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## Empirical Analysis of Financial Deepening, Money Supply Velocity, and Human Development in Nigeria

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### Abstract

Depth of financial institutions and monetary flow velocity are critical elements in human development, for boosting monetary efficiency, investment, and availability of capital, driving enhanced living standards and sustainable human development. This study thus examines the impact of the organized financial sector and monetary expansion on human development in Nigeria, focusing on monetary flow velocity (MFV), Financial Deepening Index (FDI), and the Index of human development (IHD). Autoregressive Distributed Lag (A.R.D.L) model and Robust Least Squares regression (RLSR) analysis are employed, investigating both short and long term influence of institutional financial deepening and monetary flow velocity on human development. Results from analysis indicate that institutional financial deepening meaningfully enhances human development in the long run, signifying that a soundly organized financial sector provides backings for socio-economic progress. Furthermore, whereas the short-term effects of monetary flow velocity are minimal, long-term results demonstrate positive influences on IHD, underscoring the importance of efficient money circulation for sustainable development. However, lagged effects of both FDI and MFV reveal negative associations with IHD, indicating potential short-term challenges in financial sector deepening. With the result showing a 0.6886 R-squared value, the model demonstrates strong explanatory power for target variable. This study concludes that enhancing financial services and optimizing monetary velocity is crucial for promoting inclusive growth and improving human development for the country. In recommendations, stimulating inclusive financial services and prioritizing liquidity management is advocated to optimize human development.

**Keywords:** Economic development, Human development, Financial deepening, Money supply velocity, Financial intermediation.

## 1. Introduction

Deepening the financial system and effective intermediation are indispensable for human development, mostly in developing countries like Nigeria. The essence of deepening and effective intermediation is to increase availability and usage of financial services by individuals and institutions, leading to a more inclusive financial system. It entails all-round efficacies of banking, insurance, and pension services, as well as capital market expansion, which altogether contribute to better-quality financial intermediation and human development (Ajakaiye & Fakiyesi, 2009; Demirgüç-Kunt & Levine, 2008).

In Nigeria, the deepening of the financial system has been a major policy focus, with reforms by the apex regulatory body - Nigerian central Bank (CBN) aimed at instituting financial inclusion and stability. By mobilizing savings, efficiently allocating capital, and enabling investment, a deepened financial system can stimulate development across various sectors, ultimately improving human well-being (Beck et al., 2007).

Monetary flow velocity, the rate at which money circulates in the economy, is another key factor influencing economic activity. A higher velocity indicates more frequent transactions, suggesting robust economic activity, while a lower velocity reflects slower circulation and reduced economic engagement (Friedman, 1992). In Nigeria, understanding the link between monetary flow velocity and human development is crucial, especially given the country's need for efficient capital mobilization and diversification (Sanusi, 2012).

Despite reforms, Nigeria's financial system still faces challenges such as low financial inclusion, underdeveloped capital markets, and limited credit access for small and medium-sized enterprises (SMEs) (World Bank, 2019). Inefficiencies, including high transaction costs and weak infrastructure, hinder effective capital mobilization, slowing progress in human development (CBN, 2020).

Fluctuations in monetary flow velocity, driven by factors like inflation and monetary policy changes, also impact economic activity and growth (Sanusi, 2012). Low velocity often signals inefficient capital utilization, resulting in stagnant human development. This raises concerns about the effectiveness of monetary policy in fostering development within Nigeria's shallow financial system.

Therefore, this study investigates the impact of institutional financial deepening and monetary flow velocity on human development, using the Index of human development (IHD) as a proxy for economic progress. The following are specifically the objectives in focus, to:

1. Assess the influence of institutional financial deepening index on the Index of human development.
2. Evaluate the influence of monetary flow velocity on the Index of human development.

## 2. Literature Review

This section provides for in-depth review of existing relevant literature to this study. It is thus, partitioned in two main components: theoretical review, and empirical review respectively.

### 2.1. Underpinning Theories

This study examines the roles of monetary flow velocity and financial system depth in enhancing human development in Nigeria, drawing on Endogenous Growth Theory and Monetarist Theory as its theoretical foundation. These theories collectively offer a framework for analyzing how financial system depth and monetary flow velocity interact to influence human development outcomes in Nigeria.

