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RESEARCH PAPER

Labor Market Effects of Emigration in Nigeria: Skill-level Analysis

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Abstract
This paper seeks to provide empirical information of how emigration influences employment and wages in Nigeria with special reference to high and low skill labor between 1980 and 2016. The study is premised on the modified neoclassical labor market theory while generalized method of moments (GMM) was employed as method of analysis. Starting from the drivers of emigration in each skill, economic size, income differentials and remittances play positive and important role in the case of emigration of high skill labor while income differentials and population are significant in driving emigration of low skill workers. Emigration of high skilled magnifies employment and wages of high and low skill workers. In the same vein, emigration of low skill labor has both employment and wage effect with employment being more sensitive. The wage response to emigration for each skill suggests that emigration of high skill labor widens income gap. Additional finding is that wages sluggishly respond to inflation in both labor market segments. Following these results, employment-driven economy should be pursued in order to stem emigration of high skill workers and to create more jobs for low skill workers. Also, remittances should be allowed to function as a source of investment rather than a source of funding emigration. To discourage the adverse effect of inflation on wages, the authorities should ensure low inflation or reduce the impact by ensuring that workers are paid inflation-adjusted wages.
Keywords: Emigration, Employment, High Skill Labor, Low Skill Labor, Generalized Method of Moments.
JEL Classification: F22, F24, J31, C36.

Introduction

The labor market effects of migration have received tremendous theoretical treatment over two decades but lack of data on wages and employment, particularly at skill level, compel rigorous and extensive empirical outcome. The recent efforts of the World Bank Researchers to officially document skill-level migration data for over 150 countries is highly commendable (see Docquier and Marfouk, 2005; Walmsley et al., 2007; Docquier, 2011). This database has been used to provide useful information about the labor market outcome of immigration in the countries of destination while scanty readily available evidence exists in the case of emigration in the source countries[1].

The neoclassical theory of migration predicts that increase in the emigration of highly

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1. Emigration here referred to people that officially left their country of origin (source country) for another country (destination country) for the purpose of getting gainful employment. It precludes student emigrants, asylum and people that emigrate through clandestine means.

skilled workers causes wages to rise in the high skill labor market. Whether wages will increase in the low skill sector or not depends on the composition of and relationship between high and low skilled workers. Also, whether employment increases or falls in the low-skill labor market depends on the effectiveness of the labor union. Further, emigration could widen wage gap between the high and low skill workers but it may increase employment of low skill if the large chunk of emigrants is composed of high skill (Prrymachenko, 2011). Also, if the two skills are complements, the effects of emigration are unclear. It depends on whether the labor market is tight or slack as at the time of emigration. Thus, the outcome of emigration on the labor market is not straight forward and therefore requires empirical investigation.

The unclear, albeit very scanty empirical evidence on the effects of emigration on the source countries' labor market justify further country-specific evidence in order to provide policy directives that could improve on the positive effect and discourage the negative effect. Unfortunately, such evidence is scanty in sub-Saharan Africa and not readily available for Nigeria.

The case of Nigeria is even surprising given its migration experience, the composition of emigration and the situation of its labor market. Nigeria emigrants have been increasing over time, posting 487,882 to be the eleventh emigrating countries in 2000 and increased to 920,118 in 2010 to be the fourth emigrating countries in SSA. The country moved to the third position in 2015 posting 1,199,115, while South Africa that was in second position with 1,943,099 in 2010 moved to the first position recording 3,142,511 (World Bank, 2018). This shows that the number of Nigerians moving out of the country for better economic condition is increasing. Although it could be argued that this number is negligible given the size of the labor force that was almost 77 million in 2015, a good percentage of these emigrants are high skill.[1] Using the World Bank database, the ratio of low skill to high skill emigrants was 1:11 in 2000, up from 1:8 in 1990. In 2010, it rose to 1:13 and in 2015 it was almost 1:18! This pattern of relative migration is expected to have implication on the labor market (in terms of employment and wages).

Available data show that the period of rising emigration of high skill relative to low skill labor corresponds to the period of increase in the wages of high skill workers and decrease in low skilled wages, suggesting that disproportionate increase in the emigration of high skill labor may have contributed to high-low skill labor wage gap. To the extent that wage inequality is an important indicator of well-being and that the authorities care about closing the gap of income inequality, it is pertinent to establish the contribution of skill-level emigration to wage dynamics in the Nigerian labor market.

Second, observed trend shows that there is positive co-movement of emigration and employment of high skill labor whereas such co-movement is unclear in the case of low skill labor. This could suggest that high and low skill workers in Nigeria are related in some sense. Intuitively, if they are complements, then emigration of high skilled labor poses additional threat to the labor market if a good number of already employed high skill workers migrate and employers did not declare vacancies. In this case, employment will fall in the low skill labor market. If they declare vacancies, then emigration will generate more employment in the high skill sector with little or no employment effect in the low skill sector. Since one of the goals of the authorities is to achieve increased employment, it is important to understand the role of emigration in the employment dynamics in Nigeria. This study seeks to address these issues in order to broaden the knowledge of how Nigeria's labor market reacts to emigration.

1. Besides, this is just the number of official emigrants. If unofficial emigrants were added, it will be more than double the number quoted here (see Lucas, 2005). This should be a thing of concern given the rate at which Nigerians are taking clandestine means to advanced countries, particularly Europe. Consequently, many of this Nigerians are trapped up in some Northern African countries particularly Libya and Egypt which serve as their 'escape route to Europe'

It achieves this by adjusting one major assumption of received theories that explain the labor market effects of emigration and subjects it to empirical investigation[1].

The contribution of this study to the understanding of emigration experience in Nigeria and the world as a whole is in three folds. First, it provides comprehensive quantitative evidence of skill-based labor market effects of emigration. This was done using recent updated global bilateral migration data released by the World Bank, and wages and employment data compiled from the National Bureau of Statistics (NBS); Nigeria Institute of Social and Economic Research (NISER); and National Planning Commission (NPC). Second, the study seeks to show that government's policy in relation to the labor market should be done based on relationship between high and low skill workers (whether complements or substitutes). If complementarity holds, then, government will have to do something to discourage emigration of high-skilled labor not only to avert brain drain but also to prevent unemployment of unskilled labor. If complementarity does not hold, government is faced with reducing wage inequality arising from migration of high skill. Third, the underpinning theory used to analyse emigration effects on labor market is modified to capture peculiarities (large pool of unemployment) in the emigrating countries. This work is first the first to carry out such exercise in the countries exhibiting slack labor market.

Migration Policy and Background Information on Employment and Migration in Nigeria

Review of Nigeria Migration Policy

The migration policy of Nigeria is focuses on how to ensure security for Nigerians in diaspora and also to discourage emigration. However, there is no aspect of the policy that directly prohibits or limits the movement of Nigerians to another country. People are left to decide on their own, either to stay or leave the country (IOM, 2015). However, the country is a signatory to International Labor Organization ILO and consequently, has ratified both the migration for employment convention in 1964. Also, Nigeria is a signatory to the International Convention on the Protection of the Rights of all migrant workers and members of their families (1990 and 2009). Aside the multilateral migration agreements, Nigeria also ratified bilateral immigration agreements with some developed countries such as the United States, Italy, Republic of Ireland, and Spain. Other countries that Nigeria ratified bilateral agreement are contained in Adepoju (2007), IOM (2009), Afolayan (2011) and IOM (2015).

Meanwhile, the process of formulating a national migration policy was first muted in 2006 and this led to the development of National Policy on Migration (NPM) and thereafter discussed at a national conference in 2007. The major themes of the policy are: migration and development, migration and national security and other migration-related issues. However, the draft could not pass into law due to failure of the appropriate authorities to endorse the policy (Federal Labor and Productivity, 2010). In 2008, the Ministry of Labor and Productivity formally requested the assistance of the ILO and International Organization of Migration (IOM) in preparing a national labor migration policy. The process spanned 2008 to 2010 after which it was presented for signing into law. However, the policy was not ratified and endorsed by the appropriate authorities until 2015. This implies that the National Migration Policy (NMP) of Nigeria was formally ratified in 2015.

According to the NMP, government strongly discourages indiscriminate international

1. The assumption is that the labor supply curve is vertically sloped, suggesting that the labor market is strictly tight so that only natural rate of unemployment exists in the labor market. This cannot explain the situation in Nigeria where the labor market is seemingly slack and consequently, the labor supply curve should be upward slopping, which informs the adjustment made.

recruitment from Nigeria, especially in sectors where the negative effect could be felt. The specific objectives of the policy relevant to this study are to link migration and employment with policy and practice, and to upgrade skills and vocational training in Nigeria to meet domestic and foreign demand for labor. Further, the objective seeks to increase retention rate of highly skill professionals. To make this workable, the government seeks to establish atmosphere conducive for private sector opportunities that would provide gainful employment or part time employment to low paid professionals within the public service. This specific objective is important because the authorities sense that emigration motive among Nigerians is basically for gainful employment[1], and also that many Nigerians in the diaspora are highly skilled professionals who have the potentials to contribute to their country's development.

Since high income acts as a pull effect for Nigerian skill professionals, the migration policy also makes provision for reviewing and increasing salaries applicable to highly skilled professionals employed in the public sector. There are also design strategies for the replacement of qualified persons who have migrated through provision of training in professions that are highly affected. The NMP clearly shows that government is committed to adjust wages/salary commensurate enough to stem the emigration of skill labor.

Background Information on Employment and Migration in Nigeria

Following the migration policy reviewed, it is important to see how employment and migration has fared in the country. The population and labor force of Nigeria has been rising since 1980. Of particular interest is the labor force that rose from 20 million in 1980 to 50 million in 2000 and in 2016, it increased by 30 million (Table 1). However, the dramatic increase in labor force was reflected in its share in population. As can be read off from the Table, before 2000, the share of labor force in population hovered between 27 and 30 percent but jumped to between 40 and 42 percent after 2000. Specifically, there has not been any year (from 1980 to 2016) that the labor force was up to 45 percent of population.

