



## IZVESTIYA

Journal of Economics, Management and Informatics

<http://journal.ue-varna.bg>

## THE EFFECT OF INFORMAL ECONOMY ON HUMAN CAPITAL DEVELOPMENT

Temitope Sade AKINTUNDE<sup>1</sup>, Abiodun Samuel ISAYOMI<sup>2</sup><sup>1</sup> Department of Economics, Osun State University, Osogbo, Nigeria, [temitope.akintunde@uniosun.edu.ng](mailto:temitope.akintunde@uniosun.edu.ng)<sup>2</sup> Department of Economics, Osun State University, Osogbo, Nigeria, [abiodun.isayomi@uniosun.edu.ng](mailto:abiodun.isayomi@uniosun.edu.ng)

JEL: E26, E24, J24

## Abstract

This study investigated the effect of the informal economy on human capital development and the direction of causality between informal economy and human capital development in Nigeria from 1970 to 2019. The study objectives were achieved by analysing annual time series data sourced from the World Development Indicators and Central Bank of Nigeria using the autoregressive distributed lag estimation technique and the Toda-Yamamoto causality test. Findings from the study showed positive long-run effect of informal economy on human capital development. The result from this study also revealed unidirectional causality flowing from informal economy to human capital development. Consequently, this study concluded that engagement in informal economic activities is beneficial to human capital development in Nigeria. Following these findings, Nigerian policy makers aiming to achieve human capital development should implement comprehensive policies which facilitate the competitiveness and growth of informal economic activities.

## Key words:

Human capital development,  
Informal economy, ARDL,  
Toda-Yamamoto, Nigeria

© 2023 University of Economics – Varna

**Citation:** Temitope Sade AKINTUNDE, Abiodun Samuel ISAYOMI (2023). The effect of informal economy on human capital development. *Izvestiya. Journal of Economics, Management and Informatics*, University of Economics Varna, 67 (3), p. 182 – 195.

DOI: 10.56065/IJUEV2023.67.3.182

## 1. Introduction

The importance of quality human capital cannot be overemphasised in a modern world which often demands solutions to different socioeconomic challenges (Ogunade, 2011). Consequently, much of the cross-country differences in socioeconomic development have been attributed to the sophistication of human capital rather than possession of physical, mineral and energy resources (Anyanwu et al., 2015). The fact that human is the only factor of production capable of learning, adapting, innovating, and creating makes human capital the most important factor for socio-economic development (Okebukola, 2014).

According to Djomo and Sikod (2012) human capital is the combination of knowhow, proficiency and capability possessed by individuals through training, experience or innate abilities. Specifically, education is a major aspect of human capital crucial for the expansion of the human capabilities required for socio-economic development. On the one hand, a highly educated population provides an economy with a quality workforce capable of absorbing modern technology and developing capability for self-sustaining growth and development. On the other hand, education improves the well-being of individuals through better access to lucrative employment opportunities. Consequently, individual demand for education is majorly a derived demand for lucrative formal employment opportunities (Todaro & Smith, 2015).

However, a dearth of formal employment opportunities may deprive the underprivileged majority (regardless of their level of human capital development) from earning a living in the formal economy (Todaro & Smith, 2015). Consequently, the excluded segment of the society resorts to informal economic activities for survival (Arandarenko, 2015). Specifically, as at 2018 the informal economy provides 93% of all employment in Nigeria with 95% of women working in the informal sector compared to 90% of men. About 50% of informal workers are independent workers, while 50% of informal workers are employees of small or medium informal enterprises (International Labour Organisation (ILO, 2018). Despite the employment-generation abilities of the informal economy, the likely adverse effect of such a survival strategy on human capital development is a major concern.

According to the Organisation for Economic Co-operation and Development (OECD, 2019), less than 2% of people who operate in informal economies in African countries are with tertiary education. Besides, many studies have confirmed the fact that people with low human capital (education) are more likely to engage in informal economic activities compared to those with high human capital (Gaspereniene et al., 2016).

Consequently, expansion of the informal economy may imply the existence of an army of underprivileged majority with underdeveloped human capital. Such survival strategy may be detrimental to human capital development since the informal economy is often linked to economic activities carried out by individuals by unskilled individuals with little or no formal education (La Porta & Schleifer, 2008). Hence, a large informal economy may discourage the accumulation of human capital and entrepreneurial talent via lack of innovation and productivity (Kelmanson et al., 2019).

According to Katrechka & Dahlberg (2014), the influence of informal economic activities on human capital development may occur via different channels. A growing informal economy undermines the ability of public authorities to perform socio-economic responsibilities (Omodero, 2019). This may occur through the reduction of public tax revenue which adversely affects the availability of funds for public human capital projects (Arandarenko 2015; Nikopour & Habibullah, 2010). Consequently, the less privileged majority who depend wholly on the government for human capital development may be deprived of such opportunity.

