Innovations

Monetary Policy and Human Capital Development in Sellected Sub-Saharan African Countries

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Abstract: *The study evaluated monetary policy and human capital development in 30 chosen Sub-Saharan African nations. Annualized panel data from the United Nations Development Program (UNDP) and the World Bank Development Indicator (WDI) from 1986 to 2022 were employed. The Autoregressive Distributed Lag Model (ARDL) was used for estimation. Human capital development was the dependent variable, whereas money supply legal reserve requirement and political stability were the independent variables. The analysis's findings showed that legal reserve requirement had negative and insignificant, while money supply and political stability were positive though money supply was insignificant while political stability had significant effect on of human capital during the study period. On the other hand, these factors significantly and favorably impacted the development of human capital in the short term. To manage the complexity of a dynamic global economy, policymakers must acknowledge the interdependency of these crucial elements. Economic policy frameworks must prioritize the development of human capital. Governments and monetary authorities must implement these policies that facilitate access to high quality healthcare, education, and skill development in order to streng then the workforce and improve overall wellbeing.*

Keywords: *Monetary policy, human capital development, error correction, co-integration and autoregressive distributed lag model.*

1 Introduction

Sustainable economic development requires a well-coordinated integration of monetary policy and human capital development. Understanding how these components are interdependent enables countries to strive toward developing resilient economies that can overcome setbacks and prosper in a dynamic environment. The combination of monetary policy and human capital becomes a significant driving force that influences the future course of nations worldwide in the

goal of inclusive growth and shared prosperity. Monetary policy has a significant impact on economic outcomes, especially in emerging nations like Sub-Saharan Africa (SSA).The relationship between monetary policy and the development of human capital is complex since monetary decisions have a variety of effects on health, education, and the overall capabilities of human resources. By giving a comprehensive review of current research and literature, this study seeks to investigate the interactions between these two important fields. If policymakers want investments in human capital to have a major impact on people and society as a whole, they must understand how crucial it is to properly align these factors.

The research improved our knowledge in the following areas: The most recent study employed the Autoregressive Distributed Lag Model (ARDL) to capture both the short-term and long-term association between the variables, whereas some of the earlier studies employed a linear regression technique. The new study's scope was limited to Sub-Saharan Africa. This scenario was chosen since the vast majority of sub-Saharan African nations are destitute and yet developing.In addition to the endogenous growth model employed by the previous researcher, this study employed the Human Capital Theory, which was created by economist Gary Becker in the 1960s and is predicated on the notion that people can raise their economic standing by investing in healthcare, education, and training. This idea holds that human capital is an asset that generates income in the form of better employment prospects and higher wages. Some aspects of human capital, such as education and health care, were further explained by the human capita hypothesis.

1.1 Objectives of the Study

The primary objective of the study was to examine monetary policy in relation to human capital development in a few selected Sub-Saharan African countries. The specific objectives are to: (i) determine the effect of the money supply on human capital development; (ii) investigate the effect of legal reserve requirement on human capital development; and (iii) assess the effect of political stability on human capital development of the selected sub-Saharan African countries.

1.2 Scope of the Study

From 1986 to 2022, the study examined 30 countries in Sub-Saharan Africa. The base period was selected based on the Structural Adjustment Program era and sub-Saharan African countries with low to medium levels of human capital development. With nearly half of their inhabitants living in abject poverty, the majority of Sub-Saharan African countries are the least developed, which serves as justification for this.

2. Review of Related Literature

The study supports the findings of Muazu and Yakubu (2018), who examined the factors driving the growth of the financial sector in Africa using data for 46 countries from 1980 to 2015 and the system generalized method of moments. More importantly, they investigate whether the connection between trade openness and human capital may account for financial success. Despite the fact that human capital has a major influence on financial development, our findings show that trade openness has a greater effect on private credit than on domestic credit. The interrelated ideas of openness and human capital are significantly correlated with financial progress. Trade openness (human capital) has a greater impact on private (domestic) credit than trade openness (human capital), according to an examination of the marginal impacts. According to the majority of the data available, trade openness and the development of human capital are equivalent when evaluating Africa's financial development.

