



The Nexus Among Cashless Economy, Bank Performance and Economic Growth in Zimbabwe 2014-2021.

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ABSTRACT

What prompted this research is that there is a quantum leap in the use of cashless transactions in Zimbabwe that is more than in financial sector and economic growth. Hence, the study examined whether the adoption of cashless transactions necessitates economic growth through enhancing bank performance in Zimbabwe. The study used quarterly data from Zimbabwean national bank sector reports, World Bank and Zimstat for the period 2014-2021 and a 2-stage least square method for the analysis. The results show that, cashless transactions lead to the growth of Zimbabwe's gross domestic product through enhancing bank performance. This study recommends that banks should promote the use of internet banking to realise more profits and fuel economic growth.

Key Words: Cashless Economy, Bank Performance, Economic Growth, Two-Stage Least Squares, Zimbabwe

INTRODUCTION

Cashless Economy

Cashless economy has become a topical issue in modern financial systems across the globe. Recently, considering the growing shortage of cash in some economies, globalization and the pandemics like COVID-19, the use of physical cash continues to be difficult (Kaur, 2017). With their keenness to survive, banks have become more innovative and developed other means of transacting which do not involve physical notes and coins, referred to as 'cashless' or

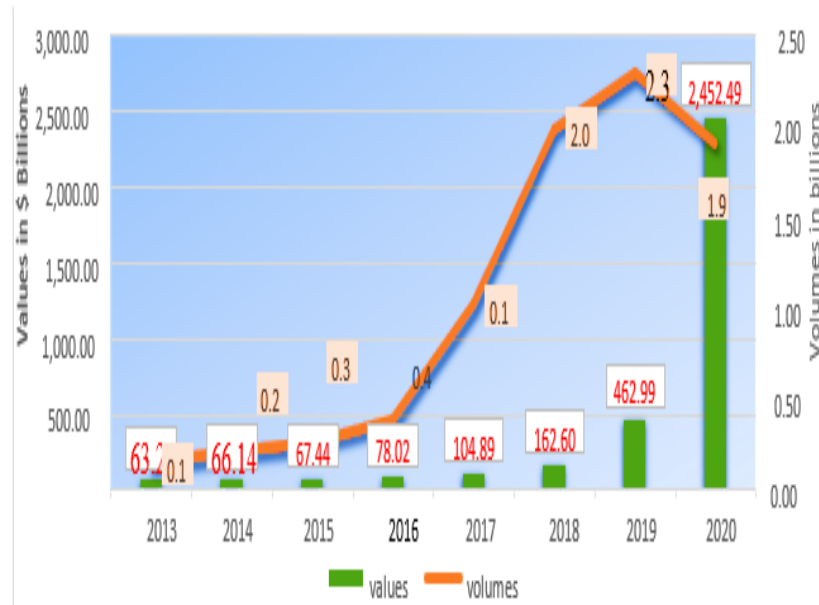
'cash-lite' transactions in this research. Cashless transactions involve the use of magnetic striped cards, internet banking, mobile banking, as well as real time electronic funds transfers. To remain competitive, more banks are transforming from their traditional approach of "bricks and mortar" into a modern approach of "clicks and motor" due to the emergence of e-commerce and digitalization of finance (Kumar & Khanna, 2017).

Despite several drawbacks, the global economy has been rapidly turned into cashlessness, which, therefore, impacts world



financial sector performance and economic growth (Al-Smadi & Al-Wabel, 2011). In Africa, the banking environment is becoming more dynamic, keeping abreast with global developments in information and communication technology (ICT). Kenya, Tanzania, Egypt, Nigeria and South Africa are also bellwethers of cashless payment use in Africa (Olusola et al., 2013). According to Global System for Mobile Communications Association (2020), nearly half a billion people subscribe to mobile services in Sub-Saharan Africa and have active mobile money accounts. Africa accounts for 64% of all mobile money transactions globally, Zimbabwe included.

In Zimbabwe, banks also promoted the use of ‘cashless’ transactions, facilitated by deregulation and rapid technological advances in information flows, communications infrastructure and financial markets. The number of point-of-sale machines (POS) per 1000 population was seen increasing over the years, which promoted the use of debit and credit cards even in remote areas of the country (Munacinga, Mbedzi & Read, 2021). The Reserve Bank of Zimbabwe (RBZ) introduced the plastic money policy which became successful and led to the rise in the usage levels to above 95% of retail transactions (Mangudya, 2021). The volumes of non-cash payments continually grew by an average of 12.46% in the period 2016 to 2020 (RBZ, 2021) as shown in Figure 1.



Source: RBZ, 2021

As the economy continues to move towards a ‘cashless’ society and enhancing the national financial soundness, government vowed to continue investing in the electronic payment infrastructure to foster bank performance (Mangudya, 2018).

Bank Performance

Bank performance is described as the bank’s capacity to generate sustainable profits (European Central Bank, 2010). According to the World Bank (2020), global financial sector performance has been improving as shown by the increase in the domestic credit to the private sector from 125.2% to 147.9% from 2016 to 2020. In Sub-Saharan Africa, banks are about 98.35% efficient, Zimbabwe included (Ngu & Mesfin, 2009).

