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TRADE OPENNESS AND HUMAN CAPITAL INVESTMENT IN NIGERIA

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ABSTRACT: *Successive administrations in Nigeria have developed a number of programmes and policies (Universal Basic Education (UBE), National Immunization Coverage Scheme (NICS), Midwives Service Scheme (MSS) and Structural Adjustment Programme (SAP) etc.) aimed at harnessing the positive influence of trade openness on human capital investment in the country. In spite of these, human capital in Nigeria is grossly under developed. This paper examines the impact of tr\ade openness on human capital investment in Nigeria between 1981 and 2020. The study employed Vector Auto Regression (VAR) modeling techniques for the analysis. Human capital investment was proxied by total government expenditure in health and education (dependent variable) while trade openness was measured by trade openness index (explanatory variable). Per capita electricity consumption and exchange rate served as check variables. Human capital investment showed strong endogenous impact (strong influence) on its self while trade openness and per capita electricity consumption exhibited strong exogenous impact (weak influence) on human capital investment throughout the forecast period. The study recommended that, since trade openness in Nigeria is crude oil centered, government should invest more revenue from the sales of crude oil in human capital development for trade openness to have any significant impact on human capital investment in Nigeria.*

KEYWORDS*:* human, capital, investment , trade, openness.

INTRODUCTION

Naturally economic growth has a pattern which involves periods of increased growth, economic stagnation and depression. Each of these phases takes a long time to complete its circle. To stimulate and sustain economic growth, countries alter these natural process by formulating programmes and policies that will enable them achieve such. Some of these deliberate causes of actions include trade policies such as trade openness. This involves the dismantling of policies that hinder free trade. These may be in the form of tariff reduction or removal, removal of export and import quarter system etc. However, (Acemoglu, Johnson and Robinson (2003) in Albouy (2012) argued that trade openness has benefited the more developed countries than the less developed countries due to trade protectionism. This is the views of Dollar and Kraay (2003) who argue that trade openness had not made meaningful contributions to the economics of the less developed countries. In a similar development, human capital is a major economic growth driver the world over, so for any country to stimulate and sustain economic growth such country must formulate programmes and policies that will enhance human capital development. Human capital refers to the skills and abilities of human resource which can be advanced through education, training and experience which also involves adequate health care provision (Blair, 2018). In recognition of the

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above facts, successive governments in Nigerian have formulated economic programmes and policies to deepen trade openness and human capital in Nigeria. Such programmes and policies include Universal Primary Education (UPE) in 1976, Universal Basic Education (UBE) in 1999, the National Health Insurance Scheme (NHIS), National Immunization Coverage Scheme (NICS) and Midwives Service Scheme (MSS) etc.

In spite of all these, the Nigerian economy has been dwindling in terms of growth and has consistently maintained its number one position as the world's headquarters of poor people. UNICEF (2018) argued that a huge number of the Nigerian population are illiterates and unskilled thus the country's huge population size has not been maximally utilized. Nigerian trade statistics have been very impressive apart from the periods between 2008 and 2009. However, these have not translated into economic growth even when Balassa (1978) asserted that more export proceed implies more foreign exchange inflows that can stimulate economic growth. These assertions have been collaborated by (Umulkher and Muganda, 2017; Keho, 2017; Pam, 2016; Soltani et al., 2013). While Amieyeofori et al. (2018) and Marilyne et al. (2018) argued that trade openness and economic growth exhibits negative relationship.

With improvement in Nigerian trade indices and proliferation of education and health care centers in the country one would have thought that there will be corresponding improvement in human capital in the country that will stimulate economic development. Why is Nigeria accommodating the highest number of poor people in the world? Why has Nigeria not been able to benefit from technological spill over from international trade? To this end, the study seeks to investigate the impact of trade openness on human capital investment from 1981 to 2020. The remaining aspect of the investigations are ordered thus: section two takes care of the theoretical review, section three handles empirical review, section four talks about methodology of study while section five centers on conclusion and policy recommendations.