The results also support those of Cyn-Young and Ragelio (2015), who looked at the connection between income disparity, financial inclusion, and poverty in Asia. With an emphasis on developing Asian economies, the study used a regression analysis of 37 developing Asian countries to identify the macroeconomic factors and country-specific characteristics that influence the degree of financial inclusion. They discover that financial inclusion is significantly impacted by per capita income and demographics. The study also demonstrates how financial inclusion lowers poverty and income inequality.

The findings support the Granger causal link and the co-integration of economic growth with total energy consumption and disaggregated energy sources, including electricity, natural gas, coal, coke, crude oil, petroleum products, and coal, in China between 1995 and 2014. The work was carried out by Zheng and Yang (2017). We employ a multivariate approach that takes into consideration both physical capital and per capita human capital in the neoclassical production function, which sets us apart from the few provincial studies on China that are currently accessible. Additionally, we employ sophisticated panel econometric methods that take provincial heterogeneity and cross-sectional dependence into account, such as bootstrapped panel Granger causality tests and Cup single bond FM estimators. According to our research, the economic benefits of human capital are two to three times greater than those of physical capital, with energy also playing a major role. Furthermore, it is crucial to investigate the causal consequences of both the total energy usage and various disaggregated energy use before local governments implement specific economic and energy policies. The findings of the Granger causality test for the rich bootstrap panel for both the panel and individual provinces show this.

The analysis backs up the findings of LJinli and Jie (2022), who assessed economic stagnation prior to the need for education. According to this study, a coordination failure to take advantage of possible human capital externalities and empirically proven decreasing returns to scale in schooling is the reason behind a durable poverty trap at low beginning average human capital. Empirically shown human capital externalities for increased returns to scale in output can lead to balanced growth when average human capital surpasses a threshold.One strategy to escape poverty and reach the human capital threshold is to make public education mandatory or provide education subsidies. suitable subsidies for school time and educational expenses that are funded by labor income. Furthermore, the study supports Oluwabunmi, Simplice, and Akintoye's (2021) investigation of the dynamic relationships between employment rates (as shown by unemployment rates) and school enrollment rates in Nigeria. The study employed autoregressive estimations and unconstrained VAR to investigate these connections.Increased investments in human capital, especially at higher education levels, will allow human capital to develop dynamically and sustain long-term growth in Nigeria, according to the new-growth theory (also known as endogenous models), which is supported by the analysis. This trend has multiplier benefits for promoting sustainable human capital development because education-driven growth creates jobs in the near term. Nonetheless, it seems that education must be combined with other cooperative components such as social safety nets, good governance, the expansion of the private sector, and the efficient use of both human and material resources in order to sustain human capital development long enough to create jobs in the future.

2.1 Theoretical Framework

This research is grounded in human capital theory. Economist Gary Becker proposed the Human Capital Theory in the 1960s, which states that investing in healthcare, education, and training can improve a person's financial situation. According to this theory, human capital is an asset that generates income in the form of better employment prospects and higher wages. Research, education, and training expenditures encourage innovation and technical breakthroughs, which in turn promote long-term economic growth. By maintaining price and financial stability, monetary policy plays a crucial role in fostering an atmosphere that encourages the growth of human capital.

3. Research Methodology

Onwumere (2021) defines research design as a systematic framework for scientific investigation and analysis. The ex post facto design, which is commonly used when the characteristics of the variables under research cannot be altered, is used in this study. According to Simon and Goes (2013), ex post facto research is grounded in an event or

fact that has already happened while simultaneously utilizing fundamental research and inquiry principles, such as the experimental method. Annualized panel data for 30 Sub-Saharan African nations from 1986 to 2022 were used in this study. The secondary data came from the World Bank Development Indicator (WDI) and the United Nations Development Program (UNDP).

3.1 Model Specification

The Bayesian estimating model, which Carl Walsh (2017) employed in his paper Monetary theory and policy in the United States of America, was adopted by the study. These structural models have the important advantage of allowing one to evaluate the impact of policy shocks and alternative, systematic monetary policy rules on macroeconomic variables. These models' basic structure can be expressed as follows:

$$E_t Y_{t+1} = A_1 Y_t + A_2 X_t + B i_t + u_t, \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (1)$$

Y1 represents an endogenous variable vector, while X1 represents an exogenous variable vector.

