



## The Impact of Cashless Economy on Inflation and Corruption in Nigeria

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**Abstract:** The effects of a cashless economy on inflation and corruption in Nigeria were the focus of this research. The statistics Bulletin published quarterly by the Central Bank of Nigeria (CBN) provided the study's data, which covered the time period from 1990Q1 to 2021Q4. The unit root test was performed on the formulated model using the Augmented Dickey Fuller (ADF) method. The variables were found to be non stationary at levels but stationary after first difference, as shown by the Augmented Dickey Fuller unit root test. To determine whether the variables are related over the long run, the Johansen method of co-integration was used. The findings demonstrated a long-term correlation between the factors. Further findings showed that the use of automated teller machine does not lessen corruption perception index and inflation rate in Nigeria but is statistically significant in the long-run. Point-of-sale systems, however, showed promise as a practical technique for lowering corruption perception index and inflation rate. A positive and statistically significant association exists between mobile banking and inflation rate, whereas the adoption and implementation of mobile banking will decrease the corruption perception index but is inconsequential in the long term. Finally, it has been observed that check transactions cut inflation over the long term while also having a positive and statistically insignificant link with the corruption perception index. To further decrease cash transaction in the nation, it was suggested that the monetary policy authority (CBN) expand the number of point of sale terminals. As a result, corruption and inflation will decrease along with the amount of currency in circulation (inflation rate).

**Keywords:** Automated Teller Machine, Point of Sale, Mobile Banking, Cheque Transaction, Corruption Perception Index, Inflation Rate.

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### 1.0 INTRODUCTION

The core mandate of the monetary policy authority (CBN) in Nigeria is to issue, manage and initiate policies that are geared towards price stability. Therefore, in order to achieve and sustain this mandate with respect to changing economic activities, the monetary policy authority in the past ten years have initiated several policies such as the

bank verification number (BVN), minimum capital requirement for national state and unit microfinance policy, cash withdrawal limit policy, naira redesign and cashless policy. Paramount among these policies are the naira redesign and cashless policy. This is because in the last six months cashless policy has been the major economic discourse in Nigeria. The primary goal of a policy of this scope is to shift the

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economy away from its reliance on physical currency and towards electronic-based transactions for the purchase of goods and services. This document officially recognises a cashless economy on the basis of the relevance of this policy to any given economy. Therefore, a cashless economy is one in which digital payment systems are widely used in place of cash.

According to Omotunde *et al.*, (2013), a cashless economy is one in which monetary transactions do not need the physical exchange of currency. It is envisioned as an economic system in which all transactions are conducted digitally, with no physical exchange of bills or currency taking place. The term "cashless economy" refers to a financial system in which the usage of physical cash is reduced via the availability of other means of payment. Although the name "cashless economy" may imply otherwise, what it really describes is an economic system in which the use of cash is drastically decreased, rather than eliminated altogether (Akhalmeh & Ohiakha, 2012).

The central bank of Nigeria has implemented a policy to transition the country's economy from a cash-based one to a cashless one through electronic payment systems (e-payment) in an effort to not only bring the country's monetary system in line with global best practises or discourage the manual movement of large sums of cash, but also to boost the capacity of Nigeria's payment systems, thereby enhancing the quality of service offered to the banking public. A cashless economy, as defined by Pam (2020), is one in which consumers and businesses alike may conduct financial transactions without ever exchanging actual currency for products or services.

In order to promote financial inclusion, the cashless economy strategy aims to reduce the price of banking services, such as interest rates on loans, and to increase the convenience and accessibility of financial transactions. the primary goal is to make monetary policy more effective in reducing inflation and boosting economic growth, but secondary goals include easing access to banking services and credit for low-income people and lowering the risk of cash-related crimes like banditry, kidnapping, and terrorism financing. However, it is pertinent to note that despite this policy inflation and corruption has increased astronomically. It is expected that, as circulation of physical cash reduced based on the cashless policy, prices of goods and service (inflation rate) will fall, but the reserve was the situation in Nigeria.

Take for instance, inflation rate in Nigeria increased on monthly basis in 2022. In January 2022 inflation rate was 15.6% it increased to 15.7%, 15.92 and 16.82% between Februarys, March and April 2022. Despite effort from the monetary policy authority (CBN) to mitigate the upsurge in the inflation rate it further increased to 17.71%, 18.8%, 19.64% and 20.52% between May through August (NBS, 2022). The value of inflation rate was worse in September, October and November reporting 20.77%, 21.09% and 21.47%. Correspondingly, as reported by transparency international, Nigeria corruption rank has been on the rise in the past ten years. For instance, Nigeria ranked 148 out of 180 countries in 2017, however the ranking improved to 144 out of 180 in 2018 but increased to 146 and 150 between 2019 and 2020. The ranking further moved up to 154 in 2021 but dropped a little to 150 in 2022.

As a consequence, this research discourse carried out an in-depth review of empirical literature. It was discovered that, bulk of the literature focused on cashless policy and economic growth. For instance, Gbanador (2023); Agu and Agu (2020); Ibe and Odi (2018); and Okoye and Raymond (2013) all worked on the relative impact of cashless policy on economic growth while studies such as, Shamanth and Aparna (2022); The effects of Nigeria's cashless policy on the bottom lines of deposit money banks were studied by Abubakar and Olakitan (2022) and Ighoroje and Okoroyibo (2020). The most recent literature among the reviewed studies was conducted by Ibe and Odi (2018), and they reported that automated teller machines are seen as the best and most common means of effecting cashless policy, which is at odds with our findings, which show that point of sale is the most potent and veritable to effect cashless policy. No research looked at how cashless payments would affect corruption in Nigeria, and just a fraction of the research looked at how cashless policies might affect inflation.