Regardless of the perpetual cash crisis, the performance of the banking sector in Zimbabwe was satisfactory, as reflected by the improvement in the return on assets

(ROA) and return on equity (ROE) to 12.04% and 43.16% respectively, as of 31 December 2021, and from 2.61% and 15.48% as of 31 December 2017 (RBZ, 2021). Figure 2 shows the trend of Zimbabwean banking sector net profit from December 2014 to December 2018.

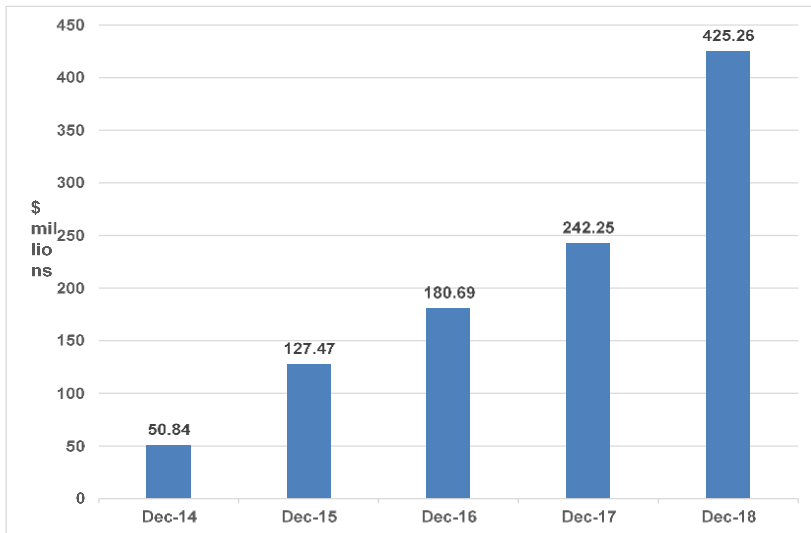


Figure 2: Banking Sector Profitability Trend from December 2014 to December 2018

Source: RBZ, 2018

The net profit of commercial banks in Zimbabwe was continuously rising from \$50.84 million in 2014 to \$425.26 million in 2018 as shown in Figure 2. According to RBZ (2021), on 31 December 2021, the net profit of commercial banks stood at \$59.29 billion, attributed to revenue enhancement measures implemented by banks, such as digital finance and agency banking, as well as partnerships with non-financial operators.

From 2014, the amount of loans and advances rapidly increased, attributed to the introduction of the multi-currency system (Mangudya, 2014). Later, loans and advances

began to fall and other banks like Trust Bank, Genesis and Royal Bank even closed the post multicurrency era due to liquidity problems (Mangudya, 2014). However, to survive, banks invested more in off-balance sheet business and generated more non-interest income. Non-interest income was driven by fees and commissions due to increased transactional volumes on digital platforms in the wake of COVID-19 (Mangudya, 2022). Raghuraj (2017) notes that the decline in interest margins has forced banks to explore alternative sources of revenues, leading to diversification into trading activities and non-traditional financial operations. As a result, the amount of loans and advances was low, whilst the total amount of bank assets was increasing. Therefore, the authors expect this to have a significant impact on Zimbabwe’s economy.

Economic Growth

Despite the rise in cashless transactions and bank performance, the global economy dwindled by an average rate of 1.95% in the period under study, Africa included (O’Neill, 2022). According to the African Development Bank Group (2024), Africa’s economic performance has been unsatisfactory, with a witnessed fall in its real GDP growth to 3.1 percent in 2023, from 4.8 percent in 2021. Zimbabwe’s economy is unstable, characterized by ups and downs emanating from deep-seated political and socio-economic problems. The economy started contracting in 1980, and in 2019 it was worsened by exogenous shocks such as El-Nino-induced drought and the destruction caused by Cyclone Idai. These developments compromised economic activities and



electricity generation, with extended effects on other sectors, pushing the economy into a recession. The situation was aggravated by foreign currency shortages, a cash crisis and constrained demand due to the on-going fiscal reforms (Mangudya, 2016; 2021).

Cash crisis is a negative financial situation characterized by lack of physical cash in circulation to satisfy the cash demand by the economic agents (Olweny & Shiphoh, 2011). It has been a common phenomenon in the Zimbabwe's economy since independence, witnessed by long queues at many banks and automated teller machines (ATMs) as the banks began to put cash withdrawal limits. The withdrawal limits drastically decreased due to unavailability of cash by the end of the year 2016 (Nyoni, 2018). In February 2023, the withdrawal limit was increased to RTGS\$15,000.00 whilst for mobile transactions it was RTGS\$100,000.00 per week (person to business) and RTGS\$70,000.00 (person to person), as an implicit way of preserving the value of the local currency and thwarting inflationary pressures (Mangudya, 2023). Traditionally, the availability of cash has been key in commercial bank performance as well as the economy at large. Figure 3 shows Zimbabwe's GDP growth trend from 1961 to 2020:

