Brain Drain and Output Performance of West African Countries

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Abstract: **- The current study focused on the examination of the impact of brain drain on output performance of West African countries. Data were obtained from 11 countries of the region which are Nigeria, Ghana, Senegal, Mali, Benin, Niger, Cote devoir, Gambia, Guinea Bissau, Burkina Faso and Sierra Leone, and from 1977-2016. The result shows that brain drain has a negative relationship on economic growth. This shows that the government of this region must undertake measures to reduce brain drain through increase in salary and creating good working condition for the people. Also, labour force shows insignificant relationship with economic growth of this region. This is due to the fact that large proportion of these countries labour force is unemployed; hence, they don't contribute to economic growth. The result suggests that policy needs to be put in place that will encourage productivity and improve employment rate in these countries.**

I. INTRODUCTION

Migration has turned the world into globalized settings with various dynamics and complexity, and the exodus of people, undoubtedly, brought about this complexity– in terms of globalization and financial interconnectedness (Manuel, Laura and Yansura, 2016). Overtime, economists had been on the quest to examine the source(s) as well as factors that propel the growth in economic output as well as economic development. But recently, more attention had been shifted to remittances, which is now taking a higher fraction of less developed countries Gross Domestic Product (GDP), as migration now creates a world system which interconnects different people in different region and has resulted in the expansion of the global market for goods and services (Manuel, Lindsay, Micah and Rachel,2005).

Historical account on migration reveals that, migration of people from one region to another improve the migrants' living standard, and tends to have advantage both on the source region– in terms of remittances; and the destination region – in terms of labour supply (Anastasia and Christos, 2014; Thanh and Philip, 2011). This is attributed to the fact that migration is not all about physical change of environment, but, it improves the standard of living of the migrants' families in the source region. Therefore, remittances in recent years have become a major source of income to different countries for socio economic finance, and as an instrument to facilitate economic growth and development in the long-run (Azam and Khan, 2005).

Migration is in different forms, which could be domestic/internal or international/foreign. A special form of migration which involves the exodus of skilled professionals from one country to another for better job opportunities, access to good technology and good working condition refers to human capital flight or brain drain(Iravani, 2011).Brain drain generally had been argued to have economic implications orcoston the source region, because the government of those countries – source countries –had invested in those workers, which will there after end being harnessed by other nations. The converse of brain drain is brain gain which arises when there are technological diffusion, remittances and other benefits that accrue to the domestic economy due to migration.

According to Andrew and Baomin (2015), the term brain drain was first used in Britain to express the movement of highly skilled scientists and technologists from Canada and UK to the United State. Others gave some reasons due to the quest for better opportunities (Kaba, 2011), and access to good technology (Iravani, 2011). In general, Beine, Docquire and Rapoport(2008) defined human capital flight as the international migrationof human resources (technical personnel) from developing countries to a developed counterpart.

For the past five decades, brain drain has significantly amplified. In 1960, world migration was estimated at 75 million. This value increased to 153 million in 1990, and further increased to 173 million in 2000. The value continued on its upward trend, as its value in 2010 was approximately 222 million, and this value has reached 247 million in 2017 (Migration and Remittances Factbook (MRFB), 2011, 2017). This increasing trend in migration is expected to continue in the future due to a continuous increase in wage differential, high unemployment rate, increase in poverty, and political unrest prevailing developing countries (Andrew and Baomin, 2015).

In West Africa, Côte d'Ivoire has the highest number of immigrants from 2000 to 2015. In 2000, total immigrants' in Côte d'Ivoire was 2 million which represent 39 percent of the total migration to West African countries. In the same year, Guinea was the second country in West Africa with the total numbers of immigrants' population of 1 million, which is approximately 20 percent of the total immigrants' population in West Africa. Burkina Faso was the third country with the total immigrants of approximately 1 million, followed by

Nigeria (488 thousand), Senegal (232 thousand) etc. From all indication, West African countries had been on disadvantaged in their net migration. Virtually all the West African countries suffer from brain drain menace, and it is more pronounced Burkina Faso, Niger, Nigeria, Guinea, Mali, Guinea Bissau and Senegal. Nigeria over the last three decades has not experienced positive net migrants; this same trend was experienced by most countries in West Africa(MRFB, 2017).

