Banking, Money Supply and Economic Growth: An Empirical Analysis from Nigeria

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ABSTRACT

Purpose
This study explores the relationships between banking, money supply, and economic growth through an empirical analysis of Nigeria.

Methodology
Data from 1986 to 2021was gathered from the World Development Indicators and analyzed using the Auto-Regressive Distributed Lag model. The variables considered in this research include money supply, banking, and economic growth.

Findings
The results demonstrate that economic growth is consistent with different variables employed. Remarkably, outstanding deposits at commercial banks (OuD) also positively affected GDP, also in the long run, a rise in OuD by a percentage led to a 23.92% GDP increase. This indicates that, on average, OuD has a considerable long-term effect on GDP. Additionally, RcR has a direct impact on economic growth, the long-run results showed that the OuL had a positive effect on GDP irrespective of the country region. Initially, it was found that they positively contributed to economic growth, which in turn justifies the purpose of the banking system, as well as supports the intermediation theory of banking.

Conclusion
According to this study, based on the ARDL model, the role of the money supply in economic growth cannot be overstated. Additionally, the disequilibrium correction terms demonstrate that Nigeria is trending toward growth targeting, one of the country's main economic goals, albeit at a slower pace.

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1. Introduction

Government, banks, investors, worldwide communities, and organizations (both governmental and nongovernmental) all receive vital information about economic growth (Abass et al., 2014; Abdul Raziq et al., 2003). This data contains the GDP per capita, the size of the economy, and its growth rate. For this reason, academics and researchers have started to explore the connection amid economic growth and the variables that influence whether it succeeds or fails. The money supply and bank are two of these variables (Bakang, 2015; Central Bank of Nigeria [CBN], 2021). The connection amid the broad money supply (BrS) and economic growth is supported by theory. According to the Keynesian Theory of Growth, shifts in the money supply can increase bond prices, decrease interest rates, increase investment, and increase output, all of which influence the equilibrium values of output and employment (Chude & Chude, 2016).

It is important that the quantity theory of money, which influenced the classical theory of inflation, said that changes in the money supply might either raise or drop prices. This demonstrates that there won't be any inflation if money growth keeps pace with improvements in real GDP (Chuku, 2015). Other academics have also shared their opinions about the connection linking the money supply and economic expansion. Cordelia (2019) believes that a decrease in money supply through an increase in interest rates would result in a decrease in GDP. This claim, is also the opinion of some economists (El-Seoud, 2014) and asserted that disparities in the quantity of money supply are the utmost momentous determinant of GDP and that nations. There are very few countries with poor economic performance that have spent more effort researching the dynamics of the total money supply. Steve and Domingo, positive economic growth might not occur in the absence of suitable financial circumstances. Emmanuel et al., (2015) holds that the money supply has an impact on economic growth. Regarding the impact of money supply on economic growth, economists differ (Engle & Granger, 1987).

Some argue that variations in the money supply are the primary drivers of GDP and that nations that focus more on analyzing the behavior of the money supply seldom see significant changes in their economic activity. Some people have doubts regarding the importance of money or GDP (Laidler, 1993). By utilizing the customary Hicksian IS-LM investigation, the security of the cash financial development relationship will show the viability of financial approach (Hussein, 2005).

Besides, money related arrangement alludes to the deliberate advances taken by the public authority, through the National Bank of Nigeria (CBN), as the financial power, to control the degree of monetary movement to advance cost soundness, financial development, and even speculation for occupations (Inam, 2014). These activities incorporate the utilization of loan costs, credit bearings, cash supply, and different variables. In any case, beginning in 1987, the pace of currency market liberation changed, prompting changes in financial strategy, particularly the accentuation on additional reluctant and powerful systems (Mukhtar & Muhammad, 2017). Starting there on, the essential objective of financial strategy was to hold cash back from turning into a huge wellspring of monetary precariousness. In addition to other things, unreasonable money related development is balancing out security.