**Endogenous Growth Theory:** Romer (1986) and Lucas (1988) assumed that economic progress is primarily of internal factors rather than external consequences. Its emphasis is on the roles of human capital investments, modernization, and information as strategic drivers. Financial system depth, by providing more efficient capital allocation and fostering innovation, can substantially add value to sustained economic progress and, by extension, human advancement.

In terms of its strength, the theory highlights the importance of financial development in fostering innovation and enhancing productivity, which can lead to improved human development. It provides a robust framework for understanding how financial systems can influence long-term economic progress through internal mechanisms like capital accumulation and knowledge spillovers.

In terms of its weaknesses, the theory overemphasized the role of internal factors, which potentially underestimates the impact of external shocks and global influences on a country's development. It assumes that markets are efficient and that the benefits of growth will be evenly distributed, which may not hold in practice, particularly in developing countries like Nigeria with significant inequality.

**Monetarist Theory:** Friedman (1956) and Schwartz (1963) posit that disparities in monetary velocity in the economy have substantial effects on economic activity both in the short and long term. The theory argues that controlling the money supply and its velocity is crucial for managing inflation and promoting stable economic progress, which can indirectly enhance human development.

Its strengths offer a clear understanding in the interconnectedness of monetary supply, inflationary pressure, and stability in the economy. Thus, it is vital for shaping effective monetary policies. It also provides a basis for examining how fluctuations in monetary flow velocity can impact economic activities and, subsequently, human development.

The weaknesses are that the theory tends to focus primarily on supply-side of the economy, potentially neglecting demand-side factors in influencing development outcomes. Also, it consistently assumes direct interconnectedness of monetary supply and economic progress, which may not always hold, particularly in economies with structural issues like Nigeria's. This can limit the theory's applicability to the complexities of human development.

### 2.2. Empirical Review

In Nzotta and Okereke (2009), interconnectedness of financial deepening and economic expansion was analyzed with data from 1986 to 2007. Using secondary data and a two-staged least-squares model, it was found that deepening of the financial system remained consistently low, with lending-rates, savings-ratio, cheques per GDP ratio, and banks per GDP ratio being significant variables. Their study concluded that Nigeria's financial system has not for the period under review, effectively facilitated

intermediation and recommended for regulatory framework restructuring. to improve risk-management and corporate-governance.

Ouandlous (2010) explored the capital markets roles in economic expansion, highlighting their importance for growth and the need for long-term strategies by government and private-sector alliances. The study emphasized that a supportive economic and political environment, along with regulatory clarity and strong legal infrastructure, is essential for the success of capital markets. The government's role in fostering investor confidence through sound policies is critical. The study recommended that governments implement policies that build trust and support capital market development.

Mayor (2019) conducted a comprehensive study on financial deepening in Nigeria from 1999 to 2017, using time series analysis to project future trends. The study concluded that the linear trend model was the best predictor of financial depth, projecting a 26.8% financial depth by 2022. This upward trajectory offers insights for policymakers and stakeholders in planning for sustainable economic development and financial stability in Nigeria.

Kaya (2020) explored the correlation between a country's income level and the complexity of its financial systems across 203 nations. The study found that higher-income countries generally have more sophisticated financial systems, especially among OECD members. However, non-OECD countries performed better on metrics like "Gross portfolio debt assets to GDP" and "Stock market value traded to GDP." The findings suggest that income level and OECD membership should be considered in policy measures addressing financial or economic crises.

James and Eloho (2020) examined the influence of deepened financial system and economic performance, focusing on metrics such as; money supply to GDP ratio, private-sector credit to GDP ratio, and gross national savings to GDP ratio. The study found that these factors positively influence economic development, with per capita income as an endogenous variable. It recommended increasing the money supply and improving capital market efficiency to boost economic development and investor confidence in Nigeria.

Godfrey and Agwu (2020) analyzed the interconnectedness of a deepened financial sector and capital market returns, using an error correction model. They found that loans to private sector negatively impacted returns, while money supply to GDP had a positive effect. The study recommended that Nigerian monetary authority should monitor the distribution of financial services and provide technical support to investors to boost market capitalization.

