The Impact of Physical and Human Capital Spending on Labour Productivity in Nigeria Maritime Sector (1985 – 2022)

Dr. Lawal Kamaldeen A .A.[14], Mufutau Akanmu Popoola[15], AJAYI, Jimoh Olayinka[16], Ajala Basirat Bolanle[17], Kowo Solomon Akpoviroro[18]

Abstract

It is evidenced from the available data that labour productivity in Nigeria Maritime Sector has generally recorded an abysmally low rate over the years. In addition to this, it is also revealed that much has not been invested by government on human capital and physical infrastructures in the country over the same period. In recent years, the Nigerian government increased her expenditure on education, health care services and infrastructures such as road constructions and within the same period, there was a marginal increase in labour productivity in Nigeria Maritime Sector. This research study uses Ordinary Least Squares (OLS) method to provide an econometric assessment of the subject matter. This study does so by ascertaining the relationship between these two forms of government spending and labour productivity and analyzing their impact on other macroeconomic variables such as Gross Domestic Product (GDP) and per capita income. Overall findings reveal that in the long run, human and physical capital spending is an important determinant of labour productivity, which will in turn, impact positively on the performance of Nigerian economy. While increase in government total expenditure on education not backed up by corresponding investment in real capital project and power sector development will impact its labour productivity negatively with its attendant effect on the economy

Keywords: Government Expenditure, Gross Domestic Product, Human and Physical Capital, Labour productivity,Ordinary Least Squares, Per Capita Income.

1.1 Introduction

Labour productivity in its simplest term refers to the quantity of labour input required to produce a unit of output. This definition takes its root from the extension of the popular Cobb-Douglas production function in which output per worker is expressed as a function of capital-labour ratio and some technological progress. In recent years, Nigeria's Gross Domestic Product has been on the increase, the productivity of its labour force is still rather poor (World Bank, 2017; Obiolor, 2017).

Taking the comparison down to Africa, labour productivity in Nigeria recorded an average growth rate of 1.2 per cent from 2000 to 2008. Generally, the growth rate of labour productivity in Nigeria has fluctuated between negative and critically low

[14] Department of Entrepreneurial Studies, National Open University of Nigeria.
[15] Department of Business Administration and Management, Federal Polytechnic Ayede, Oyo State, Nigeria. ORCID.ID-0000-0002-4529-0721. Mufutau20@gmail.com
[16] Department of General Studies (Economics Unit), Federal Polytechnic, Ayede, Oyo State, Nigeria.
[17] Department of General studies (Economics Unit), Federal Polytechnic, Ayede, Oyo State, Nigeria.
[18] Department of Business Administration, Global Humanistic University, Curacao

https://doi.org/10.58932/MULG0024

positive values over the past thirty years compared to other economies (World Bank, 2017; Arabi, 2013; Okojie, 2003).

In the recent world human capital report (WEF, 2017; Ogunleye et al, 2017), Nigeria is ranked 116th of the total 124 listed countries with a corresponding score of -1.411 in her education-based human capital performance index, and 120th with a corresponding score of -1.034 in her health-based human capital performance index (Oboh et al, 2010; Ogujiuba & Adeniyi, 2005). Nigeria is led by a wide margin by U.K, U.S, Qatar, China, India, and Ghana in education-based human capital performance index with a corresponding ranking of 10th, 11th, 26th, 58th, 63rd and 91st in the world respectively; and on health-based human capital performance index, she is ranked behind these countries with corresponding world ranking of 17th for U.K, 43rd for U.S, 44th for Qatar, 65th for China, 99th for Ghana and 112th for India (Oboh et al, 2010).

The foregoing available statistics shows that Nigeria is rocking the bottom in her human capital development. Similarly, in Nigeria, the average annual growth rate of spending on education and health combined is just about 4% compared to about 7% of the growth rate in physical spending which is almost twice as much as the former(CBN, 2017; Adamu, 2003;). Lastly, private investment will have implications for labour productivity through its impact on skills and innovation. New investment underpins the introduction of new techniques which improves both the national output and the living standard of individuals in the country (Arabi, 2013; Barro & Salaimartin, 1995; Becker & Garry, 1964).

From the foregoing, it is evidenced from the available data that labour productivity in Nigeria Maritime Sector has generally recorded an abysmally low rate over the years. In addition to this, it is also revealed that much has not been invested by government on human capital and physical infrastructures in the country. Thus the scope of this research study is to estimate the coefficients that approximate the effect of the various forms of physical and human capital spending on labour productivity as well as the link between government expenditure on human capital development and investment in physical capital in the country.