Basically, the relationships amid BrS, banking systems, and economic growth determine how strong a country's financial system is. Every nation has a different link between GDP and money supply (Hussain & Haque, 2017). As an aggregate hypothesis, money related hypothesis spreads the idea that legislatures might accomplish financial security through

financial stock guidelines. It implies that one of the primary factors influencing an economy's growth is the aggregate sum of cash available for use inside it. The cash supply of a country is the whole measure of cash available for use, including money and bank stores. Both overall economic activity and inflation are strongly influenced by the money supply. When financial institutions employ hedging techniques, they run the danger of basis risk, sometimes referred to as residual risk. This risk is one of the main reasons that prudent monetary policy is necessary to maintain financial stability.

Modugu & Dempere (2022) an expansionary financial strategy, for example, collecting the cash supply, energizes bank loaning, which in turn promotes economic growth. Numerous studies that focus on a single economy have been done previously (Arfanuzzaman (2014) in Bangladesh; Ahmed & Suliman, 2011) on Sudan) to evaluate the connection between BrS and economic growth. According to the author's understanding, only a few studies utilizing ARDL that cover the years 1986–2022 have examined the money supply, banking, and economic growth involving Nigeria. Even though there is a wealth of literature on the connections between the money supply, economic expansion, and the banking system, further research on the topic is always needed to add to the body of knowledge already available. The study exhibits uniqueness when considering the research scope and methods employed. In addition to financial soundness, another area that is anticipated to yield many findings is the interaction and dynamics between economic growth and banking variables. The study exhibits uniqueness when considering the research scope and methods employed. In addition to financial soundness, another area of the study that is anticipated to yield many findings is the interaction and dynamics between economic growth and banking variables.

2. Literature Review

Numerous studies have previously examined the relationship between GDP and money supply for a particular nation (Arfanuzzaman, 2014; Hussain et al., 2017; Modugu et al., 2022). Previous research has demonstrated interactions between financial and economic variables (Qamruzzaman, 2014; Salina et al., 2021). Mishkin (1999) tackled two important concerns in his review as the principal administrator of global monetary instability: the definition of financial instability and its potential harm to the economy. The report concluded by summarizing significant policy concerns and used the latest monetary crises in East Asia and Mexico as specific illustrations.

In 2006, Allen and Wood conducted a study on four developed countries: Australia, Japan, the United States, and Germany. The study's objectives were to define financial stability and provide a means of characterizing periods of financial instability. It is believed that under a stable financial situation, such instability is less likely to arise. The study looked at the methods used by governments to establish stability, determine corrective and preventive measures, and assess the advantages and disadvantages of each. Hussain et al. (2017) and Ahmed et al. (2011) investigated the connection between GDP and money supply. Although the money supply and GDP were not shown to be causally related, it was concluded that the series were co-integrated.

Broad money was employed as a variable by Hussain et al. (2017) to determine its long- and short-term effects on Nigeria's GDP growth rate. Arfanuzzaman (2014) discovered a causal relationship between GDP and broad money. The relationship between monetary and financial stability and their pro-cyclicity was examined by Granville, Mallick, and Stone (2009). Using quarterly data (1994–2008), they investigated what expansion shocks meant for share costs, loan fee spreads, and monetary dependability in the Eurozone. The

researchers discovered a long-term pro-cyclical relationship between financial and monetary stability, highlighting the need for monetary stability as a prerequisite for financial stability. In their investigation of the flow of monetary pressure from established to emerging economies, Balakrishnan, Danninger, Elekdag, and Tytell (2011) discovered that previous financial crises had a profound and immediate effect on emerging economies. Valencia (2014) noted that the banking incentives might be made worse or better by lowering monetary policy rates subject to equity financing. Peek et al. (2016) examined the connection between US financial stability and monetary policy. They offered a straightforward model that incorporates financial instability into the monetary policy's utility function. Their results demonstrated the significance of considering financial stability when determining monetary policy.