Ehiedu et al. (2022) examined the interconnectedness of deepened financial sector and Nigerian entrepreneurial progress, using data from 1986 to 2021. With the employment of metrics like Money Supply to GDP ratio and Private-sector credit to GDP ratio, the study found both positive and negative impacts of financial deepening on entrepreneurship. The study recommended strategic policies to encourage banks and venture capital firms to better support entrepreneurial development.

Shahbaz et al. (2022) used a three-threshold autoregressive distributed lags (TARDL) model in exploring asymmetric effects of a developed financial system on economic progress in top 10 financially developed nations of the world. Their findings indicated

that financial expansion positively impacted progress in countries like Singapore, Australia, and the US while impeding it in others like Malaysia. Their study highlighted the multifaceted dynamic forces existing among financial expansion and economic progress.

Ajudua and Odishika (2022) investigated effect of financial depth on Nigeria's economic progress, using data from 1986 to 2020. A.R.D.L model and Error Correction Mechanism were employed in the analysis of data. They found that lending rates and private-sector credit had no substantial effect, while money supply, market capitalization, and liquid liabilities positively influenced growth. The study recommended adjusting interest and lending rates to boost savings and investment.

Oji et al. (2022) analyzed long-term association of financial depth and Nigerian economic progress, using data from 1981 to 2020. Various econometric techniques were employed, and they found that the equities market had a tremendous influence on GDP. They recommended that government and financial institutions should jointly ensure enhanced credit facilities, upgrade infrastructure, and increase loan availability to support entrepreneurship and its attendant economic progress.

Hassan (2023) investigated the influence of financial deepening on Iraq's economic progress from 2004 to 2021. A long-term equilibrium was found in existing correlation of financial depth and economic Progress, with certain indicators like trading volume and stock turnover rate negatively impacting growth, while liquidity ratio and private sector credit had positive effects.

Singh et al. (2023) analyzed financial deepening's effect on economic volatility of Sub Saharan Africa countries using data from 1982 to 2019. Broad money was found to increase volatility, while domestic credit reduced it. The study recommended enhancing financial inclusion and credit availability to stabilize economic progress.

Mboto et al. (2023) examined financial deepening's impact on Nigerian exchange rate volatility, using data from 1990 to 2019. It was revealed that financial depth indicators like monetary flow velocity and market capitalization to GDP had a non-significant effect on exchange rate stability.

Agada and Ekadi (2023) studied the influence of bank regulations on financial deepening in Nigeria from 2001 to 2022. The research found that bank regulations significantly affect financial deepening and suggested easing regulations to encourage lending to the private sector.

Patrick (2023) explored the interconnectedness of Nigerian foreign direct investment (FDI) and financial deepening, with data from 1980 to 2022. It was found that FDI had significant long- and short-term effects on financial deepening, with implications for policymakers and investors.

Shan & Liu (2023) highlighted the relationship between China's digital economy and financial depth in the country. It was found that the country's financial depth enhances technical innovation, fostering digital economic progress, particularly in western and central regions of the country.

Biyase and Chisadza (2023) examined the link between financial deepening and income inequality in South Africa from 1980 to 2017. Initially, financial deepening increased inequality, but over time, the relationship inverted, reducing inequality as the financial sector matured.



Okwuosa and Ifeosame (2023) analyzed the impact of financial deepening on commercial bank performance in Nigeria from 2000 to 2022. It was found that a long term relationship exists between the country's financial depth and bank performance, recommending banks to expand their financial services.

Wachukwu et al. (2023) explored on the existing interconnectedness of financial sector depth and Nigeria's economic progress, using data from 1960 to 2021. It highlighted significant economic improvement in financial sector credit but also noted volatility in financial market capitalization, reflecting instability in the sector.

Jacob et al. (2023) investigated the formal financial sector's influence on financial deepening in Nigeria from 2012Q1 to 2022Q3. The study found that the expansion of banks and insurance significantly impacted financial deepening, suggesting enhanced regulatory and technological investments.

### 3. Methodology

This section details the quantitative approach used to examine the relationship between financial deepening and economic development in Nigeria. The study utilizes secondary time series data and applies econometric models in analyzing the influence of financial deepening indicators on the Index of human development (IHD). Key aspects of the research design, data sources, and analytical techniques are outlined to provide a concise overview of the study's methodology.

