TRADE OPENNESS, HUMAN CAPITAL AND POVERTY ALLEVIATION IN WEST AFRICA:
A Dynamic Panel Data Investigation

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ABSTRACT

West Africa is one of the sub-regions threatened with development challenges globally and in sub- Saharan Africa. Fourteen out of her sixteen countries are in the low human development category while the remaining two fall under the medium group. A greater proportion of her population lives in multidimensional poverty, with a very high degree of intensity of deprivation. This study assessed the effect of trade openness and human capital on poverty in West Africa over the period 2005–2018, with focus on 16 countries. A dynamic panel data model, estimated using the Arellano-Bover/Blundell-Bond System Generalized Method of Moments was employed. The findings revealed that human capital contributed significantly to poverty reduction in West Africa, whereas, trade openness did not reduce poverty significantly except through human capital (education). Therefore, for trade liberalization to enhance poverty alleviation in West Africa, countries in the sub-region should invest substantially in human capital development activities (tertiary education).

Key words: trade openness, human capital, poverty, West Africa.

JEL classification: F14, F41, I15, I25

1. Introduction

West Africa is one of the sub-regions confronted with development challenges globally and in sub-Saharan Africa (SSA). The latest human development report by the United Nations Development Programme (UNDP,

2019) showed that fourteen (14) out of her sixteen countries are in the low human development category while the remaining two, Cape Verde and Ghana, are in the medium group. Moreover, a greater proportion of her population lives in multidimensional poverty, with a very high degree of intensity of deprivation and number of persons living below the poverty line. These suggest that poverty is one of the major challenges threatening the sub-region.

Several policy initiatives to reduce poverty have been suggested in the literature and empirical findings support these. Prominent among such policies include economic growth (Roemer & Gugerty, 1997; Quibria, 2002; Adams, 2003; Dollar & Kraay, 2004; Muloka, Kogida, Asida & Lilya, 2012; and Canavire-Bacarreza, Jetter & Robles, 2018); human capital development (Asaju, 2012; Bhukuth, Roumane & Terrany, 2018; and Olopade, Okodua, Oladosun & Asaleye, 2019); trade liberalization (Goff & Singh, 2014; Agusalim, 2017; and Durongkaveroj & Ryu, 2019); and infrastructure development (Ali & Pernia, 2003; Ogun, 2010; Lelethu & Okem, 2016; and Meilvidiri, Jafar, Syahruddin, Nahumury & Akbar, 2020).

Notwithstanding the identified poverty reduction measures, more studies continue to focus on poverty reduction policies, particularly in developing countries of Africa where the level of poverty still remains high, in spite of the progress recorded in Asia at the expiration of the millennium development goals in 2015. Moreover, the launch of the sustainable development goals (SDGs) in 2015, with poverty reduction being one of the goals, further motivated efforts to conduct more poverty-related researches. In addition, it is expected that studies covering poverty-related issues will upsurge as the COVID-19 pandemic continues to ravage the world, plunging nations' economies into recession. This study focuses primarily on alleviating poverty through trade openness and human capital development in West Africa. This becomes essential because it is not clear whether the touted open trade has been beneficial to the West African sub-region, especially in the area of poverty alleviation. It is therefore critical to further investigate this.

Although the literature is fraught with a variety of studies promoting free trade as the panacea for economic prosperity and development of nations, especially, with the experiences of China and other East Asian countries (see Dollar & Kraay, 2004; Topalova, 2010; Goff & Singh, 2014; Agusalim, 2017;

and Durongkaveroj & Ryu, 2019). However, the link between trade and poverty has not been well and adequately researched, particularly in West Africa. In addition, a critical examination of available literature also shows most of the studies focusing on the static aspect of trade impact on poverty without giving considerable attention to some of the channels through which trade could promote poverty alleviation. The only pronounced dynamic thought in the literature is how trade affects poverty through growth. Similarly, the literature globally appears to shy away from the impact of trade on poverty through human capital. In view of this, the current work assesses the effect of trade openness and human capital on poverty in West Africa

2.   Situation Analysis of Poverty, Human Capital and Trade Openness in West Africa

This sub-section presents and discusses the situation of poverty and human capital in West Africa. Table 1 shows country-specific facts on the state of poverty in West Africa, using three measures – percentage of population in multidimensional poverty (mdp), percentage of population living below US$1.90 per day, and households final consumption expenditure per capita growth (hce) – from 2005 to 2018.

Irrespective of the measure considered, the statistics generally reveal a high rate of poverty in the sub-region, though the rates differ across countries. Moreover, the performance of each of the variables per country over time has been mixed; while some have increased, others have declined. In some countries, the performance follows a random walk; as a variable that witnessed declined in the previous year tended to rise in the current year.

For instance, the highest mdp (92.4%) in 2005 was recorded in Niger. This fell to 89.8% in 2010 and 2015 before rising again to 90.5% in 2018. The lowest (30.1%) in 2005 was recorded in Ghana. This increased to 32.4% in 2015 before it declined thereafter to 30.1% in 2018. Generally, since Ghana had the lowest mdp in the entire sub-region, this suggests that the nation is ahead of all the other fifteen countries with respect to reducing the percentage of the population living in multidimensional poverty in West Africa. This was followed by Côte d'Ivoire, which posted 46.1% in 2018, having declined from 61.5% and 59.3% in 2005 and 2015 respectively.

Table 1. Poverty Statistics for West Africa, 2005-2018

Country	Percentage of Population in Multidimensional Poverty				Percentage of Population Living Below US$1.90 Per Day				Households Final Consumption Expenditure Per Capita Growth			
	2005	2010	2015	2018	2005	2010	2015	2018	2005	2010	2015	2018
Benin	71.8	72.0[c]	64.2	66.8	Na	53.1[e]	49.5	na	-0.90	-0.01	0.02	0.01
Burkina Faso	82.6[a]	84.0	82.8	83.8	Na	55.3[d]	43.7[g]	na	0.04[a]	-0.05	9.15	7.00
Cape Verde	Na	Na	na	Na	8.1[b]	na	3.2	na	-0.89	0.03	-0.90	-0.90
Côte d' Ivoire	61.5	59.3[e]	59.3	46.1	29.1[c]	na	28.2	na	0.06	0.01[e]	0.02	-0.83
The Gambia	60.4	60.4[c]	57.2	55.2	Na	25.1	1.1	na	-0.02	-0.89	0.05	-0.89
Ghana	30.1[b]	30.5[e]	32.4	30.1	24.5	12[f]	13.3	na	0.07	0.74	10.28	-0.05
Guinea	82.5	86.5[e]	73.8	61.9	59.7[b]	35.3[f]	na	na	-0.89	7.55	0.07	0.04
Guinea-Bissau	80.4[a]	Na	80.4	67.3	Na	67.1	na	na	0.01	-0.88	-0.01	0.08
Liberia	83.9[a]	81.9[d]	70.1	62.9	68.6[c]	na	38.6[g]	na	0.14	-0.02	0.004	-0.10
Mali	86.6[a]	Na	78.4	78.1	51.2[a]	49.7[d]	na	na	0.03	0.05	-0.90	0.01
Mauritania	61.7[a]	66.0[d]	55.6	50.6	Na	1.8[c]	6.0[g]	na	0.06	0.04	-0.01	0.02
Niger	92.4[a]	89.8[f]	89.8	90.5	74.9	5.3[e]	44.5[g]	na	0.02	0.01	0.001	0.02
Nigeria	63.5[b]	43.3[e]	50.9	51.4	Na	53.5[d]	na	na	0.01	-0.92	0.18	-0.07
Senegal	66.9	74.4[e]	51.9	53.2	37.4	38.0[e]	na	na	-0.90	na	Na	na
Sierra Leone	81.5[b]	72.7	77.5	57.9	Na	52.2[e]	na	4.1	-0.89[b]	0.06	-0.87	9.73
Togo	54.3[a]	50.9	48.5	48.2	55.6[a]	54.2[e]	49.8	na	-0.02	0.003	0.03	0.01

