MIGRATION, HUMAN CAPITAL FORMATION AND ECONOMIC GROWTH IN NIGERIA

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ABSTRACT

Labour moves across countries in a bid to earn better returns. This has motivated labour into accumulating human capital in order to enhance employment potentials. Human capital makes production more efficient, thereby increases economic growth. While there are studies on the effect of migration on human capital formation (HCF) in Sub-saharan Africa, there is dearth of empirical enquiry on Nigeria. This was designed to examine the effect of migration on Nigeria's human capital formation and economic growth.

Two log-linear time series models, one predicated on the new economics of labour migration (NELM) framework and the other, an exogenous growth model, were estimated. The specified NELM equation considered migration probabilities as an incentive to build additional skills. The model established the effect of migration (measured by net migration rate and labour migration stock), cost of acquiring additional skills and other control variables (population and access to education) on human capital formation. The exogenous growth model captured the effects of migration, human capital formation, public spending on education, remittances and access to education on economic growth. The stationarity conditions of the variables were ascertained using the Augmented Dickey Fuller test. The Ordinary Least Squares (OLS) technique was applied to a distributed lag specification covering the period 1980 to 2011. Long run relationship among the variables was established employing the Johansen cointegration technique. Data for the estimates were collected from the World Bank (World Development Indicators) and Immigration Statistics Yearbooks. Six member countries of the Organisation for Economic Cooperation and Development (OECD) namely, Canada, United Kingdom, United States, Denmark, Italy and Sweden, to which Nigerians have migrated, were considered on account of data availability.

Net migration rates impacted positively on human capital formation (0.48), indicating that about 50 per cent probability of migrating provided an incentive to build skills. Labour migration stock had a positive incentive effect on HCF (0.38), significant at the 10.0% level. All the other variables were significant at the 5.0% level. There was a positive relationship between HCF and cost of acquiring additional skills (0.24), implying that additional expenses on skill formation yielded positive returns. Human capital increased in the same direction as population. However, access to education had no significant impact on HCF. Further, the exogenous model revealed that economic growth responded negatively to migration rates (-0.13) and HCF (-0.10). While the NELM model showed that skills responded positively to migration opportunities, in the exogenous model, a larger proportion of those who had accumulated human capital migrated, depleting economic growth. Economic growth responded positively to labour migration stock with an elasticity of 0.11, suggesting a net gain in output resulting from migration. It indicated that the growth estimates were sensitive to the measurement of migration by rates and/or stock.

Migration had incentive effects on human capital formation between 1980-2011. Labour migration stock had a positive impact on output. Nigeria should strive to retain potential migrants who have acquired higher skills in fostering economic growth.

Keywords: Nigerian migrants, Human capital formation, Migration stock, Employment potentials

Word count: 486

CERTIFICATION

I hereby certify that this work was carried out by Omolola Smaria Olarinde (79218) in partial fulfillment of the award of M.Phil. Degree in the Department of Economics, Faculty of the Social Sciences, University of Ibadan, Ibadan, Nigeria, under my supervision.

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List of Abbreviations

ANPA	Association of Nigerian Physicians living in the Americas
CIA	Central Intelligence Agency
CBN	Central Bank of Nigeria
DW	Durbin Watson
EU	European Union
FEC	Federal Executive Council
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GNI	Gross National Income
HCF	Human Capital Formation
IMDI	International Migration and Development Initiative
IMHSC	International Migration of High Skilled Workers
IOM	International Office for Migration
NBS	National Bureau of Statistics
NELM	New Economics of Labour Migration
NIS	Nigerian Immigration Services
NIDO	Nigerians in Diaspora Organisation
NMC	Nursing and Midwifery Council
NNVS	Nigerian National Volunteer Service
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
OLG	Overlapping Generations
SAP	Structural Adjustments Programme
SSA	Sub-saharan Africa
UN	United Nations
WB	World Bank
WDI	World Development Indicators

CHAPTER ONE

INTRODUCTION

1.1 PREAMBLE

According to Martin (2003), the United Nations defines international migration as "the movement from one of the world's 200^{+} nation states to another regardless of the purpose of being outside the country of birth or citizenship or legal status in the new country". This movement could be short-term, for three months up to a year, or long-term up to 12 months or more. Where mobility continually involves highly skilled individuals from one country to the other, conventionally, this is considered a drain on the sending economy.

The brain drain question was raised with the migration of British scientists to the United States and Canada in the early 1960s, which later became a concern for developing economies that started losing high skill workers. In Nigeria, the loss of human capital in the health sector included more than 21,000 Nigerian doctors who left for the United States, while about 21,990 health workers emigrated from Nigeria between the years 2000 and 2006 (Afolayan, 2009), which has increased to 27,587 by 2012 (Nursing and Midwifery Council, 2012). International Migration of Skilled Human Capital (IMSHC) embodies the emerging conditions covering the brain drain, brain circulation, brain gain, brain waste, brain globalisation concepts (Lowell and Findlay, 2001), internationally and within trade regions with close skill requirements. While, the previous discourse has focused on the loss of human capital from Nigeria, a more recent paradigm associated with Stark (2005) suggests that losses may be only in the short term. This happens as long as the likelihood of mobility motivates the accumulation of human capital so that the skills left behind in the country of origin are improved given the probability of migrating.

For instance, Nigerian medical doctors compete to migrate by taking medical council examinations required by the expected destination of their choice. In this way, Stark (ibid.)

suggests that they bid up the average skill levels in the country[1]. This connotes indirect benefits accrue to Nigeria if the net effect of migration on human capital is positive and there are more skills left in the country with migration than without it. In addition, direct benefits accrue where commitments to the country of origin are sustained in terms of remittances, networks, as well as in cases of return migration.

Adepoju and van der Wiel (2010) estimate that about half or more of Nigerians working in the Organisation for Economic Co-operation and Development (OECD) countries are highly skilled. The boom in the oil sector in Nigeria directed labour towards urban areas and away from agrarian livelihoods. The pull factors set in a chain migration mechanism, moving agents from rural to urban and urban to regional (Adepoju and van der Wiel, 2010). Other pull factors include employment and income levels, social security, migration legislation, labour conditions of the destination country and geographical and cultural proximity to the country of origin (Ghoddusi and Siyahhan, 2010; Nwajiuba, 2005). Push factors that historically have affected human capital in Nigeria include poverty, security, corruption, access to health and education, unemployment and relative deprivation of households who have non-migrant members compared to those who get remittances. The starting point of accounting for the effect of migration on human capital is a comparison of push (supply) and pulls (demand) factors and how they affect individual choice to accumulate skills.

The concern about stopping the exodus of skilled workers from developing countries (World Bank, 2005) informed major policy documents in Nigeria. This policy thrust is premised on the paradigm that migration is detrimental to national development. The National Economic Empowerment Development Strategy (NEEDS) underscores this viewpoint by noting that internal migration disrupts social cohesion in the villages and causes increased urban unemployment.

More recently, Nigeria progressed to a policy framework that encourages liberalization. Notably, the discourse on migration in Nigeria focuses primarily on human trafficking , capital flight and

[1] The Medical and Dental Council of Nigeria in 2011 made continuous professional development credits mandatory for Nigerian medical practitioners to qualify for renewal of their licenses.

voluntary relocation still based on a premise that migration is correlated with underdevelopment. Meanwhile, other developing nations such as the Phillipines (de Haas, 2006), Cape Verde (Batista, Lacuesta and Vicente, forthcoming) and Jordan (Zaqqa, 2006) continue to investigate the migration-development premise in the light of human capital accumulation, globalisation and related emerging conditions.

In the receiving country perspective, there are several reasons why economies encourage skilled immigration given its influence on the labour market and budgetary positions. These include the accumulation of improved skills that countries such as the United States and Australia have benefited from. Some countries such as Canada contend with the ageing problem since 1967 and more recently, Germany and New Zealand. Also, much of Europe and the United States expect to face the same problem with the baby boom[2] generation reaching retirement age. There is therefore a need for labour intensive health care for the ageing. Countries such as Denmark and Canada target masonry, artisans or other semi-skilled workers lacking in their country, a high-skill segregation phenomenon. While others still (France, Belgium and Germany) have received foreign labour as a remedy for labour market shortages (Ghoddusi and Siyahhan, 2010) using point systems as early as 1967 by Canada and later in Germany to target skills.

Sending countries may also benefit from labour liberalization as seen in experiments with targeted training of individuals to work abroad who then remit money to the country of origin. This is the case for the Philippines (de Haas, 2006) and Spain. Labour also moves from productive to less-productive sectors and this may foster brain exchange as seen between India and the OECD countries. Zaqqa (2006) also suggests that policy should support investment in higher education to meet global labour needs. Stark and Wang (2002) also argued migration may be a corrective measure for market inefficiencies for instance, an alternative to subsidies on education. Turkey, Mexico, India, the Philippines, South Korea, Bangladesh and other countries have deliberately created incentives for migrants with the aim of achieving economic development (Nwajiuba, 2005). Cape Verde, the country with arguably the highest exodus of skilled workers in the world, is a case where the general skill level retained in the country

[2] The baby boom according to the Oxford dictionary of English (electronic version) is a temporary marked increase in the birth rate, especially the one following the Second World War.

improved given the incentive to migrate (Batista *et al,* forthcoming). Observably, the international migration-human capital formation nexus in Nigeria, seems to have been sparsely investigated, perhaps primarily because of poor database (also see, de Haas, 2006).

1.2 STATEMENT OF THE PROBLEM

In an ideal situation, liberalising borders for the movements of goods and services and/or alternatively for factors of production could lead to better conditions for the country of origin. For example, labour would move to where it is most productive and may remit part of its wages home. However, Nigeria has literacy levels of barely 68 per cent, and less than one physician to every 1, 000 persons while over 20, 000 Nigerian doctors work in the United States alone (CIA World Fact Book, 2012). This suggests that Nigeria does not retain the required skills to address national needs. Although the Nigerian economy has grown steadily, conceivably, improvement in the stock of competence and knowledge would further positively impact on output.

The deficiency in human capital may partly be explained by wages, which are not commensurate with the level of skills and market demand, acting as a disincentive to additional skill formation. For instance, the need for health care personnel is high, at the same time, they work long hours for little compensation relative to some other sectors such as the financial sector. The proportion of skilled workers outside the country whose direct contribution to the economy is lost has been a major concern to Nigeria's productivity. Particularly in the 1980's Nigeria lost over 10, 000 academia from tertiary educational institutions alone and a total of 30,000 from the private and public sectors (Ara Corporation, 2012).

Migration could affect human capital in two contrasting ways. First, international demand for labour is skill based, connoting those who have above average educational attainment are more likely to migrate. Indeed, the percentage of African immigrants living in the OECD region was over half of its total tertiary educated stock (Beine, Docquier and Rapoport, 2006). The implication is a skill drain on the country of origin. The second effect is that workers respond to market needs and skilled workers could also be more productive abroad than at home. In this case, competing to join a larger market may raise the average skill level in the country of origin

resulting in a net gain. This premise appears not to have received adequate attention in Nigeria, perhaps due to sparse data on migration. The data has recently improved marginally and methods of working with the available figures have emerged. Given the increasing workforce in Nigeria ascertaining the relationship between migration and human capital formation would clarify its usefulness as an incentive towards individuals building additional skills.

Prior to the 1960s, there were about 80 countries in the world and the break-up (for example of the Union of Soviet Socialist Republics) and independence of several countries over time Nigeria inclusive increased the nations in the world by over threefold. These new borders contributed to a perceived increase in volume of migration when in fact some of the movements can be accounted for by the creation of new countries (de Haas and Vargas-Silva, 2011). This means that borders and particularly the commonwealth restriction that did not exist prior to 1960 now do and migration modalities, structure and features changed when compared to the period before 1960. Hence, new theories that emphasize the probability of migration in their investigation of its impact on economic growth emerged, which have hardly been investigated in the case of Nigeria. What is the relevance of this relationship for the Nigerian economy? If migration has a positive effect on human capital formation is the net effect positive after accounting for those who have left the country and what is the impact in economic growth?

1.3 OBJECTIVES OF THE STUDY

The primary objective is to establish the effect of migration on the level of human capital formation and how this affects economic growth in Nigeria.

The specific objectives are to:

i. ascertain the effect of migration on human capital formation in Nigeria.
ii. determine the effects of migration and human capital formation on economic growth in Nigeria.

1.4 JUSTIFICATION FOR THE STUDY

The emigration rate in Nigeria peaked in the late 1970s and early 1980s, declined in 1989, rose marginally since then, and is still on the rise (Afolayan, 2009). Prior to the 1980s, local working conditions in Nigeria were comparable to those obtainable abroad and emigration was unattractive, however following the financial crises attributed to the fall in oil prices, in 1981, emigration rates rose (Adepoju and van der Wiel, 2010).

The number of emigrants more than doubled from 10, 000 in the year 2000 to about 22, 000 in 2006. This figure is projected to increase to about 30, 000 by 2015 (Afolayan, 2009). This development coincides with less cumbersome conditions for recruiting skilled foreign labour within the Organisation for Economic Co-operation for Development (OECD) countries in order to meet market shortages particularly in the health and new technologies sectors (OECD, 2011). The 2007 global financial crisis was accompanied with a fall in migration rates, including from Nigeria, attributed to changes in the demand for labour (OECD, 2012).

During these distinct phases of the economy, different sets of theories prevailed, so that for early post colonisalisation, dependency theories emphasised the development failure premise for migration, while in the 1990s trade liberalisation theories pointed to a less dramatic effect. New theories have since the late 1990s emerged in the attempt of explaining mobility in economies faced with globalization. This study attempts to investigate the position of Nigeria premised on recent developments in methodology and data within the global trade framework.

People migrating to Nigeria have increased in the last decade, although with a negative net migration (per 1000 people) rate of -0.1 in 2011, implying more emigrants than those coming into the country. Observably, this figure is twice the value for the year 2000 (IOM, 2011). The fluctuations in global migration, is a result of demographic changes and the suspension of its commonwealth privileges in 1995 and other policies. Also, the push and pull factors have affected the pattern of migration. Some studies have captured trends in migration in Nigeria (Adepoju and van der Wiel, 2010; Afolayan, 2009, Fadayomi, 1996) while others used panel data to discuss migration as a determinant of human capital formation (de Haas, 2006; Beine,

Docquier and Rapoport, 2006). Notably, there appear to be no country-specific studies for Nigeria that investigated migration with human capital formation. This study will attempt to provide a more detailed look at migration and human capital formation in Nigeria.

Arising from the foregoing, a critical analysis of migration and human capital formation in Nigeria becomes imminent since the Nigerian population is projected to double by 2050. The increase in population is expected to result when the youth, who are currently the bulk of the citizens, attain the childbearing age. The concern arises on how these youth, who would form the labour force in Nigeria, accumulate skills and contribute to the economy. If migration serves as a nudge to build human capital in Nigeria this could situate the economy among those with a knowledge base useful for national and global productivity. The role of migration as an incentive for skill accumulation in Nigeria examined using pertinent data and methodology on what motivates human capital formation as a means of economic growth is relevant to policy makers for effective migration management[3]. Specifically, this study focuses on understanding how migration can be harnessed as an incentive to human capital formation. Further, attempts will be made to extend the discourse to cover targeted public spending on human capital development. The migration policy in Nigeria remains focused on the premise that migration is correlated with underdevelopment, establishing the extent to which this remains valid would provide important information for policy makers.

1.5 SCOPE OF THE STUDY

This study covers emigration, its effect on human capital formation and the nexus with economic growth in Nigeria from 1980 to 2011. This includes a characterisation of international migration in Nigeria using migration trends, its magnitude as well as the net effects of key push and pull factors of migration. It considers differentials in standard of living between nations in investigating the decision to emigrate. Finally, it uses demographic data on emigration and immigration, schooling and national income to measure the effect of higher emigration probabilities on education and national income.

[3] The African Union considered a draft Strategic Framework for Policy on Migration in Africa centered on improving migration data for Africa and regional exchange of information, experience and perspectives among governments, see Adebusoye, 2006.

1.6 OPERATIONAL DEFINITION OF TERMS

1. The study adopts the OECD definition of migration as the documented number of persons who have left their country of usual residence for up to a year. The study uses data from the World Bank on international migrant stock as a percentage of population available every five years to generate annual time series. Further labour migration is defined as the documented number of Nigerians leaving to six OECD (Canada, Denmark, Italy, Sweeden, United Kingdom and United States) countries for the purpose of work.
2. 'Human capital formation' refers to the stock of competencies, knowledge and abilities through tertiary education. The definition as applied in this study does not cover health, social interactions, personality or other attributes that contribute to the ability to perform labour.
3. Economic growth refers to annual changes in Gross Domestic Product. Economic development is in a few instances used interchangeably with economic growth in this document. The term economic development is used when we consider growth in the context of improvement in human capital, livelihoods or welfare.

CHAPTER TWO

BACKGROUND TO THE STUDY

Nigerian long-term documented[4] emigrants are present in the United States of America, the United Kingdom, Italy, Canada, Spain,[5] and the world over for study, work or trade. In the 1940s migration featured as small-scale movements particularly of seamen and students, and from 1960, when Nigeria came out of the British rule, citizens moved to the United Kingdom mostly for study. While this continued through the early 1980s, primarily, the economic crisis resulting from the fall in oil prices in 1981 constituted a push factor for migration of highly skilled workers. The reverse has been the case since the 2007 global financial crises that compelled many Nigerians to return to origin. Nonetheless, net migration rates for Nigeria remain negative, that is, emigrations are higher than immigrations (IOM, 2011).

2.1. TRANS-BORDER MIGRATION IN AFRICA

Migration of labour in Sub-saharan Africa, such as pastoral movements between Nigeria and the Cameroons predated colonialism (Adebusoye, 2006). Later, long distance movements between colonial blocs were facilitated so that labour was available for their enterprises (op. cit.). The independence status of many African countries meant they needed skilled manpower to cover the high skilled positions previously held by colonial administrators. After 1960 many African countries engaged in training at home and abroad, to build these skills (Adebusoye, 2006; Fadayomi, 1996). The brain drain of the 1960s affected Africa through many students who decided to remain abroad after completing their studies. Some others returned to the country of destination after only a brief stay at origin (op. cit.).

Foreign-trained Nigerian students who had completed training were often convinced that they would get neither personal nor professional satisfaction from returning to their country of origin,

[4] Irregular or undocumented migration refers to movements within countries without proper documentation, often [erroneously] referred to as illegal migration. Notably, most irregular immigrants are not criminals. For further discussions see the OECD Undocumented Migration Glossary (2008), EU Sixth Framework Programme, Roskilde University and Working Lives Research Institute. Undocumented migration is beyond the scope of this study.

[5] The countries are ordered according to value of remittances received from each in 2012.

reasoning that there were limited opportunities in their field of study. A case study by Okediji and Okediji (1972) cited in Fadayomi (1996) highlighted rigidity of government employment systems, power of entrenched civil servants, lack of research funds, professional isolation, prejudice based on tribal affiliation, discrimination against foreign diplomas and certificates as challenges that foreign trained citizens faced. Further, foreign-trained citizens faced unfavourable competition with nationals of foreign countries where skills and training were acquired for jobs in transnational corporations established in countries of origin.

Following the decline in prices of primary goods in the 1970s and the economic boom experienced by oil producing countries such as Nigeria, considerable intra-African migration to destination countries particularly Libya, Zimbabwe and South Africa became observable (Aina, 1996). By the mid 1980s and 1990s economies including Nigeria and Zimbabwe that were previously attractive to emigrants witnessed inflation, unrestrained and inefficient government spending, worsening Terms of Trade. This coupled with a weak industrial base, fall in agricultural production, trade deficits and huge debts were a strain on economic conditions in Africa resulting in a brain drain. South Africa remained the most attractive destination economy in Africa and perceived interest rose with the attainment of political independence (op. cit.).

2.2. MIGRATION IN NIGERIA

Receiving countries have become more restrictive, for example through the withdrawal of commonwealth privileges to travel without visa to the United Kingdom in 1995 and strict immigration rules in response to global insecurity. One consequence is that more skilled and fewer unskilled workers are granted entry into developed nations. As noted by de Haas (2006) over 300,000 first generation Nigerians live abroad.

Nigeria is also one of the top five destinations for West and North Africa (World Bank, 2012). Immigrants make up about 0.7 per cent of the population of the country and they come from Chad, Niger and Mali, at rates that have more than doubled in the last decade. The documented immigrants contribute not only to trade but to skilled professions as well, since non-Nigerians form about eight per cent (cc 3,000) of the doctors operating in the country. There are displaced

persons amongst the immigrants although the percentage of refugees constituted only 0.9 per cent of total immigrants in 2007 (Afolayan, 2009).

The number of nurses in the United Kingdom (UK) from Sub Saharan Africa rose from 915 in 1988/89 to 3789 in 2001/2002 declined to 2546 in 2004/2005; while the number of female caretakers recruited by private agencies to work in care homes abroad for the elderly is undocumented (Adepoju and van der Wiel, 2010). For Nigeria the decline in the number of nurses in the UK is persistent while an overall decline sets in by 2006/2007 (Nursing and Midwifery Council (NMC), 2012) and has since continued.

Table 2.1 shows the nurses leaving Nigeria between 2004 and 2012 by countries of destination as documented by the NMC, a parastatal of the Ministry of Health, which regulates all cadres of nurses and midwifes. The highest importers of labour in the health sector from Nigeria are the United States (US), UK and Canada. There has been a total decline of 91 per cent in the number of nurses leaving Nigeria when comparing the first available period 2004, which indicates 5159 nurses left Nigeria to work abroad, against the 2012 value of 457. The US, which dominates the list of destination countries for nurses from Nigeria, has the highest reduction (92%) in the number of nurses from Nigeria. Notably, all listed destination countries have recorded a decline in the number of nurses from Nigeria since 2004 till 2012. This is in the face of nurse shortages in OECD countries (OECD, 2008; Simons, Villeneuve and Hurst, 2005). The exception is Australia, prior to 2012 there were no nurses from Nigeria while 12 persons went to that destination in the same year. Also, Bahrain received three nurses in 2012 while Denmark has received seven nurses only once from Nigeria in 2011.

The overall decline in number of nurses leaving Nigeria generally coincides with the 2007 global financial crises. The global financial crisis has reduced the demand for labour given economic difficulties that destination countries face (IOM, 2011). Further, there are competing markets for labour supply particularly the Philippines, have encouraged labour migration to mitigate internal labour market constraints (Lorenzo, Galvez-Tan, Icamina, and Javier, 2007).

	Table 2.1 Nurses Leaving Nigeria by Countries of Destination 2004 -2012												
	Countries of Destination												
Year	**United Kingdom**	**United States**	**Canada**	**New Zealand**	**Ghana**	**South Africa**	**Bahamas**	**United Arab Emirates**	**Malta**	**Central America**	**Spain**	**Others[6]**	**Total**
2004	1564	1024	2153	53	40	81	57	27	19	127	14	0	**5159**
2005	1047	1432	2800	50	31	71	44	38	24	136	11	0	**5684**
2006	968	2517	1881	42	50	92	51	33	14	102	7	0	**5757**
2007	94	1211	1518	47	55	102	48	42	26	154	27	0	**3324**
2008	96	1146	1194	18	25	26	45	12	12	70	9	0	**2653**
2009	24	692	843	5	32	73	27	9	1	90	0	0	**1796**
2010	51	646	661	26	9	62	39	33	2	72	9	0	**1610**
2011	28	581	378	3	48	38	12	21	2	29	0	7	**1147**
2012*	15	203	167	0	6	26	13	9	0	0	3	15	**457**

Source: Nursing and Midwifery Council, 2012, unpublished document on nurses leaving Nigeria, Abuja headquarters

*2012 values are for first and second quarter (January – June, 2012)

[6] The column for 'others' denotes 7 for Denmark in 2011, 3 for Bahrain in 2012 and 12 for Sydney in 2012.

Table 2.2: Global Emigrants Per Population Size by Country of Origin in Descending Order; Selected Countries from a total of 200+ nations, 2011						
S/N	**Country**	**Income Group**	**GDP per capita (USD PPP)**	**Number of Emigrants (stock)**	**Population Size (stock)**	**Emigrants per Population Size (%)**
1	Cape Verde	M	4 000	199 644	495 999	40.25
2	Niger	L	800	496 773	15 511 953	32.86
3	North Korea	L	1 800	1 491 784	48 875 000	30.53
4	Serbia	M	10 700	1 681 493	7 292 574	23.06
5	El Salvador	M	7 600	998 934	6 192 993	16.13
6	Mali	L	1 300	1 578 695	15 369 809	10.27
7	Mexico	M	15 100	10 140 846	113 423 047	8.94
8	Russia	M	16 700	12 098 614	141 750 000	8.54
9	Guinea Bissau	L	1 100	128 228	1 515 224	8.46
10	Burkina Faso	L	1 500	1 348 656	16 468 714	8.19
11	United Arab Emirates	H	48 500	603 338	7 511 690	8.03
12	United Kingdom	H	35 900	4 201 866	62 218 761	6.75
13	Republic of Benin	L	1 500	576 332	8 849 892	6.51
14	Guinea	L	1 100	583 647	9 981 590	5.85
15	Singapore	H	59 900	278 597	5 076 700	5.49
16	Italy	H	30 100	3 293 565	60 483 521	5.45
17	Germany	H	37 900	4 078 251	81 702 329	4.99
18	Romania	M	12 300	1 057 974	21 442 012	4.93
19	Bangladesh	L	1 700	6 832 522	148 692 131	4.60
20	Belgium	H	37 600	470 836	10 879 159	4.33
21	Turkey	M	14 600	3 018 442	72 752 325	4.15
22	Senegal	M	1 900	479 515	12 433 728	3.86
23	Canada	H	40 300	1 303 791	34 108 752	3.82
24	Philippines	M	4 100	3 399 794	93 260 798	3.65
25	Togo	L	900	214 302	6 027 798	3.56
26	Iraq	M	3 900	1 110 277	32 030 823	3.47
27	Gambia	L	2 100	51 703	1 728 394	2.99
28	Vietnam	M	3 300	2 007 466	86 936 464	2.31
29	Rwanda	L	1 300	240 090	10 624 005	2.26
30	Liberia	L	400	85 758	3 994 122	2.15
31	Sierra Leone	L	800	94 420	5 867 536	1.61
32	South Africa	M	11 000	784 783	49 991 300	1.57
33	Sudan	M	3 000	642 707	43 551 941	1.48
34	Kenya	L	1 700	456 445	40 512 682	1.13
35	Cote D'Ivoire	M	1 600	176 692	19 737 800	0.90
36	India	M	3 700	9 059 424	1 170 938 000	0.77
37	Indonesia	M	4 700	1 832 945	239 870 937	0.76
38	United States of America	H	48 100	2 247 110	309 050 816	0.73
39	Japan	H	34 300	884 189	127 450 459	0.69
40	Nigeria	M	**2 600**	**1 041 284**	**158 423 182**	**0.66**
41	Brazil	M	11 600	955 707	194 946 647	0.49
42	China	M	8 400	5 820 295	1 338 299 512	0.43
43	Ghana	L	3, 100	957 883	24 391 823	0.39
Sources: OECD Global Migrant Origin Database Version 4 and CIA World Factbook. Legend: L – low income, M- Middle income, H- high income						

Table 2.2 is a selection of countries and their number of emigrants in the year 2011. The table indicates the number of those migrating for 43 nations extracted from a list of over 200 countries. The table consists of countries with the highest and lowest emigration rates from all the continents. The income group column follows the World Bank classification. The migrants per population section, is calculated as emigrants' fraction of the population size.