Table 1. Selected Labor Market Statistics (1980-2016)

Variables	1980	1985	1990	1995	2000	2005	2010	2015	2016
Population (million)	74	84	96	108	123	140	159	182	189
Labor force (million)	20	24	27	32	50	57	63	7.9	80
Labor force (% of population)	27.41	28.25	28.24	29.51	40.45	40.68	39.71	41.22	42.26
Total employment (% of labor force)	95.54	94.09	92.59	92.50	86.9	88.1	78..9	73.3	79.5
High skill employment (% of labor force)	30.69	35.86	37.04	37.50	38.23	47.18	51.18	57.52	54.71
Low skill employment (% of labor force)	64.85	58.23	55.56	55.00	44.47	40.14	39.65	24.90	24.72
Unemployment rate	4.40	5.90	7.80	7.50	13.10	11.90	21.10	26.70	20.5
Read GDP growth (%)	4.20	9.70	8.20	2.50	5.40	6.90	7.90	2.70	-1.60

Source: World Development Indicators (2017), National Bureau of Statistics (e-Library, 2017), and NPC (2011).

Of this less than 45 percent of population that constitutes the labor force, the share of employment in labor force was encouraging in the 1980s through 1995 after which it attracted attention. In particular, although employment recorded upward trend, its share in labor force was falling, specifically from 2005[2]. What this implies is that apart from high dependency

1. This precludes forced migration and the asylum seekers.

2. Employment data on time series basis is not readily available in Nigeria. However, National Planning Commission (NPC) document estimates of employment in each sector (agriculture, industry and services). This

burden owing to low share of labor force in population, declining share of employment in labor force increases the burden.

This increased dependency burden is shown clearly through the unemployment situation in the country. From 1980 to 1995, Nigeria experienced single-digit unemployment rate but from 2000 when the share of employment in labor was declining, unemployment rate entered double digits and was rising. This is evidenced from the rate of unemployment rate that rose from 4.4 percent in 1980 to 13.1 percent in 2000 and then to 21.1 percent in 2010, after a slight decline in 2005 and then rose systematically to 26.7 percent in 2015 but fell markedly to 20.5 in 2016. This report supports the claim that Nigeria labor market is characterized with excess labor supply because the real and financial sectors are unable to absorb considerably large amount of the supply (IOM, 2009; NBS, 2010; Okafor, 2011).

What is worrisome in the unemployment situation in Nigeria is that the country experienced persistent increase in unemployment when the economy appeared to be doing fine while the unemployment even rose further during economic downturn. In particular, when GDP growth rate rose from 2.5 percent in1995 to 5.4 in 2000, unemployment rate rose from 7.5 to 13.1 in the same period. When GDP growth fell from 7.9% in 2010 to -1.6 percent in 2016, unemployment rose dramatically from 20.6 percent and the figure in 2015 was seriously disturbing.

Even though unemployment at skill level cannot be accessed, data on employment and the labor force could provide information about the skill for which unemployment is pronounced. The share of high skill employment in labor force increased gradually from 30.7 percent in 1980 to 38.2 percent in 2000. The share rose markedly to 51.2 percent in 2010 and then to 54.7 percent in 2016. Clearly, employment of high skill relative to labor force has been on gradual increase since 1980. The share of low skill employment in labor force was higher than that of high skill in the 1980s but as from 2000, the share dropped and the decline continued into 2016 when it was 24.7 percent. Therefore, high skill labor accounts for relatively smaller share in labor force but the share has been rising. Low skill employment took the better part of the labor force but was falling. In fact, from 2000, the share of low skill employment was smaller than that of high skill employment. This dynamics suggest that unemployment rate in the 2000 and beyond should be more pronounced among the low skill labor.

Table 2. Emigration Structure in Relation to Labor Force (1980-2016)

Years	Total emigrants (% of labor force)	High skill emigrants (% of labor force)	Low skill emigrants (% of labor force)
1980	0.29	0.23	0.07
1985	0.37	0.30	0.07
1990	1.52	1.45	0.07
1995	1.35	1.27	0.07
2000	1.26	1.22	0.04
2005	2.24	2.21	0.03
2010	1.99	1.96	0.03
2015	2.09	2.06	0.03
2016	2.09	2.06	0.03

Source: Author's computation using data extracted from Docquire (2011) and World Development Indicators (2017).

One of the reasons for high and rising share of high skill employment in labor force and low and declining share of low skill employment in labor force could be that high skill labor benefit more from migration than low skill labor. This claim is supported by the information

estimate precludes employment in the in informal sector. Estimate data extracted from the NPC was complemented with the NBS employment reports and adjustments were made where necessary.

provided in Table2. The share of emigration in labor force was less than 1 percent in 1980 but rose to 2.1 percent in 2016. While the share of high skill emigrants rose from 0.23 percent in 1980 to 1.9 percent in 2010 and remain stable at 2.06 percent in 2016, the share of low skill emigrants in labor force actually fell from 0.07 percent in 1980 to 0.03 in 2005 through 2016.

Following from this analysis is the fact that high skill labor has been leaving Nigeria relative to low skill labor and the movement was more pronounced in the 2000s. The high and rising share of high skill in labor force also occurred mostly when the share of high skill emigrants rose dramatically in the 2000s, an indication that emigration of high skill must have contributed to employment of high skill labor in Nigeria

The scatter plots provide further evidence on the relationship between migration, employment and wages at skill level. As revealed, the relationship across skill level is mixed (Figures 1 and 2). The first scatterplot relates the growth of high skill emigration (LNMGH) to the growth of high skill employment (LN_HHIGH_EMP). The regression line suggests that increase in high skill migration leads to increase in employment of high skill labor. However, the slope of the scatterplot in the case of low skill migration (LNMGL) and low skill employment (LNLOW_SKILL_EMP) is almost flat indicating that the labor market of low skill labor is so slack that there may be little or no effect.

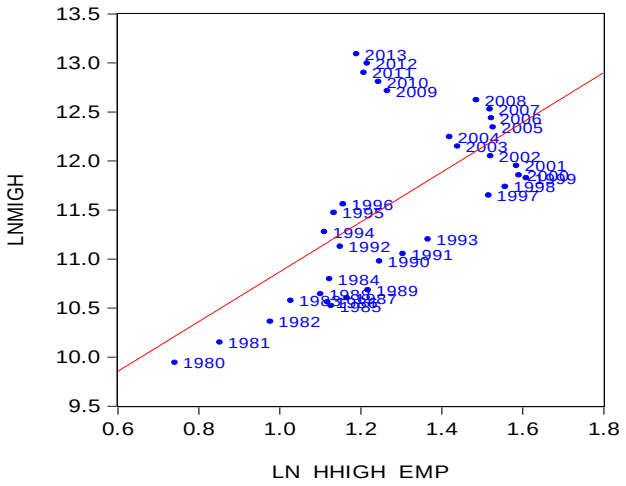

Figure 1. Relationship between Emigration and Employment (High Skill)
Source: Computed using Global Bilateral Migration data and NBS (2011).

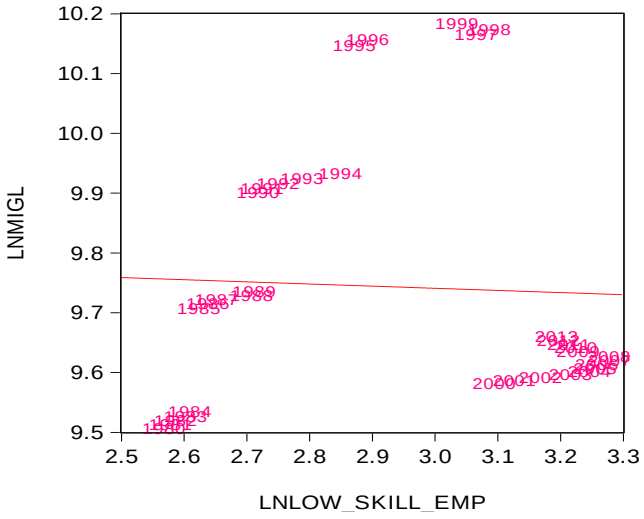

Figure 2. Relationship between Emigration and Employment (Low Skill)
Source: Computed using Global Bilateral Migration data and NBS (2011).

With regards to migration and wages, the scatter plot shows that there is positive co-movement of emigration of high skill labor and high skill wages and the regression line indicates clear positive effect (Figure 3). In Figure 4, emigration and employment relationship in the low skill labor (LNMGL and LNLW) was almost flat while the relationship between emigration of high skill labor and wages of low skill labor is positive, suggesting that increase in emigration of high skill labor leads to increase in low skill wages.

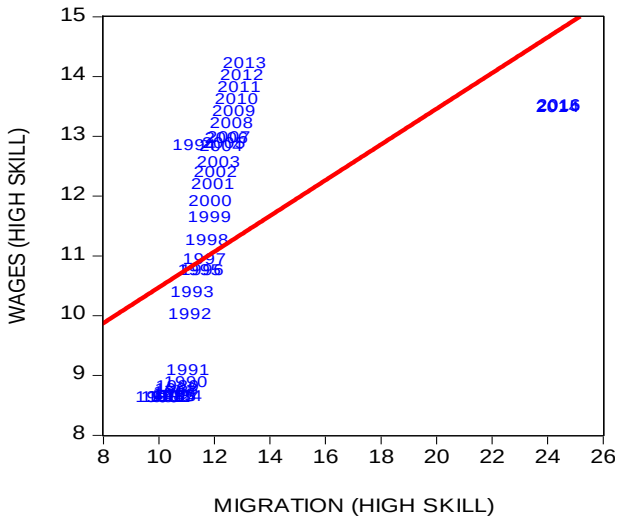

Figure 3. Relationship between Emigration and Wages (High Skill)
Source: Computed using Global Bilateral Migration data and NBS (2011).