[a] = 2006 value, [b] = 2007 value, [c] = 2008 value, [d] = 2009 value, [e] = 2011 value, [f] = 2012 value, and [g] = 2014 value.

Source: Generated by Author from UNDP (various issues) and World Bank (2020a).

Concerning the percentage of the population living below US$1.90 per day, Ghana's performance continued to outweigh others, with 24.5% in 2005 and 13.3% in 2015. The worst performing country was Togo, followed by Benin, having recorded 49.8% and 49.5% respectively in 2015. The 2018 values for all the countries were not available. With respect to household final consumption expenditure per capita growth, the performances were mixed across the countries of the sub-region, with some posting negative growth rates for the variable. For example, six out of the sixteen countries had negative growth rates for hce in 2005, 2010 and 2018 while five countries posted negative growth rates in 2015. The best performing country in 2018 was Sierra Leone (9.73%), followed by Burkina Faso (7.00%). The implication of these statistics is that poverty is one of the major problems in West African countries.

Table 2 shows information on human capital and trade openness variables. Human capital is measured in this study using tertiary school enrolment while trade openness variable is the ratio of exports and imports to the gross domestic product (GDP) as presented in sub-section 3.4.1. From the table, tertiary school enrolment has been very low across all the countries. The highest (9.83%) in 2005 was in Côte d'Ivoire. This however declined to 7.67% in 2010 before a slight increase to 8.79% in 2015 and then further to 9.34% in 2018. The least in 2005 was found in Niger (1.49%), followed by Nigeria (4.48%). Cape Verde had the highest value (23.64%) in 2015 with the least in the same year recorded by Senegal (1.75%). Cape Verde maintained her leading position in 2018, having posted 23.63% tertiary school enrolment while Niger had the least (4.41%).

With respect to trade openness, the performance generally appeared encouraging, except in two countries, Senegal (6.52%) and Liberia (12.34%), which had very low values in 2018. It should however be stressed that most of the sub-region's trade is composed of very large volumes of imports while a good number of their exports are primary products. The remainder of the paper comprises: section 2, which reviews theoretical and empirical literature on poverty-trade and poverty-human capital relationships, section 3 which focuses on extensive methodology, and sections 4 and 5 which present results and the conclusion respectively.

Table 2. Human Capital and Trade Openness Statistics for West Africa, 2005-2018

	Tertiary School Enrolment				Trade Openness			
	2005	2010	2015	2018	2005	2010	2015	2018
Benin	5.91	13.78	13.55	12.27[g]	39.96	51.44	56.76	61.85
Burkina Faso	2.37	3.58	5.64	6.52	34.17	49.73	59.89	59.75
Cape Verde	7.63	18.98	23.64	23.63	14.34	94.44	14.67	117.28
Côte d' Ivoire	9.83[b]	7.67	8.79	9.34[g]	93.92	93.96	52.72	45.68
The Gambia	na	1.96	2.73[e]	na	5.19	41.13	48.91	63.37
Ghana	5.87	8.80[d]	15.70	15.69	98.17	75.38	75.59	71.68
Guinea	3.76	1.93	11.56[f]	na	69.90	73.55	72.44	121.84
Guinea-Bissau	2.30	Na	Na	na	41.32	5.13	59.78	57.80
Liberia	na	9.53	Na	na	27.36	111.77	126.18	12.34
Mali	5.39[c]	6.13	5.53	4.52[g]	54.13	57.99	63.64	59.79
Mauritania	2.94	4.36	5.61	5.00[g]	88.24	93.43	91.95	96.56
Niger	1.48	1.37	3.30	4.41	38.48	52.38	44.17	37.59
Nigeria	1.49	9.57	Na	na	33.60	43.33	21.33	33.78
Senegal	5.42	7.59	1.75	12.76	69.44	51.93	58.11	6.52
Sierra Leone	na	Na	Na	na	46.87	51.28	66.83	56.70
Togo	5.33[a]	9.3	1.96	14.52	86.78	91.24	93.66	73.66

[a] =2006 value, [b]= 2007 value, [c] = 2008 value, [d] = 2009 value, [e] = 2012 value, [f] = 2014 value, and [g]= 2017 value

Source: Generated by Author from World Bank (2020a).

2. Literature Review

2.1 Conceptual and Theoretical Issues

2.1.1 *Poverty*

The concept of poverty is a complex phenomenon which is defined and measured in various ways as more understanding and perspectives of the term continue to evolve. Moreover, its definitions and measurements are classified into money-metric and non-money-metric.

The money-metric definitions/measures of poverty, which are quantitative and always classified as absolute and/relative, focus on income and expenditure in which a poverty line is drawn. Persons who live below this line are considered poor. It is based on this consideration that the Foster-Greer-Thorbecke (FGT) measures define and compute poverty in terms of poverty headcount ratio (percentage of the population of a society living

below the poverty line); poverty gap (this shows the depth of poverty by looking at "the extent to which the mean expenditure/income of a poor household falls below the poverty line"); and squared poverty gap (this focuses on the distance by which individuals or households fall below the poverty line), and it reflects "the proportionately greater difficulty faced by the extreme poor" (see Conway, 2004, 4).

The money-metric measures of poverty have been criticized on various grounds, such as none inclusion of qualitative issues that are critical to poverty measures as well as other important neglected concerns. These gave birth to different other measures classified under non-money-metric. Nevertheless, money-metric measures of poverty have continued to gain recognition among researchers and in policy discourses due to their suitability for empirical research.