At the peak of the problems of brain drain is the migration of medical and academics professionals in LDC's, and most especially West African countries. Ethiopia, Nigeria, Ghana, and Kenya were the highest countries affected with brain drain in sub-Saharan Africa(Jonathan, 2017). From 1993 to 2004, the number of Ghanaian's trained medical staff that left the country to work abroad was estimated at 68% of the total trained medical staff (Sani, Zuber, Stojilovska and Koneska, 2012). Also, Lalla (2012) posit that more than 10,000 academia in tertiary institutions in Nigeria left the country between 1986 and 1990. Furthermore, over 30,000 people left the industrial, public and private organization within the same period. His estimate revealed that 64% of Nigerians in USA age 25 and above have a university degree. This pinpoint to the fact that developed countries lived and harnessed the human capital from developing countries which should contribute to the growth of their domestic countries after much investment in terms of education funding by developing countries. These findings made some authors argue that brain drainis an obstacle to development in the LDCs (Adams, 2005). For example, migration of health workers has been held conventionally as being dangerous to the source countries development. Hence, it is important to examine the impact of brain drain on economic growth of these countries.

II. LITERATURE REVIEW

The Concepts of Brain Drain or Human Capital Flight

Brain drain or human capital flight is the emigration of highly skilled or well-educated individuals for better opportunities. Brain drain is sometime regarded as cost to the developing countries as they tend to loss their sound part of their labour force. The benefits of skilled migration in literature is often refers to as the brain gain, and the cost is referred to brain drain. Human capital flight always involves movement of skilled professionals from less developed countries to developed ones. Andrew and Baomin (2015) identified four factors of brain drain in Africa which are economic factors, social and educational factor, push factors and pull factors.

(i) Economic factors

Economic factors can be viewed from the aspect of deteriorating economic atmosphere. Most developing countries and most especially the African countries often witness deterioration and declining economic performance (Plaza, and Ratha, 2011). According to Andrew and Baomin (2015), "this deteriorating state of affairs has had adverse effects on the living standards and quality of life of Africans. Deteriorating economic performance in African countries constitute the major factor for the emigration of people from Africa to developed countries (Beine et al., 2008; Kwok and Leland, 1982). Among the regions classified as developing countries, sub-Saharan Africa's economic performance is the poorest (World Bank, 2011). This rising incidence of poverty combined with unemployment incidence in developing countries constitute one major factor why skilled workers migrate to the developed countries for better opportunities and better living conditions.

(ii) Social and educational factors

Skeldon (2008) in his study on skilled migration and brain drain opines that brain drain is a function of civilization which can be taken as part of social movement of people from one place to another. The trend in world migration to him therefore reflects an increase in global population movement'. Takyi (2002) on the other hand highlights that higher education can also act as a push factor in the debate of the rising number of migration.

(iii) Pull factors

According to Docquier and Rapoport (2012), pull factors are the positive characteristics of the developed country from which the migrant would like to benefit. Higher paying jobs and a better quality of life abroad are examples of pull factors. Other pull factors include superior economic outlook, the prestige of foreign training, relatively stable political environment, a modernized educational system to allow for superior training, intellectual freedom, and rich cultures. Dimaya et al. (2012:3); Ngoma and Ismail (2013:747) among others summarizes pull factors as higher wages and better employment opportunities and technologies in developed countries which create incentives for skilled workers from developing countries to migrate. The continuing disparities in pay between richer and poorer countries offer a great deal of pull towards more developed countries.