Thus, this work added to the existing body of knowledge by broadening the scope of the study by doing empirical research on how a cashless economy reduces inflation and corruption in Nigeria. As a result, the purpose of this article is to conduct an empirical analysis of the effect of Nigeria's cashless economy on inflation and corruption from 2009Q1 to 2019Q4. This part is followed by a short survey of the conceptual, theoretical, and empirical literature on cashless economy, inflation, and corruption in part 2. Section 3 concludes the study. Methods, including the definitions of study variables, will be discussed in Section 3, while the findings will be presented in Section 4. In the last section, we'll

provide some final thoughts on the work's policy implications and suggestions.

## 2.0 LITERATURE REVIEW

### 2.1 Conceptual Clarification

#### Cashless Economy

In a three-stage model of financial transactions, a cashless economy represents phase two. As a result, governments would have to go through a transition period between the "cash-based" and "cash-less" economic models before arriving at the "cashless economic" model as a final destination. A cash-based economy is one in which currency notes and coins are still widely used for regular transactions. A cashless economy, on the other hand, is one in which electronic-based payments, rather than physical currency, are the norm rather than the exception.

In other words, cashless economy is a hybrid of the traditional cash-based payment system with the increasingly dominant electronic payment methods. A cashless economy is a financial system in which the usage of physical currency is reduced to a minimum, as defined by Woleola (2017). It is crucial to remember that the foundation of the cashless system is the belief that all forms of cash transactions within a country will be replaced by electronic ones, such as those facilitated by credit cards, debit cards, point-of-sale terminals, checks, mobile banking apps, and direct electronic transfers of funds.

There is no longer any need for the Central Bank to issue physical coins and notes for circulation in a cashless economy (Osazevbaru & Yomere, 2015). The goal of the cashless economy is to eliminate the use of cash and promote digital banking rather than to do away with currency altogether. The CBN revised the daily withdrawal and deposit restrictions it had established for individuals (from N150,000 to N500,000) and businesses (from N1,000,000 to N3,000,000) to accomplish this goal. Penalty fines of N100 and N200 each excess N1000 have been lowered to 3% and 5%, respectively (Ezumba, 2011).

#### Inflation

Increases in the pricing of products and services across the board are indicative of inflation (Gbadebo & Mohammed, 2015). Because economic actors misinterpret changes in nominal variables for changes in real variables, there is a high opportunity cost associated with the wasteful use of resources. In times of inflation, the opportunity cost of keeping money rises, resulting in a less efficient allocation of real resources across economic activities. As a result,

inflation lowers people's level of living by reducing the value of their money.

According to the definition provided by Kanu (2002), inflation occurs when there is a noticeable and persistent rise in the prices of consumer goods and services. Before price increases may be considered inflation, they must be both excessive and persistent. The current rate of inflation in Nigeria is a serious economic problem that has persisted for many years. This phenomena has elevated itself beyond all previous economic ideas. Inflation in Nigeria is caused by both demand and supply, claims Masha (1995). The charges in monetary aggregates cause the pressure on the demand side, while the pressure on the supply side is the result of the economy's quiet structural features. Many factors contribute to inflation in Nigeria, including rising prices for goods and services, higher incomes, more capital inflow, recurrent deficit budgeting, and a larger money supply, according to academics.

#### Corruption

No matter how you slice it, corruption is bad for business and holds back progress in poor nations like Nigeria. Corruption is defined as an antisocial attitude that weakens authority by bestowing inappropriate advantages in violation of legal and moral standards. Corruption is defined as the misuse of public office for private gain by the World Bank (1997) and Ngouo (2000). Corruption, according to Enoefe *et al.*, (2016), has weakened Nigeria's infrastructure and undermined the country's ability to maintain a decent level of life. Corruption, as suggested below, is defined by Transparent International (2017) as the use of public office for private gain, either for the benefit of the official holding the office or a third party.

Any country's economic and political foundations will be tainted by corruption. According to estimates from the World Bank, countries like Nigeria, Kenya, and Venezuela lose up to 12% of their GDP to corruption each year (Nwabuzo, 2005).

### 2.2 Theoretical Literature

#### Solow-Swan Growth Theory

The authors of this hypothesis are Solow (1956) and Swan (1956). The neoclassicals proposed a growth model based on the idea that technological change or scientific innovation is the primary element in explaining growth in the long run, replacing investment as the primary driver. The neo-classical view held that the rate of technical progress was exogenously determined, or unrelated to internal market forces like inflation. It has been suggested (Gokal & Hanif, 2004) that the

neoclassical economic theory of growth rests on the idea that there are declining returns on labour and capital individually but constant returns when they are combined.

Therefore, neoclassical growth theory's production function is used as a gauge of economic development and stability. Thus, we get  $Y = AF(K, L)$ .

In this equation,  $Y$  is an economy's GDP and  $K$  is its capitalization.

$L$  characterises the availability of low-skilled workers in a given economy, whereas  $A$  stands for the prevalent technological standard. The production function of an economy is often rewritten as  $Y = F(K, AL)$  to account for the interplay between labour and technology.

In a closed economy, the neoclassical growth model relies on the premise that a given amount of capital would provide decreasing returns over time. Critics of the theory point to the example of China in the 1980s, when the country's economy was closed yet technical and economic development were on the rise (Balami, 2006), disputing the theory's central premise. The endogenous growth model has several limitations, but it is nonetheless applicable to our investigation since it emphasises the role of technological progress and new ideas in stimulating economic expansion. To illustrate how the country's cashless policy effort might contribute to economic development, we can look at the role that similar technology and innovations play in other economies.