#### 3.1. Research Design

This study adopts a quantitative research design, utilizing secondary time series data to explore on relationship between financial deepening, monetary flow velocity, and human development in Nigeria. The design is structured to facilitate empirical analysis of the impact of various financial deepening indicators on the Index of human development (IHD), which serves as a proxy for economic development. The study spans a significant period, covering several decades, to ensure robust analysis and findings.

#### 3.2. Data Sources

Data used for analysis in this research are primarily from trustworthy institutions, like Nigerian monetary authority (CBN), Program for Development of the United Nations - UNDP, and Federal Reserve Economic Data (FRED). The key variables include:

**Financial Deepening Index:** This captures the depth of the financial system in Nigeria, including indicators such as market depth, bank depth, insurance depth, and pension depth. The data are sourced from CBN and FRED databases.

**Monetary flow velocity:** A measure of the frequency at which money circulates within the economy. Data on money supply and velocity are obtained from the CBN database, providing insights into the monetary dynamics within the financial system.

**Index of human development (IHD):** Sourced from UNDP reports, the IHD is used as a proxy for economic development. It encompasses key dimensions like life expectancy, education mean and expected years, and levels of income per capita, offering a comprehensive view of human well-being. The dataset spans 17 years and is structured to facilitate time series analysis, allowing for the examination of trends and patterns in the relationship between financial depth, monetary flow velocity and human advancement in the country - Nigeria.

#### 3.3. Analytical Techniques

The study employs various econometric techniques to analyze the relationships amidst financial depth indicators and the Index of human development. The following methods are used:

**Descriptive Statistics:** Initially, descriptive statistics are used to summarize the key characteristics of the data, providing an overview of the distribution, central tendencies, and variability of the variables.

**Tests of Stationarity:** This helps to ensure the reliability of the time series data, stationarity tests such as the Augmented Dickey-Fuller (ADF) test are conducted to check for unit roots. This step is crucial to avoid spurious regression results and ensure valid inferences.

**Tests of Correlation:** Pearson correlation analysis is employed to examine the strength and direction of the linear relationships between the financial deepening indicators and IHD. This provides preliminary insights into the associations between the variables.

**Regression Analysis:** The study utilizes regression models to quantify the impact of financial deepening on economic development. Specifically, Auto-regressive Distributed Lag (A.R.D.L) model is employed due to its suitability for analyzing relationships among variables that are integrated at different orders i.e., at level and order-1. The ARDL model facilitates the estimation of both short and long term financial deepening influence on economic expansion.

**Test of Error Correction:** Following the A.R.D.L estimation, an ECM is used to quantify the speed of adjustment to equilibrium resulting from short-term shocks amidst Nigerian financial depth and economic advancement.

**Granger Causality Tests:** To assess the direction of causality between the variables, Granger causality tests are conducted. This technique helps determine whether financial deepening drives economic development or vice versa.

The combination of these analytical techniques ensures a comprehensive examination of the dynamic relationships between financial deepening and economic development in Nigeria, offering both short-term and long-term perspectives on the impact of financial sector growth on human development.

## 4. Results and Discussion

Table 4.1.1 Descriptive Statistics

	MFV	FDI	IHD
Mean	0.551218	0.384212	0.513288
Median	0.643791	0.290726	0.516149
Maximum	1.017230	0.989456	0.547887

Minimum	0.000000	0.154201	0.479000
Std. Dev.	0.277937	0.199302	0.022467
Skewness	-0.507167	1.648433	-0.134994
Kurtosis	2.433028	3.671508	1.510838
Jarque-Bera	1.912967	25.50889	3.244872
Probability	0.384242	0.000003	0.197417
Sum	18.74143	13.06320	17.45180
Sum Sq. Dev.	2.549211	1.310807	0.016657
Observations	34	34	34

Source: Eviews10 excerpt, 2024

Table 4.1.2 presents the descriptive statistics for Broad Monetary flow velocity (MFV), Financial Deepening Index (FDI), and Index of human development (IHD) based on 34 observations. The table includes key metrics such as mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque-Bera statistics, and probabilities. These statistics provide an overview of the distribution and variability of the data across the study period.