2. Theoretical and Empirical Literature

2.1 Theoretical Review

2.1.1 Cobb Douglas Production Function Theory

The formulae goes this: $Y = K^{\alpha}(AH)^{1-\alpha}$

Where Y = output,

K = physical capital stock,

A is the technological force that determine output for a given amounts of physical capital and labour services, H is the human capital stock measured in terms of knowledge, skill, and everything that can boost labour service, α is the efficiency of capital, and 1- α is the efficiency of human capital.

In relation to Endogenous Growth Model of Romer (1990) stressed that endogenous growth does not just happen. He identified factors such as capital, labour, human capital and index of level of technology as pre-condition for growth. Thus, the endogenous growth model becomes the foundation for the analysis of this study as it incorporates both physical and human capital components in labour productivity accounting.

2.2 Identified Gap in the Literature

While most empirical studies have considered the effects of human and physical capital on economic growth, others investigated their impact on labour productivity, but majorly focus on developed countries (Valadkhani, 2003; Lindsay, 2004; and Jorgenson, Ho &Stiroh, 2007). Also, studies that investigated the effects of both human and physical capital on labour productivity in developing countries such as Nigeria concentrated on their individual effects without considering their linkage. Research studies such as Umoru and Yaqub (2013) and Onabe et al (2013) only considered the impact of human capital, which they proxied with education and health on labour productivity in Nigeria Maritime Sector. However, the studies did not include physical capital variables which complement labour effort. Whereas according to the National Bureau of Statistics (NBS, 2017), a number of challenges impact labour productivity in Nigeria.

The challenges identified in the report include low private investment, scarcity of foreign exchange, low education and training, low government spending, low employment opportunities and poor power sector development which are some of the vital components of physical capital neglected by previous studies. Mba and Ekeopara (2012) noted that the absence of experts in Nigeria as a result of brain drain has adversely affected economic growth in the nation. They argued that to reverse the brain drain and boost economic growth, the Nigerian government should create conducive environment for investment that will ensure employment opportunities and reduce poverty.

3. Methodology

In order to model the long-run determinants of labour productivity in Nigeria, this study will adapt the modified Cobb-Douglas production function by Hall and Jones (1999) and Klenow and Rodriguez-Clare (1997).

$$Y = K^{\alpha}(AH)^{1-\alpha} \quad (1)$$

$$ln\left(\frac{Y}{L}\right) = \alpha ln\left(\frac{K}{L}\right) + (1-\alpha) ln\left(\frac{H}{L}\right) + (1-\alpha) lnA \quad (2)$$

Jones (1999) and Klenow and Rodriguez-Clare (1997), and Romer (1990) a model of our production function for aggregate output is specified viz:

$$RGDP_t = RKI_t^{\alpha}(A_t HCI_t)^{1-\alpha} \quad (3)$$

Where $RGDP_t$ is real output, RKI_t is the real physical capital stock, A is the technological force that determines output for a given amounts of physical capital and

labour services, HCI_t is the real human capital stock measured in terms of education spending, health care spending, and power investment, α is the efficiency of capital, 1- α is the efficiency of human capital, and subscript t is the sample period covering 1985-2022

$$ln\left(\frac{RGDP_t}{L_t}\right) = \alpha ln\left(\frac{RKI_t}{L_t}\right) + (1-\alpha) ln\left(\frac{RHC_t}{L_t}\right) + (1-\alpha) lnA_t \qquad (4)$$

Decomposing real human capital-labour ratio $RHCI_t/L_t$ into $REDU_t/L_t$, $RPWRE_t/L_t$, and $RHLT_t/L_t$; where $REDU_t/L_t$, $RPWRE_t/L_t$, and $RHLT_t/L_t$, are real education investment per worker, real power investment per worker, and real health care investment per worker respectively, equation (4) therefore becomes

$$ln\left(\frac{RGDP_t}{L_t}\right) = \alpha ln\left(\frac{RKI_t}{L_t}\right) + \beta 2 ln\left(\frac{REDU_t}{L_t}\right) + \beta 3 ln\left(\frac{RPWRE_t}{L_t}\right) + \beta 4 ln\left(\frac{RHLT_t}{L_t}\right) + (1-\alpha) lnA_t \qquad (5)$$