The table reveals that some highly populated countries such as Mexico and Russia have relatively high migration rates. Some less populated nations such as Cape Verde, Niger, Guinea Bissau and United Arab Emirates also show high migration rates. With a migrant size of above one million, Nigeria is close to Ghana, the median in the group, with a value of 957,883. However, when we factored in population size, Nigeria and Ghana fell to the bottom of the list with migration rates of less than one per cent of their population. Countries with high migration absolute values such as India, Japan and the United States also recorded less than one per cent migration ratios when adjusted for population size. Docquier and Rapoport (2007) also found a decreasing relationship between skilled emigration rates and population of the source country.

Nigeria is among the nine countries expected to account for half of the world's population growth between 2005 and 2050. The country could benefit from an increase in the working age population, since about 36 per cent of its population is under the age of 15 years (World Bank, 2006). Productivity hinges on the capabilities of its working population, that is, her human capital.

The list of global migrants made up of 15 low-income, 19 middle-income and 9 high-income countries is dominated by the middle-income economies. Similarly, Docquier and Rapoport (2007, p. 9) found that migrants are chiefly from middle-income economies. The latter countries historically have the highest labour migration rates relative to low income ones since they have the means to emigrate (Beine *et al*, 2006). Although low-income nations may face compelling conditions including famine, wars and other causes of national instability which tend to push

them to migrate. Of the nations with the highest migration ratio, there is equal proportion of three middle-income and three low-income economies.

Whereas higher standards of living may contribute to the reduced migration rates from high-income countries, it is not the only factor accounting for migration per population size. A headcount reveals that 18 out of the first 30 countries, arranged by migration rates have GDP per capita higher than Nigeria's 2,600 USD value.

2.3 Economic Variables Affecting Migration in Nigeria

In Table 2.3 the labour force had high values in 1980 relative to 1975 and 1990 while emigrant populations where higher in the same year [1980], this is equally true of 2011. While in 2005 the labour force was higher while emigration shrunk. High emigration rates also coincided with high unemployment rates suggesting that the labour market might vent its imperfections outside the economy. Relative to other periods, the 1980s show the first significant rise in migrant population by about five times the 1975 values. This coincides with the 1981 fall in global oil prices characterized by low real wages in the public sector in Nigeria.

In the early 1980s, the Nigerian government adopted austerity measures and subsequently in the mid-1980s the Structural Adjustment Programme (SAP) was put in place as a condition for a loan from the International Monetary Fund (IMF). The programme included devaluing the national currency and meant that real wages of professionals became relatively lower and working conditions worsened until 2000. The decrease in wages following the SAP was accompanied by a fall in emigration contrary to the expectations, suggesting that migration rates responded to other factors besides wage differentials. Otherwise, there could have been a lag in the markets response to this economic change within the period. The poorer global economic conditions consequent of the 2007 financial crises led to a decrease in migration to OECD countries suggesting that differences in living standards affect migration rates.

Table 2.3 Nigeria's Emigrant Population and Labour Market 1970 to 2011					
	Emigrant Population	**Trade in Services**	**Unemployment Rates**	**Labour Force**	**Real Take Home Wages and Salaries in the Public Sector GL.01**
Year	Number ('000)	Percentage of GDP	%of total labour force	Number ('000)	Naira per month
1975	122.7	11.4	-	53973.0	1064.1
1980	532.7	10.0	3.9	57718.5	576.1
1990	447.4	10.3	2.8	31422.3	369.7
2000	1414.3	11.2	13.1	39248.9	728.9
2005	972.1	7.5	11.9	44900.5	6476.2
2011	1,041.2	12.9	23.9	52160.0	*5119.5
Sources: UNDP Human Development Report 2009, National Bureau of Statistics, International Monetary Fund, Balance of Payments Statistics Yearbook and data files and World Bank, World Development Indicators and EconStats, CIA World Fact Book. * Latest value available is 2009					

Wages in the public sector, including the threshold recently suggested by the government at N18 000, remain extremely low, a characteristic of the complex development profile of Nigeria. Nigeria's total labour force rose to almost 65 million in 2009. This is concomitant with the incapacity to fill the demand for high skilled workers while approximately 41.6 per cent of youths and an increased number of school graduates are without a job (CBN, 2010). The International Monetary Fund (IMF) estimated the 2011 unemployment rate at 20.3 per cent. This does not deter increasing urban migration, which reflects the poor living conditions in the rural areas and agricultural problems such as deteriorating land, low access to fertilizers and other modern technologies. Agriculture employs most people in the country and some of this is disguised unemployment while productivity growth in the sector is very low.

The demand for labour in the OECD countries has been in the health care sector and information technology (OECD, 2012) whereas, number of Nigerian university graduates declined between 1990 and 2000 for all specializations except for engineering technology. Graduates in health care professions have declined steadily between 1990 and 2005 and did not rise back to the 1990 values. The specialisation with highest number of graduates remains administrative and other social sciences (NBS, 2010). Observably, this raises questions on the effectiveness of the market in allocating skill and further, the responsiveness of wages to demand and supply conditions. It appears that the supply of labour is responsive in the technology sector. Whereas, supply of health care from Nigeria has decreased, arguably this service is poorly compensated within the country and has seen a decline in demand from the OECD.

This portion of the labour market, which seems trapped with inefficient local market conditions for their skills also features in secondary school certificate holders. Emigration likelihood is five to ten times higher for workers with over 12 years of education (Beine *et al*, 2006). In Nigeria, tertiary educated workers make up over 50 per cent of emigrants and over 10,000 more primary school certificate holders emigrated in 1990 compared to secondary school counterparts; by 2000 secondary school emigrants exceeded lower educated ones (OECD, 2011). Secondary school

certificate holders have the highest rates of unemployment in Nigeria and at the same time, wages for this same group are far lower than those with tertiary education. In spite of the selection criteria in destination countries, between 1990 and 2000, secondary school certificate holders had a substantial increase (209 per cent) compared to tertiary educated workers (138 per cent). In fact, at least thrice as many migrants with secondary education left Nigeria in 2000 when compared to 1990 (OECD, 2010).

The migration of tertiary educated workers in Nigeria also more than doubled in the decade between 1990 and 2000 (OECD, 2010). In comparison, the growth for the graduates far exceeded lower skilled workers. Primary school certificate holders have the lowest migration growth rates (32 per cent) perhaps given restrictions on admittance placed by developed economies. Another possible explanation for their low migration rates may be the incomes required to fund the movement as low income groups generally coincide with low educational attainment. The products of Nigerian universities rose in the same direction as outmigration, except over 1989 to 1999 and 2010 when outmigration rose regardless of graduate outturn.

Human capital levels and types in Nigeria are not uniform while pupils in urban areas have relatively better access to education. On the average about 75 per cent of school age pupils have a school in their neighbourhood (NBS, 2006). Currently, teacher-pupil ratio stands at 1:35 in the primary school, 1:35 at secondary school and 1:31 at university levels. In addition, the gap in the quality of education between developed and least developed countries (LDCs) has widened. At the same time, the overall number of tertiary educated persons is 39,509 in 2005/2006 (NUC, 2005) a small value relative to the country's population. Notably, net enrolment in primary schools and adult literacy rates in Nigeria are improving.

The findings of the Global Migrations Perspectives (Nwajuiba, 2005) field survey on the reasons South Eastern Nigerians move abroad are highly informative to this study, particularly with respect to the role of education. About 80 per cent of migrants were driven by economic factors

confirming the intuition that Nigerians are looking for greener pastures. Then, educational pursuits featured as the next motivation (16.2 per cent) and less significantly climate and environmental reasons at 1.41 per cent while political push factors constitute 0.70 per cent. In addition, 71 per cent of respondents in the mentioned survey considered that migration improved standards of living of the person's family and this perception provided further incentive for others to follow. The same study shows migration was predominantly funded through private savings with more than 81 per cent of income from the family and personal savings. The remaining cases had sponsorships from the community, government or company, scholarship, loans or the church. Finally, although the migrants maintained links with their communities and even contributed to community development projects such as electricity, church building, water and so forth, in 73 per cent of the cases, less than half of the migrants returned.

While it may be clear that Nigerian emigrants respond to market forces we cannot ignore that migration in Africa, generally has been complex characteristically male dominated and commercially oriented (Adepoju and van der Wiel, 2010). Also, internal migration in Nigeria is characteristically circular which reflects commercial migration (Jonsson, 2009). In addition, recently, more women have been migrating while the proportion of female enrolment of the total tertiary registrations is also rising. Rather than simply join their spouse abroad, the women have become more economically independent and add to the available labour pool (Adepoju and van der Wiel, 2010).

2.4 MIGRATION POLICY IN NIGERIA

Initially, trade policy thrusts were protective such as the indigenisation attempts of the 1970s but these have given way to globalisation tendencies including liberalisation principles starting about the 1990s. This liberalization of the service sector in Nigeria is encouraged for economic and social convergence to the technological frontier and market driven incentives in place of government intervention (Oyejide and Bankole, 2001). In the past, Nigeria benefited from loans

and grants to increase infrastructure and move closer to capital-intensive markets. This strengthened the position for liberalisation given that market driven sectors such as communications have fared well within the economy. Governments have subsequently increased their interest in the service sector liberalisation and in encouraging transnational engagement of migrants, to reap the benefits of the Economic Community of West African States (ECOWAS).

Nigeria's policy on migrant workers is greatly influenced by the ECOWAS treaty. Globally, there is a new focus on maximising the benefits and reducing the drains from international migration (de Haas, 2006). Observably, the ECOWAS currently does not have a policy on migration and Nigeria in particular has operated a relatively low interference strategy. Improvements have been in the pipeline for a Nigerian migration policy since 2006 when an inter-ministerial committee prepared a draft national policy on migration approved by the National Assembly and is currently awaiting ratification by the Federal Executive Council. The draft national policy has a focus on migration and development that refers heavily to maintaining collaboration with Nigerians in diaspora (de Haas, 2006).

The International Organisation for Migration (IOM), the World Bank (WB), the World Trade Organization (WTO), certain governments and the private sector are developing the International Migration and Development Initiative (IMDI). This is a set of measures to liberalize and integrate the labour market around the world. Policy discussions now include negotiating immigration quotas with Europe in exchange for collaboration on the exchange of undocumented emigrants. In spite of that, the immigration relationship with developed economies mostly attempts to limit entries (de Haas, 2006). The IOM has recorded some cases of assisted return to Nigeria and counts the Nigerian government as cooperative in negotiations on undocumented immigrants (IOM, 2011).

The Uruguay round within the framework of the General Agreement for Tariffs and Trade, also addresses migration in the second and fourth modes out of the four modes by which services can

be traded. The four are cross border supply, where only the service crosses the border, consumption abroad, commercial presence and presence of natural persons. The New Partnership for African Development (NEPAD) in the light of global developments has also adapted promoting labour migration for development.

Networks of Nigerians living abroad such as Nigerians in Diaspora Organization (NIDO) and Nigerian National Volunteer Services (NNVS) are becoming more involved in mobilizing Nigerians for transfer of human capital as well as maintaining trade links. For instance, over 4,000 medical doctors already belong to the Association of Nigerian Physicians Living in the Americas (ANPA). The country's support of its migrant community includes the Presidential dialog launched in 2002 towards incorporating the Nigerian Diasporas in national development issues. Nigeria also allows for dual citizenship, this encourages maintaining links with the country of origin and that of residence. The cabinet of the Federal Government also includes a special assistant to the President on Nigerians in diaspora and there is a committee of the House of Representatives on diaspora affairs. In addition to linkages with the diaspora already established migrant communities make transitions easier for new entrants (Adepoju and van der Wiel, 2010).

CHAPTER THREE

REVIEW OF THE LITERATURE

3.1 THEORETICAL REVIEW

Theory and empirical studies have established the global net benefits of labour mobility, but their findings are inconclusive that migration is beneficial to the country of origin. Notably, scholars generally agree that a 'well controlled, restrictive migration policy is better than none at all' (Stark, 2005). The literature review covers the considerations a developing economy should make in deciding its position on migration. Specifically, policy in Nigeria has approached migration as a development failure whereas a paradigm shift re-examining the conditions under which migration is detrimental or beneficial is necessary.

3.1.1 WHY PERSONS MOVE

Theories on why persons migrate have been divided into macro, micro and meso based on the levels of decision-making (Hagen-Zanker, 2010 and de Haas, 2010b). Micro migration theories such as the neoclassical, Wolpert's stress threshold and value expectancy models, explain individual values in the decision to migrate. Macro theories dwell on aggregate opportunity structures and encompass the neoclassical macroeconomic migration, dual labour market and world systems theories. Finally the network, the cumulative causation and new economics of labour migration theories are meso because they discuss the contributions of web of ties, collectives or social networks.

Notably, there are often interplays between micro and macro decisions, for example, the Todaro (1976) cost-benefit model describes individuals sorting out net benefits in the decision to migrate while considering aggregate factors from the destination and country of origin. In addition, the

neoclassical migration theory involves micro and macro level analysis. Other theories that explain macroeconomic mechanisms by which persons migrate, such as the Ravenstein gravity model is often relied on by micro and meso level analysis. This makes it difficult to use this grouping with clarity.

Apart from the classification above alternative grouping has been provided. For example, by Bakewell (2010) and Abreu (2010) who attempt to contrast agency and historical-structural models. Abreu (2010) compares Crawford's (1973) value expectancy model with the historical-structural approach. In Crawford's (ibid.) model, agents consider economic and non-economic values in migration decision and make a subjective decision based on their predictions about the future. Historical-structural models emphasise systemic demand for migrant labour through the dual labour market theory (Piore, 1979) and world systems theory (Wallerstein, 1979). Finally, the new economics of labour migration attributed to Stark, 1991, attempts to combine agency and structure. While the historical-structural approach refers to macroeconomic level analysis, the new economics of labour migration (NELM) discusses meso or collective motivations for migration. Observably, the terms agency and structure are widely used in literature without any attempt at definition and especially so in migration analysis. In addition, the NELM is criticised by Bakewell, 2010: 6, as an update of neoclassical theory rather than an adequate combination of agency and structure.

Revenstein, Piore and related theories which contend that it is the immigration country that requires migrant workers are distinguished from Lewis, Wallerstein and others who view migration as a result of labour seeking better opportunities. This demand-supply classification would have been interesting if not reminiscent of tensions associated with the dominance theories. In addition some theories including the neoclassical rely on a combination of both push and pull factors making this classification difficult.

Therefore the alternative grouping of migration theories into rational and behavioural models is meaningful for this study given the clarity in the meaning of these terms.

3.1.2 RATIONAL THEORIES OF MIGRATION

It has been known that persons move for social, environmental or political reasons but Ravenstein (1885; 1889) was the first to point out that economic reasons also motivate migration. Following a long break in economic migration study, Stouffer (1940) introduced perceived opportunities as a drive for movement. He contends that the incentive for migration was mostly from expectations to settle down at the country of destination and less from distance and population. Stouffer's (ibid.) law of intervening opportunities from which the gravity theory of migration emerged, explains the inverse relationship between migration and the distance between the two countries and the direct proportion to the population of both the country of origin and destination economy.

Lewis (1954) then described the modern sector pull on the traditional labour force based on the higher marginal product of capital in the former sector, which resulted in productivity wage differentials between subsistence and advanced areas. Lee (1966) extended Ravenstein's ideas identifying obstacles to mobility and providing a list of push and pull factors of migration. Migration did not become a development failure discourse until Grubel and Scott (1966b) identified the conditions under which it depleted human resources in the country of origin of migrants, setting off what would later become the brain drain argument.

Ravenstein's migration laws, which remain foundational to mobility theories, considered movement as voluntary and motivated by economic gain. Migration is usually short distance but when the duration was long, then migrants usually chose to go to great cities of commerce and industry. In addition, migration increases in volume as industry and commerce develop and transport improves, the major direction of migration is from rural agricultural areas to the centres of industry and commerce.

In Ravenstein's three articles on migration there were eleven laws (Grigg, 1977). Some relevant arguments to our concern are discussed. First, the contention is that migration is a step-by-step process, in what is described as chain movements (Adepoju and van der Wiel, 2010) where persons move from rural to urban and then regional. In the contemporary south-north migration context, this may be an indication of wide disparities in standards of living that require step-by-step adaptation as one moves towards the more developed regions. It remains a useful assumption to mitigate the risks associated with migration.

Also, each current of migration produces a counter-current, as persons move away from cities into more industrialized regions, they are replaced by a larger number of people from the rural areas, since residents of towns are less migratory than those of rural areas. Ravenstein considered females more migratory than males within a country but males moved more across borders, although more recent evidence suggests an increase in the number of females migrating (IOM, 2011). In addition, most migrants are adults while families rarely migrate out of their country of birth. Observably, this is obtainable only to the extent that migration is regarded as voluntary. He also considered that large town populations increased more through migration than by natural increase.

However, evidence shows significant migration streams between remote areas against the predictions of the Ravenstein model. In addition, the assertion that migration increases is contended by de Haas, (2010b) who considers that modern increases in the number of migrants are closely related to population rise rather than changes in migration rates. In spite of the criticisms that Ravenstein's laws hardly represent a general rule describing migration, 'they have stood the test of time and remain the starting point for work in migration theory' (Lee, 1966: 47). This remains valid in contemporary migration discourse especially because it allows consideration of the conditions where people migrate voluntarily and predominantly for economic reasons.

A few models tried to explain migration between remote areas as a result of structural differences between markets. These include those attributed to Lewis (1954), Ranis and Fei (1961) and Piore (1979). In the Lewis (ibid.) two-sector model, surplus labour moves long-distance to a thriving centre of commerce and industry from a rural agricultural base because wages are higher in the modern sector. Like the Ravenstein migration laws, Lewis type of structural models focused on an absorption process where persons in the vicinity of a growing urban area move into it while migrants from more distant areas fill the remaining gaps until the incentive to migrate was exhausted. At this point, there would be dispersion from that region. Since markets are perfectly competitive, labour would move until there is a convergence of wages. Notably, these theories did not explain how migration could be temporary or permanent and why urban dwellers were less migratory than rural ones. In addition, wage convergence has not occurred in reality.

Again, in dual labour market theory (Piore, 1979), migration was not purely economic and also there was no wage convergence but an economic dualism of well-paid secondary sector jobs against poorly paid primary sector jobs. This difference in wages was sustained by a structural inflation that enabled constant wage rise in the secondary sector therefore attracting more migrants. The jobs in the primary sector fluctuate according to the economic cycle making the area unstable, uncertain and unattractive to native worker and sustaining continued migration. These theories did not explain why people migrated even when urban areas were saturated.

The Harris-Todaro (1970) model of internal migration later explained that it is expected rather than actual income that drives migration. The urban wage, self-employment earnings and the probability of securing a job all will contribute to the expected present value of migration, weighed against opportunity cost, cost of living, transport cost and psychic cost (Todaro and Smith, 2009: 347). Therefore, the model predicts that it can be rational to migrate to the city in the face of urban unemployment due to higher expected income at the destination. The assumptions of the model are more realistic; nonetheless the evidence from around the world

does not support the predictions that the poorest members would be the most ready to migrate. In addition, this model focuses on micro incentives to move while there are macro-political forces that influence the voluntary decision to migrate such as selection criteria by destination states (Hagen-Zanker, 2010).

3.1.3 BEHAVIOURAL THEORIES OF MIGRATION

Although these models claim to be behavioural, they often still rely on some rational assumptions (Abreu, 2010, Hagen-Zanker, 2010). One example is the stress threshold model of Wolpert (1965), which relaxes assumptions of rationality, for instance, suggesting that knowledge is based on subjective and incomplete information that individuals have. In addition, the action sphere depends on personal characteristics, the variability of the environment and life stage of the individual. According to him, individuals take account of their situation and decide whether to migrate or to adjust to their current location. They seek to achieve a threshold utility and compare it with the expected level to be achieved from various places. The utility they derive for their current position depends on the past and future rewards, however, that of future destinations depend on expected rewards rather than actual ones. The Todaro model is based on market assumptions so that in the face of positive expectations about their situation at the destination people may continue to migrate in the face of worsening economic conditions, such as unemployment. In this stress threshold model, expectations are a subjective evaluation of what each destination offers compared to the threshold utility. These complex utility schedules make the model difficult to test (Hagen-Zanker, 2010).

Another model that attempts to explain the decisions to migrate as subjective is the value expectancy model attributed to Crawford (1974). Economic agents consider additional non-economic factors such as security and self-esteem as pull factors. They associate values or returns to these economic and non-economic motivations. However, the values attributed to the specific goals such as wealth or independence to be achieved, are subjective depending on

individual and household characteristics like educational level and societal norms. Migration is influenced by a mix of factors such as the strength of the migrant's intentions, indirect influences of societal and individual factors, and modifying effects of constraints and facilitators. Notably, the model has been criticized as vague (Hagen-Zanker, 2010: 14).

A series of models including Mabogunje (1970) and Kritz and Zlotnik (1992) see migration as a dynamic process accelerated by globalization. The more popular of these structural models is the world systems theory of Wallerstein (1974) on a macro-sociological perspective of migration. The world system is integrated through market rather than political centre. There is division of labour leading to two interdependent regions, the capital-intensive core and the labour-intensive periphery. These regions are geographically and culturally different.

The model relies heavily on dependency and dominance theories where in a sustained manner the rich and powerful dominate the poor. There is a systematic transfer of surplus from semi-proletariat sectors in the periphery to the high technology industrial core. This leads to capital accumulation at a global scale concomitant with the acquisition and transformation of the peripheral surplus. Periphery states are structurally constrained to experience a kind of development that reproduces their subordinate status (Chase, Dorm and Grimes, 1995 cited in Abreu, 2010). For instance, through deficiencies in capital required to engage in more sophisticated production or through the absorption of their highest skilled labour by the industrial core. The sustained reliance of the peripheral poor on the core rich is possible since these models neglect the assumption of perfect competition of the neoclassical theory.

The theory of social systems of Hoffman-Nowotny (1981) and the theory of cumulative causation attributed to Massey (1993) are a set of models that draw heavily on rational models while complementing the labour market theory. For Hoffman-Nowotny, economic and societal push and pull factors motivate migration, which results from resolving structural tensions or power questions and prestige questions. Migrants hope to achieve their desired status in the

receiving country, however as the African maxim illustrates, a lizard does not become a crocodile by changing destinations. Therefore, tensions associated with their ambition of higher status are often transformed rather than resolved. A migrant coming from a country with a low rank is unlikely to achieve a high internal rank at the destination. According to Hoffman-Nowotny, the migrants are undercut from already established societal roles so they remain with the lowest positions in the society, whereas lower level nationals experience upward mobility, at least, in terms of power and income.

Migration could also sustain itself by leading to increased mobility. This is the theory of cumulative causation attributed to Myrdal, 1957. Also, Massey *et al* (1993) implied that migration occurs in links or chains, from rural to urban and then to regional given that they have established social relationships with previous migrants. He noted that migration does not continue indefinitely, rather migration networks become saturated, labour scarcity in the source country increases and the potential to migrate becomes very low with only the old and the children left to move (see Abreu, 2010). Migration might start to decline making its overall curve an inverted U shape. Arguably, the inverted U model, drawing from development theory and the cumulative causation arguments are vague and the exact mechanism of migration is not clear (Hagen-Zanker, 2010). Although Massey *et al* (ibid.) were able to point to networks of migrants the general flaw of the theories is the neglect of indirect feedback once the initial conditions of migration change. In addition, most migration moves do not lead to network and migration system formation (de Hass, 2011).

The most investigated of these theories for economic analysis have been those linked with the dependency such as Myrdal (1957). This is because it was backed with evidence showing widening gaps between standards of living between the rich and poor nations over time. This contradicts the neoclassical assumption that economic and social forces, tend towards equilibrium. For instance, Myrdal's hypothesis of geographic dualism, contends that the

assumption of disequilibrium situations tending towards equilibrium is false and he replaces steady state equilibrium with circular and cumulative causation.

In the case of two economies with the same initial level of development, if an exogenous shock causes disequilibrium in one economy making it worse off, the economic and social forces strengthen rather than reduce the disequilibrium. This results because of cumulative expansion in the disfavoured region making it comparatively worse off. This happens through a type of multiplier-accelerator mechanism that produces increasing returns in the favoured region. In this case, there is no convergence of wages, but rather cumulative movements away from equilibrium (Thirlwall, 2011: 264).

A set of collective decision-making models associated with Mincer (1978) and Stark, (1991) move the emphasis from structural deficiencies to household participation in the migration choice. Prominent of which is the new economics of labour migration (NELM) attributed to Stark (1991). The model went beyond individual and macro-level opportunities for migration to introduce the idea that a household participates collaboratively in migration decisions and the poor actively attempt to improve their livelihoods. It considers factors such as risk spreading in families (de Haas, 2010b). Thus the migration decision is a strategic family commitment. The family weighs returns from migration and moves only if their net benefits are positive. The family decision is an aggregate of individual utilities.

Stark (1991) combines some structural influences on migration such as income, unemployment, demography and political regimes with agency or household involvement. Households, the main decision maker, use social ties and cliques, government and non-government organizations (NGOs), laws and policies to maximize the benefits and reduce the risks of migration. Households do not migrate together but put resources up for one or more family members to move. The household in this way maximises joint income, status and minimises risks. The household is a family unit, rather than Hicks, 1933, small unit of husband and wife. It includes

other family members such as siblings left behind (de Haas, 2010b). Such individual responses arise as global markets become more appealing as a correction to certain imperfections in local markets and families spread risks by investing in certain skills that could be traded globally.

A combination of neoclassical assumptions and the NELM have emerged (Ghoddusi and Siyahhan, 2010, Di Maria and Lazarova, 2009). For instance, the NELM adopts the neoclassical assumption that developing economies are characterized by unlimited supply of labour. This same manpower is on the average deficient in human capital or skill, which could be attributed to low public expenditure on human capital. In the neoclassical school, workers in labour abundant countries are motivated to move to foreign countries given higher earning capacities in the latter, assuming technology is homogeneous across countries, until the marginal product of labour in both economies is equal. Where wages are not the motivation; then better standards of living, or better health, employment and security benefits are, in a nutshell, workers seek greener pastures. The result is convergence of real wage rates and improvements in global productivity. International migration in the neoclassical framework shifts labour from less to more productive sectors, which invariably brings about improvement in efficiency.

