the methodology adopted, conclusions of studies in the developed countries cannot be justified in developing countries due to huge differences in labour market structure, particularly in terms of the existence of a large informal sector in developing countries, not covered by the minimum wage (Alatas and Cameron, 2008).⁹ In Nigeria, the informal sector is large and dominated by low income earners. The informal sector accounts for about 68% of the labour force, meanwhile the direct effect of a minimum wage increase may not impact them. However, the

⁷ See Golan *et al* (2001), Dinardo *et al* (1996), and Dickens and Mannings (2004) for some of these studies

⁸ Some of these studies are Neumark *et al*(2005) and Golan *et al* (2001)

⁹ For instance, in the Nigeria Minimum Wage Act, part-time workers are not entitled to earn minimum wage.

potential rise in prices and other ripple effects of a wage rise in the formal sector may indirectly affect them. A study of this nature could provide policy input into effective transfer programmes which could impact positively on workers' welfare and also bridge the gap between the low and high income households.

This type of study has not been given adequate considerations in Nigeria. The few that have examined the effects of minimum wage also hold different views. Folawewo (2009) and Falokun (2011) find minimum wage improved and worsened the welfare of workers respectively. Taiwo et al (2005) also emphasised the dis-employment effects of the minimum wage in Nigeria. The major drawbacks peculiar to these studies are failure to capture the indirect effects of a minimum wage increase, and non-consideration of the heterogenous nature of workers. Taiwo *et al* (2005) assumed that all urban formal workers (i.e. implicitly meaning skilled and unskilled workers) benefitted from minimum wage increases, but incorporated the informal sector. Folawewo (2009) and Falokun (2011) did not take into account the informal sector. According to Jones (1997), any comprehensive study on minimum wage in a developing country should incorporate the informal sector. In addition, these studies assumed a perfect competitive labour market theory for the Nigerian labour market. This is unrealistic in the Nigerian setting where labour is heterogenous, employers have a degree of market power, and individual firms face an upward sloping labour supply curve. This study attempts to fill these gaps by; focusing on labour disaggregation, assuming that only formal unskilled workers benefit directly from the minimum wage; incorporating the informal sector; and adopting a monopsonistic competition labour market theory, which better explains the Nigerian labour market. Among these studies, only Falokun (2011) examined the welfare effects of the ₦18,000 per month minimum wage in Nigeria. Notably, he did not capture the distributional effects of the minimum wage increase since he assumed labour and household aggregation, also the informal sector was not incorporated.

In addition, since minimum wage seems to be one of the few welfare transfer programmes for unskilled workers in Nigeria, unlike in the developed countries, it is worth investigating if it is indeed welfare improving.¹⁰ Nigeria is plagued by high

¹⁰ Numerous welfare programme such as food stamps and supplemental security income exist in developed countries

poverty incidence, and empirically it is established that in Nigeria, poverty rate and income inequality move in tandem (Okojie *et al*, 2000; Ogwumike, 2001; and Human Development Report, 2008), in view of this, considering a study as conceived above in the context of the Nigerian economy is germane. The extent to which an individual or household participates in the labour market and also remunerated can determine the status of the household and the risk of poverty(Ogwumike *et al*, 2010)

Similarly, given that it is established in the literature that minimum wage workers not only reside in low income households, but also in middle and high income households, a minimum wage rise is expected to impact on the entire income distribution.¹¹ Hence, it is necessary to investigate the outcome of the redistribution of such a policy.

1.4 SCOPE OF THE STUDY

This study focuses on the income distribution and welfare effects of minimum wage increases in Nigeria. A static CGE model was adopted, and the 2006 Nigerian SAM used as database. The choice of a static model is due to its ability to capture feedback effects of one-off policy shocks. Also, in the study of a minimum wage, policy adjustment to time may be unnecessary since it is known that minimum wage effects on the economy can often be seen within a year (Holland *et al.*, 2006).

1.5 OUTLINE OF THE STUDY

The thesis is organised into six chapters. Following this introductory chapter is chapter two, which provides the background to the study. Besides presenting information on the evolution of minimum wage in Nigeria, it highlights salient features of the Nigerian informal sector. Chapter three focuses on the theoretical, methodological, and empirical literature on the relationship among minimum wage, income distribution, and welfare. The theoretical literature is explicitly reviewed as it provides insight on how the different labour market theories respond to the imposition of the minimum wage. Chapter four dwells on the theoretical framework underpinning the research as well as the specification of the model and data description. Chapter five

¹¹ Some of these studies are; Gramlich (1976), Browning and Johnson (1983), Burkhauser and Finegan (1989), and Manning and Bird (2005).

presents the model simulation results and discussion. Chapter six is summary of the major findings, policy implications, limitations encountered and conclusion.

CHAPTER TWO

BACKGROUND TO THE STUDY

2.1 The Nigerian Labour Market

The size of the Nigerian economy in 2013 was estimated at ₦80.2 trillion in nominal terms (CBN, 2013). The performance of the economy prior to 2010 was driven by crude petroleum and agricultural sectors as shown in Table 2.1. The services and agricultural sectors contributed most to the GDP post-2010.¹²

All sectors of the economy employ basic inputs: land, labour and capital in the production process. Labour is employed by all sectors, but in different quantities. The Nigerian labour market, as in most developing countries is dualistic, encompassing the formal and informal sectors. The formal comprises the public sector and the organised private sector. Wage setting in the formal sector is often precursored by activities in the public sector, although it has been shown that private sector wages sometimes dominate.¹³ The leading role of public sector wage settlements in the determination of private sector wage structure dates back to the colonial period (Kwanashie, 1988).

The interplay of market forces, collective bargaining, ad hoc wage commissions had dictated wage determination process in the formal sector. The role of market forces became evident in the Nigerian wage setting in the early 19th century. Scarcity of labour in the public and private sectors compelled firms to pay high wages to labour, despite their low productivity (Yesufu, 1982). The government often set up ad-hoc wage commissions to address workers' agitations and demand for pay rise. Between 1941 and 1963, ad hoc commissions dominated, the cost of living as an index for wage

¹² The declining trend in the contribution of the agriculture sector to the GDP and the increase in the share of services and manufacturing sectors observed from 2010 was as a result of the GDP rebasing, using year 2010 as the base year, carried out in 2014.

¹³ Aminu (2011) finds that before the national minimum wage increase in 1998, public sector workers were underpaid compared to private sector employees.

revision became the fundamental basis for wage reviews (Yesufu, *ibid*).

Table 2.1. Nominal Gross Domestic Product in Nigeria by Key Sectors (%).

Sectors/Year	2002	2004	2006	2008	2010	2013
Agric.	36.52	34.21	32.00	32.85	23.96	21.97
Petroleum & Solid minerals	34.69	37.33	37.76	37.59	15.60	14.50
Manufacturing	6.51	3.06	2.58	2.41	6.60	6.83
Building & construction	1.21	1.46	1.35	1.26	2.90	3.12
Wholesale and retail trade	11.76	13.01	14.77	14.42	16.44	17.02
Services	9.30	10.93	11.55	11.47	34.50	36.56
Total	100	100	100	100	100	100

Source: CBN Statistical Bulletin, 2013

Notably, other wage commissions such as the Morgan Wage Commission of 1963, revised wages based on the observed widening wage disparity between low and high income earners, it granted wage increases only to low income earners. The commission also considered the ability of the government to pay by emphasising that irrespective of the observed wide wage differentials between the actual and potential wages for low income earners, the narrowing of the gap should be gradual. Adebo Wage Commission (1971) stressed that collective bargaining alone would not keep wages in proper national balance in view of the comparison between private and public sectors and in relation to the available real resources. The Udoji Commission (1974) was notable for granting wage increases based on productivity, cost of living, and comparable pay in the private sector due to its objective to harmonise public and private sectors wages. The objective of harmonising public and private sectors wages was jeopardised due to corresponding wage increases in the private sector following agitations from workers. As opined by Yesufu (1982), trade unions in the private sector due to their relative strength have been able to fight vigorously for wage increases, following major government awards in the public sector. It is worth noting that productivity has not been emphasised in the public sector wage adjustment (Ojo *et al*, 1986).

The informal sector constitutes about 68% of the total workforce, often distinguished by its poor or non-regulatory nature, small size, small capital requirement, easy entry, non-pensionable, low tax or tax avoidance, etc. The informal sector in Nigeria is fast growing, one of the largest in Africa. It grew from 46.7% of GDP in 1990/91 to 57.9% in 1999/2000 and to 53% in 2006 (Schneider, 2005, 2012). High unemployment rate, estimated at 23.9% in 2011 by the Nigerian National Bureau of Statistics (NBS); a rising population of over 170million; huge cost of operating in the formal sector; and a rising poverty incidence have been highlighted as the probable causes of the tremendous growth in the informal sector. The ownership of informal businesses in Nigeria increased by 58% from about 8 million in 1999 to 13.5 million in 2009.¹⁴ The Nigerian agriculture sector is dominated by informal activities and thus,

¹⁴ Computed from CBN/FOS/NISER(2001) and NBS(2010)

regarded as the largest informal sector activity in the country, followed by wholesale and retail trade and manufacturing in that order.

A survey of the informal sector in Nigeria carried out by the NBS in 2001 revealed that the sector contributed 37.8% to the GDP in 1998. Excluding agriculture, the informal sector contributed only 6.7% to the national output. Manufacturing and non-manufacturing activities contributed 4.7% and 2%, respectively. Total employment generated by the informal sector was estimated at 12,407,348. The manufacturing and non-manufacturing sectors accounted for 27.7% and 72.3% respectively. A salient feature of the informal sector is the persistent dominance of low-skilled workers in Nigeria, although skilled workers are increasingly being pushed into this sector due to rising unemployment in the formal sector. Figures 2.1a, 2.1b, and 2.1c show the nature of informal sector workers in Nigeria by educational qualifications in 1999, 2004, and 2010.

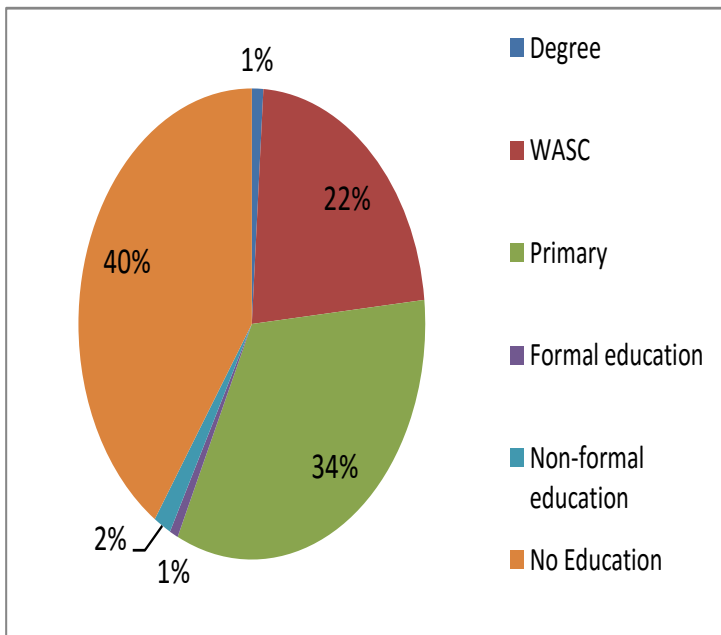


Figure 2.1a. Informal Sector Workers in Nigeria by Educational Qualifications in 1999

Source: Drawn by the author using data extracted from Statistics on Nigeria's Informal Sector: CBN/FOS/NISER 2001

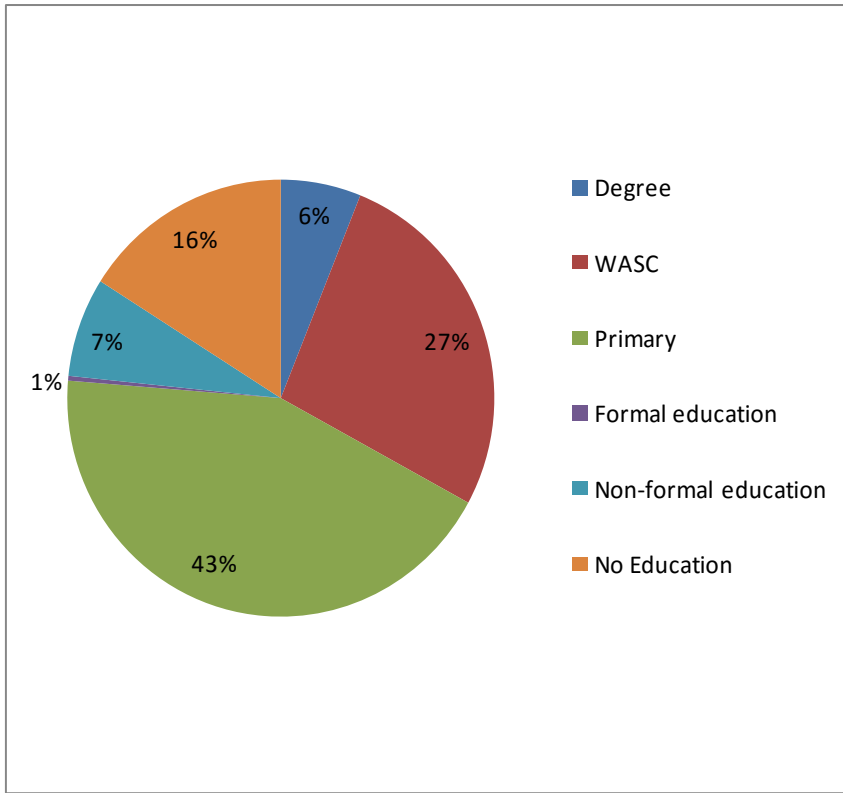


Figure 2.1b. Informal Sector Workers in Nigeria by Educational Qualifications in 2004

Source: Drawn by the author using data extracted from the Nigerian Living Standard Survey (2004).

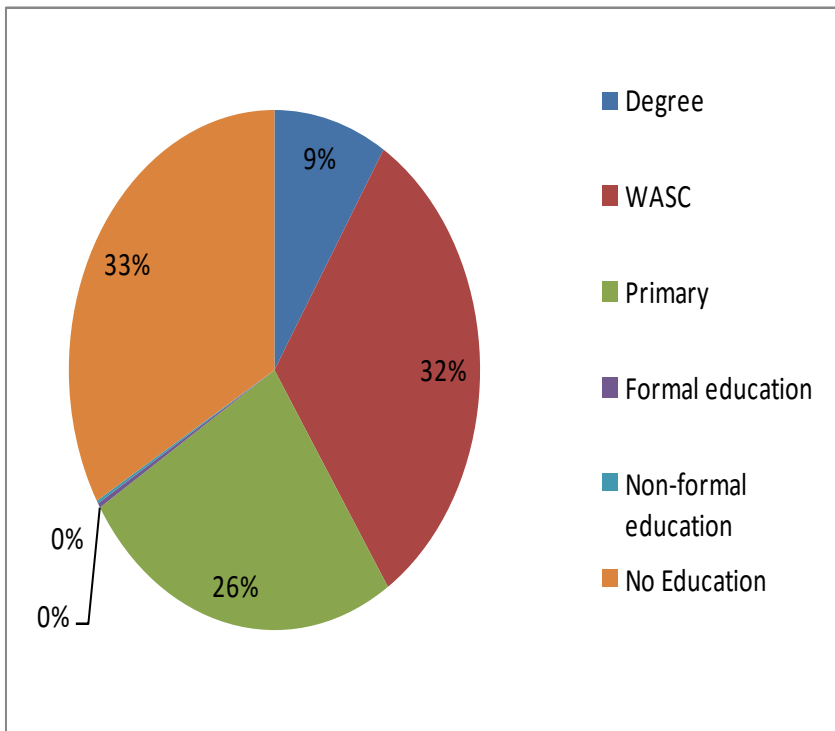


Figure 2.1c. Informal Sector Workers in Nigeria by Educational Qualifications in 2010

Source: Drawn by the author using data extracted from the Harmonised Nigerian Living Standard Survey (2010).

Figures 2.1a, 2.1b, and 2.1c show increasing participation of degree holders in informal activities. For instance, in 1999, degree holders accounted for only 1% of informal sector activities. This increased to 6% and 9% in 2004 and 2010, respectively. The increased participation of this category of people in informal activities may be linked to high unemployment in the formal sector, thus pushing people into the informal sector. The same trend is recorded by people with WASC qualifications. It is also worth noting that on the aggregate, a substantial proportion of workers engaged in informal activities in 1999, 2004, and 2010 are low-skilled, made up of those with no education, primary education and West Africa School Certificate (WASC). This category of people constitutes a large section of the poor, not covered by minimum wage legislation.

Another major attribute of the Nigerian informal sector enterprise is the dominance of sole proprietorship. Figures 2.2 and 2.3 show the distribution of informal sector workers in Nigeria in 1999 and 2009, respectively. In 1999, sole proprietorship business dominated the informal sector, accounting for 75%. Unpaid family workers accounted for 14%, while the share of paid employees was 4%. A survey carried out by the NBS which covered 54,643,676 informal sector workers in Nigeria, shows that as at September 2009, 62% of them were sole proprietors. This was followed by unpaid family workers (17%), apprentice (9%), and casual workers (9%) (Figure 2.3).

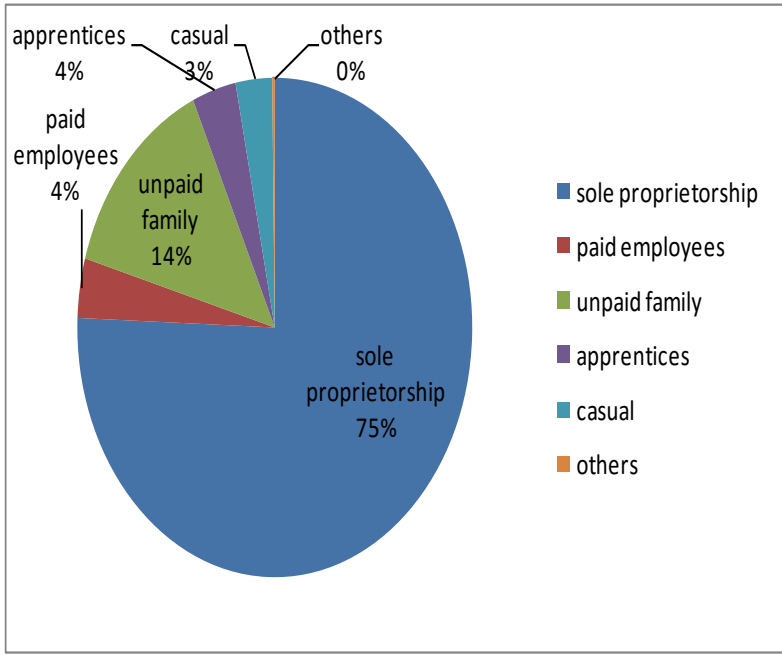


Fig 2.2: Distribution of Informal Sector Workers in Nigeria (1999)

Source: Computed by the author from CBN/FOS/NISER(2001)

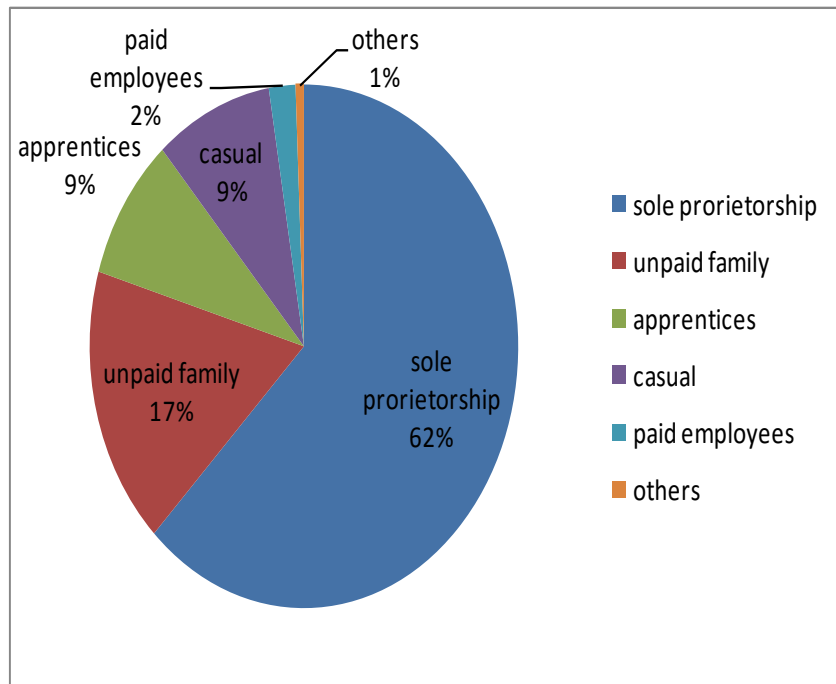


Fig.2.3: Informal Sector Workers in Nigeria.

Source: Author's computation from NBS survey(2010)

Worthy of note also is the increase in the proportion of casual workers from 3% in 1999 to 9% in 2009. Also, the proportion of apprentices and unpaid family increased, while sole proprietorship declined from 75% to 62% over the same period. A probable explanation for the decline in the proportion of proprietorship is lack of start-up capital and access to credit. This may have prompted labour to hire out its services to employers as casual labourers.

Evidence from the NBS (2004) also shows that about 60% of Nigerian households' income is from labour. This is not surprising, because labour is the major asset of a substantial proportion of Nigerian households. The agricultural sector employs the largest volume of labour, as reflected in the labour income earned by workers in this sector in the 2006 social accounting matrix. Figure 2.4 shows that agricultural workers received the largest labour income share, 39%. Also, agriculture, wholesale and retail trade employ a large share of the labour force. This evidence is corroborated by the distribution of employed persons by activity in Nigeria in 2010 as shown in Table 2.2, where agriculture and trade engaged more than half of total employed persons.

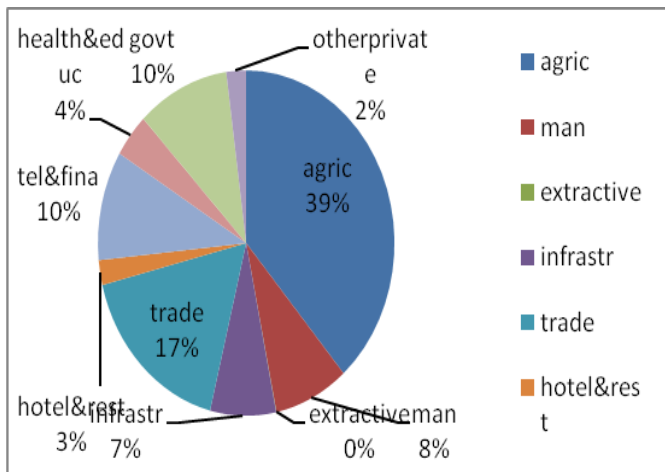


Figure 2.4. Share of Labour Income Paid to Sectors in the 2006 Nigerian SAM

Source: 2006 Social Accounting Matrix for Nigeria, IFPRI

Table 2.2. Employed Persons by Economic Activity in Nigeria (2010)

Activity Category	Distribution	
	No. of Persons	Percentage (%)
Agriculture, Forestry and Farming	14,837,693	30.5
Wholesale and Retail Trade	12,097,189	24.9
Manufacturing	5,337,000	11.0
Government	5,497,903	11.3
Health and Education	2,297,601	4.7
Finance and Communication	640,916	1.3
Construction	1,211,266	2.5
Extractive	146,488	0.3
Hotel and Restaurant	3,120,583	6.4
Other Private Services	3,415,378	7.0
Total	48,602,017	100

Source: Computed using Nigeria NBS, National Manpower Stock and Employment Generation Survey, 2010.

2.2 The Evolution of Minimum Wage in Nigeria

Nigeria's wage earning system dates back to 1900. Early attempts by the British administration to recruit local labour were met with resistance. The shortage of labour compelled private commercial firms to raise wage rates to outrageous levels to attract workers (Yesufu, 1982). By 1910, when it appeared that the problem of labour shortage had not abated and the British administration was unable to pay these high wage rates, it resorted to forced labour.

According to Yesufu (ibid), the primary motive behind the wages paid to labour was to ensure a ready market for British imported goods, without making provision for a minimum standard of living for the locals nor bridge the existing income gap. The rapid development, opening up of the country through construction and improved communications with the outside world, presented local labours with increased access to goods of modern civilisation, which could only be purchased with money (Yesufu, ibid). In 1933, the colonial government passed the Forced Labour Ordinance, following the adoption of the Forced Labour Convention by the International Labour Organisation (ILO) in 1930. This act reduced the use of forced labour, which persisted until 1956 when the government signed the Labour Code (Amendment) Ordinance. By 1960, when Nigeria gained independence, compulsory labour had ceased completely.

The idea of a minimum wage could be traced to the Provincial Wages Committee, set up in 1937 with the primary goal of periodically reviewing wage rates of daily-paid labour. The committee emphasised the need for wages to reflect the cost of living and differences in geographical location.

The idea of a living wage was first raised by the Morgan Commission of 1963, which advocated that in wage fixing, family responsibilities such as accommodation, food, clothing and transport should be considered (Fashoyin, 1980). Using these criteria of a living wage, it noted that workers had been exploited over the years.

Yesufu (1982) emphasised that this points to the degree of exploitation that had been built into the Nigerian wage structure since the economic depression of the 1930s. The Morgan Commission recognised the huge wage disparity that existed between the lowest categories of workers and the highest paid administrative workers. It therefore recommended wage increases only for junior workers (who are daily-paid) in order to bridge the wage differentials. This was granted by the government. Further, it reduced the wage zones at the lowest level of the wage spectrum in the country to six, four in the north and two in the south. Meanwhile, political interference in the wage structure of the Nigerian economy prompted the Northern Regional Government¹⁵ to unilaterally reduce the zones to four (two each in the north and south) and granted a 10% wage increase to daily-paid workers in the North. This act, politically motivated was an attempt to consolidate the hold on power in the north by the ruling party. The resulting wage zones and prevailing wage rates are shown in Table 2.3

¹⁵ The Northern People's Congress was the party in power in the north. Also, the Prime Minister was a member of the party.

Table 2.3. Zonal Wage Rates in Nigeria in 1964

Zone	Wage Rate
1) Lagos	7s 8d per day (or £10/ ₦ 20 per month)
2) Western, Eastern and Mid-western regions	6s 5d per day (or £8.2s 6d/ ₦ 16.25 per month)
3) Kaduna, Zaria, Kano and Jos urban areas	5s 6d per day (or £7.3s 0d/ ₦ 14.30 per month)
4) Northern Nigeria excluding the urban areas indicated in 3 above	5s 0d per day (or £6.10s 0d/ ₦ 12.50 per month)

Source: culled from Yesufu 1982

The end of the civil war in 1970 was marked by agitations from workers and labour unions who clamoured for increase in wages. The call for a wage-rise was premised on two factors. First, wage freeze of all categories of public sector workers between 1967 and 1970. Second, the cost of living rose sharply due to supply shortages and major disruptions due to the Nigerian civil war, thus reducing the purchasing power of workers. These developments prompted the government to set up the Adebo Wages and Salaries Review Commission. This commission was saddled with the primary responsibilities of reviewing existing wages at all levels in the public service; and examining areas in which rationalisation and harmonisation of wages and conditions of employment are desirable and feasible between the public and private sectors.

The Adebo Commission applied to all categories of workers, unlike the Morgan Commission wages review which focused exclusively on low wage/unskilled workers. The second objective of the commission was borne out of the fact that wages in the private sector had not been stagnant, indeed it has risen much higher than what obtained in the public sector for the same post. The public sector is characterised by irregular response of wage review to reflect living costs. It has become a norm for the government to set up ad hoc commissions to review wages when there are agitations, lockouts and downing of tools by workers (Aminu, 2011).

In its interim report, the Adebo Commission found that cost of living in the urban areas of Nigeria rose by not less than an average of 34% between 1964 and 1970.¹⁶ In this respect, it subscribed to the Morgan commission's definition of a minimum wage and emphasised that it should reflect living costs and the ability of the employer to pay. That is, it should have an economic and a social content. It therefore

¹⁶ Worth noting is that public sector workers received a wage increase in 1964 before the civil war and was granted only to unskilled workers on the recommendation of the Morgan Commission.

recommended a temporary cost of living allowance of 1s-7d per day and £2 per month for daily-rated and monthly-paid workers earning less than £500 annually. This wage increase was approved by the government. According to the report, this class of workers were badly hit by the rapid rise in the price level, and thus, needed urgent relief.

The wage increase was uniform across the zones, thus disregarding the practice of zonal wage differentiation which existed among daily-rated workers. At this stage, it is imperative to make a distinction between daily-rated and monthly-paid workers. Daily-rated workers are unestablished or casual labour, they are not entitled to pension or gratuity. Their wage rates vary across the delineated wage zones which existed in the country during the period, oftentimes mirroring the living cost of the zones, mostly they consist of unskilled and semi-skilled workers. Monthly-paid labour on the other hand are full-time workers who earn higher wages than daily-paid workers. In addition, wages paid to monthly-paid workers are not zoned, but uniform.

In the final report submitted to the military government on the 6th, August, 1971, the Adebo Commission made some salient findings and recommendations. It advocated for an enforceable and uniform minimum wage across the country. The commission suggested that uniformity of wages should be a gradual process, until it is phased-out in April 1976. On this basis, the wage zones were reduced to three from the existing four zones (**Zone 1-** Lagos State, **Zone 2-** Western, Mid-western, East Central, Rivers, South Eastern, Benue-Plateau, Kano and North Central states, **Zone 3-** Kwara, North Eastern, and North Western states; and minimum wages were set for each zone. Wage increases were also granted to high-level workers. A summary of the wages is shown in Tables 2.4 and 2.5

Table 2.4. Legal Minimum Wage and Revised Wage Rate to Daily-rated Labour (Adebo Commission)

	Zone 1	Zone 2	Zone 3
Legal Minimum Wage	7s per day £9-2s-0d per month	6s-6d per day £8-9s per month	6s per day £7-16s per month
General Award (daily-paid workers)	10s per day £13-0s-0d per month	8s-9d per day £11-10s-0d per month	7s per day £9-2s-0d per month

Source: Adebo Commission report 1971

Table 2.5. General Award to Established or Monthly-rated Workers (Adebo Commission)

Salary range (£ per annum)	Award
≤ 200	30% of salary or £36 (whichever is higher)
$>200 \leq 500$	£60
$>500 \leq 1000$	£120
$>1000 \leq 2000$	£180
$>2000 \leq 2500$	£240
>2500	£300

Source: Adebo Commission report 1971

The determination of the minimum wages for the zones was based on employers' capacity to pay and living costs. Although the military government approved the minimum wages, it gave no legal backing to it. Government was of the opinion that enforceable wages would result in massive unemployment and therefore suggested that the status quo machinery for enforcing minimum wages in industries continue to hold. Other general awards for daily-rated and monthly-paid labour were however officially authorised.