Theoretical Review

This study is anchored on Heckscher-Ohlin theory of comparative advantage in international trade also known as relative factor endowment was first developed by a Swedish economist Eli Flip Heckscher in 1919. His student Beertil Ohlin popularized the theory through his contributions in 1933. Later Paul Samuelson expanded the theory through his writings in 1949 and 1953 respectively. This is why theory is sometimes referred to as Heckscher-Ohlin-Samuelson model.
The theory states that countries with capital abundant factor and labour scarce factor will tend to export capital-intensive products while countries with plentiful of labour factor and capital scarce factor will tend to export labour intensive-products. Some of the major assumptions of the Heckscher- Ohlin theory are:

- There are two countries, two factors of production and two products (2x2x2).

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- The two countries are endowed with different amount of the two factors (capital and labour) for example, Nigeria and the United States of America.
- The level of technology is the same in both Nigeria and the United States of America.
- There is perfect competition in the two goods and the factors of production (capital and labour)
- Consumer taste and preference are the same in both Nigeria and the United States of America.
- No transportation cost and no trade barriers in both Nigeria and the United States of America.
- There is incomplete specialization in the production of the two products in both Nigeria and the United State of America.
- There is perfect mobility of the two factors of production (capital and labour) within both countries but no international movement etc.

The major advantage of the Heckscher- Ohlin model is that it attempts to provide explanations for the relative commodity price differences between countries as it relates to international trade which the classical trade theories developed by Adam Smith, David Ricardo and Mill could not provide. This is the core of international trade. In drumming up some level of support for the Heckscher-Ohlin theory, Haberler (1982) in Baldwin (1982) argued that the theory gives attention to space factor in international trade through factor endowments of trading countries which the classical comparative cost theories fall short of in analyzing the reason for international trade. Again, Vlatka and Bosnjak (2015) after empirically subjecting the Heckscher- Ohlin theory to test using data from Croatia and the rest of European union members states concluded that the relationship between import, export and economic growth were positive for both Croatia and the rest of EU members states. This buttresses the Heckscher- Ohlin theory of international trade.

Brecher and Choudhri after a careful analysis of trade data between the United States of America and Canada came to the conclusion that trade between the two countries supports the assertion of the Heckscher-Ohlin theory. Wood equally argued that trade between the less developed and the more developed countries supported the Heckscher- Ohlin model. Waida et al. (2015) argued in support of the Heckscher-Ohlin theory that international trade and FDI affects the economic growth of the BRICS (Brazil, Russia, India, China and South Africa) countries positively. However, the Heckscher-Ohlin theory has been widely criticized based on its assumptions.

Empirical Review

Rabai et al. (2020) investigated the impact of trade openness and human capital on economic growth in 19 Asian countries between 1985 and 2017. The study conducted co-integration test using the dynamic ordinary least square to determine if there exist a long run relationship between and among the series. Based on the outcome of the co integration test carried out, the paper

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proceeded to adopt the Dumitrescu and Hurlin (DH) causality test and found out that trade openness and human capital ware positively related.

Victor (2019) examined the impact of trade openness on economic growth among Economic Community of West African States (ECOWAS) Countries from 1970 to 2017. The study adopted a non-stationary heterogeneous dynamic panel models through the application of Pooled Mean Group (PMG) and Mean Group (MG) estimators to ascertain the nature of relationship between trade openness among these countries. The result shows that trade openness and economic growth are positively related across ECOWAS countries at the long-run. Subsequently, the paper recommended that ECOWAS member states should advance cooperation among economic actors to stimulate the development of SMEs in the region and access international markets to achieve trade openness and competitiveness among member states**.**

Marilyne et al. (2018) investigated the relationship between trade openness and economic growth: Some new insights on the openness measurement issue using a panel technique on 169 countries between 1988 and 2014. The study adopted Generalized Method of Moments Estimator (GMME) and found that trade openness has the propensity to exhibit negatively on economic growth for countries that specialized in low quality products.

Amieyeofori et al. (2018) carried a study on Maximizing Economic Growth through Trade Openness: A Case for Ivory Coast. The study adopted panel data and divided the study period into two time periods. The first period is between 1980 and 2005 and the second period is between 2006 and 2016. The variables were tested for their long run relationships using Autoregressive distributed lag (ARDL) co-integration and granger causality test. The study suggested that contrary to economic theory, the relationship between trade openness and economic growth was negative for Ivory Cost for the study period. Given the above result, the study recommended among others that Ivory Coast and other developing economies must consciously develop programmes that will stimulate the development of human capital.