Neoclassical theories are rational theories but are discussed here in the context in which they apply to the NELM. They attribute movements in labour to its demand and supply and join theories relying on Ravenstein's insight in labeling income in the source country the push factor for emigration. Although more recent applications state that income is not sufficient in determining migration decisions (Ghoddusi and Siyahhan, 2010) but rather emphasise the role played by an existing immigrant network or cultural or religious affinity. This is true for instance in the patterns of international migration in Nigeria where emigration to the United States and Europe is dominated by southern and western citizens while northerners more often travel to the Arabian Peninsula. Here, simple quality of life indexes rather than wages allow migration decisions to be based upon the living standard differentials in the source and destination countries (Ghoddusi and Siyahhan, 2010).

NELM can also be examined in the context of the neoclassical trade theory. Individual responses to pull factors are an extension of the argument that labour immobility deters economic transformation. Lewis as well as Ranis and Fei type theories maintain that as labour leaves agriculture, decreasing labour supply and increasing wages there, it exerts pressure for the introduction of agricultural technology. Trade could be substituted for labour mobility where the labour-intensive good can be exported and the capital-intensive product imported in Heckscher-Ohlin (1919, 1933) type movements. In practice, observably, factor movements do not make trade unnecessary or vice versa. This is because the Ricardian assumptions of homogeneous labour force and technology are different in reality and there are also barriers to trade. In fact, local skills may not be substitutes for migrants because they may not be able to or wish to produce the services themselves.

The neoclassical theory presents a useful contradiction that makes it appealing to adapt by the NELM. Given the assumptions of homogeneity of workers and skills, the trade theory is less suitable for exploring international migration since we imagine that the same skills at the source country are available at the destination. At the same time it is indispensible, because heterogeneity is associated with specialisation, then it becomes theoretically impossible for exports to replace factor mobility. Relaxing some of the assumptions to allow workers to accumulate different skills for source and for destination would restrict labour mobility to a one directional migration move where workers choose to accumulate skills useful abroad once they intend to work outside the country. This would mean that it becomes costly for workers to change their mind once they have developed certain skills. Also, the price of return to the country of origin is increased as they tailor their skills more and more to the needs at the destination. This line of thought rather than imply that all workers with one skill must concentrate in some geographical area, may also mean that at different time periods certain skills are required more than others.

In practice, skill differences are indications that economic and social integration have not occurred whereas economic unions encourage transfer of skills between developed countries. In fact, the European Union (EU) is so designed that labour gaps can be filled within the region and there is little need to appeal outside the union. The gap is therefore more in South-North migration (Ghoddusi and Siyahhan, 2010).

The NELM differs from the neoclassical school in contention about the welfare effects of migration on the sending country. It contrasts with neoclassical theoretical foundation, which calculates that once labour was paid its marginal productivity, then both his contribution to national output and his income cancel out so that there is no effect on other incomes or externalities. The NELM contends that market inefficiency arises when individuals do not adjust their preference to the social optimum in the absence of such incentives as education subsidies or migration. In other words, in the neoclassical view, agents invest in human capital until the private returns equal market rate of interest. At this point, marginal revenue equals marginal cost, representing the optimal human capital accumulation for the agent. Notably, individuals reach this private equilibrium and remain in steady state rather than continue to build skills whereas this point is different from the social optimal position. This inefficiency results because human capital is a public good therefore social optimum levels characteristically differ from those of private goods.

3.1.4 THEORIES OF MIGRATION AND HUMAN CAPITAL

The human capital approach attributed to Schultz (1961) assumes wages differ among workers not from duality in the market rather because workers have different abilities. According to this proposition, differences in human capital result from five factors. These are: innate ability since some components of intelligence quotient is genetic in nature; schooling; training, the component acquired after schooling; school quality and non-schooling investments such as

private decisions to study; and pre-labour market influences (London School of Economics, 2012). Workers who invest in schooling give up present earnings for higher future earnings. This means that the distribution of educational attainment in a population depends on financial and institutional factors that affect education, and the trade-off between reduced present earnings and improved future earnings.

The theory assumes that workers are rational and would continue to acquire education until they maximise the present value of lifetime earnings. The worker calculates the present value associated with each additional level of schooling and chooses the years of schooling that maximises the earning stream. Higher education has no intrinsic value given that no externalities accrue to the worker. Purposes such as the joy of understanding a subject or solving problems are not important in the worker's decision to accumulate human capital. The only motive for acquiring more schooling is for higher wages, which employers who wish to attract highly educated personnel offer. The theory has quite realistic assumptions and has evolved since the time it was first proposed by Schultz (1961). Observably, the model is difficult to estimate given what it takes to capture human capital in its proper sense. In addition, the assumption that higher education has no intrinsic value is for convenience of analysis rather than evidence based.

There is also the human capital investment approach to migration analysis attributed to Hicks (1932), Sjaastad (1962) and extended by Harris-Todaro (1970). Hicks (ibid.) also contended that differences in net economic advantage, that is, wages are the main causes of migration. This premise retained from Ravenstein remains behind practically modern economic analysis of migration. Using the present value of lifetime earnings, the worker would migrate if the net gain of changing destinations remains positive. This net gain deducts the actual costs (transportation) and psychic costs (the suffering of moving away from the family, risks of social adjustment) from the benefits of higher wages (Borjas, 2010: 323-325). This is the first attempt at linking migration with human capital investment, which is useful in explaining that migrants are selective because of individual estimated costs. However, it is difficult to test empirically

because it requires data from social surveys. It also ignores important structural factors, for example the influence of other markets or difference in level of technology across countries.
In an attempt to account for unemployment and underemployment in developing economies Todaro came up with what would be considered the representative model for the neoclassical school (Todaro (1969) cited in Abreu, 2010). This is conceived to update the models concerned with cost of benefit analysis adding that the migrant bears a risk of not getting a job when he/she arrives at the destination so that the employment rate is the probability of finding a job. Migration rates increase if urban wages and urban employment increase. Moreover, the model has evolved to include non-economic, psychological and opportunity costs of migration in the analysis.

The NELM can be regarded as an extension of the human capital investment approach. In this sense, human capital formation is a result of the desire to improve wages or standards of living in the same way that Hicks (ibid.) identified. The contribution of the NELM is that people build less human capital than optimal for the economy in the absence of incentives while migration nudges them to invest in more skills. Therefore on the aggregate, there is more human capital formation in an economy that supports the probability of migration.

3.1.5 THEORIES OF MIGRATION AND ECONOMIC GROWTH

There are certain key effects of emigration on the economy. Emigration can affect the labour market through a rise in wages or employment and a reduction in shortages of skill. There could be fiscal consequences including the loss of public funds used in educating those who left. Migration also affects the demography of the host and source countries, such as when population ageing is alleviated or when there is a movement of young skilled persons (Coppel, Dumand and Visco, 2001 cited in Moody, 2006). The models explaining how migration impacts the economy have been separated into trade, labour market, and economic growth.

3.1.5.1 TRADE MODELS

Heckscher-Ohlin (1933) type models hold that global benefits result from migration, however, output in the country of origin falls as labour moves out in response to wage differentials while the destination country experiences improved productivity. The global benefits arise because the reductions in output in the origin economy are more than offset by the rise in productivity at the destination. This will increase world productivity indeed it would be even higher where market imperfections led to unemployment in the country of origin so that it is the surplus labour that meets the demands of the destination economy. In this case output will rise at no cost to the country of origin.

This neoclassical school support of factor movements, originated with Ricardian (1921) principles. This school contends that movements of factors of production are beneficial to global economies since labour productivity is distributed where it is best used. There are specific adverse effects on country of origin, these are: gaps in skills lost to emigration and the effect on overall output following the loss of human capital. Again, where excess of labour already exists, migration should not be detrimental, however, if the proportion of skilled workers who migrate is high relative to average skill and those who migrate are the ones who contribute to productivity, then the country will suffer a drop in output.

Heckscher-Ohlin like the Ricardian comparative advantage model considers that trade results from relative factor endowments so that labour abundant countries produce labour-intensive goods. Notably, abundance in labour is not synonymous with cheap labour in an economic sense since the productivity of labour could be low (Thirlwall, 2011). In addition, the model expresses the notion that trade and migration are substitutes, suggesting that migration falls with trade liberalization. As barriers to trade decrease, a country can export more of those goods and services that it is endowed to produce increasing the demand for the factor of production, in this case, labour, associated with that supply. This rise in demand for labour improves wages making

the migration of labour unattractive to the worker. In addition, factor price differentials referring to the difference between returns on capital at the destination country and returns on labour at the country of origin, are too small in this framework to induce migration. Factors of production are internally mobile but do not cross borders, this is because input prices across nations will narrow out and converge through imports and exports.

In perfectly competitive markets, migration is the result of differences in wage rates between countries and conversely, in the absence of differentials there would be no migration. In the face of economies of scale in production, migration and trade may act as complements rather than substitutes. Given that economies of scale in production often result in monopolistic-competition effects, then production in one country could crowd out either demand or economies of scale in the other. That is, factors will shift to the location of expanding production. This would increase both the domestic market for imports and the destination economy's capacity to export (Moody, 2006: 9 -10).

Factor productivity type trade models predict that emigrants themselves achieve higher wages by moving abroad rather than staying at the source. However, the country of origin experiences a fall in the returns to capital and as long as there is no simultaneous transfer of capital, there will be a fall in national output. Notably, the destination country faces the likelihood of lower wages, a rise in the returns to capital, but individual incomes fall. The destination economy benefits from increases in national output.

According to Schumann (2004) the Mundell model considers that the absence of convergence on some costs such transport and trade barriers constitute significant economic incentives for migration. More trade can also occur with high migration rate given international differences in techniques, increasing returns to scale, imperfect competition and different taxes. Economic agents respond to these differences in wages and migrate to where they are higher. Labour demand and supply will determine these movements and government can control migration

flows by interfering in labour markets (Massey *et al*, 1993). The identified benefits of labour migration to the sending economy in this case include improved factor productivity as the direct returns of labour migration. These returns manifest through foreign direct investment (FDI), remittances, and trade linkages (Dustman and Kirchkamp, 2002; Kugler and Rapoport, 2005).

All implications of trade models point out that they are more suitable in explaining migration as interdependent on imports and exports. This study is interested in what happens to economic growth as a result of migration.

3.1.5.2 LABOUR MARKET MODELS

Neoclassical economic theory holds that labour markets are differentiated either by region or by industry. Assuming there are perfectly competitive and homogeneous skills, workers from the country of origin with low wages would migrate to the economy with high wages. This continues until wages rise in the former and decline in the destination economy as a result of increased labour supply. The wage differential therefore cannot persist and this supply and demand of labour interaction will continue until the two economies are characterised by a single wage. At this point, the wage differential that motivated migration would have disappeared and there would be no incentive to continue to migrate.

Supporters of Malthusian principles as well as recipient economies would be relieved to find that emigration is not an accepted cure for overpopulation in these models. However, emigration contributes as an outlet for surplus labour (Myint, 1958) and unemployment is a significant determinant of labour mobility, next to wage rates. Emigration is also not an export strategy for democratic economies, since the migrant may adopt his/her accustomed standard of living to his/her new homeland and benefit himself rather than his/her home community (Kindleberger, 1961). Economic thought in fact encourages policies towards full employment in contrast to

exporting excess labour. The evolving line of thought on labour mobility is concerned therefore more with the exchange of global skills, focusing on integrated economies.

The human capital investment theory or NELM where workers spend on skills in an attempt to maximize lifetime earnings could be discussed with considerations to the labour market theory. This is in order to emphasize the harmonisation between neoclassical human capital and labour theory. In both, there is a perfectly competitive market where the worker knows the salary that employers are willing to pay for each level of education, that is, the wage schooling locus and the marginal rate of return from each level of schooling. Assume also that education yields a higher rate of return than financial investments so that the worker increases present value of earning by continuing in school. The maximising rule of the present value of the worker's earnings over a lifetime depends on the constant rate of discount, independent of how much schooling the worker gets. Investment in education continues until the marginal rate of return to schooling and the constant rate of discount are the same (Borjas, 2010, pp. 243-246).

In labour market models economic agents will tend towards the average skill level within their economy whereas, in the NELM framework, openness to a more productive market where higher qualifications are needed motivate individuals to form additional skills. For example, the academic staff of Nigerian universities, compete to publish in international journals and in this way raise their skills above the average level that the national market demands. If the intrinsic values of higher skills are factored out, as the human capital investment theories do, then we can conclude that the requirements for promotion and/or better pay motivate this behaviour to acquire more skills. The inability to form higher skills in the absence of external incentives such as subsidies, regulations, or migration, results because human capital is a public good. Therefore, it is impossible that socially optimum levels will be reached by demand – supply interactions. Also, while the skills required by local demand may be adequate, it is difficult to negate the contribution of additional skills because education is a public good with positive externalities.

An incentive to invest in human capital formation drives socially optimal levels of human capital. The government liberalisation of barriers is one such incentive that brings individual levels of human capital to socially optimum rates (Zaqqa, 2006). Otherwise, workers under-invest in human capital formation when productivity is subject to the worker's human capital and average human capital in the economy. The neoclassical labour market theory is useful in understanding the conditions that motivate workers to invest in human capital.

3.1.5.3 GROWTH MODELS

The Solow-Swan[7] (1956) exogenous growth model, stipulates that labour force grows at a constant rate, output is determined by labour and capital, and all savings are invested. This model assumes that all labour shares equally in the technical progress. The alternative is the endogenous growth framework associated with Lucas (1998) and Romer (1986, 1990) that allows technology to augment labour and assumes that technological progress is dependent on the skill level of labour or human capital (Thirlwall, 2011:158).

The exogenous growth framework concludes that increase in output results from improvements of one of three factors, labour quantity and quality, capital and/or technology. In the long run steady state, economic growth is determined by the rate of growth of the labour force in efficiency units. This refers to the rate of growth of the labour force plus the rate of growth of labour productivity. Output exhibits diminishing returns to factors of production. When labour is depleted there is an adverse effect on economic growth. In the exogenous and endogenous models labour is homogenous. Mobility of skilled workers significantly enables convergence to a technological frontier in the exogenous model and openness to migration is an important factor in reducing the effects of structural change and unemployment. The assumption of convergence

[7] The exogenous growth model is credited to Solow, R.M. (1956) and Swan, T.W. (1956). It is sometimes referred to as the Solow model.

to technological frontier is useful to this analysis, because it eliminates the scenario of perpetual migration.

The human capital investment decision associated with Stark's NELM theory (1991) stipulates that the probability of moving to more productive markets motivate people to invest in human capital. Factoring the human capital investment decision within the growth model completes the transmission mechanism, which entails labour migration leads to human capital formation which contributes to economic growth, since technology is positively related to output. Growth models are in this case valuable because they allow for private and social benefits in human capital foundational to the social optimum outlook of gain theories. Individuals improve their own earnings as well as aggregate productivity through human capital formation.

Where labour is homogenous, Zaqqa (2006) using the Dutch disease model avers that other workers fill empty positions resulting from outmigration and therefore emigration reduces unemployment. In the migration-growth framework, relaxing the assumption of homogeneity, supposes that skill requirements in the migrants' country are different from those required abroad. This may imply workers build skills to be used abroad that are counter-productive resulting in "educated unemployment"[8]. This heterogeneity of skills is a more realistic assumption when comparing labour migration from developing to developed countries. For instance, Di Maria and Lazarova (2009) contend that innovative skills are required in developed countries while developing countries imitate technology advanced by the former. Notably, scholars vary on the conclusions about heterogeneous skills.

[8] Educated unemployment appears loosely defined in literature to mean graduate unemployment or unemployment of those with at least an A level degree, or someone who is educated but cannot find a job in the field she/he is trained in. It could also mean that educated workers decide to remain 'voluntarily unemployed awaiting a job that is in line with their expectations' (Stark and Fan, 2007:5). The authors speak of a condition in developing economies where employment is negatively correlated with education. They contend that educated unemployment is caused by migration in a framework where the intending migrant rather than secure a job engages in repeated attempts to migrate.

Excess education may leave an economy with a pool of skills it does not need, thereby decreasing output. Otherwise, it could be a short run consequence of labour migration, which corrects itself with time. In the latter view overeducated workers could drive movements to a new technological frontier in their country of origin (Stark and Fan, 2007). This happens in the same way that technological advancement in one sector spills over to another improving productivity there. For instance, in Nigeria, the entertainment industry, particularly movies and music, has grown more sophisticated over the years. There are several university graduates participating in the field who arguably have contributed to advance productions. Further, some Nigerian artistes who have a mismatch between their education and the employment they secure have been able to move their industry to a new frontier. The skills they built also permit them to compete on the international arena.

In addition, in an extended argument that takes consideration of intergenerational effects, even where skill accumulation differs in the country of origin, net benefits may still accrue. Consider the expected returns to an individual with and without education, if migration had not been an option to the individual. Then she/he might opt to work earlier rather than study, removing benefits of study to the next generation because of the augmented productivity and the intergenerational effects of educated parents (Goddushi and Siyahhan, 2010).

Another group of scholars argue that skill segregation results from such incentive driven decisions based on positive sorting techniques. For instance the O-Ring theory of development (Kremer, 1993) contends that components of the production process should be done properly in order for the final output to have high value. Therefore, workers with similar skill levels would prefer to work together. Where openness allows the best to be selected for migration, it may result in high skills converging in certain locations. Krugman (1991) also adds that because of reduction in transport costs, such skill segregation would be more likely.

In a country in which research and development is inefficient, it could be desireable to allow skilled emigration because it contributes to growth in the host economy. This is because the returns to technological improvement are higher at the host country and they indirectly impact the economy of the emigrants if these improvements are exported from the destination back to the source country (Dos Santos and Postel-Vinay, 2003). There are several cases of Nigerians who have excelled after being exposed to technology not available to them in Nigeria. Popular examples include sportsmen such as Akeem Olalekan Olajuwon or Mikel Obi. Also, among others, in the medical field, Professor Sunday O. Fadulu, has used Nigerian herbs in research in the United States to reverse sickling of red blood cells (Wikipedia, 2013).

Until the 1980s growth theory appeared to clearly show that the effects of labour leaving the economy were detrimental on output. Evidence from developed countries, which tend to be more mobile, contradicted the conclusions that migration in general leads to a brain drain. This discrepancy between theory and evidence renewed interest in the discourse and two transmission mechanisms emerged to explain the results. First, a focus on the proportion of skilled to unskilled labour migration showed that if there are a few skilled workers and a large fraction of them emigrate, the impact is more devastating than when some of the pool of human capital leaves the country. Second, growth models did not account for externalities such as measure of feedback effects including investment incentives, remittances and return migration (Beine, Docquier, and Rapoport, 2006, p. 6).

Further, brain drain ideas through applications of neoclassical growth models emphasised the loss of skilled capital to the country of origin in proportions that may exceed possible benefits such as remittances that could accrue from labour migration. Labour movements through drains on human capital distort the economic growth and development of the country workers are moving away from. In these cases, migration would be considered beneficial to the country of origin, under two conditions, once an individual's income improves as well as if the incomes of those who do not migrate do not get worse. Nonetheless, assuming a competitive market where

labour is paid its marginal contribution to production, a migrant removes his/her contribution to national output and the income that gives him/her claim to this share. This meant there is no welfare effect of migration (Farchy, 2009, p. 5).

A more detailed look at welfare has three distinct dimensions. First in the cost and benefit accounting context (Ghoddusi and Siyahhan, 2010) welfare is improved once benefits exceed costs. In this context migration is beneficial because global returns exceed costs however, the country of origin suffered lower output through the loss of skills. Second, through producer and consumer surpluses, for instance, when human capital formation grows and benefits are higher than the losses resulting from lower wages, implying welfare gains (Belletini and Ceroni, 2007). Finally, welfare means socially optimum solutions, which are twofold. One understanding is that there are winners and losers from the distribution of labour, such as lower wages in the destination and higher wages in the country of origin. However global gains exceed private losses and the migrants have higher private gains while the country of origin looses (Lucas, 2008; Stark, 2005; Zaqqa, 2006). The other is that in the absence of such incentives as labour mobility or subsidies, individuals accumulate less than the socially optimal level of human capital and these spurs should be present to maximise skill development (Todaro and Smith, 2009, Di Maria and Lazarova, 2009).

The mechanisms through which optimal human capital formation results from migration could involve one or more criteria. In the first case, human capital accumulation, that is, the size of the workforce is optimal (Stark, 2005) when the probability of migration improves human capital formation in the country of origin. In the same vein, the income of the migrants country should not be made worse off by the movement of some of its workers to another country (Vidal, 2008; Stark and Wang, 2002). The second refers to the maximization of the balance between emigrants and immigrants because emigration is beneficial to the sending economy when the number of immigrants is also optimally set (Schaeffer, 2005; Bertelloni and Cerotti (2002). If an economy looses skills through emigration, it could still have attractive working conditions relative to other

countries with lower wages and through immigration replace some of the losses in human capital. Furthermore, the destination country should be willing to also accept some unskilled workers for this balance to exist. Third, optimality could refer to the type and time of migration (Ghoddusi and Siyahhan, 2010, Cieslik and Tarsalewska, 2006).

Analysis of the optimal time of migration based on expectations of returns such as the human quality of life index shows that the individual may decide not to go abroad if she/he expects her/his standards of living at home to improve (Ghoddusi and Siyahhan, 2010; Schaeffer, 2005,). Also, the choice of applying for migration may exclude the possibility to work at home because of the time the individual must invest in her/his pursuit. Human capital accumulation decisions may also be made early in life so that potential migrants will choose whether they would accumulate skills useful in the domestic country or abroad in the case of heterogeneity of skills (Stark and Fan, 2007; Schaeffer, 2005).

These optimal possibilities underplay theories in support of a national account of migration such as the Harris-Todaro cost-benefit model. They do so by comparing actual formation of human capital and the socially optimum levels attained when there is an incentive to migrate. A simple account of costs and benefits cannot infer that migration could spur individuals into building more human capital. An economic agent who wants to make more money than his economy offers would look to meet the requirements of other markets in which his skills can be traded at higher returns. The seminal work of Stark (1991, 2005) drives studies (Ghoddusi and Siyahhan, 2010; Cieslik and Tarsalewska, 2005) that compare human capital formation in an economy without migration to the skill levels where there is openness to trade in human capital.

Another framework that is not a model of economic growth but is meaningful in understanding how migration affects output is the growth accounting models. In these models, per capita output is driven by growth in labour productivity and growth in labour utilisation. Migration can also affect growth through one or both channels. Migration affects labour utilisation through labour

force participation rate and the unemployment rate. Similar to the growth models, the impact of emigration on average labour productivity depends on the characteristics of those leaving. Remaining with a reduced skilled labour force would therefore decrease productivity. In addition, since a critical mass of skills in certain fields is necessary to achieve increased levels of growth in some industries, then a small country with a thin supply of labour would find it more difficult to form clusters of expertise (Moody, 2006 pp. 14-15).

Another model that is not a growth model but employs the same framework in accounting for the effects on migration on productivity is the NELM, attributed to Stark (1991). He ties migration to human capital formation by combining the motives that lead to both. He holds that wages, better living standards and other incentives raise the desire to migrate and this becomes a motivation for human capital formation to the optimal levels.

How household decisions affect human capital formation and output in NELM is explained by a simple analogy of two economies with two levels of skill, good piano players and excellent piano players[9]. If there is an opening for some piano players to move to excellent player's side, then even if only a fraction of the piano players would be selected, the general skill level of the good players would have improved because of the competition to be the ones selected for the move.

In addition to the direct benefits, positive externalities are expected to result from the skill acquisition retained in the country of origin. A nation that is better educated utilises production factors more efficiently in the same way that the growth model avers. There are also intergenerational effects that cohorts transmit through the choices that they make not captured by the market. Human capital, characterised by positive externalities, has spillover effects. In

[9] In 'Rethinking the Brain Drain', Stark (2005) makes a theoretical exposition on how human capital grows with the incentive to migrate.

addition, the market cannot be counted on to deliver the socially efficient levels of health and education (Todaro, 2009).

In the context suggested by the NELM (Stark, 1991), labour migration has welfare effects on the country of origin because as the probability of workers leaving the country rises per capita output increases (Di Maria and Lazarova, 2009). The NELM posits that migration contributes to economic development through its role as an incentive to build human capital. Human capital formation translates to economic development as technology in the growth framework. In addition, the capabilities approach (Sen, 1995) would imply that migration points to a development premise. This is because beyond income, it is the capabilities, what a person can do, that constitute human development. Therefore, freedom that education affords workers, add to the human capital endowment of a nation.

In fact, Stark and Wang (2002) theoretically look at the extreme scenario where no unskilled worker is able to migrate, they assert that the economy can still be better off. Even after adjustment for the policy making power and the first mover advantage of the destination country, the country of origin still benefits from migration. They contend that there exists a unique migration probability that allows for optimal human capital accumulation. In addition, using average earnings, over-education is socially inefficient in the short run, but a generation later, social benefits exceed costs, due to intergenerational effects of education including better choices the educated parents make (Stark *et al*, 2008).

The socially optimal perspectives in general, allows for new policy investigations on migration as a substitute for subsidies on education (Stark and Wang, 2002). Migration would be an incentive to attain socially optimal levels of human capital formation as much as taxes and subsidies, because in the absence of migration, subsidies play a corrective role. Examining these externalities add a global and social perspective to the returns on migration.

Notably, labour and technical knowledge are a universal good, while mobility of workers must also become a real contribution to the local community in which they find themselves they should not be a drain on their country of origin[10]. It must help bring about a robust, productive and social system essential for sustainable development. In an integral way, for labour mobility to translate to economic development, global output levels must rise and net benefits must be higher in the face of migration than otherwise, benefits must accrue to the migrants, their economy, as well as the destination country. Integrated markets would thus promote institutions that sustain economic development. While all these dimensions are important, this study focuses only on the impact of migration on the economic growth of the country of the migrants.

3.1.6 PHASES IN MIGRATION AND DEVELOPMENT THEORY

Migration and development research has evolved over the decades through phases of optimism (1960s until 1973), pessimism (1973-1990), readjustment and the NELM phase (1990-2001) while pluralists view generally in favour of a brain gain emerged since 2001 (de Haas, 2010a; Castles, 2008).

Migration discourse before the 1960s centred on the determinants of migration and leaving a country was seen as an integral part of modernisation rather than a development failure. It was a natural consequence of economic and non-economic factors that resulted in increased economic development through labour productivity of the skills placed through the market in the regions where they were most required. There were also fewer borders prior to the 1980s, which meant a decreased focus on individual consequences on a country. That underdevelopment induces migration was generally accepted; but whether migration resulted in development or worsened underdevelopment remained an issue that needs to be addressed.

[10] See Caritas in Veritate. 2009. Charity in Truth: On Integral Human Development. Encyclical letter of the supreme Pontiff Benedict XVI, Pauline publications Africa.