(iv) Push factors

The push factors according to Docquier and Rapoport (2012), are negative characteristics of the home country that form the impetus for intelligent people migrating from Lesser Developed Countries (LDC). In addition to unemployment and political instability, some other push factors are the absence of research facilities, employment discrimination, economic underdevelopment, lack of freedom, and poor working conditions. According to Kaba (2011), push factors in developing countries are poor working conditions, low job satisfaction and lack of training opportunities, and Ngoma and Ismai (2013) attributes push factor to wage differentials, while Dovlo (2007:137) argues that low salaries are a major reason for the brain drain. Other push factors according to Shinn (2008) are lack of professional opportunity, personal development, limited career advancement and poor supervision. Political and social unrest are other push factors

(Betts, 2011). Some problems associated with brain drain are explained below:

Brain Drain as a Political Problem

When the best of professional manpower leaves their home country and settle in a more developed one, it is a political phenomenon, but it only rarely occurs that the motives are exclusively political. It involves peculiar contradiction; it simultaneously indicates the lack of production and over production of professional manpower on the drained country. In this sense, brain drain is a symptomatic phenomenon, but at the same time it is expressive of a fundamental difficulty. To some extent it has an objective basis, as the attraction of a more developed country compared with those of the less developed ones has always existed in the course of history. Thenet effect of this is that the development of science and technology has been accelerated in the developed countries and has been slowed down in the drained countries.

Brain Drain as an Economic Problem

The economic aspect of brain drain cannot be divorced from the political aspect. First of all, it should be emphasized that it is in contradiction with the great international economic and political objective, namely the narrowing of the gap between the developed and the under developed countries. It expresses at the same time the complexity and the inter-dependence of different societies; it derives from disproportionate economic, technological and scientific development of the developed and the developing countries, entailing contradiction in the training of professional manpower and ability to satisfy the several demands for this group. It is characteristic of brain drain that the more under developed a country is economically, the more it loses by brain drain while only developed countries profit from the process. It occurs through a complicated interplay of direct an indirect economic `push' and `pull' factors. It is stimulated by the lack of an educational system as well as the absence of a manpower policy in most of the under developed countries, these deficiencies normally hindering the really efficient use of those qualified as well as those having talent. As against this, there are higher living standards and better research and working opportunities of the more developed country, which provides thousands of possibilities for developing human potential. In addition to these objective economic factors brain drain is also stimulated by the actually realized intention of the developed countries to acquire intellectual capital free, and quick as possible.

Brain Drain as a psycho-social problem

The main flow of brain drain as a change of domicile starts from the under developed countries towards the developed one, due to social, cultural and psychological factors due to preferences for living in certain countries, A large number move from few LDCs to certain developed countries and; at the same time a few numbers of highly skilled people move from a large number of LDCs. The major geographical direction of brain drain is from the South to the North, i.e. from Latin America to the United States, from Africa to Europe and to the U. S. and from the East to the West, i.e. from the Asian non-socialist countries to Europe, and from Europe to the United States and also from Asian countries to the middle East North African (MENA) Nations. It is a fact that human capital as strategic resource is flowing out of economies where it can make the greatest contribution to human welfare, into economies already well developed and having large number of trained, capable, scientific and administrative personnel.

Concept of Economic Growth

From various conventional views emanated from different economists, economic growth was viewed as a result of the transition of surplus labour from the capitalist sector and the subsistence sector (Lewis, 1954). To Harris and Todaro (1970) economic growth and development involves the movement of people from rural to the urban area due to expected income differentials between rural and urban. Solow (1956) and Swan (1956) on the other hand viewed growth in economic output as basically a function of the stock of capital (capital formation/accumulation), coupled with the growth rate in labour force and technological progress. Denison (1967) also buttresses the importance of capital accumulation in propelling economic growth. Romer (1986) considered the endogenous aspect of economic growth, and to him, economic growth hinged on investment in human capital, innovation, and knowledge. Economic growth in the long-run to Romar was seen has been a function of investment in research and development which will increase the incentive for innovations. Other empirical work had also established economic growth to different factors such as foreign aids or foreign direct investment (Papanek 1973; Chenery and Strout, 1966; Victor 1987) foreign aid and investment (de Mello, 1999), human capital investment (Lucas, 1988), and political, institutional and the degree of accountability (Owen, 1987) among others as a source of economic growth.