Arash and Parsa (2017) investigated effective factors on exports with emphasis on human capital formation in selected twenty developing countries using panel data analysis between 1995 and 2014. The findings of the study revealed that human capital and export were positively related in the twenty countries of study. Similarly, the work discovered that population, capital formation and healthcare costs variables exhibited positive and consequential effect on exports in the twenty countries investigated during the period.

Yasmin (2017) investigated the relationship between human capital inequality and globalization in 120 countries using panel regression model between 1970 and 2009. The study unveiled that developing countries do not certainly profit from globalization which is in disagreement with the standard trade theory and that globalization reduces the educational gap in less developing countries while it increase the gap in the more developed countries. The study recommended

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further findings for the validity and reliability of the standard H-O theory as it concerns the developing countries through isolating the low income from middle-income countries.

Ahmet et al. (2017) examined the relationship between trade openness, human capital formation and economic growth. The study applied panel data analysis for 38 selected African countries from 1990 to 2014. The result indicated that there existed a long run correlation between all the variables. The result further revealed that Equatorial Guinea, Niger and Guinea-Bissau have the highest GDP per capita. Equatorial Guinea was found to have exhibited more positive relationship between trade openness, capital formation and economic growth. The paper recommended that African countries should implement economic policies that will stimulates investment promotions to induce capital formation and trade openness so as to stimulate economic growth in their respective countries.

Mangir et al. (2017) investigated an analysis for the relationship between trade openness and economic growth in ten African countries using pool mean group estimator (PMG) under the panel Autoregressive distributed lag (ARDL) framework. For a period of 25 years, between 1990 and 2015.the result of the empirical analysis revealed that trade openness has a positive relationship with economic growth in the 10 African countries of interest. Based on this result the study recommended that African countries should initiate trade openness policies. This they could do by removing barriers to trade and investment as well as encouraging the process of multilateral trade agreement across the continent of Africa.

Moyo et al. (2017) carried a study on the relationship between trade openness and economic growth in Nigeria and Ghana between 1980 and 2016. The study proxied trade openness by investment, exchange rate and inflation, and adopted Autoregressive Distributed lag (ARDL) model to examine the long run relationship between trade openness and economic growth in Nigeria and Ghana. The result of the investigation revealed that at the short run there exist a positive relationship between trade openness and economic growth in the two countries. However, at the short run a negative relationship was observed in Nigeria. The paper therefore recommends that Nigeria should ensure that it aligns its exports and imports components with appropriate policies to ensure reduction of in the importation of consumer goods and foreign technologies in other to stimulate economic growth through trade openness.

Evaluation of Literature Reviewed

At the end of the literature review, the study found that no previous work known to this study investigated the impact of trade openness on human capital investment in Nigeria. For instance, Arash and Parsa (2017) investigated effective factors on exports with emphasis on human capital formation in selected twenty developing countries using panel data analysis between 1995 and 2014. While Yasmin (2017) investigated the relationship between human capital inequality and globalization in 120 countries using panel regression model between 1970 and 2009. Therefore, the localization of this study in Nigeria and adopting the VAR approach makes the study unique.

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METHODOLOGY OF STUDY

Data on Human Capital Investment (HCI), trade Openness (TOP), Exchange Rate (EXR) and Per Capita Electricity Consumption (PEC) were gathered from various issues of Central Bank of Nigeria statistical bulletin between the periods from 1981 to 2020. The paper employed an econometric approach in carrying the study. This involves the unit root test, Johansen co-integration technique to determine long run relationship between and among the series and the Vector Autoregression test (VAR) on trade openness and human capital investment in Nigeria.

Model specification

The study adopts Ahmet et al (2017) model which states thus:

GDP=f (TP, GC, GNE) (1)

Where:

GDP= Real Gross Domestics Product

TP= Trade Openness

GCF= Gross Capital Formation

GNE= National Expenditure

With some modifications, the model for study is stated thus:

HCI= f (TOP, PEC, EXR) (2)

$HCI=\alpha_0+\alpha_1 TOP+\alpha_2 PEC+\alpha_3 EXR+ \mu t$ (3)

Where:

HCI= Human Capital Investment

TOP= trade Openness

EXR =Exchange Rate

PEC= Per Capita Electricity Consumption

$\alpha_{0=}$ constant parameter

$\alpha_1, \alpha_2, \alpha_3,$ = Estimation parameters.