The non-money-metric definitions and measures, as discussed by Conway (2004, 3 & 4), cover basic needs, capabilities and human development; household welfare dynamics, vulnerability, and chronic and transitory poverty; and "a cluster of concepts around empowerment, dignity and social capital." These also have their limitations as it is hard to compute some of them due to non-availability of data for empirical considerations.

Whichever way it is defined and measured, poverty is "a situation in which an individual or a household has difficulty fulfilling its basic needs, lacks opportunities provided by an enabling environment to sustainably improve its wellbeing or is vulnerable to losing its current standard of living" (Cahyat, Gonner & Haug, 2007, 2). This suggests that poor people are deprived of basic needs of life and are confronted with a myriad of problems, which limit their freedom of choice.

2.1.2 *Trade-Poverty Hypothesis*

Theoretical discussions around trade-poverty stem from the role of trade liberalization in development. These arguments are classified into two – static and dynamic. Both are discussed comprehensively in Bhagwati & Srinivasan (2002), Conway (2004), Majeed (2010), and Goff & Singh (2014).

The static argument presupposes that trade liberalization causes resources to be reallocated away from sectors that were formerly protected through

trade policies to sectors where a country enjoys comparative advantage because relative factor prices will change in favour of more abundant resources. This is consistent with the Heckscher-Ohlin theory. The argument is based "on the channel between real wages of unskilled workers and trade liberalization in poor countries", which is "a natural conjecture of Stolper-Samuelson theorem" that predicts poverty reduction in poor countries as a result of free trade since the comparative advantages they enjoy enhance exportation of labour-intensive commodities (Majeed, 2010, 104). According to Bhagwati & Srinivasan (2002), the poor are endowed with labour, however, they lack human and financial capital, thus when poor countries open up their economies, the real wages of unskilled workers will increase; thus, contributing to reduction in poverty.

This thought however, may not be automatic due to some inherent factors within the economy. For instance, for trade openness to change relative factor prices in favour of more abundant factors, increase the price of labour and reduce poverty, it must have been that labour abundance is responsible for poverty and relative low income; but if factor reallocation is disadvantaged, trade liberalization may not favour the poor (Goff & Singh, 2014).

Moreover, the peculiarities of the society and nature of factors may also affect how trade openness can contribute to poverty reduction. Goff & Singh (2014), countering the Stolper–Samuelson theorem, which suggests that trade openness could lead to increase in the real income of abundant factors (i.e. poor people in countries with comparative advantage in unskilled labour gain from trade), and following the same line of argument as Aisbett, Harrison & Zwane (2008), noted that if such abundant factors are unskilled, which in most cases belong to the poor, then the unskilled labour must move completely out of the contracting sectors and into expanding ones for this argument to hold. In actual fact, there appears to be labour immobility among most unskilled persons in poor countries. Furthermore, Aisbett, Harrison & Zwane (2008, 35 & 36) contend that from historical evidence, developing countries protect their unskilled-intensive sectors, particularly the non-agricultural sectors, while some relatively unskilled-intensive sectors "in a global context may require workers with more skills than the poor in developing countries typically possess."

In addition, Goff & Singh (2014) hold that trade may not enhance poverty alleviation rather, it may aggravate it because the exposure of domestic economy to foreign competition may cause firms to employ temporary workers instead of permanent ones, or even retrench the existing ones in order to minimize cost. They further argue that, if as a result of trade liberalization increased labour demand favours skilled rather than unskilled labour, and if more capital goods are preferred to labour due to lower prices of capital goods, or if the economy depends majorly on natural resources, demand for skilled labour will definitely rise, thereby leading to increased poverty in poor countries.

The second theoretical explanation for the trade-poverty link is dynamic hypothesis, which presumes that trade openness affects development indicators like poverty through its effect on growth; meaning that economic growth is critical for poverty alleviation. In the words of Bhagwati & Srinivasan (2002, 180), "trade promotes growth; and growth reduces poverty." The contention is that a more liberalized trade will enhance efficient allocation of resources, thereby improving economic growth, which invariably reduces poverty in the economy. The reasoning is that a more liberalized economy will "allocate investments more efficiently, create opportunities to realize economies of scale, increase enterprises' exposure to technological improvements in productivity, and intensify competition" (Conway, 2004, 12), which should improve poverty alleviation.

2.1.3   *Human Capital and Poverty Link*

Theoretically, human capital has been acknowledged as important for development, particularly since the work of Becker (1975). Measured using education, health, training, migration, and study programmes for adults (Schultz, 1961; and Dauda, 2017); human capital is recognized as critical for addressing development challenges such as poverty, unemployment, inequality, among others (Acemoglu & Johnson, 2007; Santos, 2011; de Silva & Sumarto, 2015; and World Bank, 2020b). The argument is that investment in human capital boosts productivity, enhances growth, creates employment, empowers the youth, raises income level and therefore contributes to greater and significant declines in the levels of inequality and poverty (de Silva &

Sumarto, 2015; Bhukuth, Roumane & Terrany, 2018; and Collin & Weil, 2020).

Becker (1995) makes clear the critical connection between human capital and poverty. According to him, investment in human capital, particularly education, enhances productivity at individual and national levels, raises the skills of individuals, improves a country's standard of living, promotes economic growth and efficiency, reduces inequality, improves economic wellbeing and reduces poverty. He (Becker, 1995, 9) submits that "education is the most effective way for able young people of poor backgrounds to rise in the economic hierarchy because human capital is the main asset of 90 percent of any population." So, human capital is fundamental and strategic for poverty reduction because it empowers people, develops their capacity and capabilities to be more productive, and provides them with more employment opportunities that raise their level of income which is required for a better living standard (Asaju, 2012; Bhukuth, Roumane & Terrany, 2018; and Olopade et al., 2019).

2.1.4 *Trade, Human Capital and Poverty*

Human capital is one of the channels through which trade can alleviate poverty. For instance, trade liberalization opens up an economy to the outside world, which attracts more foreign direct investment in the domestic economy thereby increasing the number of industries and enlarging employment opportunities. However, most of the industries tend to employ more skilled workers than unskilled. Therefore, developing human capital of the poor will provide them with better and enlarged employment opportunities, increase their income level, and contribute to a decline in poverty. Becker (1995) noted that education, which is a measure of human capital, is the most effective way to raise the poor out of poverty. So, when an economy is opened up, it expands employment opportunities for skilled labour within and outside the domestic economy, which will in turn boost their income and reduce poverty.

Moreover, trade makes it possible to have access to the capital goods required for industrial growth and development in developing economies. Such capital goods also enhance and improve productivity of labour, and

when the skill of labour is developed through the human capital formation process, employment opportunities among them will rise, which will help to raise income level and invariably contribute to poverty alleviation.