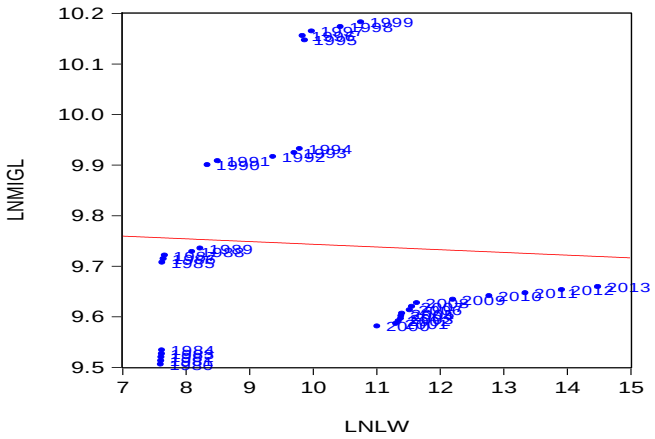

Figure 4. Relationship between Emigration and Wages (Low Skill)
Source: Computed using Global Bilateral Migration data and NBS (2011).

Literature Review

The empirical literature investigating the labor market outcome of migration is diverse and varies extensively depending on methodology and data availability. For instance, some researchers focus on the employment aspect of the labor market while others pay attention to wages. Again, some focus on the skill composition of the labor market with special reference to skilled and unskilled. While there are abundant empirical evidences on the effect of immigration on labor markets of the destination countries, there is scanty evidence in the case of source countries' labor market effects of emigration, particularly in most developing countries. The reason for this could be attributed to dearth of data on emigration and sectoral employment. This section therefore documents recent readily available empirical evidence of the labor market effect of migration (both immigration and emigration).

The empirical works on the effect of immigration on employment include Gross (2002), Gross (2004), Longhi et al. (2006), Angrist and Kugler (2003), Parasnis et al. (2006), Orrenius and Zavodny (2013), Dustmann et al. (2005), Pope and Withers (1993) and Blanchflower et al. (2007). Gross (2002) utilized system of equation for employment, labor force participation, immigration rate and real wage in the case of France between 1980 and 1995. The result suggests that employment reduces with increase in immigration in the short run but peters out in the long run. Gross (2004) extended the work of Gross (2002) to skill level analysis. Using the same method and period, the study reports that increase in high skill immigrants causes reduction in the employment of high skill native workers but increases the employment of low skill workers. However, both native high and low skill workers benefit from immigration in the long run. This suggests that immigration shock produces short run negative effect but long run positive effect.

Utilizing meta-analytic techniques, Longhi et al. (2006) analysed 165 estimates from 9 studies that investigated the impact of immigration on the employment of natives in various OECD countries. The 'consensus estimate' revealed that increase in immigration has meagre negative effect on employment. However, the cross-study analysis shows that the negative impact is notable in Europe and the United States. The reason for this, according to the author, is due to relatively flexible labor market of Europe and the United States. Still on immigration and labor force, Angrist and Kugler (2003) estimated two alternative panel data estimation for EEA during period of 1989-1992. The panel least square (pooled) shows negative effect of immigration on employment. In the second technique, they employ Panel-IV where distance was used as instrumental variable. The justification for this is that distance might correlate with immigration but not correlate with the error term. With this strategy, the effect was still negative but insignificant. To account for the role of labor market flexibility, they interacted immigration with a measure of labor market rigidity. The result suggests that more restrictive labor market will cause immigration to have large negative impact on employment.

Dustmann et al. (2005) develop a novel panel data comprising 5 types of education across 9 categories of experience for five years, that is, 1983, 1986, 1991, 1996 and 2000. They employ this method to examine the effect of immigration on the labor market of the United Kingdom and found that increase in immigration slightly reduces employment of the natives (-0.06). However, when Parasnis et al. (2006) utilized similar technique on the same issue in the case of Australia, immigration of high skill provides innovation for the economy and hence increases employment. Also, the long-run econometric analysis of Pope and Withers (1993) suggests that immigrant's increases employment in the destination countries, that is, immigration and employment are complements. Meanwhile, the study of Blanchflower et al. (2007) could not establish any seeming relationship between immigration and employment in the US and UK in their descriptive statistics of simple percentage and graphical representation.

The empirical evidence on the employment effects of immigration discussed above show diverse outcome. In some countries, immigration improves employment while in some, it discourages employment. In some cases as well, immigration tend not to significantly influence employment. Even where similar methodologies were employed, different results were observed across countries. This clearly shows that there is no unanimous outcome of the employment effect of immigration.

Papers that focus on the wage implication of immigration are Friedberg (2001), Borjas (2003), Lemos and Portes (2014), Docquier et al. (2011), Beerli and Peri (2015), and Nikell and Saleheen (2015). The Ordinary Least Square estimate of Friedherg (2001) reveals that immigration dwarfs wages in Israel. However, due to possible homogeneity problem posed by spatial correlation which might cast doubt on the reliability of the OLS, the author estimated an IV regression, using migrant information about the labor market conditions of

country of destination as instrument. The argument is that this variable influences immigration but not the error term. This method overturned the OLS result because in the IV estimates, the negative effect vanished. The author then concludes that current migration does not reduce current wages. Borjas (2003) also used this IV approach to carry out similar study for the US. Meanwhile, this study was based on skilled-level. The result was the same as in the Friedberg (2001), that is, immigration of a particular skill have notable and significant negative effects on wages of workers in that group. Lemos and Portes (2014) were interested in the possible effect of inflow of migrants from the EU country members in the UK labor market after the 2004 EU enlargement. They utilized monthly micro-level data spanning 2004 to 2006 and comprising 409 districts. Their focus is to discover which of the segments of the UK labor market was significantly affected. Their panel fixed effect at first difference suggests that the immigration inflow following the EU accession did not have worrisome wage effect in any of the labor market segments.

Docquier et al. (2011) employed global dataset on migration flow by education levels for the period 1990-2000 for 13 OECD countries to examine the effect of immigration on wages of the natives. They utilized aggregate demand and aggregate supply framework and with the aid of simulation, they found that at worse, immigrants have mild long run positive effect on wages of natives (zero in Italy, 1.7 in Australia). The authors extended the countries to 35 OECD members in 2014 with the same framework, methodology and time frame. The result suggests that immigration generally had small positive or no effect on the average wages of natives in all the OECD countries as a whole. However, country-specific simulation shows different magnitude, albeit, similar direction of effect. Countries which based their immigration selection on educational attainment had notable, significant and positive effect. Countries which migration selection does not base on education had sizable positive effect. In any case, the outcome of the study suggests that immigration and native less-educated workers are complements but the degree of complementarity differs across space.

The study carried out by Beerli and Peri (2015) investigates the employment and wage effects of immigration following expansionary immigration policy of the EU in 1999. They specifically focused on how such immigration policy influenced the labor market of the Switzerland between 1999 and 2007. They decomposed migration flow into those that arrive from the Switzerland border region and those from non-border region. In order to capture this immigration pattern, they utilized different-in-different approach. The result revealed that inflow of migrants had no significant impact on average wages of native workers. The skill-level analysis however shows that immigrants complemented highly skilled native workers, but substituted middle-skill workers while there is no evidence of effect on the low-skill workers.

The study of Nickell and Saleheem (2015) focus on the impact of migration on average wage rather than relative wage. They consider categorizing skills based on occupation requirement instead of education. The argument, according to the authors is that many immigrants in the UK and the US with high educational qualification work in low skill occupation. Employing a panel estimation comprising 11UK regions and 25occupation based on 2-digit SOC-2000Classification spanning 1992-2014, their pooled regression suggests that immigration exerted negligible, albeit, negative effect on average wages. The interesting thing about the result is that the negative effect is more pronounced within the semi/unskilled occupational group.

Foged and Peri (2016) utilize 1991-2005 longitudinal data on immigrant workers in Demark to investigate the labor outcome of refugee in that country. The result indicate that increase in refugee-country immigrants leads to increase in employment of the low skill workers and also increases low skill wages. In the same vein, Cadena and Kovak (2016) show, in their study of response of skill workers to labor demand in the United States and the

location effects. Utilizing American Community Survey between 2006 and 2010, the authors find, in their ordinary least square regression, a significant increase in immigration owing to increase in demand for low skill workers.

Borjas (2017) studies the effect of estimated 125,000 Cuban refugees has on the labor market condition of the United States. The result of the ordinary least square suggests that there is no wage effect following the supply shocks. Utilizing longitudinal survey data of migration to Australia, Tani (2017) investigates the labor market outcome of immigrants in Australia labor market. The author considers employment rate, occupation, wage and skill in the least square regression model. After controlling for all other factors, immigration policy does not affect wage or employment of the native workers in Australia.

Edo and Rapopot (2018) studies the labor market outcome of skill immigrants of the United States. The author employs American Community Survey data of 2000 immigrants across 50 US States. Utilizing skill-cell method and dealing with endogeneity by using past migrants and geographic distance as instrument, the result suggests that the effect of immigrants on wages and employment is negative in state with low minimum wage and low skill workers while there is no effect on wages in states with high minimum wage and high skill workers. The review of literature of the impact of immigration on the labor market by Edo (2018) indicates that there is no clear direction of effect. The author further finds that migration selection on skill-based tend to increase wage inequality between high and low skill of native workers. East et al. (2018) employ a difference-in-difference model of data from the American Community Survey covering 2005 to 2014. The result shows that immigration policy, that is, Secure Communities, has negative and significant effect on the employment of low skill immigrants and negative effect on employment of middle and high skill native workers. The Survey data on immigrants in the 13 European countries between 1998 and 2016 were obtained by Ho and Turk-Ariss (2018) to investigate the labor market outcome of immigrants in these 13 countries. The probit regression employed indicates that the probability of low skill immigrants being employed is significantly low while that of the high skill is relatively high.

