



The Foreign Exchange Auction System's Effect on SME Stability and Performance

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ABSTRACT

This study investigates the impact of foreign exchange auction systems on the viability and efficiency of small and medium-sized businesses (SMEs) in developing countries. This investigation uses a quantitative approach using a vector error correction model (VECM) for time series data. The results of SMEs growth and forex auction usage fail to show either a long-run or a short-run link, but they do reveal unidirectional causation running from forex auction usage to SMEs growth. The log of real SMEs' measure of economic activities and the log of SMEs loans as a measure of loans to SMEs have a unidirectional causation impact in the short run. This indicates that lending activities and the growth of SMEs have a causal effect on bank lending in the short run. The findings shed light on how the foreign exchange auction system can effectively be constructed to benefit small and medium-sized enterprises (SMEs), stimulate their growth, and support the stability of their economies in developing nations.

Keywords: Foreign Exchange, Auction System, SMEs Growth, Small- Medium-Sized Business

JEL Classifications: G150, G180, O430

1. INTRODUCTION

Industrial expansion is essential to maintaining an economy's rapid growth and development. According to the World Development Indicators (WDI) (2019) report, the industrial sector continues to be a key component of most growth and development initiatives in those economies and accounts for around 60% of the overall growth and development of the majority of advanced nations. According to Dai et al. (2021), small and medium-sized enterprises (SMEs) have been identified as the engine and foundation of rapid industrial expansion. The creation of jobs, the progress of technology, and domestic investment are all key components of economic growth and development for SMEs (Muriithi, 2021). In some Asian countries, SMEs have contributed to the economic boom. For instance, according to (Agesan, 2020), SMEs account for 33% of all exports and about 39% of industrial output in India. In 2020 data from the United Nations Economic Commission for Africa (UNECA) showed that over 90% of businesses, over 50% of the continent's GDP, and over 63% of

jobs were held by SMEs. Given the foregoing, recent times have seen the majority of African industrialisation projects strongly emphasise assisting SMEs.

The COVID-19 epidemic, which caused severe human suffering, impacted small and medium-sized enterprises (SMEs) across the continent (Agesan, 2020). SMEs are "distinct and autonomous business entities, together with their branches or subsidiaries, if any, including cooperative enterprises, controlled by one or more owners predominantly engaged in any sector or subsector" (Manzoor et al., 2019).

According to the World Bank, SMEs have fewer than 300 employees and a \$15 million annual turnover. SMEs employ fewer than 250 people in the UK, but depending on the industry, that number may reach 3000 in China or the US. SMEs are defined in South Africa as companies having a turnover of more than R15 million but <R500 million and more than 500 employees (Dai et al., 2021). Businesses in Zimbabwe that employ 4-40 people

and have assets ranging from \$50,000 to \$2 million (USD) were classified as SMEs by ZIMRA.

These SMEs employ eighty percent of the workforce on the continent in large economies and outsized corporations. They are, nonetheless, frequently the least resilient in times of distress (Naidoo, 2021). This is because smaller businesses often have lower cash reserves, smaller clientele, and a lower ability to handle commercial pressures than larger businesses.

Additional shocks from COVID-19 are exerting additional strain on operations for Zimbabwean SMEs, which are already struggling with a declining economy. Due to lockdown measures, many SMEs have seen a substantial decline in sales, and the majority claim that to survive, they have been forced to cut back on operational expenses. Nomba (2018) asserts that safeguarding and supporting SMEs during this economic volatility is crucial due to their crucial role in job creation and growth, as their survival and recovery will likely be a bellwether for the economy.

Small and medium-sized enterprises (SMEs) account for more than 98% of all firms, between 50 and 60% of all jobs, and 75% of private sector job growth in Zimbabwe (World Economy, 2018). There is no denying the importance of this sector for Zimbabwe's economy, even though its SMEs contribute 30% less to the GDP than other sectors, compared to South Africa's 39% and 57% in the EU. As predicted, business interruptions significantly hurt the sales and profitability of SMEs. For corporate confidence, the same is true.

Zimbabwe's economy is based on small, medium, and micro enterprises (SMMEs), and by 2030, it wants at least 90% of all new jobs to come from these rapidly growing businesses (ZIMSTAT, 2021). This goal is grounded in the knowledge that SMMEs produced 90% of all employment between 1998 and 2005 (World Bank, 2018). However, small and medium-sized enterprises frequently lack the funding to collect and analyse vital environmental data required for decision-making (Cheng et al., 2014).

The ability of small and medium-sized firms (SMEs) to advance industrialisation in Africa has been weakened by a number of barriers, chief among which is the lack of access to capital. SMEs have been identified as the catalyst and the cornerstone of rapid industrial expansion (Naidoo, 2021). For example, the economy of Zimbabwe has endured decades of underperformance, marked by an unstable market and depleted foreign exchange reserves, forcing businesses and SMEs to turn to the black market for surplus foreign currency to finance their operations. The Zimbabwean government created the foreign exchange Auction system, which went into effect on June 23, 2020, through the RBZ to reduce the pressure and stabilise the currency rate.