The World Bank & World Trade Organization (2015, 20) observed that to maximize the gains from trade in order to reduce poverty, "elements of a country's policy framework other than trade policy must be taken into account." Citing Goff & Singh (2014), the authors reiterate that "the link between trade and poverty is stronger in countries that have deeper financial sectors, better education levels and stronger governance."

The problem of labour immobility, which is peculiar to the poor because of the unskilled nature of their labour as reiterated by Aisbett, Harrison & Zwane (2008), can be addressed through human capital development (education) among the poor. With this, labour mobility from the contracting sectors to expanding ones will be enhanced, and this will invariably boost chances of employment among the poor thereby raising their income level and helping to reduce poverty.

Furthermore, the issue of employment of temporary workers instead of permanent ones and retrenchment raised by Goff & Singh (2014) can easily be resolved with human capital development. Without human capital development in low-income countries, the poor will be constrained from participating in and benefiting from the opportunities offered by trade liberalization. Thus, trade will help to alleviate poverty in an economy where the skill of labour is developed.

2.2 Empirical literature

2.2.1   *Trade Openness and Poverty*

Various studies have tested static and dynamic trade-poverty hypotheses. The findings on both sides continue to be mixed. While some found that trade openness enhances poverty alleviation, others discovered that trade liberalization, rather than reduce poverty aggravates it. In addition, some studies have taken a middle position, thereby reporting that trade liberalization neither reduces nor raises poverty level. These findings however, are influenced by different factors, which majorly dwell on approaches and methodological issues such as the poverty and trade openness

measures adopted, data types and study scope, model specification and estimating techniques.

2.2.2   *Trade Openness and Poverty: Direct Impact*

Recently, literature has continued to emerge on the impact of trade liberalization on poverty, using various measures of openness such as import share of GDP, export share of GDP, foreign direct investment share of GDP, ratio of exports and imports to GDP, average tariffs, etc. In the same vein, poverty is measured with different indicators as highlighted in sub-section 3.4.1 of this study. The findings of the studies however have been mixed. While some reported direct impact of trade on poverty, others found that trade, instead of reducing poverty raises its level.

Studies which incorporated trade variable as one of the regressors and reported falling poverty using various measures are: Nwafor, Adenikinju & Ogujiuba (2007); Aisbett, Harrison & Zwane (2008); Cain, Hasan & Mitra (2012); Mitra (2016a); Goff & Singh (2014); Santos- Paulino (2017); and Durongkaveroj & Ryu (2019) among others. These papers discovered that trade could play a significant role in poverty decline. However, for this conclusion to hold, trade liberalization should create jobs in sectors which employ a greater proportion of the poor, financial sectors should be deep, education levels should be high, institutions strong, and labour mobility should be high, especially from contracting to expanding sectors.

On the other hand, empirical findings have shown a direct relationship between poverty and trade openness. According to these studies, trade openness reduces the income of the poor, raises poverty head count ratio, enlarges the poverty gap, and reduces household consumption expenditure (Agénor, 2004; Topalova, 2007; Nwafor, Adenikinju & Ogujiuba, 2007; Guillaumont-Jeanneney & Kpodar, 2011; Singh & Huang, 2015; Mitra, 2016a; and Onakoya, Johnson & Ogundajo, 2019). The reasons for such conclusion stem from the fact that most policies that enhance poverty alleviation through trade openness appeared to be absent or inadequate in the countries or regions where the findings were reported. For instance, citing numerous studies, Goff & Singh (2014) explain that some trade reforms do not consider the poor, and as such when trade is opened up, the majority of

poor workers lose their jobs. Another explanation has to do with methodological flaws in which some models are miss-specified, and as such important variables that capture reforms are not controlled for. Other issues are governance and institution factors that prevent the poor from benefiting from trade openness. For instance, in certain societies, gains from trade neglect some productive sectors and firms that employ more poor persons; thus, the majority of them do not benefit from trade liberalization, rather it tends to harm them (see Haltiwanger, 2011; and McMillan & Verduzco, 2011).

Besides the positive and negative effects of trade on poverty reported above, some studies have found weak or no effect of trade liberalization on poverty (Beck, Demirguc-Kunt & Levine, 2007; Aisbett, Harrison & Zwane, 2008; Kpodar & Singh, 2011; Agusalim, 2017; and Shuaibu, 2017). These findings may not be unconnected with the trade measures employed, the estimating technique adopted, data points used, and the periods covered by the studies. For example, it is observed in the work of Aisbett, Harrison & Zwane (2008) that the authors used the fraction of households living on less than a dollar per day while growth was measured using per capita income. However, the panel models were estimated with OLS and instrumental variables techniques. The results across board were significant in some specifications while in some they were insignificant. Another observation was that the coefficients were unnecessarily large because the models were semi-logged and some coefficients of unlogged independent variables relative to the logged dependent variables were in the neighbourhood of 7.54, meaning about a 745% effect of trade openness on poverty, which is arbitrary. Furthermore, Agusalim (2017) reported neutral effect of trade on poverty in the short run.

2.2.3   *Trade Openness and Poverty: Indirect Impact*

The most profound indirect effect of trade openness on poverty has been reported through growth. In other words, economic growth contributes significantly to sustained decline in poverty. The argument is that trade openness boosts average income growth, which in turn raises the income of the poor, thereby reducing the level of poverty among them. Studies which found this result include Bhagwati (2004); Dollar & Kraay (2004); Lee, Ricci

& Rigobon (2004); Aisbett, Harrison & Zwane (2008); and Santos- Paulino (2017).

This conclusion however, has been criticized on the ground that growth literarily may not benefit the poor without the accompanying policies and institutions (see Newfarmer & Sztajerowska, 2012; Mitra, 2016b; and Santos-Paulino, 2017). Mitra (2016b, 1) has reported that programmes which can help trade to reduce poverty include: "product diversification, suitable agricultural policies, and policies promoting financial development, protecting property rights, and developing vital infrastructure." Moreover, human capital development strategies, macroeconomic stability, development of infrastructure, as well as credit and technical assistant to farmers are necessary for growth to alleviate poverty (Aisbett, Harrison & Zwane, 2008). In addition, for trade to benefit the poor through growth, policies must be put in place to raise employment in the sectors that employ the poor the most, boost exports of such sectors while appropriate institutions and macroeconomic policies must be created in addition to appropriate innovations and technologies (Aisbett, Harrison & Zwane, 2008; Levchenko, 2013; Cali, Hollweg & Bulmer, 2015; Coelli, Moxnes, & Ulltveit-Moe, 2018; Shu & Steinwender, 2019; and Gallagher & Polaski, 2020). Goff and Singh (2014) in their study on some African countries over the period 1981-2010 also reported that for trade liberalization to reduce poverty in any country the financial sectors must be deep, the levels of education must be high and institutions in such country must be strong.