μt = Error term

On a priori: $\alpha_1 > 0, \alpha_2 > 0, \alpha_3 < 0,$

RESULTS AND DISCUSSION

The empirical analysis of data in this paper was conducted in phases. It begins with the descriptive statistics analysis of the data and thereafter conducted the unit test. Furthermore, Johanson co-integration, the VAR and diagnostic tests were conducted.

Descriptive Statistics

The result of the descriptive statistics is presented in Table 1 below.

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Table 1:

	HCI	TOP	PEC	EXR
Mean	247.2572	31.98008	107.9623	100.8735
Median	98.48121	33.38961	98.97801	107.0243
Maximum	905.1439	53.27796	156.7972	358.8343
Minimum	0.420120	9.135846	50.90104	0.610025
Std. Dev.	299.7985	12.29971	29.77379	100.7620
Skewness	0.892708	-0.293481	0.165512	0.885394
Kurtosis	2.286420	2.233347	1.701009	2.987758
Jarque-Bera	6.161505	1.553800	2.994922	5.226394
Probability	0.045925	0.459829	0.223697	0.073300
Sum	9890.287	1279.203	4318.490	4034.942
Sum Sq. Dev.	3505286.	5900.034	34572.66	395966.0
Observations	40	40	40	40

Source: Computer output E-views 9.

From the descriptive statistics above, HCI exhibited a mean value of 247.2572, 299.7985 for standard deviation while it displayed 0.892708 for skewness. HCI has a kurtosis value of 2.286420 and a Jarque-Bera value of 6.161505 and its probability of 0.045925 which is statistically significant at 5% is obviously not a normal distribution. TOP mirrored a normal distribution with a skewness value of -0.293481 which is playkurtic in nature. It has a mean value of 31.98008, minimum and maximum values of 9.135846 and 53.27796, respectively. TOP has a standard deviation of 12.29971. TOP has a Jarque-Bera statistics of 1.553800 its associated probability of 0.459829 which revealed that the series is a normal distribution. On the other hand, PEC has a mean value of 107.9623, a standard deviation of 29.77379 and a minimum value of 50.90104 with an outlier of 156.7972. It has a Jarque-Bera value of 2.994922 while its probability value is 0.223697 which is above 0.05 percent, confirming that PEC is a normal distribution. Finally, EXR displays a mean value of 100.8735, minimum value of 0.610025 with an outlier of 358.8343. The standard deviation of EXR is 100.7620 and it is skewed by 0.885394. It has a kurtosis value of 2.987758 which is below a mesokurtic value of 3 suggesting leptokurtic distribution while its Jarque-Bera value is 5.226394 and it has a probability of 0.073300 which is slightly above 0.05. Therefore, EXE rate is not a normal distribution.

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Unit Root Test

The Augmented Dickey-Fuller unit root test is performed under this section on all the variables in the model to ascertain the level of their integration.

Table 2: Unit Root Test Result

Variables	Level	1st difference	Order of integration
LOG HCI	-1.770614	-7.551257	1(1)
TOP	-2.276885	-7.346672	1(1)
LOG EXR	-2.017126	-5.164911	1(1)
LOGG PEC	-2.409091	-8.435982	1(1)
	Critical Value	Critical Value	
	-2.945842	-2.954021	

Source: Computer output E-views 9.

Note*: The unit root test is at 5 percent level of significance*
The critical values are -2.945842 and -2.954021

The unit root result above indicates that all the variables adopted for the study was integrated of order one. This demanded the use of Johansen co-integration test.to determine if there exists a long run relationship in the model.

Johansen Co-integration Test.

The study employed the Johansen co-integration technique to determine if long run relationship exists among the series in the model.

Table 3: Johansen Co integration Test.

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.329934	32.07839	47.85613	0.6078
At most 1	0.222580	17.66476	29.79707	0.5909
At most 2	0.135982	8.600874	15.49471	0.4036
At most 3	0.088580	3.339063	3.841466	0.0676

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

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Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.329934	14.41363	27.58434	0.7930
At most 1	0.222580	9.063889	21.13162	0.8272
At most 2	0.135982	5.261811	14.26460	0.7085
At most 3	0.088580	3.339063	3.841466	0.0676

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Computer output E-view 9

Johansen Co-integrated Result

From the Johansen co-integration result above, both the Trace and Max-Eigen statistics indicates no co-integrating equations among the series in the model at 5 percent significance level. Therefore the study proceeded to conduct the Vector Autoregression (VAR) test.