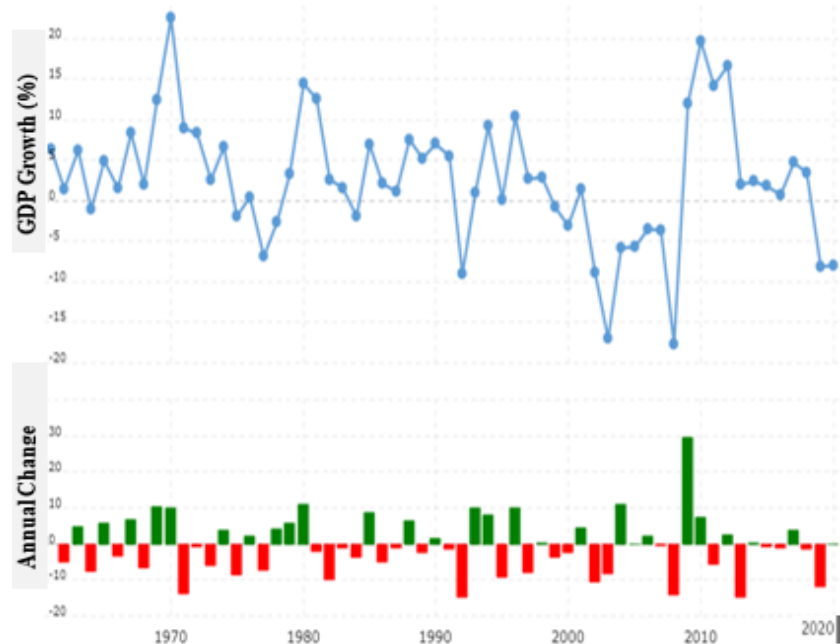


Figure 3: Zimbabwe's GDP Growth Trend, 1961 to 2020 Period

Source: Macrotrends, 2020

From Figure 3, Zimbabwean GDP growth trend from 1961 to 2020 was volatile. Also, in most of the given data points, the economy experienced GDP growth of less than 5%, whereby in some instances it could be as low as -18%. This reveals the poor performance of Zimbabwe's economy which does not conform to the growth of cashless transactions and the financial sector.

Given this background, it can be deduced that there is a continual rise in the use of cashless transactions and bank performance in Zimbabwe, whilst the economy is ailing. Therefore, this study examined whether the use of cashless transactions can lead to economic growth through fostering financial sector performance in Zimbabwe. Thus, the objectives of this research are to determine

the impact of cashless transactions on bank performance and economic growth and to determine the transmission mechanisms through which cashless transactions leads to economic growth in Zimbabwe.

LITERATURE REVIEW

Theoretical Review

Structure, Conduct and Performance Paradigm

The Structure, Conduct and Performance paradigm (SCP) was first developed by Mason in the 1930s. The SCP asserts that the basic conditions of supply and demand in an industry determine its structure. The competitive conditions which result from this industry structure influence the behaviour of companies and, in turn, dictate the performance of the industry. There exists a single causal relationship between structure, conduct and performance (Chidoko et al., 2015). That is, given their market structure, the conduct of commercial banks in terms of promoting the use of cashless transactions influence their performance and growth of the financial sector at large. Therefore, the theory helped in creating the basis for the first section of the research, the cashless economy-financial sector performance nexus.

Finance-Growth Theory

The Finance-Growth theory can be traced back to the work of Bagehot during 1870s. According to Stolbov (2014), the Bagehot theory demonstrated how the financial spheres are linked with real economy. It emphasized on the role of the

financial systems in resource mobilisation and allocation to most profitable enterprises. The economy at large gains from multiplicative effect from its positive spill-over and successful enterprises spur economic growth as well. Based on Bagehot's theory, it can be concluded that the financial system plays a role in fostering economic growth. Olaniyi and Adedokun (2022) say capital will run as surely and instantly where it is wanted, and where there is most to be made of it, as water runs to find its level. Therefore, the theory builds a framework on the finance growth nexus whereby financial sector growth is expected to enhance economic growth.

Empirical Review

Various studies have been conducted to identify the relationship between cashless economy and bank performance. Amaegberi (2018) examined the link between mobile banking transactions and bank profitability in Nigeria from 2007 to 2016. The results of the study were analyzed using economic priori criteria, statistical criteria and econometric criteria. The positive and statistically significant relationship between automated teller machines of old and new generation banks in Nigeria indicated that automated teller machine is a major factor that contributes to old and new banks' performance in Nigeria. The positive and statistically significant relationship between point of sale of old and new generation banks in Nigeria indicated that point of sale is a major factor that contributes to old and new banks' performance in Nigeria. The positive and statistically significant relationship between mobile banking of old and new

generation banks in Nigeria indicated that mobile banking is a major factor that contributes to old and new banks' performance in Nigeria. The study recommends that banks should intensify efforts to increase the assets of banks in Nigeria to make more profit. The study also calls for efficient management and utilization of funds to train and evaluate bank workers at every point in time.