**Table 4.1.3: Covariance and Correlational Matrix**

Covariance			
Correlation	MFV	FDI	IHD
BMFV	0.074977		
	1.000000		
FDI	-0.013603	0.038553	
	-0.253006	1.000000	
IHD	0.003959	-0.000871	0.000490
	0.653165	-0.200496	1.000000

Source: Eviews10 excerpt, 2024

Table 4.1.3 presents the covariance and correlation analysis for Broad Monetary flow velocity (MFV), Financial Deepening Index (FDI), and Index of human development (IHD). Covariance measures the directional relationship between the variables, while correlation reflects the strength and direction of their linear relationship. The diagonal elements in the covariance matrix represent the variance of each variable. Correlation coefficients of 1 indicate a perfect positive relationship, while negative values suggest an inverse relationship. Values near zero indicate little to no linear relationship.

**Table 4.1.4 Unit root @ level**

Table with 3 columns: Method, Statistic, Prob.\*\*

Method	Statistic	Prob.**		
ADF - Fisher Chi-square	20.2289	0.0025		
ADF - Choi Z-stat	-2.98750	0.0014		
Intermediate ADF test results UNTITLED				
Series	Prob.	Lag	Max Lag	Obs
BMFV	0.0044**	5	7	28
FDI	0.0531	1	7	32
IHD	0.1743	2	7	31

Source: Eviews10 excerpt, 2024

Table 4.1.4 presents the unit root test results for Broad Monetary flow velocity (BMFV), Financial Deepening Index (FDI), and Index of human development (IHD) at the level. The ADF - Fisher Chi-square and ADF - Choi Z-statistics indicate that Broad Monetary flow velocity (BMFV) is stationary at a level with a significant p-value of 0.0044. In contrast, the Financial Deepening Index (FDI) and Index of human development (IHD) are not stationary at the level, with p-values of 0.0531 and 0.1743, respectively.

**Table 4.1.5 Unit root @ First Difference**

Method			Statistic	Prob.**
ADF - Fisher Chi-square			46.7502	0.0000
ADF - Choi Z-stat			-5.78028	0.0000
Intermediate ADF test results in D (UNTITLED)				
Series	Prob.	Lag	Max Lag	Obs
D(BMFV)	0.0003	5	7	27
D(FDI)	0.0002	1	7	31
D(IHD)	0.0012	0	7	32

Source: Eviews10 excerpt, 2024

Table 4.1.5 shows the results of the unit root tests at the first difference level for Monetary flow velocity (MFV), Financial Deepening Index (FDI), and Index of human development (IHD). The ADF - Fisher Chi-square and ADF - Choi Z-statistics demonstrate that all three series are stationary at the first difference, with significant p-values of 0.0003 for D(BMFV), 0.0002 for D(FDI), and 0.0012 for D(IHD).

**Table 4.1.6 Lag Length Criteria**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	88.02188	NA	6.93e-07	-5.668126	-5.528006	-5.623300
1	159.0028	123.0336*	1.12e-08*	-9.800187*	-9.239708*	-9.620885*
2	164.9852	9.172958	1.40e-08	-9.599011	-8.618173	-9.285232
3	172.8035	10.42444	1.59e-08	-9.520233	-8.119036	-9.071978
4	181.3539	9.690454	1.82e-08	-9.490260	-7.668703	-8.907528

Source: Eviews10 excerpt, 2024

Table 4.1.6 presents the lag length criteria for model selection based on various information criteria. The table includes the Log-Likelihood (LogL), Likelihood Ratio (LR) test statistic, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ) for lag lengths ranging from 0 to 4. The optimal lag length is indicated by the asterisks, with the values showing that a lag length of 1 is preferred based on the lowest AIC and FPE, as well as the highest LR statistic.