VAR Lag Order Selection Criteria

To avoid the problem of multicollinearity, serial correlation and misspecification in the error term, lag one was selected based on LR, FPE, AIC, SC and HQ criteria since the date is an annual time data with fewer number of data points.

Table 4: VAR Lag Order Selection Criteria: Sample 1981-2020

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-204.4260	NA	2.481628	12.26036	12.43993	12.32159
1	-106.5727	166.9263 *	0.020293 *	7.445452 *	8.343312 *	7.751648 *
2	-102.0406	6.664876	0.041593	8.120034	9.736180	8.671186
3	-91.97473	12.43428	0.065959	8.469102	10.80354	9.265211
4	-69.52949	22.44524	0.056864	8.089970	11.14269	9.131035

Source: ***Computer output E-view 9***

Vector Auto Regression Test

Based on the outcome of the Johansen co integration result which indicated no co- integrating equation between and among the series and the subsequent optimal lag selection based on LR, FPE, AIC, SC and HQ criteria the study proceeds to carry out the VAR estimation result.

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Table 5: Vector Auto Regression result

	LOG(HCI)	TOP	LOG(EXR)	LOG(PEC)
LOG(HCI(-1))	0.611388	-1.970746	-0.002313	0.021305
	(0.11338)	(1.65622)	(0.06450)	(0.02796)
	[5.39260]	[-1.18990]	[-0.03586]	[0.76202]
TOP(-1)	-0.000110	0.466147	-0.003548	-0.001698
	(0.01034)	(0.15109)	(0.00588)	(0.00255)
	[-0.01065]	[3.08521]	[-0.60295]	[-0.66586]
LOG(EXR(-1))	0.495271	5.773433	0.988204	0.012774
	(0.16257)	(2.37493)	(0.09249)	(0.04009)
	[3.04644]	[2.43099]	[10.6845]	[0.31864]
LOG(PEC(-1))	0.053782	-10.60704	-0.173938	0.611998
	(0.54974)	(8.03084)	(0.31276)	(0.13557)
	[0.09783]	[-1.32079]	[-0.55615]	[4.51441]
C	-0.380710	53.94860	1.132774	1.757883
	(2.46115)	(35.9533)	(1.40017)	(0.60691)
	[-0.15469]	[1.50052]	[0.80902]	[2.89644]

Source: ***Computer output E-view 9.***

A critical look at the Vector Auto Regression (VAR) result above reveals that human capital investment (HCI) exhibits strong endogenous influence on itself which implies that HCI is strongly influence by itself given the t- statistic values of 5.39260 and that a one percent change in HCI will lead to about 61.13 percent increase on the present value of (HCI). TOP which is a major explanatory variable in the HCI model exhibited a negative influence on HCI given its t-statistics value of about -0.01065 and a one percent change in TOP will lead to 0.000110 percent decrease on the present value of HCI. Exchange Rate (EXR) exhibited a strong influence on HCI, accounting for about 49.5 percent of variations in HCI. PEC exhibits strong exogenous influence on HCI meaning that its influence on HCI is weak.

Trade openness (TOP) exhibited a strong endogenous influence on itself given the t- statistic values of 3.0852 which implies that the past realization of TOP has strong endogenous influence on its present value. The result equally revealed that a one percent change in TOP will lead to about 46.6 percent increase in the present value of TOP ceteris paribus. Equally, the result indicates that EXR has a strong influence on TOP given its T-statistic value of 2.43099. HCI and PEC exhibited negative influences and insignificant impact on the dependent variable (TOP) with their respective T- statistics values of -1.18990 and -1.32079 implying that they have a very weak influences on trade openness.

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Exchange rate (EXR) a control variable in the HCI has a strong exogenous influence on itself given its t-statistic value of 10.6845 with a one percent increase in exchange rate (EXR) leading to about 98.8 percent increase on the present value of exchange rate ceteris paribus. Other variables like PEC and HCI were strongly exogenous in the VAR model, inferring that they exhibited a very weak influence on EXR thus only EXR influence itself significantly. The variance decomposition of EXR result of about 99.6 percent at the short- run buttresses this argument.