EMPIRICAL REVIEW

Akonji and Wakili(2013) in their study of the impact of net migrant remittances on economic growth in Nigeria employed the Error Correction Model and seemingly unrelated regression (SUR) analysis. Their result does establish a significant relationship between net remittance and economic growth, but at the individual level, they observed that remittances provide immediate income for households at different levels. They, therefore, argued that the impact of remittance can only be more meaning and contribute to the economic growth of Nigeria if there are adequate measures to promote remittances flows. They also established that financial institutions play a vital role in reducing the cost of transferring funds through official channels.

Bakare, Najimdeen and Durrani(2014) examine human capital flight and its impact on the economy, a case study of Pakistan. In their quest to examine whether there exists a correlation between human capital flight and government policy. With

data from 1980-2011, it was found that workers' remittances have a positive impact on economic growth and per capita income.

Abdelbagi (2016) analyze migration, remittances, trade openness and economic growth in Africa countries. Using the Generalized Method of Moment (GMM), the result reveals that outgoing migrant has a negative significant impact on economic growth of the region; migrants' remittances on the other hands was found to have a positive significant Impact on economic growth during the period. Finally, in their analysis, their result also found that trade contributes positively and significantly to economic growth in the continent.

Akusoba (2014) examines "understanding brain drain in Nigerian universities" with the aim of analyzing factors responsible for skilled emigrants in Nigerian Universities. Push factors according to him drive migrants out of their home countries while pull factors are positive variables which attract and draws immigrants to receiving countries. The research identified push variables that exist in Nigerian Universities to include among others, poor working conditions and poor leadership, poor salaries and unemployment, lack of modern technology etc. these factors were seen as a force behind the emigration of Nigerian university workers to developed ones. They, therefore, opined that workers migration migrates because of a better offer, attractive incentives, and better wage.

Groizard and Llull(2007) investigate skilled migration and sending economies in the quest for testing brain drain and brain gain theories. Their results suggest a negative relationship between remittances and human capital stock, the result also shows that brain drain does not have an impact on remittances.They also found a positive effect of remittances on trade and foreign direct investment.

Yoko and Maurice (2008) in their study of whether remittances actually increase with migrants' education level, and considering the determinants of remittances as being a function of migration rate, migrants education level, source countries GDP, financial sector development and expected growth rate. Their finding shows that remittances decrease with the share of migrant's tertiary education. This suggests that educational attainment has a negative relationship with remittances. The higher the education, the lower the remittances. This pinpoints the facts that a country will always prefer unskilled labour migrants to skilled migrants.However, remittances were shown to have a positive relationship with financial market development, source country's income, level and rate of migration.

Simon and Oded (2006) also examine international migration and educated unemployment, with the analysis that focused on the link in a simple job-search framework, they find out that an individual's reservation wage in the home labour market increases with the probability of working abroad. Hence, their model implies that such unemployment would be smaller in the absence of the migration possibility. Furthermore, they integrate their model into the recent literature of the beneficial brain drain. The analysis shows that a developing country may end up with more educated individuals despite the brain drain and educated unemployment.

Achouak and Mohammed (2013) further extend the issues of brain drain to education sphere in their study of 'remittances, education and economic growth using panel data analysis with sampling from developed and developing countries. The researcher employed the modified version of Giuliano and Arranz's model (2009) to determine the relationship between economic growth, remittances, and education. A panel-based data analysis of two groups of countries over the 1990-2006 periods seems to point to the existence of a relationship between the studied variable. The first groups of countries consist of the largest remittances-recipient countries as a percentage of GDP. The second group includes countries recipient of the largest remittances in amount (value). The obtained results point to a positive relationship, but not significant, between education and economic growth. However, they noted that remittances negatively act on economic growth, which contradicts the conclusion made by Giuliano and Arranz (2009), yet it conforms to the results obtained by Chami et al. (2005), Azam and Guber (2006), Ratha (2007), Thanh Le (2008) and Khatiwada (2005). The introduction of the interactive term between remittances and education (REM*EDU), allows the researchers to conclude that remittances positively affect economic growth through its positive effect on education. The second sample consists of the largest remittances recipient countries in amount, and the result obtained for these groups indicates the presence of three variables likely to explain economic growth: delayed growth, openness to international trade and physical capital. However, remittances and the interaction term between remittances and education prove contrary to the result earlier reported.