The World Bank (2020c, 1) reported that global value chains (GVCs), which currently account for about 50% of all trade, can "boost growth, create better jobs, and reduce poverty" if countries in the developing world can "implement deeper reforms to promote GVC participation, industrial countries pursue open, predictable policies, and all countries revive multilateral cooperation."

2.2.4   *Human Capital and Poverty*

Although human capital has been acknowledged as strategic for poverty alleviation because it empowers people, develops their capacity and capabilities to be more productive, and provides them more employment

opportunities that raise their level of income required for better living standards (Attanasio, Meghir, Nix & Salvati, 2017; Olopade et al., 2019; and Collin & Weil, 2020), empirical findings do not converge. While a good number of the literature showed that human capital significantly enhances poverty alleviation (Santos, 2011; Olopade et al., 2019; and Collin & Weil, 2020), others reported an insignificant relationship between both terms (Santos, 2011; Olopade et al., 2019). These findings nevertheless are always informed by different factors such as the variables employed to measure the concepts (human capital and poverty), the prevalent economic and social conditions, among others.

Santos (2011), in her study on Argentina, found that educational quality matters for poverty alleviation. In the study, the author found that the quality of education received by children from favourable socio-economic backgrounds and those from low socioeconomic backgrounds affect poverty alleviation in the country. In the work, children from parents with low income and poor education backgrounds received low quality education and this in turn prevented poverty alleviation among them because the cognitive skills they acquire are not sufficient to take them out of poverty; therefore, in spite of their education, they are still trapped in poverty. However, children from favourable socio-economic backgrounds receive better education and get out of poverty. The study concludes that segmentation in educational quality is capable of reinforcing inequalities, thereby leading to poverty traps.

The finding reported by Santos (2011) is also in consonant with Attanasio et al. (2017, 234) which shows that parents with higher income status invest more in their children at "younger ages when investments have the greatest impacts", thereby creating "large gaps in inequality", which enhances poverty alleviation among them than children from parents with low income.

Furthermore, Olopade et al. (2019), measuring poverty with poverty headcount ratio at US$1.90 a day and human capital with education (government expenditure on education) and health (government expenditure on health), found that education significantly reduced poverty in OPEC member-countries; whereas, health impact on poverty was insignificant.

Collin & Weil (2020) in their study also reported drops in poverty due to investment in human capital (education and health).

3. Theoretical Framework and Methodology

This study is based on the structural theories of poverty which originated from scholars like Clark (1965), Harrington (1981) and Galbraith (1998). These theories view poverty from the macro and meso-level demographic and economic contexts, which represent available opportunities and constraints that determine poverty (Tomaskovic-Devey, 1991; Rank, 2005 & 2011; and Brady, 2019).

The reasoning is that economic context such as economic growth and development, industrialization and deindustrialization, and spatial and skills mismatches as well as demographic context like neighbourhood disadvantage, age/sex composition, residential segregation, urbanization and demographic transitions, etc. affect poverty (Brady, 2019).

In view of the above, this study examines poverty as influenced by socio-economic and demographic factors. Thus,

$$pov = f(\textbf{\textit{sec}}, \textbf{\textit{dem}}) \tag{1}$$

where:

pov	=	poverty
sec	=	vector of socio-economic variables
dem	=	vector demographic determinants of poverty

3.1 Panel econometric modelling and estimation issues

The study employed a dynamic panel model. The justification for this is that most economic relationships follow dynamic processes of adjustment, which should be captured in modelling. Moreover, the dynamic panel modelling approach is much more appropriate when dealing with issues of autocorrelation emanating from the inclusion of a lagged dependent variable as one of the explanatory variables, correlated specific effects, which are identified with heterogeneity among the cross sectional units (countries) and orthogonality.

Given a dynamic panel model of the type:

$$y_{it} = y_{it-1}\delta + x_{it}\beta' + \varepsilon_{it} \tag{2}$$

where:

y_{it} represents poverty variable in country i at time t and $y_{i,t-1}$ the lagged dependent variable.

x_{it} is a vector of the explanatory variables that affect poverty in addition to the variables of interest (trade openness and human capital).

$i = 1, \ldots, N;$

$t = 1, \ldots, T.$

δ is a scalar

β is $K \, x \, 1$ matrix.

ε_{it} can be decomposed into a one-way error component model,

$$\varepsilon_{it} = \mu_i + v_{it} \tag{3a}$$

or

$$\varepsilon_{it} = \upsilon_t + v_{it} \tag{3b}$$

or a two-way error component model,

$$\varepsilon_{it} = \mu_i + \upsilon_t + v_{it} \tag{4}$$

v_i is country specific effects, υ_t is time effect while ε_{it} stands for error term, with $v_i \sim IID(0.\sigma^2 v)$ and $\varepsilon_{it} \sim IID(0.\sigma^2 \varepsilon)$ "independent of each other and among themselves" (Baltagi, 2005, 135).

3.2 Empirical model for the study

The study adopts and augments the model employed by Goff & Singh (2014) in their paper, which also derives from the work of Chang, Kaltani & Loayza (2009). The model in dynamic panel model form is given as:

$$pov_{it} = \delta pov_{it-1} + to'_{it}\lambda + hc'_{it}\phi + x'_{it}\beta + \varepsilon_{it} \tag{5}$$

where:

pov signifies poverty;

δ is a scalar;

to', *hc'* and *x'* are *1 x K* matrices, which capture trade openness, human capital and control variables respectively

λ, ϕ and β are *K x 1*.

i represents individual country

t is time (year),

ε_{it} is composite stochastic error term, decomposed into

$$\varepsilon_{it} = \mu_i + v_{it} \tag{6}$$

μ implies country specific effects while v_{it} is the remaining error term, $\mu_i \sim IID(0, \sigma_\mu^2)$ while $v_{it} \sim IID(0, \sigma_v^2)$.

Based on the above, the empirical model estimated in the study is in semi-log form, and it is given as:

$$\ln pov_{it} = \alpha_0 + \alpha_1 \ln pov_{it-1} + \alpha_2 \ln top_{it} + \alpha_3 ter_{it} + \alpha_4 \ln gdp_{it} + \alpha_5 dcp_{it} + \alpha_6 cpi_{it}$$
$$+ \alpha_7 \ln pop_{it} + \alpha_8 eds_{it} + \mu_i + v_{it} \tag{7}$$

where:

pov = poverty, measured using households final consumption expenditure per capita (hce);

top = trade openness,

ter = tertiary school enrolment, which captures human capital;

gdp = per capita gross domestic product (GDP);

dcp = domestic credit to the private sector;

cpi = corruption perceptions index;

pop = population

sds = external debt stock.

However, three variants of the model were estimated, with the results presented in Tables 3 and 4.