Per Capita Electricity Consumption (PEC) exhibited a strong endogenous impact on itself. Inferring that past realization of PEC has a strong endogenous influence on its present value as can be seen from the t-statistic value of 4.51441. Subsequently, a one percent increase in PEC will lead to about 61.2 percent increase on the present values of PEC everything being equal. HCI, TOP and EXR exhibited weak influence on PEC.

Impulse Response Analysis of Variables

The impulse response function below shows the response of human capital investment to a one standard shock or innovation in its self and other variables incorporated into the human capital investment model (trade openness, exchange rate and per capita electricity consumption).

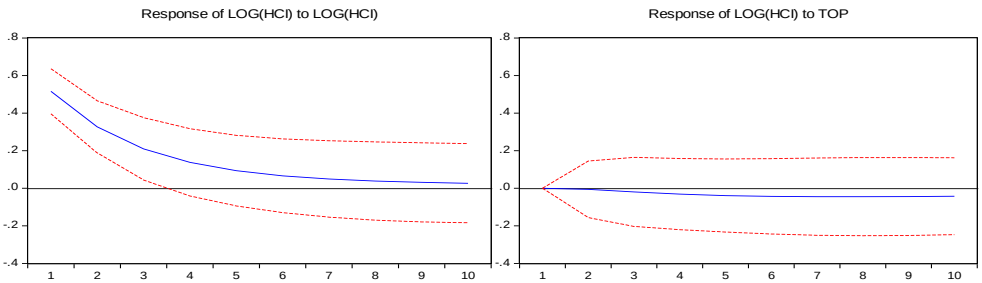

Fig. A. Response of Log (HCI) to Log (HCI) **Fig. B. Response of Log (HCI) to (TOP)**

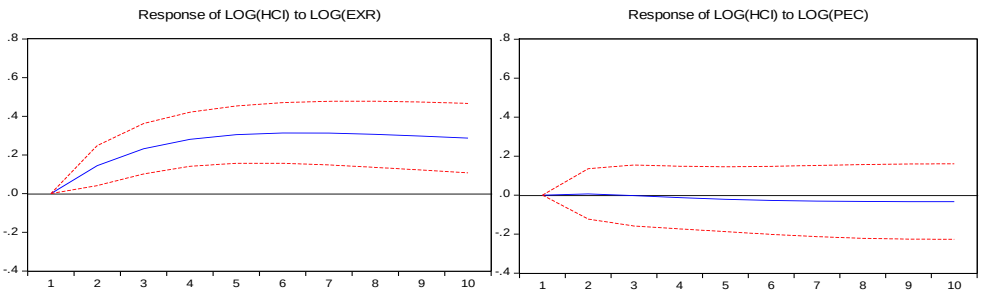

Fig. C. Response of Log (HCI) to Log (EXR) **Fig. D. Response of Log (HCI) to Log (PEC)**

From figure A, HCI responded to a shock to itself by exhibiting an exponential decline from period one to period two though there was an attempt to peak between period two and three but could not gather enough steam to sustain the momentum. It continued to experience a steady decline up to

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period seven, from period eight to the tenth period HCI maintained a steady state and was positive throughout the period. Similarly, in figure B, a one standard deviation to TOP caused HCI to maintain a stable state at zero in period one. From period two HCI began sliding into the negative region and remain at negative region up to the tenth period indicating that HCI was not responding to shocks in TOP. In the same vein, figure C, reveals that a one standard innovation to exchange rate induced an initial exponential increase in HCI from period one to period five but from period six HCI maintain a flat surface up to the tenth period. Thus, a shock in EXR cased a positive impact on HCI throughout the ten year period ceteris paribus. Finally, figure D indicates that a one standard innovation to PEC had no impact on HCI in the first three years as it continued to move along the stable line. From year three to the tenth year, shock in PEC resulted in a negative impact on HCI ceteris paribus.