The Adebo Commission in an attempt to narrow the gap between low and high income earners granted a larger percentage increase (i.e. 30%) to the former, while the latter received a 10% wage rise. Nevertheless, in monetary terms, the wage differential between these groups widened. The monetary gap increased from £2800 to about £3040. Worthy of note is that the Morgan Commission had advised against granting of percentage wage increases across worker stratum in a bid to narrowing wage gap. The Adebo Commission recommended that a Public Service Review Commission be set up to review the structure of the service and develop a new grading structure unifying all professionals, administrative and other classes. It also advised that a National Board on Productivity, Prices and Incomes be established to rationalise and harmonise remunerations in various sectors of the national economy.

The urgent need to review the public service structure and the grading system as suggested by the Adebo Commission led to the setting up of the Public Service Review Commission, also known as the Udoji Commission in September, 1972. Its objectives specifically were to correct the anomalies in the existing salary grading structure thereby ensuring the right pay for the job posts and also to harmonise the artificial wage differentials between the private and public sectors. The Commission

submitted its report exactly two years after its inauguration in September, 1974.

The Udoji Commission became notable in the history of Public Service in Nigeria for some of its proposals, which the government acceded to. It recommended that the existing cumbersome grading of over 100 scales and super scales be reduced to 17 (Grade 1-17). Among its suggestions was that permanent machinery be set up to review wages periodically, using living costs, productivity and pay levels in the private sector as criteria. The government gave consent to its wage recommendations and approved increases of ₦2.00, ₦1.75, and ₦1.40, for daily rated workers (semi-skilled and unskilled) in zones 1, 2, and 3 in that order. Monthly-rated labour also received a minimum wage of ₦60 (\$100) per month and maximum wage of ₦1,025 (\$1,708) per month.¹⁷ However, the Udoji Commission failed in some respects. Its goal to harmonise wages of public sector with private sector was not achieved, as private sector workers pressed for increased wages following the approval of Udoji Commission awards for public sector workers thus defeating the objective of the exercise. In addition, the wage increases in the public sector as recommended by the commission contributed to the widening of the monetary gap between low and high income earners since it was based on percentage and across all categories just like the Adebo Commission awards.

It is noteworthy that in 1973, the National Wages Board and Area Minimum Wages Committees were established by the Wages Board and Industrial Council Decree of 1973. They were saddled with the primary goal of ensuring improvement in the welfare of unskilled workers. Among the responsibilities of the Board was to regularly appraise the adequacy of minimum wage rates for unskilled workers based on recommendations from Area Minimum Wages Committee.

In 1976, the government established the Productivity, Prices and Incomes Board (PPIB) as earlier suggested by the Adebo Commission to ensure that the structure of remunerations and their periodical adjustments are kept in proper national balance. This was meant to replace the ad hoc commissions which often featured in the country's wage determination process.

¹⁷ The dollar value was computed using the naira-dollar exchange rate prevailing during the period.

Consequently in 1977, low income groups on grade levels 01-06 received a boost of about 10% average rise in wages. This gesture excluded the high wage earners (grade levels 07-17) and thus, bridged the wage differential between the two groups. Efforts to further narrow the wage gap was made in 1979, when another round of 10% increase was granted junior employees, while senior employees were deprived 50% of their vehicle allowances.

2.2.1 The Minimum Wage Act of 1981 and Uniform Wage

In 1981, during Alhaji Shehu Shagari administration, the National Minimum Wage Act was passed into law, thus abolishing the non-uniform wage system across zones. With the new Act, minimum wage became enforceable and backed by law. Collective bargaining was reintroduced and the minimum wage increased to ₦125 (\$209) per month (excluding allowances). Allowances were estimated at ₦225 for the least paid civil servants.

This Act was binding on employers with at least 50 employees. The choice of 50 employees was probably an attempt to increase the coverage of the minimum wage in Nigeria and workers' standard of living. Employees working part-time, seasonal workers, and those paid on commission basis were not covered by the legislation.¹⁸ The exclusion of part-time and seasonal workers from the minimum wage coverage could have also been partly responsible for the poor condition of low income households in the country. This is because poor households have as their major occupation farming, and would rather work part-time. As evidenced in the Nigerian Living Standard Survey of 2004, farmers constituted about 76% of the core poor.

Following the adoption of the Structural Adjustment Programme (SAP) in the mid 1980s, stringent measures on wages were taken. Some of the conditions to be met by countries seeking loans under the SAP were the deregulation of the labour markets and reduction of fiscal deficits. Liberalisation of the labour market meant the phasing out of institutional fixing of wages. These conditions and earlier wage freeze imposed

¹⁸ Part-time workers are those working for less than 40 hours in a week according to the Minimum Wage Act of 1981

led to stagnancy in wages between 1983 and 1988, despite about 76% rise in the general price level during the period.¹⁹ Other stringent wage measures include the issuing of an amendment to the 1981 minimum wage Act by the military government in 1986, which exempted employers with less than 500 workers. The Decree was however revoked in 1987 to the status-quo.

Following the lifting of the ban on wage increase in 1988, public sector workers received a fillip in their wages through allowances and elongated salary introduced. This across-board wage increase narrowed the inequality in the wage distribution. Wages of grade level 1(GL 01) public sector workers as a share of (GL15) workers increased from 14.4% in 1987 to 22% in 1988. It increased further to 23.4% and 24.6% in 1989 and 1990, respectively. Meanwhile, the minimum wage was left at ₦125. This means that in real terms, the worth of the minimum wage declined by about 63% since 1981. This realism of loss of purchasing power of minimum wage workers was acknowledged by the government and a tripartite committee made up of labour, employers and the government, set up to determine a new minimum wage (Akabogu, 1991) .

In 1991, following the failure of the tripartite committee to reach a consensus on wage review, the minimum wage was unilaterally increased by president Ibrahim Babangida²⁰ to ₦250 per month from ₦125. In dollar terms, the minimum wage declined from \$209 per month to \$31 per month. Given the rapid depreciating value of the naira against the United States (us) dollar, it meant that the monthly minimum wage was less than the previous ₦125. Since Nigeria imports most of her food items, the negative impact on people's welfare could be imagined. The major food items imported in 1991 were; milk, stock fish, beverages, wheat, animal and vegetable oil, live animals and sugar. Food import accounted for 8.3% of total import in 1991. The minimum wage concept was also redefined to include other allowances such as rents and transportation. Going by this new conceptualisation of the minimum wage, it meant that the minimum wage of ₦250 was less than the total salary package received

¹⁹ The wage freeze lasted from 1982 to 1988.

²⁰ President Babangida was the Nigerian military President from 1987 to 1992.

by minimum wage workers in 1981.

Another irony of the minimum wage is that according to the Nigeria Employers Consultative Association (NECA), a significant proportion of its members were already paying more than ₦250 per month as total emolument to the least paid worker before the minimum wage was set at that rate, thus only few workers benefitted from it. In addition, as at 1990, civil servants on grade level 01 (the least paid government worker) earned more than ₦250 per month in nominal terms. Also, evident is the widening of wage differentials between GL 01 and GL 15, following the redefinition of the minimum wage as shown in the fourth column of Table 2.6. In 1991, grade level 1 workers earned 28.85% of grade level 15 workers' salaries. By 1993, it had declined to 22.36%. This is an indication that some readjustments took place which negatively affected the wages of low-class workers.

Table 2.6 Real Wages of Grades level 1 and 15 Public Sector workers

	(GL 01)Real Public Sector Wages (₦ per month)	(GL 15)Real Public Sector Wages (₦ per month)	GL 01 Wages as a Share of GL 15 Wages (%)
1980	248.24	2,110.07	11.76
1981	242.72	1,833.01	13.24
1982	290.09	1,926.13	15.06
1983	240.50	1,614.77	14.89
1984	175.92	1,187.96	14.81
1985	175.54	1,228.25	14.29
1986	166.03	1,157.97	14.34
1987	152.17	1,056.78	14.40
1988	151.77	689.62	22.01
1989	114.59	489.70	23.40
1990	119.54	485.40	24.63
1991	123.90	429.51	28.85
1992	110.03	381.42	28.85
1993	113.41	507.31	22.36
1994	126.45	550.94	22.95
1995	79.08	379.66	20.83
1996	59.19	266.78	22.19
1997	63.08	348.84	18.08

1998	90.21	386.24	23.36
2003	7,339.08	63,702.67	11.52
2004	6,382.02	52,279.58	12.21
2005	6,476.62	56,512.98	11.46
2006	7,421.85	68,793.84	10.79
2007	4,724.28	43,789.84	10.79

Sources: Computed from Annual Abstract of Statistics (1999, 2001, 2009,) and Federal Office of Statistics Review of the Nigerian Economy, 1992, 1998.

The rationale behind the redefinition of minimum wage is difficult to explain. Nonetheless, one may be tempted to see it as an attempt by the government to control its wage bill due to declining oil revenue as oil prices dropped in the 1980s. Annual average of oil prices declined from \$37.42pb in 1980 to \$14.87pb in 1988. Oil revenue constitutes about 80% of total fiscal revenue in Nigeria. As shown in Table 2.7, wage bill as a share of total budget did not exceed 15% between 1984 and 1991, thus it can be inferred that the burden of personnel cost was not too high during this period. Similarly, personnel cost was less than a quarter of total recurrent expenditure, suggesting that the chunk is allocated to overhead cost.

Table 2.7. Federal Government Expenditure and Personnel Cost (₦Naira, Billion)

	Total Budget	Recurrent Expenditure	Personnel Cost	Personnel Cost as a % of Recurrent	Personnel Cost as a % of Total Budget
1984	10.008	6.072	1.078	17.8	10.8
1986	11.581	5.635	1.064	18.9	9.2
1987	17.506	10.749	1.455	13.5	8.3
1988	24.365	13.706	2.112	15.4	8.7
1989	30.107	20.810	3.394	16.3	11.3
1991	38.665	25.580	5.664	22.1	14.7
2004	1,504.20	1,110.8	370.4	33.3	24.6
2005	1,919.70	1,321.3	443.3	33.5	23.0
2006	2,038.00	1,390.2	527.9	37.9	25.9
2008	2,359.32	1,724.60	791.30	45.9	33.5
2009	2,562.82	1,766.08	1,006.34	57.0	39.3
2010	4,281.57	2,717.92	1,488.31	54.8	34.8
2011	4,008.58	2,861.83	1,686.16	58.9	42.1
2012	4,343.39	3,003.40	1,826.89	60.8	42.1
2013	4,670.43	3,048.96	1,860.29	61.0	39.8

Source: Computed by author from the Federal Republic of Nigeria Approved Revenue, Recurrent and Capital Expenditure for various years.

Personnel cost as a share of the total budget increased significantly to 24.6% in 2004, peaked at 42.1 in 2011 and 2012. It declined marginally to 39.8% in 2013. Similarly, wage bill dominated the recurrent expenditure between 2004 and 2013, it accounted for 61% in 2013. The expanding personnel cost may be the reason for Federal Government's reluctance to accede to agitations for wage increases from workers and their unions.

In 1993, as part of the provisions in the federal budget, the minimum wage was increased to ₦363 per month. The rise came as a result of the need to cushion the inflationary effects of the rapidly depreciating naira, following the deregulation of the foreign exchange market in 1992 (Aminu, 2011). Further, in September 1998, the General Abubakar regime increased sharply the minimum wage to ₦5,200 per month and directed states and local governments to determine their rates of pay subject to monthly minimum of ₦2,800. This resulted in conflicts among the tiers of government, as the state and local government were not able to match the ₦5,200 minimum for federal civil servants. This, coupled with a protracted nationwide strike by workers led the Federal Government to reduce the monthly minimum wage to ₦3,500 and ₦3,000 for federal and state workers, respectively. Parastatals, states and local governments reluctantly accepted the figure, but commenced retrenchment in order to cope with the minimum monthly pay. Evidences show that between June and December 1999, 26,940 employees in the federal, state, local governments and the private sector lost their jobs (Anyanwu, 2004). About 71.25% of them were retrenched, 18.62% retired, while 9.7% were dismissed and 0.43% had their services terminated.

Massive layoffs which often accompany upward wage reviews in the country have continued to worsen workers' welfare. The uniform wage system pattern adopted in 1981 compelled all states and local governments to pay a uniform wage as determined by the Federal Government. Due to huge expenditure outlay and fiscal burden, some states found it difficult to pay the mandated wage and have resorted to retrenchments. Compliance rate is often high among the oil producing states and those with high internally generated revenue (IGR)²¹ and most times they pay their workers the Federal Government minimum wage.²² Table 2.8 gives a summary of state governments' reaction to and compliance level with the increase in minimum wage to ₦7,500 and ₦5,500 per month in 2000 for federal and state governments' workers, respectively from ₦3,500 and ₦3,000 per month by the Obasanjo administration.

²¹ Lagos State has the highest internally generated revenue among state governments. Oil producing states get 13% oil derivation fund extra revenue.

²² Federal government minimum wage is higher than the state government wage.

Table 2.8. State Governments Compliance with the Minimum Wage Increase as at January 2001

States that paid the Federal Government minimum wage (₦7,500)	States that paid the minimum wage (₦5,500)	States that paid above the minimum wage (₦5,500) but less than (₦7,500)
*Bayelsa, *Delta	*Cross-River, Niger	*Akwa-Ibom, *Anambra, Adamawa, *Edo, Enugu, Ekiti, Ebonyi, *Abia, Bauchi, Benue, *Imo
Zamfara, *Rivers	Lagos, Sokoto, Borno	Gombe, Taraba, Kogi, Oyo, Nasarawa, Plateau, Kaduna, Kwara,
	Kebbi	*Ondo, Ogun, Osun, Jigawa, Katsina, Kano, Yobe

Source: Nigeria Labour Congress Report in Industrial Relations Experience in the Federal Public Service, since 1960

* Oil producing states in Nigeria

Note : Anambra State joined the league of oil producing states in 2012

A detailed look at Table 2.8 reveals that after the minimum wage was signed into law all states' governments paid the minimum wage. Evidences show that this compliance was achieved following strikes and lockouts by workers in some states that initially refused to pay the minimum. Nevertheless, the minimum wage was implemented amid massive retrenchment, lowering of grade levels in some states, and sack of workers' union leaders in order to reduce labour cost. As shown in Table 2.8, only four states paid the Federal Government minimum wage of ₦7,500, six paid the stipulated minimum wage for states, while others paid above the ₦5,500 recommended for states, but less than ₦7,500. It should be noted that there existed differentials even among the states that paid above ₦5,500.²³ This differential in the minimum wage again brings to the fore the issue of state government-autonomy in the determination of the appropriate minimum wage in accordance with their financial strength.

It is evident that all the oil producing states except Cross-River paid above the minimum wage stipulated for states (₦5,500). It is worth pointing out that in 2002, the International Court of Justice in Hague ruled in favour of the cessation of the oil rich-Bakassi peninsula region to Cameroon. The region was formerly part of Cross-River State. Similarly, the state lost the right of access to 76 oil wells to Akwa-Ibom State. By this ruling, the state forfeited the 13% oil derivation fund on the 76 oil wells. Thus, her inability to pay above the state minimum wage could possibly be linked to its dwindled revenue.

In 2003, government again increased the wages of civil servants across all grade levels. Grade 1 workers received a 12.5% rise, while grades 2, 3-7, 8-10, 12-14,

²³ Detailed figures of minimum wages paid by each state government are shown in Appendix 1.

and 15-17 received 10%, 8%, 7%, 5%, and 4% respectively. The Nigerian government increased the national minimum wage by 140%, from ₦7,500 to ₦18,000 per month in 2011.²⁴ The wage rise was an outcome of incessant clamour and lockouts by labour unions, agitating for improved welfare for workers. The labour union in an attempt to increase coverage, sought for an amendment of the minimum wage Act of 2000 to apply to employers with at least 20 workers, this was not granted by the government. It is over a couple of years since the new minimum wage of ₦18,000 per month was signed into law, compliance rate by the state governments is very low. Many state governments claimed that their revenue could not support the minimum wage increase. In this respect, a new revenue allocation sharing formula was being proposed by state governors in an attempt to increase their revenue from the federation account. A uniform wage pattern across the country has been blamed for the inability of weaker states to reduce their recurrent expenditure (Kwanashie, 1988). State governors are therefore advocating for power to legislate over wage matters and hence, pay according to their financial strength. Even at the federal level, the public sector wage bill has been rising. Between 2008 and 2013 there was a significant increase in personnel cost as a share of total budget and recurrent expenditure. Share of personnel cost in recurrent expenditure increased from 45.9% in 2008 to 61% in 2013 as shown in Table 2.7. Similarly, between 2008 and 2013, an average of 39% of the total budget was earmarked for personnel cost. This reinforces the outcry by the Federal Government about the rapidly rising public sector wage bill.

2.3 Evolution of Real Minimum Wage in Nigeria

Table 2.9 shows the evolution of the real minimum wage in Nigeria since 1974. One will observe the continuous decline in the real minimum wage from inception to 2010 except for temporary increases in 1981, 1991, 1998, 2000, 2009, and 2011.

²⁴ The new minimum wage has not been fully implemented

Table 2.9. Monthly Minimum Wage (Nominal and Real) 1974-2011 (2003=100)

Years	Consumer Price Index, weights 1,000	Money wage (per month) ₱	Real wage (per month) ₱
1974	0.31	60	193.55
1975	0.45	60	133.33
1976	0.50	60	120.00
1977	0.66	60	90.91
1978	0.70	60	85.71
1979	0.75	60	80.00
1980	0.88	60	68.18
1981	1.03	125	121.36
1982	1.10	125	113.64
1983	1.53	125	81.70
1984	1.87	125	66.84
1985	1.89	125	66.14
1986	2.15	125	58.14
1987	2.36	125	52.97
1988	3.80	125	32.89
1989	5.50	125	22.73
1990	5.70	125	21.93
1991	7.00	250	35.71
1992	10.43	250	23.97
1993	16.80	363	21.61
1994	29.70	363	12.22
1995	45.03	363	8.06
1996	51.47	363	7.05
1997	56.73	363	6.40
1998	63.49	3,500	55.12
1999	63.63	3,500	55.00
2000	72.87	7,500	102.92
2001	84.80	7,500	88.44

2002	95.20	7,500	78.78
2003	117.90	7,500	63.61
2004	129.70	7,500	57.82
2005	144.70	7,500	51.83
2006	157.10	7,500	47.74
2007	167.40	7,500	44.80
2008	192.60	7,500	38.94
2009	212.00	7,500	35.37
2010	234.40	7,500	31.99
2011	262.20	18,000	68.64

Source: Computed by the author from CBN Statistical Bulletin and various Minimum Wage Acts.

Evident in Table 2.9 is the continuous decline in real wages immediately after nominal wage increases in 1981, 1991, 1998 and 2000. This clearly reflects the irregular and ad hoc application of cost of living index in the country. Despite the emphasis of the Morgan and Adebayo Commissions on the need for wage reviews in Nigeria to reflect living costs, workers' emoluments have not kept pace with rising consumer prices.

It is clear that real wages declined sharply during the 1970s until 1981, when wage across the states of Nigeria were unified and minimum wage increased by over 100% from ₦60 to ₦125. Despite the increase in wages recommended by the Udoji Commission in 1974, by 1980, workers had started agitating for another wage rise. Records showed that the rapid inflation 1974 and 1980, which manifested as 183% increase in the consumer price index (CPI), eroded workers' purchasing power.

Between 1982 and 1987, there was freeze on wages, emanating largely from declining government revenue as the depression in the world oil market hit the economy. The conditions to obtain loans from the International Monetary Fund (IMF) under the Structural Adjustment Programme (SAP) required the government to liberalise interest rates and the labour market. This translated to the suspension of institutional fixing of wages. The wage freeze was amid the 129% increase in the CPI during the period. High interest rates and removal of agricultural subsidies resulted in the rise of production cost and consequently, high inflation rate. Lending rates during SAP averaged about 20.2%, compared to pre-SAP era of 11.6%. Consequently, growth rate of real per capita private consumption declined from an average of 7.8% between 1970 and 1981 to 6.3% between 1982 and 1987. Inequality in wage distribution,

measured by the average wage of junior public sector workers relative to senior employees was constant at 26.1% during the period.

There was a slight recovery in the real minimum wage in 1991, due to the 100% increase in the minimum wage from ₦125 to ₦250 by the military government as shown in table 2.9. Ironically, the new minimum wage of ₦250, was less than its worth in 1981 for two reasons. The first is that by 1990, naira had depreciated by approximately 89% against the United States dollar, as a result the wage could import fewer goods than in 1981. The other reason is that in 1991 the minimum wage was redefined to include allowances, and as such the minimum wage payment in 1991, was less than the total emolument in 1981. No wonder, by 1992 workers started demanding for rise in wages. Although, their agitation was consented to through the increase in the minimum wage to ₦363 per month, the about 45% increase in minimum wage was muted by the 61% rise in inflation, leading to a fall in the real minimum wage.

The increase of 100% in the nominal minimum wage from ₦3,500 in 1998 to ₦7,500 in 2000, although resulted in an improvement in the real wages, it was not large enough to bring its real value to the peak level observed in 1974. An interesting observation is that the real wage value in 2010 was less than one-quarter of what it was in 1974, when the nominal minimum wage was ₦60. The minimum wage was increased to ₦18,000 in 2011, thus resulting to a rise in the real wage from ₦31 in 2010 to ₦68 in 2011. It should be noted that between 1974 and 2010, the real minimum wage declined by 83%.

2.4 Poverty Profile in Nigeria

Figure 2.5 shows the relationship between minimum wage levels and national poverty line in Nigeria between 1980 and 2010. For ease of comparison, the diagram was rescaled. In 1980, the minimum wage of ₦125 per month earned by workers was ₦25 larger than the existing poverty line in the country, thus meaning that minimum wage workers lived above the poverty threshold. Meanwhile, by 1985 the poverty line was adjusted for inflation and increased to ₦395 per month, while the minimum wage was left at ₦125 per month. This shows that by 1985, a minimum wage earner gets a wage that was about three times below the poverty line. By 1996, the minimum wage had increased to ₦363, while the poverty line more than doubled at ₦805. In 2004, the minimum wage was however about four times larger than the poverty line of ₦1,869 monthly as shown in Figure 2.5. The poverty threshold increased to ₦5,566 in 2010, this was less than the minimum of ₦7,500 per month. Worth noting also is that even when the 2010 poverty line is used as a proxy for 2011, it still falls below the newly instituted minimum wage of ₦18,000 per month in 2011.

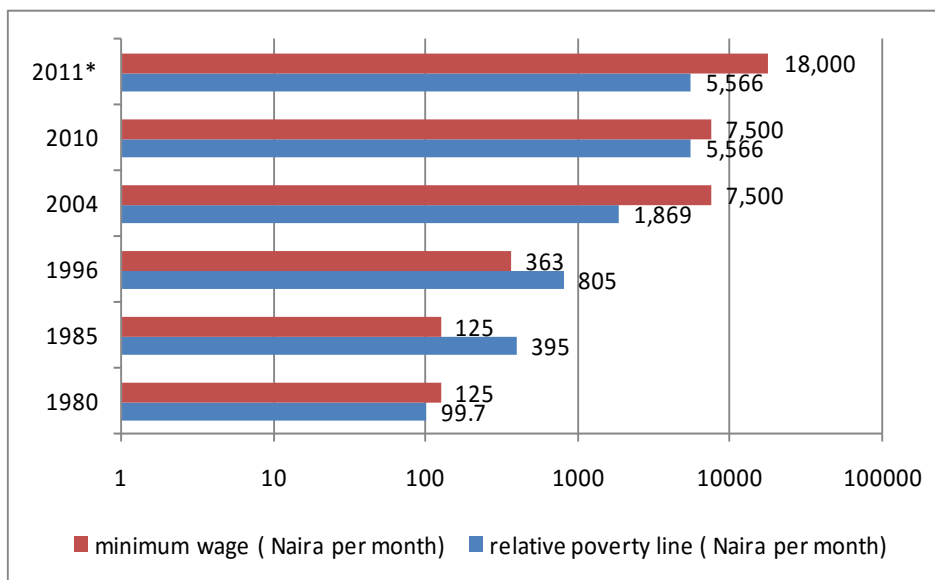


Figure 2.5. *Minimum Wage and Relative Poverty Line

Source: Computed and drawn by the author using minimum wage Acts and Nigeria household survey data for various years.

* The 2010 poverty line was used as a proxy for 2011. The last national household survey in the country was in 2010.

Figure 2.6 further shows the relative distribution of poverty incidence in the country. A close look reveals declining non-poor, rising moderate poor and very poor classes. In 1980, when only 27.2% of Nigerians lived in poverty, nearly 73% of the households population were non-poor, 21% belong to the moderate poor, while only 6.2% were very poor. About 31 years after (2010), the distribution of poverty among these three groups had changed radically and poverty incidence had risen sharply to 62.6%. Subsequently, the proportion of the non-poor in the population dropped to 31%, the moderate poor increased to 30.3%, while the very poor rose to 38.7%.

The transition of the significant proportion of the non-poor to either the moderate or very poor groups occurred in the 1980s and 1990s. As shown in Figure 2.6, by 1996, half of the non-poor population in 1980 had transited into the moderate or very poor groups. Stringent policies of the SAP in the 1980s resulted in astronomic rise in the price level as earlier argued. The CPI increased unprecedentedly from 2.4 in 1987 to 63.5 in 1998. Real wages as a share of nominal wages declined from 42% in 1987 to just 1.5% in 1998. This drastic fall in the worth of wages earned by workers may have consequently pushed a large number of people into poverty.

Although the loss in real wages cuts across all classes of workers, minimum wage workers were the least impacted. For instance, average real wage of grade level one (GL.01) workers declined by 40.7% between 1987 and 1998,²⁵ while upper level employees (GL.15) lost 63.4% as shown in Table 2.6. This could be interpreted as the effect of the narrowing of the income gap, as the wages of GL. 1 workers as a share of GL. 15 increased from 14.4% to 23.4% during this period. Hence, in addition to the

²⁵ Grade level one workers are the least paid public sector workers.

poor getting poorer, many who were not previously poor transited into poverty. Similarly, poverty among the informal workers also increased as evidenced in the rise in poverty incidence of agricultural workers from 31.5% in 1980 to 67% in 2004.

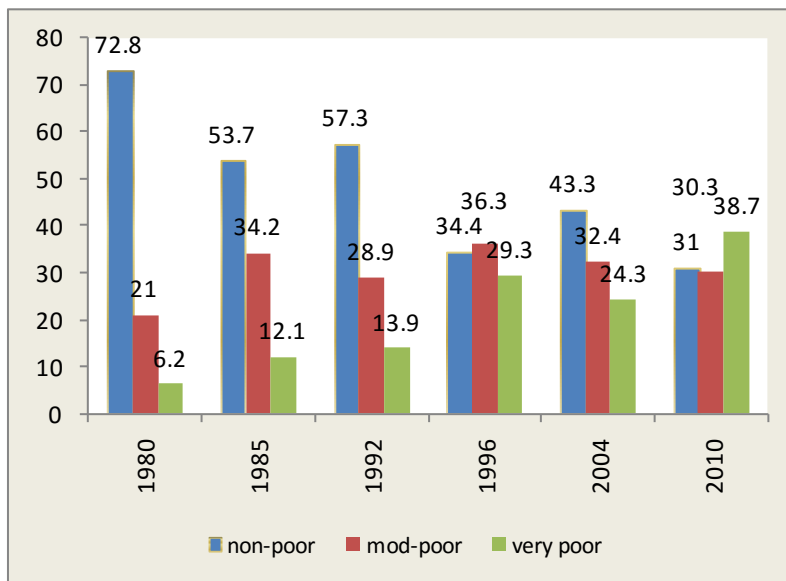


Figure 2.6. Relative Poverty in Nigeria % (1980-2010)

Source: Drawn by the author using data from the NBS, 2010 Nigeria Poverty Profile

2.5 Stylised Facts on Income Distribution in Nigeria

Figure 2.7 highlights the pattern of income inequality in Nigeria as measured by Gini index and the wage gap between high and low income earners. It also depicts the trend of poverty incidence. Between 1980 and 1996, income distribution worsened as shown by the rise in the Gini index from 34.18 to 46.5. An improvement in income inequality was recorded in 2004. As shown in the figure, there are indications that this improvement commenced between 1998 and 2000, when buoyant minimum wage increases were granted. This was not sustainable, as income inequality worsened in 2010 by rising to 48.8. Also, evident is the widening of wage differentials between low and high skilled workers in recent times.



Figure 2.7. Gini Coefficient, Poverty Incidence and Workers Wage Gap.

Sources: Drawn by the author using, data from the World Bank (www.data.worldbank.org) and NBS(1992,1998,1999,2001, and 2009)

Figure 2.8 shows wage differentials between the average salary of low and high income earners in the public and private industries across key sectors of the economy in Nigeria between 1992 and 1999. Evident is an increasing divergence between the wages of the low and high income earners. Nevertheless, a brief convergence or narrowing of the wage gap could be noticed in 1994. Despite increases in the minimum wage of low wage earners in 1993 and 1998, the wage disparity maintained a widening trend as depicted in Figure 2.8. Similarly, one could observe the rapid and upward trend of earnings of the high income category as against the slow growth of low income category.