The following model was adopted and modified in the recent study as:

$$DIH_{it} = \beta_0 + \beta_1 MS_{it} + \beta_2 RERVBL_{it} + \beta_3 PSTG_{it} + \in_t \quad - \quad - \quad - \quad - \quad - \quad (2)$$

Where: DIH represents Human Capital Development, MS represents Money Supply, RERVBL representsLegal reserve requirement, PSTG represents Political Stability and$\in_t$represents Error Term,

3.2 Techniques of Analysis

The recent study employed the Autoregressive Distributed Lag Model (ARDL) technique. Finding the long-term and short-term relationships between the variables is the rationale behind this estimation technique.

Below is the ARDL model used for the estimation:

$$\Delta DIHP_{t=} \beta O + \sum_P^q \beta_{1\,\Delta} DIHP_{t-n} + \sum_P^q \beta_2 \Delta MS_{t-n} + \sum_P^q \beta_3 \Delta RERVBL_{t-n} + \sum_P^q \beta PSTGEX_{t-n} + \vartheta_1 MS_t + \vartheta_2 RERVBL_t + \vartheta_3 PSTG_t + \in_t$$

Maximum Lag is denoted by P, Minimum Lag by Q, and Time Lag by t-n. Et stands for error term, Δ for differential operator, and $\sum$ for summation. The following are some benefits of using the Autoregressive Distributed Lag Model (ARDL): Both independent and dependent variables are lags in ARDL. It can handle variables with varying orders of integration and models both short-term and long-term outcomes. Additionally, it is a dynamic model that solves OLS's diagnostic issue. Even with a tiny sample size, ARDL is still effective. It offers the chance to modify and use any appropriate lag cells.

4. Data Analysis and Results

The panel data used for estimation came from the World Bank Development Indicator (WDI) and the United Nations Development Program (UNDP). We examined thirty Sub-Saharan African nations. The dependent variable is human development. Examples of independent variables are the monetary policy rate and the currency exchange rate.

4.1 Descriptive Analysis Test

To investigate the nature of the data, a descriptive statistics test was conducted, as indicated in Table 4.1 below. The mean, median skewness, kurtosis, and other features that would improve accurate comprehension of the variables are displayed via descriptive statistics.

Table 4.1: Descriptive Analysis Table

	DIH	MS	PSTG	RERVBL
Mean	0.444326	25.05832	30.28934	11.60833
Median	0.446600	21.29430	29.87290	9.514300
Maximum	0.741000	117.1918	64.95400	49.75183
Minimum	0.212000	5.143200	4.628600	0.638399
Std. Dev.	0.104697	15.10298	15.21772	7.355726
Skewness	0.341128	1.969275	0.475405	1.666612
Kurtosis	2.771426	8.323677	2.825243	6.369308
Jarque-Bera	23.79353	2015.443	42.95178	1032.345
Probability	0.000007	0.000000	0.000000	0.000000
Sum	490.0918	27639.32	33409.14	12803.99
Sum Sq. Dev.	12.07946	251366.4	255200.1	59625.58
Observations	1103	1103	1103	1103

Source: Author's computation (extract from e view)

Table 4.1 showed that DIH averaged 0.44% and ranged from 0.21% to 0.74%, MS averaged 25.06% and ranged from 5.14% to 117.19%, PSTG averaged 30.29% and ranged from 4.63% to 64.95% and RERVBL averaged 11.61% and ranged from 0.64% to 49.75% of the 30 selected sub Saharan Africa countries from 1986 to 1922.

4.2 Test for Stationarity

Stationarity is tested using Panel Unit Root Tests. The purpose of the test was to prevent spurious regression. When two non-stationary variables are regressed on one another and the regression coefficients that are produced are statistically significant, this is known as spurious regression. Consequently, the stationarity status of the data was ascertained using the Augmented Dickey-Fuller (ADF) unit root test. The ADF-

based decision rule states that, at the 5% level of significance, the statistic must be higher than the Mackinnon Critical Value.

Table 4.2: Summary of panel unit root test

Variables	Adf Statistics	Critical Statistics @ 5 % Level	Probability Value	Order of Integration
DIH	-5.440042	-2.863936	0.0000	1(0)
MS	-6.064997	-2.863955	0.0000	1(0)
PSTG	-4.161149	-2.863936	0.0008	1(0)
RERVBL	-3.324275	-2.863943	0.0141	1(0)

Source: Author's computation (extract from e view)

The result from table 4.2 showed that no unit root problem existed between monetary policy and human capital development variables. DIH, MS,PSTG and RERVBL were integrated at order zero (level) i.e. 1(0).