Variance Decomposition Results

Variance decomposition results in a VAR system helps to comprehensively examine the contributions of each innovation or shock to the variance of the forecast error associated with the forecast of each variable (Christopher, 2012). The variance decomposition result indicates that HCI has the highest exogenous value of 100 percent followed by EXR with 99.6 percent; TOP has 96 percent while PEC exhibited 85.2 percent. At the end of the year period HCI, TOP, EXR and PEC exhibited 38.5 percent, 59.9 percent, 97.0 percent and 67.5 percent of the forecast error respectively. In the short- run (first three years) HCI TOP, EXR and PEC have an average of 84.4 percent, 86.3 percent, 99 percent and 80.6 percent respectively. In the same vein, the ten year average for HCI, TOP, EXR and PEC were 64.84 percent, 70.27 percent, 97.84 percent and 73.40 percent of the forecast error in the VAR system for the period. Finally, the average contribution of the variables to the innovation or shock to HCI indicates that HCI accounted for an average of 64.8 variance of the forecast error on itself. TOP a major explanatory variable in the model displayed a very weak impact on HCI both at the short-run and long-run periods given its average value of about 0.5. While EXR accounted for an average of 34.5 inferring that EXR exhibited strong impact on HCI during the forecast period. PEC did not contribute significantly to the over raw influence on HCI as it accounted for an average of 0.2 in the forecast error for the ten year period.

Table 7: Variance Decomposition Result of HCI

Period	S.E.	LOG(HCI)	TOP	LOG(EXR)	LOG(PEC)
1	0.516213	100.0000	0.000000	0.000000	0.000000
2	0.628020	94.67236	0.008456	5.309055	0.010126
3	0.701999	84.70737	0.083708	15.19978	0.009135
8	1.001584	45.21065	0.870058	53.58160	0.337688
9	1.046827	41.47737	0.972543	57.14020	0.409889
10	1.087137	38.51893	1.055115	59.95275	0.473198

Source: ***Computer output E-view 9***

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Table 8: VAR Granger Causality/Block Exogenous Wald Test

Variables	HCI	TOP	EXR	PEC	Joint Val/prob.
HCI		0.000113 (0.9915)	9.280801 (0.0023)	0.009571 (0.9221)	12.06652 (0.0072)
TOP	1.415868 (0.2341)		5.909714 (0.0151)	1.744483 (0.1866)	7.694692 (0.0528)
EXR	0.001286 (0.9714)	0.363550 (0.5465)		0.309302 (0.5781)	0.481192 (0.9230)
PEC	0.580680 (0.4460)	0.443374 (0.5055)	0.101534 (0.7500)		3.422516 (0.3310)

Source: **Source: Computer output- E-view 9**

A critical observation of the Granger Causality/ Block Exogeneity Wald test result above shows that TOP does not Granger cause HCI given its chi-square vale of 0.000113 and a probability value of 0.9915 which is not significant at 5 percent significance level. Also, PEC which displayed a chi-square value of 0.009571 with a probability value of 0.9221 which is equally not significant at 5 percent does not Granger caused HCI but EXR which is a control variable Granger caused HCI since it exhibited a chi-square value of 9.280801 and a very low probability value of 0.0023 that is significant at 5 percent. Jointly TOP, EXR and PEC Granger caused HCI with a joint probability value of 0.0072 and it is significant at 5 percent level.

This finding is in consonant with the VAR result and the decomposition results discussed earlier and do represent the true economic situation in the country. Fluctuations in EXR will either affect HCI positively or negatively depending on the direction of fluctuations. If the value of the naira falls, more naira will be required for a unit of the foreign currency that the naira exchanges for; this will be inimical to human capital development because most of the skills required for the development of human capital are foreign based that solely depend on EXR for their acquisition thus increase in exchange rate hurts HCI in Nigeria.

Treating TOP as dependent variable as seen in the VAR Granger Causality/Block Wald result above, revealed that HCI does not Granger caused TOP given its chi-square of 1.415868 and a probability value of 0.2341 and it is not statistically significant at 5 percent. Also PEC did not Granger caused TOP based on its probability value of 0.1866 which is not significant at 5 percent; again EXR Granger caused TOP because of it very probability value of 0.0151 and it is significant at 5 percent level. However, the joint probability of all the variables in the model shows that HCI, EXR and PEC jointly Granger caused TOP ceteris paribus. This result is mirrored in the VAR result and the VAR decompositions result above. These findings confirm that the performance of trade openness is largely a function of exchange rate. Everything that has to do with trade depends largely on exchange rate therefore a lower exchange rate will translate to a higher purchasing power of the naira and when the naira is somewhat devalued the purchasing power of the naira

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fails; when this happens the volume of import and export contracts and culminate into Gross Domestic Product (GDP) which will ultimately lead to economic contraction.