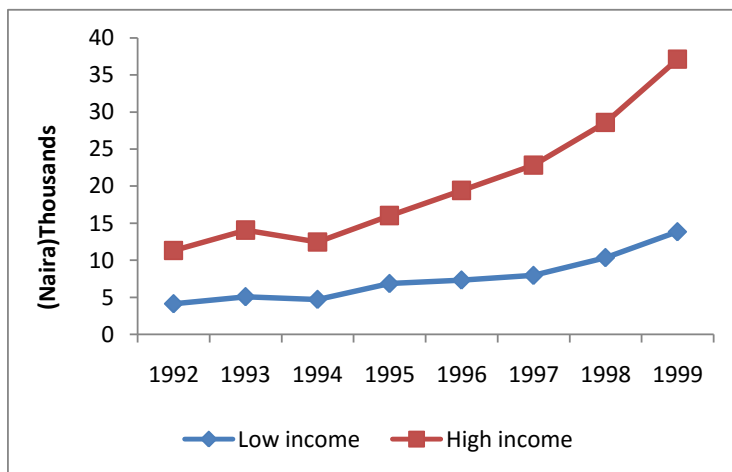


Figure 2.8. Wage Disparity Using Average Wages of Low and High Income Earners in Nigeria (Naira/Annum)

Source: Computed and drawn by the author, using data from the CBN

Figure 2.9 juxtaposes the national minimum wage and average wages of low income earners in key sectors of the Nigerian economy. In 1992 and 1993, only junior workers in the manufacturing, ministries and departments earned less than the national minimum wage rate. This suggests that even in the formal sector (i.e. ministries and departments) some workers were paid below the legislated minimum wages. This trend characterised the ministries and departments in all the years under observation.

By 1998, when the official minimum wage was increased to ₦3,500 per month, the average wages earned by junior workers in all the sectors were less than the national minimum wage. Wages per month in the mining sector (₦2,509) and financial institutions (₦1,243) were the closest to the national minimum wage, this trend was mirrored in 1999. A key observation from this is that junior workers in the mining sector were remunerated higher than their counterparts due to the higher risk associated with their jobs. Worthy of note is that in the agriculture sector, average wages of low income workers were higher than the national minimum wages, except in 1994, 1998, and 1999. Similarly, in the trade sector, low income workers earned above the minimum wage except in 1998 and 1999.

In summary, it can be deduced from the above review that wage fixing machinery in Nigeria has not followed a particular pattern. More obvious is the observation that wage increases have not kept pace with rise in prices, and this has eroded the real value of wages over time. Prior to the enactment of the Uniform Wage Act of 1981, wage fixing reflected geographical location, thus taking into account differences in living costs across the country. This is important if wages earned by workers is to be welfare enhancing. Also noticeable is the influence of economy-wide policies on labour market outcomes. During the Structural Adjustment Programme (SAP), price level increased sharply with the CPI rising by 2,545% between 1987 and

1998. This period was marked as the time when about half of the non-poor population in Nigeria transited into either moderately poor or very poor groups. Thus, it is evident that policies that have indirect effects on players in the labour market could determine the welfare of workers. It is also evident that differentials in wages of low and high income earners narrowed and widened over time as shown in the background. This partly points to inconsistencies in the wage policies adopted in the country. Similarly, the wages of high income category have witnessed more rapid growth compared to the low income group over the years.

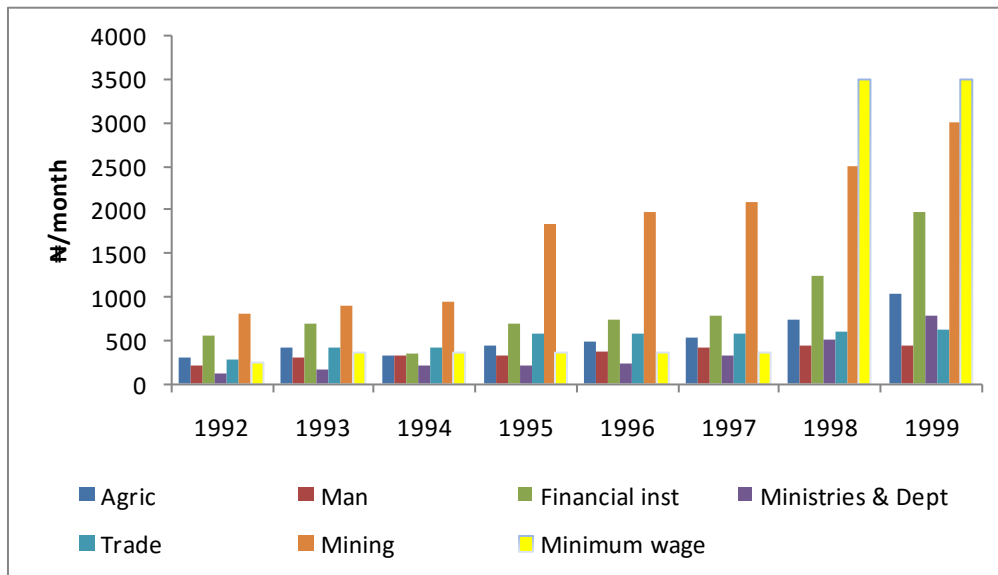


Figure 2.9. National Minimum Wage and Average Wages (junior workers) in Selected Sectors of the Economy (₦/per month)

Source: Computed and drawn by the author, using data from the CBN Statistical Bulletin, 2003.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

The perfect competitive labour market theory predicts a negative relationship between minimum wage increase and employment of labour. The argument is that since firms face a perfectly elastic labour supply, at which the required labour is supplied at a given wage, the fixing of wages above this equilibrium will result in a decline in labour demand and consequently welfare of workers. This view had been the consensus, until Card and Krueger (1994) proposed the monopsony case of an increase in the minimum wage, which turned out positive employment effects. Other theories of minimum wage under different labour market theories have emanated since their seminal work. As a result, opposing views exist on the ideal labour market theory that suits developing and advanced nations and the labour market outcomes under the imposition of an institutionally fixed wage.

This chapter therefore reviews the literature on the interaction among minimum wage, income inequality and welfare, it is divided into four subsections. The first part investigates the theoretical link between minimum wage and welfare, while the second and third sections examine the methodological and empirical relationships, respectively. In the methodological and empirical review, attempts will be made to place emphasis on the varying methods adopted and results obtained therefrom were compared. The fourth section conceptualises welfare and income inequality.

3.2 Theoretical Review

Stigler's seminal article in 1946 on minimum wage, eight years after the Fair Labour Standard Act of 1938²⁶ was instituted offered some answers to questions about the relevance of a minimum wage in fighting poverty. In this theoretical paper, he

²⁶ The Fair Labour Standards Act of 1938 is a federal law in the United States, which established the national minimum wage for workers and also putting a cap on the hours an employee can work.

emphasised the contrasting role of a minimum wage in a competitive labour market and one in which the employer has control over wages. He argues that since in a competitive setting, workers are paid their value of marginal product, an institutionally determined wage above this level will result in unemployment. In a situation where employers determine wages, a higher wage could induce employment. His opinion on the poverty-reducing effect of minimum wage is that since family income and needs are the fundamental factors in the problem of poverty, it implies that minimum wage may be a poor tool in reducing poverty. He concludes that for minimum wage to have the desired positive impact on poverty, it must vary with employment level, family size, number of earners, non-wage income and other factors.

The theoretical link among minimum wage, income inequality and welfare can be approached through the transmission mechanism of employment and price effects of minimum wage. The single most important issue in determining the distributional effects of minimum wage is the disemployment impact (Gramlich, 1976). Welfare is impaired if the aggregate loss of earnings to low wage earners due to employment displacement arising from a minimum wage hike outweighs the benefits accruing to them. Although, several studies have investigated the impact of minimum wage legislation on the labour market, many of them emphasise its impact on a market where there is complete coverage. Ideally, any meaningful study on the impact of minimum wage in developing countries should also take account of the uncovered sector (informal sector) where the minimum wage legislation does not apply. This review is therefore premised on a dualistic labour market structure, a prominent feature of the Nigerian labour market and the outcome of minimum wage imposition.

3.2.1 Labour Market Theories

i) Perfect Competitive Labour Market

The competitive model of wage determination can be used to identify the benefits and costs of minimum wage legislations, who the gainers and losers are likely to be in a competitive environment. This theory assumes that workers and jobs in the formal and informal sector are homogenous, and that the market forces ensure that the wage rates in each sector are the same. The analysis of the impact of minimum wage

on employment in a competitive labour market is illustrated in Figures 3.2.1a and 3.2.1b.

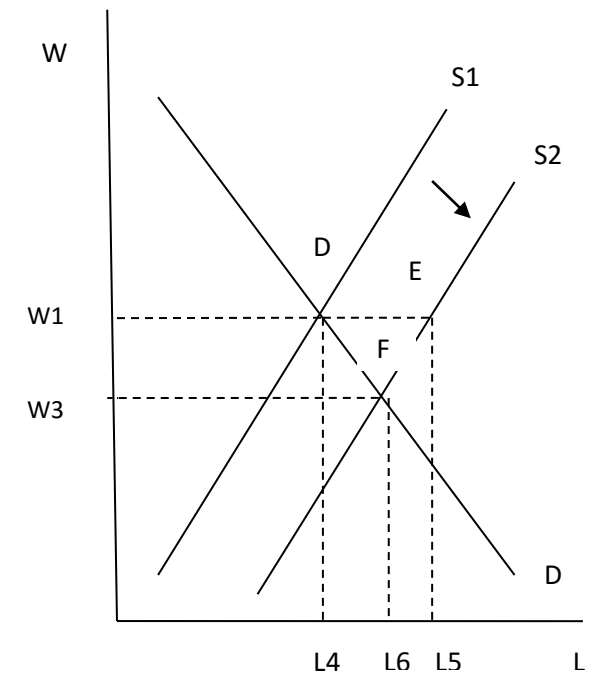
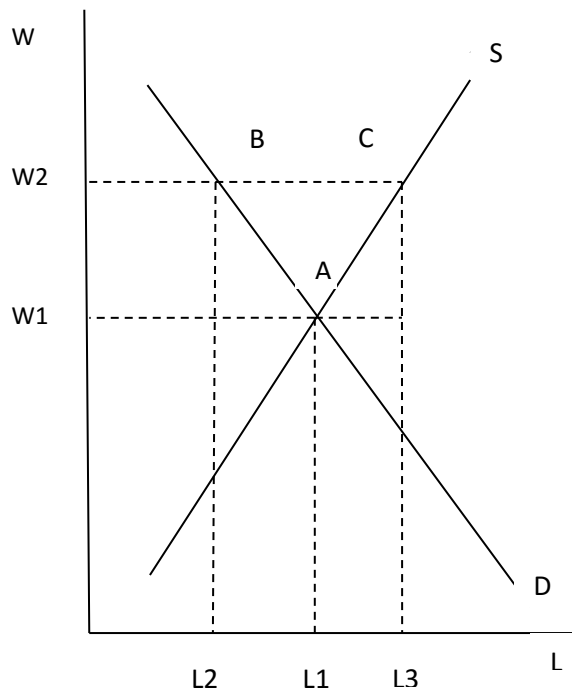


Figure 3.2.1a. Impact of Minimum Wage in the Formal Sector

Figure 3.2.1b. Impact of Minimum Wage in the Informal Sector

Source: The Economics of Labour Markets (Kaufman and Hotchkiss, 2003)

The labour market highlighted above is dualistic in nature. Figures 3.2.1a and 3.2.1b depict the covered (formal) and uncovered (informal) sectors, respectively. Assume that initial wage rates are the same in both sectors due to competitive forces depicted by W_1 in the diagrams. In this situation, workers are indifferent to working in either sector because there is no wage differential. The level of employment is thus the same in the covered and uncovered sectors as depicted above. The imposition of a minimum wage (a wage floor) above the market determined wage rate in the formal sector only (depicted as W_2) leads to a rise in labour costs and subsequently decline in labour demand in the formal sector (from L_1 to L_2). The disemployment effects could worsen in the long run as the demand curve for labour becomes more elastic, and it is replaced with capital and the less expensive informal sector labour.

However, it is worth noting that the decline in employment does not fully translate into a rise in unemployment rate. For example in figure 3.2.1a, one will observe that at minimum wage rate W_2 , L_2 units of labour is employed, while the supply of labour at the minimum wage has increased to L_3 , thus creating excess labour supply, and leading to rationing of jobs. Nevertheless, unemployment rate may not rise by the magnitude L_3-L_2 , because some of the unemployed population will give up their job search and exit the labour market; others could pursue non-work alternatives such as schooling, while some may remain in the labour market by finding alternative employment (either paid-employment or self-employment) in the uncovered informal sector.

Assuming that a fraction of the L_3-L_2 , excess labour supply in the covered formal sector moves to the uncovered informal sector, the supply of labour at the prevailing wage rate W_1 in the uncovered informal sector will rise from S_1 to S_2 as shown in Figure 3.2.1b.²⁷ At W_1 there is excess supply of labour of L_5-L_4 , thus depressing wages of existing workers in the uncovered informal sector, and hence, reduce their welfare. However, the fall in wages to W_3 results in an increase in employment to L_6 from L_4 . This implies that the effect of a minimum wage on the welfare of workers in the uncovered informal sector could be ambiguous. If wages are

²⁷ It should be pointed out that some workers will remain unemployed in the formal sector, since their reservation wage is higher than the uncovered sector wage.

downward rigid in the informal sector and assuming that some of the unemployed workers in the formal sector continue to search for jobs in the informal sector, there will be a net increase in unemployment.

ii) Monopsony Labour Market

Proponents of this theory hold a contrary view about the effects of a minimum wage rise in a monopsonistic labour market. They emphasise that a rise in the minimum wage could result in increased employment. Card and Krueger (1994) marked a turning point about the widely held view that a rise in minimum wage reduces employment. In their study, they find no evidence that the rise in New Jersey's minimum wage reduced employment at fast food restaurants in the state. Other studies have also find evidence that minimum wages have little or no negative impact on employment.²⁸ These results have been interpreted in many economic circles as empirical evidence in support of the monopsonist case (Jones, 1997).The labour market outcome of fixing a minimum wage in a monopsony labour market is illustrated in Figure 3.2.1c.

²⁸ See Machin and Manning(1994)

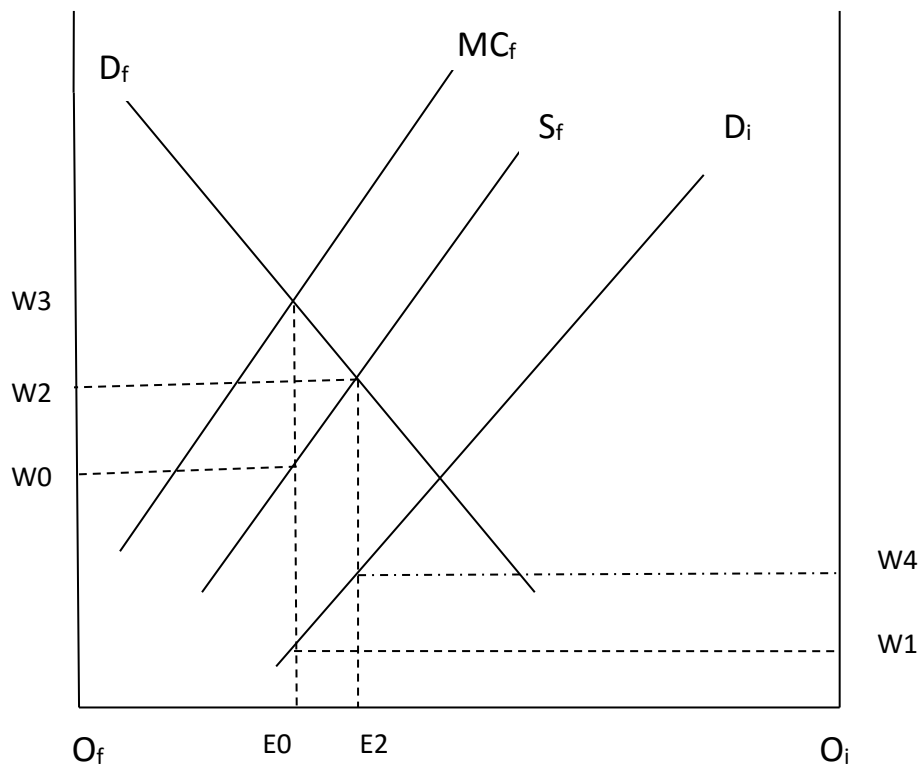


Figure 3.2.1c. Monopsony Case of the Impact of Minimum Wage in Formal and Informal Sectors

Source: The impact of minimum wage legislation in developing countries where coverage is incomplete (Jones, 1997).²⁹

²⁹ Some modifications were made on the original diagram by the author.

In this model, we assume that only firms in the covered formal sector have monopsony power and determine employment level only, while employers in the uncovered informal sector remain competitive. Wages in the formal sector also serve as signals to informal sector wages. The supply of labour is also assumed to be fixed in the short run at $O_f O_i$.

As shown in Figure 3.2.1c, before the minimum wage increase, the monopsony firm in the formal sector pays wage W_0 to hire E_0 labour, the point of intersection of its marginal cost with the marginal revenue product of labour traced to the labour supply curve in the formal sector. At this point, $O_f E_0$ workers are employed in the formal sector, and $E_0 O_i$ are employed in the informal sector. A monopsonist equates his demand curve with the marginal cost curve, rather than the supply curve. This is because for him to employ an additional worker, he pays an added cost on all existing workers. Firms in the informal sector however pay W_1 , determined competitively and by wage signals in the formal sector as shown by the intersecting line of MC_f and D_f drawn to D_i (demand curve for informal sector workers).

Another point worth noting is the exploitative nature of the monopsonist. Although workers in the formal sector earn a higher wage rate (W_0) than those in the informal sector (W_1), what they earn (W_0) is less than the wage (W_3) which equates their marginal revenue product.

The imposition of a minimum wage (W_2) makes the monopsonist a wage taker and operates at the competitive equilibrium, thus paying a higher wage W_2 and increasing employment of labour units to E_2 .³⁰ At W_2 , the monopsonist can afford to employ more workers since wage is now institutionally fixed and he can employ as much labour at the fixed rate without driving up wages. The increase in the supply of labour to the formal sector comes from the informal sector since we have assumed a fixed endowment of labour supply. As informal sector workers are attracted to the formal sector, the wage rate is driven up in the former as depicted by W_4 in the diagram.

³⁰ The monopsonist can afford to increase employment, as long as its marginal revenue product exceeds wages.

If government increases the minimum wage beyond W_3 (the exploitative point), employment will fall below the original level E_0 . In this model, we can infer that all original low wage earners in the formal sector gain (improved welfare), as they all retain their jobs and now have a higher pay. A plausible explanation for this is that in developing countries, wages are initially too low that even with a minimum wage increase, employers can afford to pay less than W_3 .

Also, the informal sector workers that moved into the formal sector will also benefit from a higher wage. Lastly, the remaining workers in the informal sector will also have an improved welfare as a result of the increase in the informal sector wage to W_4 .

v) **Efficiency Wage Theory**

The efficiency wage theory unlike other labour market theories assumes that wage level affects workers' productivity. An efficiency wage is a premium wage over the market average. According to these proponents, a higher minimum wage in form of an efficiency wage leads to higher productivity, either by inducing workers to increase their effort (also prevent them from shirking) or improving their physical strength through improved diet and health. The resultant higher marginal revenue product leads to higher employment as illustrated in Figure 3.2.1d.

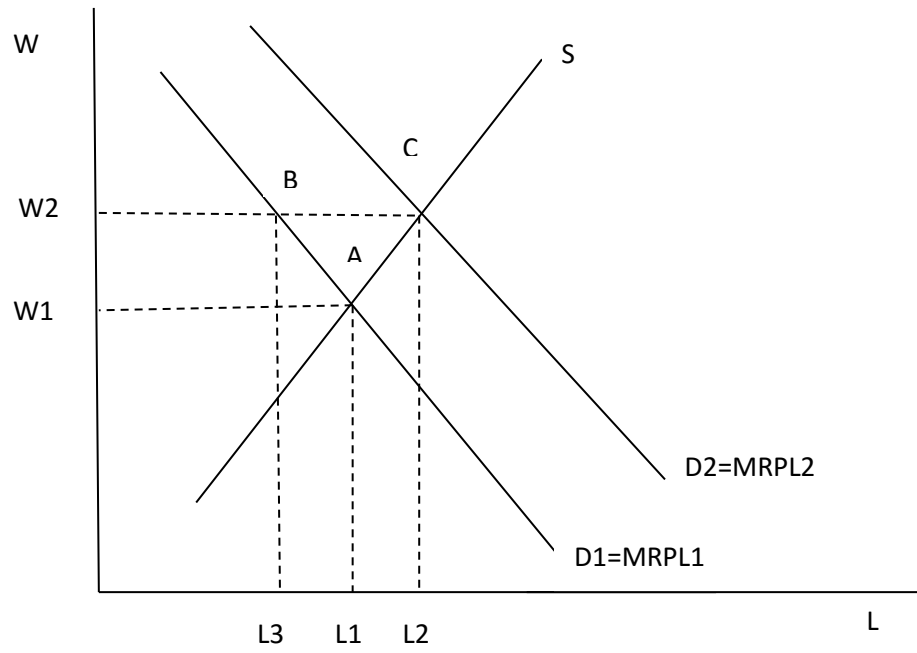


Figure 3.2.1d. Minimum Wage and the Efficiency Wage Theory

Source: The Economics of Labour Markets (Kaufman and Hotchkiss, 2003)

In this model, the minimum wage is interpreted to mean an efficiency wage. Before the imposition of the minimum wage (W_2), the wage rate was W_1 and L_1 labour is employed, denoted by point A; a competitive equilibrium. In a situation where increases in wage do not stimulate increased productivity, a higher minimum wage at W_2 will lead to a decline in employment to L_3 , depicted in Figure 3.2.1d.

If wage levels affect workers' productivity one for one, the imposition of the minimum wage, W_2 will result in a higher marginal revenue product ($MRPL_2$), hence a higher demand curve D_2 . Consequently, employment of labour will rise to L_2 . Similarly, a higher wage could induce a higher quality worker with a higher reservation wage to join the labour market and thereby, enhance productivity.

vi) **Monopsonistic Competition Labour Market**

This is a combination of the monopsony and competitive labour market model. An economy with a single employer (monopsony) rarely exists in the real world, neither does a perfect competitive labour market exist. The assumptions of the perfect competitive labour theory are too restrictive and impractical for a country like Nigeria. The theory that both employers and workers have perfect information about wages and employment opportunities in the labour market seems unrealistic in the Nigerian economy in which the labour market is dualistic, with majority of workers operating in the informal sector. Information about job vacancies is also costly.

Further, skill-homogeneity hardly exists. Workers differ by skill type. In Nigeria, one would expect to find high heterogeneity among labour skills. Similarly, the assumption that firms are wage takers, and that a fall in wage rate by anyone firm will lead to loss of workers to other firms paying the competitive wage rate has been found not to be true. Bhaskar *et al* (2004) argue that workers may not resign immediately following a cut in wages if they must search for new ones. This is because job search involves cost. The search proves more difficult in a country such as Nigeria where there is imperfect information and high unemployment rate. Workers also consider non-wage job characteristics before making decisions to change jobs.³¹

³¹ Non- wage job features include job specification, hours of work, job satisfaction, and distance of the firm from the worker's place.

What is more applicable in a developing country particularly Nigeria is a monopsonistic competition labour market where employers compete with one another for employees (particularly high quality workers). In this model, there is a degree of free exit and entry and labour skills are heterogenous. The presence of rival firms alters the decisions and behaviours of other firms.

In a monopsonistic competitive labour market, a higher minimum wage has two opposing effects; the employment increasing “oligopsony” effect and the employment reducing “exit” effect. On one hand, a higher minimum wage increases labour force participation rate, inducing increased employment. On the other, a binding minimum wage reduces employers’ profits (through high labour cost) when there is free entry and exit, thus compelling some employers to exit the market. Since firms make zero profits in a monopsonistic competitive market due to competition, increased labour cost may lead to negative profits or loss leading to exit of some firms. The exit of some firms has negative effects on employment. The diagram below shows the effects of the imposition of a minimum wage in a monopsonistic competition labour market.

Source: Oligopsony and Monopsonistic Competition in Labour Markets (Bhaskar *et al.*, 2002).³²

³² Modification was made to the original diagrams by the author in order to capture the formal and informal sectors.

As shown in panel A, equilibrium employment in the absence of a minimum wage is given as $O^F E_0$ in the formal sector and $E_0 O^I$ in the informal sector. In the case of a pure monopsonist, an institutionally fixed minimum wage at W^m in the formal sector leads to increase in employment from O^F to E_2 .

Meanwhile, in a monopsonistic competitive labour market, the imposition of a minimum wage W^m , results in a leftward shift in the labour supply curve (fall in labour supply) faced by firm i , from Ls^{f1} to Ls^{f2} as depicted in panel A. The fall in labour supply of firm i results from the increase in the wages of rival firms to the minimum. Consequently, the marginal cost curve also shifts leftward from Mc^{f1} to Mc^{f2} . Thus, the new profit maximising level of employment is at E_1 .³³ It is evident from panel A that employment rises less in the monopsonistic competitive market due to intense competition from rival firms. The imposition of a minimum wage in the formal sector induces increased labour supply from the informal sector to the formal sector. As a result of this, wage is bid up in informal sector from W_2 to W_3 as shown in panel A of Figure 3.2.1e. In panel A, the oligopsony employment increasing effect is exhibited as employers in the labour market increased their labour demand.

Panel B showcases the employment reducing “exit” effect of the introduction of a minimum wage in a monopsonistic competitive labour market. Unlike the monopsony labour market, the monopsonistic competitive labour market assumes costless entry into the market. As increasing number of firms enter, competition rises, and increased labour cost arising from minimum wage increase result in loss of profit for some firms. Exit of firms has a negative effect on total employment through the loss of exiting employer payrolls. The consequent fall in employment in the formal sector from L_1 to L_2 , with a fixed minimum wage at W^m is shown in panel B. Some of the workers who are displaced in the formal sector move into the informal sector, increasing the labour supply from Ls^{i1} to Ls^{i2} as shown in panel C. This exerts downward pressure on wages from W_3 to W_4 , thus leading to an increase in employment from L_3 to L_4 .

³³ By setting the minimum wage above the market clearing wage, employers find it easier to fill job vacancies since wages are fixed at the minimum and increased labour demand at that price will not drive up wages.

It should be noted that the overall effect of a minimum wage in a monopsonistic competitive labour market depends on which effect dominates.³⁴ Hence, a minimum wage set above the market wage could have a positive or negative effect on employment and welfare.

3.3 Methodological Review

The literature is replete with empirical techniques for estimating the effects of a minimum wage increase on welfare and income distribution. No consensus is reached on the most appropriate method, as they all have their drawbacks. However, their benefits and appropriateness outweighs one another, thus necessitating the use of a particular method. Although the potential distributional consequences of the minimum wage have long been noted (Stigler, 1946), they have received comparatively less attention and there is no established consensus on the empirical strategy for estimating these effects (Dinardo *et al.*, 1996). The fundamental methodologies widely used in the minimum wage literature are therefore elucidated upon here. These methods are either grouped under the partial equilibrium or the applied or general equilibrium approach. They include; simulation, conventional regression, non-parametric regression and the computable general equilibrium (CGE) methods.

3.3.1 Simulation Approach

This method involves the use of the information provided by a nationally representative household survey data to identify low wage earners (potential beneficiaries of a minimum wage) and simulating their additional earnings from a minimum wage increase based on various assumptions. This simulation approach differs from the CGE simulation in that, while the former uses the income or expenditure survey or the labour force survey as the database, the database for the latter is the SAM which shows the inter-linkages among sectors, agents, institutions in the economy, and their inter-relationship with the outside world. Earlier studies (Browning and Johnson, 1983) and (Mincy, 1990) focused on simulation methods in appraising the distributional and efficiency effects of a minimum wage rise. Other

³⁴ Either employment reducing "exit" effect or oligopsony employment increasing effect.

more relatively recent studies which have adopted this method are (Addison and Blackburn, 1999) and (Manning and Bird, 2005).

A major drawback of this method is that it is not a direct estimate of the consequences of minimum wage increases on family income, but rather hinges on contentious and unrealistic assumptions, such as the passing of all increased labour costs to consumers in form of higher prices, local and foreign consumers maintain demand, and low or zero labour demand elasticity. As a result of these assumptions, simulation method captures only short-term effects of minimum wage changes, because it violates the general equilibrium conditions of price substitutability. For instance, Browning and Johnson (1983) assumed a one-product economy which ignores the general equilibrium effects of the changes in relative product prices on the distribution of income.

Further, simulation results are highly sensitive to the labour demand elasticity chosen. Disemployment effects are calculated using a range of elasticities suggested by estimates from time-series studies. Oftentimes, these time-series studies report employment-wage elasticities among teenagers and young adult without incorporating elasticities of aggregate workers. As noted by Addison and Blackburn (1999), applying these elasticities directly to a group of minimum wage workers thus unavoidably understates the implied disemployment effects from the time-series estimate.

In addition, studies that have used simulation ignored the effect of possible changes in labour supply of other family members on the household income (Addison and Blackburn, 1999). They assume that all other factor inputs (high wage labour, capital) are composite factors in perfectly inelastic supply, thus ignoring possible income increases arising from increased labour supply. Lastly, they do not capture spillover effects arising from a minimum wage increase.³⁵ The spillover effects could however impact on welfare and income distribution pattern.

3.3.2 The Conventional Regression Method

Another method that has been widely used is the traditional regression method or the parametric regression approach. This method involves using time-series, cross-

³⁵ For example, see Browning and Johnson 1983.

sectional or panel data, and regressing welfare or income inequality measures on the minimum wage data and some control variables. The gross national product (GNP) or unemployment rate is often used to control for business cycle conditions and its effect on welfare.³⁶ Studies that have adopted this approach include (Bell, 1997), (Addison and Blackburn, 1999) and (Golan *et al.*, 2001).

The major limitation of this approach as noted by Alatas and Cameron (2008) is that since the minimum wage variable is expressed as the ratio of minimum wage to average wage, it is often difficult to separate the impact of the variation in minimum wage from the impact of average wages. They also emphasised the limitation of omitted control variables. Controlling for observable and unobservable variables that have effects on welfare and income distribution besides minimum wage may also present challenges.