### Bank Focus Theory

Kapoor (2014) put out the hypothesis of bank concentration. The premise of the thesis is that financial institutions provide services to customers via non-traditional channels that are yet conventional and have low delivery costs. Examples of such methods include internet banking, POS systems, mobile payment systems, etc. Therefore, banks provide a wide variety of financial services through electronic payment methods, removing the need for consumers to visit the location where their accounts are maintained. Since the hallmark of the CBN cashless policy is electronic payment methods, this theory is relevant to our research.

### 2.3 Empirical Literature

Using quarterly time series data from 2012 to 2021, Gbanador's (2023) study examined the impact of Nigeria's cashless policy on economic development using an ex-post facto research approach. The data was analysed using several diagnostic tools as the serial correlation,

heteroskedasticity, and Cusum test. Unit root tests for the variables were conducted using the Phillip-Peron and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) procedures, and the data was analysed using Auto-Regressive Distributed Lag (ARDL). Check (CQ) and Internet banking (IB) were shown to have a positive correlation with GDP, whereas the link between ATMs and GDP was found to be negative but negligible. The study's findings imply that the Central Bank of Nigeria should encourage banks to provide high-quality ATM services to its clients as a means of promoting economic development in the country. One of the reasons for the cashless policy is the hope that more people would start using alternative payment methods.

Shamanth and Aparna (2022) used the cashless procedures established by SBI Bank to investigate the impact of the cashless policy on the bank's financial performance. The significance of the association between the independent variables (electronic banking indicators) and the profitability measures (ROA and ROE) was determined using a multiple regression approach. The bulk of the indicators have a favourable effect on the bank's performance as measured by ROA and ROE, as shown by the findings. According to the findings of the research, if banks want to increase the likelihood that their customers would embrace a cashless policy, they should concentrate on improving the other factors.

Abubakar and Olakitan (2022) investigate the effect of the cashless policy implemented by the Central Bank of Nigeria on the profitability of deposit money banks in Nigeria. Ex-post facto research approach was used to examine how the Central Bank of Nigeria's cashless policy affected the performance of deposit money banks in Nigeria since the variables under study were unaffected by the researcher. The bulk of the information utilised in this analysis is secondary data taken from the Central Bank of Nigeria's (CBN) Statistical Bulletin, which spans the years 2011 through 2020. The findings show that automated teller machines and point-of-sale terminals have a significant influence on deposit mobilisation overall, whereas the impact of mobile banking is small but favourable. It is suggested that by developing a wide variety of payment choices, both the cost and danger of transferring and processing cash may be minimised, simplifying the cash collecting process. This has far-reaching implications for the administration of universities and colleges throughout the nation.

Ighoroje and Okoroyibo (2020) look on how the cashless policy in Nigeria affected the efficiency of deposit money banks during 2009-2018. The

research used Econometric methods, including Descriptive Statistics, the Augmented Dicker Fuller and Philip Perron Tests for Unit Roots, and the Autoregressive Distributed Lags (ARDL) for cointegration and coefficient analysis. A favourable and statistically significant relationship between ATM use and ROE was found, as was the use of Internet banking. While Point of Sale (POS) systems have a little positive influence on ROE, Mobile Banking (MB) systems have a large negative effect. The results of the research indicate that the cashless policy has had a beneficial effect on the profitability of Nigeria's money deposit institutions. In the event of a power loss, the report suggests that banks put in place a back-up system to power a backup generator in the event that the government fails to do so.

The impact of non-cash payments on money circulation and inflation during the COVID-19 epidemic is examined by Fitriani et al. (2021). Inflationary consequences of money supply are also explored. During the COVID-19 epidemic (2017-2020), the circulation of money is employed as a proxy for the effect of non-cash payments on inflation. Observation and careful documentation were among the methods used to compile the data. Additional methods employed for data analysis included: hypothesis testing, multiple linear regression analysis, simple linear regression analysis, and classical assumption testing for model 1. Non-cash payments were shown to have a very beneficial impact on both monetary circulation and inflation rate, whereas monetary circulation was found to have a considerable impact on inflation rate. During the COVID-19 epidemic in Indonesia, the mediation test utilising the Sobel demonstrated that the quantity of money circulation might partly mediate the effect of non-cash payments on the inflation rate.

The purpose of Titalessy's (2020) research is to demonstrate a connection between cashless payments and price increases in Indonesia. The findings demonstrate that electronic money reduces inflation, using data from the Central Bureau of Statistics Republic of Indonesia and Bank Indonesia for the period 2019-2020Q2 to back up the claim. In this work, the Ordinary Least Squares (OLS) technique was used for quantitative analysis. The study's findings suggest that there is little to no correlation between debit card purchases and price increases. In Indonesia, the use of credit cards has no appreciable impact on inflation but the use of electronic money has a notable impact. To ensure that noncash transactions in Indonesia are used for all transactions and not just for cash withdrawals, it is important to consider the public's understanding of the use of noncash transaction instruments, which

have been intensified by Bank Indonesia through the cashless society.