**Table 4.1.7 Summary of ARDL Estimation (IHD as DV)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
IHD(-1)	0.984791	0.029199	33.72707	0.0000
FDI	0.000710	0.002885	0.246254	0.8073
FDI(-1)	-0.001830	0.002933	-0.623994	0.5379
MVS	0.003435	0.002581	1.331049	0.1943
MFV(-1)	-0.002402	0.002542	-0.944745	0.3532
C	0.009653	0.014141	0.682604	0.5007
R-squared	0.987510			
Adjusted R-squared	0.985197			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	1.926862			

Source: Eviews10 excerpt, 2024

Table 4.1.7 summarizes the ARDL estimation results with IHD as the dependent variable. The coefficient for IHD(-1) is 0.9848 and highly significant ( $p < 0.0001$ ), indicating a strong positive effect of past IHD on current IHD. Both FDI and FDI(-1) coefficients are statistically insignificant, with p-values of 0.8073 and 0.5379, respectively. The coefficients for MFV and MFV(-1), representing current and lagged Broad Monetary flow velocity, are also statistically insignificant, with p-values of 0.1943 and 0.3532. The constant term (C) has an insignificant coefficient ( $p = 0.5007$ ). The model exhibits a high R-squared value of 0.9875 and an Adjusted R-squared of 0.9852, a highly significant F-statistic ( $p < 0.0001$ ), and a Durbin-Watson statistic of 1.9269, indicating no significant autocorrelation.

**Table 4.1.8 The F- and t-Bounds Test**

F-Bounds Test		Null Hypothesis: No levels of relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	0.149067	10%	3.17	4.14
K	2	5%	3.79	4.85
		2.5%	4.41	5.52
		1%	5.15	6.36
t-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-0.693057	10%	-2.57	-3.21
		5%	-2.86	-3.53
		2.5%	-3.13	-3.8
		1%	-3.43	-4.1

Source: Eviews10 excerpt, 2024

Table 4.1.8 presents the F- and t-Bounds test results for assessing the long-run relationship. The F-statistic value of 0.1491 is below the critical values for both I(0) and I(1) at all significance levels, indicating no evidence of a long-run relationship. For the t-statistic, the value of -0.6931 is also above the critical values for I(1) at all significance levels, further supporting the absence of a long-run relationship. Thus, both tests suggest that there is no significant long-run relationship between the variables at the specified levels of significance.

**Table 4.1.9 Variance Inflation Factors (Multicollinearity)**

	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
IHD(-1)	0.000853	1034.987	1.840353
FDI	8.32E-06	6.951185	1.470208
FDI(-1)	8.60E-06	7.395085	1.575292
MFV	6.66E-06	12.00641	2.084521
MFV(-1)	6.46E-06	10.80384	2.145023
C	0.000200	923.5644	NA

Source: Eviews10 excerpt, 2024

Table 4.1.9 shows the Variance Inflation Factors (VIF) for the variables used in the model. The IHD(-1) variable has a centered VIF of 1.8404, suggesting a low to moderate correlation with other predictors. FDI and FDI(-1) have centered VIFs of 1.4702 and 1.5753, respectively, also indicating low multicollinearity. BMFV and MFV(-1) have slightly higher centered VIFs of 2.0845 and 2.1450, but these values still indicate an acceptable level of multicollinearity. The constant term (C) does not have a centered VIF as it is not subject to the same analysis.

**Table 4.1.10: Serial Correlation LM Test:**

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.228204	Prob. F(1,26)	0.6369
Obs*R-squared	0.287123	Prob. Chi-Square(1)	0.5921

Source: Eviews10 excerpt, 2024

Table 4.1.10 is the Breusch-Godfrey Serial Correlation LM Test results showing no evidence of serial correlation in the model's residuals. Both the F-statistic (0.2282,  $p = 0.6369$ ) and the Obs\*R-squared (0.2871,  $p = 0.5921$ ) indicate that the null hypothesis of no serial correlation cannot be rejected, confirming that the model is free from autocorrelation issues.

**Table 4.1.11: Heteroskedasticity Test**

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.238068	Prob. F(5,27)	0.9422

Obs*R-squared	1.393426	Prob. Chi-Square(5)	0.9250
Scaled explained SS	1.039335	Prob. Chi-Square(5)	0.9593

Source: Eviews10 excerpt, 2024

The Breusch-Pagan-Godfrey test results indicate no evidence of heteroskedasticity in the model. The F-statistic is 0.238, with a corresponding p-value of 0.9422, suggesting that the null hypothesis of homoscedasticity cannot be rejected. Similarly, the Obs\*R-squared value is 1.393, with a p-value of 0.9250, and the scaled explained sum of squares is 1.039, with a p-value of 0.9593. All results confirm that the residuals are likely homoscedastic.