Tong (2017) examined 257 institutions from 26 different countries in his study to determine how US monetary policy affects global bank risk-taking. Haddad and Hakim (2017) noted that the Gulf Cooperation Council (GCC) countries went through an economic downturn during the global financial crisis, characterized by falling share prices, bank credit restrictions, stopped GDP growth, ballooning sovereign bond spreads, and heightened risk aversion. Elsayed and Yarovaya (2019) investigated how the financial stress indices in eight MENA countries were impacted by the volatility of the Arab Spring.

It was found that increased central bank transparency and accountability boosted the resilience of the banking industry and external capital inflows (Akanksha et al., 2022; Nasreen & Anwar, 2019). In their research, Wang, Zeng, and Hu (2022) examined China's role in maintaining financial stability throughout the 21st-century financial crisis through monetary policy. In their investigation into how banks' decisions affect stability during turbulent times, Nguyen, Phan, and Dao (2023) found that diversifying into non-interest earnings might increase riskiness. The quantity theory of money states that the amount of money in a country is directly correlated with its level of economic activity. When velocity is assumed to be constant (Jahan & Papageorgiou, 2014), the money supply is determined by the GDP of the nation. Additionally, the quantity theory suggests that a rise in the money supply will have a short-term impact on GDP (real production). Long-term testing of this idea is the goal of research. As a result, it is suggested that the null hypothesis (H1) for each of the three sample countries be investigated: H1: GDP is unaffected by the money supply (Jahan et al., 2014).

3. Methodology

This research is based on the core concepts and significant sources of the theories of money supply, credit creation, and financial intermediation. The objective of the study is to comprehend the interplay between money supply, banking, and economic growth. Determining if one variable has a considerable influence over another is essential. Managers and policymakers will undoubtedly benefit from this insight as they create successful corporate strategies and policies.

To evaluate the robustness and susceptibilities of the member nations' financial systems, the International Monetary Fund (IMF) releases financial soundness indices. Additionally, the World Bank releases data for its member nations on many characteristics. These two databases provided the sample data that was taken out and used in the investigation.

In order to verify the integration order and identify the long-term relationship between the variables, the study employed the Autoregressive Distributed Lag (ARDL) bounds testing technique as outlined in Pesaran et al. (2001). This approach has a number of benefits over

earlier cointegration methods. For example, it could be used for mixed integration orders with tiny sample sizes. Additionally, by using the proper lag in the model architecture, endogeneity issues can be resolved. The ARDL bounds testing method was estimated using an infinite error correction model.

$$Gdp = (OuD, OuL, BrS, RcR) \quad (1)$$

$$Gdp = \emptyset_1 + \emptyset_2 OuD + \emptyset_3 OuL + \emptyset_4 BrS + \emptyset_4 RcR + \mu \quad (2)$$

$$\Delta Gdp = \emptyset_0 + \sum_{m=1}^{J} . \emptyset_{1m} \Delta Gdp_{.t-n} + \sum_{m=1}^{J} . \emptyset_{1m} \Delta OuD_{.t-n} + \sum_{m=0}^{J} . \emptyset_{2m} \Delta OuL_{.t-n} + \sum_{m=0}^{J} . \emptyset_{4m} \Delta BrS_{.t-n} + \sum_{m=0}^{J} . \emptyset_{5m} \Delta RcR_{.t-n} + \partial_1 Gdp_{t-1} + \partial_2 OuD_{t-1} + \partial_3 OuL_{t-1} + \partial_4 BrS_{t-1} + \partial_5 RcR_{t-1} + \mu \quad (3)$$

$$\Delta Gdp = \emptyset_0 + \sum_{m=1}^{J} . \emptyset_{1m} \Delta Gdp_{.t-n} + \sum_{m=1}^{J} . \emptyset_{1m} \Delta OuD_{.t-n} + \sum_{m=0}^{J} . \emptyset_{2m} \Delta OuL_{.t-n} + \sum_{m=0}^{J} . \emptyset_{4m} \Delta BrS_{.t-n} + \sum_{m=0}^{J} . \emptyset_{5m} \Delta RcR_{.t-n} + \partial_1 Gdp_{t-1} + \partial_2 OuD_{t-1} + \partial_3 OuL_{t-1} + \partial_4 BrS_{t-1} + \partial_5 RcR_{t-1} + \in ECT_{t-1} + \in_t \quad (4)$$