Like the case of employment effects of immigration, the outcome of the wages/income effects of immigration is also diverse across space and skills. In some countries, wages of natives were not affected by inflow of migrants while in some countries, it had positive effect and in some it exerted negative effect. At the skill level, immigrants complement high skill native workers but leaves low-skilled native workers unaffected or worse-off. It must be recalled that these analysis was based on the inflow of migrants and the effects on the labor market of the destination (receiving) countries. In what follows, attention is shifted to outflow of migrants and the employment/ wages of those left behind.

The empirical studies of the labor market outcome of emigration in the source countries are scanty. It is limited by studies exploring principally wage effects of emigration and mostly concentrating on Mexico-US labor mobility, and recently on OECD countries. The only readily available ones are Mishra (2006); Aydemir and Borjas (2006); Hanson (2007) for Mexico, Docquier et al. (2014) for OECD countries, Bouton et al. (2011) for Moldova, Elsner (2011) for Lithuania and Pryymachenko (2011) for EU-8[1].

Mishra employed the spatial correlation approach to estimate the effect of emigration on Mexican wages during 1970-2000. The result shows a strong positive effect, with the wage elasticity being 0.4%. Aydemir and Borjas (2006) utilized structural aggregate production framework, and utilize constant elasticity of substitution (CES) production function to estimate the emigration elasticity of wages in Mexico. The Least Square method employed show that Mexico's weekly wage elasticity with respect to emigration between 1980 and 2000

1. The EU-8 are Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia and Slovakia

was positive and significant. This suggests that increase in emigration of Mexican workers leads to increase in wages of workers left behind. Hanson (2007) utilized difference-in-difference wage regression to establish the impact of emigration of Mexicans on the wages between 1990 and 2000. The author controlled for state-of-birth fixed effect, allows returns to observable characteristics to vary across regions and compared changes in Mexican earnings in low and high-migration states in the 1990s. The result reveals that wages in both high- and low-skill migration states rose significantly following emigration with that of the high-skill emigration having higher positive impact on wages.

Bouton et al. (2011) employed 2006 labor force survey of the republic of Moldova to examine the impact of emigration on wages under the aggregate labor demand framework. Their result suggests positive and significant effect, that is, increase in emigration mount upward pressure on wages in the source country. In the same vein, the result of Elsner (2011) reveals that emigration of skilled workers increases wages of skilled natives but have no effect on the wages of low skill workers. Their results were premised on simulation within the context of structural model of aggregate labor demand framework.

Pryymachenko investigated the impact of emigration on the unemployment of EU-8 countries between 1997 and 2007. The author found that emigration has a strong negative effect on unemployment in the EU-8 countries, with unemployment rate decreasing by 4 percent following 10 percent increase in emigration rate. In the works of Docquier et al. (2014), emigration poses a bigger threat for low-skilled workers, thereby increasing wage gap between the high- and low-skilled workers. According to the authors, emigration of high skilled workers reduces low-skill wages in the UK while it has no effect on the US native workers. The implication of this is that immigration widens wage gap in the UK more than in the US. Generally, emigration worsens wages of low skill labor left behind due to increase in wage gap between the high skill and the low skill.

The empirical review shows that the labor market outcome of immigration is diverse, depending on the method adopted and the countries under study. Meanwhile, the effect of emigration in the labor market of the source country is very scanty but available evidence also shows diverse results. The results are just from three countries (Mexico, Moldova and Lithuania) and two regions (EU-8 and OECD). Apparently, these results mainly explain labor market situation in some European and American countries which may not likely be generalized across countries, particularly in Africa due to the unique labor market situation in the continent and also migration history. Interestingly, no readily available quantitative empirical evidence that shows the labor market effects of emigration in African countries. This is more interesting in the case of Nigeria where the largest emigration among African countries is being experienced over the years. This is the empirical gap that this study seeks to fill.

Theoretical Framework and Methodology

Theoretical Framework

This study follows a version of the neoclassical macroeconomic theory linking migration with labor market condition developed by Kahnee et al. (2010). The theory recognizes the influence of labor union in wage and employment determination in the face of immigration. Meanwhile, Pryymachenko (2011) modifies the model to capture the case of source countries. Specifically, the author pays attention to emigration effect. Since the focus of this paper is on how emigration influences the labor market, the Pryymachenko model is chosen as a framework. However, the study relaxes the assumption of full employment found in the Pyrrmachenko (2011) model. The basic Pryymachenko model assumes a vertical labor supply curve, in which case, changes in wages have no effect on labor supply, but if labor supply

responds to changes in wages, it makes sense to assume that labor supply curve is upward sloping. Thus, the model turns out to be a modified version of the Pryychenko framework. This is important to reflect the fact that unemployment exists in the markets and that increase in demand leads to increase in wages but not as much as would have been if it was vertically sloped.

The labor market is composed of high skilled and low-skilled labor (Figure 5). The left panel shows how employment and wages of high skill labor are affected by emigration while the right panel is that of the low skilled counterpart. The market for high skilled labor is at equilibrium at point A where L_{h0} amount of labor could be hired at the going wage (h_0). The vertical line L^*_0 is the high skill labor force, suggesting that at h_0, there is $L^*_0 - L_{h0}$ amount of unemployed high skill labor. In the same spirit, $L^*_0 - L_{l0}$ is the amount of unemployed low skill workers at I_0 labor wage in the low skill labor market.

Consider first the emigration of high-skilled workers; the immediate effect is the reduction in the high skill labor force, shifting the labor supply curve leftwards from L_{h0} to L_{h1}. That is, emigration of high skill shrinks high skill labor market. With the assumption that no rule restricts already employed workers from emigrating, emigration (shown in the Figure 5) is a mix of the employed and unemployed workers.[1] If high- and low-skill workers are complements then employment in the low-skill sector will fall if firms decide not to declare vacancies. If firms declare vacancies (to replace those that emigrated) then there will be pressure on the wage of high skill workers to rise due to replacement effect and the equilibrium will settle at point B (point B). The implication of this as shown in the diagram is that employers may not employ as much as those that emigrate due to high wage. Depending on the degree of complementarity, this action may or may not increase wages in the low-skill sector but may likely increase employment. If firms decide not to declare vacancies[2], there will not be any seeming effect on wages but the labor force, described by the labor supply curve will shrink. Thus the effect of emigration of high skill reduces the size of labor force, and could increase wages and employment (if firms declare vacancies) but not as much as the number of workers that resigned for the purpose of emigrating.

High-skill labor marketLow-skill labor market

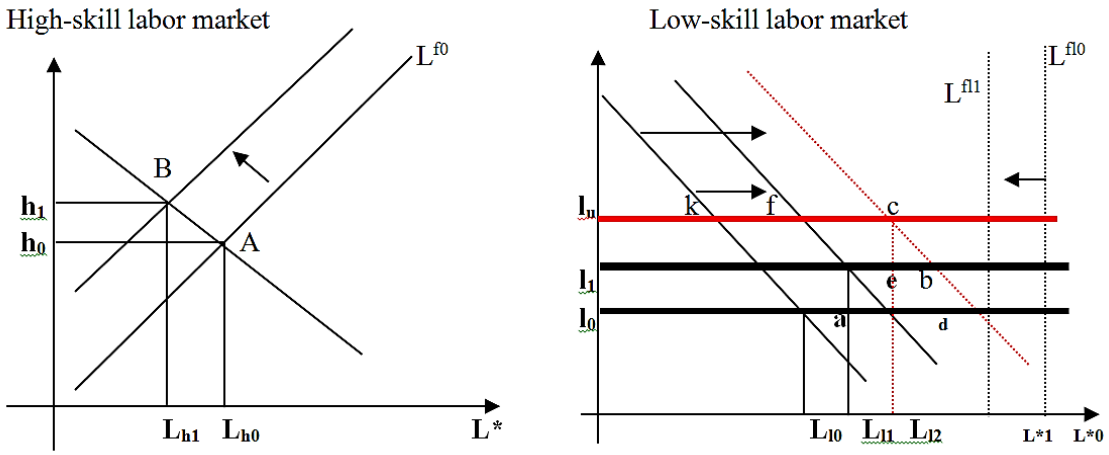

Figure 5. The Effects of Emigration on Wages and Employment
Source: Research findings.

1. In this case, we do not consider workers that are under employment bond. Since this bond arrangement is not general across industries, our assumption is plausible. Further, the no restriction assumption implies that the intending emigrant is not facing litigation of any type.
2. This may be possible if capital and labor are substitutes.

In the low skill labor force, the initial equilibrium (before emigration) is at point *a*, where l_0 and L_{10} are the corresponding going wage and employment. Suppose emigration takes place among the low skill workers. The labor force curve will shift from L_{10} to L_{l2}[1]. Under perfectly competitive market assumption, whether wages will increase or not depends on the extent of slackness of the market and the effectiveness of labor union. Consider first the absence of union[2] and suppose the labor market is slack, there is large pool of unemployed workers. Wages will not increase but employment will rise and the market will be operating at point *d*. If the market is not slack so much, market wage will increase following increase employment due to emigration. In this regard, wages will increase from I_0 to I_1 and employment will increase from L_{I0} to L_{I1}. The employment in the latter scenario will be smaller than the former due to increase in market wage.