Furthermore, increased access to informal economic opportunities (especially for unskilled individuals) may discourage such individuals from developing their human capital (Kolm & Larsen, 2016). Besides, the income insecurity inherent in the informal economy makes it difficult for informal workers to forgo their daily income for activities (formal education and training) that develops their human capital (Jacobs, 2019). Similarly, the fact that human capital development is not a major requirement for access to informal economic opportunities may also be detrimental to human capital development. The fact that individual level of human capital development may not be a requirement for access to informal economic opportunities may be detrimental to human capital development.

The literature on the link between the informal economy and human capital development is made up of studies which conceptualised the informal economy as an outcome of human capital development or vice versa (Kireenko & Nezorova, 2015; Ciutiene et al., 2015; Berniell, 2021; Kolm & Larsen, 2016). Consequently, there is yet no consensus among scholars on the direction of causality between the informal economy and human capital development. Similarly, studies on the effect of shadow economy are yet to reach a consensus on the direction of the effect of shadow economy on human capital development (Kolm & Larsen 2016; Mondal & Sanaul 2017; Bobba et. al, 2021).

Given the aforementioned controversies, further study on the subject matter is required in a developing country like Nigeria, where majority of the population engage in informal economic activities. Consequently, the goal of this study is to investigate the effect of informal economy on human capital development in Nigeria from 1970 to 2019. The rest of this paper is respectively dedicated to review of relevant literature, methodology, discussion of result and policy implication.

## 2. Literature Review

In spite of the distinct explanations given by modern human development theorists, each agreed that investment in human capital yields return in the form of increased marginal productivity which translates to increased future earnings through increased likelihood of securing lucrative formal employment (Mincer, 1958; Shultz, 1961 & Becker 1962). However, expansion of the informal economy at the expense of the formal economy may jeopardise realization of returns to human capital development. Studies which focus on the link between informal economy and human capital development abound in the literature.

Tumen (2015) studied the influence of the informal economy on the education decisions of youths in 17 South American countries and Turkey using macro and micro data respectively. Findings from his study revealed inverse association between secondary and tertiary education enrolment rates and informal employment opportunities. However, a positive relationship was discovered between rate of student out of lower secondary school and the informal economy. Based on these findings, his study concluded that the availability of informal economic opportunities is discouraging demand for formal education in developing countries.

Ciutiene et al. (2015) examined the interdependency between human capital and the power of the informal economy in Lithuania from 2005 to 2012. Their study revealed a negative and significant inverse impact of attractiveness of human capital on the power of the informal economy. Furthermore, a significant direct effect of the level of education on the magnitude of the informal economy was also discovered. The result from their study also revealed a possible effect of the growth of the informal economy on human capital development through unattractiveness of human capital.

Chen (2015) analysed the relationship between weak protection of property rights and legal enforcement of contracts (legal informality) and human capital development in China. His study revealed that although legal informality contributed to China's economic growth by minimizing cost of production, informal workers usually detest transitioning to formality due to lack of skills required in such a new regime. Consequently, his study concluded that informality discourages the development of skills required for growth sustenance in a more developed and naturally complicated economy.

Kolm and Larsen (2016) examined the effect of informal economic opportunities on the educational attainment of informal workers with low education using a four-sector equilibrium search and matching model. Findings from their study revealed an indirect association between expansions of informal economic opportunities and the educational attainment of lowly educated informal economy workers. Consequently, their study recommended enforcement of a strict deterrence policy against industries that employ lowly-educated as an encouragement for higher educational attainment of lowly-educated informal workers.

Wahab (2017) studied the effect of informal economic activities on the livelihood of Royinga refugees in Klang Vally Malaysia using surveys, in-depth interviews and focus group discussions. The result from his study suggested that wages or any form of income earned by Royinga parents who participate in informal economic activities ensure their ability to support and maintain the educational expenditure of their children in Malaysia. Similarly, Mondal and Sanaul (2017) studied the contribution of urban informal vegetable selling to socio-economic status of vegetable sellers in Dhaka city Bangladesh and found a positive contribution of vegetable selling to continued enrolment in school.

Aghajeri et al. (2019) studied the effect of the informal economy on societal development in s the Middle East from 2000 to 2015. The results from their study revealed a significant inverse effect of the informal economy and income inequality on societal development. Increase in government health and education expenditures was also found to have significant direct effects on the level of societal development.

Berniell (2020) evaluated the impact of occupational choice of participants in the informal sector on human capital development. Findings from his study suggested that the effect of participation in the informal economy on human capital development depends on occupational choice of participants. Specifically,

increasing size of the informal economy encourages informal entrepreneurs to complement shortage of physical capital with investment in human capital. However, a large informal economy discourages informal economy employees from investing in human capital.