Mckenzie (2012) in his study of the effects of migration on Mexican households, employed health outcomes, education mortality and other household issues as a benchmark to examine the impact of remittances on health. The result of the study shows that remittances improve child health outcomes by allowing the purchase of additional medical and nutritional inputs. It was also found that children with migration or migration tendency have less education as compared with children with no migration. Also, both the infant mortality and birth-weight results show some strong improvements in child health from migration after instrumentation. Children in migrant households are found to be 30 percent more likely to be delivered by a doctor, but 19 percent less likely to be breastfed and 11 percent less likely to receive all of their recommended vaccinations for tuberculosis, diphtheria, polio, and measles. It, therefore, seems that migrants' children are receiving less preventive health care in their infancy.

III. METHODOLOGY

The neoclassical theory assumes three variables namely: output (Y), capital (K) and labour (L). The output is assumed

to be a function of two factors of production, K and L. They further assume a constant return to scale production function and diminishing returns to factors input – labour and capital. Form the above assumptions, the So low-Swan postulates that economic growth occurs when the relative share of capital increase than that of labour from the national income. To them, increase in capital relative to labour in national income creates economic growthsince the productivity of labour will increase when more capital is given to them (i.e increase in capital per labour). More also, they posit that marginal productivity of labour is higher in the less developed economy, and therefore, increase in capital investment will produce higher returns than countries with large capital accumulation.This is because those countries with high capital accumulations will have higher break-even investment (i.e the investment that will be needed to keep the capital stock from falling). Lastly, because capital exhibit diminishing returns, the economy will grow and reach a point where an increase in capital will no longer yield increase in economic productivity. This stage is known as the steady state of the economy. The only force that can get the economy beyond the steady state is growing in technology. The simple Cobb-Douglas version of this model can be written as:

$$Y_t = A({K_t}^{\alpha}(L_t)^{1-\alpha}) - - - eqn\ 1$$

Where Y is output, K is stock of capital, and A is technology and L is the stock of human capital. Obtaining the log of equation 1 yield:

$$LnY_t = A + \alpha LnK_t + (1-\alpha)Ln(L_t) - - - enq2$$

Hence, our model can be specified as:

$$LnY_{it} = \beta_0 + \beta_1 BD_{it} + \beta_2 LnK_t + \beta_3 A_{it} + \beta_4 LnL_{it} + \beta_5 LnPCI_{it} + \beta_6 RER_{it} + \mu_{it} - - eqn3$$

Where Y_{it} is the real GDP, BD is brain drain, which is proxied by net migration, K is the stock of fixed capital, A is the stock of technology – proxied by total factor productivity, L is the labour force, PCI is per capita income and RER is real exchange rate.

IV. RESULT DISCUSSION

Panel Unit Root Test

The unit root test is carried out to examine the order of integration of the variables. The estimation used the Levin-Lin-Chu test which assumes a common autoregressive parameter for all panels. The Levin–Lin–Chu test with panel-specific means but no time trend requires that the number of time periods grow more quickly than the number of panels, so the ratio of panels to time periods tends to zero. The test involves fitting an augmented Dickey–Fuller regression for each panel; and it required that the number of lags to include be selected based on the AIC with at most 10 lags.