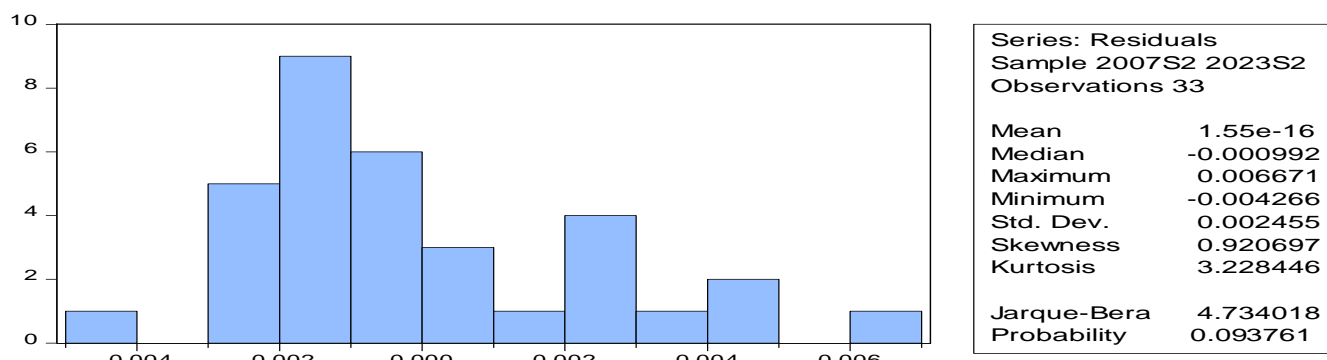
**Table 4.1.12: Robust Least Squares Estimation**

Variable	Coefficient	Std. Error	z-Statistic	Prob.
IHD(-1)	0.979656	0.014551	67.32752	0.0000
FDI	0.007399	0.001438	5.146986	0.0000
FDI(-1)	-0.008696	0.001462	-5.949132	0.0000
MFV	0.004261	0.001286	3.313334	0.0009
MFV(-1)	-0.004496	0.001267	-3.548910	0.0004
C	0.011997	0.007047	1.702358	0.0887
Robust Statistics				
R-squared	0.688578	Adjusted R-squared		0.630907
Rw-squared	0.998346	Adjust Rw-squared		0.998346
Akaike info criterion	77.83536	Schwarz criterion		91.71814
Deviance	7.11E-05	Scale		0.001003
Rn-squared statistic	8459.551	Prob(Rn-squared stat.)		0.000000
Non-robust Statistics				
Mean dependent var	0.514327	S.D. dependent var		0.021970
S.E. of regression	0.003239	Sum squared resid		0.000283

Source: Eviews10 excerpt, 2024

Table 4.1.12 shows key Findings from robust Least Squares regression analysis which reveals a significant positive coefficient for IHD(-1) (0.9797,  $p < 0.0001$ ), indicating strong persistence. Foreign Direct Investment (FDI) positively impacts IHD (0.0074,  $p < 0.0001$ ), while lagged FDI negatively affects it (-0.0087,  $p < 0.0001$ ). Monetary flow velocity (MFV) also has a positive effect (0.0043,  $p < 0.001$ ), but lagged MFV shows a negative coefficient (-0.0045,  $p < 0.001$ ). The model has a robust fit, with an R-squared of 0.6886 and an adjusted R-squared of 0.6309, indicating that approximately 63.09% of the variance in IHD is explained by the independent variables.