Ozgun et al. (2021) examined the influence of the informal sector on measures of sustainable development in 160 economies from 1960 to 2016 using ordinary least square estimation. Findings from their study suggested a negative effect of the informal economy on education, education attainment, carbon dioxide emission per capita, life expectancy and access to potable water. Their study also suggested that the discovered empirical relationships are stronger in developing countries.

However, Bobba et al. (2021) opined that using the overall informality rate as the sole determinant of schooling policy may be misleading as strict social contribution policies which eliminate informal jobs increased schooling investments at the expense of workers' and firms' welfare. However, benign social contribution policies which increase informality increase welfare and the proportion of people who complete secondary school.

The literature review revealed that several authors have researched different aspects of the relationship between informal economy and various dimensions of human capital development. However, the literature is yet to reach a consensus on the effect of informal economy on human capital development and the direction of causality between the informal economy and human capital development. Consequently, there is need for more up-to-date research with better methods, newer data and more specialised scope.

### 3. Methodology

#### 3.1 Data Description and Model Specification

This study utilized annual time series data spanning from 1970 to 2019. The data were obtained from the World Development Indicators and Central Bank of Nigeria. The dependent variable, human capital development (HUM) is measured as gross primary school enrolment while the explanatory variable of interest, informal economy (INF) is measured as informal economy (% of GDP). This study controlled for expected life span (LEX) measured as life expectancy at birth (Years); income (INC) measured as per capita income; and foreign direct investment (FDI) measured as direct investment equity. The estimates of the study were derived using E-views 10 software.

The empirical model for this study stems from the assumption of human capital theory that rational individual invests in human capital development to increase their chances of securing lucrative formal economic opportunities; and the assumption that of the neoclassical perspective that the enormity of the informal economy can be used as a measure of the difficulty of accessing formal economic opportunities. Combining these assumptions, the informal economy is expected to have negative effect on human capital development. Controlling for other variables identified as determinants of human capital development in the literature, the model for this study is stated as:

$$HUM_t = f(INF_t, LEX_t, INC_t, FDI_t, SPE_t) \quad (1)$$

The implicit model is specified explicitly as:

$$HUM_t = \alpha_0 + \alpha_1 INF_t + \alpha_2 LEX_t + \alpha_3 INC_t + \alpha_4 FDI_t + \alpha_5 SPE_t + \mu_t \quad (2)$$

A priori expectation:  $\alpha_1 < 0$ ;  $\alpha_2, \alpha_3, \alpha_4, \alpha_5 > 0$

#### 3.2 Estimation Technique

The autoregressive distributed lag (ARDL) bounds testing technique was used to estimate of the effect of the informal economy on human capital development in Nigeria. This estimation technique was informed by the result of the Kwiatkowski-Phillips-Schmidt-Shin stationarity test and Augmented Dickey Fuller (ADF)

unit root tests which revealed that the series used in the study are either stationary at level I(0) or first difference I(1). The ARDL estimation technique enables the estimation short-run effects, long-run effects and the speed of adjustment from short-run disequilibrium to long-run equilibrium.

Specifically, the unrestricted ARDL version of equation (2) is specified as:

$$\begin{aligned} \Delta HUM_t = & \beta_0 + \beta_1 \Delta HUM_{t-1} + \beta_2 \Delta HUM_{t-2} + \beta_3 \Delta INF_t + \beta_4 \Delta INF_{t-1} + \beta_5 \Delta INF_{t-2} + \beta_6 \Delta LEX_t + \\ & \beta_7 \Delta LEX_{t-1} + \beta_8 \Delta LEX_{t-2} + \beta_9 \Delta LEX_{t-3} + \beta_{10} \Delta INC_t + \beta_{11} \Delta INC_{t-1} + \beta_{12} \Delta INC_{t-2} + \\ & \beta_{13} \Delta FDI_t + \beta_{14} \Delta FDI_{t-1} + \beta_{15} \Delta FDI_{t-2} + \beta_{16} \Delta SPE_t + \beta_{17} \Delta SPE_{t-1} + \beta_{18} \Delta SPE_{t-2} + \beta_{19} \Delta SPE_{t-3} + \\ & \alpha_1 HUM_{t-1} + \alpha_2 INF_{t-1} + \alpha_3 LEX_{t-1} + \alpha_4 INC_{t-1} + \alpha_5 FDI_{t-1} + \alpha_6 SPE_{t-1} + \mu_t \end{aligned} \quad (3)$$