The ECM states that the dynamics of the adjustment process leading to the long-term equilibrium are accurately represented in the short term by the error correction term (Engle & Granger, 1987; Banerjee et al., 1993). The ECM coefficient, denoted by ξ, measures the pace at which the long-term equilibrium is being reached. It is expected to be less than one and negative, with a larger magnitude denoting a quicker correction process. Furthermore, we utilized the time-varying exogeneity causality test, which allows us to monitor changes in causal relationships over time. This tactic outperforms alternative methods for two reasons. It accomplishes this by first eliminating the need to perform a unit root test in order to confirm the stationarity of the variable (Toda & Yamamoto, 1995). Secondly, cointegration tests between the variables are not necessary (Granger, 1988).

4. Results and Discussions

4.1. ADF and DF Unit Root Testing

Unit root testing is utilized to ascertain the stationarity of variables or the presence of a unit root. Economic variables are generally stochastic processes that lack stability. A simple combination of non-fixed series constitutes a non-stationary series that is closely associated with economic theory. This research employs the Dickey-Fuller and Augmented Dickey-Fuller tests. The unit root test was employed to assess the time series properties of the data. The unit root test indicates that the variables are stationary at I(0) and I(1).

Table.1.Unit Root Testing @ I(0) and I(1)

		ADF (H_0)				DF (H_0)			
		DF_α				ERS_α			
$z_{.t}$		$\tau_{.\mu}$	1%	5%	Prob.	τ_τ	1%	5%	Prob.
Intercept without Time Trend	GDP	3.74	4.19	1.27	0.25	0.52	6.47	4.87	0.62
	OuD	0.49	1.69	4.85	0.21	0.28	1.94	5.78	0.65
	OuL	4.57	5.52	1.93	0.06	4.92	4.38	4.74	0.05
	BrS	5.95	3.79	5.81	0.83	0.58	6.75	4.25	0.36
	RcR	1.68	1.86	3.35	0.84	4.27	2.92	3.59	0.79
	ΔGDP	5.29	4.71	1.99	0.00	5.17	5.35	2.74	0.09
	ΔOuD	4.66	1.62	3.47	0.00	6.28	1.42	2.13	0.04
	ΔOuL	2.18	4.29	3.20	0.00	1.69	5.17	1.81	0.00
	ΔBrS	5.92	1.21	6.14	0.00	5.51	3.73	4.16	0.00
	ΔRcR	5.28	4.72	6.39	0.60	5.09	5.26	3.62	0.00
Intercept with Time Trend	Gdp	2.35	5.39	5.42	0.00	3.35	4.21	5.73	0.00
	OuD	6.12	5.22	3.49	0.31	1.64	4.11	5.38	0.00
	OuL	1.89	4.15	4.32	0.00	3.46	6.17	5.49	0.00
	BrS	5.53	6.82	2.32	0.00	4.44	5.12	1.34	0.00
	RcR	3.43	1.82	3.29	0.00	5.12	4.39	6.26	0.00
	ΔGdp	4.16	4.37	5.63	0.00	5.61	3.44	4.19	0.00
	ΔOuD	6.31	2.11	3.68	0.00	3.07	5.27	3.74	0.00
	ΔOuL	3.45	1.39	3.18	0.00	2.27	6.47	5.99	0.00
	ΔBrS	5.92	3.39	4.33	0.00	2.47	6.72	7.17	0.00
	ΔRcR	3.61	5.39	5.94	0.00	5.13	3.95	5.98	0.00

Source: Author's own elaboration

The null hypothesis of no cointegration may be rejected based on Table 2 since the calculated F-statistic 5.71 is higher than the Upper Bound table value at both the 5% and 1% levels, indicating a long-term link between the variables. The outcome shows that we can go on to the established model's short- and long-term analyses.