Where β_2, β_3 andβ_4 are the re-parameterised coefficient (1-α) coming from the decomposition of equation (4). A further slight modification of equation (5) to include a dummy variable (DUM) that represents the proxy for efficient governance (labour productivity is expected to be high under a good government regime, and low under a corrupt regime), log of real exchange rate (REXR), unemployment rate (UNEMPR), and real oil price (ROIP) which are other factors affecting labour productivity in Nigeria (NBS, 2017) plus a constant and stochastic error term becomes

$$ln\left(\frac{RGDP_t}{L_t}\right) = \beta 0 + \beta 1 ln\left(\frac{RKI_t}{L_t}\right) + \beta 2 ln\left(\frac{REDU_t}{L_t}\right) + \beta 3 ln\left(\frac{RPWRE_t}{L_t}\right) + \beta 4 ln\left(\frac{RHLT_t}{L_t}\right) + \beta 5 \ln(REXR_t) + \beta 6 ln(ROIP_t) + \beta 7 ln(UEMPR_t) + \beta 8 (\text{DUM}) + E_t \qquad (6)$$

Where β_1 has been substituted for α, and β_0 captures (1- α) lnA. The real GDP per labour force (L) is in Nmillion; ditto for real capital investment per labour, real education spending per labour, real power investment per labour, and real health care spending per labour. Real exchange rates and real oil price (petroleum pump price) are in Nhundred while unemployment rate is in percentage. The subscript't' indicates a time series sample observation covering the period 1985 to 2022 The parameters β_0, β_1, β_2, β_3, andβ_4 are expected to have positive signs; the parameters β_5, β_6 andβ_7 are expected to have negative signs; while parameter β_8 could assume positive or negative sign. E is the stochastic error term. Education per Labour (REDU/L), Real Health per Labour (RHLT/L), Real Capital Investment per Labour (RKI/L), Real Power per Labour (RPWRE/L), Real Oil Price-Real Petroleum Pump Price- (ROIP), Real Exchange Rate (REXR) Unemployment Rate in Nigeria (UEMPR)and Dummy Variable (DUM) capturing efficient governance.

$$\Delta ln\left(\frac{RGDP_t}{L_t}\right) = \gamma_0 + \sum_{i=0}^{p} \gamma_{1i}\, \Delta ln\left(\frac{RKI}{L}\right)_{t-i} + \sum_{i=0}^{p} \gamma_{2i}\, \Delta ln\left(\frac{REDU}{L}\right)_{t-i} + \sum_{i=0}^{p} \gamma_{3i}\, \Delta ln\left(\frac{RPWRE}{L}\right)_{t-i} + \sum_{i=0}^{p} \gamma_{4i}\, \Delta ln\left(\frac{RHLT}{L}\right)_{t-i} + \sum_{i=0}^{p} \gamma_{5i}\, \Delta ln(REXR)_{t-i} + \sum_{i=0}^{p} \gamma_{6i}\, \Delta ln(ROIP)_{t-i} + \sum_{i=0}^{p} \gamma_{7i}\, \Delta ln(UEMPR)_{t-i} + \sum_{i=1}^{p} \delta_i\, \Delta ln\left(\frac{RGDP}{L}\right)_{t-i} + \theta E_{t-1} + v_t \quad (7)$$

Unlike equation (6), equation (7) gives the short-run determinants of labour productivity, which include current and past changes in the included explanatory variables and the lagged value of the residual from the long-run labour productivity function specified in equation (6). If this assumption is incorrect so that E_t is in fact non-stationary, then the regression equation (6) if estimated is subject to the spurious regression phenomenon.

The study employed secondary data which cover the period 1985 through 2018, and which are derived from the CBN statistical bulletin, 2015:18; the (WDI), 2018; (NBS), 2018; the World Bank Reports, 2018; International Labour Organisation, 2018; and Online Journals, reports and articles.

4. Results Analysis

Stationarity and Co-integration Tests Results

Table A2 of the appendix reports the results of the Johansen cointegration test. The test confirms the existence of long-run equilibrium relationship among at least five of the variables. This implies that the dependent variable LN(RGDP/L) is cointegrated with at least five variables among LN(REDU/L), LN(RHLT/L), LN(RPWRE/L), LN(RKI/L), LN(RUEMPR), LN(ROIP), and LN(REXR) based on the five cointegrating equations established by the outcome of the test. Considering the Maximum Eigenvalue results for the eight variables, it is found that the null hypothesis of no cointegrating equation (CE), i.e. no long-run relationship, is strongly rejected against the alternatives of 1, 2, 3, 4 and 5 cointegrating relationships as the computed statistics turn out to be significant at 5% critical value in each case. However, the number of CEs less than or equal to 5 as against 6 or 7 cannot be rejected. The null hypothesis of at most 5 CEs can also not be rejected by the test. Therefore, the tests favour just five cointegrating equations.