The pessimistic era (1973-1990) backed by dependency theory saw the periphery (neocolonialism) systematically transferring surplus labour to the industrialized core leading to the acquisition and transformation of poor economies. The result was impoverishment and worsening of the income gap (Castles, 2008: 4). These structural models were however vague and lacked a clear theoretical underpinning to show how migrants may choose where to go. The pessimistic phase also appeals to the growth framework in investigating migration and economic development. This recognizes that the total wealth of a society is a combination of human and physical capital. Human capital investment theories assume that people are utility maximizing while investment in additional schooling is attractive once the present value of expected future benefits exceeds cost. That is people will invest in human capital if it improves their welfare. The conclusions of the pessimistic phase were that once labour was lost the economy's output suffered.

Grubel and Scott (1966b) pointed out the potential negative effects of outflows of human capital on the country of origin given the deficiencies in skills that result from the movement. This viewpoint emerged at the same period as Schultz human capital theory (1961), which connected investment in skills with economic development. Schultz's (1961) notion is represented using the neoclassical growth model in which productivity induces output and human capital depletion decreases economic growth.

The migration of highly skilled workers deepen losses in human capital which deters growth through a vicious circle in which underdevelopment induced outflow of workers, which further worsened the country of origin condition. However, de Haas (2010b) holds that there is a structural deficiency in this argument since if underdevelopment causes migration, given that certain income levels are required to migrate, the logical scenario would be less migration rather than more. Further, de Haas (ibid.) holds that there is more migration in the face of economic development contrary to what the pessimistic era predicts.

Historically, human capital flight connotes loss of heritage and wealth given examples of Arabic revival of the neo-Platonist traditions. Also, the outflows of scientists and economists from Europe to America following the anti Semitic sentiments in the former marking the World War II period point to the development failure premise. The colonial institutions also encouraged the extraction of resources, including human capital and the disarticulation of sectors rather than productive capacities (Ake, 1981). As the dependence theories lost their appeal in the 1980s so did the overall conclusion that migration pointed to a development failure.

The positive view emerged, associated with neoclassical economics, it contends that markets would adjust to equilibrium and appeared to make discourse on migration unnecessary. The principle relies on the modernisation premise and argues that in a liberal market at the beginning of underdevelopment in poor nations there would be migration, which enhances development and tends to income equilibrium. The root cause of migration is eliminated and migration rates fall.

The readjustment and the NELM phase is captured in the thought that 'the mere possibility of skilled emigration may encourage many more workers to acquire information technology or other skills than are ultimately able to leave, leading to a net increase in labour force skills' (Todaro and Smith, 2009 pp. 76). Openness to a global market, following labour mobility principles, makes workers build more skills, which increases the number of skilled workers globally and those who remain in the country of origin. The NELM holds that both individual incomes and the conditions of those who remain behind improve in ways distinct from those predicted by previous models; the pillar of the argument being that productivity grows in the same direction as the incentive to develop human capital.

Arguably, if wages depend on levels of education, and there is openness to migration, this drives individual investment decision in human capital formation, then it is not human capital depletion that results from wage differentials. To underscore this line of argument, migration is also viewed not as a permanent move from origin to destination countries but as a more complex

interaction where agents maintain simultaneous commitments to two or more communities and through networks or return migration positively affect both economies.

3.2 METHODOLOGICAL REVIEW

Translating theory into models in the migration-human capital formation framework has been difficult given the stylised, sometimes abstract and difficult to test theories. The growth models, where human capital is regressed against economic growth are useful in answering the question of the effect of skill formation on output. This is the second concern of this study. To address how migration affects skill formation, either the cost-benefit approach or the human capital investment approach is appropriate. First, we attempt to understand exactly what characteristics of migrants are captured by the data. Then we examine the incentive effect of migration in building human capital. Finally, we look at the economic development effect of migration.

3.2.1 WHO IS A MIGRANT?

The definitions of migration have focused on their legal nature creating difficulties in looking at its economic and social implications (de Haas, 2011). The Webster dictionary defines a migrant as one who leaves their country to live in another, especially in order to find work. Migrants may be defined by foreign birth, by foreign citizenship, or by their movement into a new country to stay temporarily or for the long-term (Anderson and Blinder, 2012). However, the Nigerian census does not differentiate between foreign-born and those with foreign-nationality, ignoring the status of dual citizenship. Notably, some people who are foreign born may not be foreign-nationals. The OECD has distinguished these categories in their dataset making it possible to see both the size of emigrant population and the extent of expatriation (Lemaitre, 2005, p. 2).

'The 1998 United Nations recommendations on the statistics of international migration define an international migrant as any person who changes his or her own country of usual residence.

Persons living outside their country of origin for up to one year or more are considered to be long-term migrants'. The limit of one year is for practical purposes and fits the reference period used to track population change. The definition also covers purpose of visit so that persons leaving for recreation, holiday, visit to friends and relatives, business, medical treatment or religious pilgrimage, are not considered migrants. While migrants may be classified as resident or temporary, the latter category could spend years within an economy, such is the cases of persons studying abroad, some of whom also work during the course of their programme.

The most recent Nigerian Migration and Urbanisation Survey is the one conducted in 1993 by the Nigerian Institute for Social and Economic Research (de Haas, 2006). The data sets on migration in Nigeria include those of the Nigerian Bureau of Statistics (NBS) sourced from Nigerian Immigration Service (NIS). These notably represent data on foreigners arriving in Nigeria and those departing from the country, but not of Nigerians, while there is also no reference to the period of stay. The data is based on flash cards completed during entry and exit into the country at regulated terminals.

Observably, there are unauthorised entry points into the country, making collection of accurate information on those entering or leaving the country difficult. For instance, not less than 59,000 Nigerians are currently in Northern African countries alone without valid travel documents. Also, as at 2007 about 6, 500 Nigerians had either entered the European Union illegally or legitimately but subsequently stayed without proper documentation in the region (Afolayan, 2009). Generally, main categories of regular emigrants refer to the NIS to obtain their Economic Community of West African States travel certificates and international passport (de Haas, 2006).

Also, once in the country, the lack of enforcement of identification regulations and the possibility to go through everyday activities with ease without being challenged and the need to register makes it difficult to understand the resident status of many persons living within the country. While persons arriving in the country are more difficult to track, those leaving the country must

follow entry requirements of their host country (Lemaitre, 2005). Therefore, the OECD provides data in the form of bilateral migration matrices. The Docquier and Marfouk (2006) dataset for the OECD shows both number of immigrants into the OECD and the emigration rates by country at three levels of education (low, medium and high). This is available for Nigeria at five-year intervals between the years 1975 and 2000. The World Bank has also published migration rates by country of origin, including for Nigeria, at five year intervals since 1970.

The National Population Commission (NPC) and the Ministry of Foreign Affairs, Diaspora desk, also maintain documents on migration of Nigerians, with periodic publications. In addition, the nursing and midwifery council has for the last ten years kept annual data on heath care workers leaving the country (see Table 2.1 nurses leaving Nigeria by country of destination).

3.2.2 TESTING FOR HUMAN CAPITAL FORMATION

Two broader methodological approaches have been applied to migration and human capital investment analysis. One is the cost-benefit framework attributed to Harris and Todaro (1969) for rural-urban migration and later extended for international migration by Borjas (1989). The other is the human capital model with a theoretical basis in the work of Stark (1991).

In the cost-benefit framework, the Harris-Todaro reference model describes output in the rural-agricultural sector as a function of rural labour, fixed available land and fixed capital. In the urban manufacturing sector, output is a function of total labour including those of rural migrants, and fixed capital. The relative price of agricultural goods with respect to manufactured goods, is a function of rural and urban outputs. Wages are determined by a combination of prices and quantities, and rural sector pays labour the marginal contribution to the production process. The urban wage however, is restricted by the condition that it must be at least as high as the minimum wage in the manufacturing sector. It is also assumed that labour demand is never so high as to pull the minimum wage downwards.

The Borjas (2010) framework adopts these assumptions whether the labour markets are in different cities, different states or even in different countries. The worker discounts actual costs as well as psychic costs such as separation from the family and compares the present value of lifetime earnings for alterative employment opportunities. That is, the present value of earnings, if the worker stays at home is compared with the present value if the worker should travel abroad. It then becomes rational for the worker to move as long as the net gain to migration is positive (Borjas, 2010).

In practical terms, one way to discount present value of future earnings appeals to socio-economic panel data (Bodman, 1998). The other is a systematic cataloguing (Zaqqa, 1996) that compares the costs and benefits of education to the household. The benefits side includes income differences of skilled labour at source and destination countries; improvements in productivity of the migrant, as well as remittances sent home and accumulated savings. Whereas expenses include the opportunity costs of education measured as the income of labour without education, travel costs are calculated to include multiple trips where applicable and costs of moving the household.

The cost-benefit approach is more useful in situating human capital as a determinant of migration rather than understanding the incentive effects of migration. Notably, it is more tasking to estimate the cost-benefit model since it requires up to date socio-economic data or primary data. Zaqqa (2006) mentioned that respondents were so difficult to locate until he appealed to snowball sampling to collect the necessary information for analysis. This sampling method is observably biased towards the socio-economic background of the initial person involved in the survey.

In the human capital investment framework, multiple regression analysis may be used to estimate how migration impacts capital formation appealing to the ordinary least squares (Di Maria and Lazarova, 2009; Cieslik and Tarsalewska, 2005; Bodman, 1998). This shows the dependent

variable, human capital formation varies with migration. Higher wages abroad than at home serve as an incentive for migration derived from the neoclassical assumption that persons have preference sets and choose in a bid to maximise satisfaction. The necessary condition for migration to result in human capital formation is that the levels of human capital increase in the same direction as labour migration.

In order to find the net effects of migration one can also compare the proportion of graduates remaining in the country relative to total individuals in the economy. This gives the growth rate of pre-migration to post-migration levels of human capital (Cieslik and Tarsalewska, 2005; Stark and Fan, 2007). Alternatively, the impact of migration on enrolment rates would account for incentive effects (Di Maria and Lazarova, 2009). For instance, Di Maria and Lazarova (ibid.) while studying the impact of migration for countries in the EU were able to compare human capital levels in the year 2000 to a pre-accession decade earlier while accounting for the effects of increased physical capital that accompany such regional integration. The other key determinant of human capital formation that their study accounted for was public spending on education as a proxy for the cost of acquiring it.

The dependent variable, human capital formation may be captured using enrolment in tertiary education (Di Maria and Lazarova, 2009) or literacy rates (Groizard and Llull, 2004). In fact, enrolment was considered the correct approach to incentives rather than graduate outturn because they better explained workers response to the motivation to acquire skills (Di Maria and Lazarova, 2009). Completion rates may be associated with ability, which is not what the incentive effect measures. Skills could also be affected by population density, which rises in the same direction as human capital since schools tend to be located around settlements with more people and a reduced distance from school implies lower costs of education (Di Maria and Lazarova, 2009). In addition, proximity to the world technological frontier explains the type of skill acquired, since countries with close production capacities would tend to have the same type of skills classified as innovation while the less advanced imitate their developments.

Skill levels could also be affected by networks, estimated as the stock of migrants in 1990 (Docquier and Rapoport, 2012), these motivate migrants since they have a support group already present at the destination. In addition, countries farther away from the main destination tend to have lower probabilities of migration given the additional costs that moving requires (Easterly and Nyarko, 2009).

In using data that are qualitative in nature such as those measuring the determinants of migration and the probability of migration, the probit model has been used (Hagen-Zanker, 2010). Also, if the regression is of a yes or no type, then the Ordinary Least Squares (OLS) is not indicated (Gujarati, 2005:561). An alternative method using secondary data is to proxy the probability of migration using emigration rates (Groizard and Llull, 2004) making the use of the probit model redundant in this case.

It is expected that migration will be correlated with human capital formation since the same factors may account for an individual being more likely to migrate or accumulate human capital. In addition, the level of education may also provide a higher probability to migrate (Batista *et al,* forthcoming; Di Maria and Lazarova, 2009; Cieslik and Tarsalewska, 2005, Beine *et al,* 2006*,* 2001). This relationship could be verified through tests of homoscedasticity and serial correlation or by paying attention to Durbin Watson values of regression. Where autocorrelation is present, instrumental variables have been used to correct for serial correlation. In Cieslik and Tarsalewska (2005) as well as Bodman (1998) the chosen instruments were subjected to the Stock and Yogo test for weak instruments or Hansen-Sargan J Tests or full information maximum likelihood to correct for simultaneity problems.

Instrumental variables could represent a factor that influences the condition of one variable only through the effect on another variable. The two stage least squares can effectively combine the impact of multiple instruments. In the first stage, the endogenous variable is regressed on all the instruments, then, comes the second stage where the obtained values are either introduced into

the equation to be estimated or used as instruments. The challenge then remains in choosing the appropriate instrument (Angrist and Krueger, 2001: 69-70). Two requirements apply to selecting the instrument, it must be correlated with the endogenous variables, but it must not repeat the problem of autocorrelation by being correlated with the error term.

Two stage least squares (Batista *et al.*, forthcoming) instrumental variables (Beine, Docquier and Rapoport, 2006; Cieslik and Tarsalewska, 2005) and general equilibrium analysis (Marchiori, Shen, and Docquier, 2010) have been applied to estimate the relationships between migration and human capital formation and the impact on economic growth. The method is appropriate in avoiding problems of endogeneity between human capital and economic growth. Beine, Docquier, and Rapoport (2006) and de Haas (2010) speak of betta (ß) convergence of human capital levels.

Instruments for migration probability could include population size at the destination and population density of the country of origin or wage differentials (Cieslik and Tarsalewska, 2005). While those for brain drain, that is the economic growth impacts, could be estimated using instruments such as geographic share of emigration, population size and initial stock of immigrants (Heuer, 2011; Di Maria and Lazarova, 2009; Barro and Sala-i-Martin, 1995), others may include racial tensions, migration stock at the beginning of the period, life expectancy at birth, GDP per capita of the source country a proxy for wage differentials; which are an established driving force of migration (Beine, Docquier and Rapoport, 2006). They are suitable instrumental variables because of their high correlation with human capital and/or number of observations available. Observably, all of the mentioned studies used panel data, which are more likely to show endogeneity given the varied data sets. Finally, lagged values of endogenous variables through the error correction mechanism would also serve the same purpose.

Dummy variables have served two purposes in the migration-economic development discourse. They account for the heterogeneity in the effect of skill on human capital where data on skilled

migration is missing. They also capture certain individual effects, like age and gender and how these affect the likelihood of migration (Czaika and Vothknetcht, 2012).

A more sophisticated substitute to dummy variables is to subject the individual's choice to distinct stages. These periods (stages) include after graduation where the individual faces the decision problem of getting a job or scouting for migration options assuming the possibilities are mutually exclusive (Stark and Fan, 2007). Apparently, this requires data on the age at the time of migration. Alternatively, a simpler framework (Cieslik and Tarsalewska, 2005; Stark, 2003) ignores individual characteristics and assumes that workers borrow the funds required for human capital formation at a zero rate of interest.

Proponents of the NELM state that they can successfully account for individual effects such as gender, age of entry (Docquier and Rapoport, 2012) or how aspirations motivate the decision to migrate (Czaika and Vothknetcht, 2012) while still paying attention to push and pull or other structural influences. The decision to migrate may be affected by certain individual characteristics for instance age, which captures perception of risk, as younger persons are more risk neutral. In addition, age of entry into the destination country can account for where education has been acquired and capture which economy bears the cost of training, with milestones such as age 12, 18 and 22. In fact, correcting the emigration rates for 195 countries of origin with migration to the OECD before age 22 reduce the brain drain by half for all but ex-Soviet and African countries where the effects were marginal (Docquier and Rapoport, 2009). Marital status is also sensitive since immigration laws that favour family reunion may make emigration more attractive.

Gender also affects labour migration patterns which have in the past been male dominated with women joining their spouses to raise a family although in recent times more females participate in the labour market generally and in migration decisions for work in particular (Adepoju and van der Wiel, 2010; Germengi and Swinnen, 2005; Batista *et al,* forthcoming). Other extensions

of the incentive model show that the decision to send children to school depends on a certain level of ability (Berlettini and Cerotti, 2003) this could help capture intergenerational effects and the time cost of acquiring skills (Di Maria and Stryszowski, 2006; Schaeffer, 2005).

Household characteristics that affect migration patterns also include income since middle-income groups have been seen to be more likely able to afford the economic, social and other costs of migration. Other contributors to the migration decision include regional factors, for instance, levels of income inequality since perceived relative deprivation may induce poor households to opt for migration. This can be accounted for using the Gini-coefficient. Migration networks and other social ties and cliques are also positively correlated with the decision to move. The net effect of migration can also be obtained by comparing levels of migration at a later date to counterfactual levels. In this way, Farchy (2006), uses Slovakia as a counterfactual to the Czech Republic in estimating the impact of accession to the EU on both economies that were before their breakup a single nation.

Critics (Abreu, 2010) contends that the integration of household and structural effects have not been successful but at best, the NELM is an update on the agency effect. While the model may not account for individual effects satisfactorily, it allows for an account of the combination of agency and structure effects through proxies without appealing to household surveys or primary data, the only option using the cost-benefit approach.

Studies have also chosen between a simpler model where skill compositions between two economies are homogeneous (Stark and Fan, 2007; Stark and Wang, 2002) or the heterogeneous framework (Ghoddusi and Siyanhann, 2010; Di Maria and Lazarova, 2009; Stark, 2005). The decision is mostly based upon demographic variables available. Generally, empirical evidence suggests that skill compositions are different between sectors and could fall under such generic categories as skills requiring innovation which describe developed economies and those requiring imitation for developing nations (Di Maria and Lazarova, 2009). Moreover,

occupational specific data accounts for the fact that skills are only partly transferable across borders (Czaika and Vothknetcht, 2012).

One way to account for both a heterogeneous workforce and skilled emigration is to allow the composition of human capital to depend on science and technology skills (Di Maria and Lazarova, 2009; Bodman, 1998) or Ph.D graduates (Docquier and Rapoport, 2009). Alternatively, a simple decomposition of the skilled migration may be done multiplying migration rate per population with schooling gap, as is the case with Docquier and Rapoport (2006). The human capital levels are then compared against migration per population size or changes in migration over time.

Finally, a more complex methodological approach (de Haas, 2010c; Beine, Docquier and Rapoport, 2006) appeals to the overlapping generations (OLG) framework attributed to Samuelson (1958) and distinguishes labour participation over different time periods. In the migration related literature for OLG, risk-neutral workers decide to invest in human capital formation in their youth while in adulthood they consider whether to migrate. Since there are selective migration policies at the destination country, the skilled workers are distinguished from the unskilled through a higher probability of migration.

3.2.3 TESTING FOR THE IMPACT OF MIGRATION ON ECONOMIC DEVELOPMENT

Modelling the effects of migration on economic growth has progressed since the introduction of technology into the growth model (1960s). Studies have emerged on the impact of migration on human capital formation and on economic development following Lucas' (1988) introduction of human capital in the growth model. The discourse of migration before the 1960s was focused on the determinants of migration, simply considered a natural result of modernisation. The later debate starting in the 1990s focused on microeconomic models examining the impacts of

migration on human capital formation, which allowed individual responses to incentives to affect skill formation decisions.

Migration theory in the 1960s was equipped with the Solow (1956) exogenous growth model, in which the contribution of labour to growth was independent of technological progress. Labour and capital were substitutable, since the prices of factors of production were flexible. Capital exhibited diminishing returns, which meant that investment did not determine long-term growth, which rather depended upon the labour force growth and labour saving techniques. Improvements to the quality of labour through better health, nutrition and education had important positive effects on economic growth and the depletion of skilled labour pointed to loss of productivity. Premised on the inability of this model to explain persistent differences in standards of living worldwide, particularly because it predicted a convergence of per capita income across the world meant other theories should be developed to explain this inconsistency (Thirlwall, 2011, p. 131).

The new growth theory relaxes the assumption of diminishing returns to capital and asserts that with constant or increasing returns to capital, incomes will not converge across nations. Lucas (1988) and Romer (1986, 1990) type models allowed human capital formation and research and development to prevent the marginal product of capital from declining (Thirlwall, 2011, p. 162). People build skills in order to offer them where they are most productive. There is perfect competition assumption suggesting that the migrants have excellent knowledge of wage levels, employment opportunities at the source and at the destination and they can make a rational decision to migrate by comparing these economic factors.

Indeed, Beine, Defoort and Docquier (2007) compiled a list of things that matter in measuring the impact of migration on development. They affirm that initial levels of human capital matter and that countries with initially low levels of human capital benefit more from the incentive effect with similar conclusions supported by Beine *et al,* (2006), Schaeffer (2005), and

Mountford (1997). Also, the magnitude of migration could tilt the results in favour of a brain drain. It is also helpful to disaggregate migration to account for natives separate from residents by defining international migrants based on country of birth.

For instance, using the age at which the migrant leaves to account for where higher education was acquired matters in the brain drain versus brain gain discourse since cost of education and level of skill are factors that account for a development failure. Others contend that investment in skill decisions vary with levels of education, mix between emigrants and immigrants and the type of skill formation (Stark, 2007; Beine *et al, 2006*; Groizard and Llull, 2004). It was countries with little educational progress, those in Eastern Europe and SSA that experienced a brain drain. Finally, migration impacts are enrolment-specific, as tertiary level emigration have positive effects on secondary level enrolment rates (Di Maria and Lazarova, 2009).

If migration accounts for human capital formation, and human capital formation accounts for economic development, then by deduction migration accounts for economic development. The probability to migrate or the migration rate is introduced into the GDP per capita growth model along with human capital and other variables that account for economic development (Di Maria and Lazarova, 2009, Cieslik and Tarsalewska, 2005).

The theoretical postulates of the NELM suggest that countries can experience gain regardless of income classifications. Notably, the results seem to differ between north–north and south-north migration. For Doucquier and Marfouk (2006) the differences between skilled and total emigration rates are particularly strong in Africa. Meanwhile, for Marchiori, Shen and Docquier (2010) emigration could induce human capital formation regardless of the region. Finally, Beine, Defoort, and Docquier (2007) affirm that the classification according to income levels affect results. The World Bank classifications as to what constitutes high, middle or low-income countries when contrasted with other definition such as gross national income below a determined level would produce distinct results (Beine, Docquier, and Rapoport, 2006).

Net outcomes from migration may in addition be sensitive to other characteristics as well. These include a link between current level of development and proximity to the technological frontier (Di Maria and Lazarova, 2009; Di Maria and Stryszowski, 2006). In cases in which skills are heterogeneous across countries the results could be educated unemployment at the country of origin or underemployment or even unemployment of the migrant at the country of destination. Intergenerational benefits of human capital formation (Zaqqa, 1996) when accounted for also support the brain gain argument. The cost of education may entail exclusion from the possibility to work because of the time the individual must invest in his/her pursuit (Stark and Fan, 2007 and Zaqqa, 2006,). Moreover, human capital accumulation decisions may be made early in life so that individuals decide whether they would accumulate skills useful in domestic country or abroad. The country of origin may then experience short-term losses if the skills formed are different from those required there (Schaeffer, 2005).

Finally, while it is unnecessary to exclude the possibility of return to the source country, it is important to notice that the focus of this study is on the gains that human capital formation contributes to the source country rather than returnees, network creation, FDI or any other source of gain. In this instance, remittances serve as a control variable for return migration (Cieslik and Tarsalewska, 2005).

3.3 EMPIRICAL REVIEW

In more recent literature, economies open to trade including migration such as Japan, South Korea, Taiwan and Singapore that grew faster than more closed ones like Bangladesh, India and Indonesia raised questions about the continued validity of brain drain arguments. The results of these studies support general conclusions neither for the brain drain nor for the brain gain. What they do is to point out the correlation between labour migration and human capital formation. In this way, they update the conditions under which migration could impact an economy. This discourse arises because there have been discrepancies in the evidence that labour migration

generally leads to decreases in human capital within an economy. The rational response then is to explore a country's position on international migration of human capital.

3.3.1 THE INCENTIVE EFFECT

Several studies support the incentive effect, showing higher probabilities of migration come with increases in the level of human capital accumulation in general (Docquier and Rapoport, 2012; Ghodussi and Siyahhan, 2010; Farchy, 2009; Di Maria and Lazarova, 2009; Docquier and Rapoport, 2006; Beine *et al,* 2003; Poutvaara, 2000, Vidal, 1998). Others such as Stark and Wang (2002), Beine *et al (*2007, 2001), Mountford (1997) affirm that skilled migration fosters human capital formation even in low income countries. Household effects are particularly important for developing economies in which the characteristics of community contributions are important since it is more difficult to secure income through private insurance markets or government programs (de Haas, 2010c, p. 20).

Beine, Docquier and Rapoport (2006) and Docquier and Rapoport (2007), however contend, that the drain effects far outweigh the gains for developing economies. Using a panel data set of six countries to test the global impact of mobility of skilled workers on human capital formation, they point out that the effect of skilled migration on human capital formation is ambiguosly linked to levels of development. This is because while the incentive effect of migration has positive effects on human capital formation, financial constraints are likely to limit people's capacity to respond in poor countries.

There is certain strong evidence in support of the incentive effects of migration, Commander *et al* (2004) find positive human capital formation in the information technology industry, partly related to migration. Lucas (2008) shows that students from the Philippines have increased skills in the health sciences and maritime training in response to international demand for skilled workers. In the Philippines, increase in migration has contributed to human capital formation and

economic growth with 72 per cent of all students enrolled in higher institutions being in private establishments. This suggests a response to incentives to invest in human capital formation despite low incomes in the Philippines (Di Maria and Lazarova, 2009 and Lucas, 2008). In contrast, in Mexico, possibilities of emigration to the United States serve as a deterrent to investment in education because better education offers only small gains to the migrants (McKenzie and Rapoport, 2007).

Further, a case study of Jordan, for out-migration shows that the sending society benefits more from migration where there are lower levels of employment in the labour market for skilled workers (Zaqqa, 2006). Batista *et al* (forthcoming) using a tailored household survey find evidence in Cape Verde, possibly a country with the highest emigration in Africa, to support significant correlations between probability of migration and investment in specific educational advancement. Conversely, a shock decreasing probabilities of migration also resulted in lower educational attainments.

One striking support that some skilled workers do train just to go abroad comes from a survey indicating that 40 per cent of skilled doctors working in the United Kingdom were influenced to train in medicine by the possibility of migration (Kangasniemi *et al* (2004) cited in Farchy, 2009). Many small and developing nations are however, exempted from these general conclusions because even when incentives to build human capital are accounted for, skilled emigration rates are beyond any net skill creation threshold (Docquier and Rapoport, 2006).

Other perspectives maintain that there are rather optimal possibilities of migration to which the individual responds (Ghoddusi and Siyahhan, 2010). For instance, Beine, Docquier, and Rapoport (2006: 633-634) and Vidal (1998) refer to a critical threshold, which grows in the same direction as the probability of migration and wage differentials. This again raises the paradox that although migration provides a stronger incentive in poorer nations financial constraints do not allow them to acquire higher education.