Table.2.ARDL Bound Testing

Test Statistic	**Value**	**K**
F-statistic	5.714896	4
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's own elaboration

4.2. ARDL Long-run Estimation

According to Table 3, OuD eventually had a favorable effect on GdP. Additionally, over time, a percentage rise in OuD resulted in a 23.92% increase in GdP. Table 2 clearly demonstrates that OuD was quite important over the long term. This indicates that OuD has a long-term, on average, substantial impact on GdP. Additionally, RcR had a direct effect on economic growth over the long term, but OuL had a favorable effect on GdP

overall. High OuD and OuL were found to have a favorable impact on economic growth, supporting the banking system's justification and adhering to the intermediation hypothesis of money. Additionally, a 10% rise in OuL will eventually result in a 25.9% boost in economic growth. Table 3 further demonstrates that OuL has a long-term, substantial impact on GdP. RcR essentially had a non-significantly favorable effect on economic growth. In essence, BrS is positive and critical at the 5% level, meaning that an increase of 1.27% in economic growth will result from each percentage increase in BrS. Nigeria's economy was seen to grow considerably because of the BrS. This is in accordance with (Ozekhome, 2018). Therefore, the BrS may influence economic growth, which in turn may have an effect on a nation's economic climate.

According to Table 3, OuD eventually had a favorable effect on GDP. Additionally, over time, a percentage rise in OuD resulted in a 23.92% increase in GDP. Table 2 demonstrates that OuD was quite important over the long term. This indicates that OuD has a long-term, on-average, substantial impact on GDP. Additionally, RcR had a direct effect on economic growth over the long term, but OuL had a favorable effect on GDP overall. High OuD and OuL were found to favorably impact economic growth, supporting the banking system's justification and adhering to the intermediation hypothesis of money. Additionally, a 10% rise in OuL will eventually result in a 25.9% boost in economic growth. Table 3 further demonstrates that OuL has a long-term, substantial impact on GDP. RcR essentially had a non-significantly favorable effect on economic growth. In essence, BrS is positive and critical at the 5% level, meaning that an increase of 1.27% in economic growth will result from each percentage increase in BrS. Nigeria's economy was seen to grow considerably because of the BrS. This is under Ozekhome (Ozekhome, 2018). Therefore, the BrS may influence economic growth, which in turn may affect a nation's economic climate.

Table.3.Long-Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OUD	23.925585	14.628475	1.635549	0.0364
OUL	25.741053	14.998573	1.716233	0.1203
RCR	0.200497	1.541098	0.130100	0.8993
BRS	1.277816	0.572693	2.231239	0.0526
C	8.984409	6.924488	1.297484	0.2267

Source: Author's own elaboration

At 1%, the error correction term ECM (-1) is significant and has the right sign. The coefficient's value is -0.99, which indicates that around 99% of the GdP shock from the previous year has returned to the long-term equilibrium this year. In other words, only around 99% of the difference between Nigeria's long- and short-term GdP is fixed in a year, and deviating GdP adjusts to equilibrium with lags. This rate of adjustment is really high.

Table.4.Short-Run Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.077738	0.243830	-0.318819	0.7571
D(GDP(-2))	0.288851	0.203475	1.419589	0.1894
D(OUD)	8.177252	5.482380	1.491551	0.1700
D(OUD(-1))	12.362507	8.664208	1.426848	0.1874
D(OUD(-2))	16.231522	13.32340	1.218271	0.2541
D(OUL)	-7.866383	5.292986	-1.486190	0.1714
D(OUL(-1))	-11.89568	8.702193	-1.366975	0.2048
D(OUL(-2))	-16.20260	12.79784	-1.266042	0.2373
D(OUL(-3))	-1.368750	0.773165	-1.770320	0.1105
D(RCR)	-2.416695	4.319552	-0.559478	0.5895
D(RCR(-1))	1.717539	4.484493	0.382995	0.7106
D(RCR(-2))	-7.051760	4.829041	-1.460282	0.1782
D(RCR(-3))	6.867426	3.031919	2.265042	0.0498
D(BRS)	-0.961173	0.507363	-1.894448	0.0907
D(BRS(-1))	-0.394301	0.786278	-0.501478	0.6281
D(BRS(-2))	-0.097387	0.763441	-0.127563	0.9013
D(BRS(-3))	1.251483	0.582190	2.149613	0.0601
CointEq(-1)	-0.995061	0.246240	-4.041029	0.0029