Also in Nigeria, Gambo, Oyewole, Abba and El-Maude (2013) revealed that e-banking contributed to bank performance in terms of return on assets with a time lag of two years. Kiprop (2016) revealed that the adoption of mobile banking by commercial banks in Kenya has improved their performance over the years. Therefore, the study recommends that commercial banks should increase their focus and investments in mobile banking as this is the future of the banking industry for them to remain profitable. Abubakar (2014) revealed that a positive relationships existed between mobile banking and total deposits, and between internet banking and total asset while on the other hand, no significant relationship existed between internet banking and total deposits, and between mobile banking and total asset in Nigeria. Kamau (2014) researched on the effects of cashless transactions and financial trading income on non-funded income in commercial banks in Kenya and found a positive relationship between cashless economy and bank performance.

Also, other studies looked at the relationship between bank or financial sector performance and economic growth. Sunde (2012) looked at financial sector

development and economic growth nexus in South Africa and found out that economic growth is explained by the financial sector variables and control variables such as inflation, exchange rate, and real interest rates. Tee and Ong (2016) examined the effect of adopting cashless payments in five European Union (EU) countries, namely, Austria, Belgium, France, Germany, and Portugal, for the period of 2000-2012. Ong et al. (2022) looked at the effect of cashless payments on the internet and mobile banking in selected Asian countries. Wong. et al. (2020) carried out a researched study titled: 'Cashless Payments and Economic Growth: Evidence from Selected OECD Countries.' It was an investigation on the relationship between cashless payments and economic growth in selected OECD countries. Nyoni (2018) researched on the topic: "Towards A Cashless Zimbabwe: An Empirical Analysis."

Previous research has been done on cashless transactions versus bank profitability and others on finance-growth nexus. From the best knowledge of the researcher, little was done on the cashless transactions, bank performance and economic growth nexus, especially in Zimbabwe. Even theories do not seem to conclusively answer the relationship; there seems to be a chicken and egg problem. Diversification of income sources is said to comparatively yield advantages since it can reduce the shocks to net interest margins arising from adverse changes in lending rates (Mwero, 2019). Bank expansion into fee-based services leads to low lending rates, given that diversification impacts on loan pricing, and that interest rate margins

effectively curbs volatility in bank earnings. It has been discovered that financial sector growth leads to economic growth through the multiplier effect. Conversely, according to economic growth models, an increase in national income promotes savings and investment and, consequently, results in financial sector growth. Empirically, the reviewed studies have been characterized by vagueness and have made generalized conclusions with absolute disregard of the transmission mechanisms between cashless transactions, bank profitability and economic growth. This study, therefore, sought to fill this research gap.

HYPOTHESES

H₁: Cashless transactions do have a significant impact on bank performance and economic growth.

H₂: Transmission mechanisms through which cashless transactions lead to economic growth are through bank performance in Zimbabwe.

METHODOLOGY

The study used quarterly secondary data from Zimbabwean national bank sector reports, World Bank and Zimstat for the period 2014-2021. As mentioned above, definition of cashless transactions follows research done by Kumar and Khanna (2017) and the availability of data. Therefore, the cashless payments used in this research are mobile banking (MB), internet banking (IB), as well as point of sale (POS) transactions. Return on assets (ROA) and gross domestic product (GDP) were used to measure bank performance and economic growth,

respectively, with interest rates (IR) and inflation (INFL) as control variables. As supported by theoretical and empirical literature, POS, IB and MB coefficients are expected to be positive since they are becoming the main sources of non-interest income for the banks due to the rise in the use of cashless transactions, hence an increase in POS, IB and MB transactions increases bank performance (Kumar & Khanna, 2017).

The dependent variable, ROA is used in the model. According to Rose and Hudgins (2010), ROA is the net income divided by total assets. In other words, it measures how efficiently a bank can manage its assets to produce profits. Data of banking sector profitability were extracted from RBZ publications for this research, where it is given as percentages.

POS is a payment system whereby users are issued with electronic cards which can be slotted into special electronic machines to effect payments (Azeez, 2011). Upon executing a transaction, the value is ascertained and the amount is entered into a POS terminal into which the electronic card has been slotted. The cash equivalent of the amount is transferred from the payer's account into the account of the payee automatically (Azeez, 2011). Using the POS comes with a certain charge, in addition to the commission charged to the retail outlet using the machine (Omose, 2011). The values (ZWL\$ millions) of POS transactions in Zimbabwe given in RBZ monthly and quarterly economic review publications were used in this research.

MB is defined as any transaction (including the transfer of right or ownership to use goods

and services) which is started and/or completed by using mobile access to computer networks with the assistance of an electronic gadget (Tiwari et al., 2006). That is, it allows people to access various financial services through mobile devices or gadgets like cellphones. The researcher used the values (ZWL\$ millions) of MB transactions in Zimbabwe given in RBZ monthly and quarterly economic review publications.