The general perspective remains that domestic human capital accumulation grows with migration (Ghodussi and Siyahhan, 2010; Farchy, 2009; Di Maria and Lazarova, 2009; Docquier and Rapoport, 2006; Beine *et al,* 2003; Poutvaara, 2000). There is some level of openness required to achieve this. In fact, comparing proportions of individuals with higher education to the general population, Stark and Fan (2007) conclude that people will invest in skill formation once the probability of emigration in the first period exceeded five per cent. Other reports hold that the source country can experience a brain gain where there are moderate probabilities of migration. They refer to optimal rates that are neither too high nor too low to encourage the worker to invest in global human capital (Ghodussi and Siyahhan, 2010; Stark, 2005).

It appears that these probabilities of migration impact differently on each level of education because destination countries often request for certain skill levels. As a result human capital formation at secondary and tertiary levels grow positively with migration, whereas primary school levels are unaffected (Cieslik and Tarsalewska, 2005). Still the distance to the technological frontier determines the effect on human capital formation. In fact, closer countries benefit more from tertiary educated workers, an indication of the effect of homogeneity between skills needed at home and abroad (Di Maria and Lazarova, 2009).

In addition, when externalities are accounted for, net earnings per worker rises when the decision to acquire human capital is spurred as is the case, by migration incentives. In addition where unemployment is already high, labour migration presents no cost for the country of origin. More than that migration is conducive to and can even be a substitute for subsidies for encouraging socially optimum levels of human capital formation (Stark and Wang, 2001).

3.3.2 THE ECONOMIC GROWTH EFFECT

The studies that look at migration and output effects for developing economies in SSA using panel data (Beine, Docquier and Rapoport, 2006; Beine *et al,* 2001; Groizard and Llull, 2004) have arrived at varied results. Beine, Docquier and Rapoport (2006, 2001) after adjusting for endogeniety using instrumental variables, find incentive effects. This mechanism shows a positive relationship between migration and development in SSA. However, Groizard and Llull (2004) using two stage least squares find that at higher probabilities of migration, human capital formation is depleted. The 2001 studies were both criticized for faulty data sets, however the later study (Beine *et al,* 2008) benefit from Docquier and Marfouk (2006) World Bank sponsored data set. In addition, causality tests indicated that migration had a positive and significant although small (0.05 per cent) effect on economic growth in Australia. Also, bi-directional causation shows that a one per cent increase in output growth causes a 0.015 per cent increase in migration (Bodman, 1998). Finally, "where accompanied by policies to promote return migration, international labour mobility could represent a powerful tool for growth" (Farchy, 2009).

Skill creation may suffer even where immigration of skilled workers enhances output. This happens if average human capital grows when immigrants are of better education quality than emigrants and therefore these educated settlers' crowd out initiatives to foster skill development by native workers (Stark, 2007; Zaqqa, 1996). These negative effects are diminished when considerations of intergenerational benefit are included particularly when higher average skill levels drive new technological frontiers in the economy.

A third group finds that countries with initially low human capital and low immigration rates are the main beneficiaries of a brain gain. Particularly, in a study of 127 countries, Beine *et al* (2008) show migration induces human capital formation while using counterfactual simulation to estimate country effects. Although an earlier study (Beine *et al*, 2003) had shown that these

results were true regardless of the wealth of the country of origin. A significant contribution of the 2008 study is their verification of incentive effects through empirical tests using improved data sets.

The impact of openness to migration on economic growth could be positive and significant (Farchy, 2009; Bodman, 1998) or positive but not significant to the economy (Barro and Sala-i Martin, 1995). How much output grows with migration depends on the net skill levels retained in the country of origin (Stark, 2007; Stark and Wang, 2002; Groizard and Llull, 2004). It is also influenced by the exchange between potential emigrants and immigrants (Stark, 2007; Belletini and Ceroni, 2002). In addition, the likelihood of return to the country of origin raises the gains from migration because the returnees are endowed with improved human capital (Farchy, 2009). Finally, high student mobility eventually distorts labour migration of the country of origin because of the decision to postpone optimal accumulation of human capital and then, eventually, acquire global skills in the destination country. The latter could be mitigated by government subsidy on skills needed in the source country rather than global skills (Ghoddusi and Siyahhan, 2010).

Conventional thought suggests that a destination economy interested in the welfare of the unskilled workers who stay behind should be prepared to admit some of then with the skilled ones. Economic unions also show better returns on labour migration since convergence is more likely within a region than globally (Di Maria and Lazarova, 2009; Farchy, 2009; Beine *et al*, 2006). The effects of ascension to the EU on general enrolment ratios support gain theories. The lack of immediate growth in output could be characterised by high delays in the responses to probabilities of migration attributed to risk adverse agents who weigh the cost of investing in human capital accumulation. Therefore when the general enrolment ratio was lagged three years, the results support the creation of skill argumentation (Farchy, 2009).

Loses from labour migration are also concentrated on least developed economies (Di Maria and Lazarova, 2009; Vidal, 2008; Docquier and Rapoport, 2006; Poutvaara, 2006). While countries with initially low incomes and low emigration rates are more likely to experience a brain gain, Sub Saharan Africa (SSA) is peculiar because the ratio of skilled emigrants to average skill level is exceptionally high (Docquier and Rapoport, 2006).

In magnitude, overall losses in developing countries were higher than gains at home and globally while differences in the types of skills acquired also lead to fall in output of these nations (Di Maria and Lazarova, 2009). Low-income economies would not invest in human capital accumulation given the barriers to migrate to developed countries (Vidal, 2008). Beine *et al* (2006) and Mountford (1997) find that countries with initially low human capital and low immigration rates are the ones that experience a brain gain.

Yet, another group of scholars find that the larger the gap between incomes in the destination country and the country of origin the higher the incentive to migrate and therefore, more likely there would be a net gain on the latter economy (Lucas, 2008; Cieslik and Tarsalewska, 2005; Stark and Wang, 2002). One explanation is the instance of middle-income households being the same ones to receive remittances from abroad which begins to equalize for example once poorer income household gain from migration networks (Taylor, 2006).

Appealing to Say's law, Stark and Fan (2007b) show that newly acquired skills could be a catalyst to technological development rather than result in educated unemployment. They support the argument with evidence on the growth of the industrial technology sector in India. While income drives migration, a three per cent increase in migration flows, drives the gap in earnings between the poor and rich countries so much as to overwhelm other trade flows (Lucas, 2008). In addition when the evolution of income inequality and output fits the Kuznet inverted U hypothesis, income inequalities reduce with migration in the long run (Galor and Tsiddon, 1996). Lucas (2008) did not deviate from the paradigm that the major winners are undoubtedly the

migrants themselves; and although there are significant global benefits, the gains to the country of origin remain somewhat ambiguous.

Migration is attractive because of higher wages nudging emigrants on to build those skills that are required to trade labour on a global market. The debates against labour mobility rather than trade in goods and services are also arguably seen as political given the possibility of economic integration that accompanies trade including migration. Where traditionally production and consumption of services often occur simultaneously, we see advances in information and communications technology amongst others, replacing conventional processes and economies benefit increasingly from outsourcing. In some cases, decisions of migration and outsourcing can become substitutes. However, Nigeria has not seen much outsourcing when compared with India and Eastern Europe.

In summary, globalisation is strictly welfare increasing because the positive probability of migration is followed by an increase in optimal levels of human capital workers choose to form. Simulation exercises also point out enormous global income gains from labour mobility (Lucas, 2008). An extension of these gains holds that there are also improvements in the welfare of the country of origin in cases where controlling migration is costly (Stark *et al,* 2004), if the labour market is inefficient and unemployment already exists or when the average level of human capital in the economy is not optimally set (Todaro and Smith, 2009).

CHAPTER FOUR

THEORETICAL FRAMEWORK AND METHODOLOGY

4.1 THEORETICAL FRAMEWORKS

Labour markets determine the returns to labour through supply and demand interactions and the rational individual's decision problem is wage maximization. On the aggregate, equilibrium wage rate in the developing economy is below the value in a developed country (Borjas, 2005). Wage depends largely on the level of skill, so that a worker's decision problem is how much human capital to form. The individual weighs the economic, social and psychological costs of migration such as transport expenses, the price of adaptation, time spent in procuring migration documents, against benefits of better living standards (Todaro, 1976). The household will invest in the decision to migrate, once perceived benefits exceed risks. Plausible increases in the returns to human capital, as a result of migration will expectedly nudge an individual to invest more in education.

"A brain gain results if the positive effects raise human capital stock above the levels expected in the absence of migration" (Farchy, 2009) or if the probability of emigration induces more skill creation than skill loss (Di Maria and Strizowski, 2006). The necessary condition for brain gain therefore is that human capital must increase following a growth in the probability of migration (Groizard and Llull, 2004). The necessary and sufficient condition is that the incentive effect must be greater than actual skilled migration (Beine *et al,* 2006). Basically, when human capital levels rise even after losses to migration, there is skill creation. Martin (1993) avers that the long-

term effects of international migration between two countries, is described as a 'migration hump[11]' where migration rose above the values expected in its absence.

4.1.1. MIGRATION AND HUMAN CAPITAL FORMATION THEORETICAL FRAMEWORKS

The study adopts a mix of the microeconomic neoclassical migration theoretical framework and the NELM for which the following propositions hold:

i. In a perfectly competitive market differences in both wages and employment rates would motivate migration, in this way the model relaxes the assumptions of full employment.
ii. The individual will weigh costs such as wage rates, probability of employment at the destination country against benefits such as social conditions, social ties and cliques and technologies that reduce cost of migration in the decision making process. If the perceived benefits in the receiving economy are sufficiently attractive, migration costs may be negative. In this case, a negative earning differential may be necessary to stop migration.
iii. Migration would continue until there is convergence of wages.
iv. Migration is a result of labour market inefficiencies in allocating resources.
v. Governments can control migration by influencing labour markets for example reducing the likelihood of employment for migrants, increasing psychological or material costs of migration at the destination country or raising incomes at the country of origin.
vi. Decisions are made by households rather than being made by individuals. Households, evaluate risks such as the probability of employment at the destination against returns and pool resources together to fund migration when they consider it is beneficial.

[11]Groizard and Llull (2004) later describes the bulk of middle income migrants as forming a migration hump in their observation of 92 developed and developing countries across the continents. Migration humps according to de Haas (2010) are "short-term hikes in migration in the wake of trade reform".

vii. Migration is an investment decision, which requires households to acquire potential information that will optimise the outcome of their decision such as human capital.

4.1.2 THE COST BENEFIT APPROACH

Workers compare returns to human capital at the country of origin and destination when they make investments in skill decisions. The worker maximizes utility from acquiring skills in two periods. In the first, utility from consumption equals earning and this also holds in the second period. The expected net return to migration ER(0) is calculated just before departure time at time 0 (Massey *et al*, 1993) expressed as

$$ER(0) = \int_0^n [P_1(t) - P_2(t)\, W_d(t) - P_3(t)\, W_0(t)]\, e^{-dt}\, dt] - C(0)$$

The potential returns to migration are the difference between the benefits and costs for migration. $P_1(t)$ is the probability of avoiding deportation $P_2(t)$ is the probability of employment at the destination economy and $P_3(t)$ is the probability of employment at the source country. $W_d(t)$ are the earnings if employed at the destination, and $W_0(t)$ is the earning if employed at the source community, d is the discount factor, and C(0) is the sum of all economic, social and psychological costs.

If the expected returns to migration are positive, the worker would migrate, if it is negative the he/she remains, while a value of zero would leave a worker indifferent between migrating or not. While this approach is very useful in capturing net effects of migration, it requires an accounting framework for comparing cost and benefits that secondary data does not capture.

4.1.3 THE HUMAN CAPITAL FORMATION APPROACH

In Stark (2005: 20-22) new economics of labour migration model, a worker aims to maximize his returns to human capital formation by getting as much skills as he can to reach his desired wage rate. He has a cost function of forming human capital (h)

$$c(h) = k(h) \qquad (1)$$

In the formation of human capital he/she considers private returns (p) and/or social returns (s) in an associated production function

$$f(h) = p \ln(h+1) + s \ln(\bar{h}+1) \quad (1.1)$$

for all h>0; p>k and s>0

The net earnings per worker function associated with human capital is:

$$w(h) = pln(h+1) + sln(\bar{h}+1) - kh \qquad (2)$$

for all positive values of h. The worker maximises human capital subject to the first order condition given as:

$$dw(h)/d(h) = p/(h+1) - k \qquad (3)$$

and the sufficient condition is expressed as:

$$\frac{d^2 w(h)}{dh^2} = -\frac{p}{(h+1)^2} > 0$$

so that the worker's optimisation decision considering private returns to human capital is stated as:

$$h^* = \frac{p}{k} - 1 \qquad (4)$$

$$w(h^*) = (p+s)ln\frac{p}{s} - s + k \qquad (5)$$

If we also considers the externalities associated with human capital, we modify equation (2)

$$W(h) = p\ ln(h+1) + s\ ln(\bar{h}+1) - kh$$

so that equation 2.3 can be re-written as,

$\frac{dw(h)}{d(h)} = p + s\ /(h+1) - k$, and it becomes

$$h^{**} = \frac{p+s}{k} - 1 \qquad (6)$$

In this case, equation 5 becomes

$$w(h^*) = (p+s)\ ln\frac{p+s}{k} - (p+s) + k \qquad (7)$$

A comparison of the optimal human capital (h*) without externalities to the optimal human capital with externalities (h**) and the wages associated with both shows that since s>0 and h**>h*, then

$$w(h^{**}) - w(h^*) = (p+s)\ ln\frac{p+s}{p} - s \qquad (7.1)$$

The intuition is that since for every x>1, x lnx> x-1, then

$$x = \frac{p+lns}{p} > 1 \text{ and } w(h^{**}) - w(h^*) > 0 \qquad (7.2)$$

The wages associated with social benefits from human capital formation are higher than those that result only from calculations of private returns. Imagine also that a worker has two economies to choose from, source (a) and destination (b) so that the level of returns at the destination to a worker whose human capital in the source economy is (h) is expressed as:

$$B \ln (a + 1) + C \qquad (7.3)$$

Where: $B > p + s$ and $C \geq 0$ and B and C are constant and exogenous to the model.

The theoretical model describes a simple two-country economy, with production exhibiting constant returns to scale. Labour is the only input in the production process therefore gross earnings per worker equal output per worker. The economy produces a single commodity whose price is normalised to 1. The workforce is homogeneous so that there are N^J identical workers in the set j = (S, D); where S describes the size of the labour force in the country of origin and D is the same variable for the destination country.

If the economy were closed, investment decisions on education acquisition would be limited to the returns available in that country. Workers maximum earnings are computed as the difference between gross income and the cost of acquiring human capital. The gross earnings per worker depend on both his/her level of human capital and the average level of human capital in the economy. In a closed economy, the individual builds human capital up to the optimum point where private returns are highest:

$$v^J = \frac{Bj}{c} - 1 \qquad (7.4)$$

Where: $B^j \varepsilon (B^s , B^D)$ is the private returns in the sending and the destination country and k is a constant parameter $0 < c < B^j$.

This relationship describes the constraint so that if the private returns are higher in the destination country than in the country of origin, then the investment in human capital must be higher in the former when compared to the latter.

$$\text{If } B^a > B^b \text{ then } v^b > v^a \qquad (7.5)$$

Imagine that we open the economy so that migration becomes possible and entails no costs, then since private returns are higher in the destination country relative to the country of origin, the direction of the migration will be from B^a to B^b. The optimal level of human capital for the open economy is thus expressed as:

$$V^{a*} = p\frac{(B^b - B^a) + B^a}{K} - 1 \qquad (7.6)$$

Where: p is the probability of migration, for every $0 < p < 1$, the level of human capital in an open economy is greater than the values for a closed economy because earning are dependent on a positive probability of migration. We assume that emigration is permanent and there is no provision for return. The mechanism is that the probability of migration induces the worker to accumulate human capital, which ultimately translates to increased levels of human capital in the sending economy but also aggregate improvements in the skill levels globally. In addition to the general framework where migration induces human capital formation, emigration particularly is also considered to contribute to increases in skill formation (Vidal, 1998). Capital for investments is generated through domestic savings as well as from abroad.

$$\widetilde{W}(h) - q\,[B\ln(h+1) + C + (1-q)[p\ln(h+1) + s\ln(\bar{h}+1) - kh \quad (7.7)$$

since

$$\frac{dw(h)}{dh} = \frac{qB}{h+1} + \frac{(1+q)p}{h+1} - k = \frac{q(B-p)+p}{h+1} - k \quad (7.8)$$

$$\frac{d^2w(h)}{dh^2} = -\frac{q\,(B-p)+p}{h+1} < 0 \qquad (7.9)$$

A worker's optimal level of human capital when comparing source and destination countries is:

$$w(\widetilde{h^*}) = (p+s)\frac{lnq\,(B-p)}{k} - [p(B-p)+p] + k \qquad (8)$$

Equation 8 indicates that there can be a positive relationship between probability of migration and net earnings per worker (Cieslik and Tarsalewska, 2005 p. 6). Wages or standards of living drive migration decisions, so that a worker accumulates human capital in order to maximise wages. The worker finds that it is more advantageous to accumulate human capital when there are two economies he/she considers and one (b) has higher returns on human capital than the other (a).

4.1.4 HUMAN CAPITAL FORMATION AND ECONOMIC DEVELOPMENT

The neoclassical theoretical framework in the independent seminal work of Solow (1954) and Swan (1954) includes labour in the economic growth model, which updated the Harrod-Domar[12] (1946) framework. Human capital contributes to economic development or per capita gross domestic growth (Barro and Sala-i-Martin, 1995).

The Solow model predicts convergence of wages across countries as they trade given that factors of production exhibit diminishing marginal returns. In fact, Mankiw, Romer and Wiel (1992:409) argue that the Solow model should still be taken seriously and interpret the evidence as consistent with the Solow predictions that poorer countries would have higher returns to physical and human capital compared to rich nations. Since we assume that wage differentials drive migration and particularly that these movements occur only as long as the differences in living standards persist, the Solow model eliminates a scenario of perpetual migration and is appropriate to the analysis of growth impacts of migration. In addition, the Solow model is

[12] Evsey Harrod (1939, 1948) and Roy Domar (1946) are both credited with the discovery of a neo-Keynesian approach to modeling economic growth.

suitable because it allows long term growth to depend on labour force growth and labour saving techniques. The model is specified in the simplest form as:

$$Y_t = F(K_t, A_t L_t) \qquad (9)$$

Where the left hand side represents total output. The model assumes two factors of production K_t represents capital; L_t, labour and t denotes time. Time does not affect production directly, as output would increase over time only if inputs to production grow. Labour is augmented by technology (A_t), which is Harrod neutral, that is, it is labour production efficiency that results. The production function exhibits constant returns to scale, for capital (K) and labour productivity (AL). This implies that the economy is big enough to absorb any changes to labour and capital and that the gains from specialisation have been exhausted.

The growth model using a Cobb-Douglas production function can be extended to include human capital and specified as:

$$Y = AK(t)^a [A(t)\, H(t)]^{1-a} \qquad (10)$$

Y, K and A are as specified in the Solow growth model, Y defines output, K defines physical capital and A is a positive value representing technology or effectiveness of labour. H is the total amount of productive services supplied by workers, which is from the contribution of labour to production from every skill level. An exogenous fraction of output s is saved, and capital depreciates at the rate (d) so that:

$$\acute{K}(t) = sY(t) - dK(t) \qquad (10.1)$$

We define growth rate of technological progress as g

$$\acute{A}(t) = gA(t) \qquad (10.2)$$

The value of human capital depends on years of schooling so that if each worker spends the same time on education, then effectiveness of labour is a function of the number of workers (L) and the amount of education (A), and:

$$H(t) = L(t)\, G(A) \qquad (10.3)$$

Population, which is equal to the work force grows at an exogenous rate expressed as:

$$\acute{L}(t)=nL(t) \qquad (10.4)$$

Physical capital per unit of effective labour is stated as:

$$k = K / [AG(E)L] \qquad (11)$$

and output per worker is the same as output per unit of effective labour services so that equation 10 becomes:

$$Y/L = A\, G\, (E)\, y \qquad (12)$$

This implies that the rise in education received will increase output per worker on the balanced growth path in the same proportion as it increases G (E). The endogenous growth model introduces human capital as a contributor to economic growth without affecting the conclusions of the exogenous growth model about the effects of physical capital accumulation.

4.2 METHODOLOGY

The key advantage for Nigeria of the framework proposed by Cieslik and Trasalewska (2005) resting on Stark (2005) human capital theory is that it employs variables from basic demographic data, appropriate where statistics are generally deficient. The approach is two-throng, first an investigation of the correlations between migration and gross investment in human capital and then an exploration of the relationships between labour migration, human capital formation and GDP growth per capita relying on the Solow (1956) model.

4.2.1 MODEL SPECIFICATION: MIGRATION AND HUMAN CAPITAL FORMATION

The functional form for the relationship between migration and human capital formation derives from equation (8) following the works of Cieslik and Tarsalewska (2005) anchored on the new economics of labour migration model (Stark, 1990). We test the impact on human capital formation (h) of public spending on education (p), migration (m), population (n), access to education (a), and a measure of living standards (y) while the error term ε_t is stochastically normally distributed.

$$h_{tj} = \alpha_0 + \alpha_1 m_t + \alpha_2 p_t + \alpha_3 a_t + \alpha_4 y_t + \alpha_5 n_t + \varepsilon_t \qquad (13)$$

In a more detailed analysis, we also test for the impact of labour migration on human capital formation. Apart from labour migration that replaces migration rates, all other variables remain the same and the equation is expressed as:

$$h_{tj} = \alpha_0 + \alpha_1 lm_t + \alpha_2 p_t + \alpha_3 a_t + \alpha_4 y_t + \alpha_5 n_t + \varepsilon_t \qquad (14)$$

where lm represents labour migration.

In order to reduce the distribution of the series without affecting its order, we specify the natural logarithm values, so that equation 13 becomes:

$$lnh_{tj} = \alpha_0 + \alpha_1 lnm_t + \alpha_2 lnp_t + \alpha_3 lna_t + \alpha_4 lny_t + \alpha_5 lnn_t + \varepsilon_t \qquad (15)$$

These estimates the degree of responsiveness of human capital to migration, public spending on education, access to education and income levels. Equation (15) was transformed to correct for

autocorrelation, by using lagged values of the explanatory variables so that the equation estimated was:

$$h_{tj} = \alpha_0 + \alpha_1 m_t(-2) + \alpha_2 p_t(-2) + \alpha_3 a_t(-2) + \alpha_4 y_t + \alpha_5 n_t + \varepsilon_t \quad (16)$$

Also, equation 14 becomes

$$\ln h_{tj} = \alpha_0 + \alpha_1 \ln lm_t + \alpha_2 \ln p_t + \alpha_3 \ln a_t + \alpha_4 \ln y_t + \alpha_5 \ln n_t + \varepsilon_t \quad (17)$$

The relationship is the same as specified in equation (15) only that labour migration (lm) now enters the equation replacing migration rates (m). Similarly, the labour migration equation as an autoregressive distributed lag and one of the explanatory variables transformed by lagging two periods. GDP was strongly correlated with labour migration and was excluded form the final transformation. Equation (17) was estimated as:

$$\ln h_{tj} = \alpha_0 + \alpha_1 \ln lm_t + \alpha_2 \ln p_t + \alpha_3 \ln a_t(-2) + \alpha_4 \ln n_t + \alpha_5 \ln h_t(-2) + \varepsilon_t \quad (18)$$

The dependent variable, H_t represents human capital formation and refers to the level of graduates produced by the country. Enrolment rates are more easily available as there are gaps in data on completion rates for tertiary institutions. In addition, enrolment reacts to work prospects much faster than the stock of university graduates (Di Maria and Lazarova, 2009). Variables describing human capital could either be those representing stock (average years of schooling or schooling attainment) or flow including enrolment rates or output from various institutions. Enrolment however has a disadvantage that it does not depict actual outcomes.

The explanatory variables are chosen based on the NELM analytical framework premised on the fact that previous empirical studies have appealed to these in their investigation of how migration

affects human capital formation (Docquier and Rapoport, 2012, de Hass, 2011, Di Maria and Lazarova, 2009; Cieslik and Tarsalewska, 2005).

Two main variables affect levels of human capital in this framework, migration rates and public spending on education. *A priori,* we expect that migration rates will increase with human capital formation, since we have postulated that it grows when the probability of migrations rises. The other key factor that affects human capital formation is public spending on education since government spending on this component also subsidises the costs of education making it more accessible. Public spending on education reduces private investment in skill formation and the more the government investment the less the cost of acquiring education.

Human capital is expected to increase as public spending on education rises because improved skills are the direct returns on such spending. An alternative to public spending as a measure of investment in education has been savings rate as it is generally considered that higher savings rates imply more investment. Nonetheless, because of the significant informal sector in Nigeria and high income inequalities that would affect the average values, savings will not be representative of investment in education decisions.

The other variables control for the effects of omissions and include standards of living measured in GDP per capita (y) which impacts positively on the educational level because better conditions mean the returns to education are more likely to be enjoyed and therefore, they motivate human capital formation. Such variables that represent living standards and motivate human capital formation could also include life expectancy, number of telephone users (Cieslik and Tarsalewska, 2005). Life expectancy figures are more readily available but they vary little over short periods and may not capture the effects of livings standards. National income may strongly correlate with human capital and GDP per capita of the country of origin is in addition, a proxy for wage differentials (Beine *et al*, 2001). Further, standards of living also describe proximity to

the technological frontier as more advanced nations have closer values (Di Maria and Lazarova, 2009).

Human capital accumulation is also affected by access to education, training and health; as well as prices of complementary inputs. With respect to access to education, following Lazarova, Zaqqa (2006) this study has adopted the number of teachers to proxy access to education since it describes the supply-side of education. An alternative proxy applied in other studies (Di Maria and Lazarova, 2009; Beine *et al.*, 2006) was population density, which is not representative of access to education in Nigeria. Statistics show that 75 per cent of school age pupils have access to schools in Nigeria (NBS, 2009). Further, population, which entered the equation as a control control variable may rise with human capital as economically active persons increase with population (Fadayomi, 1996). Conversely, population increases may exert pressures on available resources through Malthusian type frameworks (Di Maria and Lazarova, 2009).