To determine the effect of trade openness on poverty through human capital,, both variables were interacted in the empirical model specified in equation (7) to have:

$$\ln pov_{it} = \alpha_0 + \alpha_1 \ln pov_{it-1} + \alpha_2 \ln top*ter_{it} + \alpha_3 \ln gdp_{it} + \alpha_4 dcp_{it} + \alpha_5 cpi_{it}$$
$$+ \alpha_6 \ln pop_{it} + \alpha_7 eds_{it} + \mu_i + v_{it} \qquad (8)$$

3.3 Estimation technique

The study employed the Arellano-Bover/Blundell-Bond system generalized methods of moment (GMM). The justification for this stems from the fact that the GMM estimators are employed for dynamic models, particularly when the number of time (years) is less than the number of cross-sectional units (countries). Moreover, they help to address any endogeneity problem inherent in the model. The system GMM is also superior to all other panel estimating techniques.

For instance, assuming a one-way error component model, equation (6) can be substituted into equation (2) to become:

$$y_{it} = y_{it-1}\delta + x_{it}\beta' + \mu_i + v_{it} \qquad (9)$$

So, equations (7) & (8), which are dynamic models, cannot be estimated using pooled, fixed effects and random effects estimators. Using such estimators for a dynamic model of this type will return biased and inconsistent results. Furthermore, the inclusion of y_{it-1} as one of the explanatory variables will lead to autocorrelation while individual (country) effects (μ_i) "characterizing the heterogeneity among the individuals" (countries) will also render the results inconsistent (see Baltagi, 2005, 135). For example, y_{it} is a function of μ_i, which also implies y_{it-1} being a function of μ_i. This means that y_{it-1} correlates with the error term (v_{it}). So, using the Arellano-Bond Difference GMM and the Arellano-Bover/Blundell-Bond system GMM can help to solve these problems.

The process involves first differencing the model "to get rid of the effects along with any time-invariant regressor" (Salisu, 2012, 4). So, differencing equation (7) or (8) gives:

$$y_{it} - y_{it-1} = (y_{it-1} - y_{it-2})\delta + (x'_{it} - x'_{it-1})\beta + (v_{it} - v_{it-1}) \qquad (10)$$

which helps to control for the fixed effects. The assumption guiding $(v_{it} - v_{it-1})$ is that it follows first order moving average process {MA(1)} with unit root.

Equation (10) can be written as:

$$\Delta y_{it} = \Delta y_{i,t-1}\delta + \Delta x_{it}\beta + \Delta v_{it} \tag{11}$$

With equation (10), any endogeneity caused by the correlation between the explanatory variables and the effects are removed completely.

Having removed the unobserved country-level effect, υ_i, which is correlated with $y_{i,t-1}$, the Arrelano-Bond difference GMM suggests that instrumental variables can be applied to handle the correlation between $\Delta y_{i,t-1}$ and Δv_{it} to produce efficient results. The system GMM however, improves on this. Blundell & Bond (1998) noted that further slight stationarity restriction on the initial conditions process will permit using an extended system GMM estimator, which employs lagged differences of y_{it} as instruments for equations at levels together with lagged levels of y_{it} as instruments for equations in first differences (Baltagi, 2008; and Salisu, 2012). What this implies is that system GMM uses both lagged and level variables as instruments, which help to increase the efficiency of the estimate and produce better results. Moreover, the process also helps to resolve the problem of reverse causality, particularly when the explanatory variables are lagged at least twice and used as instruments in the first-differenced equation. On the basis of these, the study employed the system GMM as estimating technique.

3.4 Variables and their measures

3.4.1　*Key Variables*

Poverty measures

The literature is fraught with different measures of poverty, such as multidimensional poverty index, poverty head count ratio, poverty gap, households final consumption expenditure, human development index, per capita income of the poor, and welfare indicators like deprivation in water,

sanitation, shelter, and energy (see Dollar & Kraay, 2004; Agusalim, 2017; Goff & Singh, 2014; Onakoya, Johnson &Ogundajo, 2019; Durongkaveroj & Ryu, 2019; and Wright, 2020). However, in this study, household's final consumption expenditure per capita was adopted due to data availability, as data on the other measures were scanty, and even missing for some countries covered in the study.

Human capital measures

A plethora of human capital measures have been used in the literature. Some of these cover education variables such as school enrolment and completion rates (primary, secondary and tertiary), literacy rate, education expenditure, educational attainment, etc.; health variables like average life expectancy, incidence/prevalence of diseases, mortality rates (infant, under five and crude death), physicians per 1,000 people, health expenditure, hospital beds per capita, etc.; training and apprenticeship variables like length of work place training; migration variables like net migration and brain drain; managerial skill development variable; and study programmes for adults (see Barro, 1991; Mankiw, Romer & Weil, 1992; Sharpe, 2001; Acemoglu & Johnson, 2007; Cohen & Soto, 2007; Cohen & Leker, 2014; Ajakaiye et al., 2016; and Dauda, 2017, 2018 & 2020). This study however, used tertiary school as the education variable (tertiary school enrolment). There are two major reasons for adopting this variable. Firstly education, particularly at tertiary school level, is the most appropriate for the study because its influence on trade is evident. The second reason is data availability.

Trade openness

There are two major measures of trade openness identified in the literature. These are incidence-based measures, which cover tariff data; quantitative and foreign exchange restrictions, and export taxes (trade policy measures); and outcome-based measures, which are built on trade data through which trade is distorted (see Spilimbergo, Londoño & Székely, 1999; Bhatti et al, 2011; Goff & Singh, 2014; and Onakoya, Johnson & Ogundajo, 2019). This study employed the second measure, which is given as $(X + M / GDP)$, where X and M are exports and imports respectively.

3.4.2   *Control Variables*

The control variables are: per capita GDP (this controls for income level, economic growth or economic development); domestic credit to the private sector (to control for financial deepening); corruption perceptions index (which controls for level of corruption, which can affect trade); population; and external debt stock (which can hamper trade).

3.5 Post estimation/diagnostic test

The post estimation/diagnostic tests conducted in the study are: Wald Chi-square, which tests for the joint significance of the explanatory variables employed in the model; autocorrelation or serial correlation, and the Hansen Chi-square tests. Because of the assumption that $\left(v_{it} - v_{it-1}\right)$ follows MA(1) with unit root, Arrelano-Bond proposes the need to test for second-order serial correlation for the remainder disturbances of the differenced equation because "the consistency of the GMM estimator relies upon the assumption that $E\left(\Delta v_{it} \Delta v_{it-1}\right) = 0$," (Salisu, 2012, 5). In addition to this, the over-identifying restrictions test was conducted to complement the second-order serial correlation, using the Hansen test.

3.6 Scope of the study

The study focuses on trade openness, human capital and poverty alleviation in West Africa, using a dynamic panel data investigation. It covers sixteen West African countries over the period 2005-2018.