The effect of cashless policy on GDP growth in Nigeria was studied by Agu and Agu (2020) from the first quarter of 2010 to the fourth quarter of 2018. The ordinary least squares (OLS) method was used on quarterly time series data. This information was gathered from the 2019 editions of the World Bank's Development Indicator and the Statistical Bulletin, Annual Report, and Statement of Account published by the Central Bank of Nigeria (CBN). The data was put through a battery of statistical tests including a look for unit roots, cointegration, and granger causality. Based on the analysis of ATM use and POS payment trends, the research concluded that Cashless Policy has been an effective instrument in affecting economic performance. The research concluded that improving the efficiency of e-payment systems would boost bank income and contribute to economic development in Nigeria, thus it suggested that banks spend more in ICT to do so.

The effects of a cashless policy on the Nigerian economy were studied by Ibe and Odi (2018). The policy was first implemented in December 2011 by the Central Bank of Nigeria (CBN). From 2009 to 2016, we gathered quarterly time series data from the Annual Bulletin and Reports of the Central Bank of Nigeria (CBN). This research demonstrates a long-term, statistically significant connection between cashless policy measures and GDP development in Nigeria. Furthermore, the size of the association between cashless policy and GDP suggests that ATMs are the best and most prevalent way of enacting cashless policy. When a significant proportion of a country's population is unbanked, as is the case in Nigeria, it is all the more important to raise awareness and encourage the unbanked to join the banking system.

Cashless Economy Policy in Development of the Nigerian Economy was evaluated by Okoye and Raymond (2013). With a total sample size of 68, this study used a descriptive research strategy. The researchers utilised a convenient sampling method. The acquired data was put through an ANOVA and chi-square (x2) test for reliability and validity to ensure its reliability and validity. The findings show that the vast majority of Nigerians are aware of the policy and agree that it would aid in the battle against corruption and money laundering while also making it safer to carry less cash. Cybercrime and illiteracy are two of the biggest issues that are expected to slow down the policy's rollout. Some suggestions include that the government change its approach to educating the illiterate about the

cashless economy and that a framework be developed to offer cyber security in Nigeria.

### 3.0 METHODOLOGY

This article made use of secondary information culled from the CBN statistics bulletin. Inflation rate (INFR), corruption perception index (CPI), and cashless economy (ATM, POS, mobile banking, and check; CHQ) are used as proxies from 2009 quarter one to 2019 quarter four, respectively.

#### 3.1 Model Specification

Solow and Swan's growth theory provides a broad theoretical foundation for model specification by postulating that technological progress, labour productivity, and capital accumulation are the primary drivers of economic expansion, and their growth model extends this theory by postulating that, in the long run, technological innovation—not investment—is the primary factor explaining this expansion. This study's model is based on the modified models developed by Gbanador (2023) to examine the impact of cashless policy on economic growth in Nigeria. The following are the parameters in their model:

$$GDP = f(CQ, ATM, IB) \dots\dots\dots (1)$$

GDP = National Income and Product Money sent through check (CQ) or automated teller machine (ATM)

EB = Electronic Banking

Point-of-sale (POS) terminal and mobile banking (MOB)) were included as additional variables to the model because of their significance as proxies for the cashless economy. The Inflation and Corruption Perception Index (an endogenous variable) is modelled as a function of four exogenous variables (ATM, POS, mobile banking, and check) in the model. The following are the parameters of the model

$$INFR = f(ATM, POS, MOB, CHQ) \dots\dots\dots 3.1$$

The mathematical model could be symbolically expressed as;

$$INFR = B0 + B1ATM + B2POS + B3MOB + B4CHQ \dots\dots\dots 3.2$$

Equation (3.2) above is transformed into an econometric model by incorporating the disturbance term ( $\epsilon$ ) as follows;

$$INFR = B0 + B1ATM + B2POS + B3MOB + B4CHQ + e \dots\dots\dots 3.3$$

#### Model Two: Cashless Economy and Corruption Perception Index Model

$$CPI = f(ATM, POS, MOB, CHQ) \dots\dots\dots 3.4$$

The mathematical model could be symbolically expressed as;

$$CPI = B0 + B1ATM + B2POS + B3MOB + B4CHQ \dots\dots\dots 3.5$$

Equation (3.2) above is transformed into an econometric model by incorporating the disturbance term ( $\epsilon$ ) as follows;

$$CPI = B0 + B1ATM + B2POS + B3MOB + B4CHQ + e \dots\dots\dots 3.6$$

To make a severely skewed variable seem more normal, a logarithmic modification might be used (Kenneth, 2011).

The revised model used in this investigation looks like this:

$$LINFR = B0 + B1LATM + B2LPOS + B3LMOB + B4LCHQ + e \dots\dots\dots 3.7$$

$$LCPI = B0 + B1LATM + B2LPOS + B3LMOB + B4LCHQ + e \dots\dots\dots 3.8$$

Where;

INFR = Inflation CPI = Corruption Perception Index, ATM= Automated Teller Machine, POS = Point of Sale, MOB = Mobile Banking, CHQ = Cheque Transaction f = functional relationship

B0 = Intercept of relationship in the model/constant

B1-B4 = Coefficients of each independent or explanatory variable

e = Stochastic or Error term

#### 4.0 Empirical Data Analysis

To prevent the issue of false regression, it is virtually standard practise in time series analysis to check the sequence of integration for each series. Augmented Dickey-Fuller (Dickey & Fuller, 1979) is used to investigate the stationary property of each variable. We accept the null hypothesis (Ho) that data is non-stationary and reject the alternative hypothesis (H1) that data is stationary if the Augmented Dickey Fuller (ADF) test statistics are greater than the Mackinnon Critical Value at 5% and at absolute term, i.e. ignoring the negative value of both the ADF test statistics and the Mackinnon critical values.