Some of the studies that have adopted this method implicitly compared welfare in relatively high minimum wage years with welfare in relatively low minimum wage years. Notably, during this period, economic conditions that affect welfare would have changed, thus necessitating for a control variable such as the GNP. Nevertheless, the GNP measure may be unable to completely control for changes in economic conditions. The consequence is that minimum wages are likely to be endogenous and estimates obtained from the regression biased.

Another major shortcoming of this method as pointed out by Lemos (2004) is the often missing connection between the empirical models of studies adopting this approach and theoretical underpinnings.

3.3.3 Non-Parametric Regression Approach

Studies on the welfare and income dispersion effects of a minimum wage rise have also exploited the non-parametric and semi-parametric regression methods.³⁷ In this approach, the relationship between welfare measures (dependent variable) and minimum wage (independent variable) is not restricted by the model to follow any specific functional form. Historical data determines the appropriate functional form.

³⁶ Golan *et al* (2001) is an example of such study.

³⁷ See Dinardo *et al.* (1996); Flinn (2002); and Neumark *et al.* (2005).

This eliminates the problem of functional form misspecification usually encountered in the traditional regression method (parametric) involving distributions using Pareto, normal, log normal distributions, etc. Another advantage over the conventional regression method is that the response coefficient is allowed to vary from observation to observation, which relaxes the assumption of fixed coefficients associated with traditional regression method. It allows for regression of welfare measures on the minimum wage earned by different quantiles of the income group.

Neumark *et al.* (2005) used the method in determining the effects of minimum wage on changes in incomes of families at different points in the income distribution. They also used the approach to investigate the extent to which minimum wages push families initially near-poor into poverty or lift initially poor families out of poverty using difference-in-difference approach. According to them “ the non-parametric approach provides a far richer empirical description of the effects of minimum wages on family incomes than would a regression-based approach that arbitrarily specifies particular points of the distribution and asks whether the proportions of families above or below those points increase or decrease”

Nevertheless, it is worth pointing out that the method is not without its inadequacies which include; the complexities of recovering estimates of the combined effects contemporaneous by and lagged increases in minimum wages, as well as the inability to fully exploit continuous variation in the minimum wage (Neumark *et al.*, 2005).

3.3.4 The Computable General Equilibrium Method (CGE)

All the methods highlighted so far are partial equilibrium approaches, they only capture the direct effects of minimum wage increases. Meanwhile, in reality, minimum wage generates indirect effects, which affects other factors used in the production process, relative prices, and labour in the informal sector (non-beneficiaries of a minimum wage). Accounting for all these is therefore germane in a minimum wage study.

The CGE is most widely used among the general equilibrium methods, and has gained prominence in investigating the welfare and income distribution effects of a

minimum wage. One probable reason for this is its rich database; the SAM, which provides a comprehensive and detailed framework for systematic recording of transaction flows in an economy. The SAM captures the inter-linkages among economic agents, institutions and the rest of the world. CGE models are multi-sector models of the economy. They are based on Walrasian general equilibrium models of market-clearing on the product and the factor markets. It involves calibration by using the SAM data to simulate the effects of a policy change.

Some of the studies that have adopted this method in examining the impact of minimum wage legislations are Hinnosaar(2004), Taiwo *et al.* (2005),Holland *et al.* (2006), Lahr and Kanfi (2006), Folawewo (2009), and Falokun(2011). The use of the CGE approach in appraising the effect of policy changes (such as the minimum wage) on the economy is becoming widespread due to its ability to isolate just the wage shock and examine the impact of the shock across the entire economy.

Only a CGE model is able to capture the direct and secondary effects (spillover effects) of minimum wage changes. By measuring changes in production, relative prices, factor usage, household income and consumption, the model is able to estimate welfare effects on low income households and other households as well (Holland *et al.*, 2006). The fact that it allows for disaggregation of household units into various components will enable the modeller appraise the impact on different households of interest.

CGE models as opposed to econometric system models offer a unique approach to evaluate a spectrum of minimum wage increases. This is because they enable the modeller explicitly recognise resource constraints; an economic reality that other models are unable to handle well (Lahr and Kanfi, 2006). The broad classifications of CGE are static and dynamic models.

3.3.4.1 Static CGE Models

Static models do not account for the time path of adjustment to a proposed policy change. They are counterfactual short run equilibrium analysis, and thus, disregard the growth and accumulation effects of economic policies. Nevertheless, these single period models are more suitable for capturing feedback to a one-off policy shock. A

large number of studies on the impact of minimum wage on welfare and inequality have exploited this method.³⁸

The main criticism of this approach is its inability to accommodate the transition path of the economy. This is because some policy changes takes time to feed-through into the economy, and might require adjustment of some variables in the system to fully capture the policy effects. The intertemporal and sequential dynamic (recursive) models, variants of the dynamic CGE models, overcome this limitation.

3.3.4.2 Recursive and Intertemporal Dynamic CGE Models

These two categories of dynamic CGE model differ mainly on the foresight of economic agents about future prices on which their decisions are based. In the recursive model, economic agents are assumed to have myopic behaviour. That is they deal with one period at a time, neglecting the influence of subsequent changes in prices, tastes, etc (Adenikinju *et al.*, 2009). This type of model involves a series of static CGE models linked between periods by an exogenous and endogenous variable updating procedure. It is widely used for developing countries studies, due to imperfect information, which often necessitate economic agents to make decisions based on static expectations. Morley *et al.* (2011) adopted a recursive dynamic CGE approach in investigating the macroeconomic effects of minimum wage increases in Honduras.

On the other hand, the intertemporal or truly dynamic CGE model assumes that economic agents have perfect foresight of the future and thus, react to future changes in prices. Households maximise their intertemporal utility function under a wealth constraint to determine their consumption schedule over time.

Another important feature of the CGE is the treatment of households. Irrespective of the variants of the CGE model (static or dynamic), households can be modelled either as representative households or micro-simulation. In the former approach, household categories are aggregated according to socio-economic characteristics, income types or poverty status, and each of the household type chosen represents a group of households assumed to have homogenous qualities. This approach is more

³⁸ See Hinosaar (2004), Holland et al (2006), Taiwo *et al.* (2005), Folawewo (2009) and Falokun (2011) for some of these studies.

widely used due to the complexities involved with micro-simulation. It can fully capture inter-households welfare and income inequality effects³⁹. Notably, one major limitation is its inability to capture intra-income inequality effects among households.

A micro-simulation household approach makes use of actual households in a national household survey, rather than representative households. It takes care of the drawback of the representative households, hence captures the intra-income inequality effects among households. Meanwhile, complexities arising from reconciling the micro-simulation components with the CGE models present challenges in this approach.⁴⁰

3.4 Empirical Review

Numerous studies have investigated the effects of a minimum wage policy on welfare and income distribution. While a significant number of them focused on the developed countries experience, a few studies exist for developing countries. In Nigeria, in particular a handful of literature exists despite its significance in redirecting wage policies. Nevertheless, empirical results of the effects of minimum wage increases on welfare and income inequality in developed and developing countries are mixed, while some are inconclusive.

One reason for mixed results is the methodology adopted. Since the CGE method accounts for direct and indirect effects of a minimum wage increase, employment losses could be larger or smaller than that obtained with the partial equilibrium which only accounts for first-round effects (DPRU, 2008). Critical assumptions of the model, such as minimum wage compliance level and coverage, factor elasticity of substitution, wage elasticity and more importantly the disaggregation of the primary factor component of the SAM are also prominent determining factors. Factor elasticity of substitution and wage elasticity are often based on related literature and guesstimates, thus making it a tool in the hand of a modeller. Regardless of the aforementioned challenges, this section documents a review of the empirical results of

³⁹ Aka (2006) is an example of a study that adopted a representative household approach, it investigated welfare and inequality effects of trade liberalisation in Coted'Ivoire.

⁴⁰ See Adenikinju *et al.* (2009) for an explicit exposition on merits and draw-backs of the micro-simulation method.

studies on the impact of minimum wage increases on welfare and income inequality in advanced and developing countries.

3.4.1 Negative Evidence of the Effects of Minimum Wage on Welfare and Income Distribution

Gramlich (1976) applied a simulation technique to the United States (US) population survey data for 1973 and 1975. Investigating the impact of the 25% increase in the minimum wage in the US from \$1.60 to \$2.00 per hour in 1974, he finds a weak link between wages and family income, suggesting that minimum wage may not have strong redistributive effects. The results further reveal that about 7 and 10% of low wage teenagers (minimum wage beneficiaries) and high-wage teenagers are in low income families respectively, while 40% of low wage teenagers are in high-income families. This meant that the spillover of benefits into high income families reduced the efficiency of the minimum wage as a redistributive tool. He concludes that for every billion dollars that arise from the minimum wage policy implementation which accrues to low wage workers, only about \$350 million goes to low income households.

Further, Browning and Johnson (1983) conducted a simulation of the distributional and efficiency effects of the 1976 minimum wage increase in the US. The study simulated an increase in the minimum wage from \$2.30 per hour to \$2.80 per hour. Just like other studies which have adopted the simulation technique, it assumed that other factors of production are composite inputs, thus preventing spillover effects. It also assumed full coverage and a one-product economy. The study concludes that when the assumption of no dis-employment effect is taken into account, the minimum wage results into \$5.6 billion increase in total income. Only \$1.6 billion of this income accrues to the lowest six deciles. When dis-employment is incorporated, the losses to low income classes increased. The losses that accrue to low income households were attributed to two factors. Only a small fraction of beneficiaries of the minimum wage belong to low income households. Also, the income gains of minimum wage earners in this household get eroded by higher income tax and disengagement from government transfer income benefit.

Also, Burkhauser and Finegan (1989) simulated the poverty effects of the proposed 1988 Kennedy-Hawkin Bill designed to increase the minimum wage in the US from \$3.35 to \$5.05 per hour. The study used census data for 1950, 1960, 1970, 1980 and 1985 to identify potential minimum wage beneficiaries. The survey data revealed an increasing shift over the years in the fraction of low wage earners in high income families. Their findings are that the wage bill from the proposed increase in minimum wage was about \$7billion, of this amount, only \$800million goes to poor families, as share of low wage earners in poor households was only 11%. About \$2.8billion was disbursed to families with income three times above the poverty line. The study did not incorporate job losses and rise in price level which usually accompany minimum wage increases, thus losses to low income earners were not as high as Browning and Johnson's (1983) which incorporated dis-employment effects.

Burkauser *et al.* (1996) re-estimated Card and Krueger's distributional analysis of the minimum wage increases in the US from \$3.35 in 1989 to \$4.25 in 1990. Their study corrected for Card and Krueger's flaw of using unadjusted income deciles for family size to measure the distributional effect of minimum wage on families. Using 1990 population survey and a simulation technique, they grouped workers by income-to-needs ratio of their respective families. Also, assuming no dis-employment effects, they find that only 22 per cent of minimum wage workers are poor and that a marginal 19.3% of the benefits of the minimum wage increase would be disbursed to this category of people. The residual goes to the upper class families.

Golan *et al.* (2001) extended the literature in the US, by examining the welfare effects of minimum wage and other government transfer programmes between 1981 and 1997, using panel data of 50 states and the current population survey data. The authors regressed various welfare indices (such as the Gini index and coefficient of variation) on government policy variables (minimum wage inclusive). The study unlike previous work on minimum wage controlled for other government programmes, macroeconomic and demographic variables. The study regressed the first four moments of each state's income vector on minimum wage, demographic and macroeconomic variables in order to explore how policies affect relative incomes and the welfare measures. They find minimum wage reduces the average income (first moment), reshapes the income distribution so that there is more dispersion (second

moment), has a long right tail (third moment), and thick tails (fourth moment). They conclude that these changes to the income distribution made the income distribution more unequal according to any of the welfare measures.

Page *et al.* (2005) studied the effect of minimum wage increases on welfare recipient families in the US. The study adopted a reduced form panel model and used state-level panel data obtained from the population survey between 1983 and 1996. The findings reveal that a 10% rise in minimum wage would lead to between 1 and 2% increases in the size of welfare caseload. In California for example, where minimum wage increased from \$4.25 to \$5.75, they expected welfare dependency to increase between 3 and 7%.

Neumark *et al.* (2005) investigated the effects of minimum wage on the distribution of family incomes in the US between 1986 and 1995, using a non-parametric difference-in-difference approach. The method involved an actual before and after analysis of the effects of the minimum wage on family incomes using a matched population survey data from 1986 to 1995. The use of a matched data provided an advantage relative to an analysis of the annual cross-sections data. The availability of two consecutive years' data for each family enabled them observe their transitions between various parts of the income distribution. This change reflected the actual experiences of families rather than differences in the set of family sampled in each year. This led to a more precise inference. They find that although higher minimum wages raised the incomes of some poor families, the net effect was an increment in the proportions of poor and near-poor families. The study also corrected for various biases.

Hinnosaar (2004) examined the implications of the Estonian labour market policy reforms such as changes to the minimum wage and social benefits. It adopted a static CGE method. The study simulated an increased union bargaining power which implies a higher minimum wage for low skilled labour and found an increase in unemployment among the low-skilled, a decline in production and consumption. A flaw of this simulation results is that they are highly dependent on elasticity estimates taken from research based on other countries. This is because there were no available estimates based on Estonian data for these elasticities. Further, the static model did not take into

account the potentially important dynamic effects created by the labour market policies.

Manning and Bird (2005) assessed the efficiency of minimum wage as an instrument of poverty reduction in Indonesia. They adopted simulation method which took into account those who benefitted and paid for the wage increase using household-level data. The simulation results reveal that minimum wage legislations are not an effective anti-poverty target tool. It was found that only about 17% of the additional earnings from the minimum wage increase in 2003 flowed to poor households, 34% of the benefits flowed to the near-poor, while half of the benefits accrued to non-poor households. Moreover, the examination of net benefits reveals that only one in four poor households gain through higher incomes, while three out of four poor households lose through higher prices.

Taiwo *et al.* (2005) also using a CGE method investigated the impact of a likely minimum wage increase from ₦7,500 in 2000 to ₦9,375 on labour market outcomes and other macroeconomic variables in Nigeria. The study adopted the 1999 SAM for Nigeria and a 25% rise in minimum wage was simulated. Labour input was categorised into urban formal, urban informal and rural labour, it was assumed that labour is mobile across sectors. Their results show that unemployment rate increased by 35.6%. Wage rates of all other labour categories, urban informal, and rural labour, also rose by 2.26% and 5.10%, respectively, signifying spillover effects in the Nigerian labour market. Also, while a sharp fall was recorded in the employment of urban formal labour in all sectors (minimum wage earners), urban informal and rural labour experienced some reallocation of labour across sectors and employment was recorded in some sectors.

Mascella *et al.* (2009) considered the possibility of alleviating poverty in Ontario through increase in minimum wages. Using simulation technique, their results suggest that, even without any negative employment effects, planned increases in Ontario's minimum wage may lead to virtually no reduction in the level of poverty. This conclusion is based on the sensitivity results that if all the workers affected by the minimum wage increase had experienced a fall in working hours by 5.55% (dis-employment effect), the potential small reduction in poverty would be fully offset.

More recently, Sabia and Burkhauser (2010) examined the poverty effects of the increase in the states and federal minimum wage rates in the US from \$5.15 per hour in 2003 to \$5.85 per hour in 2007 using a survey data and employing a panel regression. They went further to simulate the distributional effect of the proposed increase in the minimum wage from \$7.25 per hour in 2009 to \$9.50 per hour, also using a population survey. Their simulation method incorporated employment elasticities ranging from -0.1 to -0.9. The panel regression shows no evidence that minimum wage increases between 2003 and 2007 reduced poverty rate. From the simulation experiments, they find that the proposed wage increase did not appropriately target the working poor. Their findings show that only 11.3% of workers who will benefit from the proposed wage increase lived in poor households. About 63.2% of beneficiaries of minimum wage are secondary workers residing in households with income twice the poverty line, while 42.3% of the beneficiaries lived in families with incomes three times the poverty line. When employment elasticities of -0.6 and -0.2 are incorporated, about 1.3 million jobs will be lost.

Morley *et al.* (2011) using a recursive dynamic CGE model of the Honduras economy examined the impact of a reduction in remittances, a change in foreign savings, and changes in minimum wage policy on macroeconomic variables. The study introduced working capital as a factor of production. The simulation results of a 50% rise in minimum wage resulted in a decline in GDP growth from 5.19% to 3.59%.

Falokun (2011) extended the minimum wage literature in Nigeria by investigating the welfare effects of the increase in minimum wage from ₦7,500 to ₦18,000 in Nigeria in 2011 using a static CGE analysis. The study assumed one labour category, an aggregated household, and did not also take account of the informal sector. By doing this, it was difficult providing explanations to the distributional effects of the minimum wage among households and workers, which is germane. Unlike Folawewo (2009), he finds that all sectors registered decline in employment. The study used indicators such as GDP per capita and real per capita consumption as welfare indicators and concluded that the increase in minimum wage to ₦18,000 will make workers worse-off.

Sabia and Nielsen (2012) pushed the frontier on the minimum wage literature and sought to establish whether increases in the minimum wage reduced poverty and participation in hardship-related programmes such as the food stamp, energy assistance and housing assistance programmes in the US between 1996 and 2007, using data from the Survey of Income and Programme Participation (SIPP). They adopted a difference-in-difference approach to estimate the model, they find no evidence that minimum wage increases reduced poverty in the US during this period. A 10% rise in minimum wage was associated with a statistically insignificant 0.39% rise in state poverty incidence. Similarly, their findings show that increases in the minimum wage did not reduce 16 to 64 year olds, workers, and less experienced participation in hardship-related programmes. Nevertheless, for less-educated individuals, they found that minimum wage increases reduced participation in food stamp programme, significant at 10 per cent. The authors dubbed minimum wage a poor anti-poverty instrument.

3.4.2 Positive Evidence of the Effects of Minimum Wage on Welfare and Income Distribution

The literature is also replete with studies which supported that minimum wage policies are effective in reducing poverty incidence and redistributing income. Mincy (1990) investigated the effect of minimum wage on poverty in the US, using the population survey data for 1987 and adopted the simulation technique. It simulated the effects of a higher minimum wage on the poverty gap for the poor and near-poor families with at least one member paid less than \$4.25(minimum) in 1987. The simulation used assumptions of dis-employment effects, coverage and compliance levels. The results show that a higher minimum wage would have a larger poverty-reducing effect than previous studies suggested. It explains that with full coverage and compliance, as well as a \$4.25 minimum wage, the poverty gap among families with at least one wage earner would fall by 11.1%. When dis-employment effect was taken into account, it made a little difference, as the resulting decline in poverty was about 3 to 4 percentage points smaller. This is because, dis-employment effects fell heavily on teenagers whose contribution to family income was small.

Dinardo *et al.* (1996) presented a semi-parametric approach using the population survey data to analyse the effects of institutional and labour markets factors on

changes in the distribution of wages in the US between 1979 and 1988. They find that de-unionisation, demand and supply shocks, as well as decline in the real value of the minimum wage explain the increase in wage inequality during this period. They conclude that the decline in the real value of the minimum wage explains a substantial proportion of the increase in wage dispersion, particularly for women.

Teulings (2003) using a two-stage kernel density method finds evidences that support those of Dinardo *et al.* (1996). He observes that the decline in minimum wage in the US in the 1980s was mainly responsible for the increase in inequality in the lower half of the wage distribution. He employs the current population survey data for 1973, 1979, 1985, 1989 and 1991. The first stage involved applying a flexible functional form to wage distribution, while in the second process, the variation in the parameters of this flexible form was related to the minimum wage.

Addison and Blackburn (1999) adopted a reduced form regression approach to explore the impact of a minimum wage rise on poverty in the US. The study computed poverty rates for three groups (teenagers, young adults, and junior high school dropouts) whose income positions were most likely to be affected by changes in the minimum wage. The group's poverty rate was used as the dependent variable in the study. They find that between 1983 and 1996, the minimum wage had a poverty-reducing effect among teenagers and older junior high school dropouts.

Holland *et al.* (2006) used a static CGE model of the Washington economy to examine the economic impact of increases in Washington's minimum wage. Three simulations were conducted with different scenarios: the first is a 5% rise in minimum wage, immobile capital (short run), minimum wage labour and other wage labour have an elasticity of 0.5, elasticity of substitution of between capital and other labour, and aggregate capital, other labour, and minimum wage labour is 0.5. The second scenario differs from the first in that capital is assumed to be mobile. The third scenario assumed an elasticity of substitution of 10. Results for scenario one show a lesser loss of minimum wage jobs due to immobile capital among industries, other labour also recorded job losses. The change in equivalent variation shows that low income and lower middle income household recorded increase in welfare. Results for the second scenario suggest that loss in minimum wage jobs was higher with a mobile capital, loss

of other labour jobs also increased substantially compared to scenario one. Overall, the welfare of low income households and higher income households improved and declined, respectively. The third scenario yields a negative equivalent variation for all the household groups due to the high dis-employment effects resulting from the substantial elasticity of substitution of 10. They conclude that low income households in Washington experienced an increase in welfare, while there was a slight decrease in welfare for high income households.

Flinn(2006) adopting a simple model of search, matching, and bargaining, characterised the relationship between minimum wage levels, labour market outcomes, and the welfare of labour market participants. Using US data for young labour market participants (16-24 year olds inclusive) in March 1997 and March 1998, he concludes that the increase in minimum wage which occurred in September 1997 may have been welfare enhancing. He acknowledges that various implications of the model are not consistent with the data.

Machin and Manning (1994) examined the effects of minimum wage on wage dispersion and employment in the United Kingdom (UK) in the 1980s. They used data on workers covered by the UK wages council and find a decline in the level of the minimum wage relative to the average wage (minimum wage variable) significantly contributed to widening wage dispersion. However, they find no evidence of an increase in employment resulting from the decline.

Machin *et al* (2003) studied the impact of the introduction of a national minimum wage in the UK in 1999 on wage distribution and employment in the care home industry. The minimum wages that applied to ages 18 to 21 and above 22 were £3 and £3.60, respectively. Using a survey data conducted by them and a panel regression, they find the introduction of a minimum wage in this sector had a substantial positive effect on wage inequality. The gap between the 50th and 10th percentiles of the log hourly wage distribution narrowed from 0.21 to 0.09, while the distribution in the upper half remained unchanged. The employment effect was negative and manifested in terms of employment reduction and cuts in hours worked, this was moderate, ranging from about elasticity of -0.35 to -0.55.

Dickens and Manning (2004) examined the effects of the re-introduction of the minimum wage in UK in 1999 on income inequality. They conclude that the new minimum wage was effective in raising the earnings of the lowest paid workers. Nevertheless, the effect of the minimum wage on overall wage inequality was marginal, with no detectable effect on earnings at the 10th percentile, even when the effect of the new minimum wage was largest. They opine that this could have resulted from the fact that the minimum wage was set at low levels, hence affecting less than 10% of workers. Also, the spillover effect was non-existent. This study reinforced Machin *et al.* (2003) that wage dispersion reduced after the introduction of minimum wage in the UK, meanwhile, the wage gap reduction was larger in study in question.

Folawewo (2009) examined the macroeconomic impact of minimum wage legislations in the Nigerian economy using a static CGE model and a 2005 Nigerian SAM. In the study, labour was disaggregated into skilled and unskilled, the analysis was restricted to the formal sector only. The employment effects are mixed for skilled and unskilled labour in the agriculture, manufacturing and mining industries. Both labour categories registered reduction in employment in the service industry, with more brunt on the unskilled workers. According to the author, this can be attributed to the effect of layoffs in the public sector. The results also reveal that consumption of low and high income households rose, with the former benefitting more. Thus, he concludes that the imposition of minimum wages led to increased welfare for the two households.

Bosch and Manacorda (2010) sought to explain the nexus between the growth of earnings inequality and decline in the real minimum wage in Mexico between the 1980s and early 2000s. Using household micro data from urban Mexico and instrumental variable estimation technique, they find that the decline in the real value of the minimum wage accounted for a substantial growth in inequality at the bottom end of the distribution. The fall in the minimum wage was responsible for a rise in 50-10 percentile gap of 1.4 percentage points a year and a rise in the 90 to 50 percentile gap of 1.8 percentage points.

3.4.3 Inconclusive Evidence of the Effects of Minimum Wage on Welfare and Income Distribution

Using panel regression and data from the 1973 population survey, Behrman, Sickles, and Taubman (1983) find mixed results when they examined the dynamic effects of minimum wage changes and expansion of coverage on the earnings distribution across race and sex in the US. They identified four characteristics of earnings distribution; logarithm mean earnings relative to GNP per labourer, logarithm real cell mean earnings, within cell variances of the logarithm earnings, and the proportion below the poverty level for a two-child, two-adult family. Their results emphasised the importance of dynamics in understanding the impact of minimum wage on earnings distribution. It was observed that in almost all the cases, the long run effects are at least twice the magnitude of the short run effects, and that in many cases, the adjustment periods are quite long. They find the expansion of minimum wage coverage had a strong positive effect on females. Rises in minimum wage also reduced the fractions of females and blacks below the poverty line, and have increased the real mean earnings for white and black males. On the downside, black males did not benefit from expansion of minimum wage coverage. Also, the increase in the minimum wage failed to increase the real mean earnings of black females, but did so for white males. Further, those with higher educational attainment benefitted more from minimum wage expansion of coverage and increase.

Bell (1997) probed the divergent trends observed in the real minimum wage in Columbia and Mexico in the 1980s. Using time-series (individual data) and panel data (manufacturing sector), the study finds minimum wage had no effect on employment nor wages in Mexico. The elasticity of low skilled employment with respect to the minimum wage was almost zero and statistically insignificant. In Columbia however, the minimum wage had a negative dis-employment effect on low paid unskilled workers (minimum wage labour) in the range of 2 to 12%.

Flinn (2002) investigated the impact of minimum wage rise on wage distributions in the US, using a non-parametric approach, implemented using bootstrap methods. The result of the study was also mixed. He found that the 1996 change in minimum wage from \$4.25 per hour to \$4.75 per hour did not improve welfare, but the 1997 minimum wage changes from \$4.75 per hour to \$5.15 per hour improved welfare in the population of youths aged 16 to 24.

This study differs from the reviewed studies on minimum wage in Nigeria. It departs from them in empirical terms. Studies that examined the welfare effects of minimum wage, (Folawewo, 2009) and (Falokun, 2011) used consumption as welfare indicators. This study attempts to use equivalent variation, a better welfare measure used widely in the CGE literature to capture welfare effects.⁴¹ The equivalent variation is a money metric welfare measure, it is appropriate when comparing many potential changes to the status quo, since the price vector of the base year is the same. Also, these previous studies neglected the large informal sector in the country, where most of the poor and unskilled workers reside. For instance, Falokun (2011) used an aggregated labour, he assumed that all labour are paid the minimum wage and hence, impossible to capture the indirect effects on other labour classes arising from changes in relative factor prices. These oversights, could have affected the outcome of their results tremendously.

Taiwo *et al.* (2005) corrected for some of these limitations, incorporated the informal sector and disaggregated labour into three categories (urban formal, urban informal and rural labour). This study departs from Taiwo *et al.* (2005) in that it attempts to investigate the welfare and income distribution effects of minimum wage increases in Nigeria, while they examined employment effects. The latter's work was premised on a perfectly competitive labour market and thus, assumed that labour skills are homogenous and as a result did not split labour by skill type. By this, the study assumed that aggregate urban labour benefits directly from a minimum wage increase. In reality however, it is the unskilled labour that benefits directly. Hence, the study could have overestimated the unemployment effects among the urban formal labour. This study takes care of these limitations and also uses a more recent SAM for the Nigerian economy.⁴² The theoretical underpinning of this study is the monopsonistic perfect competition, which assumes heterogenous labour skills. Thus, labour is disaggregated by skill (skilled or unskilled) and sector (formal or informal).

3.5 Conceptualisation of Welfare and Income Inequality

⁴¹ Some of these studies are Aka (2006), Holland *et al* (2006), Annabi *et al.* (2004), and Decaluwe *et al.* (2004).

⁴² This study used the 2006 SAM for the Nigerian economy constructed by Nwafor *et al.* (2010) for IFPRI.

3.5.1 Welfare

The term welfare does not have a precise definition. Various criteria of social welfare have dominated the literature. Welfare as defined by Adam Smith is the growth of the gross national product (Koutsoyiannis, 1975). However, efficiency in the distribution of the goods and services produced is necessary to ensure maximisation of the welfare level. This definition gave rise to welfare being conceptualised as the per capita income (PCI).

Another strand in the literature is the cardinalist approach to welfare, which rests solely on the diminishing marginal utility. The argument here is that welfare is maximised if income is equitably distributed in the society. This welfare measure has been criticised on the grounds that individuals do not have equal marginal utility of money (Koutsoyiannis, 1975).

The Pareto welfare measure has also gained popularity and asserts that welfare is improved if it is possible to make at least one person better off without making any one worse-off. This criterion of welfare does not seem plausible because government policies often alter the consumption pattern of households negatively and positively.

The Kaldor-Hick Compensation criterion states that a change constitutes an improvement in social welfare if those who benefit (gainers) from it could compensate those who are hurt (losers) and still be left with some gain. This welfare criterion became known as the Compensating and Equivalent Variations (CV and EV) welfare approaches, and has dominated the welfare literature in recent times. A major advantage of the CV and EV is that they measure changes in utility and do so in monetary units. The CV is the amount of money that would be given to or taken away from a consumer after a policy change, to make him just as well off as he was before the change in policy. EV on the other hand measures how much money would have to be taken away from a consumer before the policy change to leave him as well off as he would after the policy change. That is, it is the income change equivalent to the policy change in terms of the change in utility.

These two approaches (CV and EV) have been used extensively to measure welfare, particularly where applied policy analysis is relevant and which requires measures that allow the comparison of changes in welfare arising from certain policy

changes (Khondker *et al*, 2006). Some authors that have used the Equivalent variation include; Holland *et al* (2006) and Aka (2006). A major advantage of the EV over CV is its appropriateness in comparing many potential changes to the status quo, since the price vector used in all comparisons is uniform. Wunder *et al* (2006) adopted the CV method in investigating the welfare effects of the euro cash changeover. Loughrey and O'Donoghue (2011) also adopted this measure in evaluating the welfare impact of price changes on household welfare in Ireland between 1999 and 2010. Welfare indicators such as employment and PCI have also been used in the literature to evaluate welfare impacts of policies.⁴³

This study adopted the EV welfare approach in evaluating the welfare effects of minimum wage on households in Nigeria. The rationale for the choice of this method is linked to a number of factors. The first is that, since a minimum wage policy involves a reallocation of resources in which some are hurt, while others benefit, it is essential that a non-abstract welfare measure is used. The EV measure is expressed in monetary terms, which is metric and better to understand than utility (Varian, 1990). This is also essential to make welfare policy intervention easier and target-driven.