4.2.2. MODEL SPECIFICATION: MIGRATION, HUMAN CAPITAL FORMATION AND ECONOMIC GROWTH

Premised on equation (12), a rise in education improves a worker's productivity. We estimate the relationship between Gross Domestic Product (Y) as the dependent variable and migration (m), public spending on education (p), human capital (h), remittances (r) and access to education (a). Subscript t refers to the time period. The traditional macroeconomic proposition on the relationship between migration and economic growth are extended allowing individual workers to respond to probabilities of migration, by building more skills, following Di Maria and Lazarova (2009).

$$Y_t = \alpha_0 + \alpha_1 m_t + \alpha_2 p_t + \alpha_3 h_t + \alpha_4 r_t + \alpha_5 a_{t+} \varepsilon_t \qquad (19)$$

Also we estimate same, for labour migration (lm) replacing migration and all other variables remain the same and are expressed as:

$$Y_t = \alpha_0 + \alpha_1 lm_t + \alpha_2 p_t + \alpha_3 h_t + \alpha_4 rs_t + \alpha_5 a_t + \varepsilon_t \quad (20)$$

And the natural log form is stated so that equation 19 becomes:

$$\ln Y_t = \alpha_0 + \alpha_1 \ln m_t + \alpha_2 \ln p_t + \alpha_3 \ln h_t + \alpha_4 \ln r_t + \alpha_5 \ln a_t + \varepsilon_t \quad (21)$$

where lnm is the elasticity of income with respect to migration. Similarly, lnp, lnh, lnr, lna all represent the degree of responsiveness of income to public spending, human capital, remittances and access to education respectively. Subscript t refers to the time period.

also equation (21) is expressed as:

$$\ln Y_t = \alpha_0 + \alpha_1 \ln lm_t + \alpha_2 \ln p_t + \alpha_3 \ln h_t + \alpha_4 \ln r_t + \alpha_5 \ln a_t + \varepsilon_t \quad (22)$$

The variables in equation (22) represents elasticity of the same variables in equation (21) with respect to income, however, migration is replaced with labour migration (lnlm).

The equation implies that the growth rate of GDP per capita (Y) measured in purchasing power parity (PPP) is affected by the five variables to be estimated, the migration rate (m) that is the change in net emigration level representing the probability of migration (Vidal, 1998); the level of human capital (h), the skill level in the country which affects economic development through the standard growth framework. Human capital formation, through classical growth channel, contributes to economic development. Public expenditure on education (p) denotes the cost of human capital formation. Access to education represents the advantages of having more teachers. Remittances are a source of addition income and foreign exchange could contribute to the GDP, particularly in SSA where remittances are at values close to official development aid and are considered the largest financial flow after FDI. Finally, we expect a positive relationship

between migration rate, human capital and economic development because we have shown theoretically that through the incentive effect they move in the same direction.

Equations (20) and (22) were transformed to correct for autocorrelation and estimated as:

$$\ln Y_t = \alpha_0 + \alpha_1 \ln m_t(-1) + \alpha_2 \ln p_t(-1) + \alpha_3 \ln h_t(-1) + \alpha_4 \ln r_t(-1) + \alpha_5 \ln a_t + \varepsilon_t \quad (23)$$

In equation (22) the GDP variable was excluded given its autocorrelation with labour migration and estimated as:

$$\ln Y_t = \alpha_0 + \alpha_1 \ln \ln m_t(-1) + \alpha_2 \ln h_t(-1) + \alpha_3 \ln h_t(-1) + \alpha_4 \ln r_t(-1) + \alpha_5 \ln a_t + \alpha_4 \ln y_t(-1) + \varepsilon_t \quad (24)$$

4.3 ESTIMATION TECHNIQUES

Previous studies (Di Maria and Lazarova, 2009) have used Ordinary Least Squares (OLS) for measurements of the impact of migration in human capital formation. It is notable that most investigations on this relationship have utilised panel data for a set of countries. In these cases, instrumental variables were introduced to correct for heterogeneity issues that arise.

4.4 DATA REQUIREMENT, SOURCES AND TRANSFORMATION

Immigrants to Organisation of Economic Co-operation and Development (OECD) countries by educational status are recorded in the statistical office of the European Communities (EuroStat), an OECD publication. Many countries including Nigeria, notably do not include nationalized or second-generation migrants in their data. The World Bank (2010) dataset covers statistics on net migration and levels of education of emigrants and immigrants reported every five years. The

International Office for Migration releases random figures at about the same five-year interval in their outlook on migration report. The Central Intelligence Agency (CIA) World Fact Book provides some country profiles including annual migration rates and net migration. Observably, these migration rates are often static for a period of five years.

In Nigeria, the National Population Commission (NPC), National Commission for Refugees (NCFR), Development Research Centre on Migration, Globalisation and Poverty, Post Census Enumeration Survey (PES) and Net Migration and Urbanisation Survey all provide some random information on demography and migration in Nigeria. The National Immigration Services (NIS) has the details of all foreign emigrants and immigrants (persons departing and persons arriving) from and to the country without reference to the duration of stay. This information was published through the annual abstract of the National Bureau of Statistics (NBS). The Survey of Internal Migration, provides population figures relevant to the extent in which demographic size and income per capita contribute to the net effect of labour migration. The data is only on arrival by nationality and reasons for entry by region of origin and none on departures.

This study has therefore adopted the OECD and World Bank data on migration rates as a percentage of population for Nigeria. At the same time, the problem of static period is addressed by estimating the actual number of migrants using annual population. A similar approach was used in de Haas (2010b). The data on level of education of migrants was not available for more recent years making it impossible for this study to differentiate skilled from unskilled migrants. In addition the specific data on labour migration was also scanty therefore this study made use of labour migration figures to six OECD countries (United States, United Kingdom, Canada, Denmark, Italy and Sweden).

Enrolment rates for tertiary educated person as well as total public expenditure on education are those available from the Annual Abstract of Statistics of the NBS while public spending on education (recurrent) are from the CBN.

CHAPTER FIVE

EMPIRICAL RESULTS

5.1 PRELIMINARY DATA ANALYSIS

The variables used in the analysis are migration rates (m), labour migration (migration stock), human capital (h), gross domestic product (y), public spending on education (p), recurrent public spending on education (p2), remittances (r), access to education (a) and population (n). Net migration rates (m) are five-year estimates of the total number of immigrants minus the annual number of emigrants including citizens and non-citizens. Labour migration rates are annual immigrant stock of Nigerians to six OECD countries (Canada, Denmark, Italy, Sweden, United Kingdom, United States). A detailed description of variables and their sources is shown in the appendix, Table A1.

The general descriptive statistics (Appendix A5) shows trends and distributions of a series. Deviations from the normal distribution have been transformed using the natural logarithm of the values in the regression analysis rather than absolute values in order to reduce spacing of the data points and normalise the series without affecting the order. The log-form smoothens the trend and stabilizes the series while bringing the variance to the same order. The parameter measuring standard of living (Y), which is the GDP was also adjusted for population changes.

Human capital (h), remittances (r), access to education (e) public spending on education (p) and labour migration (lm) are slightly skewed to the left, that is, most values are concentrated on the right of the mean, with extreme values to the left. A negative sign is indicative of skewness to the left. Migration (m), standard of living (y) and recurrent public spending on education (p2) have skewness values greater than zero indicating that they are skewed marginally to the right. Remittances, standard of living and access to education, are closer to the kurtosis value of three expected for a normal distribution. The other variables are remotely different from three; human

capital has a kurtosis value of 7.6. A value greater than three indicates that it is sharper than the normal distribution, with values concentrated around the mean and thicker peaks. Migration has values of 1.7, labour migration 1.4 and public spending, 1.5. This applies to cases flatter than the normal distribution with a wider peak.

Migration was highest in the early 1980 fell to its lowest value in 1985 although it has risen steadily since then. Theory avers that migration rates would rise as economic conditions worsened, although empirics suggest that migration has increased at about the same rate as population (de Haas, 2011). Immediately after 1981, associated with fall in international oil prices, migration rates in Nigeria increased steadily. It would appear that the response to worsening economic conditions in Nigeria was delayed as the 1985 reduction in migration was against the 1981 fall in oil prices. It is unclear what led to the fall in migration values in 1985, although poor economic conditions led to the expulsion of more than two million workers mostly from Ghana, Niger, Cameroon and Chad (Adepoju and van der Wiel, 2010) in 1983 and 1985. This by the migration definition used by the World Bank would be captured in Nigeria's migration rates. Further, the expulsion may have decreased the pressure on the labour market and increased employment of Nigerian workers reducing the pressure to migrate. The migration rates rose steadily after 1985 but it was not until 2004 that it approached the values that persisted in the early 1980s.

It has been inferred that migration patterns would be affected by external policy, particularly heavier restrictions on entry conditions between 1995 and 1999. Notably, in Nigeria both migration and labour migration rose in 1995 and afterwards. Observably, the 2007 global financial crises was not characterized by a significant decline in migration rates, while labour migration stock decreased by 1,145 persons in 2008, rose again by 2009 and fell by 286 in 2010. Migration has risen steadily immediately after the sharp decline in 1985, against expectations that more strict entry conditions into the country of destination would reduce migration rates.

Remarkably, there are lower growth rates of migration after 2006 perhaps in response to the 2004 global financial crisis.

Labour migration to six OECD countries has risen steadily since 1980, fell by about six per cent between 1990 and 1991 and by about 37 per cent in the following year and did not rise until 1995. Labour migration to the United Kingdom, the country that suspended commonwealth privileges to Nigeria in 1995, also rose that very year and significant rises were seen between the years 1995 and 1996. Labour migration fell in the year 2007 and 2008 relative to 2006. These shifts would suggest that labour migration responded more to market conditions following the 2007 global financial crises than to internal policy at the country of destination, following more strict entry regulations in 1995. Observably, the few points of entry discussed are insufficient to draw general conclusions on labour migration.

Human capital was notably at its lowest between 1990 and 1995 and at its highest between 1997 and 2005 with a peak in the year 2004, declined after 2007 although the values have since 2009 risen again.

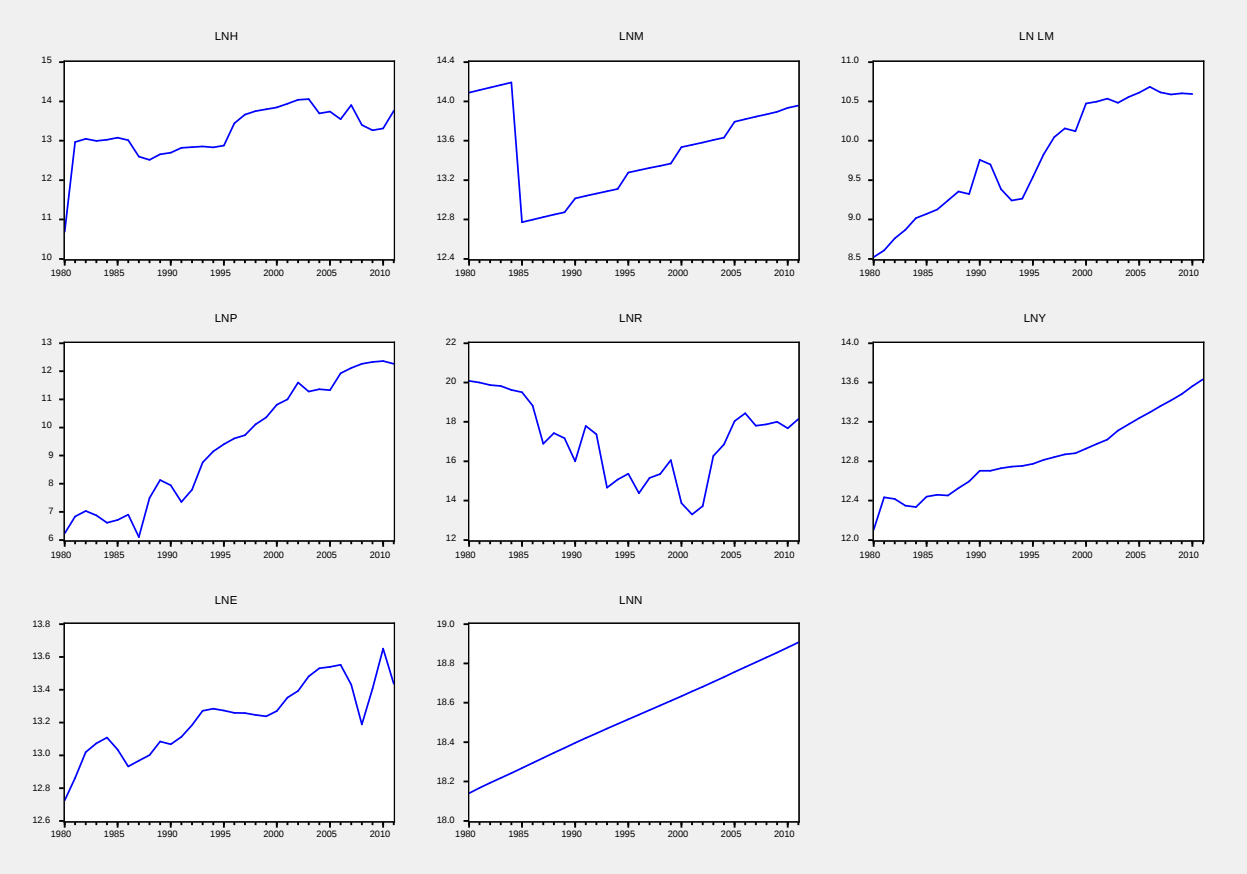
Worker's remittances, that is, transfers made by migrants to their relatives in their country of origin, are an indicator of access to credit facilities. The remittances by migrants to Nigeria were above 500 million US dollars in the 1980s but declined afterwards, while the lowest figure reported is in the year 2001. The values have been quite volatile over the 32-years of analysis. It declined persistently through the 1980s but increased in 1988 relative to 1987. Notably, in 2003, it picked up but dropped again by 2007 and again declined until 2010 when it rose but not near the values of the early 1980s.

Access to education has also been volatile. It rose between 1980 and 1984, declined between 1985 and 1987 and varied around the low values between 1985 and 1990. Access to education grew steadily after 2001 but plummeted from 2008 to 2009. A significant increase in the variable

can be seen between the years 2003 and 2005. It declined afterwards, and did not grow again until 2010.

GDP has risen steadily through the period of analysis (1980-2011). Public spending on education has also grown steadily with higher growth rates after 2006. Finally population has increased steadily and appears to have a trend with a constant mean.

Figure 5.1 Individual Trends of the Variables



Source: Computed based on Appendix A2 and A3

5.2 PRESENTATION AND ANALYSIS OF REGRESSION RESULTS

The results for the Augmented Dickey Fuller (ADF) test including constant and trend, for unit root are reported for one per cent level of significance. The results show that the null hypothesis of the ADF test for a unit root cannot be rejected for all variables at 99 per cent level of confidence. Human capital is trend stationary in the mean at I(0) order of integration. Most of the other variables (migration, remittances, public spending, standard of living) are integrated of order one I(1) with the exception of access to education and population which are in the second order I(2).

TABLE 5.1 TEST FOR UNIT ROOT

Variables *	Levels	d1	d2	Critical Value	Order of Integration
	***At 1% level of significance**				
H	-3.661661	..		-5.139943	I(0)
LM	..	-3.679322	..	-4.289795	I(1)
M	..	-3.711457	..	-12.05127	I(1)
P	..	-3.689194	..	-4.663737	I(1)
A	..	..	-3.689194	-7.534685	I(2)
R	..	-3.670170	..	-5.321844	I(1)
Y	..	-3.670170	..	-8.936068	I(1)
N			-4.416345	-4.793345	I(2)

5.3 ESTABLISHING THE LONG-TERM RELATIONSHIPS AND IMPACT

The Johansen cointegration test is used typically when variables are integrated of order I(1), although it is not obligatory to pre test the order. It is therefore possible to apply the Johansen test though the variables have different orders of integration. This test is chosen because it allows for more than one cointegrating result, required to determine if there is any long-term relationship between the parameters. The outcome indicates correlations between the variables. The results show Eigen values are significantly different from zero and two cointegrating equations at five per cent level of significance and one cointegrating equation at one per cent level of significance. This affirms that there is a long-term relationship between the variables.

Table 5.2 **Cointegration Test Results**

Included Observations 30 (after adjusting endpoints)

Test Assumption: Linear deterministic trend in data

Lag interval: 1 to 1

Series: LNH LNM LNP LNE LNR LNY

Eigen Value	**5% critical value**	**1% critical value**	**No of CE's**
0.803964	94.15	103.18	None **
0.602824	68.52	76.07	At most 1*
0.549712	47.21	54.46	At most 2
0.340562	29.68	35.65	At most 3
0.159322	15.41	20.04	At most 4
2.67E-05	3.76	6.65	At most 5

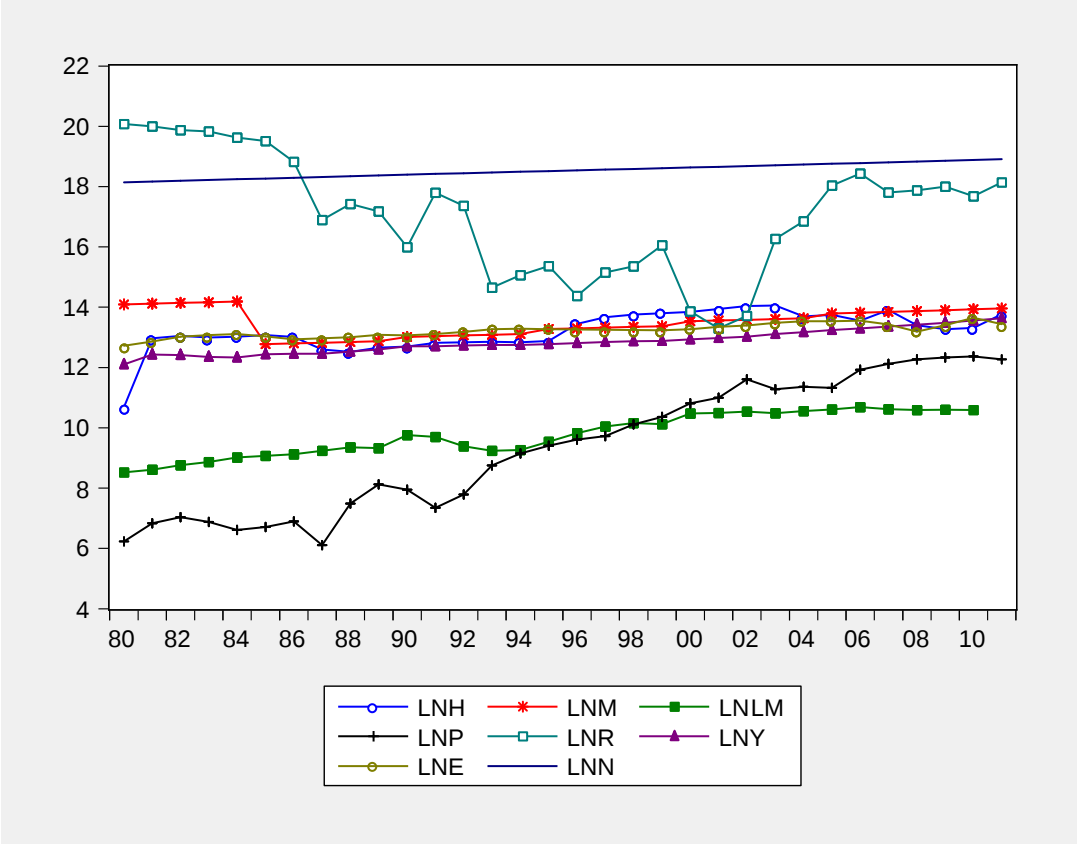
***(**) denotes rejection of the hypothesis at the 5%(1%) level**

Trace test indicates 2cointegrating equation at the 5% level

Trace test indicates 1cointegrating equation at the 1% level

Figure 5.2 shows that trends in the logarithmic values of variables used in the regression analysis while plotting all variables on a single chart. This features migration series moving in the same direction with human capital between 1983 and 1995, however in 1994, the trends in human capital formation diverged and have continued to move in a relatively different direction from those in migration until 2004. The divergence was repeated again between 2007 and 2010 although at smaller rates. Over these periods, changes in human capital formation drop significantly while migration rates fluctuate but increase on the average. Human capital only resumed positive growth rates again after 1995. The values have fluctuated since 2004 but have been on the decline since 2007. Public spending on education (p) was also low during the late 1980s, which persisted until 1995 when the values grew again. There has been steady growth rate in public spending on education since 2006.

Figure 5.2 Trends in Variables Used in the Regression Analysis Log Values



Legend:

H	Human Capital Formation	Y	Standards of Living
M	Migration	LM	Labour Migration
E	Access to Education	P	Public Spending on Education
N	Population	R	Remittances

Notes: LN denotes natural logarithm values

5.4 ESTABLISHING THE RELATIONSHIPS BETWEEN THE VARIABLES

This study set out to determine if migration spurred human capital formation and the net effect on economic growth after accounting for lost skills from those leaving the country. It started by using covariance and correlations as a reliable measure to access the relationship between the variables. Table 5.3 describes the relationship between the variables used in the analysis. The tendency of the variables is captured in the sign of the covariance and correlation coefficients.

Migration stock variable (lm) shows strong positive correlations with public spending on education, human capital formation, living conditions and access to education. Only public spending and remittances are positively and significantly correlated with migration rates. While this is reliable, that is the method produces identical results in repeated applications, the validity of this conclusions would be verified using simple regression analysis.

Contrary to the expectation that migration stock and migration rates would move in the same direction and be closely correlated since they represent the same phenomena, the correlation matrix shows a non-significant and statistically weak relationship between these variables. Further, remittances are negatively correlated with the migration stock data and most other data. It is also possible that changes in another variable influence both migration stock data and remittances.

The pairwise correlation matrix indicates that labour migration is strongly correlated with GDP, access to education, total public spending on education, recurrent public spending on education and human capital formation. Labour migration is weakly correlation with migration and has negative correlation with remittances. The highest correlation is between labour migration and GDP growth showing that at higher standards of living there is more migration. This could be related to the income status of the country as low migration rates are associated with low-income countries given the cost of migration. Middle-income countries have been able to take advantage of global labour markets given that they can afford to migrate. The variables compared with human capital formation reveal that labour migration has the highest correlation values (0.77).

Table 5.3: Pairwise Correlation Matrix

	LM	**M**	**P**	**Y**	**H**	**R**	**E**	**N**
LM	**1.0000**							
M	0.1543	**1.0000**						
PS	0.8373	0.3479	**1.0000**					
Y	0.8897	0.1260	0.9116	**1.0000**				
H	0.7739	0.0865	0.4432	0.5649	**1.0000**			
R	-0.5135	0.6575	-0.2638	-0.5293	-0.4270	**1.0000**		
E	0.8441	0.1077	0.7061	0.8527	0.6545	-0.5357	**1.0000**	
N	0.9522	0.0835	0.8835	0.9703	0.6654	-0.6004	0.8819	**1.0000**

Source: Computed with values from Appendix A2 and A3

5.5 OLS REGRESSION RESULTS

The variables for all of the regression analysis were log transformed in order to bring the series closer to a normal distribution, reduce the problem of multicolinearity, and transform the variances to the same scale. The regression estimate results denote elasticity and are interpreted as the effect of a percentage change in the dependent variable when the independent variables change by one per cent. Equation 25 reports the results of an OLS regression of the human capital formation equation (t-statistics are reported in parenthesis below the corresponding estimated coefficient and ln denotes natural logarithm).

$$H = -62.75 + 0.48 \ln m(-2) + 0.13 \ln p(-2) - 0.47 \ln a(-2) + 6.56 \ln n - 3.66 \ln Y \quad \text{(eq.25)}$$

(-2.74) (4.71) (2.17) (-0.98) (3.54) (-4.79)

Adjusted R^2= **0.78** Number of Observations = **30** F= **22.68** Durbin-h = **-3.0285**

The same results are reported in Table 5.4. They show a significant relationship between human capital formation and the key explanatory variable, migration, at the one per cent level of confidence. The results show that human capital is responsive to changes in migration two periods earlier with a coefficient of 0.48. Further, public spending on education has a positive impact on human capital formation at the five per cent level of significance. Public spending on education positively impacts on human capital formation by 13 per cent two periods later.

Population may also have a positive effect on human capital formation since higher number of people means more economically active population, although, in Malthusian type models the impact of population is negative. The results affirm the former assertion, showing a positive and significant relationship between population and human capital. Access to education and GDP, which were both expected to relate positively with human capital showed an indirect relationship. Access to education was not significant. The second variable, GDP, was to show that at improved standards of living there was more human capital formation but the results were

the reverse. Although GDP is positively correlated with HCF in the correlation matrix, it appears that at higher standards of living there is less human capital formation in Nigeria. This counter intuitive result may be because this study adopted enrolment rates rather than completion rates to represent human capital. The data was primarily used because enrolment rates capture the incentive effect more readily (Di Maria and Lazarova, 2009) but also because better annual series were available for enrolment rates.

Theory posits that human capital formation would be positively related with migration, public spending on education, access to education and standard of living. The NELM theory predicts that migration rates would move in the same direction with human capital formation since people would build more skills if they could receive higher returns for them on a global market. In this sense, the results for Nigeria are indicative of an incentive effect that migration has on human capital formation. Observably, the presence of the incentive effect that migration has on human capital formation in Nigeria affirms some previous studies using pooled data on SSA (Di Maria and Lazarova, 2009; Cieslik and Tarsalewska, 2005; Beine *et al*, 2001). Beine *et al,* 2006 and Doquier and Rapoport , 2007 contend that while the incentive effect of migration is positive for human capital formation, financial constraints are likely to limit people's capacity to respond in poorer countries.

Table 5.4 OLS Regression Results for the Impact of Migration on Human Capital Formation

Dependent Variables	**H**
Number of Observations	**30**
Variable	**Coefficient**
C	**-62.7569 **** (-2.7437)
M(-2)	**0.4832*** (4.7101)
P(-2)	**0.1367**** (2.1707)
E(-2)	**-0.4682** (-0.9821)
N	**6.5624*** (3.549079)
Y	**-3.6611*** (-4.7936)
Adjusted R-squared	0.7889
F-statistics	22.6841
D-W-Statistics	1.7996
Durbin-h	-3.0285

Source: Authors Computation based on Appendix A2

Note: *, ** and *** indicate statistical significance below 1%, 5% and 10% levels, respectively. t-values are in parenthesis.

A high probability of migration, close to a fifty-fifty chance, derived from the magnitude of the coefficient, is required for a unit change in human capital formation. Using a sample of 127 countries including those in the Sub Saharan African (SSA) region, the value of migration was found to be between 0.042 and 0.050 (Beine *et al,* 2006). Notably, the magnitude of impact for this study shows a much higher value at 0.48. This could have resulted from data discrepancies between both studies since this analysis appealed to net emigration rates rather than labour migration rates used by Beine *et al* (2006). Labour migration stock values are used later in this study (Table 5.5) although this reduced the value to (0.38) it is still significantly different from the estimates arrived at in Beine *et al.,* 2006. This difference perhaps is accounted for since the latter relied on panel data series while this study is country specific. Also, it was impossible to measure migration by skill level directly in our study giving missing data on graduates by field of study.

Rodriguez-Pose and Vilata-Bufi, (2004) point out that, contradictory results have obtained from models using stock or flow variables in the measure of human capital. This study has used rates and stock variables in the measure of migration and flow variables to calculate human capital. The enrolment as a proxy for human capital formation is the right point of analysis in measuring responses to incentives (Di Maria and Lazarova (2009). While it is suitable to measure agent responses to incentive effects on enrolment rates, this did not provide information about what a country is doing with its educated stock. Our study also lacked indicators of adjustment between education supply and labour demand.