**Table 4.1.1: Unit Root Test Using Augmented Dickey Fuller (ADF)**

Variables	Levels		First Difference		Order of Integration	P-value
	ADF Statistics	5% Critical Value	ADF Statistics	5% Critical Value		
LCPI	-2.737463	-2.938987	-3.112547	-2.938987	1(1)	0.0038
LINFR	-0.428814	-1.949609	-2.339987	-1.949609	1(1)	0.0204
LATM	-2.255893	-2.938987	-3.589938	-3.938987	1(1)	0.0105
LPOS	-1.351024	-2.938987	-3.635122	-2.938987	1(1)	0.0094
LMOB	-1.416639	-2.938987	-4.908417	-2.938987	1(1)	0.0003
LCHQ	-1.732890	-2.938987	-3.212179	-2.938987	1(1)	0.0268

Source: Extracts from E-view 10. \* Level of significance at 5%

The results in the table above show that before differentiation, the ADF test statistics for all the variables are smaller than the Mackinnon critical value. Thus, further testing for stationarity at first difference is required to guarantee the stationarity of data for these variables. All variables were shown to be stationary at first difference using the ADF unit root test. Since the values of the ADF test statistics are bigger than the MacKinnon critical value at both the 95% and 95% confidence levels, we conclude that the null hypothesis must be rejected. Therefore, 1(1) is the order of integration for any and all variables.

**Model one Co-integration Result**

The foregoing unit-root tests show that all of the variables are stationary of order 1(1), thus we proceed to test for cointegration using the methods developed by Johansen (1991) and Johansen and Juselius (1990). Similar to the Dickey-Fuller test, the Johansen approach is a generalisation. The hypotheses about the total number of cointegrating vectors were tested using two likelihood ratio tests (trace and maximum eigenvalue). The tables below reflect the results of tests for cointegration between the variables in the estimate equation for a cashless economy and a corruption perception index. Trace statistics (likelihood ratio) over the 5% critical threshold are required for a long-run cointegrating vector.

**Table 4.2.1a. Test for Johansen co-integration using trace statistic**

Hypothesized no. of CE(s)	Eigen value	Trace statistic	0.05 critical	Prob
None*	0.509542	75.72368	69.81889	0.0156
At most 1*	0.466717	47.93951	47.85613	0.0491
At most 2	0.346422	23.42011	29.79707	0.2261
At most 3	0.126398	6.833666	15.49471	0.5971
At most 4*	0.039299	1.563585	3.841466	0.2111

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level  
\* denotes rejection of the hypothesis at the 0.05 level

Source: Author's computation from E-views 10

**Table 4.2.1b. Test for Johansen co-integration using trace statistic**

Hypothesized no. of CE(s)	Eigen value	Max-eigen statistic	0.05 critical value	Prob
None	0.509542	27.78417	33.87687	0.2236
At most 1	0.466717	24.51940	27.58434	0.1176
At most 2	0.346422	16.58644	21.13162	0.1924
At most 3	0.126398	5.270081	14.26460	0.7074
At most 4	0.039299	1.563585	3.841466	0.2111

Max-eigenvalue test indicates no cointegrating eqn(s) at the 0.05 level  
\* denotes rejection of the hypothesis at the 0.05 level

Source: Author's computation from E-views 10

Once the variables' stationarity has been established, co-integration, or the existence of a long-run link between them, may be tested in tables 4.2.1a and 4.2.1b. The Johansen method was used to conduct the co-integration test, which yielded the data shown in Tables 4.2.1a and 4.2.1b. This suggests that the cashless economy and the

corruption perception index in Nigeria are intertwined in the long term.

How CPI, ATM, POS, MOB, and CHQ stack up against one another over the long haul. The long-run Co-integrating equation, shown in Table 4.2.1c below, reveals the kind and amplitude of the



observed connection. The Consumer Price Index (CPI) serves as the dependent variable in this equation.

**Table 4.2.1c: Normalise Co-integration Result**

Variables	Coefficient	Std. Error	t-Statistics
LATM	8.240609	1.45786	5.652538
LPOS	-0.782663	1.45028	-0.539663
LMOB	-2.231378	1.48303	-1.504607
LCHQ	0.304746	2.04986	0.148667

*Source: Author's computation from E-views 10*

The normalized beta coefficient representing the long-run relative statistical relationship between Indicative of a t-statistic of 5.652583, the CPI and ATM are revealed to be 8.240609 with a standard error value of 1.45786. The significance threshold for this is 5%. Inferentially, CPI and ATM are related in a way that is statistically significant. There is a discrepancy between the sign implication and the a priori anticipation of the connection. However, the t-statistic of -0.539663 is obtained from the standard error of the beta coefficient indicating the long-run relative statistical link between CPI and POS, which is -0.782663. The t-statistics that were calculated have no significance at the 5% level. So, as expected

from economic theory, there is a negative correlation between CPI and POS.

The computed t-statistic for the relative statistical association between the CPI and MOB over the long term is -1.504607, with the standard error being 1.48303. The calculated t-statistics are both negative and insignificant at the 5% level, as was expected beforehand. Finally, we construct a normalised beta coefficient of 0.34746 indicating the long-run relative statistical association between CPI and CHQ, with a standard error of 2.04986 adding up to 0.148667. A positive t-statistic was calculated, which was not what was expected a priori.