3.7 Data and variables

The study employed secondary data from the World Bank and Transparency International as presented in Table 3. The table also contains information on the variables employed in the study and their definitions.

Table 3. Variables, Definitions and Sources

Variables	Definitions	Sources
Hce	Households and NPISHs final consumption expenditure per capita (constant 2010 US$)	World Bank (2020a)
Top	Trade (% of GDP)	World Bank (2020a)
Ter	School enrolment, tertiary (% gross)	World Bank (2020a)
Gdp	GDP per capita, PPP (constant 2011 international $)	World Bank (2020a)
Dcp	Domestic credit to private sector (% of GDP)	World Bank (2020a)
Cpi	Corruption perceptions index	Transparency International (Various issues)
Pop	Population, total	World Bank (2020a)
Eds	External debt stocks (% of GNI)	World Bank (2020a)

Source: Compiled by Author (2020).

4. Empirical Results and Discussion

4.1 Descriptive statistics

Descriptive statistics of the variables employed for model estimation are presented in Table 4. The statistics cover central tendencies and variability measures.

Table 4. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
hce (US$)	202	571.70	486.93	5.24	2411.55
ter(%)	143	7.53	5.49	0.99	24.53
top(%)	224	59.99	38.46	1.28	311.35
gdp(US$)	224	1979.90	1683.40	2.36	6643.25
dcp(%)	221	15.97	13.16	1.22	65.74
Cpi	216	29.03	11.25	2.00	59.00
pop (million)	224	9.64	24.6	0.005	181. 00
eds (%)	224	42.17	50.06	1.31	497.93

Source: Computed by Author (2020).

The results in Table 4 show that household consumption expenditure per capita in West Africa averaged US$571.70 within the study period. However,

this value ranges between a minimum of US$5.24 and a maximum of US$2,411.55, with the deviation from the average value given as US$486.93. The mean value, nevertheless, is low compared to what obtains in most countries in North Africa, Asia, Europe, North America and Southern America (see World Bank, 2020a). This shows a high level of poverty in the sub-region.

The mean value of tertiary school enrolment during the period under consideration was 7.53%, and it hovered between 0.00% and 24.53%, with the standard deviation being 5.49%. The mean value appears too low. Average value of trade openness stood at 59.99% with a minimum of 1.28% and a maximum value of 311.35%; whereas, the spread was 38.46%.

The per capita GDP of the sub-region is low as the mean value during the study period was US$1,979.90 with the standard deviation being US$1,683.40. Poverty will tend to be high in a society that has very low income per head as shown in this result. Domestic credit to the private sector had its average value as 15.97%, with its minimum and maximum values being 1.22% and 65.74% in that order. Corruption appears to be high in the sub-region, going by the low mean value of the corruption perception index, which was 29.04 during the period under consideration. This is capable of fuelling poverty. The sub-region's population during the study period averaged 9.64 million while the mean of external debt stocks as percentage of GDP stood at 42.17%, which could aggravate the level of poverty in the sub-region due to the mount spent on debt servicing.

4.3 Results of econometric model estimation

4.3.1 *Effect of Trade on Poverty Alleviation in West Africa*

The findings from two models are presented in this section. The first does not contain human capital while the second has the human capital variable as part of the regressors. The aim is to determine how the variables of interest (trade openness and human capital) affect poverty in West Africa.

Table 5. Trade and Poverty Alleviation in West Africa

Dependent Variable = Natural log of Households Final Consumption Expenditure Per Capita

Regressors	1		2	
	Coefficients/ Probabilities	Robust Std. Err.	Coefficients/ Probabilities	Robust Std. Err.
$lnhce_{t-1}$	0.80*** (0.000)	0.110	0.787*** (0.000)	0.085
Top	0.0005 (0.386)	0.0005	0.0003 (0.324)	0.0003
Ter			0.005*** (0.000)	0.001
Lngdp	0.19** (0.043)	0.091	0.134*** (0.017)	0.056
Dcp	0.006** (0.030)	0.003	0.003*** (0.036)	0.001
Cpi	0.002 (0.137)	0.002	-0.002 (0.136)	0.001
Lnpop	0.044 (0.206)	0.035	-0.004 (0.786)	0.016
Eds	0.003 (0.126)	0.002	-0.001 (0.330)	0.001
Const.	-1.065 (0.212)	0.853	0.402 (0.404)	0.482
Wald-Stat.	367.68*** (0.000)		9158.69*** (0.000)	
AR(1) (p-Value)	0.008***		0.081	
AR(2) (p-Value)	0.770		0.509	
Hansen Stat.	1.000		1.000	

Note: ***, **,* denote significance at 1%, 5% and 10% levels respectively while probabilities are in parenthesis. AR(1)-(p-Value) signifies Arellano-Bond test for AR(1) and AR(2)-(p-Value) stands for Arellano-Bond test for AR(2). Hansen Stat. is the Hansen Chi-square statistic, which tests for over-identifying restrictions while Wald-Stat. implies Wald Chi-square statistic that tests for the joint significance of the explanatory variables employed in the model.

Source: Computed by Author (2020).

From the findings, lagged household consumption expenditure per capita has positive and significant impact on its current value; showing about 0.80% and 0.79% increases in household consumption expenditure due to a percentage increase in its lag in models one and two respectively. This is also consistent with the *apriori* expectation. Trade openness in both models relates

positively with the household consumption expenditure per capita, however, the impact was not statistically significant. This implies that trade devoid of other policies is not important for poverty alleviation in West Africa. The finding is consistent with studies like Beck, Demirguc-Kunt & Levine (2007); Aisbett, Harrison & Zwane (2008); Kpodar & Singh (2011); Agusalim (2017); and Shuaibu (2017), which all reported that trade does not have any significant effect on poverty alleviation.

Human capital contributes positively and significantly to per capita household consumption expenditure, with about 0.50% increase due to a 1% increase in tertiary enrolment. The implication is that human capital development is one of the policy initiatives that can decrease poverty in West Africa. The finding converges with some studies. Prominent among them are: Santos (2011), which discovered that children with high quality of education in Argentina escapes poverty trap as against those with low quality education. Olopade et al. (2019) also reported significant reduction in poverty as a result of education in OPEC member-countries. Collin & Weil (2020) also reported the same finding.

Per capita income raises household consumption expenditure significantly in the sub-region, given the positive and statistically significant coefficients returned by both models. A percentage increase in its value leads to around 0.19% and 0.13% increases in household consumption expenditure per capita. The implication is that increasing per capita income will depress poverty in West Africa. The finding is in line with conclusions emerging from studies which show that per capita income and its growth enhance poverty alleviation across economies (Bhagwati, 2004; Dollar & Kraay, 2004; Lee, Ricci & Rigobon, 2004; Aisbett, Harrison & Zwane, 2008; and Santos-Paulino, 2017).