Public spending on education refers to an investment in human capital formation, measured using recurrent government expenditure. This approach was used given that recurrent values are useful for measuring short run impact and found more robust to the OLS regression than total expenditures. These values are expected to increase human capital formation, as more government investments would translate to increased turnout of students. These results conform

with Di Maria and Lazarova (2009) and show that human capital and public spending move in the same direction, though public spending is lagged periods in Nigeria.

Access to education (a) and standard of living (y) are both included in the equation to account for missing variables. Their presence also negatively affects human capital formation. Access to education represents the ease with which one can procure skills and in this way serves as a proxy for private investments. Since data on the total number of teachers in private and public primary and secondary schools has been used to represent access to education, higher values are expected to express better access to education and therefore, more human capital accumulation. However, their contribution to human capital formation was not significant.

Standard of living is also expected to affect human capital formation positively. Higher standard of living would mean there can be more invested in skills since it is expected that the returns would be enjoyed for longer periods. The converse also holds since higher skills translate to improved living standard. In this study, standard of living in the current period account for a negative but significant change in human capital formation. Generally speaking, SSA has shown poor results in terms of human capital formation (Beine *et al*, 2006). Observably, GDP enters the equation as a proxy for standard of living. The theoretical background implies that at low standard of living, more people would leave the country for better opportunities therefore there would be less human capital as GDP rates declined. The results show that high levels of human capital are associated with low levels of GDP. Notably, the pairwise correlation matrix in Table 5.3 shows a positive correlation between GDP and human capital and a strong positive correlation with labour migration (0.90). The correlation matrix is a reliable method of examining the relationship between variables, however regression analysis is both reliable and valid.

The OLS assumes homoscedasticity and no serial correlation. In our initial examination, low Durbin-Watson values for the simple regression analysis suggested the existence of

autocorrelation. The migration and human capital variables have been known to be endogenous since some of the same factors that account for skill formation also account for migration (Cieslik and Tarsalewska, 2005). The inclusion of autoregressive variable on human capital formation helped remedy this problem while lagged values of public spending on education; migration and access to education also improved the Durbin Watson values. The final results with Durbin-Watson values of 2.109 that is close to 2, informed the conclusion that the initial autocorrelation problem has been remedied. To validate the autocorrelation the Durbin-h values was calculated applying the formula $h = 1 - \frac{1}{2}d\sqrt{\frac{T}{1-T*\widehat{Var\beta_1}}}$ and the result was -3.0334. The null hypothesis indicating the condition for no serial correlation is that h values lie between -1.96 < h < 1.96, that is, we reject the null hypothesis for Durbin-h values less than -1.96. Therefore, the result shows no serial correlation of the error terms.

The residual variance results for the model explaining the relationship between migration and human capital formation show a relatively good fit where R-squared and adjusted R-squared values are 0.87 and 0.85, respectively. This means that the proportion of variation in the dependent variable that is explained by the independent variables is 85 per cent. The results are robust to variable changes for public spending and migration at two subsequent periods. They indicate that human capital formation decisions are affected by public spending from previous periods and that building human capital in response to migration probabilities takes time. That is, agents first watch the market to see if changes in migration probabilities persist before they decide to respond by building additional skills.

Further, Table 5.5 extends the analysis using data on labour migration from Nigeria to six OECD countries (Canada, Denmark, Italy, Sweeden, United Kingdom and United States) to determine its relationship with human capital formation in Nigeria. The sample size covers six of the key recipients of documented migrants from Nigeria and is interpreted as representative of the behaviour of Nigerian emigrants generally. Equation 26 reports the results of an OLS regression

of the human capital formation equation regressed on labour migration stock (t-statistics are reported in parenthesis below the corresponding estimated coefficient and ln denotes natural logarithm).

$$H = 54.27 + 0.38 \ln lm + 0.24 \ln p - 3.18 \ln n + 0.32 \ln a(-2) + 0.57 \ln h(-1) \quad \text{(eq.26)}$$

(3.02) (1.85) (2.76) (-2.84) (0.83) (4.15)

Adjusted R^2= **0.85** Number of Observations = **29** F= **33.47** Durbin-h = **-3.0334**

The results indicate that labour migration impacted positively (0.38) on human capital formation, although significant only at 10 per cent levels of confidence (0.07). The implication is that if labour migration, interpreted as the probability to migrate, was high then it encouraged more people to accumulate human capital with the view to work abroad. A one percent increase in labour migration positively affected human capital (0.38). This indicates that human capital responds strongly to changes in migration.

Public spending on education (0.24) also had a significant (at 5%) and positive relationship with human capital formation. This means that a one unit change in public spending on education would lead to a 0.24 unit change in human capital formation. Access to education had a positive but not significant impact on human capital formation. Finally, at higher levels of human capital formation, population was significant and negative (-3.18). This conforms Malthusian type models that higher population rates crowd out access to resources making the economic agents worse off.

Table 5.5 OLS Regression Results on Labour Migration and Human Capital Formation

Dependent Variables	**H**
Number of Observations	**29 (After adjustments)**
Variable	**Coefficient**
C	**54.2778**** (3.0241)
LM	**0.3857***** (1.8552)
P	**0.2432**** (2.7629)
N	**-3.1827*** (-2.8413)
LNE(-2)	**0.3216** (0.8371)
LNH(-1)	**0.5768*** (4.1519)
Adjusted R-squared	0.8529
F-statistics	33.4796
D-W-Statistics	2.1090
Durbin-h	-3.0285

Source: Authors Computation based on Appendix A2 and A3

Note: *, ** and *** indicate statistical significance below 1%, 5% and 10% levels, respectively. t-values are in parentheses.

Equation 27 reports the results of an OLS regression of the economic growth equation on migration rates and other variables (t-statistics are reported between the brackets and ln denotes natural logarithm).

$$Y = 10.24 - 0.13 \ln m(-1) + 0.19 \ln p(-1) - 0.10 \ln h(-1) + 0.04 \ln r(-1) + 0.24 \ln a \quad \text{(eq.27)}$$

(5.15) (-3.36) (12.41) (-3.13) (4.29) (1.55)

Adjusted R^2= **0.95** Number of Observations = **31** F= **130.20** Durbin-h = **-1.9896**

The coefficients of determination for the model explaining the impact of migration on economic growth at 0.95 and a significant F-statistics indicate the parameters have a good fit in explaining any long-term relationship between the endogenous and exogenous variables. In addition, the Durbin-Watson value of 1.98 is close to the predicted value and allows us to rule out the existence of autocorrelation. A further control for autocorrelation using the Durbin-h test generated a value of -1.98 indicating no auto correlation among the error terms.

In this model, economic growth depends on public spending and remittances at a previous period but not on migration. Remittances have a positive and significant relationship with economic growth in our study, although marginal in magnitude (0.04). The impact of migration on economic growth is significant and it is noted to be negative. In the preceding model, human capital depended on migration rates and on investment in education. The time series results indicate that, migration has a negative and significant relationship with economic development. This confirms studies (de Haas, 2006, Groizard and Llull, 2004) that indicate that while an incentive effect exists for developing countries, the loss of human capital is too high to allow for any economic development in the country of origin. This contradicts the finding that lists Nigeria among those who experienced a brain gain (Beine *et al,* 2006).

The new economics of labour migration theory predicts that migration would affect human capital formation and in addition, that the impact of skill formation and migration on economic

development would be positive. Notably, the empirical evidence on the impact of migration on economic development is split among positive, significant but marginal impacts (Di Maria and Lazarova, 2009; Bodman, 1998); positive but insignificant impact on economic development (Lucas, 2008) and marginal but not significant role on betta (β) growth convergence (Barro and Sala-i-Martin, 1995). Further, the result is sensitive to the initial economic condition of the country of origin; particularly migration has a positive and significant impact on economic development in an already thriving economy and that proximity to the technological frontier matters (Di Maria and Lazarova, 2009).

Migration affects not only the levels of human capital formation, generally measured by years of study but beyond this, the type of skills opted for by the migrants are influenced by the demands on the labour market (Di Maria and Stryszowski, 2006; Di Maria and Lazarova, 2009). Therefore, the impact of human capital on economic growth depends on the quantity, quality and type as well as on many factors relating labour supply to demand (Rodriguez-Pose and Vilata-Bufi, 2004), inevitably none of these factors could be accounted for in this study given missing data. In addition, the effect of migration and human capital formation may require a threshold probability of the former that motivates workers to invest in the latter. Particularly, if workers perceive that the skills they build would not be valued in the destination country or securing admittance to the destination country is difficult, then the motivation to build such skills will reduce. In Nigeria, migration decisions may be less affected by internal policy as they are by global policy in OECD countries and other nations demanding for labour. The data shows that for prolonged periods, 1987-1997 strict immigration policies have somewhat negatively affected migration rates in the country.

Another body of scholars show that if the skilled workers are being replaced by immigrants then, wage rates do not change within the country and those who remain behind will not be motivated to cover the gap. Also, countries within the same technological group benefit more from migration because the skill required at home and abroad are the same. In addition, when student

mobility is high, the decision to accumulate human capital is postponed and therefore the results are less favourable to the premise that migration induces human capital accumulation for the country of origin. The proportion of Nigerian emigrants who study abroad remains open to investigation.

Beine *et al* (2006) also point out that in SSA the ratio of skilled workers to the average skill level is particularly large and therefore, net increases in human capital formation are below the levels required to account for economic development. Our study shows a significant but negative implication of human capital on growth, which has a coefficient of -0.10. This is counterintuitive and partly results from the variable used to capture human capital, that is, enrolment rates rather than completion rates. This is first because enrolment rates are considered more appropriate in capturing the incentive effect (Di Maria and Lazarova, 2009) more recent data on completion dates are not available, and the last graduate outturn statistics from the NBS dated back to 2007.

Finally, more populated countries tend to be more open to migration following gravitation theories (Beine *et al,* 2006). In our analysis, population has a positive and significant relationship with economic growth. Notably, the same variable might have a negative impact where it represents Malthusian type pressures and conflicts (Di Maria and Lazarova, 2009). In the latter instance, higher population exerts pressure on available resources leading to conflicts regarding their allocation. The variable was however removed from the final analysis given the autocorrelation problems it posed, particularly since economic growth was previously adjusted for changes in population.

Table 5.6 OLS Regression Results on the Impact of Migration and Human Capital on Economic Growth

Dependent Variables	**GDP**
Number of Observations	**31**
Variable	**Coefficient**
C	**10.2493*** (5.1506)
LNM(-1)	**-0.1379*** (-3.3638)
LNP(-1)	**0.1975*** (12.4187)
LNH(-1)	**-0.1000*** (-3.1313)
LNR(-1)	**0.0442*** (4.2980)
LNE	**0.2427***** (1.5545)
Adjusted R-squared	0.9556
F-statistics	130.2039
D-W-Statistics	1.9880
Durbin-h	-1.9896

Source: Authors Computation based on Appendix A2 and A3
Note: *, ** and *** indicate statistical significance below 1%, 5% and 10% levels, respectively. t-values are in parentheses.

Equation 28 reports the results of an OLS regression of the economic growth equation regressed on labour migration stock (t-statistics are reported between the brackets and ln denotes natural logarithm).

$$Y = 0.98 + 0.11 \ln lm(-1) + 0.06 \ln h - 0.12 \ln h(-1) + 0.00 \ln r(-1) + 0.00 \ln a \quad \text{(eq.28)}$$

(1.24) (3.18) (2.53) (-7.12) (1.22) (0.00)

Adjusted R^2= **0.98** Number of Observations = **31** F= **458.05** Durbin-h = **-5.1360**

Table 5.7 OLS Regression Results on the Impact of Labour Migration on Human Capital Formation and Economic Growth

Dependent Variables	**GDP**
Number of Observations	**31**
Variable	**Coefficient**
C	**0.9826** (1.2453)
LNLM(-1)	**0.1173*** (3.1891)
LNH	**0.0661**** (2.5385)
LNH(-1)	**-0.1255*** (-7.1243)
LNR(-1)	**0.0056** (1.2257)
LNE	**0.0004** (0.0053)
LNY(-1)	**0.8903*** (13.602)
Adjusted R-squared	0.9891
F-statistics	458.0504
D-W-Statistics	2.0401
Durbin-h	-5.1360

Source: Authors Computation based on Appendix A2 and A3
Note: *, ** and *** indicate statistical significance below 1%, 5% and 10% levels, respectively. t-values are in parentheses.

In the second regression analysis for the effects of labour migration and human capital formation on economic growth, labour migration was highly correlated with public spending on education. Therefore the public spending variable was removed from the equation. Table 5.7 shows the results of the analysis. Labour migration at the previous period positively affected economic growth and the impact was significant. Human capital (0.06) in the current period also has a significant and positive relationship with economic growth. This highlights the NELM transmission mechanism that labour migration leads to human capital formation, which in turn results in economic growth.

There was also a positive relationship between remittances and economic growth although this was not significant. When human capital, remittances and labour migration were regressed against economic growth, remittances (0.005) had a positive impact on GDP although marginal in magnitude and not significant.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1. INTRODUCTION

This study determined whether human capital formation in response to the probability of leaving the country compensated skills lost from migration. It employed regression analysis in establishing the impact of migration on human capital formation; and migration and human capital formation on economic growth. Further analysis was conducted by means of a dataset on labour migration to six member countries of the organization for economic cooperation and development to establish the relationship between labour migration and human capital formation; and labour migration and human capital formation and economic growth.

6.2 SUMMARY

The emigration of labour has for long been viewed as detrimental to economic growth in the country of origin and possible gains have been considered insufficient to plug the drain. The contemporary thoughts are more pluralistic and show new channels through which labour mobility principles engender economic growth such as the incentive effect on human capital formation. Migration outcomes have been mixed rather than strictly positive or negative.

In our study, the ordinary least squares (OLS) technique was used to estimate the relationship between migration and human capital formation in Nigeria. This methodology when subject to autoregressive distributive lags was found robust. The estimates suggest that for Nigeria the effects of migration on human capital formation are positive and relevant in magnitude and significant at the one per cent level of confidence. In an extended analysis using labour migration to six OECD countries, the results are positive (0.38) and remotely significant at ten

per cent levels of confidence (0.07). These two results indicate that there is an incentive effect that raised human capital induced by the probability of working abroad.

In the second relationship, an OLS regression was run to test the relationship between migration (-0.13) and economic growth. This was found to be negative and significant. Further, economic growth was found to have responded negatively to human capital formation (-0.10). This suggests that as human capital formation increased by one per cent economic growth decreased by 0.10 per cent. This result is counter-intuitive but could be due to the fact that enrolment rates which were used as a proxy for human capital formation. While enrolment rates capture correctly how people respond to the incentive to migrate, completion rates would describe the effect on output. Since in the first part of the relationship enrolment was utilised to capture human capital formation, the same was extended to the second component of the analysis. Moreover, in the extended analysis using labour migration to six OECD countries, migration had a positive effect on economic growth (0.11). In addition, this growth was through the human capital formation channel, which had a positive (0.06) and significant impact on economic growth.

Access to education had a positive but not significant relationship with economic growth. There was also a positive but significant relationship between HCF and public spending on education, although in the analysis involving labour migration, public spending on education had a positive (0.24) and significant effect on HCF.

In addition, the Johansen cointegration test showed a long run relationship between the variables, which present two cointegrating equations at five per cent and one cointegrating equation at one per cent level of confidence.

The pairwise correlation matrix also shows that labour migration is strongly correlated with growth (0.90) and human capital formation (0.77) while human capital formation is weakly correlated with growth (0.53). The results are indicative of the incentive effect of migration but

inconclusive on the impact on economic growth premised on the NELM theory that migration leads to human capital formation and the latter results in improved output.

6.3 CONCLUSION

The study set out to determine whether there was a correlation between migration and human capital formation in the sense that workers respond to market needs and incentives beyond their borders in the decision to accumulate skills. This was found to be a reliable and valid conclusion in the case of Nigeria since migration moved in the same direction as human capital formation pointing to an incentive effect. The conclusion is important to migration management since it confirms that liberalising labour movements has positive effects. This does not mean that Nigeria should continue to loose skilled labour because the net effect is positive. Rather, the government should provide incentives to retain desired skills within the economy without stifling migration, which is an impetus to human capital formation.

The effect on migration on economic growth was inconclusive as the results were sensitive to the type of migration data used. Specifically, economic growth responded positively to migration stock data and negatively to migration rates. Conceivably, improvements in human capital formation would affect economic growth positively as long as some of those skills are retained in the economy. This emphasizes the need to manage migration with a view to retaining desired skills. This study contributes to the body of knowledge situating migration as part of the globalization process rather than maintaining a strict association between migration and underdevelopment.

6.4 RECOMMENDATIONS

Nigeria is relatively an open economy and one might find it difficult to appreciate the need to advocate for labour mobility when the destination country has the first mover advantage. That is, so much more about emigration depends on policy at the destination country. While this is true, Nigeria could still adopt proactive incentives to encourage other economies to make use of their inputs. The evidence in this paper that migration exhibits an incentive effect on human capital formation and labour migration contributes to economic growth implies that Nigeria should consider this incentive effect in policy formulation while paying attention to strategies towards retaining desired skills.

This means that Nigeria should revisit the migration policy, accommodating the perspective that migration and labour migration could contribute to human capital formation rather than continue to adhere to the strict development failure premise. The Nigerian government should provide incentives, such as higher wages, in order to match the offers of attractive economies and retain the skills required within the country. Collaboration between labour abundant and labour scarce countries could promote the formation of a global pool of experts. This policy support particularly is to position Nigeria as a profitable trade partner so that developed economies do not become averse to admitting Nigerian migrants and thereby restrain the human capital formation incentive.

Migration is also a preferred incentive to developing human capital because it does not entail a direct cost to the government, unlike subsidies or other price incentives. Generally speaking, attempts to control migration are expensive. Governments should target skills that need to be retained within the economy and provide subsidies on education targeted for local human capital only. This may be difficult in cases where the same skills needed in Nigeria are in demand abroad. Such is the case for health workers. In these cases, the government should match the returns on education in order to retain the skills needed.

6.5 OUTSTANDING RESEARCH ISSUES

Given that certain skills are more urgently required than others, further studies are required to determine how migration affects development depending on the level and type of skill. In addition, this study has touched on two of the three mechanisms through which migration affects economic development that the NELM theory dwells on, the incentive effect and the role of remittances. The third, the effects of return migration have not been examined. The assumption that migration is permanent and characterised by a breach of interactions with the sending society is unfounded in the face of contrary evidence. In other words, contrary to the notion that migrants will sever relations permanently with the country of origin, evidence has shown that they regularly interact with the community. Further studies looking at temporary migration would be useful in understanding migrants' behavior for Nigeria and their impact on economic development.

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APPENDIX

Table A1: Definition and Sources of Variables used in the Estimations

Variable	Definition	Explanation	Expected sign	Source
h: Human Capital Formation	Student Enrolment in the universities, colleges of education, monotechnics and polytechnics	Enrolment variables better explain demand for education decisions	Explained variable	Federal Ministry of Education and Nigerian Bureau of Statistics (NBS, 2010)
y: Gross Domestic Product per capita	Gross domestic product adjusted for changes in population (₦, millions)	Living conditions in an economy explain investments in education or human capital formation	+	NBS, Annual Abstract of Statistics, 2010
p: Public Spending on Education	Recurrent government expenditure on education (₦, millions)	Government spends on education supplementing private spending and making education more accessible	+	CBN, Statistical Bulletin 2011
R: Remittances	Workers remittances and compensation of employees paid (US$)	In economic growth model, the contribution of remittances on output is measured.	+	World Development Indicators, 2010
M: Migration Rates	Estimated net migration rates as a percentage of the population. Net migration rates are five-year estimates of the total number of immigrants minus the annual number of emigrants including citizens and non-citizens	Persons that invest in skills that increase their probability of finding a job when they plan to migrate	+	World Bank, World Development Indicators, 2010 and United Nations Population Division, 2011
LM: Migration Stock	Nigerian immigrants stock to six OECD countries for purpose of work	Persons that invest in skills that increase their probability of finding a job when they plan to migrate The countries are: Canada, Denmark, Italy, Sweden, United Kingdom, United States.	+	Immigration statistics yearbooks of the US, UK and Canada
A: Access to education	Total number of teachers in private and public primary and secondary schools	The more teachers the more accessible education becomes and the less costly	+	World Development Indicators, 2010 and UNESCO
N: Population	Population	Rising populations mean more labour however in Malthusian type models population negatively affects growth	+ or -	WDI, 2010

Table A2: Data Description

Code	h	y	p	r	n	m	a
1980	43898	180757.44	509.10	523061500	75543388	1314455	336056
1981	427956	251052.30	930.00	484047300	77604166	1350312	385132
1982	463394	246726.60	1135.10	427641500	79623647	1385451	451128
1983	440112	230380.80	967.40	408608400	81635550	1420459	475902
1984	453633	227254.70	745.50	332669100	83691577	1456233	492653
1985	477957	253013.30	823.40	297614300	85828707	351898	458188
1986	448537	257784.40	990.90	149898300	88057486	361036	413075
1987	296427	255997.00	448.60	21663150	90363921	370492	427855
1988	272552	275409.60	1786.70	37029140	92731304	380198	442582
1989	314345	295090.80	3389.00	28785830	95133496	390047	480898
1990	326557	328606.10	2819.10	8853592	97552057	448739	473292
1991	368897	328644.50	1553.30	53510680	99986136	459936	495091
1992	376122	337288.60	2414.30	34802540	1.02E+08	471246	531742
1993	383488	342540.50	6331.50	2310584	1.05E+08	482685	579819
1994	374658	345228.50	9434.70	3500637	1.07E+08	494282	587806
1995	391035	352646.20	12172.80	4704164	1.1E+08	583078	581181
1996	689619	367218.10	14885.70	1746727	1.13E+08	596877	572624
1997	862023	377830.80	16791.20	3818789	1.15E+08	610924	571679
1998	941329	388468.10	24614.10	4660930	1.18E+08	625312	565411
1999	983689	393107.20	31563.80	9400247	1.21E+08	640157	561109
2000	1032873	412332.00	49563.20	1052114	1.24E+08	754500	579289
2001	1136160	431783.10	59744.60	593365	1.27E+08	772899	628795
2002	1249776	451785.60	109455.20	903964	1.3E+08	791978	654711
2003	1274772	495007.10	79435.90	11562450	1.33E+08	811709	715710
2004	888000	527576.00	85580.70	20855290	1.36E+08	832037	752129
2005	930000	561931.40	82791.10	68030230	1.4E+08	978763	758455
2006	765522	595821.60	151700.00	101562400	1.43E+08	1003373	767728
2007	1096059	634251.00	183500.00	53993480	1.47E+08	1028660	680150
2008	661493	672203.00	212800.00	58170920	1.51E+08	1054660	534177
2009	577029	717036.00	226676.00	65654800	1.54E+08	1081417	663225.3
2010	605068	776332.00	234842.00	47650430	1.58E+08	1124805	847859
2011	947538	833593.00	212600.00	75513424	1.63E+08	1153750	684418.7
Measure	Units	₦'millions	₦'millions	USD	Number	Number	Number
Sources: see Table A1	NBS, Federal Ministry of Education	NBS, Annual Abstract of Statistics	CBN statistical bulletin, reports	World Bank: WDI, Index Mundi	World Bank: WDI	World Bank: WDI,	World Bank: WDI and UNESCO

Table A3: OECD Immigrant Stock by Country of Birth: Labour Migration (lm)

	NIG-UK	NIG-DENMARK	NIG-ITALY	NIG-CANADA	NIG-SWEDEN	NIG-US	TOTAL
1980	65	90	2,324	133	164	2,241	5,017
1981	90	88	2,529	140	166	2,461	5,474
1982	180	85	3,072	170	163	2,702	6,372
1983	150	82	3,626	116	168	2,967	7,109
1984	370	72	4,016	347	175	3,258	8,238
1985	335	73	4,431	89	193	3,577	8,698
1986	335	83	4,513	152	187	3,928	9,198
1987	670	84	4,851	179	206	4,312	10,302
1988	1,065	85	5,232	241	200	4,735	11,558
1989	1,810	97	3,575	304	214	5,199	11,199
1990	985	99	6,855	276	227	8,843	17,285
1991	815	111	6,856	371	251	7,912	16,316
1992	745	133	5,627	572	273	4,551	11,901
1993	915	138	4,067	457	289	4,448	10,314
1994	1,470	151	4,328	355	287	3,950	10,541
1995	1,780	175	4,371	444	300	6,818	13,888
1996	2,430	213	4,828	509	283	10,219	18,482
1997	2,145	262	12,587	713	297	7,031	23,035
1998	3,550	316	12,911	900	321	7,730	25,728
1999	3,480	358	13,001	916	379	6,742	24,876
2000	5,595	400	20,056	1,088	401	7,831	35,371
2001	6,290	424	19,489	1,325	427	8,253	36,208
2002	6,480	485	20,835	1,281	473	8,105	37,659
2003	6,300	526	19,508	931	566	7,872	35,703
2004	6,280	506	20,172	1,369	721	9,374	38,422
2005	6,620	516	19,840	2,034	1,034	10,597	40,641
2006	5,875	511	20,006	2,481	1,315	13,459	43,647
2007	4,153	513	19,923	2,255	1,456	12,448	40,748
2008	3,149	512	19,964	1,837	1,666	12,475	39,603
2009	3,651	513	19,943	2,046	1,561	12,462	40,176
2010	3,400	512	19,954	1,942	1,614	12,468	39,890

Sources: Immigration statistics yearbooks of the United States, United Kingdom and Canada, 2011

Table A4: Persons Arriving and Departing from Nigeria, 1990-2011

Year	Immigrations (i)	Emigrations (e)	Net Migration (e-i)/e
1990	917745	1084038	-0.103786952
1991	985678	971529	0.808299083
1992	1581186	1756815	-0.103305698
1993	1645218	1575326	-0.385974078
1994	984876	967291	0.098019107
1995	945684	1062104	0.377692768
1996	1826024	1463253	-0.219124786
1997	1024861	1142618	-0.121716969
1998	1023421	1003542	0.967152346
1999	1486197	1974120	-0.283559763
2000	1351203	1414339	-0.047999808
2001	1275863	1346451	-0.217093678
2002	1688481	1054145	0.556949945
2003	1486120	1641251	-0.338942672
2004	1646780	1084961	0.057391003
2005	1044361	1147228	1.298727019
2006	2472945	2637164	0.041361857
2007	2549112	2746242	-0.555321417
2008	1720312	1221195	0.306048584
2009	2681124	1594940	0.564487692
2010	2430524	2495264	0.047143308
2011	2137826	2612899	-1