Internet banking is defined by Malhotra (2009) as accessing one's bank account and carrying out financial transactions through the internet on your smartphone, tablet or computer on the bank's website. It is nothing but a banking transaction, carried out over the internet, via respective bank or financial institutions' website, under a personal profile, with a personal computer. It is quick, usually free and allows you to carry out several tasks such as paying bills and transferring money, without having to visit or call your bank. The researcher used the values (ZWL\$ millions) of internet banking transactions in Zimbabwe given in RBZ monthly and quarterly economic review publications.

Gross domestic product (GDP) is the standard measure of the value of final goods and services produced by a country during a specified period (OECD, 2009). It is a key measure of a nation's economic development and growth. It is the value of the goods and services produced by the nation's economy less than the value of the goods and services used up in production. GDP is also equal to the sum of personal consumption expenditures, gross private domestic investment, net exports of goods and

services, government consumption expenditures, and gross investment. When GDP is growing, *ceteris paribus*, workers and businesses are generally better off than when it is not. In broad terms, an increase in real GDP is interpreted as a sign that the economy is doing well (Barbara, 2017). The data for Zimbabwean national income growth given in ZWL\$ billions on World Bank publications was used in this research.

Interest rate is simply the price of money. It also represents the cost of borrowing money or the reward for saving it. Banks borrow money from the public in the form of deposits at a lower cost and lend it out at a higher cost to earn profit. The quarterly data given in percentages on RBZ publications was used in this research. IR is expected to be negative since it is the cost of borrowing. If the cost of borrowing increases, the income for banks falls since interest is the traditional source of income for banks, also it deters borrowing and economic growth. The data used in this research were found in RBZ publications, given in percentages (Olaniyi & Adedokun, 2022).

The inflation rate is defined as the persistent rise in the general price level. High inflation is usually not desirable since it denotes the increase in the cost of living for the ordinary economic agents. It is whereby too much money is chasing too few goods; therefore, it has a negative impact on society since more goods and services will become dearer. Moreover, it is of great importance to mention that there is a negative relationship between the inflation rate and exchange rate (OECD, 2009). That is, if inflation rate rises, it makes local goods and services

uncompetitive on the international markets and, therefore, reduces their demand which, consequently, leads to the reduction in the currency's exchange rate and the reverse is true when inflation rate falls. Thus, inflation rate is a variable of great concern to the policy-makers, hence qualifies it to be in this model, reflecting the state of the economy. The data used in this research were found in RBZ publications, given in percentages. It is also expected that there will be a positive relationship between cashless transactions, financial sector growth and economic growth.

The quantitative research design was adopted, where a simultaneous regression model was used. This was necessitated by the assumed two-way relationship between financial sector development and economic growth. The study, therefore, employed a 2-stage least square (2-SLS) regression model estimated using Stata.

Estimation Technique

The Two Stage Least Square (2-SLS) estimation was used to determine the impact of all the variables (both dependent and independent) in the regression model. 2-SLS regression model was suitable since it is used when the dependent variable's error terms are correlated with the independent variables. Furthermore, it is appropriate when there are feedback loops in the model, such as those between economic growth (GDP) and profitability (ROA) which are structural equations (Gujarati, 2004). It was also chosen since it minimises the sum of square errors that yields the most efficient results.

This technique combines factor analysis and multiple regression analysis, and it is used to analyze the structural relationship between measured variables and latent constructs. This method is preferred because it estimates the multiple and interrelated dependence in a single analysis, (Gujarati and Porter 2004). In this analysis, two types of variables are used, which are endogenous variables and exogenous variables. Endogenous variables are equivalent to dependent variables and are also equal to the independent variables.

Compared to OLS, 2SLS standard errors are usually higher, an indication that theoretically, the variance 2SLS estimator is higher than that of the OLS estimator. Decision on whether to use OLS or 2SLS is on a tradeoff basis, bearing in mind that OLS is efficient whilst 2SLS is consistent under more general conditions. Thus, 2SLS was chosen on the basis that it is consistent (Gujarati, 2004).

According to Gujarati (2004), the assumptions underlying 2SLS are that there is no autocorrelation in disturbance terms, no multicollinearity, no normality, and no homoscedastic, and that the model is linear in parameters.

Theoretical Framework

The following empirical model was applied to examine the relationship between cashless transactions, bank performance and economic growth, hinged on the SCP paradigm and the finance-growth theory. As such:

$$\begin{aligned} \bullet \quad gdp &= \alpha_0 + \alpha_1 roa + \alpha_2 ir + \\ &\alpha_3 infl + \varepsilon \end{aligned} \quad (1)$$

$$\begin{aligned} \bullet \quad roa &= \beta_0 + \beta_1 mb + \\ &\beta_2 pos + \beta_3 ib + \mu \end{aligned} \quad (2)$$

Where:

- roa = return on assets
- mb = mobile banking transactions
- pos = point of sale transactions
- ib = internet banking transactions
- gdp = gross domestic product
- ir = interest rates
- $infl$ = inflation
- μ and ε = error/disturbance terms
- B_0 and α_0 = constants