**Table 4.2.1d: Lag Length Selection**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-42.72250	NA	8.48e-06	2.511710	2.727182	2.588374
1	258.1533	506.7382	4.25e-12	-12.00807	-10.71524	-11.54809
2	309.0413	72.31447*	1.17e-12*	-13.37059*	-11.00040*	-12.52730*
3	327.1068	20.91798	2.04e-12	-13.00562	-9.558072	-11.77901

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Error correction mechanism (ECM) was used to analyse the relationship between governance, national security, and GDP per capita in Nigeria. The first part of this strategy is the estimation-appropriate lag order subsection. Table

4.2.1c displays the outcome of the VAR environment's lag order selection. According to the findings, Akaike Information criterion at lag order 2 is optimal for doing estimate since it provides the lowest value. So, we use lag 2 to estimate the ECM.

**Table 4.2.2: Parsimonious Error Correction Model**

Variables	Coefficient	Std. Error	t-Statistics	Prob
C	1.100363	0.048828	2.055449	0.0481
D(LATM)	0.094792	0.208328	0.455013	0.6622
D(LPOS)	-0.239116	0.087088	-2.745688	0.0413
D(LMOB)	-0.371238	0.235621	-1.575571	0.1250
D(LCHQ)	0.058223	0.269880	0.269880	0.8306
ECM(-1)	-0.864291	0.305355	-2.830449	0.0124
<b>Adj R<sup>2</sup> = 0.412548, F-statistics = 1.938481 (0.015288), DW = 1.985305</b>				

*Source: Author's computation from E-views 10*



The series needed to be co-integrated so that an error correction technique could be estimated. The presence of a long-run link between the cashless economy and the corruption perception index was proven using the Johansen co-integration test. Akaike information was used to make the lag decision, and lag 2 was used for the estimate. Therefore, Table 4 displays the ECM's findings. The p-value of 0.0124 in 2.2 indicates that the error correcting technique is highly significant and correctly signed at a level of -0.864%. This indicates a yearly rate of adjustment of 86%. Some cashless economy factors also have favourable impacts on the corruption perception index, including LATM (0.094792) and LCHQ (0.058223), whereas LPOS (-0.239116) and LMOB (-0.371238) have negative effects. The point-of-sale log value was determined to be statistically significant at the 5% level, whereas the ATM, mobile banking, and check log values were

all found to be statistically insignificant. This implies that a drop in corruption perception index would result from a one-unit rise in any of the following variables: LPOS, LATM, LMOB, or CHQ.

Corruption perception index variance was found to be explained by the combined effects of explanatory factors (41%) and additional variables (59%) that were not included in the model (41%). Overall, the model's significance was shown by the corresponding probability value of 0.015288, indicating a high level of significance. A Durbin Watson of 1.985305 demonstrated that the series had no auto-correcting errors. Overall, the data suggested that cashless economies had a substantial effect on the Corruption Perceptions Index in Nigeria.

**Diagnostic Test**

**Table 4.2.3: Ramsey Reset Test, Serial Correlation LM Test and Homoscedasticity Test Results**

	F-Statistic	Prob.Value
Ramsey iiReset iiTest	6.589015	0.8153
Breusch-Godfrey iiSerial iiCorrelation iiLM iiTest	4.454993	0.0802
Breusch-Pagan-Godfrey iiHeteroskedasticity Test	1.630035	0.1804

Source: Author's Computation using E-view 10

According to Table 4.2.3 above, the results of the diagnostic test reveal that the Ramsey reset test's The model is well-specified since the f-statistic (6,589015) with a calculated p-value of 0.8153 is larger than the 5% (0.05) critical value. The analysis concluded that the alternative was more likely.

5% (0.05), the analysis shows that there is no serial correlation in the model.

Least Squares (Breusch-Godfrey) Serial Correlation The f-statistic for the serial or autocorrelation test is 4.454993, whereas the Chi-Square probability value is 0.0802. Because this probability value is greater than the critical value of

The Chi-Square probability value is 0.1804, and the f-statistic, as determined by the Breusch-Pegan-Godfrey test for heteroscedasticity, is 1.630035. There is no evidence of heteroskedasticity in the model, since the probability Chi-square value is more than 5% (P > 0.05). In regression, it is preferred that residuals have a constant variance, making them homoscedastic.