Table 4.1: Unit root test

Variables	ADF Statistic at Level	Prob. Value	ADF Statistic at First Difference	Prob. Value	Order of integration
RGDP	14.7290	1.0000	-3.2674	0.0005	I(1)
BD	-1.4472	0.0739	-3.8187	0.0001	I (1)
GFCF	0.5679	0.7149	-5.2065	0.0000	I (1)
PCI	0.0834	0.5332	-7.3197	0.0000	I (1)
RER	-1.2500	0.1057	-8.0483	0.0000	I (1)
LF	-0.2890	0.3863	-9.5929	0.0000	I (1)

The result Levin–Lin–Chu test in the table above shows that none of the variables was significant at the level form, but were all stationary at their first difference. Hence, all the variables used in the model are integrated of order one i.e I (1) process.

Cointegration Test

Since all the variables of interest are not stationary at order zero, there is need to conduct the co-integration test to ascertain their long-run relationship. The Westerlund technique developed in 2007 will be employed. The focus of this test is to examine the absence of cointegration by determining whether there exists error correction for the panel as a whole or for individual panel members. The test encompasses large degree of heterogeneity both in the short-run dynamics and the long-run cointegrating relationship, as well as dependence on within and across the cross sectional unit (Persyn, 2010).

The Gt and Ga statistics test for the presence of short-run relationship or long-run cointegrating for at least one individual country. The statistics are computed using the weighted average of the individually estimated t-ratio's in the model. One the other hand, the Pt and Pa test statistics examine the pool information across the sectional unit. The rejection of H0 suggests the rejection of the presence of cointegration for the model.

Statistics	Stat. value	Z – value	Prob.
Gt	-0.990	4.668	1.000
Ga	-0.353	5.369	1.000
Pt	-4.979	1.735	0.959
Pa	-0.283	3.683	1.000

The cointegration result in the table above shows that the Pr. value for Gt, Ga, Pt and Pa are all greater than 0.05 for model. This therefore shows that there is long-run relationship in the models both for individual country and in the panel as a whole.

The Hausman Test

In order to decide whether to employ fixed effect or random effect, we estimate the Hausman test. It basically tests whether the unique errors (*ui*) are correlated with the regressors, the null hypothesis is they are not. The null hypothesis of this model is the preference of random effect to fixed effect against the alternative hypothesis of fixed effect (Greene, 2008).

Chi-Square	Prob.	Decision
-32.92	0.0000	FE

Since the probability level is less than 5%, we conclude that the perfect model is fixed effect estimation.

THE RESULT

The result of the impact of brain drain on economic growth is presented in the table below:

Variables	Coefficient	t – value	Prob.
C	14.10411	8.74	0.000
BD	-6.57e-08	-2.05	-1.30e-07
LnGFCF	0.1648816	9.78	0.000
LnLF	0.0235881	1.20	0.235
TEC	0.0000188	4.53	0.000
RER	0.002081	4.94	0.000
LnPCI	0.7765749	5.19	0.000

Thus

$$LnRGDP = 14.1 - 6.57e - 08 + 0.165LnGFCF + 0.02LnLF + 0.00002TEC + 0.002RER + 0.78LnPCI$$

The result above shows that emigration of skilled professionals from West Africa leads to a reduction in the economic growth of the region. Also, stock of physical capital shows a positive relationship with economic growth within the year covered. Labour force shows an insignificant relationship with economic growth of West African countries. Furthermore, technology exerts positive relationship with economic growth of this region, as well as the depreciation in their exchange rate. Lastly, per capita income also shows positive relationship with economic growth within the period.

V. CONCLUSION AND POLICY IMPLICATIONS OF FINDINGS

The current study focused on the examination of the impact of brain drain on output performance of West African countries. Data were obtained from 11 countries of this region which are Nigeria, Ghana, Senegal, Mali, Benin, Niger, Cote devoir, Gambia, Guinea Bissau, Burkina Faso and Sierra Leone.The result shows that brain drain has a negative relationship on economic growth. This shows that the government of this region must undertake measures to reduce brain drain through increase in salary and creating good working condition for the people. Also, labour force shows insignificant relationship with economic growth of this region. This is due to the fact that large proportion of these countries labour force is unemployed; hence, they don't contribute to economic growth. The result suggests that policy needs to be put in place that will encourage productivity and improve employment rate in these countries.

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