The restricted version of the unrestricted ARDL model in equation (3) is specified and estimated as:

$$\begin{aligned} \Delta HUM_t = & \beta_0 + \beta_1 \Delta HUM_{t-1} + \beta_2 \Delta HUM_{t-2} + \beta_3 \Delta INF_t + \beta_4 \Delta INF_{t-1} + \beta_5 \Delta INF_{t-2} + \beta_6 \Delta LEX_t + \\ & \beta_7 \Delta LEX_{t-1} + \beta_8 \Delta LEX_{t-2} + \beta_9 \Delta LEX_{t-3} + \beta_{10} \Delta INC_t + \beta_{11} \Delta INC_{t-1} + \beta_{12} \Delta INC_{t-2} + \\ & \beta_{13} \Delta FDI_t + \beta_{14} \Delta FDI_{t-1} + \beta_{15} \Delta FDI_{t-2} + \beta_{16} \Delta SPE_t + \beta_{17} \Delta SPE_{t-1} + \beta_{18} \Delta SPE_{t-2} + \beta_{19} \Delta SPE_{t-3} + \\ & \theta ECT_{t-1} + \mu_t \end{aligned} \quad (4)$$

Where:  $\beta_0$  is the intercept,  $\beta_1 - \beta_{19}$  are short-run coefficients of the explanatory variables;  $\alpha_1$  to  $\alpha_6$  are long-run coefficients of the explanatory variables. ECT is the error correction term;  $\theta$  is the coefficient of the error correction term (expected to be significant and satisfy the inequality  $0 \geq \theta \geq -1$ );  $\mu_t$  is the error term. Normality, Ramsey regression specification error, Breusch-Pagan-Godfrey heteroscedasticity, cumulative sum, and cumulative sum of squares were conducted to ascertain the validity of the ARDL model estimates.

The Toda-Yamamoto (1995) causality test was used to achieve the second specific objective targeted at determining the direction of causality between informal economy and human capital development. The Toda-Yamamoto causality test is more suitable for this study than the popular Granger (1969) causality test since it does not assume that all the study variables are stationary at level. Specifically, the Toda-Yamamoto causality test is based on the estimation of the augmented VAR model ( $k + dmax$ )

$$\begin{aligned} HUM_t = & \mu_0 + \left[ \sum_{i=1}^k \alpha_{1t} HUM_{t-i} + \sum_{i=k+1}^{dmax} \alpha_{2t} HUM_{t-i} \right] + \left[ \sum_{i=1}^k \beta_{1t} INF_{t-i} + \sum_{i=k+1}^{dmax} \beta_{2t} INF_{t-i} \right] \\ & + \varepsilon_{1t} \end{aligned} \quad (5)$$

$$\begin{aligned} INF_t = & \theta_0 + \left[ \sum_{i=1}^k \gamma_{1t} INF_{t-i} + \sum_{i=k+1}^{dmax} \gamma_{2t} INF_{t-i} \right] + \left[ \sum_{i=1}^k \delta_{1t} HUM_{t-i} + \sum_{i=k+1}^{dmax} \delta_{2t} HUM_{t-i} \right] \\ & + \varepsilon_{2t} \end{aligned} \quad (6)$$

Where:  $k$  is the optimal time lag of the VAR model and  $dmax$  is the maximum order of integration of the variables in the VAR model.

## 4. Results and Discussion

### 4.1. Unit Root Test

Table 1 presents the unit root tests results. The comparison of the test statistics and critical values of at least two of the tests at 0.05 significance level revealed that the series are either integrated at level or at first difference. The unit root tests results is consistent with the autoregressive distributive lag technique which assumes that series whose parameters are to be estimated must be stationary at level and first difference.

**Table 1**

**Unit Root Tests Results**

ADF				KPSS		
Ho: Unit Root				Ho: Stationarity		
Variable	I(d)	Statistic	Critical Value (5%)	I(d)	Statistic	Critical Value (5%)
HUM	I(0)	-2.937	-2.924	I(0)	0.335	0.463
INF	I(1)	-8.465	-2.924	I(0)	0.393	0.463
LEX	I(0)	-4.370	-3.511	I(1)	0.234	0.463
INC	I(1)	-3.671	-3.506	I(1)	0.363	0.463
EXP	I(1)	-5.662	-2.925	I(0)	0.190	0.463
FDI	I(1)	-8.370	-2.924	I(0)	0.085	0.146

Note: Null hypothesis is rejected if absolute value of test statistic greater than critical value (5%)

Source: Authors' computation, 2023 using E-views 10.

**4.2. Bounds Test**

The bounds test result is presented in Table 2. The fact that the absolute values of F-statistics and t-Statistic are greater than their respective absolute upper bound values suggests evidence of co-integration among human capital development, informal economy, and the control variables. This result implies that the informal economy and control variables are important policy variables for long-run change in human capital development in Nigeria.