Source: Author's own elaboration

4.3. Stability Test for the Model

Tables 5, Figure 1, Figure 2, and Figure 3 present the results of diagnostic tests conducted on the ARDL models to assess their reliability and robustness. The study cannot rule out the null hypothesis that there is no serial correlation in the model in the first instance using the Breusch-Godfrey Serial Correlation LM Test. This suggests that, based on the tests, the model does not contain serial correlation. The inquiry investigated the stability of the model.

The findings showed the CUSUM and CUSUM Square, proving that the instruments are reliable and relevant to the research. Thus, while analyzing the relationship between Nigeria's economic growth and broad money supply, it is acceptable to conclude that the ARDL models are reliable and consistent.

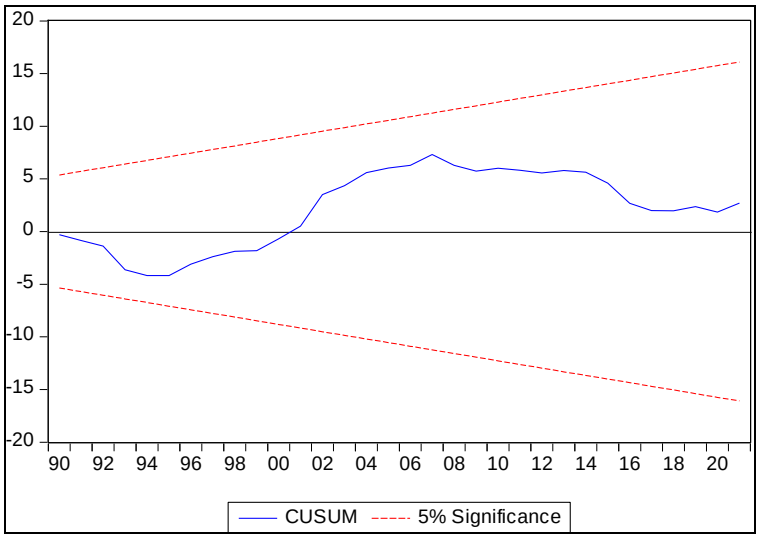


Figure.1.Normality Test
Source: Author's own elaboration

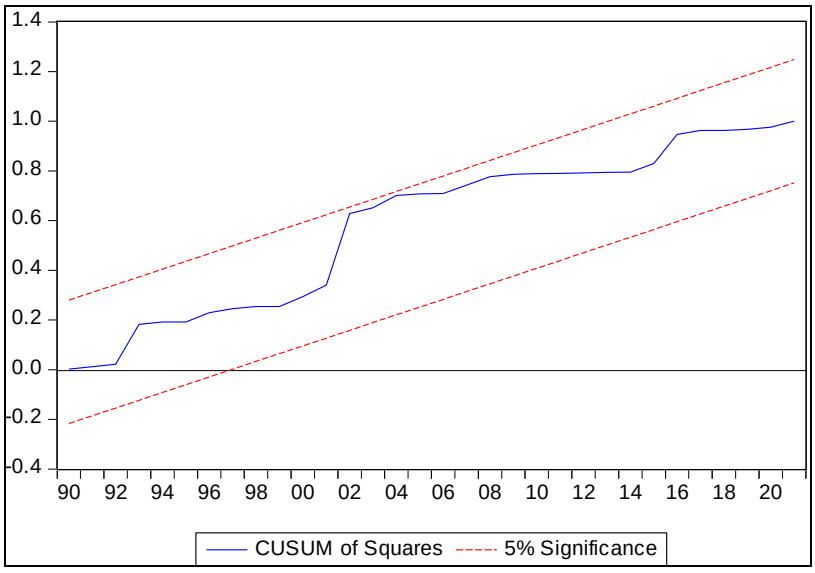
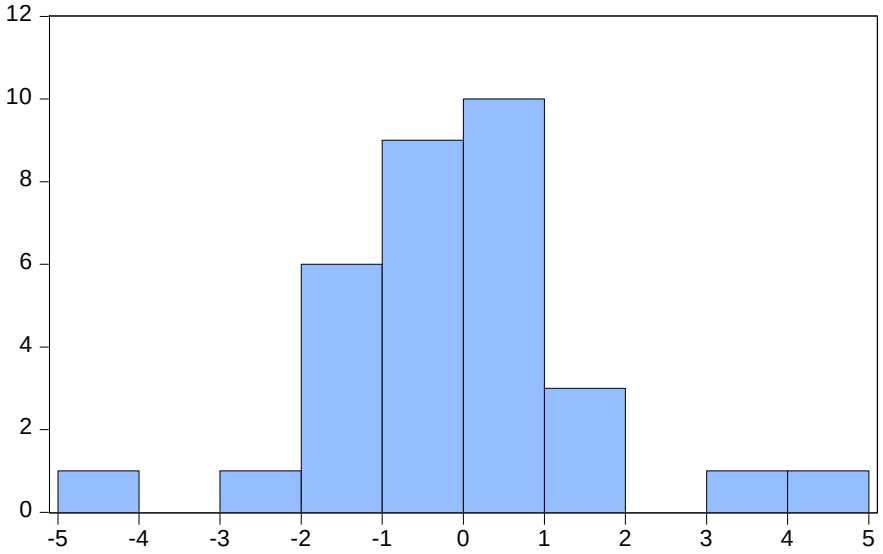


Figure.2.Normality Test
Source: Author's own elaboration



Series: Residuals
Sample 1990 2021
Observations 32

Mean	4.67e-14
Median	-0.117131
Maximum	4.332084
Minimum	-4.378115
Std. Dev.	1.617057
Skewness	0.172865
Kurtosis	4.453342
Jarque-Bera	2.975641
Probability	0.225864

Figure.3.Normality Test
Source: Author's own elaboration

Table.5.Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.804337	Prob. F(2,7)	0.4848
Obs*R-squared	5.979730	Prob. Chi-Square(2)	0.0503

Source: Author's own elaboration

5. Conclusion