4.3 Estimation Test

The Autoregressive Distributed Lag Model (ARDL) was used in the investigation.ARDL model was applied because it offers the following advantages: ARDL has both the lag of Dependent and independent variables. It models both for long-run and short and it tolerates variables with different order of integration. It is also a dynamic model that overcomes the diagnostic problem with OLS. ARDL remains efficient in the face of small sample size. It provides the opportunity to adjust and adopt any suitable lag cells.

Table 4.3: ARDL Result of monetary policy and human capital development

Dependent Variable: D(DIH)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Long run				
MS	0.001356	0.001118	1.212694	0.2255
PSTG	0.003323	0.001100	3.019633	0.0026
RERVBL	-0.002127	0.001965	-1.082455	0.2793
C	0.339825	0.038765	8.766329	0.0000
Short run				
D(MS)	0.001533	0.000159	9.650333	0.0000
D(PSTG)	0.003124	0.000226	13.81443	0.0000
D(RERVBL)	-0.000128	0.000117	-1.088094	0.2768
C	0.020375	0.003971	5.131515	0.0000

Author's computation from e view

Result from table 4.3 revealed that Money supply (MS) had a positive and non significant effect on human capital development of the selected sub-Saharan African countries, (Co-efficient= 0.00, t-statistics= 1.21, p-value >0.05). This implied that money supply made no relevant impact on human capital development which could be attributed to diversion of government spending on non-viable projects. Political Stability (PSTG) had a positive and significant effect on human capital development of the selected sub Saharan African countries within the period under study (Co-efficient= 0.00,t-statistics= 3.02 , p-value <0.05).This implied that Political Stability made human capital development to thrive. Legal reserve requirement (RERVBL) had a negative and insignificant effect on human capital development of the selected sub-Saharan African countries within the period under study (Co-efficient=-0.00 ,t-statistics= -1.08, p-value >0.05) This implied that excess reserve did not have any significant effect on human capital development and idle money does not yield any profit.

However, in the short run all the variables except RERVBL had positive and significant outcomes. The poor performance of the variables in the long run could be attributed to the government inconsistent policies and inability to complete and sustain the existing viable projects.

4.4. Post estimation/Diagnostic Tests

Diagnostic or post estimation tests are those tests which are conducted after the main analysis in order to find out whether the model used for the estimation was suitable and reliable.

4.5. Test for Heteroskedasticity

This test is employed to check for autocorrelation.

Table 4.4 Result for Heteroskedasticity test on monetary policy and human capital development

Heteroskedasticity Test: ARCH

F-statistic	0.447818	Prob. F(2,1086)	0.6391
Obs*R-squared	0.897370	Prob. Chi-Square(2)	0.6385

Source : Author's construction

The heteroskedasticity result looking at the chi-square result and its probability showed 0.6391 which is greater than the significance value of 0.05. This entails that the model coefficients are reliable for policy making, prescription and forecast.

4.6 ARDL Co-integration test

A long-term equilibrium relationship between the non-stationary variables is determined by cointegration, whereas the error correction model illustrates how the dependent variable adapts to the dynamics (changes) of the independent variables.

Table 4.5 Result of ARDL Co-integration text of monetary policy and human capital development

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)*	-0.059958	0.010059	-5.960834	0.0000