Second, this particular welfare method looks beyond mere changes in the household consumption of goods and services in its welfare assessment. It compares utility of households at various prices and incomes in the benchmark period, with the simulations. In addition, in a policy study involving different simulations, it is essential that one compares different policy scenarios with another using a uniform variable vector as the base to avoid a biased comparison. In this regard, the EV method is appropriate, since the price vector used in all comparisons is the same (the status quo price vector).

3.5.2 Income Inequality

The term income inequality is defined as the dispersion of the distribution of income, consumption, welfare indicators or an attribute of the population (Litchfield, 1999). Inequality is broader than poverty or welfare, as it is defined over the entire

⁴³ Falokun (2011), and Gindling and Terrell (2007) are examples of such studies

distribution and not on a sub-sample of the population or households below a certain poverty threshold. Inequality is measured using different approaches. The desirability of a particular income distribution measure rests on its conformity to a set of axioms. Litchfield (1999) and Cowell (2009) provide details of these major criteria as presented in what follows.

1. **Decomposability:** The overall inequality should be related consistently to the constituent parts of the distribution. That is, a good inequality measure should be decomposable into within and between subgroups. The generalised entropy class of measures are easily decomposable. The Gini coefficient is only decomposable if the subgroups of the population do not overlap in the vector of incomes. It is also worth noting that the Atkinson measure can be decomposed, but the decomposed parts do not sum up to total inequality.
2. **Income Scale Dependence:** This axiom states that if everyone's income changes by the same proportion, it can be argued that there has been no alteration in the income distribution, suggesting that the value of the inequality measure remains the same.
3. **Principle of Population:** This criterion requires inequality measures to be invariant to replications of the population. That is, merging two identical distributions should not alter inequality.
4. **The Pigou-Dalton Transfer Principle:** This axiom requires the inequality measure to rise (at least not fall) in response to a mean preserving spread. An income transfer from a poorer person to a richer person should register as a rise in inequality and vice versa

Measures of Inequality

Income distribution pattern can be measured using various measurements. Some of these inequality measures are; Variance, Coefficient of Variation, Gini coefficient, Atkinson's index, Dalton's index, and Generalised Entropy. The notable ones that have dominated the income distribution literature are discussed next.

1. **Gini coefficient:** This inequality measure is based on the Lorenz curve. The Lorenz curve is a cumulative frequency curve comparing the distribution of variables with the uniform distribution that represents equality. The Gini

coefficient takes on a value between 0 and 1 or rescaled to 100. 0 indicates perfect equality, while 1 represents complete inequality. This measure is not easily decomposable, but is independent of income scale and population size. It can also measure inter-income inequality appropriately. Symbolically it is given as:

$$Gini = \frac{2}{n^2 y} [y(1) + 2y(2) + 3y(3) + \dots + ny(n)] - \frac{n+1}{n}$$

2. **Coefficient of Variation:** The coefficient of variation is defined as the square root of variance divided by the mean of income. One major disadvantage of this measure is that it has a weak principle of transfer attribute.
3. **Atkinson's index:** This measure also has a weak principle of transfer feature. It is decomposable into subgroups, independent of income scale and population size. Its mathematical expression is stated below

$$A_{\epsilon} = 1 - \left[\frac{1}{N} \sum_{i=1}^N \left(\frac{y_i}{y} \right)^{1-\epsilon} \right]^{\frac{1}{1-\epsilon}} \quad \epsilon \neq 1$$

4. **Generalised Entropy Measures:** These measures have a strong principle of transfers attribute, they are easily decomposable, it is one of the most widely used inequality method. It takes on a value between zero and infinity, the former representing equal distribution and the latter indicating higher levels of inequality. Symbolically, it is expressed as:

$$GE(\alpha) = \frac{1}{\alpha^2 - \alpha} \left[\frac{1}{n} \sum_{i=1}^n \left(\frac{y_i}{y} \right)^{\alpha} - 1 \right]$$

The parameter α in the equation represents weight given to distances between incomes at different parts of the income distribution, which can assume any real value.

The commonest values used are; 0, 1, and 2. $\alpha=0$ attaches more weight to distances between incomes in the lower tail; $\alpha=1$ applies equal weights across the distribution, while $\alpha=2$ gives proportionately more weight to gaps in the upper tail. Aka (2006) adopted the Gini coefficient, Atkinson index, and Generalised entropy methods in estimating the inequality effects of trade liberalisation in Cote d'Ivoire.

In this study, the main focus is on evaluating the income distribution effects of the minimum wage on households. The households selected are high urban, middle urban, low urban, high rural, middle rural, and low rural, suggesting they are assumed to be representative agents and hence, intra-heterogeneity differences are not accounted for. The Gini coefficient and Theil entropy inequality index were selected due to their suitability in measuring changes in income distribution between groups, under the assumption of complete homogeneity within groups (Agenor *et al.*, 2007). The post-shock income distribution indicators are compared with the baseline values to assess the impact of the minimum wage increase on households.

CHAPTER FOUR

THEORETICAL FRAMEWORK AND METHODOLOGY

This chapter documents the theory underlining the research. Specifically, the theoretical link between minimum wage and welfare is presented here. Following this, the methodology of the study including the model blocks and estimation procedure are discussed. Finally, the welfare estimation method; the equivalent variation technique and inequality measures adopted are elaborated upon.

4.1 Theoretical Framework

The framework of the study draws largely on the monopsonistic competitive labour market theory⁴⁴, in which a large number of relatively small employers hire similar labour, but not identical.⁴⁵ Each employer has a degree of market control arising from the imperfect information feature of the factor market. Further, it is assumed that there is less restriction on entry and exit of firms. This labour market structure best mirrors the Nigerian labour market conditions in which there is a dichotomous labour market structure (formal and informal sectors).

The study thus adapts the Dixit-Stiglitz monopsonistic competition model, following the insightful work of Bhaskar and To (2004). The Dixit-Stiglitz model assumes that employers compete directly with other numerous employers, as against the circle model where an employer competes only with her two immediate neighbours. The intuition behind this is that intense competition could reduce employment when the minimum wage is increased.

The utility function of the representative worker is given as:

⁴⁴ A blend of monopsony and perfect competitive labour market.

⁴⁵ It is assumed that labour is heterogeneous.

$$U = w_j l_j - \left(l_j^\rho \right)^{\alpha / \rho} \quad 1$$

Where w_j is wage offered by employer j ; l_j is the number of hours the worker supplies to employer j ; ρ and α are parameters that determine the elasticity of labour supply. Assume that $\alpha > \rho > 1$, this condition is sufficient to ensure concavity of the utility function.

Since profits are driven to zero in a monopsonistic competitive labour market, welfare is identical to the utility of the representative worker in equation 1. This implies that the effect of minimum wage on utility is written as:

$$\frac{dU}{dW^m} = \frac{\partial U}{\partial W^m} + \frac{\partial U}{\partial n} \frac{\partial n}{\partial W^m} \quad 2$$

$$\frac{\partial n}{\partial W^m} = - \frac{p}{p-1} \frac{n^*}{w^*} \quad 3$$

Equation 3 captures the effect of a change in minimum wage on the number of firms. This is the employment reducing exit effect it is negative. This indicates that a higher minimum wage reduces the number of firms due to higher labour cost, this has a direct effect on firms.

Similarly, the effect on welfare of a change in the number of firms is given in equation 4 (see Appendix 2 for derivations of equation 4)

$$\frac{\partial U}{\partial n} = wl - \frac{\alpha}{\rho} l^\alpha n^{\alpha - \rho / \rho} \quad 4$$

It also captures the “oligopsony” employment increasing effect and employment reducing “exit” effect, although indirectly. The first term in equation 4 is positive and indicates that labour could increase as a result of a minimum wage increase. The second term captures the reduction in the number of firms as it affects the welfare of agents through employment losses.

Substituting equations 3 and 4 into 2, we can write the effect of a minimum wage on welfare, evaluated at w^* as (see Appendix 3 for derivations of 5):

$$\frac{dU}{dW^m} = -\frac{1}{(p-1)w^*} \left[\rho w^* n^* l^* - \alpha (n^* l^{*p})^{\alpha/\rho} \right] \quad 5$$

$$\frac{dU}{dW^m} \begin{matrix} < \\ > \end{matrix} 0 \quad 6$$

Equations 5 and 6 show that an increase in the minimum wage has in general an ambiguous effect on welfare. On the one hand, the increase in minimum wage could induce firms to employ more labour at a fixed wage. On the other hand, a minimum wage hike could raise the labour cost of firms and consequently production cost, thus leading to the exit of some firms and dis-employment effect.

4.2 Methodology

4.2.1 Choice of the Model

Minimum wage policies often have indirect and economy-wide effects. Adopting a partial equilibrium technique limits the credibility of the findings for policy inferences due to its inability to capture the indirect effects of policy scenarios and exogenous shocks. Feedback effects resulting from increased or decreased disposable income when minimum wage rises are not accounted for in partial equilibrium methods (DPRU, 2008). These effects are germane in investigating the welfare and income distribution effects of minimum wage policies on households.

To capture the interrelations that take place among agents (households, firms, government, and the rest of the world), factors, consumption, intermediate inputs, consumer prices, and production units when a minimum wage is reviewed, a computable general equilibrium (CGE) method is essential. Further, since different prices (export prices, domestic prices, factor prices, and import prices) may change when minimum wage is increased, a CGE approach becomes more relevant. In addition, a CGE model allows for modelling of different accounts, thus enabling the impact of policies on agents to be examined.

The choice of the CGE method is also premised on its ability to fully account for the transmission mechanism through which minimum wage affects the economy, welfare and income distribution. Further, it has the advantage of accounting for the indirect effects of policy shocks, thus making it germane in this kind of study in which only formal sector workers benefit directly from a minimum wage increase, while those in the informal sector are not covered, but could be indirectly affected.

In addition, CGE models explicitly model variations in the consumption behaviour of households due to changes in their income from various channels. This is important for welfare analysis. CGE models have been used extensively in the literature to capture the effects of minimum wage changes and other labour markets policies.⁴⁶

The model adopted is the standard PEP-1-1 model developed by Decaluwe *et al.* (2010). It is a single-country, static CGE model and an improvement over the EXTER model. Unlike the latter, it allows the modeller incorporate several labour categories and transfers among agents (Decaluwe *et al.*, 2010). The model was modified taking into account the objective of this study and the peculiarities of the Nigerian labour market, particularly the factor market structure. The preference for a static CGE model arises from its ability to capture appropriately the feedback effects of one-off policy shocks such as a minimum wage. Also, in the study of a minimum wage, adjustment of the policy to time may be unnecessary because it is known that minimum wage effects on the economy can often be seen within a year (Holland *et al.*, 2006).

4.2.2 Model Description

The equations of the model are structured along seven inter-linked blocks. They are production and factor demand, income and savings, demand, international trade, prices, equilibrium, and the labour market blocks.

(a) Production and Factor Demand

⁴⁶ Decaluwe *et al.*(2004), Hinno Saar(2004), Taiwo *et al.* (2005), Holland *et al.* (2006), Folawewo (2009), Falokun(2011), and Morley *et al.* (2011) are some of the studies that have used CGE models within this context.

The production function is described by a nested structure of two levels. At the top or first level, the output of each productive activity combines value (VA) and total intermediate consumption in fixed shares.⁴⁷ This is represented by a Leontief production function as depicted in equations 1 and 2. At the second level (equation 3), each industry's value-added (VA) consists of composite capital and composite labour, following a constant elasticity of substitution (CES) specification.⁴⁸ Equation 3 allows for factor substitution among composite labour and capital. Capital is aggregated in the model. The various categories of labour are combined following a CES technology which reflects imperfect substitutability among the different types of labour as depicted in equation 5.⁴⁹ This feature allows for substitution among the labour types, when there is a minimum wage review which automatically alters relative factor prices. In this respect, labour is grouped into: formal skilled (fsk), formal unskilled (fusk), informal skilled (infsk) and informal unskilled (infusk). This classification clearly reflects the heterogenous worker nature of labour, which also allows for incorporation of the informal sector workers in the Nigerian labour market.

Commodities produced by firms locally are allocated between exports and domestic sales. This is based on the assumption that suppliers maximise revenue for any given aggregate output level, subject to imperfect transformability between exports and domestic sales, expressed by a constant elasticity of transformation (CET) function.

$$VA_j = v_j XST_j \quad 1$$

$$CI_j = io_j XST_j \quad 2$$

$$VA_j = B_j^{VA} \left[\beta_j^{VA} LDC_j^{-\rho_j^{VA}} + (1 - \beta_j^{VA}) KDC_j^{-\rho_j^{VA}} \right]^{\frac{1}{\rho_j^{VA}}} \quad 3$$

⁴⁷ The two aggregate inputs are assumed to be strictly complementary, without any possibility of substitution.

⁴⁸ This feature allows for substitution between capital and other labour types.

⁴⁹ The CES combination of the different categories of labour allows the analysing of the spillover effects of a minimum wage increase.

$$LDC_j = \left[\frac{\beta_j^{VA} RC_j}{1 - \beta_j^{VA} WC_j} \right]^{\delta_j^{VA}} KDC_j \quad 4$$

$$LDC_j = B_j^{LD} \left[\sum_l \beta_{l,j}^{LD} LD_{l,j}^{-\rho_j^{LD}} \right]^{\frac{1}{\rho_j^{LD}}} \quad 5$$

$$LD_{l,j} = \left[\frac{\beta_{l,j}^{LD} WC_j}{WTI_{l,j}} \right]^{\delta_j^{LD}} (B_j^{LD})^{\delta_j^{LD}-1} LDC_j \quad 6$$

$$KDC_j = B_j^{KD} \left[\sum_k \beta_{k,j}^{KD} KD_{k,j}^{-\rho_j^{KD}} \right]^{\frac{1}{\rho_j^{KD}}} \quad 7$$

$$KD_{k,j} = \left[\frac{\beta_{k,j}^{KD} RC_j}{RTI_{k,j}} \right]^{\delta_j^{KD}} (B_j^{KD})^{\delta_j^{KD}-1} KDC_j \quad 8$$

$$DI_{i,j} = aij_{i,j} CI_j \quad 9$$

Where: l is defined over; fsk, fusk, infsk, infusk

(b) Income and Savings

In this study, the household structure is a representative type of six categories. The households differ with respect to location (rural or urban), and expenditure or income levels. They are the urban low income, urban middle income, urban high income, rural low income, rural middle income, and rural high income. Boeters and Savard (2011) opine that a household differentiation by income class is vital to answer distributional questions.

Households receive income from factors of production (labour and capital), and transfers from other agents as specified in equation 10. The income of households is related to their sources of employment. The different sectors in the economy employ value-added (fsk, fusk, infsk, infusk, and capital) and intermediate inputs and pay wages and interests to labour and capital, respectively. Labour income is then shared among the households depending on the distribution of the workers in the household as depicted in equation 11.

They spend their income on consumption, taxes, and savings. Direct taxes are deducted from their income. Household savings are a linear function of disposable

income. It is assumed that households have Stone-Geary utility function from which derives the linear expenditure system.

$$YH_h = YHL_h + YHK_h + YHTR_h \quad 10$$

$$YHL_h = \sum_l \lambda_{h,l}^{WL} \left[W_l \sum_j LD_{l,j} \right] \quad 11$$

$$YHK_h = \sum_k \lambda_{h,k}^{RK} \left[\sum_j R_{k,j} KD_{k,j} \right] \quad 12$$

$$YHTR_h = \sum_{ag} TR_{h,ag} \quad 13$$

$$YDH_h = YH_h - TDH_h \quad 14$$

$$CTH_h = YDH_h - SH_h \quad 15$$

$$SH_h = PIXCON^\eta sh0_h + sh1_h YDH_h \quad 16$$

$$TR_{ag,f} = \lambda_{ag,f}^{TR} YDF_f \quad 17$$

$$TR_{agng,gvt} = PIXCON^\eta TR_{agng,gvt}^0 \quad 18$$

$$TR_{agd,row} = PIXCON^\eta TR_{agd,row}^0 \quad 19$$

$$YF_f = YFK_f \quad 20$$

$$YFK_f = \sum_k \lambda_{f,k}^{RK} \left(\sum_j R_{k,j} KD_{k,j} \right) \quad 21$$

$$YDF_f = YF_f - TDF_f \quad 22$$

$$YG = YGK + TDHT + TDFT + TPROD + TPRCTS + YGTR \quad 23$$

$$YGK = \sum_k \lambda_{gvt,k}^{RK} \left(\sum_j R_{k,j} KD_{k,j} \right) \quad 24$$

$$TDHT = \sum_h TDH_h \quad 25$$

$$TDFT = \sum_f TDF_f \quad 26$$

$$TPRODN = TIPT \quad 27$$

$$TIPT = \sum_j TIP_j \quad 28$$

$$TPRCTS = TICT + TIMT \quad 29$$

$$TICT = \sum_i TIC_i \quad 30$$

$$TIMT = \sum_m TIM_m \quad 31$$

$$YGTR = \sum_{agng} TR_{gvt, agng} \quad 32$$

$$TDH_h = PIXCON^h ttdf 0_h + ttdh 1_h YH_h \quad 33$$

$$TDF_f = PIXCON^f ttdf 0_f + ttdf 1_f YFK_f \quad 34$$

$$TIP_j = ttip_j PP_j XST_j \quad 35$$

$$TIC_{nm} = ttic_{nm} \left(PL_{nm} + \sum_i PC_i \right) DD_{nm} \quad 36$$

$$TIC_m = ttic_m \left[\left(PL_m + \sum_i PC_i \right) DD_m + \left((1 + ttim_m) PWM_m e + \sum_i PC_i \right) IM_m \right] \quad 37$$

$$TIM_m = ttim_m PWM_m e IM_m \quad 38$$

$$SG = YG - \sum_{agng} TR_{agng, gvt} - G \quad 39$$

$$YROW = e \sum_m PWM_m IM_m + \sum_k \lambda_{row, k}^{RK} \left(\sum_j R_{k, j} KD_{k, j} \right) + \sum_{agd} TR_{row, agd} \quad 40$$

$$SROW = YROW - \sum_x PE_x^{FOB} EXD_x - \sum_{agd, row} TR_{agd, row} \quad 41$$

$$SROW = -CAB \quad 42$$

Firms receive income from its share of capital income and disburse same to government taxes and transfers. Government collects direct and indirect taxes, capital income, and transfers from other agents as shown in equation 23. Her income is spent on consumption and transfers to households. The rest of the world (ROW) receives export income and capital income (equation 40). This income is spent on transfers to other agents and imports.

(c) **Demand**

The aggregate demand for domestic and imported goods consists of household consumption demand, demand for investment purposes, and government consumption demand. Investment demand equals gross fixed capital formation in the absence of inventory changes. Industries also demand for commodities as intermediate input in the production process.

$$C_{i,h}PC_i = C_{i,h}^{MIN}PC_i + \gamma_{i,h}^{LES} \left(CTH_h - \sum_{ij} C_{ij,h}^{MIN}PC_{ij} \right) \quad 43$$

$$GFCF = IT - \sum_i PC_i \quad 44$$

$$PC_i INV_i = \gamma_i^{INV} GFCF \quad 45$$

$$PC_i CG_i = \gamma_i^{GVT} G \quad 46$$

$$DIT_i = \sum_j DI_{i,j} \quad 47$$

(d) **Trade**

This block represents trade relations among countries. The available supply of goods and services in a given economy is made up of locally produced and imported commodities. The relationship between imported and domestic goods is represented by a constant elasticity of substitution (CES) function (equation 54). This is the popular *Armington* function. In addition, there is imperfect substitutability between domestic goods and imported commodities, suggesting that elasticity is less than one. Goods produced locally are either consumed in the domestic market or exported. To avoid a situation whereby some sectors will divert production towards export only due to higher export prices, it is assumed that goods produced for the domestic market are somewhat different from those produced for the export market, and are thus, not perfectly transformable. This is represented by a CET function (equation 50).

$$XST_j = B_j^{XT} \left[\sum_i \beta_{j,i}^{XT} XS_{j,i}^{\rho_j^{XT}} \right]^{\frac{1}{\rho_j^{XT}}} \quad 48$$

$$XS_{j,i} = \frac{XST_j}{(B_j^{XT})^{1+\delta_j^{XT}}} \left[\frac{P_{j,i}}{\beta_{j,i}^{XT} PT_j} \right]^{\delta_j^{XT}} \quad 49$$

$$XS_{j,x} = B_{j,x}^X \left[\beta_{j,x}^X EX_{j,x}^{\rho_{j,x}^X} + (1 - \beta_{j,x}^X) DS_{j,x}^{\rho_{j,x}^X} \right]^{\frac{1}{\rho_{j,x}^X}} \quad 50$$

$$XS_{j,nx} = DS_{j,nx} \quad 51$$

$$EX_{j,x} = \left[\frac{1 - \beta_{j,x}^X}{\beta_{j,x}^X} \frac{PE_x}{PL_x} \right]^{\delta_{j,x}^X} DS_{j,x} \quad 52$$

$$EXD_x = EXD_x^o \left(\frac{ePWX_x}{PE_x^{FOB}} \right)^{\delta_x^{XD}} \quad 53$$

$$Q_m = B_m^M \left[\beta_m^M IM_m^{-\rho_m^M} + (1 - \beta_m^M) DD_m^{-\rho_m^M} \right]^{\frac{-1}{\rho_m^M}} \quad 54$$

$$Q_{nm} = DD_{nm} \quad 55$$

$$IM_m = \left[\frac{\beta_m^M}{1 - \beta_m^M} \frac{PD_m}{PM_m} \right]^{\delta_m^M} DD_m \quad 56$$

(e) Prices

The price of an aggregate good is a weighted sum of the prices of its components. The price of an industry's commodity therefore is a weighted sum of the prices of value-added and aggregate intermediate consumption. In the same way, the price of aggregate intermediate inputs is made up of the commodity prices of the industry's intermediate inputs, while the price of value-added is a combination of the prices of composite labour and capital.

Price paid by consumers for imported goods is the world price (converted to local currency), taxes on imports and domestic indirect taxes. For local goods consumed, the price paid is the sum of the price received by the producer and indirect taxes. Thus, the price of the composite is a weighted sum of the price paid for domestically produced and imported goods. In the case of commodities without import substitutes, the price of commodities is the price paid for the local product.

$$PP_j = \frac{PVA_j VA_j + PCI_j CI_j}{XST_j} \quad 57$$

$$PT_j = (1 + ttip_j) PP_j \quad 58$$

$$PCI_j = \frac{\sum_i PC_i DI_{i,j}}{CI_j} \quad 59$$

$$PVA_j = \frac{WC_j LDC_j + RC_j KDC_j}{VA_j} \quad 60$$

$$WTI_{l,j} = W_l \quad \text{where } l \text{ is defined over fsk, fusk, infsk, and infusk} \quad 61$$

$$RC_j = \frac{\sum_k RTI_{k,j} KD_{k,j}}{KDC_j} \quad 62$$

$$RTI_{k,j} = R_{k,j} \quad 63$$

$$PT_j = \frac{\sum_i P_{j,i} XS_{j,i}}{XST_j} \quad 64$$

$$P_{j,x} = \frac{PE_x EX_{j,x} + PL_x DS_{j,x}}{XS_{j,x}} \quad 65$$

$$P_{j,nx} = PL_{nx} \quad 66$$

$$\left(PE_x + \sum_i PC_i \right) = PE_x^{FOB} \quad 67$$

$$PD_i = (1 + ttic_i) \left(PL_i + \sum_{ij} PC_i \right) \quad 68$$

$$PM_m = (1 + ttic_m) \left((1 + tim_m) ePWM_m + \sum_i PC_i \right) \quad 69$$

$$PC_m = \frac{PM_m IM_m + PD_m DD_m}{Q_m} \quad 70$$

$$PC_{nm} = PD_{nm} \quad 71$$

$$PIXGDP = \sqrt{\frac{\sum_j PVA_j VAO_j \sum_j PVA_j VA_j}{\sum_j PVAO_j VAO_j \sum_j PVAO_j VA_j}} \quad 72$$

$$PIXCON = \frac{\sum_i PC_i \sum_h C_{i,h}^0}{\sum_{ij} PC_{ij}^0 \sum_h C_{ij,h}^0} \quad 73$$

$$PIXINV = \prod_i \left(\frac{PC_i}{PC_i^0} \right)^{\gamma_i^{INV}} \quad 74$$

$$PIXGVT = \prod_i \left(\frac{PC_i}{PC_i^0} \right)^{\gamma_i^{GVT}} \quad 75$$

(f) Labour market

As pointed out in the background of the study, the Nigerian labour market is dominated by a large informal sector, which accounts for about 68% of total labour force. Its size was estimated at 57.9% of GDP in 2000 (Schneider, 2005). This sector is rapidly growing due largely to the high unemployment rate in the formal sector, estimated at 23.9% in 2011 (NBS, 2012). In the informal segment of the market, the minimum wage is not enforced and workers do not benefit directly from a minimum wage increase.

The minimum wage in Nigeria has been reviewed five times since the uniform minimum wage Act was signed into law in 1981. It is widely believed that these series of wages do not reflect the living costs as they were not properly indexed to the prices. Yet, the setting of minimum wages in the formal sector may have ripple effects on workers in the informal sector.

Therefore, in modelling the labour market, an attempt is made to capture in a stylised way these features. The factor labour consists of the formal skilled, formal unskilled, informal skilled and informal unskilled workers. We assumed a binding minimum wage for unskilled workers in the formal sector, such that some workers are laid off due to job rationing. In this market, the wage rate is fixed. A minimum wage set above the market clearing wage would lead to rationing of jobs in the formal sector. This results into excess labour in this sector, ensuring that the market does not clear.

In the labour markets for formal skilled, informal skilled, and informal unskilled workers, wages exhibit a high degree of flexibility and adjust to clear the market. Here, wage rate adjusts to clear the market, thus equilibrating the demand and supply of labour. Each labour category is mobile across industries. Sectors employ all categories of labour, but in different proportions, and can substitute among the labour types according to CES technology.