Applying the Engle-Granger cointegration test on the residual obtained from the estimation of the long-run equilibrium equation stated in (6) reveals that the regression results reported in table 2 below is not spurious as the estimated residual

of (6) is I(0). The null hypothesis for the unit root in the residual of (6) is rejected at both 1% and 5% critical values with a t-statistic of [3.154499] against [2.641672] and [1.952066] respectively, with a corresponding P-value of 0.0026. Thus, the implication of these results is that long-run relationship exists between the identified variables of human and physical capital and labour productivity in Nigeria between 1985 and 2022.

Analysis of Regression Estimates .

The estimated model of equation (6) is:

$$ln\left(\frac{RGDP_t}{L_t}\right) = 8.566 + 0.226ln\left(\frac{RKI_t}{L_t}\right) - 0.346ln\left(\frac{REDU_t}{L_t}\right) + 0.193ln\left(\frac{RPWRE_t}{L_t}\right) + 0.452ln\left(\frac{RHLT_t}{L_t}\right) - 0.056\ln(REXR_t) + 0.018ln(ROIP_t) + 0.105ln(UEMPR_t) - 0.116(\mathrm{DUM}) + E_t(8)$$

The table shows that real capital spending per worker, LN(RKI_L); real education spending per worker, LN(REDU_L); real power spending per worker, LN(RPWRE_L); and real health care spending per worker, LN(RHLT_L) all have significant long-run effects on labour productivity in Nigeria. While the coefficient estimates of other included variables real exchange rate, LN(REXR); real petroleum pump price, LN(ROIP); real unemployment rate, LN(RUEMPR) and the dummy variable (DUM) are clearly insignificant in terms of their long-run effects on Nigeria's labour productivity, they may have a contributory effect on the country's labour productivity in the short-run as the coefficient estimates of some of the variables (with the exception of real oil price and real unemployment rate) are in conformity with the theoretical expectation.

As theorized, real capital spending per worker, LN(RKI_L); real power spending per worker, LN(RPWRE_L); and real health care spending per worker, LN(RHLT_L) exert positive influence on labour productivity growth in Nigeria over the past 38 years. However, the result generated by the coefficient estimates of real education spending per worker, LN(REDU_L) does not conform with the theoretical expectations of positive relationship. Specifically, the elasticity coefficient generated for real education spending per worker, LN(REDU_L) is negative, suggesting that an inverse relationship exist between real education spending and labour productivity in Nigeria. Specifically in the Table 2, the R-squared and adjusted R-squared showed that the independent variables explain the de-pendent variables by a magnitude of about 87% and 82% respectively.

As specified in equation, it must be emphasized again that the stationarity property of the residual from the long run estimate of table 2 which was incorporated as the error correction term of our ECM model is I(0) – a condition already validated by the Engle-Granger cointegration test reported previously on the residual obtained. In the initial estimation of the ECM model, the first differenced form of the variables in equation (7) using Schwarz Information Criteria to guide in the choice of optimal lag length was over-parameterized. Meanwhile, the Redundant Variable test was performed on the over-parameterized results of the initial ECM model of equation (7) to remove the

most insignificant and redundant variables from the over-parameterized regression to arrive at the parsimonious regression model reported .

5. Conclusion and Policy Implications

In this paper the short-term and the long-term effects of human and physical capital spending on Nigeria's labour productivity in Nigeria Maritime Sector have been examined using annual time series data from 1985 to 2022. The empirical evidence from this study supports the assertion that physical and human capital spending have significant long run relationship with labour productivity in Nigeria. Specifically, real capital spending per labour, real education spending per labour, real power sector spending per labour, and real health spending per labour (which are independent variables used to proxy physical and human capital) have significant impact on labour productivity in Nigeria.

Thus, government expenditure on education and health should be intensified at all levels of government. In a more specific term, increase in government expenditure on health will translate into increase in the performance of its labour force, while increase in government total expenditure on education not backed up by corresponding investment in real capital project and power sector development that will discourage its educated citizens from migrating out of the country for a more enabling environment will continue to have significant negative effect on what its labour force can produce. Furthermore, the result also showed that government should find a lasting solution to the problem of power generation and distribution in the country, as power spending has significant long-run effect on labour productivity in Nigeria Maritime Sector.