**Table 2**

**Bounds Test Result**

H <sub>0</sub> : No Levels Relationship			
F Statistic	9.402	T Statistic	-6.137
Lower Bound 1(0)	2.62	Lower Bound 1(0)	-2.86
Upper Bound 1(1)	3.79	Upper Bound 1(1)	-4.19

Note: Null hypothesis is rejected if the absolute values of test statistic exceed the upper bound.

Source: Authors' computation, 2023.

**4.3. Effect of the Informal Economy on Human Capital Development.**

The short-run and long-run estimates are presented in Table 3. The p-values of the long-run coefficients of informal economy (0.013 < 0.05); life expectancy (0.000 < 0.05); income (0.000 < 0.05); foreign direct investment (0.031 < 0.05); and government investment in human capital (0.000 < 0.05) are significant at 0.05 level. This implies that all the explanatory variables are long-run determinants of human capital development in Nigeria. Likewise, the probability values of short-run coefficients of one-period lag informal economy (0.002 < 0.05).

**Table 3**

**Long-run and Short-run ARDL Model Estimates**

Dependent Variable: Human Capital Development				
Method: ARDL				
Model Selection Criteria: Akaike Information Criteria				
Selected Model: ARDL(2, 2, 3, 2, 2, 3)				
Case: Unrestricted Constant and No Trend				
Variable	Coefficient	St. Error	T-Statistic	Probability
Long-Run Estimates				
INF	0.494	0.185	2.674	0.013**
LEX	2.356	0.358	6.573	0.000***
INC	-2.436	0.334	-7.303	0.000***
FDI	-0.258	0.113	-2.282	0.031**
SPE	0.909	0.191	4.746	0.000***
Short-run Estimates				
Variable	Coefficient	St. Error	T-Statistic	Probability
C	-0.181	0.025	-7.286	0.000***
D[HUM(-1)]	0.554	0.090	6.138	0.000***
D[INF]	0.089	0.046	1.940	0.063
D[INF(-1)]	-0.191	0.056	-3.393	0.002***
D[LEX]	-1.851	9.739	-0.190	0.851
D[LEX(-1)]	19.708	19.510	1.010	0.321
D[LEX(-2)]	-19.643	10.401	-1.889	0.070
D[INC]	0.562	0.449	1.253	0.221
D[INC(-1)]	1.358	0.543	2.501	0.019**
D[FDI]	0.071	0.059	1.198	0.241
D[FDI(-1)]	0.234	0.065	3.586	0.001***
D[SPE]	0.193	0.056	3.435	0.002***
D[SPE(-1)]	-0.269	0.069	-3.928	0.000***
D[SPE(-2)]	-0.140	0.055	-2.561	0.016**
ECT(-1)	-0.588	0.072	-8.177	0.000***
R SQUARE	0.816			

Note: \*\* and \*\*\* denotes significance of coefficient at 5% and 1% levels of significant respectively.

Source: Authors' computation, 2023 using E-views 10.

Specifically, the long-run coefficient of informal economy (0.494) is positive and statistically significant. This implies that 1 percentage point increase in informal economy will result in about 0.49 percentage point increase in human capital development in the long run. This result agrees with Wahab (2017) disagrees with Carpio (2014); Kolm and Larsen (2016); Ozgur et al., (2021) and partly agrees

with Bobba et al, (2021); Ciutiene et al. (2015); Berneill (2020) and Tumen (2015) which found both positive and negative effect of informal economy on human capital development.

However, the beneficial long-run effect of informal economy on human capital development disagrees with the a priori expectation. The inconsistency of the finding with a priori expectation may be due to the fact that most underprivileged Nigerians fund their human capital development with income earn from informal economic activities. This may also be explained by the desire of informal workers to be eligible for formal economic opportunities whenever socioeconomic conditions are favourable. For instance excluded Nigerian parents usually fund the human capital development of their wards to ensure that they have better chances of securing lucrative formal employment opportunities. By implication this result agrees with studies which concluded that governments of in poor developing democracies are often reluctant to take decisive action on the expansion of informal economic activities for fear of losing political support from the masses ( Isayomi & Akintunde, 2021 ).

Contrary to the positive long-run effect, the findings from this study revealed that short-run coefficient of one period lag of informal economy (-0.191) is negative and statistically significant at 0.05 level. This implies that 1 percentage point increase in informal economy in the current year results in about 0.19 percentage point decrease in human capital development in the subsequent year. This agrees with the a priori expectation that expansion of the informal economy results in socioeconomic conditions which discourage human capital development.