(g) Equilibrium

The model specifies supply and demand equilibrium in the goods and services market, as well as the factor market. Similarly, total investment expenditure must equal the sum of agents' savings. The sum of supplies of every commodity by local producers must be equal to domestic demand for that commodity produced locally. Also, supply to the export market of each good must be matched by demand. Equation 76 represents equilibrium in the goods market. Equilibrium in the labour market is specified in equations 77 to 80.

$$Q_i = \sum_h C_{i,h} + CG_i + INV_i + DIT_i \quad 76$$

$$\sum_j LD_{fusk,j} = LS_{fusk} \quad 77$$

$$\sum_j LD_{inf,j} = LS_{inf} \quad 78$$

$$LS_{inf} = LSO_{inf} + LS_{fusk,j}^e \quad 79$$

$$\sum_j LD_{fusk,j} + LS_{fusk,j}^e = LS_{fusk,j} \quad 80$$

$$\sum_j KD_{k,j} = KS_k \quad 81$$

$$IT = \sum_h SH_h + SG + SROW \quad 82$$

$$\sum_j DS_{j,i} = DD_i \quad 83$$

$$\sum_j EX_{j,x} = EXD_x \quad 84$$

(g) Other Equations

$$EV_h = \left(CTH_h - \sum_{ij} PC_{ij} C_{ij,h}^{MIN} \right) \prod_i \left(\frac{PCO_i}{PC_i} \right)^{\gamma_{i,h}^{LES}} - \left(CTHO_h - \sum_{ij} PCO_{ij} C_{ij,h}^{MIN} \right) \quad 85$$

$$GDP^{BP} = \sum_j PVA_j VA_j \quad 86$$

$$GDP^{MP} = GDP^{BP} + TPRCTS \quad 87$$

$$GDP^{IB} = \sum_{l,j} W_l LD_{l,j} + \sum_{k,j} R_{k,j} KD_{k,j} + TPROD_N + TPRCTS \quad 88$$

$$GDP^{FD} = \sum_i PC_i \left[\sum_h C_{i,h} + CG_i + INV_i \right] + \sum_x PE_x^{FOB} EXD_x - e \sum_m PWM_m IM_m \quad 89$$

Variables

VOLUME VARIABLES

$C_{i,h}$: Consumption of commodity i by type h households

$C_{i,h}^{\min}$: Minimum consumption of commodity i by type h households

CG_i : Public consumption of commodity i

CI_j : Total intermediate consumption of industry j

DD_i : Domestic demand for commodity i produced locally

$DI_{i,j}$: Intermediate consumption of commodity i by industry j

DIT_i : Total intermediate demand for commodity i

$DS_{j,i}$: Supply of commodity i by sector j to the domestic market

$EX_{j,x}$: Quantity of product x exported by sector j

EXD_x : World demand for exports of product x

IM_m : Quantity of product m imported

INV_i : Final demand of commodity i for investment purposes

$KD_{k,j}$: Demand for type k capital by industry

KDC_j : Industry j demand for composite capital

KS_k : Supply of type k capital

$LD_{l,j}$: Demand for type l labour by industry j

LDC_j : Industry j demand for composite labour

LS_l : Supply of type l labour

$LS_{fusk,j}^e$: Excess supply of formal unskilled labour

Q_i : Quantity demanded of composite commodity i

VA_j : Value-added of industry j

$XS_{j,i}$: Industry j production of commodity i

XST_j : Total aggregate output of industry j

PRICE VARIABLES

e: Exchange rate; price of foreign currency in terms of local currency

$P_{j,i}$: Basic price of industry j's production of commodity i

PC_i : Purchaser price of composite commodity i (including all taxes and margins)

PCI_j : Intermediate consumption price index of industry j

PD_i : Price of local product i sold on the domestic market (including all taxes and margins)

PE_x : Price received for exported commodity x (excluding export taxes)

PE_x^{FOB} : FOB price of exported commodity x (in local currency)

PIXCON : Consumer price index

PIXGDP : GDP deflator

PIXGVT : Public expenditures price index

PIXINV : Investment price index

PL_i : Price of local product i (excluding all taxes on products)

PM_m : Price of imported product m (including all taxes and tariffs)

PP_j : Industry j unit cost, including taxes directly related to the use of capital and labour, excluding other taxes on production

PT_j : Basic price of industry j's output

PVA_j : Price of industry j value-added (including taxes on production directly related to the use of capital and labour)

PWM_m : World price of imported product m (expressed in foreign currency)

PWX_x : World price of exported product x (expressed in foreign currency)

R_{k,j} : Rental rate of type k capital in industry j

RC_j : Rental rate of industry j composite capital

RK_k : Rental rate of type k capital (if capital is mobile)

RTI_{k,j} : Rental rate paid by industry j for type k capital

W_l : Wage rate of type l labour

WC_j : Wage rate of industry j composite labour

WTI_{l,j} : Wage rate paid by industry j for type l labour

NOMINAL (VALUE) VARIABLES

CAB: Current account balance

CTH_h: Consumption budget of type h households

G: Current government expenditures on goods and services

GDP^{BP}: GDP at basic prices

GDP^{FD}: GDP at purchasers' prices from the perspective of final demand

GDP^{IB}: GDP at market prices (income based)

GDP^{MP}: GDP at market prices

GFCF: Gross fixed capital formation

IT: Total investment expenditures

SG: Government savings

SH_h: Savings of type h households

SROW: Rest of the world savings

TDF_f: Income taxes of type f businesses

TDFT: Total government revenue from business income taxes

TDH_h: Income taxes of type h households

TDHT: Total government revenue from household income taxes

TIC_i: Government revenue from indirect taxes on product i

TICT: Total government receipts of indirect taxes on commodities

TIM_m: Government revenue from import duties on product m

TIMT: Total government revenue from import duties

TIP_j : Government revenue from taxes on industry j production (excluding taxes directly related to the use of capital and labour)

$TIPT$: Total government revenue from production taxes (excluding taxes directly related to the use of capital and labour)

$TPRCTS$: Total government revenue from taxes on domestic goods and imports

$TPRODN$: Total government revenue from other taxes on production

$TR_{ag,agj}$: Transfers from agent agj to agent ag

YDF_f : Disposable income of type f businesses

YDH_h : Disposable income of type h households

YF_f : Total income of type f businesses

YFK_f : Capital income of type f businesses

$YFTR_f$: Transfer income of type f businesses

YG : Total government income

YGK : Government capital income

$YGTR$: Government transfer income

YH_h : Total income of type h households

YHK_h : Capital income of type h households

YHL_h : Labour income of type h households

$YHTR_h$: Transfer income of type h households

$YROW$: Rest of the world income

EV_h : Equivalent variation for household h

PARAMETERS

$aij_{i,j}$: Input-output coefficient

B_j^{KD} : Scale parameter (CES-composite capital)

B_j^{LD} : Scale parameter (CES-composite labour)

B_m^M : Scale parameter (CES-composite commodity)

B_j^{VA} : Scale parameter (CES-value added)

$B_{j,x}^X$: Scale parameter (CET-exports and local sales)

B_j^{XT} : Scale parameter (CET-total output)

$\beta_{k,j}^{KD}$: Share parameter (CES—composite capital)

$\beta_{l,j}^{LD}$: Share parameter (CES—composite labour)

β_m^M : Share parameter (CES—composite commodity)

β_j^{VA} : Share parameter (CES— value-added)

$\beta_{j,x}^X$: Share parameter (CET— exports and local sales)

$\beta_{j,i}^{XT}$: Share parameter (CET— total output)

η : Price elasticity of indexed transfers and parameters

γ_i^{GVT} : Share of commodity i in total current public expenditures on goods and services

γ_i^{INV} : Share of commodity i in total investment expenditures

$\gamma_{i,h}^{LES}$: Marginal share of commodity i in type h household consumption budget

io_j : Coefficient (Leontief-intermediate consumption)

$\lambda_{ag,k}^{RK}$: Share of type k capital income received by agent (ag)

$\lambda_{ag,agj}^{TR}$: Share parameter (transfer functions)

$\lambda_{h,l}^{WL}$: Share of type l labour income received by type h households

ρ_j^{KD} : Elasticity parameter (CES-composite capital); $-1 < \rho_j^{KD} < \infty$

ρ_j^{LD} : Elasticity parameter (CES-composite labour); $-1 < \rho_j^{LD} < \infty$

ρ_m^M : Elasticity parameter (CES-composite commodity); $-1 < \rho_m^M < \infty$

ρ_j^{VA} : Elasticity parameter (CES-value-added); $-1 < \rho_j^{VA} < \infty$

$\rho_{j,x}^X$: Elasticity parameter (CES- exports and local sales); $-1 < \rho_{j,x}^X < \infty$

ρ_j^{XT} : Elasticity parameter (CES-total output); $-1 < \rho_j^{XT} < \infty$

δ_j^{KD} : Elasticity of substitution (CES-composite capital); $0 < \delta_j^{KD} < \infty$

δ_j^{LD} : Elasticity of substitution (CES-composite labour); $0 < \delta_j^{LD} < \infty$

δ_m^M : Elasticity of substitution (CES-composite commodity); $0 < \delta_m^M < \infty$

δ_j^{VA} : Elasticity of transformation (CES-value-added); $0 < \delta_j^{VA} < \infty$

$\delta_{j,x}^X$: Elasticity of transformation (CET-exports and local sales); $0 < \delta_{j,x}^X < \infty$

δ_x^{XD} : Price elasticity of the world demand for exports of product x

δ_j^{XT} : Elasticity of transformation (CET- total output); $0 < \delta_j^{XT} < \infty$

$sh0_h$: Intercept (type h household savings)

$sh1_h$: Slope (type h household savings)

$tr0_h$: Intercept (transfers by type h households to government)

$tr1_h$: Marginal rate of transfers by type h households to government

$ttdf0_f$: Intercept (income taxes of type f businesses)

$ttdf1_f$: Marginal income tax rate of type f businesses

$ttdh0_h$: Intercept (income taxes of type h households)

$ttdh1_h$: Marginal income tax rate of type h households

$ttic_i$: Tax rate on commodity i

$ttim_m$: Rate of taxes and duties on imports of commodity m

$ttip_j$: Tax rate on the production of industry j

v_j : Coefficient (Leontief-value-added)

4.2.3 Closure Rule

The macro-closure adopted in the model ensures a fixed current account balance and a flexible exchange rate. Consequently, transfers between the rest of the world and domestic institutions are fixed, the trade balance is also fixed. Equilibrium in the investment-savings market is achieved by adopting an investment-driven savings closure, in which the level of investment is fixed, and savings of agents adjusted endogenously to the desired investment level. Fixing the investment level and foreign savings are necessary in order to avoid the misleading welfare effects that could arise when foreign savings and real investment change in simulations involving a static model. In a static-single period model, a household which reduces its investment stock and raises its level of foreign savings, borrows to do so and thus, will have a higher welfare level in the simulated period. Nevertheless, since the model is a single period, the household does not pay back in the next period, when its welfare level is expected to decline. Government savings is flexible, while real expenditure is fixed. Price of imported products was adopted as the numeraire.

The macro-constraints imposed on the labour market would affect the demand and supply side of the market. Wage rate is fixed in the labour market for formal

unskilled (minimum wage) workers. This creates excess labour supply of minimum wage workers in the market. Since wage rate is fixed, the labour market for this category of workers is not cleared. This excess labour supply moves into the informal labour market for unskilled workers, where the wage rate adjusts and the market is cleared. On the labour demand side, firms substitute the relatively expensive minimum wage workers. This increases demand for other classes of workers and puts upward pressure on wages. The overall effect on wages in the informal sector depends on which effect dominates, the labour demand or supply side. In the labour market for formal skilled (fsk), informal skilled (infsk), and informal unskilled (infusk), labour supply and demand equilibrate and wage rate adjusts to clear the market.

4.2.4 Household Inequality and Welfare Estimation

The study adopts the equivalent variation (EV) welfare method to measure the welfare of households following the introduction of a minimum wage increase. This approach to welfare is monetary-based and measures the amount of money a consumer would give up or be offered to provide him/her with the same utility level as he/she would have obtained after the policy reform. The household's utility level at given prices and income in the base run is compared to the level of utility after the introduction of the policy (Varian, 1990). The EV measure is more appropriate when comparing many potential changes to the status quo, since the price vector used in all comparisons is the same. A positive and negative EV values indicate welfare improvement and decline, respectively. Functionally, it is denoted as:

$$EV_h = \left(CTH_h - \sum_{ij} PC_{ij} C_{ij,h}^{MIN} \right) \prod_i \left(\frac{PCO_i}{PC_i} \right)^{\gamma_{i,h}^{LES}} - \left(CTHO_h - \sum_{ij} PCO_{ij} C_{ij,h}^{MIN} \right) \quad 90$$

Where: the variables and parameters are as defined earlier. See below for author's derivation of the EV welfare measure.

Equivalent Variation Equation

$$U^{LES}(C_i) = \prod_{i=1}^I (C_{i,h} - C_{i,h}^{MIN})^{\gamma_{i,h}} \quad 91$$

Equation 91 represents the utility function of the representative agent of type h households. This is a Stone-Geary utility function.

$$\text{Where: } \sum_i \gamma_{i,h}^{LES} = 1$$

The demand function is obtained by maximising equation 91 subject to the budget constraint in equation 92,

$$\sum_i PC_i C_{i,h} = CTH_h \quad 92$$

which yields equation 93 below:

$$C_{i,h} PC_i = C_{i,h}^{MIN} PC_i + \gamma_{i,h}^{LES} \left(CTH_h - \sum_{ij} C_{ij,h}^{MIN} PC_{ij} \right) \quad 93$$

Equation 93 is the consumer demand function.

Dividing equation 93 through by PC_i gives

$$C_{i,h} = C_{i,h}^{MIN} + \frac{\gamma_{i,h}^{LES}}{PC_i} \left(CTH_h - \sum_{ij} C_{ij,h}^{MIN} PC_{ij} \right) \quad 94$$

The indirect utility function $V^{LES}(PC_i, CTH_h)$ is obtained by replacing $C_{i,h}$ in equation 91, with equation 94

$$V^{LES}(PC_i, CTH_h) = \prod_{i=1}^I \left[C_{i,h}^{MIN} PC_i + \frac{\gamma_{i,h}^{LES}}{PC_i} \left(CTH_h - \sum_{ij} C_{ij,h}^{MIN} PC_{ij} \right) - C_{i,h}^{MIN} \right]^{\gamma_{i,h}^{LES}} \quad 95$$

$$= \prod_{i=1}^I \left(\frac{\gamma_{i,h}^{LES}}{PC_i} \right)^{\gamma_{i,h}^{LES}} \prod_{i=1}^I \left(CTH_h - \sum_{ij} C_{ij,h}^{MIN} PC_{ij} \right)^{\gamma_{i,h}^{LES}} \quad 96$$

$$= \left(CTH_h - \sum_{ij} C_{ij,h}^{MIN} PC_{ij} \right) \prod_{i=1}^I \left(\frac{\gamma_{i,h}^{LES}}{PC_i} \right)^{\gamma_{i,h}^{LES}} \quad 97$$

Equation 97 gives the indirect utility function

Solving equation 97 for CTH_h gives the money metric indirect utility function $CTH_h(PC_i, V)$, a measure of the income needed to attain utility V at the vector prices PC_i

From equation 97, we have

$$V^{LES} = CTH_h \prod_{i=1}^I \left(\frac{\gamma_{i,h}^{LES}}{PC_i} \right)^{\gamma_{i,h}^{LES}} - \sum_{ij} C_{ij,h}^{MIN} PC_{ij} \prod_{i=1}^I \left(\frac{\gamma_{i,h}^{LES}}{PC_i} \right)^{\gamma_{i,h}^{LES}} \quad 98$$

$$CTH_h \prod_{i=1}^I \left(\frac{\gamma_{i,h}^{LES}}{PC_i} \right)^{\gamma_{i,h}^{LES}} = V^{LES} + \sum_{ij} C_{ij,h}^{MIN} PC_{ij} \prod_{i=1}^I \left(\frac{\gamma_{i,h}^{LES}}{PC_i} \right)^{\gamma_{i,h}^{LES}} \quad 99$$

Solving equation 99 for CTH_h yields:

$$CTH_h = \prod_{i=1}^I \left(\frac{PC_i}{\gamma_{i,h}^{LES}} \right)^{\gamma_{i,h}^{LES}} V^{LES} + \sum_{ij} C_{ij,h}^{MIN} PC_{ij} \quad 100$$

Equation 100 gives the money metric indirect utility function. Equations 97 and 100 are combined to derive the EV.

$$EV_h = CTH_h^{LES} (PCO_i, V^{LES} (PC_i, CTH)) - CTH_h^{LES} (PCO_i, V^{LES} (PCO_i, CTHO)) \quad 101$$

Plugging in equation 100, we have:

$$EV_h = \prod_{i=1}^I \left(\frac{PCO_i}{\gamma_{i,h}^{LES}} \right)^{\gamma_{i,h}^{LES}} V^{LES} (PC_i, CTH) + \sum_{ij} C_{ij,h}^{MIN} PCO_{ij} - CTHO \quad 102$$

Substituting for the indirect utility function $V^{LES} (PC_i, CTH)$ in equation 102, we have

$$EV_h = \prod_{i=1}^I \left(\frac{PCO_i}{\gamma_{i,h}^{LES}} \right)^{\gamma_{i,h}^{LES}} \left(CTH_h - \sum_{ij} C_{ij,h}^{MIN} PC_{ij} \right) \prod_{i=1}^I \left(\frac{\gamma_{i,h}^{LES}}{PC_i} \right)^{\gamma_{i,h}^{LES}} + \sum_{ij} C_{ij,h}^{MIN} PCO_{ij} - CTHO \quad 103$$

$$EV_h = \left(CTH_h - \sum_{ij} PC_{ij} C_{ij,h}^{MIN} \right) \prod_{i=1}^I \left(\frac{PCO_i}{PC_i} \right)^{\gamma_{i,h}^{LES}} - \left(CTHO - \sum_{ij} PCO_{ij} C_{ij,h}^{MIN} \right) \quad 104$$

Different approaches to measure income inequality exist (Cowell, 2009).⁵⁰ The choice of income distribution techniques adopted in any study depends on its appropriateness in the study. In this research, households are assumed to be representative agents and hence, intra-heterogeneity differences are not accounted for. The Gini coefficient and Theil entropy inequality index were selected due to their suitability in measuring changes in income distribution between groups, under the assumption of complete homogeneity within groups (Agenor *et al.*, 2007). The post-shock income distribution indicators are compared with the baseline values to assess the impact of the minimum wage increase on the households. Both indicators are defined formally as:

$$Gini = \frac{2}{n^2 \bar{y}} [y(1) + 2y(2) + 3y(3) + \dots + ny(n)] - \frac{n+1}{n} \quad 105$$

Where: $n=6$ is the number of household categories=low-rur, mid-rur, high-rur, low-urb, mid-urb, hig-urb, and \bar{y} is the arithmetic mean level of consumption or disposable income for household categories.

$$GE(1) = \frac{1}{n} \sum_{i=1}^n \frac{y_i}{\bar{y}} \log \frac{y_i}{\bar{y}} \quad 106$$

Where: y represents the disposable income of the representative households. The Gini index ranges from 0 to 1, denoting perfect income equality and inequality, respectively. Theil entropy does not have a range, however the larger the index is, the more unequal is the pattern of income distribution.⁵¹

⁵⁰ Cowell (2009) explicitly defines various measures of income inequality and their merits and disadvantages.

⁵¹ Income inequality indices were computed using the DAD 4.5 software developed by Duclos, Araar, and Fortin (2008).

4.2.5 The Social Accounting Matrix and Computable General Equilibrium

The database for the study is the Nigeria 2006 Social Accounting Matrix (SAM) developed by Nwafor *et al.* (2010). The SAM is a square matrix with equal rows and columns providing information on expenditure and income flows of a country within a year. The original SAM had 61 sectors, three factors of production (land, labour, and capital), 12 household categories (classified by location and geopolitical zones), enterprises account, tax account, investment, rest of the world (ROW), and the government account.

For the purpose of this study, the SAM was reaggregated into ten sectors⁵² and commodities, five factors of production, six household categories. Given the interest of the study, the labour account was disaggregated into formal skilled, formal unskilled, informal skilled and informal unskilled to reflect the Nigerian labour market. Capital is aggregated. One of the foremost advantages of the SAM is that it accommodates splitting of households into homogenous socio-economic characteristics, particularly to analyse the effects of government policies on income distribution (Decaluwe *et al.*, 1999). Consequently, the study disaggregated households into urban low income, urban middle income, urban high income, rural low income, rural middle income, and rural high income based on their consumption expenditure patterns.

⁵² The production sectors are: agriculture; manufacturing; extractive; utilities and construction; trade, hotel and restaurant; finance, telecoms, and estate; health and education; administration, and other private sector services.

CHAPTER FIVE

SIMULATION RESULTS AND ANALYSIS

5.1 Introduction

Four sets of simulations are carried out and reported, based on historical wage reviews in Nigeria. The first scenario analysed the impact of a 20 per cent (henceforth SIM1) increase in the minimum wage from ₦7,500 per month to ₦9,000 per month. The second and third simulations involved 35 (SIM2) and 50 per cent (SIM3) increases in the minimum wage from ₦7,500 per month to ₦10,125 and ₦11,250 per month respectively. The fourth simulation is the 140% increase in the minimum wage from ₦7,500 to ₦18,000 per month, the current minimum wage in the country. First, the general results of these simulations are analysed and subsequently, compared more specifically with respect to the effects on welfare and income distribution as measured by Equivalent Variation (EV), Gini coefficient and generalised entropy, respectively.

5.1.1 Diagnostic Check

To ensure that the model is properly calibrated, confirming that the model reproduces the base year values, diagnostic checks were carried out in this study. The first diagnostic check involves finding out if the initial SAM values (base year) are replicated without any shock to the model. One major way of confirming this is to check the input point (without shock), which indicates the magnitude of the largest difference between the left and right side of each equation. If the solution to the model reproduces the initial equilibrium value, the difference between the left and right side of the equations should be zero or negative. Thus, a large infeasibility at the input point from the output file indicates that the model does not replicate the base year values. In this study, the initial equilibrium without shock shows that the input point is small at 0.0000112414 (Table 5.1). This is an indication that the simulation results are not unnecessarily bloated.

The second diagnostic test, which comes handy after the introduction of the shock, is the Leon. It helps check if the model is correctly specified. The Leon is a control variable which ascertains that the last market is in equilibrium, thus ensuring that the Walras law is not violated. The value of the Leon must be infinitesimally small or zero. In this study, all the simulation experiments have very small Leon values as depicted in Table 5.2.

Results of Diagnostic Test

Table 5.1. Diagnostic 1: Baseline Simulation Check- Minimum Wage Shock

Iter	Phase	Ninf	Infeasibility	RGmax	NSB Step	InItr	MX	OK
0	0		1.1241449642E-05	(Input point)				
Pre-triangular equations:							92	
Post-triangular equations:							69	
1	0		1.1234116613E-05	(After pre-processing)				
2	0		3.9251352169E-11	(After scaling)				

Table 5.2. Diagnostic 2: Leon Check- Minimum Wage Increases

VAR LEON Excess supply on the last market				
	LOWER	LEVEL	UPPER	
Simulation 1	-INF	.	+INF	
Simulation 2	-INF	.	+INF	
Simulation 3	-INF	-1.16E-10	+INF	
Simulation 4	-INF	.	+INF	

5.1.2 Employment and Wage Effects

Simulation 1 (20% increase in the minimum wage)

The direct effect of an increase in the minimum wage by 20 (sim1) from ₦7,500 to ₦9,000 per month is a reduction in the labour demand for formal unskilled workers (minimum wage workers) as shown in Table 5.4a. This is not unexpected as increase in the factor price of minimum wage workers (as shown in Table 5.3) leads to a reduction in employment. In the manufacturing sector, employment of minimum wage workers declined by -7.2%, while it declined by -17.2% in the extractive industry. Similarly, the health and education, and finance sectors, telecoms, and estate also shed -10.7% and -16.4% of formal unskilled workers, respectively. Unsurprisingly, in government establishments (administration) the demand for formal unskilled workers declined by -13.1% due to rise in wage bills. This finding is in harmony with the consequence of minimum wage imposition in government parastatals in Nigeria

Only agriculture, trade, and other private services sectors registered increases in employment. For instance, in the agriculture, as well as wholesale and retail industry, employment of unskilled workers increased by 24.8% and 7.64%, respectively. These sectors are largely informal and thus, their wage bill on formal unskilled workers is not substantial. For instance, the agriculture sector spends only 13% of its total wage bill on minimum wage workers (formal unskilled workers), while trade sector spends 10.7%. Thus, since the wage rate of minimum wage workers is fixed, they can afford to employ more workers without driving up the wage rate. Further, because the goods produced in these sectors are inelastic, and firms could easily pass-on some of the labour cost increase to consumers in form of higher prices. As shown in Table 5.5, price increases in the agriculture, trade, and other private services sectors were the largest.

In addition, this mixed trend in employment could be traced to the monopsonistic competitive labour market framework which advocates that setting fixed wage floors may also induce employers to increase employment since they can hire at a constant wage, without driving up the wage rate. In this respect, this study

differs from Taiwo *et al* (2005) which presented a general decline in sectoral labour demand for minimum wage workers after an increase in their wages.

Table 5.3. Changes in Labour Remuneration under the Different Minimum Wage Increase Scenarios

Labour	Base level (price)	SIM 1(20% increase in minimum wage)	SIM 2(35% increase in minimum wage)	SIM 3(50% increase in minimum wage)	SIM 4(140% increase in minimum wage)	
		Percentage change from base				
Formal skilled	1	15.2	26.6	38	112.7	
Formal unskilled	1	20	35	50	140	
Informal skilled	1	31.7	55.5	79.3	258.5	
Informal unskilled	1	33.7	59.3	84.9	273	

Source: Author's compilation

Table 5.4a. Changes in Labour Demand (formal sector) following Increases in Minimum Wage (20%, 35%, 50% and 140%)

Sector	BAU ₦' Million	Formal skilled % change from base				BAU ₦' Million	Formal unskilled % change from base			
		Sim1	Sim2	Sim3	Sim4		Sim1	Sim2	Sim3	Sim4
Agric	412,646	31.1	51.0	68.3	291.6	465,325	24.8	39.8	52.3	84.3
Man	113,615	-2.6	-5.3	-8.2	-5.6	123,082	-7.2	-12.3	-16.9	-19.7
Extrac	2,147	-13.1	-21.4	-28.6	-111.64	439	-17.2	-27.2	-35.4	-56.8
Util & con	132,778	-5.5	-9.6	-13.6	-40.4	226,082	-10.1	-16.4	-21.8	-31.8
Trade	175,288	13.0	20.2	25.9	145.1	168,414	7.64	11.3	13.9	33.0
Hotel & rest	39,203	3.7	5.5	6.9	50.4	83,307	-1.21	-2.2	-3.2	-0.1
Fin, tel & est	654,920	-12.1	-19.2	-24.8	-111.6	242,231	-16.4	-25.1	-31.9	-56.7
Hlth & edu	278,603	-6.2	-10.4	-14.2	-55.9	65,351	-10.7	-17.0	-22.3	-37.3
Admin	530,632	-8.7	-14.3	-19.3	-102.5	384,251	-13.1	-20.7	-27.0	-50.4
Other private services	17,990	7.8	12.7	16.7	86.2	34,922	2.8	4.3	5.6	12.4

Source: Author's compilation

Table 5.4b. Changes in Labour Demand (informal sector) following Increases in Minimum Wage (20%, 35%, 50% and 140%)

Sector	BAU ₦' Million	Informal skilled % change from base				BAU ₦' Million	Informal unskilled % change from base			
		Sim1	Sim2	Sim3	Sim4		Sim1	Sim2	Sim3	Sim4
Agric	237,052	11.6	17.9	22.8	111.6	2,396,863	9.6	14.6	18.4	99.3
Man	15,089	-17.1	-26.0	-32.9	-180.7	487,893	-18.5	-28.1	-35.3	-198.0
Extrac	56	-26.0	-38.6	-47.8	-286.6	199	-27.4	-40.4	-49.7	-303.9
Util & con	26,425	-19.5	-29.4	-36.9	-215.4	267,188	-21.0	-31.4	-39.2	-232.7
Trade	255,902	-3.7	-6.1	-8.0	-29.9	962,682	-5.5	-8.7	-11.3	-47.3
Hotel & rest	8,871	-11.6	-17.5	-21.9	-124.6	79,843	-13.3	-19.8	-24.7	-141.9
Fin, tel & est	8,871	-25.2	-36.8	-45.1	-286.5	28,409	-26.5	-38.6	-47.1	-303.9
Hlth & edu	17,646	-20.2	-30.4	-37.3	-230.8	12,262	-21.6	-32.0	-39.6	-248.2
Admin	-	-	-	-	-	-	-	-	-	-
Other private services	42,918	-8.1	-11.9	-14.7	-88.8	100,142	-9.8	-14.5	-17.7	-106.2

Source: Author's compilation

The rise in the minimum wage increases the relative cost of formal unskilled labour, and results in substitution among labour factors. Consequently, due to the elasticity of substitution among the labour categories, firms substituted formal unskilled workers (minimum wage workers) with other labour. This indirectly leads to increase in the demand for other labour categories and puts upward pressure on their wage rates as shown in Table 5.3. In the 20% wage increase simulation, wage rate of formal skilled workers rose by 15.2%, while those of informal skilled and informal unskilled labour increased by 31.7% and 33.7%, respectively. This result corroborates Taiwo *et al.* (2005) that following a 25% increase in the minimum wage of urban formal workers in Nigeria from ₦7,500 per month to ₦9,375, wage rates of rural labour and urban informal labour also increased.

The indirect effect of the minimum wage increase on the employment of other labour categories is also shown in Tables 5.4a and 5.4b. Employment of formal skilled workers increased in the agriculture, hotel and restaurant, trade and other private service sectors. Labour demand in the agriculture and trade sectors rose by 31.1% and 13% respectively, while it increased by 7.8% and 3.7% in the other private services and hotel sectors, respectively. A probable explanation for the increase in the demand for formal skilled labour in these sectors is because these sectors are labour intensive and make use of a large quantity of workers. Since the wages of this category of labour rose much less than the increase in wage rates of other labour categories, firms are induced to increase labour demand.⁵³ Another plausible explanation for the increase in employment of formal skilled workers can be traced to the existing pool of unemployed formal skilled workers who now move to the informal sector for employment as a result of the increase in the minimum wage.

However, in the finance, health and education, extractive, manufacturing, administration, and utilities sectors labour demand for formal skilled workers declined. Employers in the finance as well as health and education sectors reduced their employment by -12.1% and -6.2%. Similarly, firms in the manufacturing and

⁵³ For example in simulation 1, the wage rate of formal skilled workers increased by 15.2% after the increase in minimum wage, compared to increases of 20, 31.7 and 33.7% for formal unskilled, informal skilled, and informal unskilled labour respectively (Table 5.3).

extractive industries shed their employment of formal skilled labour by -2.6% and -13.1% in the 20% wage increase scenario.

Labour demand for informal skilled and informal unskilled workers in the agriculture sector increased as shown in Table 5.4b. Nevertheless, it was noted that, due to faster growth of wage rate in the informal unskilled labour market, the demand for labour rose less than that of the informal skilled workers. In simulation 1, employment of informal skilled labour increased by 11.6, while demand for informal unskilled workers increased by 9.6. The mixed trend observed in the employment of other labour by sectors is in harmony with Folawewo (2009) and Taiwo *et al.* (2005) which also find mixed employment effects after the increase in minimum wages in Nigeria.

Simulation 2 (35% increase in the minimum wage)

A 35% increase in the minimum wage from ₦7,500 per month to ₦10,125 per month results in a decline in the employment of formal unskilled workers as shown in Table 5.4a. One observes a gradual employment loss as the minimum wage increases further when compared with the 20% simulation. For instance, in the manufacturing sector, a 35% increase in the minimum wage results in decline in employment of formal unskilled workers by -12.3%, compared to employment decline of -7.2% with a 20% increase in the minimum wage. Similarly utilities and construction also shed -10.1% and -16.4% of formal unskilled workers in the 20% and 35% minimum wage increase.

The decline in employment was largest in the extractive and finance industries, with employment loss of -27.2% and -25.1%, respectively. Labour demand for minimum wage workers in government ministries and parastatals also declined by -20.7%. Similar to the trend observed with the 20% minimum wage increase, only agriculture, trade, and other private services sector registered increases in employment. For instance in the agriculture industry, trade, and other private services sector, employment of unskilled workers increased by 39.8%, 11.3%, and 4.3%, in that order.

The 35% increase in the minimum wage for formal unskilled workers and consequent decline in labour demand prompted employers to substitute other labour

categories for minimum wage workers. This resulted in an increase in the wage rate of formal skilled, informal skilled, and informal unskilled labour by 26.6%, 55.5%, and 59.3%, respectively as shown in Table 5.3. Similarly, one would observe that a larger increase in the minimum wage has a greater positive impact on the wage rate of formal skilled, informal skilled and unskilled workers. For instance, in terms of the indirect effect on wages, formal skilled, informal unskilled, and informal skilled workers had a larger increase in wages with a 35% rise in the minimum wage.

The trend of labour demand for formal skilled workers under the 35% increase in the minimum wage mirrored the labour demand pattern observed in the 20% minimum wage increase, only that the magnitude of employment differs. Employment of formal skilled labour in the agriculture, trade, other private services, hotel and restaurant increased by 51%, 20.2%, 12.7%, and 5.5%, respectively in simulation of 35% increase in the minimum wage. This employment increase was higher than what was observed with the 20% minimum wage increase in simulation 1 as depicted in Table 5.4a. For instance, in the 20% simulation, employment of formal skilled workers in the agriculture and trade industries increased by 31.1% and 13%, respectively. Like in the 20% minimum wage increase simulation 1, labour demand for formal skilled workers declined in the manufacturing, extractive, utilities and construction, finance, health and education, and government parastatals.