References

Adelowokan, O.A. (2012). Growth effect of Education and Health Expenditure in Nigeria : African Journal of Scientific Research Vol. 10, No. 1. ISSN 2220-9433.

Appleton, S. & Teal, F. (1998). Human Capital and Economic Development. A Background Paper Prepared for the African Development Report.

Aschauer, D. A. (1989), "Is Public Expenditure Productive?".Journal of Monetary Economics, 23, 177-200.

Adamu, G. M. (2003) "The impact of human capital formation on economic development in nigeria: An error correction approach" *Nigerian Economic Society* (NES) Part two pg 53-77.

Arabi, K. & Abdalla, S. (2013). The impact of human capital on economic growth: Empirical evidence from Sudan. *Research in World Economy*,4(2):43-53.

Barro R J & X Sala-i-Martin (1995) *Economic Growth*. McGraw-Hill New York.

Becker, Gary S., (1964) Human capital: A theoretical and empirical analysis, with special reference to Education. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship, Available at SSRN: https://ssrn.com/abstract=1496221

Barro, R.J. and X. Sala-i-Martin (2004). Economic Growth. 2nd Edition, Cambridge, Massachusetts, London, England: The MIT Press.

Boopen, S. (2006) Transport Infrastructure and Economic growth: Evidence from Africa using dynamic panel estimates. The empirical economics letters, 5(1), 37 – 52. Central Bank of Nigeria (2014).CBN Statistical bulletin, 2014.

Dae-Bong, K. (2009) "Human capital and its Measurement: The 3rd OECD World Forum on Statistics, Knowledge and Policy" Charting Progress, Building Visions, Improving Life.Busan, Korea.

Delong and Olney (2006) Macroeconomics; McGraw-Hill international, 2nd ed.

Dickey, D.A, and Fuller, W.A. (1981). Likelihood Ratio Statistic for Autoregressive Time Series with a Unit Root. Econometrica, 49, 1057-1072.

Engle, R.F and Granger C.W.J. (1987). Co-integration and Error Correction Representations, Estimation and Testing, Econometric, March, (25), 1-76.

Frank, R. H., & Bernanke, B. S. (2007). Principles of Microeconomics (3rd ed.). New York: McGraw-Hill/Irwin.

Griffin, K. and J.B. Knight (1990) "Human Development and the International Development Strategy for the 1990s"Macmillan: Basingstoke.

Hall, Robert E., and Jones, Charles I. (1999). "Why Do Some Countries Produce So Much More Output per Worker than others?" Quarterly of Economics 114: 83-116.

Johansen, S. and K. Juselius (1990), "Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money," Oxford Bulletin of Economics.

Jorgenson, D. W; Ho, M. S and Stiroh, K. J. (2007). A Retrospective Look at the U.S. Productivity Growth Resurgence. Federal Reserve Bank of New York Staff Reports, no. 277 February 2007 JEL classification: O3, O4

Klenow, Peter J., and Rodriguez-Clare, Andres (1997) "The Neo-classical Revival in Growth Economics: Has it Gone Too Far?" NBER Macroeconomics Annual 12: 73-103.

Lindsay C. (2004). Labour productivity. U.K Office for National Statistics • Labour Market Trends •November2004.

Madden, G. and Savage, S.J. (1998). 'Sources of Australian Labour Productivity Change 1950-94', Economic Record, vol. 74, pp. 362-83.

Mankiw, G., D. Romer and D. Weil (1992). "A Contribution to the Empirics of Economic Growth."Quartely Journal of Economics, pp. 407-37.

Mba, R.N and Ekeopara C. (2012). Brain Drain: Implication for Economic Growth in Nigeria. American Journal of Social Issues and Humanities. Vol 2, No2.

OECD (2001). Measuring Productivity. Organisation for Economic Co-operation and Development. OECD Publications, 2, rue André-Pascal,75775 Paris Cedex 16,France.

National Bureau of Statistics (2017). Labour Productivity Report. March, 2017.

Onabe B. J.,Eneji M. A., and Juliana D. V. (2013). Health care expenditure, health status and national productivity in Nigeria (1999-2012). Journal of Economics and International Finance. Vol 5(7), pp.258-272.