The findings of the study informs why, and subsequently how, ChatGPT is implemented into marketing techniques. For instance, the study shows that performance expectancy, effort expectancy, and social influence greatly affect marketers' usage intention towards tools such as ChatGPT. Second, learning value plays a key role in the mediation process, positively altering the linkages between performance expectancy, effort expectancy and intention to use ChatGPT.

The findings underline that for businesses to embody ChatGPT, they need to perceive it as both helpful to their paintings and fascinating to apply. Learning possibilities, consumer-friendly capabilities, and the capacity to boost performance are crucial characteristics that can drive adoption. Social have an impact on also performs a part, as marketers are much more inclined to undertake new tools if they observe their peers the utilization of and making the most of these.

From a reasonable point of view, managers might employ those insights to design strategies that inspire adoption, including emphasizing the tool's getting knowledge of blessings, boosting its customer pleasure, and encouraging a culture of collaboration and invention. By specialized in these areas, firms can enhance the usage of ChatGPT of their advertising activities, leveraging efficiency and innovation.

Ultimately, this studies contributes to the rising frame of understanding concerning AI adoption in advertising, supplying both theoretical insights and pragmatic suggestions for corporations wishing to integrate AI equipment into their plans.

Author Contributions

Ahmed Adekunle carried out the conceptualization, formal analysis, revised, results estimation, tabulation of data, and response to reviewers' comments

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Conflicts of Interest

No conflict of interest

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