In the presence of active union, labor demand due to emigration will create incentive for wage bargaining, and this will push wage further upwards, shifting labor supply curve upwards so that the market will operate at point *f*. At this point, active unionism neutralizes the employment potential of emigration but makes the existing workers better off. If the bargaining arrangement is so strong that workers have to be laid off, then emigration will cause reduction in employment because the labor force will be operating at point *k*.[3] What happens to the high-skilled labor market following low skill emigration depends on whether there is incentive for people to increase their market value or not. If they increase market value, wages will fall, unemployment will rise and this in turn may create push effect for emigration.

This theory can be extended by considering the possibility of schooling, which will increase the size of high skill labor force. According to the new economics of labor migration, the demand for high skilled immigrants may create incentives for workers to upgrade their market value, not necessarily for the purpose of being employed in the country of origin but to qualify for emigration[4]. However, owing to financial constraints, not all will eventually emigrate. In this case, emigration may not change the size of the high skill labor market because of the new supply of workers generated by the probability of leaving, but it will reduce the size of the labor market of the low skill.

The theory thus predicts that high skill labor market will benefit from emigration of high skill workers either in terms of employment or wages or both. If the market for low skill is highly saturated, low skill will benefit in terms employment only. If it is not then, the effect is inconclusive. If labor union is actively present, then the employment effect will be mild or even reduce but wages will unambiguously increase. Knowledge acquisition in anticipation for emigration could make emigration have no effect on wages in the high skill sector, but it will certainly change the structure of the labor force. Not only that, this arrangement will also generate push effect to migrate, putting those with adequate skill on alert.

Methodology and Data

The major focus of this paper is to empirically document the labor market effect of emigration at skill level. The theoretical framework articulated above does not say anything about the cause of migration. In this regard, emigration is taken as given in the labor market model[5].

1. We deliberately shift the labor force curve of the low skill smaller than that of the high skill counterpart. This is to show that high skill workers are given the opportunity to migrate more than the low skill workers.
2. Or if the union is ineffective
3. The position taken in this study is that changes in employment of low skill do not significantly influence wages of the high skill workers.
4. For example, some Nigerians attend nursing and security schools for the purpose of qualifying for emigration.
5. People that eventually emigrated officially must have satisfied all immigration conditions (which are outside the control of the emigrating country).

However, it is of interest to examine the drivers of emigration so as to provide information about the factors responsible for emigration which in turn influences the labor market condition. Variables that are included in the determinants of migration are picked from the classical migration theories, information network theory and the human capital theory of migration. The classical migration theories identify income differentials, employment, and population as drivers of migration (Harris and Todaro, 1970), while information and human capital theories of migration identify remittances and skill acquisition as potential candidates (Stark and Taylor, 1989; Adepoju, 2007; Afolayan et al., 2008; Olubiyi, 2013). Using Harris-Todaro (1970) model as a guide, classical migration theory suggests that potential migrants are motivated by high income expected to receive in the foreign/destination country. Hence emigration is an increasing function of the difference between foreign and home average wages/income, all things being equal. Lucas (2004) argues that increase in economic size (GDP) can influence migration. Increase in the GDP of source country provide additional source of income that could finance migration. As income increases ease with which migration costs are covered also increases and this consequently raises migration decision. However, if GDP is so high that emigration reduces markedly, then it must be the case that the country has reached the point of migration hump, where reduction in migration is informed by increased economic size. The theoretical analysis of Diajic (2016) corroborates this proposition. This argument leads to another factor that drives emigration, that is, employment. If the basis for emigrating is lack of securing gainful employment, then as employment increases, due perhaps to effective migration policies among others, emigration is expected to reduce[1].

The information network theory suggests that people in diaspora are well informed about the labor market situation in their country of residence and so could use this information to invite intending migrants from the source country and, most times, finance the (one-way or round) trip using remittances (Lucas, 2004). Other potential drivers of migration include population and human capital development (Sjaastad, 1962). The human capital theory was based on skill selection migration policy. According to the theory, since migration is based on skill selection, potential migrants seek to increase his/her market value for the purpose of migrating. Thus if the stock of human capital increases, it is expected that migration should increase as well. This situation leads to the saturation or otherwise of the labor market discussed in the theoretical framework. If the labor market is saturated, then the supply curve is upward sloping and the emigration could raise both wages and employment. Equation 1 summarizes the discussion of the drivers of migration as articulated above:

$$MIG_t = f(GDP_t, (Y_{ht} - Y_{ft}), E_t, REM_t, POP_t, HC_t) \quad (1)$$

where MIG_t is emigration stock at time t, GDP is the gross domestic product, Y_i (i = h, f) represents per capita income of Nigeria (h) and foreign (f), using the US per capita income as a proxy; E_t, REM_t, POP_t and HC_t stand for stock of employment, workers' remittances, population and human capital respectively. Tertiary school enrolment was used as a proxy for human capital. The justification for using the US per capita income is that first, Nigerians are highly concentrated in the US more than any other foreign developed countries. Second, the proxy is commonly used in empirical analysis, particularly in migration and trade.

Following the theoretical framework, the estimable equation of the effects of emigration on the labor market is specified as follows:

$$E_t = f(MIG_t, W_t, X) \quad (2)$$

where W is the average wage (high skill and low skill) and X represents other catchall variables such as GDP and inflation. The third equation stems from the dynamics of wages

1. It must be recalled that the Nigeria Migration Policy objective also emphasizes employment strategy as a way of stemming emigration.

due to migration phenomenon. Following our theoretical framework and the works of Oladi and Beladi (2006), Bouton et al. (2011) and Elsneer (2011)[1], the model for the determinants of wages is specified in equation 3.

$$W_t = f(MIG_t, E_t, GDP_t, INF_t, HC_t) \quad (3)$$

Thus, apart from emigration (established by our theoretical framework) other variables include employment (E), economic condition (GDP), inflation (INF) and human capital development (HC). In order to ascertain uniform unit of measurement and to account for omitted variables that may affect the dependent variables, logarithmic transformations of equations 1 to 3 produce the following estimable models:

$$\ln MIG_t = \beta_0 + \beta_1 \ln GDP_t + \beta_2 \ln(Y_{ht} - Y_{hf}) + \beta_3 \ln E_t + \beta_4 \ln REM_t + \beta_5 \ln POP_t + \beta_6 \ln HC_t + \varepsilon_t \quad (4)$$

$$\ln E_t = \gamma_0 + \gamma_1 \ln MIG_t + \gamma_2 \ln GDP_t + \gamma_3 \ln W_{ht} + \gamma_4 \ln W_{lt} + \gamma_5 INF_t + \varepsilon_t \quad (5)$$

$$\ln W_t = \psi_0 + \psi_1 \ln MIG_t + \psi_2 \ln E_t + \psi_3 \ln GDP_t + \psi_4 INF_t + \psi_5 \ln HC_t + \varepsilon_t \quad (6)$$

where W_{lt} implies wage of low skill workers at time *t*; W_{ht} stands for wage of high skill workers at time *t.* To appreciate the intuition of the theoretical framework, equations 4 to 6 are estimated for each skill level.

Technique of Estimation

There are at least three estimation issues that need to be resolved in equations 4 to 6. First, the existence of serial correlation arising from the fact that some variables may not likely be readily observable. Such variables include labor market policy and business environment second, is the possibility of heteroskedasticity. The third one is endogeneity arising from simultaneity problem, in which case, the variables (migration, employment and wages) simultaneously affect each other. By implication, any shock to migration or wages will also affect employment. Also, any shock to employment or migration will affect wages. Thus in any case, the OLS is no longer an appropriate estimation method because the coefficients will be inconsistent and inefficient.

Various methods could be used to address these problems but the commonly used is the Generalized Method of Moments (GMM) introduced by Hansen (1982). The GMM estimator is basically established to deal with endogeneity issues but it can also produce consistent estimates in the presence of serial correlation and heteroskedasticity (Baum, 2011). Meanwhile, for GMM to be the appropriate estimation technique, it must satisfy the condition of relevant and valid instrumental variables (IV) (Baum and Schaffer, 2003). Finding appropriate instruments for these models is inevitably impossible. However, the lagged values of endogenous (and purely exogenous) variables could serve as proxy for instruments (Baum, 2011). The intuition behind the use of lagged variables is that information contained in the contemporaneous (endogenous) variable which makes it to correlate with the error term is contained in the lagged value of the variable. Thus, using them as instruments will remove the endogeneity so that the error term will be purely white noise (being independently and identically distributed). Of course, 3 Stage Least Square (3SLS) could also have being an alternative to the GMM. But the advantage of GMM over 3SLS is that while 3SLS assume that instruments are exogenous in the system of equation, GMM assume that the instruments are exogenous in equation by equation, therefore, employing GMM allows the researcher to estimate the system, equation by equation and therefore provides richer information about the effect of the independent variables on dependent variables. Apart from treating instruments as

1. Oladi and Beladi (2006) is considered relevant because it provides theoretical effects of migration on wages at the skill level in both the source and destination countries unlike other earlier theories that based their analysis on the countries of destination only (see Borjas, 2003).

exogenous in the system of equation, the use of 3SLS is based on the assumption that the instruments are known whereas GMM is capable of dealing with endogeneity of unknown instruments by interacting both linear and nonlinear sources of endogeneity. Since getting appropriate instruments for equations 4 to 6, utilizing GMM will be an advantage.

Even when lagged endogenous variables are to be included as instruments, the problem shifts to the numbers of lags of each of these variables to be used. This problem is solved by utilizing lag selection criterion. For this study, the Akaike Information Criteria (AIC) was employed[1]. Apart from the issue of lag selection, it is still important to ensure that these instruments are actually valid.