Employment of informal skilled and informal unskilled workers declined in all the sectors, except agriculture where it increased by 17.9% and 14.6%, respectively. This could be attributed to the large increase in the wage rate of these workers arising from the indirect effect of minimum wage increase in the formal sector. It is also evident from Table 5.4b that the employment loss of informal unskilled workers is higher than that of informal skilled workers. This could be traced to the larger wage rate of informal unskilled workers.

Simulation 3 (50% increase in the minimum wage)

The third simulation is a 50% increase in the minimum wage for formal unskilled workers from ₦7,500 to ₦11,250 per month. As shown in Table 5.4a, demand for formal unskilled labour declined in all the sectors employing them except in the agriculture, trade, and other private services industries. This mirrored the trend

observed in the 20% and 35% simulations. Notably, the magnitude of the employment losses was higher in the 50% simulation. The decline in employment could be traced to increase in production costs of firms as labour cost rises. The manufacturing and extractive sectors shed formal unskilled labour by -16.9% and -35.4%, respectively. Similarly, finance, telecommunications and real estate sector reduced labour demand by -31.9%.

Wage rates of other labour categories increased sharply following increase in the minimum wage for formal unskilled workers. As shown in Table 5.3, formal skilled, informal unskilled and informal skilled workers received increases of 38%, 84.9%, and 79.3% respectively in their wage rates. This increase is as a result of the spillover effect arising from the substitution of other labour categories for minimum wage workers. The pattern of labour demand for formal skilled, informal skilled and unskilled labour workers also followed the same trend as observed in simulations 1 and 2, but differs in magnitude.

Simulation 4(140% increase in the minimum wage)

Tables 5.4a and 5.4b also show the labour demand effects arising from the increase in the minimum wage by 140% from ₦7,500 to the current ₦18,000 per month. Similar to the trend observed in the first three simulations, the direct effect of this policy is a decline in the employment of minimum wage workers in all sectors except agriculture, trade, and other private services which recorded increases of 84.3%, 33%, and 12.4% respectively. Other sectors responded to the increase in labour cost by reducing their employment of minimum wage workers.

The rise in the demand for other labour categories as employers substitute the relatively expensive minimum wage workers exerted upward pressure on their wage rates as shown in Table 5.3. Wages of formal skilled, informal skilled and unskilled rose by 112.7%, 258.5%, and 273%, respectively.

5.1.3 Macroeconomic Effects

Table 5.5 and 5.5a present the macroeconomy-wide effects of a 20%, 35%, 50% and 140% increase in the minimum wage, respectively. In Table 5.5, GDP at purchasers' prices increased marginally, ranging between 6.6% and 13.5% in the different simulations. Government revenue from direct income tax on households also received a boost due to increase in households' income. In simulations 1 and 2, government revenue from household income tax increased by 16.8% and 29.5%, respectively. In the simulation of a 50% increase in wages, government income revenue increased significantly by 42.2%. Further, consumer price index (CPI) rises by 21.5% in simulation 1 and further by 37.1% and 52.1% in simulations 2 and 3. This comes about as a result of the rise in production cost and wage bill.⁵⁴ Another possible explanation for the rise in prices of goods is that, since output is fixed in the short run, the boost in consumption demand arising from wage increases puts upward pressure on prices.

Table 5.5 further shows the differential rise in prices across the various commodities produced in the economy. All sectors experienced increases in prices, except the extractive industry whose prices declined by -3.1%, -4.9%, and -6.2% in simulations 1, 2 and 3, respectively. In simulations 1, 2 and 3, the largest price increases were recorded by the agriculture sector in the magnitude of 41.8%, 74.2% and 107.3%, followed by other private services and trade. Although these sectors (agriculture, trade, and other private services) are largely informal and do not benefit directly from minimum wages, the rise in labour cost of informal sector workers resulted to increased production cost, and consequently rise in prices of commodities produced by this labour category.

A possible reason for the decline in the price of extractive commodities is that, this sector being a high risk one pays a premium above the market wages. Hence, an increase in the minimum wage may not have a negative effect on prices in this sector, since it already pays its workers wages higher than the existing minimum wage.

⁵⁴ The spillover effect of a rise in the minimum wage of formal unskilled workers is a simultaneous increase in the wages of other labour categories. Although substitution among labour took place, the wage bill of firms increased, thus raising production costs and prices.

Evidence from the Nigerian wage data shows that between 1992 and 1999, the extractive sector paid the highest average annual minimum wage of ₦21,000 to junior workers, compared to workers in the financial institutions which followed with an annual wage of ₦10,510 (CBN, 2003).

The rise in the domestic prices of commodities resulted in an influx of imported commodities into the economy, particularly for goods with substitutes. As shown in Table 5.5, domestic consumers shifted to imports, to assuage the price effects of domestic goods.

Table 5.5. Macroeconomic Effects of Minimum Wage

Macro-variables	Base value	Sim 1(20%)	Sim 2(35%)	Sim 3(50%)
GDP ^{FD}	20,350,420	6.6	10.5	13.5
Govt revenue from household income tax	125,405	16.8	29.5	42.2
Consumer Price Index	1	21.5	37.1	52.1
Domestic Price of Commodity				
Agric.	1	41.8	74.2	107.3
Man.	1	1.3	2.8	4.7
Extractive	1	-3.1	-4.9	-6.2
Utilcon.	1	6.2	10.7	15.2
Trade	1	25.2	44	62.6
Hotel & restaurant	1	17.5	30.4	43.3
Fin,telecoms,estate	1	12.1	21.2	30.4
Health&education	1	11.0	19.2	27.5
Admin.	1	11.8	20.5	29.2
Other private services	1	25.9	45.3	64.7
Import (Qty)				
Agric.	554,809	117.3	240.5	395.3
Man.	2,614,011	2.0	5.0	9.2
Extractive	706,870	-7.0	-10.9	-13.8
Utilcon.	563,243	4.4	7.9	11.5
Fin,telecoms,estate	528,127	10.3	18.7	27.9
Export (Qty)				
Agric.	34,238	-26.6	-39.2	-48.2
Man.	7,424,786	-1.7	-3.1	-4.6
Extractive	22,154	2.8	4.3	5.5
Utilcon.	170,821	-9.3	-15.2	-20.4
Fin,telecoms,estate	184,670	-16.4	-25.8	-33.5

GDP^{FD}: GDP at purchasers' price from the perspective of final demand

Table 5.5a. Price Effects of a 140% Increase in Minimum Wage

Domestic Price of Commodity	Base value	Sim 4 (% increase in prices)
Agric.	1	332.5
Man.	1	6.2
Extractive	1	-25.9
Utilcon.	1	46.8
Trade	1	208.7
Hotel & restaurant	1	140.5
Fin,telecoms,estate	1	77.2
Health&education	1	79.8
Admin.	1	80.5
Other private services	1	212.9

In the policy simulations 1, 2 and 3, import demand for agricultural products registered the largest increase of 117.3%, 240.5% and 395.3%, respectively. This is attributed to the significant increase in its domestic price. Other domestic commodities and services with import alternatives also recorded increases in imports. Import of manufactured goods increased by 2.0%, 5.0% and 9.2% in the 20%, 35% and 50% simulations. However, the demand for imported extractive goods declined due to a fall in the domestic price. The increase in prices of local products also took its toll on exports demand, as it lost competitiveness in the world market. For instance, export of manufacturing goods declined marginally by -1.7%, -3.1% and -4.6% in simulations 1, 2 and 3, while that of agricultural products shed about -27%, -39.2% and -48.2%, respectively. The negative effect of this will be felt by producers and farmers whose export income will suffer losses.

Table 5.5a shows the price effects of the 140% increase in the minimum wage to ₦18,000 per month. Evident is the astronomic rise in prices due to higher production cost arising from increased labour cost. Interestingly, as observed in simulations 1, 2, and 3, prices of agriculture, trade, and other private services rose the largest, by 332.5%, 208.7%, and 212.9%, respectively despite these sectors being largely informal. A plausible reason for this is the spillover effect on the wages of those in the informal sector arising from the minimum wage increase. This increases the cost of informal labour as shown in Table 5.3 and consequently, prices of goods produced.

5.1.4 Effects on Household Income

Tables 5.6 and 5.7 present labour income, total income, disposable income, and the consumption expenditure of households. In simulation 1 (20% rise in minimum wage) labour incomes for all household category increased following the increase in the minimum wage of formal unskilled workers only. The same trend is mirrored in simulation 2 (35% rise in minimum wage), simulation 3 (50% increase in minimum wage) and simulation 4 (140% increase in minimum wage), three salient points are worth noting with respect to this trend. The first is that, although only the wage of formal unskilled workers was increased directly through the minimum wage policy, the spillover or indirect effect impacted positively on the wage rates of other labour categories as shown in Table 5.3.

Second, despite the loss in wages as a result of the decline in employment which affected all labour categories, the increases in wages for those workers who retained their jobs largely offset the losses, hence a rise in labour income for all households. The third observation is that irrespective of the significant decline in labour demand across the labour markets, growth in labour income for all households increased more proportionately than the minimum wage increase.

In all the scenarios considered, high urban households recorded the largest increase in labour income, despite getting less than 10% of its labour income from minimum wage workers. For instance, in the first simulation of a 20% increase in the minimum wage, high-urban households recorded the largest rise in labour income, estimated at 27.8% (Table 5.6). High-rural households followed recording an increase of 25.96%, while wage income of low-urban households increased by 25.92%. Middle-urban, middle-rural, and low-rural households' labour income rose by 25.2%, 24.5% and 24.8%, respectively. The significant rise in the wage income of high-urban households is attributed to the spillover effects of the wage increase on formal skilled workers who are members of high-urban households. This trend is mirrored in the 140% simulation (Table 5.6).

This household receives bulk of its wage income from formal skilled labour. Precisely, it receives about 30% of the total labour income from formal skilled labour, which represents the highest among the household category. Thus, the indirect increase

in the wage rate of this labour category by 15.2% resulted in a boost in its labour income. Interestingly, low-urban household with the largest labour income receipts from minimum wage workers recorded only 25.9% rise in its labour income. The intuition behind this is that the increase in

Table 5.6. Labour and Disposable Income of Households

	Labour income of households (% change from the base year)					Base (₦'million)	Disposable income of households (% change from the base year)			
	Base (₦'million)	Sim 1	Sim 2	Sim3	Sim4		Sim 1	Sim 2	Sim 3	Sim4
Low-rur	945,765	24.8	43.5	62.3	188.7	1,677,151	17.5	31.2	45.3	129.6
Mid-rur	1,304,587	24.5	43.1	61.6	188.7	1,976,059	16.5	29.5	42.9	123.3
High-rur	1,669,067	25.96	45.5	65.1	202.4	2,635,885	16.9	30.3	44.0	127.4
Low-urb	1,691,853	25.92	45.4	65.0	202.9	1,687,034	20.3	35.7	51.1	159.5
Mid-urb	2,227,887	25.2	44.3	63.3	198.3	2,594,509	17.0	29.8	42.7	133.6
High-urb	2,659,656	27.8	48.9	70.0	221.6	4,757,153	15.4	27.0	38.6	122.4

Source: Author's compilation

Table 5.7 Total Income and Consumption Budget of Households

	Total income of households (% change from the base year)					Consumption expenditure of households (% change from the base year)				
	Base (₦'million)	Sim 1	Sim 2	Sim 3	Sim 4	Base (₦'million)	Sim 1	Sim 2	Sim 3	Sim 4
Low-rur	1,677,151	17.5	31.2	45.3	129.6	1,673,373	17.5	31.2	45.3	129.6
Mid-rur	1,976,059	16.5	29.5	42.9	123.3	1,965,877	16.5	29.5	42.9	123.3
Hig-rur	2,635,885	16.9	30.3	44.0	127.4	2,590,917	16.9	30.3	44.0	127.4
Low-urb	1,708,353	20.3	35.7	51.1	159.5	1,513,374	20.3	35.7	51.1	159.5
Mid-urb	2,638,727	17.0	29.8	42.7	133.6	1,981,491	17.0	29.8	42.7	133.6
High-urb	4,817,021	15.4	27.0	38.6	122.4	3,062,979	15.4	27.0	38.6	122.4

Source: Author's compilation

the minimum wage for formal unskilled labour resulted in a substantial decline in their labour demand, thus reducing their labour income.

As shown in Table 5.7, total income of all households increased in all the simulations considered, although in varying proportions, with the largest rise recorded in the 140% simulation. The rise in total income for all household classes is attributed largely to the increase in labour income. Income from labour constitutes about 60% of Nigerian households' aggregate income based on computations from the Nigeria Social Accounting Matrix (SAM), 2006. For example, in simulation 1, low-urban households had the largest increase in total income of 20.3%, followed by low-rural and middle-urban with increases of 17.5% and 17%, respectively. Incomes of middle-rural, high-rural, and high-urban households rose by 16.5%, 16.9% and 15.4%, respectively. This result corroborates the findings of Folawewo (2009) that total income of high-income and low-income households increased following increases in the minimum wage in Nigeria. It also supports Falokun (2011) which found that nominal income of households increased after the increase in the minimum wage by 140%.

Table 5.6 also shows the disposable income of households, their total income less income taxes. Observably, the absolute value of the disposable income of urban households declined, while that of rural dwellers did not change. This is because we assumed that rural households' direct income tax payment is insignificant. Similarly, Table 5.7 depicts the consumption budget of households, after savings have been deducted.

5.1.5 Effects on Household Consumption

Table 5.8 shows the consumption demand of households for various commodities after the introduction of the 20%, 35%, 50% and 140% increases in the minimum wage. Consumption demand takes account of price changes of commodities and thus, measures welfare. The astronomic rise in the price of agricultural products resulted in a decline in the consumption of agricultural commodities by all households in the four simulations. For instance, in simulation 1, low-rural, middle-rural, and low-urban households recorded the largest decline in their consumption of these products, estimated at -10.7%, -7.7% and -6.7% respectively, while in the 140% simulation, their consumption declined by a greater magnitude of -130.1%, -93.2%, and -80.4% correspondingly. This could be attributed to the fact that these classes of people are poor and thus, spend a large proportion of their income on food products. In fact, the expectation was a much significant decline in the consumption of agricultural products among these categories due to the large price increase.⁵⁵ There is a high likelihood that some of the price effect was muted because a significant proportion of members of these households are farmers (with the exclusion of low-urban households), and oftentimes produce most of the agricultural commodities they needed. Further, in simulation 1, high-urban households recorded a marginal drop of -3.2% in consumption, since they spend less income on agricultural items. This same trend was observed in simulations 2, 3, and 4. Consumption spending on agricultural commodities by low-rural, middle-rural, and low-urban households declined by -15%, -10.9%, and -9.5% in the 35% experiment (simulation 2). With a 50% (Simulation 3) per cent rise in the minimum wage, their consumption demand declined further by -17.8%, -12.9%, and -11.3%, respectively as shown in Table 5.8. An increase in the minimum wage by 140% to ₦18,000, would result in a decline in the consumption of low-rural, mid-rural, high-rural, low-urban, mid-urban, and high-urban by -130.1%, -93.2%, -54.5%, -80.4%, -54.1%, and -37.3%, respectively.

⁵⁵ We observed that in all the simulations, the decline in the consumption of agricultural products was less than the percentage increase in prices.

The pattern of changes in the consumption of manufactured products following increases in the minimum wage varies markedly across households and differs from the trend observed with agricultural products where all

Table 5.8. Consumption Demand of Households

	Base (₦' million)	Low-rurh consumption (% change from the base year)				Base (₦' million)	Mid-rurh consumption (% change from the base year)				Base (₦' million)	High-rurh consumption (% change from the base year)			
		Sim1	Sim 2	Sim 3	Sim 4		Sim1	Sim 2	Sim 3	Sim 4		Sim1	Sim 2	Sim 3	Sim 4
Agric.	1,393,930	-10.7	-15.0	-17.8	-130.1	1,340,679	-7.7	-10.9	-12.9	-93.2	1,180,925	-4.4	-6.3	-7.4	-54.5
Man.	189,079	-7.9	-9.8	-8.1	-124.8	438,724	-7.2	-9.6	-9.7	-96.3	849,382	4.2	9.1	15.4	12.0
Extractive	2,042	-3.7	-2.2	2.9	-96.5	7,339	-4.2	-4.4	-2.0	-76.3	29,741	6.4	13.3	21.8	26.2
Utilcon.	10,920	-2.5	-3.5	-4.0	-30.1	58,387	-1.9	-2.9	-3.3	-22.4	190,078	-0.1	0.09	0.54	-4.4
Trade	1,012	-17.5	-25.6	-31.1	-201.4	1,828	-12.7	-18.7	-22.7	-144.8	7,908	-6.8	-9.8	-11.9	-78.5
Hot&Res	1,744	-10.2	-15.2	-18.7	-112.1	17,125	-7.5	-11.2	-13.8	-81.1	35,461	-3.5	-5.1	-6.1	-39.1
Fin,telecoms & est	18,351	-26.2	-38.6	-46.1	-263.3	34,035	-20.0	-29.8	-35.9	-194.2	183,803	-5.5	-6.8	-6.4	-57.3
Health &educat	2,959	-9.6	-14.4	-17.7	-98.6	8,691	-7.2	-10.9	-13.4	-72.1	25,572	-2.5	-3.6	-4.1	-27.1
Other private	296	-17.4	-25.4	-30.8	-199.0	8,006	-12.6	-18.5	-22.5	-143.1	42,857	-6.8	-9.8	-11.9	-77.9
		Low-urbh consumption (% change from the base year)					Mid-urbh consumption (% change from the base year)					High-urbh consumption (% change from the base year)			
	Base (₦' million)	Sim 1	Sim 2	Sim 3	Sim 4	Base (₦' million)	Sim 1	Sim 2	Sim 3	Sim 4	Base (₦' million)	Sim 1	Sim 2	Sim 3	Sim 4
Agric.	1,021,378	-6.7	-9.5	-11.3	-80.4	892,300	-4.5	-6.5	-7.8	-54.1	764,293	-3.2	-4.5	-5.4	-37.3
Man.	288,244	5.04	10.1	16.6	17.5	628,138	4.4	8.3	12.8	24.5	934,895	8.4	14.9	21.6	65.1
Extractive	8,538	8.3	16.2	25.8	38.4	18,046	6.7	12.6	19.3	39.0	51,537	10.4	18.6	27.2	76.8
Utilcon.	75,314	-0.3	-0.30	-0.01	-6.5	127,553	-0.11	-0.04	0.16	-2.7	288,100	0.57	1.0	1.6	4.2
Trade	3,702	-10.3	-15.2	-18.7	-115.8	8,721	-6.9	-10.3	-12.7	-76.7	33,968	-4.4	-6.6	-8.2	-48.5

Hotel & res	13,149	-5.4	-8.1	-10.1	-57.6	83,251	-3.5	-5.4	-6.8	-37.2	138,838	-1.9	-2.9	-3.6	-19.8
Fin,telecoms &estate	44,759	-9.2	-13.1	-14.7	-84.7	132,646	-5.5	-7.9	-9.0	-46.5	599,669	0.01	-0.8	2.1	7.5
Health & educ	6,612	-4.1	-6.2	-7.6	-39.9	32,700	-2.6	-3.9	-4.9	-24.0	86,168	-0.7	-1.1	-1.3	-5.8
Other private	12,748	-10.3	-15.2	-18.6	-114.9	24,029	-6.9	-10.3	-12.7	-76.2	135,970	-4.4	-6.6	-8.2	-48.5

Source: Author's compilation

households' consumption declined. In simulations 1, 2, 3, and 4 prices of manufactured products rose marginally by 1.3%, 2.8%, 4.7% and 6.2%, respectively (Tables 5.5 and 5.5a). In the first scenario (sim 1), low-rural and middle-rural households responded by reducing their consumption of the products by 7.9% and 7.2%. For this category of people, manufactured items (particularly food) have an elastic demand. Other household categories increased their consumption of manufactured products. One plausible reason for this is that for middle-urban, high-urban households and high-rural households, manufactured products are less elastic. Middle-urban and high-urban households thus increased their consumption demand by 4.4% and 8.4%, respectively in manufacturing as shown in Table 5.8. The same trend is observed in the 140% minimum wage increase.

In simulation 1, the fall in the price of extractive products resulted in a decline of -3.7% and -4.2% in the consumption expenditure of low-rural and middle-rural respectively on extractive commodities. This seems plausible since these households usage of extractive product is low, thus a fall in price may not induce them to increase consumption. Also, it could be translated that these households continue to buy the same quantity of extractive products, but at lower prices which leads to decline in their expenditure on extractive items. On the other hand, a fall in extractive product prices benefits all urban households and high-rural households as they increased their consumption expenditure on extractive commodities. High-rural, low-urban, middle-urban, and high-urban households' consumption expenditure on extractive goods rose by 6.4%, 8.3%, 6.7% and 10.4%, respectively in simulation 1. In simulations 2 and 3, an interesting consumption pattern was observed among low-rural and middle-rural household. In simulation 2, low-rural households' consumption of extractive products declined by -2.2%, less than what was observed in simulation 1, while in simulation 3, when minimum wage increased by 50%, it increased its consumption by 2.9%. Middle-rural households' consumption declined further in the second experiment by -4.4%. It however declined less in the third experiment by -2.0%. For high rural, low-urban, middle-urban, and high-urban households, the same trend was mirrored in simulations 2, 3, and 4. That is, their consumption expenditure on extractive products increased with the wage increase. In simulation 4, consumption of extractive products

by high-rural, low-urban, middle-urban, and high-urban increased by 26.2%, 38.4%, 39% and 76.8%, respectively (Table 5.8).

The prices of utilities and construction increased marginally by 6.2%, 10.7% and 15.2% in simulations 1, 2, and 3 respectively, while it rose sharply by 46.8% in simulation 4 (Tables 5.5 and 5.5a) . In simulation 1 (i.e. 20% increase in the minimum wage), low-rural households reacted by reducing consumption expenditure on these services by -2.5%. They reduced it further by -3.5% and -4.0% in simulations 2 and 3. The consumption pattern of middle-rural families also mimicked those of the latter, as expenditure on utilities and construction declined by -1.9%, -2.9% and -3.3% in the three simulations in that order (Table 5.8). This is not unexpected, since these classes of people are poor, any slightest increase in the cost of such utilities could induce them shift to alternatives. High-rural households' consumption expenditure also declined insignificantly in the first experiment by -0.1%, although the decline was much less than those of the low-rural and middle-rural families. However, with increases in the minimum wage by 35% and 50% in scenarios 2 and 3, expenditure on these services rose marginally by 0.09% and 0.54%, respectively, despite continuous rise in its prices. Nevertheless, in the 140% simulation, high-rural households reduced their consumption by -4.4%.

In addition, low-urban families reduced their expenditure on utilities and construction by -0.3% in simulations 1 and 2. Nevertheless, in the third scenario, when wage increased by 50%, low-urban households reduced their consumption marginally by -0.01%, while in simulation 4, they reduced it by -6.5%. Middle-urban households' consumption of utilities and construction services also declined in simulations 1 and 2. It however increased marginally in the third simulation by 0.16%. Different consumption behaviour was exhibited by high-urban households. In all the four simulations, their consumption expenditure on utilities and construction increased steadily by 0.57%, 1.0%, 1.6% and 4.2% (Table 5.8). An interesting intuition from the pattern of consumption displayed by the different households is that, for households that have high usage of utilities and construction (low-urban, high-rural, middle-urban, and high-urban) , higher minimum wage induced them to increase their consumption, while those households which makes little usage of services reduce their consumption as prices rise.

Unsurprisingly, an increase in the price of trade impacted more adversely on the poor households than on the rich households. For example, in simulation 1, following an increase of 25.2% in price, it was observed that low-rural and middle-rural households reduced their consumption by -17.5% and -12.7%. Expenditure of high-rural and low-urban families also declined by -6.8% and -10.3%, while middle-urban reduced consumption by -6.9%. High-urban households are least adversely affected, consumption was reduced by only 4.4%. In simulations 1, 2, 3, and 4, a rise in the prices of finance and telecommunication services triggered a significant decline in the consumption expenditure of the poor households. For example, in simulation 1, a 12.1% per cent increase in price resulted in a -26.2% and -20% decline in the expenditure of low-rural and middle-rural households, respectively. A plausible reason for this is that these households are believed to have an elastic demand for financial and telecommunication services, hence a marginal rise in price could prompt a huge demand decline. High-rural, low-urban, and middle-urban families also reduced their consumption expenditure, albeit marginally by -5.5%, -9.2%, 5.5% correspondingly. This trend was observed in simulations 2, 3, and 4 for these households. High-urban households however increased their consumption by 0.01% in simulation 1, reduced it by 0.8% in simulation 2, and increased it by 2.1% in simulation 3 and further by 7.5% in the 140% minimum wage increase (Table 5.8).

In the four scenarios, increase in the minimum wage induced price increases of 11%, 19.2%, 27.5%, and 79.8% each in health and education services (Tables 5.5 and 5.5a). This rise in the cost of acquiring human capital led to a general decline in households' spending on these services. Specifically, low-rural and middle-rural households reduced their expenditure by -9.6% and -7.2% in simulation 1 and further in simulations 2, 3 and 4 (Table 5.8). These households are poor, and often rely on subsidised health and educational services. This means that out-of-pocket (OOP) expenditure on these services is low. Oftentimes, rural dwellers are induced through subsidies to increase their patronage of these services. Thus, an increase in cost would serve as a disincentive. Low-urban families, most of whom are poor, also reduced expenditure on health and education by -4.1% in the first simulation. High-rural, middle-urban, and high-urban households' spending on these services however declined marginally by -2.5%, -2.6%, and -0.7% in that order. In the 140% simulation,

low-rural, middle-rural, high-rural, low-urban, middle-urban, and high-urban consumption of health and education services declined by -98.6%, -72.1%, -27.1%, -39.9%, -24.0%, and -5.8%, respectively. Also, worthy of note is the insignificant decline in the consumption of high-urban households. This category of household attaches much importance to health and education and thus, spends a lot on them. Findings from this study on the consumption pattern or welfare of households following a 140% minimum wage increase points out that consumption effect could vary across households when direct and indirect effects are taken into consideration. This is because, households with workers who are not minimum wage workers were also affected either through price increases or spillover effects on their wages. This salient finding was not recorded by Falokun (2011) who find that aggregate consumption demand declined sharply when price effects are considered as a result of the 140% minimum wage increase.

5.1.6 Welfare Effects of Minimum Wage Increases

The welfare effects of minimum wage increases are measured using the equivalent variation (EV) measure. The (EV) approach incorporates changes in the consumption budget of households and changes in prices induced by policy changes. A major advantage of using consumption budget is that it is the income left to households after taxes and savings have been deducted. The EV measure also enables one compare different scenarios of policy changes to the status-quo, since the price vector used in all comparisons does not change. This allows for proper evaluation of different policy changes.

Table 5.9 depicts the welfare changes of households following increases in the minimum wage. The values of the EV welfare measure in the table show how much the utility of the different households changes considering variations in the price and consumption budget arising from minimum wage increase. That is, does the change in policy hurt or benefit the households. As mentioned earlier, a positive value indicates welfare improvement, while a negative value denotes welfare loss.

In simulations 1, 2, and 3, only high-urban households benefitted from increases in minimum wage in terms of welfare improvement. All other households registered welfare losses, in different degrees. In simulation 1, the largest welfare loss was

Table 5.9. Equivalent Variation

	Simulation 1	Simulation 2	Simulation 3	Simulation 4
Low-rurh	-0.094	-0.121	-0.130	-0.220
Mid-rurh	-0.069	-0.091	-0.098	-0.140
High-rurh	-0.013	-0.010	-0.001	0.240
Low-urbh	-0.035	-0.043	-0.044	-0.111
Mid-urbh	-0.011	-0.012	-0.009	0.193
High-urbh	0.007	0.014	0.021	0.231

Source: Author's compilation

recorded by low-rural households (-0.094), followed by middle-rural, low-urban, high-rural, and middle-urban in that order. Worth pointing out is that low-rural households receive more than half of their income from informal activities. Although this category of workers benefitted indirectly from a minimum wage increase, the rise in prices eroded most of the gains in income recorded. Similarly, formal skilled workers only contributed a small amount to the labour income received by this household. Similarly, middle rural households receive bulk of its labour income from informal activities. The welfare of low-urban households declined less (compared with low-rural and middle-rural households) because a relatively large number of workers in this household are skilled. A substantial number of these skilled workers in this household work in the informal sector. Worth pointing out is that minimum wage workers largely dominated middle-urban and low-urban households, particularly the latter.

The welfare of middle-urban households declined relatively less, as shown by the negative EV value of -0.011. About one-third of its labour income comes from formal skilled workers wage bill and another one-third from minimum wage workers. Although loss of jobs among minimum wage workers negatively impacted the labour income received by this household, increased labour demand and wage rates for skilled workers who are also members of the household cushioned the negative effect. In addition, this household also received capital income, unlike the low-urban household which depended on labour income. Similarly, the rise in prices further eroded the gains among workers who retained their jobs. High-urban households recorded improvement in welfare, largely as a result of the positive indirect wage effect on skilled workers who dominated this household.

In simulation 2, the welfare of high-urban households increased, while low-rural, middle-urban, low-urban, and middle-rural households recorded high welfare losses. Although, high-rural families also registered a decline in welfare, it was an improvement over simulation 1 as shown by EV value of -0.010 compared to -0.013 in simulation 1. In simulation 3, high-rural and middle-urban households recorded some improvement in welfare compared to simulation 2, although their welfare still declined. Low-rural, middle-rural and low-urban households further recorded more losses in welfare, while only high-urban experienced higher welfare improvement. Meanwhile, with a 140% increase in the minimum wage from ₦7,500 to ₦18,000 per

month, the welfare of high urban, middle-urban, and high -rural households improved. The welfare of low-urban, low-rural and middle-rural families however worsened.