In a similar manner, using EXR as dependent variable, the VAR Granger/Block Exogeneity Wald result indicates that HCI did not Granger caused EXR given its chi-square statistics of 0.001286 and a probability value of 0.9714 which is not statistically significant at 5 percent level. Equally, based on a chi-square value of 0.363550 and a probability statistics of 0.5465 which if higher than the value at 5 percent, TOP is not statistically significant at 5 percent level thus TOP did not Granger caused EXR. Similarly, PEC did not Granger caused EXR given its probability value of 0.5781 and the joint probabilities of HCI, TOP and PEC was not significant at 5 percent level of significance based on its value of 0.9230.

Again these findings are in line with previous results obtained from the VAR result and the various decompositions results discussed above. This result inferred that none of the variables incorporated into the model has any significant impact on EXR, indeed EXR is determined by other factors not included in the model but it has a very strong impact on other variables in the model.

Lastly, by adopting Per Capita Electricity Consumption (PEC) as the dependent variable while HCI, TOP and EXR were treated as independent variables, the result above revealed that HCI did not Granger caused PEC based on its high probability of 0.4460 which is not significant at 5 percent level of significance. Also TOP and EXR did not Granger caused PEC given their probability values of 0.5055 and 0.7500 which are clearly higher than 5 percent significant level equally and are not significant. Subsequently, the joint probability of all the variables incorporated into the model did not Granger caused PEC since their joint probability of 0.3310 is higher than 5 percent significant level. The reason for this result could be due to the fact that about 87 percentage of the country's total export is accounted for by the petroleum sector but contributes only 12.24 percent to employment due to its highly specialized skill requirements (World Bank, 2020). Whereas, other sectors like agriculture that employs about 70 per cent of Nigerians accounts for only 1.6 percent of total export in 2018 (NBS, 2019).

Meanwhile, the link between TOP and HCI is in the area of learning by doing, skills and knowledge transfer as argued by Grossman and Helpman (1991). Since the major contributor to trade in the country can only employ about 12.2 percent of Nigerians therefore, those channels through which trade openness contribute to human capital investment are lacking. Hence there is the need for government to invest more revenue from the sales of crude oil in human capital development for trade openness to have any meaningful impact on human capital investment in Nigeria.

Similarly, another possible reason why TOP did not exhibit strong exogenous influence on HCI in Nigeria could be due to the massive importation of manufactured agricultural and food products into the country. Between 2016 and first quarter of 2019 Nigeria spent about 54.5 trillion naira on

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the importation of manufactured goods which was dominated by food and agricultural goods (NBS, 2019). Given this scenario, local knowledge will perpetually be kept unproductive since they are not involved in the production processes where skills and knowledge could be acquired. Therefore, policy makers in the country should look in the direction of establishing manufacturing industries to convert agricultural produce to finished products in the country so that more Nigerians can participate in the agricultural value chain.

CONCLUSION AND RECOMMENDATIONS

The study critically looked at the impact of trade openness on human capital investment in Nigeria between 1981 and 2020. The paper used total government expenditure on health and education (recurrent and capital components of government expenditure on health and education) to proxy for human capital investment, trade openness was measured by trade openness index, per capita electricity consumption was introduced to ascertain the contribution of electricity on human capital development while exchange rate was used as check variable. The study was conducted by first checking for the normality of the variables in the series through a detailed descriptive statistical analysis and proceeded with the unit root test using the Augmented Dickey-Fuller unit root test to ascertain the order of integration of all the variables in the model. The paper went a step further to carry out the Johannsen co-integration test for long run relationship among the variables. Based on the findings of the co-integration test, the study performed the Vector Autoregression (VAR) test. Human capital investment and trade openness exhibited strong endogenous influences on themselves but trade openness and per capita electricity consumption showed weak influence on human capital investment. Exchange rate was found to have shown strong influence on human capital investment.

The study recommended that, since trade openness in Nigeria is crude oil centered, government should invest more revenue from the sales of crude oil in human capital development for trade openness to have any significant impact on human capital investment in Nigeria. Also, government should encourage trade openness especially in sectors where we have comparative advantage.

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