The estimation followed the following stages of 2SLS:

Stage 1

From equation 1, roa is assumed endogenous hence, other X variables which affect roa but not directly related to the error terms of GDP (instruments of) were identified. These variables are mb , pos and ib , all representing cashless transactions. Hence, this resulted in equation 3 which is a reduced form of roa whereby,

$$\bullet \quad r\hat{oa} = \hat{\pi}_0 + \hat{\pi}_1 mb + \hat{\pi}_2 pos + \hat{\pi}_3 ib + \mu_1$$

$$\text{Therefore } r\hat{oa} = \beta_0 + \beta_1 \hat{X} + \mu \quad (3)$$

Stage 2

Substitute the predicted values of endogenous variable (roa) in original model 1 and apply OLS.

$$\bullet \quad r\hat{oa} = \beta_0 + \beta_2 mb + \beta_3 pos + \beta_4 ib + \mu_1^* \quad (4)$$

$$\bullet \quad gdp = \alpha_0 + \alpha_1 (\beta_0 + \beta_2 mb + \beta_3 pos + \beta_4 ib + \mu_1^*) + \alpha_2 ir + \alpha_3 infl + \mu_2^* \quad (5)$$

Diagnostic Tests

According to Cameron and Trivedi (2005), diagnostic tests involve a variety of tests carried out as a way of assessing the sufficiency and relevancy of the model. The tests conducted are stationarity, co-integration, multicollinearity, autocorrelation, heteroscedasticity, endogeneity and the normality tests. These tests were carried out to determine whether the assumptions of 2SLS were violated.

FINDINGS

Descriptive Statistics

Table 1 shows that return on assets (roa) had the lowest standard deviation of 0.040524, depicting the lowest degree of variability as compared to other variables. This can be attributed to the stagnant financial sector growth in the period under study due to various economic factors. Internet banking (ib) had the greatest

variability of 158 852.6, attributed to ability of the internet banking platform to process high value transactions as compared to other platforms and the rise in internet banking usage which was consolidated by high investment in ICT by banks, technological advancement in the economy and cash shortages.

Table: 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Roa	32	0.036025	0.040524	0	0.1355
Pos	32	22510.39	45263.94	302.11	177095.2
mb	32	37043.48	57548.3	695.2	204858.1
gdp	32	19.9075	2.612273	17.58	26.22
ib	32	67252.85	158852.6	220.67	715129.7
infl	32	53.69875	45.29809	0	100.79
ir	32	13.26344	8.536484	6.74	40.62

Source: Author’s compilation using Stata 12.1

Stationarity Test

Augmented Dick-Fuller (ADF) and Phillips-Perron’s (PP) unit root tests confirmed that only return on asset (lgroa) and internet banking (ib) are stationary at level, whilst all other variables are stationary at first difference before running the regression. This means that the null hypothesis that the series is non-stationary can be rejected. All variables became stationary and were integrated of orders zero (I (0)) and one (I (1)). Therefore, estimation

continues without the possibility of obtaining spurious relationship.

Table: 2 Summary Statistics of the PP Unit Root Test for all Variables

Original Variable	Differenced Variable	t-statistic	Critical values at 5%	Order of Integration	Decision
Roa	Lgroa	-6.457	-3.584	I(0)	Stationary
Gdp	Dlggdp	-5.572	-3.580	I(1)	Stationary
Infl	Lginfl	-4.970	-3.588	I(1)	Stationary
Mb	Dlmb	-4.569	-3.580	I(1)	Stationary
Ib	Ib	29.731	-3.576	I(0)	Stationary
Pos	Dlpos	-5.933	-3.580	I(1)	Stationary
Ir	Dlir	-5.119	-3.580	I(1)	Stationary

Source: Author’s compilation using Stata 12.1

Multicollinearity Test

All independent variables were found to be uncorrelated, using pairwise correlation test, meaning that each one is independent of the other or are not related to each other. Thus, all explanatory variables are employed in the estimation of the model.



Table 3: Correlation Matrix Table

	Lgroa	Dlgpos	Dlgmb	lginfl	dlggdp	ib	dlgir
Lgroa	1.0000 00	0.5437	0.3523	- 0.6251	0.0185	0.488 8	0.374 5
Dlgpos	0.5437	1.00000 0	0.2525	- 0.3315	0.2099	0.164 6	0.375 3
Dlgmb	0.3523	0.2525	1.0000 00	- 0.1103	-0.0659	0.003 1	0.369 4
Lginfl	- 0.6251	- -0.3315	- 0.1103	1.0000 00	- -0.1263	- 0.521 7	- 0.295 9
dlggdp	0.0185	0.2099	- 0.0659	- 0.1263	1.00000 0	0.033 2	0.052 5
Ib	0.4888	0.1646	0.0031	- 0.5217	0.0332	1.000 000	0.309 6
Dlgir	0.3745	0.3753	0.3694	- 0.2959	0.0525	0.309 6	1.000 000

Source: Author's compilation using Stata 12.1

Autocorrelation

To detect autocorrelation, the Breusch-Godfrey Lagrange Multiplier (LM) test was used. Since the results show a probability value of 0.6886 which is greater than the test statistic of 0.05, at 5% level of significance, the null hypothesis that there is no serial-correlation is not rejected. It can be concluded that there is no autocorrelation based on Breusch-Godfrey LM test.