**Fig. 1: Normality Histogram**

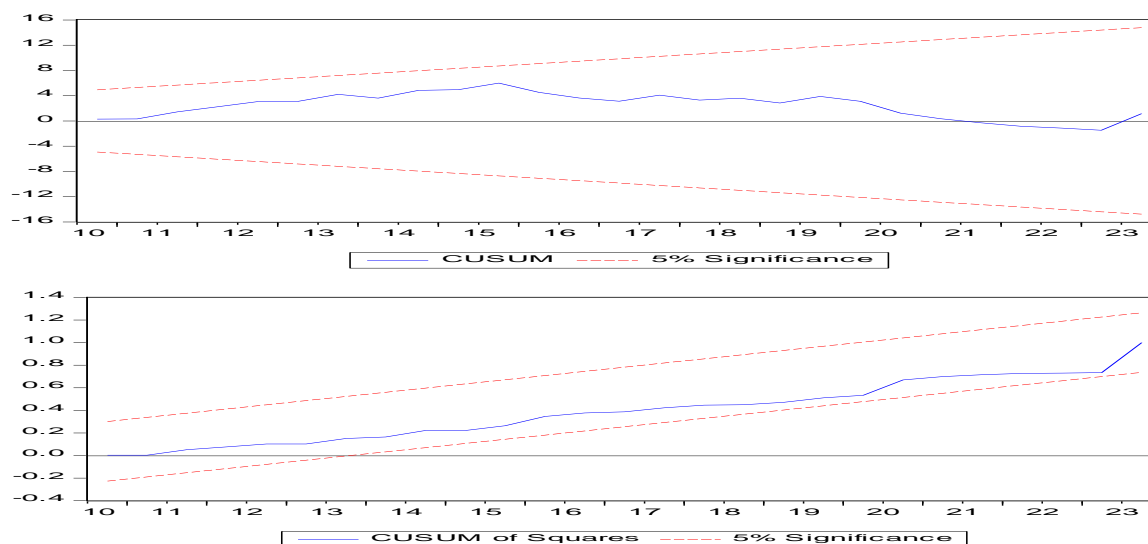


Source: Eviews10 excerpt, 2024

Figure 1 presents the histogram of residuals from the estimated model for the sample period from 2007 to 2023. The distribution of residuals appears approximately normal, as indicated by the relatively symmetric shape around zero. The Jarque-Bera statistic is 4.73 with a probability of 0.09376, indicating that the residuals do not significantly deviate from a normal distribution at the 5% level. This normality supports the validity of the model assumptions regarding residual distribution.



**Figure 2 (A & B): CUSUM and CUSUM of Square Test**



Source: Eviews10 excerpt, 2024

Fig 2 A and B are the CUSUM and CUSUM of Squares tests. Both fall within the lower and upper bounds, indicating model stability. The CUSUM starts at zero, rises slightly, and ends just below zero, suggesting minor deviations. Conversely, the CUSUM of Squares consistently rises from zero, indicating stable variance. Overall, while the model is generally stable, the CUSUM's final position raises some concerns.

#### 4.2. Discussion of Findings

The study's descriptive statistics indicate moderate variability in Monetary Flow Velocity (MFV), Financial Deepening Index (FDI), and the Index of Human Development (IHD), with FDI showing a right-skewed distribution, while MFV and IHD are near-normal. ARDL estimation reveals that past levels of IHD significantly influence current IHD, while short-term effects of FDI and MFV on IHD are not significant. However, the Robust Least Squares analysis shows that both FDI and MFV positively impact IHD in the long run, despite their lagged values having negative effects. With an R-squared of 0.6886, the model demonstrates that financial deepening and monetary flow velocity are important contributors to human development, though short-term adjustments may introduce complexities. Hypothesis tests reject the null hypotheses, confirming that financial deepening significantly enhances human development and that MFV, while not impactful in the short term, plays a vital role in fostering long-term human development.

## 5. Summary, Conclusion and Recommendation

This study examined the role of the organized financial sector in enhancing human development in Nigeria, focusing on the impacts of financial deepening and monetary flow velocity. The analysis using ARDL and Robust Least Squares regression revealed that financial deepening significantly contributes to long-term improvements in human development, while efficient money supply circulation also positively influences development over time. However, short-term negative effects of lagged financial deepening and money flow suggest transitional challenges during financial sector expansion. The findings emphasize the importance of a sustainable and inclusive financial system for fostering human development. To address these, it is recommended that Nigeria

promotes financial inclusion through accessible banking, insurance, and digital payment systems, particularly for underserved populations. Furthermore, liquidity management should be optimized through flexible monetary policies that align money supply growth with economic activities, ensuring efficient circulation to support sustainable economic and human development.

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