**Normality Test**

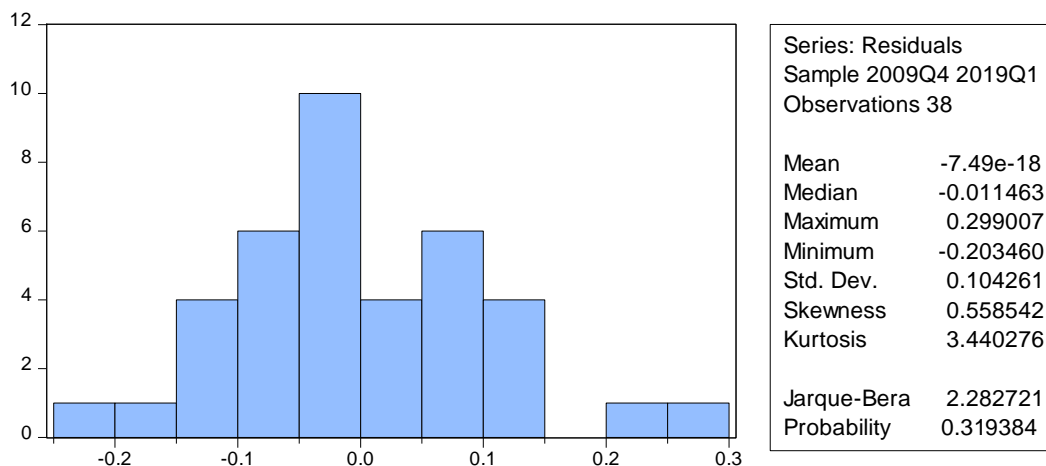
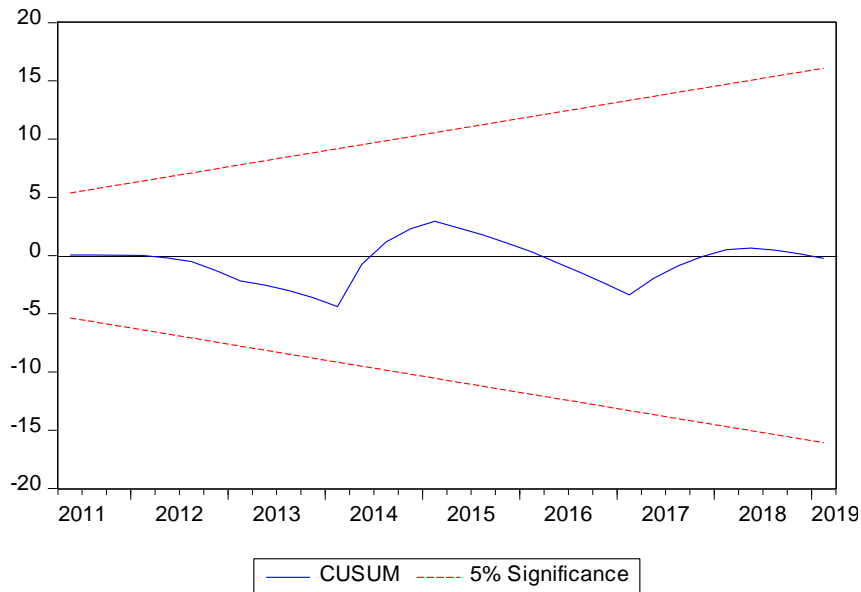


Figure 4.1

Figure 4.1, shows summary of the normality test with Jarque-Bara value of 2.282721 and a corresponding probability value of 0.319384 more

than 0.05 level of significance, indicating that the residuals are normally distributed.



**Figure 4.2: Stability Test**

Figure 4.2, shows summary of the stability test, the result showed that the model is stable. This is evident to the fact that the blue line is in-between

the two red (-5 & +5) or less than 0.05 level of significance.

**Model Two Co-integration Result**

**Table 4.2.4a: Test for Johansen co-integration using trace statistic**

Hypothesized no. of CE(s)	Eigen value	Max-eigen statistic	0.05 critical value	Prob
None*	0.545099	91.88514	69.81889	0.003
At most 1*	0.491879	61.16576	47.85613	0.0018
At most 2*	0.452296	34.76135	29.79707	0.0124
At most 3*	0.230177	11.28257	15.49471	0.1947
At most 4*	0.027321	1.080363	3.841466	0.2986

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level  
 \* denotes rejection of the hypothesis at the 0.05 level

*Source: Author's computation from E-views 10*

**Table 4.2.4b: Test for Johansen co-integration using trace statistic**

Hypothesized no. of CE(s)	Eigen value	Max-eigen statistic	0.05 critical value	Prob
None	0.545099	30.71938	33.87687	0.1138
At most 1	0.491879	27.58434	27.58434	0.0702
At most 2	0.452296	21.13162	21.13162	0.0229
At most 3	0.230177	10.20220	14.26460	0.1990
At most 4	0.027321	1.080363	3.841466	0.2986

Max-eigenvalue test indicates no cointegrating eqn(s) at the 0.05 level  
 \* denotes rejection of the hypothesis at the 0.05 level

*Source: Author's computation from E-views 10*

Once we know the variables are stationary, we may check tables 4.2.4a and 4.2.4b to see whether there is a long-run connection between them, known as co-integration. The Johansen method was used to conduct the co-integration test,

which yielded the data shown in Tables 4.2.1a and 4.2.1b. This suggests that there is a causal link between Nigeria's cashless economy and the country's inflation rate.

Long-term correlations amongst the indicators of INFR, ATM, POS, MOB, and CHQ. The type and size of the observed connection are shown

in the long-run Co-integrating equation shown in Table 4.2.4c below. The dependent variable, INFR, has been normalised in the equation.

**Table 4.2.4c: Normalise Co-integration Result**

Variables	Coefficient	Std. Error	t-Statistics
LATM	12.71850	1.67145	7.609261
LPOS	-13.31562	1.66372	8.003522
LMOB	4.296201	1.68456	2.550340
LCHQ	-8.612967	2.40010	3.588567

*Source: Author's computation from E-views 10*

Long-term relative statistical association between INFR and ATM is represented by a normalised beta coefficient of 12.71850 with a standard error value of 1.67145, indicating a t-statistic of 7.609261. The significance threshold for this is 5%. This implies that INFR and ATM are related in a way that can be measured statistically. There is a discrepancy between the sign implication and the a priori anticipation of the connection. In contrast, the t-statistic for the link between INFR and POS is 8.003522, and the normalised beta coefficient for this relationship is -13.31562, with a standard error of 1.66372. Significant at the 5% level, according to the calculated t-statistics.

Therefore, consistent with economic theory, there is a negative association between INFR and POS.

Long-term relative statistical association between INFR and MOB is represented by a normalised beta coefficient of 4.296201 with a standard error of 1.68456 yielding a t-statistics value of 2.550340. Contrary to a priori expectations, the estimated t-statistics is positive and significant at the 5% level. At last, we find that the normalised beta coefficient, which represents the relative statistical association between INFR and CHQ over the long run, is -8.612967 with a standard error of 2.40010 adding up to 3.588567. As was expected beforehand, the calculated t-statistics are positive and statistically significant at the 5% level.