Definition of Variables and Sources of Data

Table 3. Definition of Variables and Sources of Data

S/N	Variable	Definition and measurement	source
1	lnMig:MIGRATION (LOW/HIGH SKILL)	Log of the stock of emigrants. Emigrants are people that stay for a year or more in a country different from their home country. Emigrants in this context are categorized into high skill and low skill. High skill either possesses higher education or special skill not equally distributed.	Global Bilateral Migration. World Bank. available at *http://databank.worldbank.org/data/reports.aspx?source=Global-Bilateral-Migration#*
2	LnGDP: GDP	Log of gross domestic product at current market price. This is used to proxy the economic size.	Computed using data from the World Development Indicators. The World Bank (2017).
3	$\ln(Y_f - Y_h)$: INCOME DIFFERENCE	Log of difference in per capita income between the US and Nigeria in nominal term	Computed using data from the World Development Indicators. The World Bank (2017).
4	$\ln E_t$: EMPLOYMENT (HIGH/LOW SKILL)	Growth of employment (categorized into high and low skill)	Computed using data extracted from the National Institute of Social and Economic Research (NISER), National Planning Commission and Annual Abstract of Statistics (Published by the NBS, various issues).
5	LnREM: REMITTANCES	Log of Personal remittances. This is defined as the proportion of emigrants' income sent back home.	Computed using data from WDI, 2017
6	LnPOP: POPULATION	Log of total population	Computed using data from the World Development Indicators. The World Bank (2017).
7	LnHC: HUMAN CAPITAL	Log of human capital. Tertiary school enrolment rate was used as proxy	Computed using data from the World Development Indicators. The World Bank (2017).
8	LnW: WAGE (HIGH/LOW SKILL WAGE)	Log of annual wage.	Computed using Annual Abstract of Statistics, National Bureau of Statistics (Various issues).
9	INF: INFLATION	Inflation rate. Percentage change in consumer price index.	Computed using data from the World Development Indicators. The World Bank (2017).

Source: Research findings.

The validity condition implies that the number of the IV must be greater than or equal to

1. The justification for choosing AIC among others such as HQC, SIC, LR and FPE is based on the sample size. When the sample size is less than 60, the appropriate lag selection criterion is AIC (Liew, 2004; Ashgar and Abdi, 2007).

the number of the explanatory variables. The *J*-statistics, developed by Hansen (1982) gives the value of GMM objective function evaluated using an efficient GMM estimator. If the set of IV is equal to the number of regressors, then the value of *J* will be zero. Otherwise, *J* will be greater than zero. The *J*-statistic behaves like χ^2 random variable with degree of freedom equals the number of over-identifying restrictions.

Data on all these variables were collected from 1980 to 2016. However, data on migration reported in the World Bank data base terminates in 2010. But 2011 through 2013 were extracted from Docquier et al. (2014) while we utilized moving average method to generate data for 2014 to 2016.

Empirical Results and Discussions

Descriptive Analysis of the Variables

Low and high skill wage grew at an average of approximately 10% and 11% while average growth of high skill and low skill emigrants grew at approximately 12 and 10 percent respectively (Table 4). This is an indication that both high skill wage and migration grew faster than low skill wage and migration. Employment of low skill labor grew at an average of approximately 3% while that of high skill labor grew at 1.3% on average. The maximum and minimum growth for the corresponding category of labor is 3.28; 1.61, 2.57; 0.74. Remittances, GDP and income differentials grew at an average of 6.4, 24.9 and 10.3 respectively. Inflation averaged 20%, but reached a pick of around 75%. Aggregate emigration grew at an average of 12.4% while aggregate employment and human capital grew correspondingly by 1.3% and 7.3%. There is no evidence of over-dispersion in the series given the low values of standard deviation compared to the mean of each series

Table 4. Descriptive Statistics of the Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	37	24.96	1.12	23.48	26.98
POPULATION	37	3.97	0.01	3.95	3.98
LOW-SKILL WAGE	37	10.42	2.23	7.60	14.49
HIGH-SKILL WAGE	37	11.30	2.10	8.62	14.21
MIGRATION (LOW-SKILL)	37	9.74	0.21	9.51	10.18
MIGRATION (HIGH-SKILL)	37	11.69	0.96	9.94	13.09
MIGRATION (TOTAL)	37	12.38	0.74	10.99	13.55
INCOME DIFFERENCE	37	10.31	0.44	9.37	10.82
REMITTANCES	37	6.36	3.17	0.89	9.95
EMPLOYMENT (TOTAL)	37	3.55	0.37	2.96	3.98
EMPLOYMENT (LOW-SKILL)	37	2.96	0.26	2.57	3.28
EMPLOYMENT (HIGH-SKILL)	37	1.27	0.21	0.74	1.61
HUMAN CAPITAL	37	7.25	3.97	1.83	13.70
INFLATION	37	19.29	17.51	5.38	72.84

Source: Research findings.

Determinants of Emigration in Nigeria

The literature classifies factors driving emigration into the push and pull variables. Push factors include employment, population and human capital endowment. Also, insecurity, low level of economic activity (GDP) and lack of access to social infrastructure are among the push factors. The pull factors include foreign income, access to social infrastructure, effective contract enforcement, and adequate security among others. Although, this study was unable to

capture all the pull and push factors due to dearth of data, the major variables such as income differential, population, and human capital endowment are considered.

To deepen the understanding of this study, determinants of migration was examined at the skill level, that is, high skill and low skill. Starting with total (aggregate), there are four variables that significantly drive total migration in Nigeria of which three are push factors and one control variable (remittances) (Table 5). Increase in aggregate employment reduces total emigration in Nigeria. A 1% increase in total employment was associated with 0.1% decrease in total emigration. This outcome could be traced to the retention strategy stated in the migration policy. However, favourable economic activity proxy by GDP engenders emigration. This result is not surprising because improved economic activity provides additional funds for financing emigration. Lucas (2004) pointed out that increase in GDP will magnify emigration up to a point where it will later reduce it. Further, the empirical findings of Djajic (2016) support this outcome. This point is usually referred to as migration hump. Hence, the reason why emigration responds positively to GDP is that migration hump has not occurred in Nigeria.

Table 5. Determinants of Emigration in Nigeria

	MIGRATION (AGGREGATE)	MIGRATION (HIGH-SKILL)	MIGRATION (LOW-SKILL)
EMPLOYMENT (AGGREGATE)	-0.149*		
	(-1.81)		
GDP	0.110*	0.185****	-0.062
	(1.86)	(5.20)	(-0.70)
POPULATION	0.064***	0.285	0.081**
	(3.20)	(0.14)	(2.37)
INCOME DIFFERENCE	0.061	0.327***	0.002****
	(0.13)	(6.58)	(4.99)
REMITTANCES	0.019****	0.056****	0.024
	(6.17)	(7.90)	(0.96)
HUMAN CAPITAL	-0.009	0.014	-0.016
	(-0.29)	(0.69)	(-0.30)
EMPLOYMENT (HIGH-SKILL)		-0.039***	
		(-4.37)	
EMPLOYMENT (LOW-SKILL)			-0.006***
			(-3.20)
Constant	86.191**	-8.149	-107.010*
	(3.11)	(-1.07)	(-2.38)
OBSERVATION	36	36	36
R-SQUARED	0.87	0.77	0.34
ADJUSTED_R-SQUARED	0.81	0.64	0.29
ENDOGENEITY (χ^2)	3.895	0.531	5.745
P-VALUE OF EDOGENEITY	0.142	0.766	0.565
J-STATISTICS (χ^2)	8.112	14.428	5.149
P-VALUE J-STATISTICS	0.150	0.231	0.397
AR(1)	0.002	0.031	0.004
AR(2)	0.741	0.229	0.491

Source: Research findings.
Note: *t* statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Increase in population influences migration, particularly when the economy has not

reached its migration hump. A 1% increase in population leads to 0.06% increase in total migration. Human capital development, as well as income differentials, shows negative but insignificant effect. Remittances positively influence total migration with 1% reduction in remittances leading to 0.02% reduction in emigration. What this implies is that there is financial binding constraint on potential emigrants and remittances tend to ease the constraint. According to the social network theory, the diaspora who are well informed by the economic situation in their countries of residence tend to provide adequate information and also remit money back home for the purpose of financing emigration of intending relative(s). Our result therefore conforms to this prediction and it is the case that part of money remitted by the people in the diaspora is used to fund emigration. This result supports Lucas (2004) and Beerli and Peri (2015).

Unlike the case of total emigration, emigration of high skill labor was driven by income differential. Further, increase in employment of high skill labor reduces tendency to emigrate. Meanwhile, comparing the rate of response of migration to employment and income differential, migration is sensitive to a change in the former than in the latter. As can be read off, if there is a 1% increase in employment of high skill labor, there will be 0.04% reduction in high skill emigration, but the same percentage increase in income differential will only lead to about 0.03% emigration of high skill workers. What this result suggests is that emigration will reduce when more high skill jobs are created. However, the pull factor prevails, suggesting that apart from more jobs being created, income must also be raised to discourage the emigration of high skill workers. Remittances also serve as a major driver of emigration of the high skill labor, suggesting that part of the money remitted by the diaspora were used to finance emigration of the highly skill labor. It is however surprising to observe that changes in human capital development did not have any effect on the emigration of highly skill workers.

Increase in economic activity will not stem emigration of high skill labor in Nigeria because such improvement will ease access to credit to finance emigration just as hinted by Lucas (2004). This situation is consistent with a version of the literature that argues that economic improvement could raise the income of the workers which in turn provides source of finance for migration. Meanwhile, since income differential influences emigration of high skill positively, it follows that increase in income due to economic improvement has not reached the point of discouraging workers from migrating when the opportunity arises.