Source: Nigerian Immigrations Services, Abuja, 2012

Table A5: Descriptive Statistics

	LM	M	P	Y	H	R	E
Mean	22051.58	788019.9	51948.22	397132.4	630741.3	1.05E+08	563401.6
Median	17285.00	754500.0	12172.80	352646.2	477957.0	34802540	565411.0
Maximum	43647.00	1456233.	234842.0	776332.0	1274772.	5.23E+08	847859.0
Minimum	5017.000	351898.0	448.6000	180757.4	43898.00	593365.0	336056.0
Std. Dev.	13732.17	353282.1	74332.37	156037.3	325375.3	1.60E+08	123038.3
Skewness	0.302435	0.498339	1.412917	0.876251	0.463661	1.580900	0.410062
Kurtosis	1.418928	2.000132	3.646204	2.852874	2.121727	3.955816	2.579408
Jarque-Bera	3.701475	2.574425	10.85377	3.995008	2.107081	14.09281	1.097273
Probability	0.157121	0.276039	0.004397	0.135673	0.348701	0.000871	0.577737
Sum	683599.0	24428618	1610395.	12311104	19552980	3.27E+09	17465451
Sum Sq. Dev.	5.66E+09	3.74E+12	1.66E+11	7.30E+11	3.18E+12	7.70E+17	4.54E+11
Observations	31	31	31	31	31	31	31

Natural Logarithm Values

	LNH	LNM	LNLM	LNP	LNR	LNY	LNE
Mean	13.19147	13.47774	9.779378	9.274802	17.03985	12.82248	13.21873
Median	13.07728	13.53381	9.757594	9.406959	17.36520	12.77322	13.24531
Maximum	14.05828	14.19136	10.68387	12.36667	20.07521	13.56234	13.65047
Minimum	10.68962	12.77110	8.520587	6.106132	13.29357	12.10491	12.72503
Std. Dev.	0.660478	0.458060	0.706909	2.131750	1.999292	0.374908	0.218787
Skewness	-1.585241	0.007190	-0.153658	0.024507	-0.159236	0.260532	-0.062060
Kurtosis	7.610400	1.736112	1.615366	1.520527	2.016140	2.261030	2.545112
Jarque-Bera	40.43917	2.063593	2.598389	2.830356	1.381314	1.056048	0.287175
Probability	0.000000	0.356366	0.272751	0.242882	0.501247	0.589769	0.866245
Sum	408.9357	417.8098	303.1607	287.5188	528.2352	397.4970	409.7807
Sum Sq. Dev.	13.08696	6.294562	14.99162	136.3308	119.9151	4.216674	1.436028
Observations	31	31	31	31	31	31	31

Table A6: Results Of Unit Root Tests

Null Hypothesis: LNH has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.139943	0.0002
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNH)
Method: Least Squares
Date: 07/06/13 Time: 20:10
Sample(adjusted): 1981 2011
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNH(-1)	-0.478859	0.093164	-5.139943	0.0000
C	6.415950	1.230463	5.214256	0.0000

R-squared	0.476714	Mean dependent var	0.099097
Adjusted R-squared	0.458670	S.D. dependent var	0.458076
S.E. of regression	0.337030	Akaike info criterion	0.725051
Sum squared resid	3.294086	Schwarz criterion	0.817566
Log likelihood	-9.238287	F-statistic	26.41901
Durbin-Watson stat	0.885192	Prob(F-statistic)	0.000017

Null Hypothesis: D(LNM) has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.05127	0.0000
Test critical values:	1% level	-3.711457	
	5% level	-2.981038	
	10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNM,2)

Method: Least Squares
Date: 07/05/13 Time: 12:15
Sample(adjusted): 1986 2011
Included observations: 26 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNM(-1))	-1.011030	0.083894	-12.05127	0.0000
D(LNM(-1),2)	0.018719	0.074431	0.251496	0.8040
D(LNM(-2),2)	0.026421	0.063925	0.413320	0.6838
D(LNM(-3),2)	0.034148	0.051762	0.659702	0.5170
D(LNM(-4),2)	0.042084	0.036296	1.159481	0.2599
C	0.045555	0.010413	4.374833	0.0003

R-squared	0.974014	Mean dependent var	0.055603
Adjusted R-squared	0.967518	S.D. dependent var	0.293575
S.E. of regression	0.052910	Akaike info criterion	-2.841261
Sum squared resid	0.055990	Schwarz criterion	-2.550931
Log likelihood	42.93639	F-statistic	149.9313
Durbin-Watson stat	2.404926	Prob(F-statistic)	0.000000

Null Hypothesis: D(LNP) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.663737	0.0009
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNP,2)
Method: Least Squares
Date: 07/05/13 Time: 12:10
Sample(adjusted): 1984 2011
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNP(-1))	-1.798214	0.385574	-4.663737	0.0001
D(LNP(-1),2)	0.627003	0.280689	2.233803	0.0351
D(LNP(-2),2)	0.301905	0.193964	1.556500	0.1327
C	0.354085	0.111229	3.183389	0.0040

R-squared	0.609666	Mean dependent var	0.002156
Adjusted R-squared	0.560874	S.D. dependent var	0.636413
S.E. of regression	0.421729	Akaike info criterion	1.242656
Sum squared resid	4.268529	Schwarz criterion	1.432971
Log likelihood	-13.39718	F-statistic	12.49524

Durbin-Watson stat	1.928611	Prob(F-statistic)	0.000040

Null Hypothesis: D(LNLM) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.289795	0.0022
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNLM,2)
Method: Least Squares
Date: 08/21/13 Time: 18:29
Sample(adjusted): 1982 2010
Included observations: 29 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNLM(-1))	-0.815127	0.190015	-4.289795	0.0002
C	0.055223	0.031113	1.774935	0.0872

R-squared	0.405317	Mean dependent var	-0.003252
Adjusted R-squared	0.383292	S.D. dependent var	0.191786
S.E. of regression	0.150611	Akaike info criterion	-0.881756
Sum squared resid	0.612462	Schwarz criterion	-0.787460
Log likelihood	14.78546	F-statistic	18.40234
Durbin-Watson stat	1.936705	Prob(F-statistic)	0.000205

Null Hypothesis: D(LNP2) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.944093	0.0005
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNP2,2)
Method: Least Squares
Date: 08/21/13 Time: 18:30

Sample(adjusted): 1985 2011
Included observations: 27 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNP2(-1))	-2.976498	0.602031	-4.944093	0.0001
D(LNP2(-1),2)	1.395951	0.479246	2.912809	0.0081
D(LNP2(-2),2)	0.860640	0.343914	2.502483	0.0203
D(LNP2(-3),2)	0.350067	0.198811	1.760807	0.0922
C	0.775194	0.210947	3.674824	0.0013

R-squared	0.746091	Mean dependent var	0.017482
Adjusted R-squared	0.699926	S.D. dependent var	1.385008
S.E. of regression	0.758693	Akaike info criterion	2.451138
Sum squared resid	12.66355	Schwarz criterion	2.691108
Log likelihood	-28.09036	F-statistic	16.16134
Durbin-Watson stat	2.093313	Prob(F-statistic)	0.000003

Null Hypothesis: D(LNA,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.534685	0.0000
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNA,3)
Method: Least Squares
Date: 07/05/13 Time: 12:16
Sample(adjusted): 1984 2011
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNE(-1),2)	-2.107172	0.279663	-7.534685	0.0000
D(LNE(-1),3)	0.862027	0.187338	4.601460	0.0001
C	-0.006326	0.019907	-0.317803	0.7533

R-squared	0.702902	Mean dependent var	-0.012680
Adjusted R-squared	0.679134	S.D. dependent var	0.185795
S.E. of regression	0.105244	Akaike info criterion	-1.564119
Sum squared resid	0.276906	Schwarz criterion	-1.421383
Log likelihood	24.89767	F-statistic	29.57364
Durbin-Watson stat	2.108779	Prob(F-statistic)	0.000000

Null Hypothesis: D(LNR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.321844	0.0001
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNR,2)
Method: Least Squares
Date: 07/05/13 Time: 12:17
Sample(adjusted): 1982 2011
Included observations: 30 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNR(-1))	-1.009947	0.189774	-5.321844	0.0000
C	-0.062723	0.200298	-0.313151	0.7565

R-squared	0.502859	Mean dependent var	0.017931
Adjusted R-squared	0.485104	S.D. dependent var	1.524509
S.E. of regression	1.093931	Akaike info criterion	3.081772
Sum squared resid	33.50717	Schwarz criterion	3.175186
Log likelihood	-44.22659	F-statistic	28.32203
Durbin-Watson stat	1.995654	Prob(F-statistic)	0.000012

Null Hypothesis: D(LNY) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.936068	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNY,2)
Method: Least Squares
Date: 07/05/13 Time: 12:18
Sample(adjusted): 1982 2011
Included observations: 30 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNY(-1))	-1.010544	0.113086	-8.936068	0.0000
C	0.040515	0.009130	4.437670	0.0001

R-squared	0.740388	Mean dependent var	-0.008578
Adjusted R-squared	0.731116	S.D. dependent var	0.077022
S.E. of regression	0.039939	Akaike info criterion	-3.538578
Sum squared resid	0.044664	Schwarz criterion	-3.445165
Log likelihood	55.07867	F-statistic	79.85330
Durbin-Watson stat	1.223795	Prob(F-statistic)	0.000000

Null Hypothesis: D(LNN,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 6 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.793345	0.0045
Test critical values:	1% level	-4.416345
	5% level	-3.622033
	10% level	-3.248592

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNN,3)
Method: Least Squares
Date: 07/04/14 Time: 22:14
Sample (adjusted): 1989 2011
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNN(-1),2)	-0.495665	0.103407	-4.793345	0.0003
D(LNN(-1),3)	1.121929	0.182094	6.161260	0.0000
D(LNN(-2),3)	-0.008656	0.224411	-0.038574	0.9698
D(LNN(-3),3)	0.309933	0.222574	1.392496	0.1855
D(LNN(-4),3)	0.214864	0.226090	0.950347	0.3581
D(LNN(-5),3)	-0.378319	0.188706	-2.004801	0.0647
D(LNN(-6),3)	0.546381	0.125592	4.350429	0.0007
C	-0.000277	6.12E-05	-4.515195	0.0005
@TREND("1980")	1.31E-05	2.79E-06	4.710140	0.0003

R-squared	0.915858	Mean dependent var	1.08E-05
Adjusted R-squared	0.867777	S.D. dependent var	0.000107
S.E. of regression	3.87E-05	Akaike info criterion	-17.19344
Sum squared resid	2.10E-08	Schwarz criterion	-16.74912
Log likelihood	206.7246	Hannan-Quinn criter.	-17.08170

F-statistic	19.04826	Durbin-Watson stat	1.750246
Prob(F-statistic)	0.000003		

Table A7: Results Of Cointegration Test

Date: 07/05/13 Time: 12:20
Sample(adjusted): 1982 2011
Included observations: 30 after adjusting endpoints
Trend assumption: Linear deterministic trend
Series: LNH LNM LNP LNE LNR LNY
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.803964	118.2192	94.15	103.18
At most 1 *	0.602824	69.33551	68.52	76.07
At most 2	0.549712	41.63427	47.21	54.46
At most 3	0.340562	17.69823	29.68	35.65
At most 4	0.159322	5.207207	15.41	20.04
At most 5	2.67E-05	0.000801	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates 2 cointegrating equation(s) at the 5% level
Trace test indicates 1 cointegrating equation(s) at the 1% level

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.803964	48.88373	39.37	45.10
At most 1	0.602824	27.70124	33.46	38.77
At most 2	0.549712	23.93604	27.07	32.24
At most 3	0.340562	12.49102	20.97	25.52
At most 4	0.159322	5.206405	14.07	18.63
At most 5	2.67E-05	0.000801	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Max-eigenvalue test indicates 1 cointegrating equation(s) at both 5% and 1% levels

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNH	LNM	LNP	LNE	LNR	LNY
0.851688	5.197332	-3.267241	-0.078413	-1.180432	11.70850
-2.784193	0.095749	2.143656	-8.078209	-0.324741	-5.676287

2.013734	-0.782830	-0.089213	-9.633852	0.324704	2.750784
-3.189782	0.115466	3.025496	2.543508	0.578948	-15.37122
2.659154	0.139519	0.347772	-1.648989	0.081344	-2.837663
-0.148550	2.005159	-1.135253	-4.235849	-0.230802	10.01007

Unrestricted Adjustment Coefficients (alpha):

D(LNH)	0.031030	0.059828	-0.078142	0.036002	-0.050211	4.29E-06
D(LNM)	-0.102803	0.067675	0.004729	-0.087057	-0.012114	0.000735
D(LNP)	0.086646	-0.029388	-0.032553	-0.179343	-0.059015	-0.001091
D(LNE)	0.031183	0.043301	0.050801	-0.007653	-0.000248	-1.28E-05
D(LNR)	0.392237	0.176343	-0.391898	-0.024569	0.255629	0.001409
D(LNY)	-0.006385	0.003667	-0.008916	0.002719	0.003318	-0.000146

1 Cointegrating Equation(s): Log likelihood 64.92008

Normalized cointegrating coefficients (std.err. in parentheses)

LNH	LNM	LNP	LNE	LNR	LNY
1.000000	6.102388	-3.836194	-0.092067	-1.385991	13.74740
	(0.69390)	(0.48789)	(1.67026)	(0.17318)	(2.31502)

Adjustment coefficients (std.err. in parentheses)

D(LNH)	0.026428
	(0.03489)
D(LNM)	-0.087556
	(0.04205)
D(LNP)	0.073795
	(0.07399)
D(LNE)	0.026558
	(0.01646)
D(LNR)	0.334063
	(0.16787)
D(LNY)	-0.005438
	(0.00593)

2 Cointegrating Equation(s): Log likelihood 78.77070

Normalized cointegrating coefficients (std.err. in parentheses)

LNH	LNM	LNP	LNE	LNR	LNY
1.000000	0.000000	-0.787121	2.884679	0.108217	2.104370
		(0.15323)	(0.83508)	(0.04490)	(0.85796)
0.000000	1.000000	-0.499652	-0.487800	-0.244856	1.907947
		(0.05589)	(0.30459)	(0.01638)	(0.31294)

Adjustment coefficients (std.err. in parentheses)

D(LNH)	-0.140144	0.167004
	(0.11333)	(0.20234)
D(LNM)	-0.275976	-0.527823
	(0.13747)	(0.24543)
D(LNP)	0.155618	0.447513
	(0.25228)	(0.45041)

D(LNE)	-0.094000	0.166215
	(0.04945)	(0.08828)
D(LNR)	-0.156909	2.055469
	(0.56335)	(1.00580)
D(LNY)	-0.015648	-0.032834
	(0.02015)	(0.03598)

3 Cointegrating Equation(s): Log likelihood 90.73872

Normalized cointegrating coefficients (std.err. in parentheses)

LNH	LNM	LNP	LNE	LNR	LNY
1.000000	0.000000	0.000000	-8.390773	0.047726	2.109173
			(1.82310)	(0.08976)	(1.05348)
0.000000	1.000000	0.000000	-7.645285	-0.283255	1.910996
			(1.47970)	(0.07285)	(0.85505)
0.000000	0.000000	1.000000	-14.32493	-0.076850	0.006102
			(2.73046)	(0.13443)	(1.57780)

Adjustment coefficients (std.err. in parentheses)

D(LNH)	-0.297501	0.228176	0.033838
	(0.12454)	(0.18493)	(0.13750)
D(LNM)	-0.266452	-0.531525	0.480532
	(0.16710)	(0.24814)	(0.18451)
D(LNP)	0.090065	0.472996	-0.343187
	(0.30575)	(0.45403)	(0.33759)
D(LNE)	0.008299	0.126447	-0.013593
	(0.04631)	(0.06877)	(0.05113)
D(LNR)	-0.946088	2.362258	-0.868551
	(0.61781)	(0.91742)	(0.68215)
D(LNY)	-0.033602	-0.025855	0.029518
	(0.02356)	(0.03499)	(0.02602)

4 Cointegrating Equation(s): Log likelihood 96.98423

Normalized cointegrating coefficients (std.err. in parentheses)

LNH	LNM	LNP	LNE	LNR	LNY
1.000000	0.000000	0.000000	0.000000	0.465722	-1.617105
				(0.10489)	(0.66367)
0.000000	1.000000	0.000000	0.000000	0.097604	-1.484217
				(0.07736)	(0.48945)
0.000000	0.000000	1.000000	0.000000	0.636762	-6.355488
				(0.14706)	(0.93045)
0.000000	0.000000	0.000000	1.000000	0.049816	-0.444092
				(0.01226)	(0.07756)

Adjustment coefficients (std.err. in parentheses)

D(LNH)	-0.412338	0.232332	0.142761	0.358640
	(0.16359)	(0.18052)	(0.16969)	(0.44038)
D(LNM)	0.011241	-0.541577	0.217141	-0.805620
	(0.20682)	(0.22821)	(0.21453)	(0.55673)
D(LNP)	0.662131	0.452288	-0.885789	0.088059

	(0.36903)	(0.40721)	(0.38279)	(0.99341)	
D(LNE)	0.032710	0.125564	-0.036747	-0.861109	
	(0.06185)	(0.06825)	(0.06416)	(0.16649)	
D(LNR)	-0.867719	2.359422	-0.942883	2.257707	
	(0.83124)	(0.91723)	(0.86223)	(2.23763)	
D(LNY)	-0.042274	-0.025541	0.037743	0.063687	
	(0.03160)	(0.03487)	(0.03278)	(0.08506)	

5 Cointegrating Equation(s): Log likelihood 99.58743

Normalized cointegrating coefficients (std.err. in parentheses)

LNH	LNM	LNP	LNE	LNR	LNY
1.000000	0.000000	0.000000	0.000000	0.000000	-0.498128
					(0.63869)
0.000000	1.000000	0.000000	0.000000	0.000000	-1.249706
					(0.36016)
0.000000	0.000000	1.000000	0.000000	0.000000	-4.825558
					(0.89472)
0.000000	0.000000	0.000000	1.000000	0.000000	-0.324400
					(0.09283)
0.000000	0.000000	0.000000	0.000000	1.000000	-2.402671
					(2.03979)

Adjustment coefficients (std.err. in parentheses)

D(LNH)	-0.545858	0.225327	0.125299	0.441438	-0.064672
	(0.17800)	(0.17158)	(0.16163)	(0.42187)	(0.04550)
D(LNM)	-0.020972	-0.543267	0.212928	-0.785644	0.049524
	(0.23642)	(0.22788)	(0.21468)	(0.56032)	(0.06044)
D(LNP)	0.505200	0.444054	-0.906313	0.185375	-0.211937
	(0.41699)	(0.40194)	(0.37864)	(0.98828)	(0.10660)
D(LNE)	0.032051	0.125529	-0.036833	-0.860699	-0.038827
	(0.07083)	(0.06827)	(0.06431)	(0.16786)	(0.01811)
D(LNR)	-0.187961	2.395087	-0.853983	1.836177	-0.640955
	(0.90426)	(0.87162)	(0.82109)	(2.14311)	(0.23117)
D(LNY)	-0.033449	-0.025078	0.038897	0.058215	0.005295
	(0.03598)	(0.03468)	(0.03267)	(0.08527)	(0.00920)

Table A8: Results For Ordinary Least Squares Analysis

1. OLS Regression Results: Migration and Human Capital Formation

Dependent Variable: LNH
Method: Least Squares
Date: 12/31/13 Time: 11:07
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-62.75694	22.87270	-2.743749	0.0113
LNM(-2)	0.483210	0.102589	4.710160	0.0001
LNP2(-2)	0.136753	0.062998	2.170753	0.0401
LNE(-2)	-0.468254	0.476776	-0.982126	0.3358
LNN	6.562495	1.849070	3.549079	0.0016
LNY	-3.661160	0.763754	-4.793638	0.0001

R-squared	0.825354	Mean dependent var	13.30136
Adjusted R-squared	0.788970	S.D. dependent var	0.482094
S.E. of regression	0.221464	Akaike info criterion	-0.000254
Sum squared resid	1.177115	Schwarz criterion	0.279986
Log likelihood	6.003803	Hannan-Quinn criter.	0.089397
F-statistic	22.68418	Durbin-Watson stat	1.799645
Prob(F-statistic)	0.000000		

1b. OLS Results Of Labour Migration Of Nigerians To Six OECD Countries

Dependent Variable: LNH
Method: Least Squares
Date: 12/31/13 Time: 11:21
Sample (adjusted): 1982 2010
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	54.27787	17.94790	3.024191	0.0060
LNLM	0.385745	0.207916	1.855293	0.0764
LNP	0.243295	0.088055	2.762992	0.0111

LNN	-3.182705	1.120137	-2.841355	0.0092
LNE(-2)	0.321657	0.384235	0.837136	0.4111
LNH(-1)	0.576845	0.138934	4.151922	0.0004

R-squared	0.879200	Mean dependent var	13.28549
Adjusted R-squared	0.852940	S.D. dependent var	0.482585
S.E. of regression	0.185064	Akaike info criterion	-0.354241
Sum squared resid	0.787718	Schwarz criterion	-0.071352
Log likelihood	11.13649	Hannan-Quinn criter.	-0.265644
F-statistic	33.47961	Durbin-Watson stat	2.109008
Prob(F-statistic)	0.000000		

2a. OLS Results: Migration, Human Capital Formation and Economic Growth

Dependent Variable: LNY
Method: Least Squares
Date: 07/06/13 Time: 19:19
Sample(adjusted): 1981 2011
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.24934	1.989911	5.150652	0.0000
LNM(-1)	-0.137974	0.041017	-3.363845	0.0025
LNP(-1)	0.197573	0.015909	12.41879	0.0000
LNH(-1)	-0.100067	0.031957	-3.131332	0.0044
LNR(-1)	0.044283	0.010303	4.298039	0.0002
LNE	0.242796	0.156186	1.554536	0.1326

R-squared	0.963019	Mean dependent var	12.87179
Adjusted R-squared	0.955623	S.D. dependent var	0.377895
S.E. of regression	0.079607	Akaike info criterion	-2.051440
Sum squared resid	0.158433	Schwarz criterion	-1.773894
Log likelihood	37.79732	F-statistic	130.2039
Durbin-Watson stat	1.988033	Prob(F-statistic)	0.000000

2b. OLS Results: Labour Migration, Human Capital Formation and Economic Growth

Dependent Variable: LNY
Method: Least Squares
Date: 08/24/13 Time: 19:53
Sample(adjusted): 1981 2011
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.982601	0.789033	1.245324	0.2250
LNLM(-1)	0.117325	0.036790	3.189068	0.0039

LNH	0.066179	0.026069	2.538579	0.0180
LNH(-1)	-0.125476	0.017612	-7.124335	0.0000
LNR(-1)	0.005620	0.004585	1.225722	0.2322
LNE	0.000425	0.079548	0.005347	0.9958
LNY(-1)	0.890318	0.065455	13.60202	0.0000

R-squared	0.991343	Mean dependent var	12.87179
Adjusted R-squared	0.989179	S.D. dependent var	0.377895
S.E. of regression	0.039311	Akaike info criterion	-3.438957
Sum squared resid	0.037088	Schwarz criterion	-3.115153
Log likelihood	60.30383	F-statistic	458.0504
Durbin-Watson stat	2.040145	Prob(F-statistic)	0.000000

Table A9: Results For Ordinary Least Squares Analysis Without Lagged variables

A1. OLS Regression Results: Migration and Human Capital Formation (No lagged variables)

Dependent Variable: LNH

Method: Least Squares

Date: 07/07/14 Time: 02:20

Sample: 1980 2011

Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.153341	44.20973	-0.139185	0.8904
LNM	-0.037157	0.208295	-0.178385	0.8598
LNP2	0.071416	0.139731	0.511096	0.6136
LNE	1.738581	0.893521	1.945764	0.0626
LNN	-0.138352	3.298304	-0.041947	0.9669
LNY	-0.093308	1.312934	-0.071068	0.9439

R-squared	0.543431	Mean dependent var	13.20929
Adjusted R-squared	0.455630	S.D. dependent var	0.657509
S.E. of regression	0.485120	Akaike info criterion	1.558519
Sum squared resid	6.118872	Schwarz criterion	1.833344
Log likelihood	-18.93630	Hannan-Quinn criter.	1.649616
F-statistic	6.189306	Durbin-Watson stat	1.115375
Prob(F-statistic)	0.000663		

A2. OLS Results Of Labour Migration Of Nigerians To Six OECD Countries (no lagged variables)

Dependent Variable: LNH

Method: Least Squares

Date: 07/07/14 Time: 02:27

Sample (adjusted): 1980 2010

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	60.73404	43.90540	1.383293	0.1788
LNLM	1.239835	0.415175	2.986292	0.0062
LNP2	0.040939	0.121441	0.337107	0.7389
LNE	1.860484	0.796029	2.337206	0.0277

LNN	-5.072236	3.280160	-1.546338	0.1346
LNY	0.724200	1.187508	0.609848	0.5475

R-squared	0.655144	Mean dependent var	13.19147
Adjusted R-squared	0.586173	S.D. dependent var	0.660478
S.E. of regression	0.424882	Akaike info criterion	1.297974
Sum squared resid	4.513115	Schwarz criterion	1.575520
Log likelihood	-14.11860	Hannan-Quinn criter.	1.388447
F-statistic	9.498806	Durbin-Watson stat	1.254365
Prob(F-statistic)	0.000036		

B1. OLS Results: Migration, Human Capital Formation and Economic Growth (no lagged variables)

Dependent Variable: LNY

Method: Least Squares

Date: 07/07/14 Time: 02:29

Sample: 1980 2011

Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.252690	2.438236	2.564432	0.0165
LNM	-0.073306	0.055879	-1.311872	0.2010
LNP2	0.131577	0.016863	7.802731	0.0000

LNH	0.027258	0.047035	0.579534	0.5672
LNR	0.058943	0.014716	4.005335	0.0005
LNE	0.382065	0.204021	1.872678	0.0724

R-squared	0.930601	Mean dependent var	12.84783
Adjusted R-squared	0.917255	S.D. dependent var	0.395697
S.E. of regression	0.113824	Akaike info criterion	-1.340966
Sum squared resid	0.336854	Schwarz criterion	-1.066140
Log likelihood	27.45545	Hannan-Quinn criter.	-1.249869
F-statistic	69.72904	Durbin-Watson stat	1.310598
Prob(F-statistic)	0.000000		

2b. OLS Results: Labour Migration, Human Capital Formation and Economic Growth (no lagged variables)

Dependent Variable: LNY

Method: Least Squares

Date: 07/07/14 Time: 02:31

Sample (adjusted): 1980 2010

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.929101	2.119079	0.438446	0.6647

LNLM	0.406569	0.064975	6.257342	0.0000
LNH	-0.065645	0.052191	-1.257795	0.2196
LNR	0.026856	0.012675	2.118781	0.0438
LNE	0.629843	0.198781	3.168522	0.0039

R-squared	0.910828	Mean dependent var	12.82248
Adjusted R-squared	0.897110	S.D. dependent var	0.374908
S.E. of regression	0.120257	Akaike info criterion	-1.251675
Sum squared resid	0.376008	Schwarz criterion	-1.020387
Log likelihood	24.40097	Hannan-Quinn criter.	-1.176281
F-statistic	66.39317	Durbin-Watson stat	0.931646
Prob(F-statistic)	0.000000		