Table 4: Breusch-Godfrey LM Test for Autocorrelation

lags(p)	chi2	Df	Prob>chi2
1	0.161	1	0.6886

Source: Author's compilation using Stata 12.1

Heteroscedasticity

The results from Breusch-Pagan Godfrey test employed to check for heteroscedasticity show a probability value of 0.0832, which is greater than 0.05, implying the null hypothesis that there is homoscedasticity or constant variance, at 5% level of significance is not rejected, concluding that errors are homoscedastic. Therefore, the consequences of heteroscedasticity, which include large standard errors, incorrect t-calculated and F-calculated values, are eliminated and, thus, inferences made from the results obtained would be valid and reliable (Gujarati, 2004).

Table 5: Breusch-Pagan / Cook-Weisberg test for Heteroscedasticity

Variables: Fitted values of lgroa

chi2(1)	3.00
Prob > chi2	0.0832

Source: Author's compilation using Stata 12.1

H₀: There is homoscedasticity or constant variance.

H₁: There is heteroscedasticity or non-constant variance.

Endogeneity Tests

The results of a widely used general specification testing method (Hausman Specification test) detecting endogeneity problem to ascertain the use of Ordinary Least Square (OLS) or 2SLS are shown in Table 6.

Table 6: Endogeneity Tests

H₀: Variables are exogenous.

Durbin (score) chi2(1)	6.71911 (p = 0.0095)
Wu-Hausman F (1,23)	7.26189 (p = 0.0129)

Source: Author’s compilation using Stata 12.1

The endogeneity test results in Table 6 show p-values less than 0.05 meaning that they are significant, hence, there is endogeneity problem. Therefore, it means that the OLS results will be biased, hence instrumental variables estimators will be used as an alternative in this case.

Table 7: First-Stage Regression Summary Statistics

F (3,22)	12.1545			
Level of Significance	10%	15%	20%	25%
2SLS relative bias	9.08	6.46	5.39	
2SLS Size of nominal 5% Wald test	22.30	12.83	9.54	7.80

Source: Author’s compilation using Stata 12.1

Since the F-statistic value is 12.1545, which is greater than the critical values at any level of significance, the null hypothesis that instruments are weak is rejected and concludes that instruments are not weak.

In addition, Basmann and Sargan’s over-identifying restrictions tests were used to determine if the regression model has more instruments than is necessary or whether the instruments are valid or not. They give an answer to the question of whether extra instrumental variables are necessary and truly exogenous. In addition, the tests also determine whether the instruments are weak or not. The selected instruments are said to be invalid or weak if the p-values are less than 0.05 (Singh et al., 2017).

Table 8: Tests of Over-Identifying Restrictions

H₀: Instruments are valid.

Sargan (score) chi2(2)	4.77724 (p = 0.0918)
Basmann chi2(2)	4.5257 (p = 0.1041)

Source: Author’s compilation using Stata 12.1

From the results shown in Table 8, the null hypothesis that instruments are valid is accepted. This means that the instruments included in the regression model are significantly correlated with the endogenous variable (roa) because the p-values (0.0918 and 0.1041) are greater than 0.05, hence the model is perfectly identified. Thus, the selected instruments are strong, and they explain much in the variation of the endogenous variable.



Regression Results and Discussion

Table 9 presents stage 1 of 2SLS regression results. The R-squared indicates that 60.18% changes in bank's profitability is explained by the variation of mobile banking, internet banking and point of sale transactions while the remaining 39.82% is accounted for by other factors not considered in this model. Such factors may include bank size, government policies, asset quality, liquidity and deposits. These factors call for further study along their boundaries. The Adjusted R², adjusts for the number of predictors in the model, value of 0.5541 justifies the relationship and it follows that 55.41% of the dependent variable is explained by the independent variables given in the model adjusted to the effect of increased independent variables.

The F statistic was used to measure the overall significance of the model thus model specification. Results shown in Table 5 indicate F-statistic of 12.60 accompanied by a probability (F-statistic) of 0.000. Given that the prob (F-statistic) is close to zero, the model is significant. Accordingly, the model is correctly specified and can conclude that at least one of the variables in the model explains variations in profitability. There is a statistically significant relationship between the variables at the 99 % confidence level.