Low skill emigration is not driven by economic activity, remittances and human capital. The push factors that drive emigration are employment and population. According to the result, increase in employment of low skill labor will reduce emigration of this set of workers. Hence, if market of low skill workers is booming, that is, more employment opportunities exist; the rate of emigration will reduce. During the labor market down turn (less employment opportunities), the large pool of unemployment will raise incentive to migrate. However, the magnitude of effect suggests that emigration of low skill is not sensitive to employment situation. This could be informed by inability to cover the cost of migration or the reluctance of the authorities in the country of destination to consider them or both.

Meanwhile, income differential also exerts significant pull effect but not as much as that of the push effect. In particular, 1% reduction in employment of low skill necessitates 0.006% increase in emigration while the same percentage increase in income differentials will only increase this type of emigration by 0.002%. Compared to the high-skill migration, it is clear that changes in income differentials influences high skill emigration more than low skill emigration. One reason for this is that a highly skilled worker that officially migrate will find a job that pays relatively higher wage than the one received at home compared to the low skill emigrants whose probability of getting a job that will pay relatively higher income than the one received at home will be low. This is because jobs available for these emigrants are dangerous, demeaning and dirty (Adepoju, 2006).

It is interesting, albeit not surprising, to observe that emigration of low skill was not driven by remittances. The reason is that some OECD countries give relatively high consideration for the high skill workers. Also, remittances under the altruistic consideration only provide additional 'income' to raise the living standard of the low skill, and perhaps to enable them acquire special skill that will enable them enjoy consideration for migration.

The summary of the drivers of migration by labor market category is as follows: total migration is negatively driven by aggregate employment and positively driven by population and remittances. Emigration of high skill workers was inversely influenced by employment of high skill workers, but positively driven by improvement of the economy (both in terms of size as well as income differential) and remittances. In the case of emigration of low skill labor, employment of low skill workers, population and income differentials are candidates. Clearly, different factors are significantly responsible for patterns of emigration in Nigeria, but employment and income differentials are major factors that cut across the patterns. The result therefore supports the standard migration theory in which income differential and employment among others, are important drivers of migration.

Emigration and Employment in Nigeria

There are two major variables of interest in the labor market, namely the labor force (unemployed and employed workers) and wages. Therefore the analysis of emigration and the labor market is investigated based on employment and wages. The theoretical underpinning of this study predicts that increase in the emigration of high skill workers will unambiguously lead to increase in employment. The effect of high skill migration on the employment of low skill workers depends on whether they are complements or not. If complementarity holds and firms declare vacancies then, employment of low skill may remain the same or even increase.

Unlike previous studies where only aggregate employment was studied, the present study extended the empirical evidence by paying attention to how the employment of a particular skill (say high skill) is affected by emigration of either high or low skill. This kind of analysis shows the implication of emigration of a particular skill on the employment of own skill and the other skills. Focusing on the skill level, the effect on employment of emigration of high skill labor is positive and significant (Table 6).

Specifically, increase in the emigration of high skill labor leads to increase in high skill employment. What this suggests is that most Nigerians that left for abroad were initially employed. This statement was corroborated by the work of Adepoju (2006) where it was articulated that the structure of emigration (particularly among the high skill) is such that most Nigerian abandoned their jobs in search of greener pasture. However, since the change is not one-for-one, it means that the numbers of recruitment made was less than the numbers of people that left the job in favour of emigration. Looking at how employment of low skill workers respond to emigration of high skill, it can be conjectured that to some extent, low skill workers benefit from the emigration of high skill workers in terms of employment. This outcome may appear as if high and low skill workers are substitutes but this may not be the case. It could be that high skill workers and physical capital are substitute. It could also be that some high-skill workers pick up low skill jobs in the first instance but later got employed in the high skill sector, thereby creating vacancies which were eventually filled by low skill workers.

Table 6. Results of Labor Market Effect of Emigration (Employment)

	EMPLOYMENT (AGGREGATE)	EMPLOYMENT (HIGH-SKILL)	EMPLOYMENT (LOW-SKILL)
GDP	0.0207*	0.314***	0.111*
	(1.99)	(6.27)	(2.52)
HUMAN CAPITAL	-0.00718	-0.0461*	-0.0193
	(-0.53)	(-2.54)	(-0.98)
MIGRATION (AGGREGATE)	0.0351		
	(0.35)		
LOW-SKILL WAGE	0.314***	-0.0863***	
	(5.97)	(-4.72)	
HIGH-SKILL WAGE	-0.130*		-0.131
	(-2.41)		(-1.36)
INFLATION	-0.00358**	-0.00334**	-0.000667
	(-2.65)	(-2.50)	(-1.27)
MIGRATION (HIGH-SKILL)		0.359**	0.153****
		(3.01)	(10.39)
MIGRATION (LOW-SKILL)		0.005	0.217**
		(1.32)	(3.03)
Constant	1.570	4.872***	1.267
	(1.15)	(4.01)	(0.97)
OBSERVATION	36	36	36
R-SQUARED	0.86	0.72	0.52
ADJUSTED_R-SQUARED	0.79	0.64	0.50
ENDOGENEITY (χ^2)	0.355	0.326	0.493
P-VALUE OF EDOGENEITY	0.433	0.849	0.781
J-STATISTICS (χ^2)	1.944	4.199	10.188
P-VALUE J-STATISTICS	0.746	0.209	0.117
AR(1)	0.022	0.019	0.006
AR(2)	0.551	0.710	0.218

Source: Research findings.
Notes: *t* statistics in parentheses; * $p < 0.01$, ** $p < 0.05$, *** $p < 0.01$.

Employment of low skill also responds positively and significantly to emigration of low skill workers. Following a 1% change in emigration of low skill, employment of this type of skill will change by 0.2%. However, employment of high skill was not affected by emigration of low skill workers. This outcome suggest that high skill emigration influences low skill employment but emigration of low skill workers does not influence employment of high skill workers

Other determinants of employment include economic activity; wages of both high and low skill, and inflation (Table 6). The effect of economic activity on total employment was negative, suggesting that increase in economic activity reduces employment at the aggregate level. This result is surprising but several spells of job losses in the face of increasing economic activity in Nigeria could be one reason for this outcome. In fact when the analysis shifted to skill level, increase in GDP drives down employment of the respective skill. This result could be possible if physical capital and labor are substitutes and cost of capital is relatively cheaper. Another point is that if a good percentage of economic activity takes place in the informal sector where data on employment is difficult to access, employment might

seem to reduce following improved GDP, particularly when it is possible to ensure that part of economic activity going on in the informal sector are captured in GDP. In Nigeria, economic activity in the informal sector are now reasonably captured and easily accessed but the same thing cannot be said in the case of informal sector employment. Given this reason, the result concerning the effect of GDP on employment should be taken as tentative until data on informal employment can be accessed.

Inflation rate is detrimental to virtually all categories of employment. The effect is most noticed in aggregate employment where 1% increase in inflation reduces employment by 0.004%. Consequently, before inflation could be a threat to employment, it will rise above 100%! The slight effect may be traced to the interplay between good prices and factor prices (that make up aggregate price level). Since both (factor and good prices) rise, the purchasing power will not be affected so much as to cause reduction in demand which will eventually reduce employment.

Another determinant of high skill employment is own wage. As the result shows, increase in wages of high skill leads to reduction in employment. The same goes for low skill but the degree of response is greater. A 1% increase in wages of high skill reduces employment by 0.08% while the same percentage increase in wages of low skill reduces employment by 0.1%. From this result, it turns out that low skill labor is exposed to wage shocks more than high skill labor.

The summary of the effect of emigration on employment is that high skill employment is more sensitive to emigration of own skill than low skill employment's response to change in low skill emigration. Emigration of low skill have significant positive effect on employment of low skill labor but have no effect on the employment of high skill labor. Although emigration of high skill and low skill workers has positive and significant effect on employment of the respective skill, the response was more pronounced in the high skill sector.

Emigration and Wages in Nigeria

Reports in Table 7 show how wages of each skill level responds to variables that determine it. High skill wage was significantly affected by employment and emigration of high skill workers, economic activity and inflation. A 1% increase in the emigration of high skill workers raises high skill wage by approximately 0.2%. This result validates our theoretical prediction and it also supports the findings of Pryymachenko (2011). The result suggests that firms eventually declare vacancies following emigration of their high skill workers. The demand later mounts pressure on wages to increase so that both employment (as noted earlier) and wages rise. Of course the wage response is not one-for-one for at least two reasons. First, emigration of high skill workers did not completely take place among the already employed, at least some takes place among the high skill unemployed workers. Second, increase in wages tends to discourage firms to employ as much as they would have wished if wages were to be fixed. Given the fact that market for high-skill is not perfectly competitive[1], the increase in wage will affect both the present workers and the new entrant. When emigration of high skill was replaced with emigration of low skill, high skill wages did not respond to changes in emigration of low skill workers.

1. This is not because there is effective labor union that participates in wage negotiation but because skill labor market is heterogeneous and wages differ based on the nature of the skill.

Table 7. Results of Labor Market Effects of Emigration (Wages)

	HIGH-SKILL WAGE	HIGH-SKILL WAGE	LOW-SKILL WAGE	LOW-SKILL WAGE
EMPLOYMENT (HIHG-SKILL)	0.024**	0.019***		
	(2.39)	(5.56)		
MIGRATION (HIHG-SKILL)	0.170***			0.025***
	(3.46)			(7.24)
GDP	0.441**	0.391***	0.277***	0.292**
	(2.41)	(3.29)	(5.47)	(2.52)
INFLATION	0.021**	0.031***	0.003**	0.004*
	(2.22)	(3.32)	(2.58)	(1.83)
HUMAN CAPITAL	0.050	0.041	0.023	0.026
	(0.54)	(0.32)	(1.06)	(1.60)
MIGRATION (LOW-SKILL)		0.104	0.063***	
		(1.33)	(4.03)	
EMPLOYMENT (LOW-SKILL)			0.011***	0.014**
			(3.97)	(2.08)
Constant	-26.11**	-48.17**	-35.14***	-34.59***
	(-3.22)	(-2.74)	(-6.08)	(-4.95)
OBSERVATION	36	36	36	36
R-SQUARED	0.827	0.866	0.838	0.767
ADJUSTED_R-SQUARED	0.792	0.729	0.820	0.661
ENDOGENEITY (χ^2)	1.732	0.219	2.272	2.279
P-VALUE OF EDOGENEITY	0.188	0.639	0.321	0.320
J-STATISTICS (χ^2)	12.287	9.179	15.401	9.716
P-VALUE J-STATISTICS	0.153	0.102	0.382	0.455
AR(1)	0.060	0.010	0.024	0.003
AR(2)	0.711	0.253	0.441	0.194

Source: Research findings.
Note: *t* statistics in parentheses; * $p < 0.01$, ** $p < 0.05$, *** $p < 0.01$.