Domestic credit to the private sector significantly enhances household consumption expenditure per capita in both models. A percentage increase in its value raises per capita household consumption by 0.60% and 0.30% in both models respectively; meaning that credit provided to the private sector is capable of reducing poverty in the sub-region. The result is consistent with Ho & Odhiambo (2011); Kheir (2018); and Dewi, Abd.Majid, Aliasuddin & Kassim (2018). Results returned for other variables (corruption perception index, population and external debt stock) were not significant.

Post Estimation/Diagnostic Tests. With respect to post estimation/diagnostic test results, the explanatory variables employed in the analysed models were jointly significant going by the statistical significance of the Wald Chi-square statistic (p-value for both models = 0.000). The Hansen Chi-square statistic was insignificant (p-value for both models = 1.00) and so the null hypothesis was not rejected. This means that the instruments used were valid and truly exogenous. The hypothesis of no autocorrelation was also not rejected as the Arellano-Bond test for AR(2) was insignificant for both models (p-value for model 1 = 0.770, and p-value for model 2 = 0.509).

4.3.2 *Effect of Trade on Poverty Alleviation in West Africa through Human Capital*

Table 6 presents the results for the influence of trade openness on poverty through human capital. The findings in Table 6 show that trade openness contributes to poverty reduction significantly through its impact on education. The coefficient of 0.045 was significant at 5% significant level. Lagged household consumption expenditure raises its current value significantly. Similarly, per capita GDP increases per capita household consumption expenditure significantly by 0.17% due to a 1% increase in its value. This implies that rising per capita income in West Africa contributes significantly to poverty reduction. Credit to the private sector raises household consumption expenditure per capita with the coefficient being marginally significant at 10% level of significance. These outcomes diverge from the result reported earlier in Table 5. Corruption perception index, population and external debt stocks are not important for poverty reduction as their results were statistically insignificant.

Table 6. Trade, Human Capital and Poverty Alleviation in West Africa

Dependent Variable = Natural log of Households Final Consumption Expenditure Per Capita

Regressors	Coefficients/Probabilities	Robust Std. Err.
$Lnhce_{t-1}$	0.732*** (0.000)	0.109
lnter*top	0.054** (0.038)	0.026
Lngdp	0.166*** (0.016)	0.069

Regressors	Coefficients/Probabilities	Robust Std. Err.
	0.003*	
Dcp	(0.077)	0.001
	-0.0004	
Cpi	(0.673)	0.001
	0.005	
Lnpop	(0.706)	0.014
	-0.0001	
Eds	(0.755)	0.0004
	0.021	
Const.	(0.946)	0.310
	3529.82***	
Wald-Stat.	(0.000)	
AR(1)-(p-Value)	0.056	
AR(2)-(p-Value)	0.399	
Hansen Stat.	1.000	

Note: ***, **,* denote significance at 1%, 5% and 10% levels respectively while probabilities are in parenthesis. AR(1)-(p-Value) signifies Arellano-Bond test for AR(1) and AR(2)-(p-Value) stands for Arellano-Bond test for AR(2). Hansen Stat. is the Hansen Chi-square statistic, which tests for over-identifying restrictions while Wald-Stat. implies Wald Chi-square statistic that tests for the joint significance of the explanatory variables employed in the model.

Source: Computed by Author (2020).

Post Estimation/Diagnostic Tests. The post estimation/diagnostic test results were not different from the ones presented in Table 5. The probability of the Wald Chi-square statistic was significant (p-value = 0.000), meaning that the explanatory variables employed in the model were jointly significant. The Hansen Chi-square statistic was insignificant (p-value = 1.00), implying non-rejection of the null hypothesis, which means that the instruments were valid and truly exogenous. Finally, the Arellano-Bond test for AR(2) was also insignificant (p-value = 0.399). This means that there was no autocorrelation.

4.4 Discussion of results

The findings of this study as presented in tables 5 and 6 show that human capital development has positive and significant impact on household consumption per capita (a measure of poverty). This implies that human capital contributes significantly to poverty alleviation in West Africa. The finding is consistent with that of Attanasio et al. (2017); Olopade et al. (2019); and Collin & Weil (2020). Human capital is highly important because

it is a means through which skills, capacities and capabilities can be developed, thereby empowering the poor and enhancing their chances of securing or creating employment. This in turn will help to raise their level of income and contribute to a decline in poverty. Galbraith (1960) as cited by Dauda (2011) explained that the development attained by America was as a result of developing men. The implication is that development cannot occur without investing in people (human capital development).

In the model, trade reduced poverty, however, the impact was not significant. In the findings presented in Table 6, which interacted trade openness with human capital, trade, through its impact on human capital contributed significantly to poverty alleviation in West Africa. The import is that trade ordinarily may not benefit the poor in the sub-region without accompanying policy such as human capital development. Shuaibu (2017) in his study also concluded that liberalization of trade cannot be solely relied upon to address poverty in Nigeria except it is accompanied with complementary policies.

Ordinarily, most West African countries produce and export primary products, which are not able to compete in the international market, except a country like Nigeria that exports crude oil. Moreover, the primary products West African countries trade in are lowly priced in the international market, whereas, the finished and semi-fined manufactured products these countries import have very high price tags. In addition, the exchange rate continues to dwindle, which consistently drains their external reserves. In addition, these countries depend on advanced economies for capital equipment which are quite expensive. It appears developed economies benefit substantially from trade liberalization because it grants them access to cheap raw materials from West Africa, which they in turn use to produce manufactured goods sold at expensive prices to Africa. West African countries therefore must invest rigorously in human capital to enable them reap the benefit of trade openness.

5. Summary, Conclusion and Policy Recommendation

This study examined the effects of trade openness and human capital on poverty in West Africa over the period 2005-2018, using dynamic panel data modelling approach and system GMM estimating technique. The findings

revealed that human capital contributes significantly to poverty reduction in the sub-region while the declining effect of trade openness on poverty was only significant through its impact on human capital. The import of the findings is that trade liberalization has not truly contributed substantially to poverty alleviation in West Africa, except through its effect on human capital. The greater proportion of the population and labour force of the sub-region are unskilled, and thus do not actually participate largely in the few sectors, particularly the extractive sector (that contributes more exports) and manufacturing, that benefit from trade openness. In view of this, the majority of these workers, who suffer labour immobility and have many dependants, operate in the informal sector and earn low wages, which are not sufficient to lift them out of poverty. Moreover, most West African countries have not developed their manufacturing sector that could have benefited extensively from trade liberalization (through exportation of manufactured products), expanded their activities and helped to boost employment. So, trade has only succeeded in making West African countries net-importers instead of expanding their exports and contributing markedly to poverty alleviation. Therefore, the policy recommendation of this study is that countries in West Africa should invest in human capital, particularly tertiary education, to enable them reap the benefits of trade liberalization.

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