Obialor, M.C., (2017), Effect of government human capital investment on economic growth in Sub-Saharan Africa: Evidence from Nigeria, South Africa and Ghana (1980-2013), International Journal of Asian Social Science, 7, (4), 328-339

Oboh, J.S, Rahmah I, & Abu, H.S, (2010), The impact of human capital development on the economic growth of Nigeria. Prosiding Pekem V, Jilid I. Port Dickson, Negeri Sembutan: Persidangan Kebangsaan Ekonomi Malaysia ke V (PERKEM V). pp: 63-73.

Ogujiuba K & Adeniyi, A. (2005) Economic growth and human capital development in Nigeria.

Ogunleye, O. O., Owolabi, O. A., Sanyaolu, O.A., & Lawal, O. O. (2017). Human capital development and economic growth in Nigeria. IJRDO-Journal of Business Management, 3(8), 1-22.

Okojie, E. I. (2003) Education and health in Nigerian economy: Structure, growth and development. A Research working report submitted to the Department of Economics, ABU.

Phillips, P.C.B, and Perron, P. (1988), Testing for a Unit Root in time Series Regression. Biometrika, 75, 335-346.

Romer, P. (1990), Human Capital and Growth: Theory and Evidence, Carnegie-Rochester Conference Ser. Public Policy, 32(0):251–86.

Romer David (2012) Advanced Macroeconomics. McGraw-Hill Irwin, 4th ed. ISBN 978-0-07-351137-5

Solow R. M (1957). Technical change and the aggregate production. Review of Economics and statistics, August

Tinbergen, Jan. (1942). ZurTheorie der LangfristigenWirtschaftsentwicklung .WeltwirtschaftlichesArchiv 5 5, no. l : 51 1-49. 1959. Selected Papers. Amsterdam:North-Holland.

Todaro, M.P. and Smith, S.C. (2009). Economic Development, 9th Ed., Pearson Education (Singapore) Pty. Ltd., Delhi, India.

Umoru D. and Yaqub J. O. (2013). Labour Productivity and Health Capital in Nigeria: The Empirical Evidence. International Journal of Humanities and Social Science. Vol. 3No. 4.

Valadkhani Abbas (2003). An Empirical Analysis of Australian Labour Productivity. Australian Economics Papers, 42(3), 2003, 273-291.

Weil, N. (2009). Economic growth. 2nd edition, Prentice Hall publishing, New Jersey, USA.

World Bank (2017), World Fact Book, UN Transparency International. Washington DC., World Development Indicator (2017).

World Economic Forum (2017). The Human Capital Report 2017. ISBN 92-95044-49-5.

Appendix-I

Table A1 The Unit Root Test Results for the Selected Variables

Variable	Available data	MacKinnon critical value*			AO(		p	Dt S
		1		0		%		
$ln(RGDP_t\|L_t)$	1985-2022	-	3	.	2	1	1	
$\Delta ln(RGDP_t\|L_t)$	1985-2022	-	3	.	2	1	0	
$ln(RKI_t\|L_t)$	1985-2022	-	3	.	2	1	1	
$\Delta ln(RKI_t\|L_t)$	1985-2022	-	3	.	2	1	0	
$ln(REDU_t\|L_t)$	1985-2022	-	3	.	2	1	1	
$\Delta ln(REDU_t\|L_t)$	1985-2022	-	3	.	2	1	0	
$ln(RPWRE_t\|L_t)$	1985-2022	-	3	.	2	1	1	
$\Delta ln(RPWRE\|L_t$	1985-2022	-	3	.	2	1	0	
$ln(RHLT_t\|L_t)$	1985-2022	-	3	.	2	1	1	
$\Delta ln(RHLT\|L_t)$	1985-2022	-	3	.	2	1	0	
$ln(REXR_t)$	1985-2022	-	3	.	2	1	1	
$\Delta ln(REXR_t)$	1985-2022	-	3	.	2	1	0	
$ln(ROIP_t)$	1985-2022	-	3	.	2	1	1	
$\Delta ln(ROIP_t)$	1985-2022	-	3	.	2	1	0	

	1985-2022	-	3	.	2	1	1
$ln(UEMPR_t)$							
	1985-2022	-	3	.	2	1	0
$\Delta ln(UEMPR_t)$							

Source: Author's Computation

Notes: 1) * indicates that the corresponding MacKinnon critical values at 10% and 5% levels apply to both the ADF and Phillips-Peron t statistic 2)