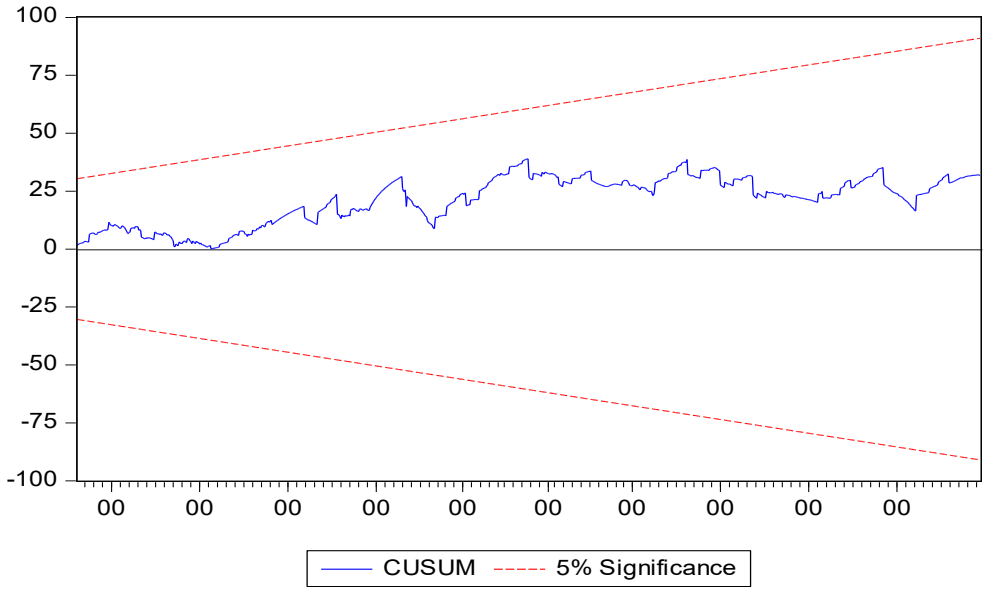
Source: Author's computation.

Table 4.5 showed a probability value of 0.00.There was a significant co-integration between monetary policy and Human Capital development of the selected sub Saharan African countries within the period under study (Co-efficient= -0.06, t-statistics= -5.96, p-value <0.05.This implied that a strong and significant relationship existed between monetary policy and Human Capital development of the selected sub Saharan African countries within the period under study.

4.7 Cusum Test

Cusum test is a diagnostic test that shows model stability. The model is stable when the blue line sits between the two red lines.

Figure 4.1: Result of Cumsey test of monetary policy and human capital development



Source: Author' computation from e view 10

Figure 4.1 has clearly shown that the blue line sat in between the two red lines. So the models are stable and reliable.

5. Conclusion and Recommendation

Monetary policy is a strategic instrument available to the central bank to control investment, inflation, and overall economic stability. Investing in human capital, which encompasses health, education, and skills is essential to promoting innovation, productivity, and long-term economic success. The relationship between these two essential components must be recognized by policymakers as they strive to navigate the complexities of a rapidly evolving global economy. Long-term investments in human capital development increase a nation's capacity to adapt to global concerns and technological advancements. When supported by effective monetary policies that maintain price stability and provide an environment conducive to economic activity, the combination of monetary policy and human capital can be a powerful development engine.

We made the following recommendations based on the study's findings: The central bank of each country and other regulatory agencies should regularly monitor and assess interest rates. Lowering student loan interest rates can increase access to higher education. To assist and improve healthcare and educational institutions, central banks could consider enacting quantitative easing policies that allocate and adjust financing rates.

In order to enhance infrastructure, teacher preparation, and instructional resources, governments ought to provide public schools with more funds. A better trained workforce is the result of a well-funded educational system. Government-sponsored initiatives that promote lifelong learning can aid employees in adjusting to shifting labor markets. This includes programs for adult education and vocational training that are financed by reallocating a portion of the money supply to these endeavors. Furthermore, increasing access to reasonably priced healthcare services guarantees that everyone may keep their health without facing financial hardship. A healthy workforce is essential for both productivity and economic stability. Increasing public investment on healthcare through modified money supply policies should be encouraged. Funding programs for preventative care can lower long-term medical expenses while enhancing population health in general. Priority should be given to programs that emphasize regular checkups, mental health care, and nutrition.

To make more money available to healthcare providers, central banks should reduce reserve requirements. Hospitals and clinics may be able to obtain loans for expansion projects or technology advancements that enhance patient care if there is more money available for lending. Lower reserve requirements make credit more accessible,

allowing existing and potential business owners to secure capital to launch ventures that support economic growth and employment creation. As workers adjust to shifting market needs, this entrepreneurial activity frequently results in the creation of new talents.

Governments ought to concentrate on creating strong health systems that deliver necessary services without being disrupted by instability or conflict. Once more, schools are frequently targeted in areas that are rife with terrorism or violence, which results in closures and lower enrollment rates. Political instability has caused severe disruptions in education in nations like Nigeria, keeping millions of children out of school. Political stability makes it possible to allocate funds more effectively for curriculum development, teacher preparation, and educational infrastructure. Long-term educational policies that support high-quality learning outcomes can be put into place by governments.

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