The coefficient of the error correction term (-0.588) is negative and also statistically significant since the absolute value of the t statistic (-8.177) of the error correction term exceeds the upper bound (-4.19) of the t-bounds test associated with the error correction model regression. The negative sign of the coefficient of the error correction term implies that the model is able to adjust from short-run deviations to long-run equilibrium. More specifically, the coefficient of the error correction term of (-0.588) implies that about 59% of the deviations from long-run equilibrium are corrected yearly. Consequently, it takes about 1.7years ( $-0.588^{-1}$ ) to adjust deviation from long-run equilibrium in a particular year.

#### 4.4. Post Estimation Diagnostics

Table 4 presents the result of post estimation tests. The probability values of the tests shows that the autoregressive distributed lag model is free from serial correlation, heteroscedasticity, abnormally distributed error and misspecification. Figure 1 presents the result of the cumulative sum of squares (CUSUMSQ) test. The results show that CUSUMSQ plot falls within the 0.05 level of significance lines. This shows that estimated coefficients are stable and can be used for policymaking purposes.

**Table 4**

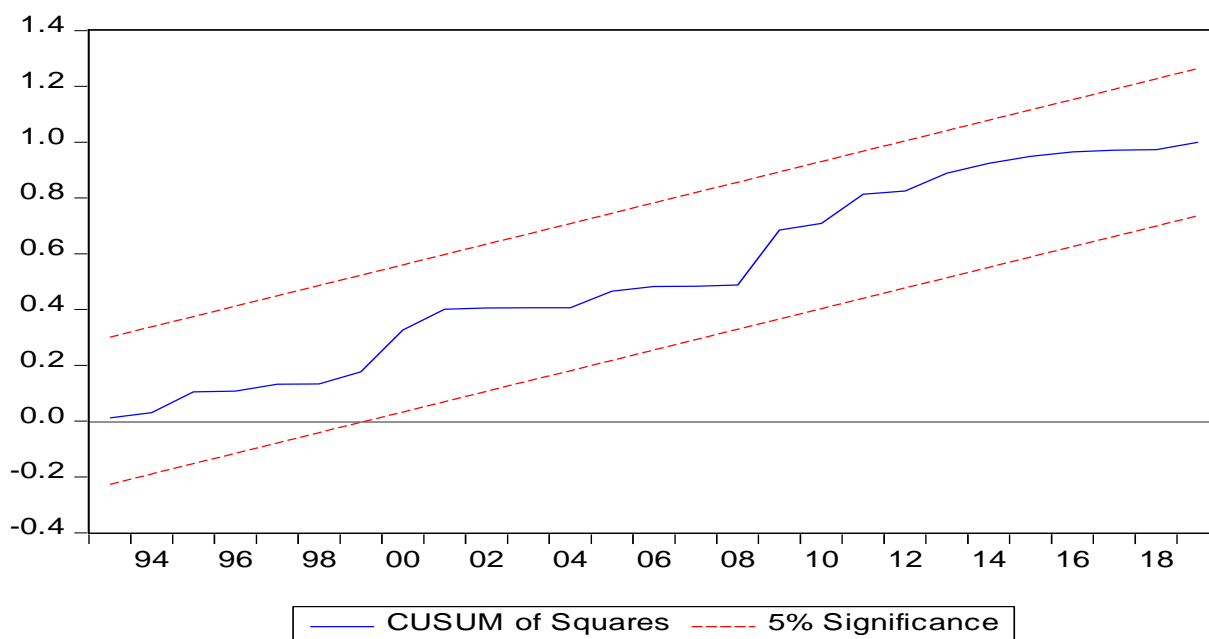
**Post Estimation Diagnostics**

Test	Statistic	Value	Probability
Serial Correlation LM	Obs*Rsquared	1.5575	0.4590
B-P-G Heteroscedasticity	Obs*Rsquared	21.3694	0.3168
Normality	Jarque-Bera	0.6738	0.7140
Ramsey RESET Test	F	1.4982	0.2429

Note: The null hypotheses for the post estimation diagnostics are no serial correlation; homoscedasticity; normality and correct specification respectively.

*Source: Authors' computation, 2023 using E-views 10*





**Figure 1: Cumulative Sum of Squares Test**

*Source: Authors' computation, 2023 using E-views 10*

#### 4.5. Causality Test Result

The result of the Toda-Yamamoto causality test is presented in Table 5. The result revealed a unidirectional causality flowing from the informal economy (INF) to human capital development (HUM). The unidirectional causality from the informal economy to human capital development indicates that the informal economy is a cause and not an effect of human capital development in Nigeria. This finding agrees with extant studies which conceptualize informal economy as a determinant of human capital development (Berniell, 2021; Bobba, Flabbi & Levy 2021; Ozgur et al. 2021) The finding however disagrees with studies that conceptualise human capital development as a determinant of the informal economy (Kireenko & Nezorova, 2015; Čiutienė et al. 2015).