The trend observed in the welfare pattern of high-rural and middle-urban households is worth noting. It may take a much larger increase in the minimum wage for these households to achieve welfare improvement. For these households, welfare improvement is a consequence of an indirect effect of minimum wage increases for formal unskilled workers, since more than half of labour income received comes from skilled workers. Nevertheless, low-urban, who received the bulk of their labour income from minimum wage workers may continue to wallow in abject penury, since they are adversely affected by the wage policy. Middle-rural and low-rural households although benefitted indirectly from wage increases, the accompany price increases made them worse-off

A major intuition behind this outcome is that, although all households benefitted from minimum wage increases either directly or indirectly (through spillover effects on wage rates) the concomitant increases in prices subdued the wage gains of households who recorded welfare losses. This resulted in a significant decline in the consumption demand of these households. For instance, analysis of changes in aggregate consumption demand of households after the 20% wage increase shows that, low-rural, middle-rural, and low-urban households' consumption demand declined by -105.7%, -81.5%, and -46.3%, respectively. Consumption expenditures of middle-urban, high-rural, and high-urban families however declined by a smaller percentage; -30.1%, -29.6%, and -14.6%, respectively. The marginal decline in the consumption demand of high-urban household's further points out that the indirect benefit of wage increases and small job losses among the formal skilled workers muted the accompanying price increases. High urban households received the largest share of total formal skilled wage bill, estimated at over 30%.

Informal skilled and unskilled workers are worse-off due to large decline in labour demand arising from high wage rates earned by them. In addition, benefits from wage increases which accrued to those who retained their jobs among them were further eroded by increase in domestic prices. Further, minimum wage workers also recorded a decline in welfare. This is attributed to employment decline and price

increases. Only formal skilled workers benefitted. This is because their wage rate increased less than the increase in the informal workers' wages, which led to increase in labour demand.

5.1.7 Income Distribution Effects of Minimum Wage Increases

In analysing the effects of increases in the minimum wage on the income distribution of households, the study adopted the Gini coefficient and Theil entropy inequality measures. The Gini index is based on the Lorenz curve; a cumulative frequency curve that compares distribution of income with the uniform distribution that represents equality. The Theil index is a class of the generalised entropy index and satisfies the five axioms which a good inequality measure should meet.⁵⁶ One major advantage of these inequality measures is that they can suitably study changes in income distribution between groups, under the assumption of complete homogeneity within groups (or representative households). This is the focus of this study, preoccupied with dealing with representative household categories.

Table 5.10 presents values of Gini coefficient and Theil entropy. Both indicators show an improvement in income distribution, following 20%, 35%, 50% and 140% increases in the minimum wage. Specifically, Gini coefficient shows that income inequality among the representative households declined by -2.2%, -3.9%, -5.4% and -6.0% (percentage change from the base year) in simulations 1, 2, 3 and 4 respectively. Similarly, the results of the Theil entropy index also reflect a fall of -4.2%, -7.3%, -9.9% and -11.4% (percentage change from the base year) in income inequality among households in simulations 1, 2, 3 and 4 in that order. The improvement in income distribution can be attributed largely to the spillover effects of the increase in the minimum wage which impacted positively on the wages of other labour categories, this provided a boost to the income of households. For example, in the 20% per cent increase in minimum wage, Table 5.6 shows that income of low-rural and low-urban households increased by 17.5% and 20.3%, respectively. Since the income of households in the upper class rose by a smaller percentage (high-urban and high-rural incomes increased by 15.4% and 16.9%, respectively), minimum wage

⁵⁶ The axioms are; income scale dependence, principle of population, anonymity, Pigou-Dalton transfer principle, and decomposability.

Table 5.10. Income Distribution Effects of Minimum Wage Increases on Households

	Base	Simulation 1	Simulation 2	Simulation 3	Simulation 4
Gini coefficient	0.4304	0.4206	0.4136	0.4071	0.4048
Theil entropy	0.0851	0.0815	0.0789	0.0766	0.0754

increases improved income distribution in Nigeria. In addition, it is evident from Table 5.10 that increases in the minimum wage would narrow the income inequality in the nation. We would observe that the income distribution improved further as minimum wage increases. For example, in simulation 4 (140% increase in minimum wage), income distribution improved compared with simulation 3(20% increase in minimum wage).

CHAPTER SIX

SUMMARY, POLICY RECOMMENDATIONS AND CONCLUSIONS

In this chapter, the main findings of this study are summarised, the limitations encountered and areas of possible future research are also presented, policy implications are drawn from the results, and some recommendations offered.

6.1 Summary of Findings

This study investigated broadly the welfare and income distribution effects of minimum wage increases in Nigeria. Minimum wage policies set wage floors for employers of unskilled labour in the formal sector, thus ensuring that this category of labour is provided with a subsistence or living wage. In developed countries, it is the practice that minimum wages are indexed to the cost of living and adjusted in line with changes in the consumer price index (CPI). In Nigeria, minimum wages are not properly indexed to prices. Price level often grow faster than wage increases, thus eroding the purchasing power of wages.

Evidences have shown that minimum wage fixing in Nigeria is arbitrary. Often- times growth rate of wages trail growth of price indexes. As shown in this study, the real minimum wage declined by 80% between 1974 and 2008. Also, observed is the rising poverty incidence and deteriorating income distribution pattern despite about six wage reviews since 1981, when a uniform minimum wage was legislated. The Nigerian labour market is dualistic in nature, with the existence of a large informal sector. This segment of the labour market, however are not covered by minimum wage legislations. The informal sector workers are indirectly affected by such legislations through two channels: wage changes (through substitution effect), and price changes. Against this backdrop, this study examined the impact of minimum wage increases on the welfare and income distribution of households. Some of these household derive a greater portion of their labour income from the informal sector.

In attempting to do this, the study adopted a static computable general equilibrium (CGE) model, calibrated on a 2006 social accounting matrix (SAM) for Nigeria. The CGE method has the advantage of capturing indirect effects of policies. There were six representative households disaggregated along the line of income class and location of residence. In order to capture the indirect effect on the informal sector, labour was disaggregated into formal skilled, formal unskilled, informal skilled and informal unskilled categories. It was assumed that only workers in the formal unskilled labour market are covered by the minimum wage. The indirect effects on formal skilled, informal skilled and informal unskilled workers were also captured by the study. Four simulation experiments were carried out based on historical wage reviews in Nigeria; 20%, 35%, 50%, and 140% increases in the minimum wage.

Findings from the study revealed that labour demand for formal unskilled labour declined, following increases of 20%, 35%, 50%, and 140% in their wages. Although some sectors also recorded marginal rise in employment of this category of workers, this is explained by the employment increasing-effect of the monopsonistic-competition labour market. Employers substituted other labour categories for the relatively more expensive minimum wage labour, thus putting upward pressure on their wages. Specifically, the demand for formal skilled workers rose sharply than other labour categories, since its wages rose much less than the increase in the wages of other labour. This mixed trend in the employment of other labour categories following a minimum wage increase supports related studies for Nigeria such as Taiwo *et al* (2005) and Folawewo (2009).

On the macroeconomy side, government revenue received a boost due to increased income tax revenue arising from labour income increases. The CPI also rose, as a consequence of rising production costs induced by high wage bills. The resultant effect of the rise in price, as shown in this study is that import demand increased for goods with import-substitutes. Exports of local commodities declined due to loss of competitiveness on the world market.

All households registered increases in labour income as wage rates increased across all the labour markets. In the 20%, 35%, and 50% simulations, welfare as measured by the equivalent variation approach declined for all households except

high-urban households. The largest welfare loss was recorded by low-rural households. A large number of members of this household were engaged in agriculture and trade and therefore, do not receive a minimum wage. They are however indirectly affected adversely by price increases emanating from the wage policy.

Another major finding is that, with larger increases in the minimum wage as observed with the 50% and 140% simulations, high-rural and middle-urban households' welfare declined less and eventually improved, while low-urban, middle-rural, and low-rural households recorded greater losses (Table 5.9). This points to the fact that large rise in prices of goods will adversely affect the consumption pattern of lower income households more than the upper income households. Worth noting also is that the upper income households are dominated by skilled workers who are not direct beneficiaries of the minimum wage, but are affected indirectly by the wage and price effects. Further, in all, the study reveals that income distribution improved marginally following increases in the minimum wage by 20%, 35%, 50% and 140%.

6.2 Policy Implication and Recommendations

Some policy lessons can be drawn from the results of this study. Worth noting is the finding that welfare of the upper income households (high-urban, high-rural, and middle-urban) improved with increases in the minimum wage. However, the welfare of lower income households deteriorated further as minimum wage increased. This is because as minimum wage increases, price level rises and erodes the gains from the wage policy.

Further, results of the study reveal that sharp increases in wages would hurt the low income group through astronomic rise in prices and employment losses. As shown in the simulation results, welfare of lower income households deteriorated more with sharp increases in the minimum wage compared to small wage increases. This is because low income households are more negatively affected by increase in prices and job losses which often accompany minimum wage increases. In addition, they depend solely on labour income unlike high income households who derive income from capital as well as labour. Gradual increase in the minimum wage is suggested since this will have less volatile impact on prices. This finding supports Cunningham (2007) that a minimum wage set too high only makes high skilled workers better off.

Evidences from the developed countries also revealed that minimum wage increases often range between 5% and 20% increases, compared to about 140% increase as witnessed in Nigeria. For instance, in the United States, the federal minimum wage increased by an average of 11% between 1980 and 1992 (Page *et al*, 2005).

Also, worth noting is that despite low urban households having the highest proportion of unskilled workers who are beneficiaries of the minimum wage, they eventually became worse-off. This is attributed largely to the dis-employment and price effects of the minimum wage increases. Therefore, it is recommended that policies that directly target the unskilled workers such as food and transportation subsidies, and low-housing scheme should complement the minimum wage policy. Studies have shown that poor workers spend a large proportion of their wages on these amenities. Cunningham (2007) also suggests that the minimum wage policy should be used in conjunction with other social programmes

Analysis of the results also shows that the informal sector workers were also adversely affected by price increases arising from the minimum wage increase. Although, the informal sector workers do not receive a minimum wage, they are negatively affected indirectly by the price effect. Policies to cushion the negative price effect on the informal sector workers and lower income households are therefore germane. Price regulation of commodities should be encouraged in order to check uncontrollable increase in prices following a minimum wage increase. Anecdotal evidences reveal that in Nigeria, prices of commodities respond to announcement of wage increases, even before its implementation.

Timeliness in the adjustment of wages is also suggested in order to avoid sharp increases in the minimum wage with its negative impact on prices and also to prevent incessant disputes between the government and labour unions over wage fixing. As demonstrated by this study, small and periodic increases in the minimum wage may not induce astronomic rise in prices. In Ecuador and Panama, minimum wage adjustments take place at least every two years (Starr, 1981). Also, in the UK, minimum wages are reviewed periodically (Rubery, 2003).

6.3 Limitations of the study

One limitation of the study is the SAM used in the analysis. The SAM used is 2006, a more recent one would have reflected changes in the structure of the economy in the last six years. Nevertheless, it is believed that the results obtained in this study will not be greatly different from a study using a more recent Nigerian SAM. This is because the structure of the Nigerian economy has not changed much over the last six years. The non-oil sector still leads in contribution to growth rate, while the oil sector still contributes more than 80% of the total government revenue generated.

In arriving at our results, it was assumed that the minimum wage was binding on all employers of unskilled labour in the formal sector. In reality, and in Nigeria, this may not be so, since the ability to pay the minimum wage by employers (state and local governments, and the private sector inclusive) has always been a source of conflict between employers and labour unions. This suggests that while some employers remain unyielding to pay the new wage rate, workers' welfare may deteriorate more than recorded in this study as price also increases.

6.4 Areas of Future Research

An updated Social Accounting Matrix that reflects the rebased economy and the growth and employment potentials of the unveiled sectors may be an area of interest for further study. Since these service-based sectors have a high employment capacity, it would be interesting to know if and by how much an increase in the minimum wage would create distortions in these labour markets. The disaggregation of the labour account to capture private and public sector workers would provide information on the diverse effects of the minimum wage in private and public sector firms. This is because, formal private firms are known to pay above the minimum wage, and thus it would be informative to know if increases in the minimum wage leads to a decline in labour demand in this sector.

6.5 Conclusions

This study investigated the welfare and income distribution effects of minimum wage in Nigeria. A notable objective of a minimum wage policy is to provide low-skilled workers with an acceptable standard of living. Meanwhile, when minimum

wage is reviewed, there are direct, as well as indirect effects on those who do not benefit directly from the wage increase. This study captured the spillover effects of different minimum wage scenarios on households disaggregated by income class and location, and on different classes of workers, particularly those in the informal sector.

Minimum wage increases impacted more adversely on the welfare of lower income households than on high income households. This could be traced to the price and dis-employment effects arising from the wage policy. Although, informal sector workers benefited from the spillover increase in their wages, much of the gains were eroded by price increases. To this end, the minimum wage coverage should be extended to the informal sector. Welfare programmes targeted at the unskilled workers should complement minimum wage increases to assuage possible negative impacts. In addition, timeliness in the adjustment of the minimum wage is important to avoid sharp increases in wages and consequently, prevent astronomic rise in the prices of goods and services

References

- Addison, J. and Blackburn, M.1999. Minimum wages and poverty. *Industrial and Labour Relations Review*, 52.3: 393-409.
- Adebo Report. 1970. First report of the wages and salaries review commission. Federal Ministry of Information Printing Division, Lagos.
- Adebo Report. 1971. White paper on the second and final report of the wages and salaries review commission, 1970-1971. Federal Ministry of Information Printing Division, Lagos.
- Adenikinju, A., Ajakaiye, O., Decaluwe, B. and Iwayemi, A. 2009. *Computable general equilibrium modelling in Nigeria*. Ibadan: Ibadan University Press. University of Ibadan.
- Ojo, F., Aderinto, A. and Fashoyin, T. 1986. Manpower development and utilisation in Nigeria: problems and policies. Nigeria's Manpower Planning Experience. Lagos University Press.
- Agenor, P.,Izquierdo, A. and Jensen, T.J. 2007. *Adjustment policies, poverty and unemployment: the IMMPA framework*. USA: Blackwell Publishing Limited.
- Aka, B.F. 2006. Poverty, inequality and welfare effects of trade liberalisation in Coted'Ivoire: A Computable General Equilibrium Analysis. *African Economic Research Consortium (AERC) Research Paper, 160*.
- Akabogu, C. 1991. The minimum wage betrayal. *Concord Newspaper*. January 6:3.
- Alatas, V. and Cameron, L. 2008. The impact of minimum wages on employment in a low-income Country: A quasi-natural experiment in Indonesia. *Industrial and Labour Relations Review*, 61.2: 201-223.
- Aminu, A. 2011. Government wage review policy and public-private sector wage differential in Nigeria. *African Economic Research Consortium (AERC) Research Paper, 223*.

- Annabi, N., Cockburn, J. and Decaluwe, B. 2004. A sequential dynamic CGE for poverty analysis. A paper prepared for Advanced MPIA Training Workshop in Dakar Senegal, June 10-14, 2004
- Anyanwu, U.E. 2004. Towards a knowledge-based economy: the Nigerian labour market challenge. National Manpower Board, Abuja. *Proceedings of the Second National Tripartite Conference of Manpower Planners, Producers, and Employers in Nigeria*. pp. 23-24
- Bell, A.1997. The impact of minimum wages in Mexico and Columbia. *Journal of Labour Economics*, 15.S3: 102-S135.
- Behrman,J.R., Sickles, R.C and Taubman, P. 1983. The impact of minimum wages on the distributions of earnings for major race-sex groups: a dynamic analysis. *The American Economic Review*, Vol. 73, No. 4, pp. 766-778.
- Bhaskar, V. and To, T. 2004. Dixit-Stiglitz monopsonistic competition and minimum wages.
- Bhaskar, V., Manning, A. and To, T. 2002. Oligopsony and monopsonistic competition in labour markets. *Journal of Economic Perspectives*, 16.2:155-174.
- Boeters, S. and Savard, L. 2011. The labour market in computable general equilibrium model. *CPB Discussion Paper, 201*, Netherlands Bureau for Economic Policy Analysis, Den Haag.
- Bosch, M. and Manacorda, M. 2010. Minimum wage and earnings inequality in urban Mexico. *American Economic Journal: Applied Economics*, 2.4:128-149.
- Browning, E. and Johnson, W. 1983. The distributional and efficiency effects of increasing the minimum wage: a simulation. *The American Economic Review*, 73.1: 204-211.

- Burkhauser, R., Couch, K. and Wittenburg, C. 1996. Who gets what from minimum wage hikes: a re-estimation of Card and Krueger's distributional analysis in myth and measurement: the new economics of the minimum wage. *Industrial and Labour Relations Review*, 49.3: 547-552.
- Burkhauser, R. and Finegan, T. 1989. The minimum wage and the poor: the end of a relationship. *Journal of Policy Analysis and Management*, 8.1:53-71.
- Card, D. and Krueger, A. 1994. Minimum wages and employment: a case study of the fast food industry in New Jersey and Pennsylvania. *The American Economic Review*, 84.4:772-793.
- CBN. 2003, 2013. *Central Bank of Nigeria Statistical Bulletin*. Abuja.
- CBN/FOS/NISER, 2001. A study of Nigeria's informal sector, Volume 1: statistics on Nigeria's informal sector.
- Cowell, F.A. 2009. *Measuring inequality*. 2nd edition USA: Oxford University Press.
- Cunningham, W. 2007. *Minimum wages and social policy: lessons from developing countries*. The World Bank.
- Decaluwe, B., Patry, A., Savard, L. and Thorbecke, E. 1999. Poverty analysis within a general equilibrium framework. *Working Paper 9909*, CREFA 99-06.
- Decaluwe, B., Lemelin, A., Maisonnave, H. and Rochibud, V. 2010. The PEP standard computable general equilibrium model single-country, static version. PEP-1-1
- Decaluwe, B., Dissou, Y. and Robichaud, V. 2004. Regionalism and labour market structure: a CGE analysis of West African Economic and Monetary Union (WAEMU). *Journal of African Economies*, 13.2:302-332

- Dickens, R. and Manning, A. 2004. Has the national minimum wage reduced UK wage inequality? *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, 167.4:613-626.
- Dinardo, J., Fortin, N. and Lemieux, T. 1996. Labour market institutions and the distribution of wages, 1973-1992: a semi-parametric approach. *Econometrica*, 64:5:1001-1044.
- DPRU, 2008. *Minimum wages, employment and household poverty: investigating the impact of sectoral determinations*. Development Policy Research Unit. University of Cape Town.
- Falokun, G. 2011. Welfare, minimum wage and sustainable development in Nigeria. A *Monograph from NISER Seminar Series*.
- Fashoyin, T.1980. *Industrial relations in Nigeria*. London: Longman Group Limited.
- Flinn, C. 2002. Interpreting minimum wage effects on wage distributions: a cautionary tale. *Annals of Economics and Statistics*, No. 67/68. *The Econometrics of Policy Evaluation* (Jul. - Dec. 2002), pp. 309-355.
- Flinn, C. 2006. Minimum wage effects on labour market outcomes under search, matching, and endogenous contact rates. *Econometrica*, 74.4: 1013-1062.
- Freeman, R.B. 1996. The minimum wage as a redistributive tool. *The Economic Journal*, 106.436:639-649.
- Folawewo, A.O. 2009. Minimum wage legislation and its macroeconomic impact in developing countries: The case of Nigeria. *Asian-African Journal of Economics and Econometrics*, 9.1: 57-73.
- Gindling, T.H. and Terrell, K. 2007. Minimum wages and the welfare of workers in Honduras. *IZA Discussion paper*, No. 2892
- Golan, A., Perloff, J. and Wu, X. 2001. Welfare effects of minimum wage and other government policies. *Working Paper Series*, Institute for

Research on Labour and Employment, University of California Berkeley.

Gramlich, E. 1976. Impact of minimum wages on other wages, employment, and family incomes. *Brookings Papers on Economic Activity*, Vol. 1976.2: 409-461.

Human Development Report.2008. hdr.undp.org/en/reports.

Hinnosaar, M. 2004. Estonian labour market institutions within a general equilibrium framework. *Working papers of Eesti Pank*, No.5, 2004.

Holland, W., Bhattacharjee, S. and Stodick, L. 2006. Assessing the economic impact of minimum wage increases on the Washington economy: a general equilibrium approach. *Working Paper Series*, 2006-12. Washington State University.

Jones, P. 1997. The impact of minimum wage legislation in developing countries where coverage is incomplete. *Working Paper Series/98-2*. Centre for the Study of African Economies, University of Oxford.

Kaufman, B.E. and Hotchkiss, J.L. 2003. *The economics of labour markets*. 6th edition. Thomson, South-Western.

Khondker, B, Mujeri, M, and Raihan, S. 2006. Welfare and poverty impacts of tariff reforms in Bangladesh: a general equilibrium approach . *MPIA Working Paper*, 2006.

Koutsoyiannis, A. 1975. *Modern microeconomics. Second edition*. Macmillian Press Limited. Houndmills, Basingstoke, Hampshire.

Kwanashie, M. 1988. Towards a new wage policy for Nigeria. A paper presented at the national conference on Uniform Remuneration in the Public Service. March 14-20, 1988.

Lahr, M.L. and Kanfi, T. 2006. The effects of a rise in the minimum wage on labour market vacancies in New Jersey: a CGE analysis. Unpublished

paper presented at the 2nd interim conference of the International Input-Output Association, Sendai, Japan, July 20, 2006.

- Lemos, S. 2004. *The effect of the minimum wage on prices*. No. 1072, March 2004. Institute for the Study of Labour (IZA).
- Litchfield, J.A. 1999. Inequality: methods and tools. Text for World Bank's website on inequality, poverty, and socio-economic performance. www.worldbank.org/poverty/inequal/index.
- Loughrey, J. and O'Donoghue, C. 2011. The welfare impact of price changes on household welfare and inequality, 1999-2010. *IZA Discussion Paper No. 5717*
- Machin, S. and Manning, A. 1994. The effects of minimum wages on wage dispersion and employment: evidence from the UK wages councils. *Industrial and Labour Relations Review*, 47.2:319-329.
- Machin, S., Manning, A. and Rahman, L. 2003. Where the minimum wage bites hard: introduction of minimum wages to a low wage sector. *Journal of the European Economic Association*, 1.1:154-180.
- Manning, C. and Bird, K. 2005. Minimum wages and poverty in a developing country: simulations from Indonesia's household survey. Department of Economics, Australian National University. *Working Paper Series*, Vol. 2005-24.
- Mascella, S., Teja, S. and Thompson, B. 2009. Minimum wage increases as an anti-poverty policy in Ontario. *Canadian Public Policy*. 35.3:373-379.
- Mincy, R. B. 1990. Raising the minimum wage: effects on family poverty. *Monthly Labour Review*, July 1990, pp. 18-25.
- Morley, S., Pineiro, V. and Robinson, S. 2011. A dynamic computable general equilibrium model with working capital for Honduras. *IFPRI Discussion Paper 01130*. October 2011

- NBS. 2004. *Nigerian Living Standards Survey*. Abuja
- NBS.1999, 2001, 2009, *Annual Abstract of Statistics and Federal Office of Statistics Review of the Nigerian Economy*, 1992, 1998.
- NBS. 2010. *National Manpower Stock and Employment Generation Survey in Nigeria. Household and MicroEnterprise (Informal sector)*.
- NBS. 2012. *Nigeria Poverty Profile Report*. Nigeria National Bureau of Statistics.
- NBS. 2012. *Social Statistics in Nigeria. Part III: Health, Employment, Public Safety, Population, and Vital Registration*. NBS
- Neumark, D., Schweitzer, M. and Wascher, W. 2005. The effects of minimum wages on the distribution of family incomes: a nonparametric analysis. *The Journal of Human Resources*, 40.4: 867-894.
- Nwafor, M., Diao, X. and Alpuerto, V. 2010. A 2006 social accounting matrix for Nigeria: methodology and results. *Nigeria Strategy Support Program (NSSP). IFPRI Report No. NSSP007*
- Ogwumike, F.O. 2001. An appraisal of poverty and poverty reduction strategies in Nigeria, *Central Bank of Nigeria Economic and Financial Review*, 39.4:45-71.
- Ogwumike, F.O, Alaba, A.A, Alaba, O.B, Alayande, B.A, and Okojie, C.E. 2010. *Labour market, earnings and inequality in Nigeria, in Ogwumike, F.O(Ed), poverty and inequality in Nigeria*. African Economic Research Consortium, Nairobi and Joycefitround Publishers, Ibadan 2010.
- Okojie, C.E., Anyanwu, J. C., Ogwumike, F.O. and Alayande, B.A. 2000. Poverty in Nigeria – an analysis of gender issues, access to social services and the labour market. Collaborative Research Project with Food and Nutrition Policy Program, Cornell University, Ithaca NY, USA and Funded by the African Economic Research Consortium, Nairobi, Kenya.

- Page, M., Spetz, J. and Milliar, J. 2005. Does minimum wage affect welfare caseloads? *Journal of Policy Analysis and Management*, 24.2: 273-295.
- Rubery, J. 2003. Pay equity, minimum wage, and equality at work. *Working Paper* WP/19/2003. International Labour Organisation.
- Sabia, J. and Nielsen, R. 2012. Can raising the minimum wage reduce poverty and hardship? New Evidence from the Survey of Income and Programme Participation (SIPP). Employment Policies Institute.
- Sabia, J. and Burkhauser, R. 2010. Minimum wages and poverty: will a \$9.50 federal minimum wage really help the working poor? *Southern Economic Journal*, 76(3):592-623.
- Schneider, F. 2005. Shadow economies around the world. What do we really know? *European Journal of Political Economy*, Vol. 21, pp. 598-642.
- Schneider, F. 2012. The shadow economy and work in the shadow: what do we (not) know? *IZA Discussion Paper* No. 6423.
- Starr, G. 1981. *Minimum Wage Fixing*. International Labour Organisation, Geneva.
- Stigler, G. 1946. The economics of minimum wage legislation. *The American Economic Review*, 36.3: 358-365.
- Taiwo, I., Oladeji, S., Akerele, W., Adenikinju, A., Bamidele, O. and Uga, E. 2005. The political economy of minimum wage in Nigeria. *Issue 1 of Monograph Series National Centre for Economic Management and Administration*.
- Public Service of Nigeria, 1974. Government Views on the report of the public Service review Commission (Udoji). December 1974. Federal Ministry of Information Printing Division, Lagos.
- Public Service of Nigeria, 1975. Government views on the report of the public service review panel (Akintola Williams Report). September 1975. Federal Ministry of Information Printing Division, Lagos.

Teulings, C.N. 2003. The contribution of minimum wages to increasing wage inequality. *The Economic Journal*, 113.490: 801-833.

Varian, H.R. 1990. *Intermediate microeconomics: a modern approach*. 2nd edition.
New York: W.W. Norton & Company

World Bank: www.data.worldbank.org

Wunder, C., Schwarze, J., Krug, G. and Herzog, B. 2006. Welfare effects of the euro cash changeover. *IZA Discussion Paper* No. 2508.

Yesufu, T.M. 1982. *The dynamics of industrial relations in Nigeria: the Nigerian experience*. Ibadan: University Press Limited.

APPENDIX 1: States Governments Compliance with the ₦7,500 Minimum Wage Increase in 2000

State	Minimum Wage Rate(as at Jan 2001)
*Akwa Ibom	₦6,750
**Anambra	₦6,000
Adamawa	₦6,000
*Bayelsa	₦7,500
*Delta	₦7,500
*Edo	₦6,500
Enugu	₦6,000
Ekiti	₦6,500
Ebonyi	₦6,500
*Abia	₦6,500
Bauchi	₦6,000
Benue	₦6,000
*Cross Rivers	₦5,500
*Imo	₦6,500
Gombe	₦6,000
Taraba	₦6,500
Nasarawa	₦6,000
Plateau	₦5,850
Zamfara	₦7,500
Kaduna	₦5,600
Niger	₦5,500
Kogi	₦6,000
Kwara	₦6,000
*Ondo	₦6,500
Oyo	₦6,500
Ogun	₦6,500
Osun	₦6,500

Lagos	₦5,500
Kebbi	₦5,500
Sokoto	₦5,500
Borno	₦5,500
Jigawa	₦6,500
Katsina	₦6,000
Kano	₦5,650
Yobe	₦6,000
*Rivers	₦7,500

Source: Nigeria Labour Congress Report in Industrial Relations Experience in the Federal Public Service since 1960

* Oil producing states in Nigeria

APPENDIX 2

Let $U = nwl - (nl^\rho)^{\alpha/\rho}$

$$\frac{dU}{dn} = wl - \frac{\alpha}{\rho} (nl^\rho)^{\alpha/\rho - 1} \cdot l^\rho$$

$$= wl - \frac{\alpha}{\rho} (nl^\rho)^{\frac{\alpha-\rho}{\rho}} \cdot l^\rho$$

$$= wl - \frac{\alpha}{\rho} n^{\alpha-\rho/\rho} l^{\alpha-\rho} \cdot l^\rho$$

$$= wl - \frac{\alpha}{\rho} l^\alpha n^{\alpha-\rho/\rho}$$

APPENDIX 3

$$\frac{dU}{dw^m} = \left[w^* l^* - \frac{\alpha}{\rho} l^{*\alpha} n^{*\alpha-\rho/\rho} \right] - \frac{\rho}{\rho-1} \frac{n^*}{w^*}$$

$$= -\frac{\rho}{\rho-1} \frac{n^*}{w^*} w^* l^* + \frac{\alpha}{\rho} l^{*\alpha} n^{*\alpha-\rho/\rho} \left(\frac{\rho}{\rho-1} \frac{n^*}{w^*} \right)$$

$$\begin{aligned}
&= -\frac{\rho}{(\rho-1)w^*} n^* w^* l^* + \alpha \frac{1}{(\rho-1)w^*} n^{*\alpha-\rho} n^* l^{*\alpha} \\
&= -\frac{\rho}{(\rho-1)w^*} n^* w^* l^* + \frac{\alpha}{(\rho-1)w^*} n^{*\alpha/\rho} l^{*\alpha} \\
&= -\frac{\rho}{(\rho-1)w^*} n^* w^* l^* + \frac{\alpha}{(\rho-1)w^*} (n^* l^{*\rho})^{\alpha/\rho} \\
\frac{dU}{dW^m} &= -\frac{1}{(p-1)w^*} \left[\rho w^* n^* l^* - \alpha (n^* l^{*\rho})^{\alpha/\rho} \right]
\end{aligned}$$