The last column in Table 7 shows that emigration of low skill raises low skill wage (just as it raises low skill employment). However, a cursory look at the magnitude of effect reveals that high skill workers benefit more from emigration of high skill workers than low skill workers. Consequently, emigration of high skill contributes to wage gap in the labor market of Nigeria. The reason for this is also articulated in our theoretical framework where it was conjectured that low skill labor market is more saturated than the high skill counterparts and consequently, creates less pressure on low skill wage following demand for low skill workers as a result of emigration. High skill emigration also contribute to increase in low skill wages but the magnitude of effect is mild (0.03). This positive effect supports the theoretical framework but contrasts the findings of Elsner (2011). From the theoretical framework, this result suggests that high and low skill is complements. When emigration takes place in the low-skill sector, wages of low skill workers rose but high skill wage was unaffected. This outcome is not surprising since there is no significant effect of low skill employment on high skill emigration. That said, the effect of low skill emigration on low skill wages is mild, suggesting that the labor market is somewhat saturated.

Aside from emigration effect, employment significantly and positively affects wages of each skill. If employment of high skill increases by 1%, high skill wage will rise by 0.02%.

Meanwhile, the response of wages to employment is slightly faster in high skill sector (0.02) than in low skill sector (0.01). This provides additional support to conjecture that low skill sector is more saturated than high skill labor sector.

Inflation has positive but mild effect on wages. A 1% increase in inflation will lead to 0.02% increase in high skill wage but raises low skill wage by a negligible magnitude (0.003%). So, generally, inflation worsens the purchasing power of wage earners in Nigeria and the low-skill workers are hard hit. Improvement in economic activity also raises wages of both skills with high skill workers having upper hand. Specifically, a 1% increase in GDP growth is associated with 0.44% increase in high skill wage but 0.3% increase in low skill wage. Again, low skill is not really benefitting from GDP growth both in terms of wages and employment.

From the whole analysis, it is clear that skill-level analysis of the labor market effect provides in-depth knowledge of how each skill is being affected. Generally, both high and low skill labor benefit from emigration in terms of employment, but in terms of wages, high skill workers benefit more. Further, emigration of high skill influences wage gap while inflation worsens the condition of low-skill workers more than the high-skill workers. This result supports the work of Hanson (2007).

The statistical properties of all the models (determinants of emigration, employment and wages), are presented at the bottom of each table. The adjusted R-squared ranged between 0.29 (determinants of emigration of low skill) and 0.88 (determinants of low skill wages). The endogenous variables used in the determinants of emigration are wages and employment (of respective determinants). The instrumental variables are the first lag of the dependent, endogenous and purely exogenous variables. The lag length was selected by the lowest values of Akaike information criterion (AIC). In the model for employment, the endogenous variables specified are emigration and wages of respective skill while the first lag of all the variables (dependent, endogenous and purely exogenous) is used based on the AIC selection. In the wages model, emigration and employment of respective skill were used as endogenous variables while first lag of all the variables were also considered as instruments. There is no evidence of endogeneity in any of the models and the instruments used in each model were valid, given the *p*-value of the J-statistics. Further, the Arellano-Bond GMM-type GMM estimated in this model suggests that the first order autocorrelation (AR(1)) exists. This is usually the situation when using GMM estimation (see Roodman, 2004 and Ullah et al., 2017). However, the hypothesis that the residual correlates with the error term in the AR(1) is rejected in each model. This implies that the regressors in each variable do not correlate with future errors.

Conclusions and Policy Recommendations

This paper seeks to provide empirical evidence on the labor market effects of emigration in Nigeria between 1980 and 2016 with special focus on skill level. A neoclassical migration theory was modified to capture the peculiarities of Nigerian labor market. Using the GMM to estimate the coefficients, it was found that high skilled workers gain more from emigration of high skilled labor than the low skilled counterpart in terms of wages (as predicted by Oladi and Beladi, 2007) and employment, just as predicted by the theoretical framework. The result also supports the empirical findings of Hansen (2007) but in contrast with Docquier et al. (2011). Furthermore, emigration of low skill provides additional benefits in the low skill sector due to positive employment and wage effect. This outcome also contrasts the work of Docquier et al. (2011) but supports Oladi and Beladi (2007).

Given these results, it can be concluded that first, high skill labor benefit more in terms of employment and wages if emigration takes place among high skill labor than if it takes place

among the low skill labor. Also, low skill workers benefit more in terms of employment if emigration takes place among low skill labor than if it takes place among the high skill labor. But employment of high skill labor responds more to emigration of high skill labor than the response of employment of low skill labor to emigration of low skill labor; therefore, the net effect is that high skill workers benefit more from emigration than low skill workers in terms of employment.

Second, both high- and low-skill workers experience increase in wages due to emigration of respective skills. However, high skill workers benefit more than low skill workers when emigration takes place among the high skill workers. When emigration takes place among the low skill labor, low skill workers benefits because of increase in wages but high skill workers are unaffected. The fact that the magnitude of effect is stronger in the high skill labor market than in the low skill labor market suggests that emigration of high skill workers contributes to the widening of wage gap in the Nigeria. This finding is in support of the study of Edo (2016). Meanwhile, this wage gap can be reduced if emigration takes place substantially among the low skill. Third, increase in wages is negotiated away by inflation rate due to sluggish responsiveness of wages to inflation. Again, the low skill workers are hard hit with increase in inflation because it weakens their already low purchasing power compared with the high skill workers.

The policy recommendations are provided based on our findings and in the context of Nigeria migration policy. From the migration policy of Nigeria, the authorities wish to actually stem emigration of the high skill workers due perhaps to the macroeconomic implication (brain drain). The policy to achieve this is to create more jobs and to also raise wages of high shill labor. Since employment of both low and high skill reduces emigration of respective skill, job opportunities for Nigerian labor force will reduce emigration. In particular, our result shows that government could reduce emigration of high skill by providing gainful employment. The government has embarked on the M-power employment scheme, a strategy employed to provide jobs for high skill unemployed labor is in good direction[1]. However, more is needed to be done in order to discourage these graduates from utilizing any opportunity arising from migration. Further, the minimum wage of thirty thousand naira (N30,000) has just been signed into law. This represents 67% increase in the minimum wage of the country. Consequently, the high skilled workers will also benefit from this policy. But to lower inequality arising from emigration, it is recommended that the consequential salary adjustment should be done in such a way as to impress the high skill workers. Alternatively, the government should provide other allowances that will impress the high skill workers for them to stay back. Worrisomely, improvement in the economy facilitates emigration of high skill. This indicates that the country has not experienced migration hump. To solve this problem, it is recommended that the enlargement of economic size should continue, but such enlargement must be (gainful) employment-driven (employment of labor not physical capital) with the expectation that in the long run, the country will experience inflow of high skilled workers instead of outflow.

When the economic activity is employment driven, it will be possible to direct remittances to investment that will generate more employment and hence reduce emigration of high skill rather than sponsoring emigration. From another angle, even if emigration of high skill labor cannot be stemmed directly since there is no section in the migration policy of Nigeria that places ban on emigration; remittances sent by the diaspora can be indirectly channelled to productive use. Our result shows that remittances are used to finance further emigration. The recommendation provided in this regard is that government should provide impressive incentives for remitters, so as to motivate them to invest the remittance which will be

1. The M-power is an employment initiative scheme of the present administration. The scheme is a short-term approach for reducing unemployment of high skill labor.

supervised by whoever would have been the next emigrant. Such incentives, though not captured in the study, include special interest rate arrangement, provision of land for the purpose of investment, property rights, effective contract enforcement, and low or zero bureaucratic bottlenecks.

Emigration of high skilled widens wage gap. Emigration of low skill increases wages of low skill labor while the high skill labor is unaffected. It is recommended that emigration of low skill labor should be encouraged while strengthening the protection of Nigerians in diaspora. Doing this will raise wages of low skill workers, thereby reducing the gap. Unfortunately, authorities in the countries of destination require the services of high skill labor while source countries' authorities indirectly restrict the movement of high skill. In this case, the recommendation is that the government should intensify efforts on how to generate more employment for the low skill workers.

Fourth, our results show that increase in wages less than compensate for increase in inflation rate with the resultant effect of worsening purchasing power. Although, our result did not show the source of inflation, most evidences point to fiscal stance as the source of inflation rate while the monetary authorities accommodate it. Since the activity of the monetary authorities are not captured in our result, the fact that Nigeria monetary authorities are saddled with the responsibility of ensuring stable price level, it is recommended that the monetary authorities should ensure that inflation does not rise faster than wages to the extent that it makes wages worthless. Alternatively, inflation can be made pure through prompt and well-articulated inflation-adjusted wages which can be designed by the government alongside the labor union. In the present Nigeria, negotiation for wage increase always trail persistent inflation in which case, the money income would have lost a substantial proportion of its value before negotiation and implementation takes place.

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