**Table 4.2.5d: Lag Length Selection**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-22.32942	NA	2.90e-06	1.438391	1.653863	1.515054
1	288.4338	523.3907	8.63e-13	-13.60178	-12.30895	-13.14180
2	355.6019	95.44932*	1.01e-13*	-15.82115*	-13.45096*	-14.97786*
3	377.4676	25.31820	1.44e-13	-15.65619	-12.20864	-14.42958
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Error correction mechanism (ECM) was used to analyse the relationship between governance, national security, and GDP per capita in Nigeria. The first part of this strategy is the estimation-appropriate lag order subsection. The

outcome of the VAR environment lag order selection is shown in Table 4.2.5d. According to the findings, Akaike Information criterion at lag order 2 is optimal for doing estimate since it provides the lowest value. So, we use lag 2 to estimate the ECM.

**Table 4.2.6: Parsimonious Error Correction Model**

Variables	Coefficient	Std. Error	t-Statistics	Prob
C	0.450528	0.123837	3.638069	0.0112
D(LATM)	-0.112727	1.381681	-0.081587	0.9355
D(LPOS)	-1.447923	0.567260	-2.552486	0.0345
D(LMOB)	-0.375447	0.162697	-2.307648	0.0203
D(LCHQ)	-0.561772	1.789907	-0.313855	0.7557
ECM(-1)	-0.116906	0.025184	-4.642023	0.0254
<b>Adj R<sup>2</sup> =0.500001, F-statistics = 1.822231 (0.006557), DW =1.709881</b>				

*Source: Author's computation from E-views 10*

The series needed to be co-integrated so that an error correction technique could be estimated. The presence of a long-run link between the cashless economy and the corruption perception index was proven using the Johansen co-integration test. Akaike information was used to make the lag decision, and lag 2 was used for the estimate. Table 4.2.6 displays the ECM results, which show that the error correction method of -0.1169% is correctly signed and statistically significant (p0.0254). According to these calculations, the rate of adaptation would be 12% each year. The cashless economy factors also have a negative effect on inflation, with LATM at -0.112727, LPOS at -1.447923, LMOB at -0.375447, and LCHQ at -0.561772. When the impact of each variable on inflation rate was analysed, it was discovered that the log value of point-of-sale terminals and mobile banking was significant at the 5% significant level,

whereas the log value of ATMs and checks was not. This means that if LPOS, LMOB, LATM, and LCHQ all increased by one unit, the inflation rate would fall.

In addition, the modified R2 coefficient revealed that the combined impacts of the explanatory variables accounted for 50% of the variance in the inflation rate, while the remaining 50% was explained by factors beyond the scope of the study. Overall, the model's significance was shown by a probability value of 0.006557, indicating that the model is extremely important. A Durbin Watson of 1.709881 demonstrated that the series had no auto-correcting errors. Taken together, the findings suggested that Nigeria's inflation rate will be significantly affected by the country's transition to a cashless economy.

**Diagnostic Test**

**Table 4.2.7: Ramsey Reset Test, Serial Correlation LM Test and Homoscedasticity Test Results**

	F-Statistic	Prob.Value
Ramsey iiReset iiTest	1.346013	0.0815
Breusch-Godfrey iiSerial iiCorrelation iiLM iiTest	1.744701	0.1349
Breusch-Pagan-Godfrey iiHeteroskedasticity iiTest	0.900612	0.4927

Source: Author's Computation using E-view 10

Table 4.2.7 shows that the f-statistic (1.346013) from the linearity test of the Ramsey reset test is greater than the 5% (0.05) critical value, indicating that the model is correctly specified, as determined by the diagnostic test. The analysis concluded that the alternative was more likely.

Least Squares (Breusch-Godfrey) Serial Correlation The Chi-Square probability value for the serial or autocorrelation test is 0.1340, and the f-statistic is 1.744701. Therefore, the study shows that the model does not exhibit any serial correlation, as the calculated probability is greater than the critical value of 0.05 by around 13% (0.1349).

For heteroscedasticity, the Breusch-Pagan-Godfrey test yields an f-statistic of 0.900612 and a Chi-Square probability of 0.4927. There is no evidence of heteroskedasticity in the model, since the probability Chi-square value is more than 5% (P > 0.05). In regression, it is preferred that residuals have a constant variance, making them homoscedastic.

**5.0 CONCLUSION AND RECOMMENDATIONS**  
**CONCLUSION**

It follows that the usage of ATMs does not reduce the corruption perception index or the inflation rate in Nigeria, but it does have a statistically meaningful long-term effect. Point-of-

sale systems, however, showed promise as a practical technique for lowering corruption perception index and inflation rate. A positive and statistically significant association exists between mobile banking and inflation rate, whereas the adoption and implementation of mobile banking will decrease the corruption perception index but is inconsequential in the long term. Finally, long-term data suggest that cheque transactions lower inflation rates and have a positive but negligible association with the corruption perception index

**RECOMMENDATIONS**

Based on the findings, the following recommendation were made below;

- i. The monetary policy authority (CBN) should increase the number of point of sale terminal to further reduce cash transaction in the country. This will reduce the volume of cash circulation thereby reducing corruption and price of goods and services (inflation rate).
- ii. Deposit money banks (DMBs) should provide security around automated teller machine locations to protect customers from being attack from hoodlums while steps should be taken to improve on internet network particularly issues surrounding mobile banking. This will rapidly enhance the desired cashless policy.

- iii. Finally, the monetary policy authority should mandate the deposit money banks to drastically reduce the charges on cheque transaction

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