**Table 5**

#### Toda-Yamamoto Causality Test

Maximum Order of Integrations (dmax): 1		
Optimal Lag Length (K) : 5		
Null Hypothesis	Chi Square Statistic	Probability
<b>INF does not granger cause HUM</b>	25.30541	0.0001***
<b>HUM does not granger cause INF</b>	1.30123	0.9348

Note: \*\*\* denotes rejection of the null hypothesis at 1% level of significance.

*Source: Authors' computation, 2023 using E-views 10*

### 5. Conclusion and Policy Implications

This study investigated the effect of the informal economy on human capital development; and the direction of causality between the informal economy and human capital development in Nigeria from 1970 to 2019. The ARDL-bounds test technique and the Toda-Yamamoto causality test were use to achieve the study objectives. Contrary to a priori expectation, this study revealed significant positive effect of the informal economy on human capital development in Nigeria. The result of the study also revealed a uni-directional

causality flowing from the informal economy to human capital development. Both of these findings revealed that the informal economy is in fact beneficial to human capital development in Nigeria.

Findings from this study have several policy implications for Nigeria. Extant policies such as (Universal Basic Education) targeted at human capital development in Nigeria often focus on the supply side of human capital development. Consequently, such policies often fail to maximize the positive influence of informal economy on human capital development. Similarly, existing policies targeted at empowering individuals who engage in informal economic activities have often focused on financial inclusion. However, maximizing the human capital development benefits of the informal economy requires a holistic policy targeted which enhance the competitiveness and growth of informal economic activities.

## References

1. Aghajeri, S. J., Zaranezhad, M., and Akbarzadeh, M. H. (2019). Investigation of the relationship between underground economy and social development in a selection of Middle East countries. *Quarterly Journal of Social Development*, 13(2), pp. 195-218.
2. Anyanwu, S. O., Adam, J. A., Obi, B., and Yelwa, M. (2015). Human capital development an economic growth in Nigeria. *Journal of Economics and Sustainable Development*, 6(14), pp. 16-26.
3. Arandarenko, M. (2015). The shadow economy: Challenges to economic and social policy. In: Krstic, G., and Schneider, F. ed., *Formalizing the Informal Economy in Serbia*. Cham: Springer, pp. 5-12.
4. Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of political economy*, 70(5), pp. 9-49.
5. Berniell, L. (2021). Occupational choice and investments in human capital in Informal Economies. *The BE Journal of Macroeconomics*, 21(2), pp. 399-423.
6. Bobba, M., Flabbi, L., Levy, S., and Tejada, M. (2021). Labor market search, informality, and on-the-job human capital accumulation. *Journal of Econometrics*, 223(2), pp. 433-453.
7. Carpio, S. (2014). *Education and the Informal Sector: Evidence from Venezuela and Brazil* (Doctoral dissertation, Université d'Auvergne-Clermont-Ferrand I).
8. Chen, M. A. (2012). *The informal economy: Definitions, theories and policies*. WIEGO working Paper.
9. Ciutiene, R., Meiliene, E., Savaneviciene, A., and Vaitkevicius, S. (2015). Interdependence between human capital and the power of a informal economy: Lithuanian case study. *Technological and Economic Development of Economy*, 21(3), pp. 460-482.
10. Djomo, J. M. N., and Sikod, F. (2012). The effects of human capital on agricultural productivity and farmer's income in Cameroun. *International Business Research*, 5(4), pp. 149-159.
11. Gaspereniene, L., Remeikiene, R., Ginevicius, R., and Skuka, A. (2016). Critical attitude towards the theory of digital s economy: literature review and new foundations. *Terra economicus*, 14(4), pp. 156-172.
12. Isayomi A. S. And Akintunde T. S. (2021). The effect of governance on growth of shadow economy in West Africa. *Annals of Spiru Haret University Economic Series*, 21(4), pp. 583 - 603
13. Katrechka, A., & Dahlberg, S. (2014). The effect of the shadow economy on social development. *University of Gothenburg*.
14. Kelmanson, M. B., Kirabaeva, K., Medina, L., Mircheva, M., and Weiss, J. (2019). *Explaining the informal economy in Europe: size, causes and policy options*. International Monetary Fund.
15. Kireenko, A., and Nevzorova, E. (2015). Impact of informal economy on quality of life: Indicators and model selection. *Procedia Economics and Finance*, 25, pp. 559-568.
16. Kolm, A. S., and Larsen, B. (2016). Informal unemployment and education. *IZA Journal of Labor Economics*, 5(1), pp. 1-36.
17. La Porta, R., and Shleifer, A. (2008). *The unofficial economy and economic development* (No. w14520). National Bureau of Economic Research.