Table 9: First-Stage Regression Results

Dependent Variable: lgroa				
Method: 2-Stage Least Squares				
Sample (adjusted): 2012q1- 2021q4				
Included observations: 29 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Cons	2.938343	0.0502609	58.46	0.0000
Dlgpos	0.0034227	0.012724	0.27	0.790
Dlgmb	-0.105773	0.0790111	-1.34	0.193
Ib	6.17e-07	1.14e-07	5.41	0.000
R-squared	0.6018	Prob(F-statistic)		0.000
Adjusted R-squared	0.5541	F(3, 25)		12.60

Source: Author's compilation using Stata 12.1

The following equation (6) is obtained when equation 3 is substituted by the estimated coefficients:

$$lgroa = 2.9383 + 0.0034dlgpos - 0.1058dlgmb + 6.1700 ib \quad (6)$$

The results show that only internet banking (ib) is statistically significant since the p-value is less than the 5% level of significance. This is concurring with the results of previous research done by Nyoni (2020), Olusola et al. (2013) and Zandi et al. (2016), where the results show that internet banking acts as a driver of bank performance and subsequently enhances economic growth. This is attributed to the wide coverage in the use of internet even in the most remote areas of the country in cahoots with the move by banks to go paperless and

government’s policies towards enhancing financial inclusion. Therefore, it enhances its significance in explaining the Zimbabwean cashless society and its contribution towards bank performance. The positive relationship of internet banking and bank performance, which is in line with the research expectations, is due to the transactional charges, fees and commissions collected by banks from the transactions which may enhance profitability.

Mobile banking transactions (dlgmb) and point of sale (dlgpos) are not statistically significant since their p-values are more than the 5% level of significance. It has been noted that many Zimbabweans are avoiding the use of cashless platforms like mobile banking due to the complications they are associated with, where the clients could end up losing their money on failed transactions. The rise in consumer queries relating to cashless transactions is a clear indication that there is a problem in the banks’ ICT systems.

The stage 2 of 2SLS regression results is shown in Table 10. The regression includes the estimated value of roa substituted in the original model and all other exogenous variables in the system.

Table 10: Second Stage Regression Results

Variable	Coefficient	Std. Error	Z	P> z
Cons	-20.5701	6.859291	-3.00	0.003
Igroa	5.310938	2.290851	2.32	0.020
Iginfl	2.354559	0.8977748	2.62	0.009
Dlgir	1.881117	0.9589636	1.96	0.050
Dependent variable: dlggdp		Prob. > chi ² : 0.0000		
R-squared: 0.2828				
Instrumented: lgroa				
Instruments: lginfl, dlgir, dlgpos, dlgmb ib				

Source: Author’s compilation using Stata 12.1

Table 10 shows the results of Stage 2 of the 2SLS. whereby an estimate of roa (Igroa) together with other exogenous variables are regressed against gross domestic product (dlggdp). The results show that Igroa is statistically significant. Thus, cashless transactions have great explanation towards the variation of economic growth through impacting bank profitability. In tandem with the expectations of the study, the results show that the effects of bank performance to economic growth in Zimbabwe significantly influenced by the growth of cashless society. Inflation and interest rates are statistically significant as well, meaning that they significantly influence the country’s economic growth, though they show positive relationship with economic growth against what was expected.



CONCLUSIONS

The objective of the study was to examine the nexus among cashless transactions, bank performance and economic growth. This study contributes to the existing literature in two ways. Firstly, it reveals the nexus among cashless payments, financial sector and economic growth in Zimbabwe. Secondly, this paper provides evidence on which cashless payment would result in growth-enhancing effect in Zimbabwe. The findings show that there is a positive significant relationship between bank performance (roa) and economic growth (gdp). New evidence was provided to show that the rise in the use of cashless transactions enhances financial sector performance which consequently fuels economic growth. It is, therefore, recommended that the policy-makers ensure that there is financial stability in Zimbabwe.

The study shows that cashless transactions have an influence on bank performance and economic growth depicted by the positive and significant relationship between internet banking (ib) and bank performance (roa). Therefore, it is recommended to enhance the use of cashless transactions in the economy. However, the study reviews that the influence of cashless transactions on bank performance and economic growth is being undermined by point of sale and mobile banking transactions which were insignificant. It is recommended to improve information and communication technological systems which could be the cause of insignificance in the variables. Banks are recommended to invest more in developing their ICT systems to promote the flow of plastic money so that it can

significantly contribute towards the growth of the Zimbabwean economy.

Based on the findings, to realise more benefits from cashless transactions, it is recommended that the banks should work on promoting the use of other cashless payment platforms like mobile banking and point of sale. Technological development should also come as a form of innovation and invention. That includes the development of new financial services on non-cash-based payment systems. For instance, the banks should take advantage of the private sector's appetite for capital and then allow one to access credit services without visiting the brick and motor financial institution.

SUGGESTIONS FOR FUTURE RESEARCH

There are few studies in Zimbabwe which have looked at cashless transactions, bank performance and economic growth. There is room for further research in this area since it is not over-researched in Zimbabwe. The study suggests further research in the following areas:

1. The impact of cashless transactions on other sectors of the economy like Manufacturing, Mining and Agriculture.
2. Determinants of bank performance in Zimbabwe.
3. Impact of cashless transactions on SMEs' performance in Zimbabwe
4. Causality between cashless transactions and economic growth.

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