18. Mincer, J. (1958). Investment in human capital and personal income distribution. *Journal of political economy*, 66(4), pp. 281-302.
19. Mondal, M. (2017). Urban Informal economy in Bangladesh: A case study on mobile vegetable vendor in Dhaka City. *Qualitative Report*, 22(11), pp. 2893-2903.
20. Nikopour, H., and Shah Habibullah, M. (2010). Shadow economy and poverty. *MPRA paper 23599*, pp. 1-26
21. Okebukola, P. A. (2014). Human capital development and innovation. In T. Abioye, C. Awonuga and A. Amuwo eds., *Leadership & Innovation in Africa's Development Paradigm*.
22. Omodero, C. O. (2019). Government general spending and human development: A case study of Nigeria. *Academic Journal of Interdisciplinary Studies*, 8(1), pp. 51-59.
23. Ogunade, A. O. (2011). Human capital investment in the developing world: an analysis of praxis.
24. Ozgur, G., Elgin, C., and Elveren, A. Y. (2021). Is informality a barrier to sustainable development? *Sustainable Development*, 29(1), pp. 45-65.
25. Toda, H.Y. and Yamamoto, T. (1995). Statistica inference in vector autoregressions with possibly integrated process. *Journal of Econometrics* 66(1-2), pp. 225-250.
26. Todaro, M. P. and Smith, S. C. (2015). *Economic development* (12<sup>th</sup> ed). Edinburgh, United Kingdom: Pearson Education Limited
27. Tumen, S. (2015). Skill Acquisition in the Informal Economy and Schooling Decisions: Evidence from Emerging Economies. *Labour*, 29(3), pp. 270-290.
28. Wahab, A. A. (2017). Rethinking refugees as economically isolated: The Rohingya participation in informal economy in Klang Valley, Malaysia. *Journal of ASEAN Studies*, 5(2), pp. 100-118.

**Appendix A**  
**ARDL Error Correction Regression**

ARDL Error Correction Regression

Dependent Variable: D(HUM)

Selected Model: ARDL(2, 2, 3, 2, 2, 3)

Case 3: Unrestricted Constant and No Trend

Date: 05/04/22 Time: 09:20

Sample: 1970 2019

Included observations: 47

ECM Regression				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.181185	0.024868	-7.285794	0.0000
D(HUM(-1))	0.553603	0.090195	6.137857	0.0000
D(SHA)	0.088710	0.045719	1.940315	0.0629
D(SHA(-1))	-0.191474	0.056429	-3.393201	0.0021
D(LEX)	-1.850917	9.738757	-0.190057	0.8507
D(LEX(-1))	19.70766	19.51035	1.010113	0.3214
D(LEX(-2))	-19.64256	10.40100	-1.888527	0.0697
D(INC)	0.562463	0.449049	1.252563	0.2211
D(INC(-1))	1.357652	0.542822	2.501099	0.0187
D(FDI)	0.070897	0.059174	1.198118	0.2413
D(FDI(-1))	0.233781	0.065185	3.586404	0.0013
D(EXP)	0.193138	0.056234	3.434522	0.0019
D(EXP(-1))	-0.269469	0.068594	-3.928464	0.0005
D(EXP(-2))	-0.140273	0.054767	-2.561253	0.0163
CointEq(-1)*	-0.587880	0.071896	-8.176812	0.0000
R-squared	0.815641	Mean dependent var		0.010871
Adjusted R-squared	0.734983	S.D. dependent var		0.078891
S.E. of regression	0.040613	Akaike info criterion		-3.315587
Sum squared resid	0.052780	Schwarz criterion		-2.725114
Log likelihood	92.91629	Hannan-Quinn criter.		-3.093388
F-statistic	10.11243	Durbin-Watson stat		2.180239
Prob(F-statistic)	0.000000			

\* p-value incompatible with t-Bounds distribution.

**Appendix B**

**Levels Equation and Bounds Test**

Levels Equation  
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SHA	0.494284	0.184882	2.673516	0.0126
LEX	2.355978	0.358438	6.572896	0.0000
INC	-2.436149	0.333577	-7.303109	0.0000
FDI	-0.257831	0.113009	-2.281517	0.0306
EXP	0.908791	0.191499	4.745658	0.0001

$$EC = HUM - (0.4943*SHA + 2.3560*LEX - 2.4361*INC - 0.2578*FDI + 0.9088*EXP)$$

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	9.402224	10%	2.26	3.35
		5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
Actual Sample Size	47	Asymptoti: n=1000		
		Finite Sample: n=50		
		10%	2.435	3.6
		5%	2.9	4.218
		Finite Sample: n=45		
		10%	2.458	3.647
		5%	2.922	4.268
		1%	4.03	5.598

t-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-6.136753	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79