The auction system was introduced to increase efficiency and transparency in the economy's foreign exchange trade. Later, they implemented the second forex auction system to meet the needs of small and medium-sized businesses (SMEs) in need of foreign currency and to establish the SME sector as a trustworthy

supplier of foreign currency. The Reserve Bank's allocation of US\$6.3 million to the SMEs sector during the week ending May 27th, 2021, is supported by evidence. The sum rose from \$6.1 million the week before (May 2021). According to the Small and Medium Enterprises Association of Zimbabwe, the second quarter of 2021 showed that SMEs are a key sector of the economy, with allotments increasing by 13.5% over the third quarter of 2020. (SMEAZ).

The current study aims to assess the efficiency of SMEs concerning the stability and viability of the foreign exchange auction system if that is the case. In light of this, this study investigates the impact of the foreign exchange auction mechanism on the operation of SMEs from June 2020 to April 2022. A vector autoregressive (VAR) time series econometrics model was employed in the study to assess the relationship between exchange rate stability and SME growth.

Therefore, the primary goal of the study is to evaluate how the foreign exchange auction system has affected the performance of SMEs in Zimbabwe by providing answers to the following questions.

1. How has the exchange auction system affected the expansion of SME loans?
2. How does the weekly exchange rate affect price stability?
3. How does the exchange auction mechanism affect the performance of SMEs?

1.1. Hypothesis

1. The expansion of SMEs loans has nothing to do with the exchange auction mechanism
2. The currency auction mechanism and the increase in loan volume in the SMEs market are positively correlated.

2. LITERATURE REVIEW

The late 2000s saw the Zimbabwean dollar lose its ability to perform the typical functions of a currency due to differences in the macroeconomic policy framework and the ensuing hyperinflation (Chimhore and Chivasa, 2021). The economy consequently became unofficially dollarised. According to (Marire, 2020), a multicurrency system (with a number of legal tenders) was put into place in February 2009 following the 2008 elections and the establishment of the Government of National Unity (GNU), thereby abandoning the Zimbabwean dollar. This system remained in place until the middle of 2019 when the Zimbabwean dollar was formally reinstated (under the guise of RTGS5 dollars) and designated as the only form of legal money. On both the official and the unofficial markets, the currency's value has decreased rapidly ever since it was officially brought back into circulation. Hyperinflation ended overnight when the Reserve Bank of Zimbabwe could no longer manufacture money, which was a direct result of the de facto abandoning of the Zimbabwean dollar in 2009 and the implementation of the multicurrency regime at that time. Both of these events led to a quick – albeit temporary – stabilisation of the economy. After a period of negative growth, the economy has expanded positively since 2009, and inflation has been at historically low levels.

2.1. Exchange Rates and How They Are Determined

According to Hamilton (2018), an exchange rate is the price of one currency stated in terms of another or a set of currencies. The currency rate is a significant economic determinant for a nation like Zimbabwe, which has a small open economy but hasn't fully embraced global trade. Changes in exchange rates have a big impact on what people, corporations, and the government decide. This affects the balance of payments, inflation, and the economy simultaneously. The selection of an exchange rate type is considered in economic and political scenarios involving present concerns, future developments, and development strategies, focusing mostly on emerging nations.

According to Burton and Gilman (1991), the exchange rate affects the cost of imported goods and the profitability of export industries, affecting the inflation rate, output, and employment rate. Burton and Gilman (1991) state that a country's choice of an exchange rate system—pegged, floating, or fixed—determines the boundaries for autonomous monetary policy and affects how much an economy is touched by booms and recessions outside.

According to Labonte (2004), the floating exchange rate regime is what Zimbabwe uses with its main trading partners. According to a system with a floating exchange rate, the exchange rate is a fixed price set at random by supply and demand in the market (Dordunoo, 2020). In order to purchase products or assets from Zimbabwe, foreigners buy dollars. Similarly, Zimbabweans exchange their dollars for foreign currencies to buy goods or assets abroad. Whatever price settles, these marketplaces set the exchange rate. Employing monetary and fiscal measures to affect the exchange rate is neither routine nor systematic. Additionally, Jefferis (2020) reaffirmed that exchange rates at the other extremes—including currency boards and circumstances in which a nation lacks a different currency or legal tender (referred to as “full dollarisation”)—are “hard pegs.” Between these two extremes exist a variety of managed arrangements, including managed pegs and floats, where the value of a currency is determined to varying degrees by market forces, rules, laws, and interventions by governments and central banks.

2.2. Exchange Rate Regimes and Business Overview in Zimbabwe

It is crucial to look at Zimbabwe's Balance of Payment (BOP) to comprehend the causes of the US dollar shortage, despite the country's economy being de facto dollarised. In a nation with its currency, the central bank can issue new currency and deliver it to the banking system and the economy. This choice is not available in a nation without its currency. Following hyperinflation and the loss of the value of the Zimbabwean dollar, Zimbabwe underwent full dollarisation between 2009 and 2019. Only foreign currencies were used from 2009 to 2019, and dollarisation was complete. Dollarisation is not very exceptional, as was already said.

The three fundamental functions of a currency are to store value, to facilitate exchanges, and to act as a unit of account. Karan (2021) states that in times of economic turbulence, countries allegedly exchanged their native currencies for more reliable ones. Maguchu (2021) stressed that the black market is mostly a roadside currency

trade, exchanging the US dollar for local and other currencies in the multicurrency basket. Most commerce occurs openly on the streets of large cities and towns as if it were legal. In Zimbabwe, it is a typical economic practice for small and big enterprises alike to buy foreign cash on the street.

According to Chimhore and Chivasa (2021), the country's export revenues fell by 49%, from US\$ 2.6 billion in 1997 to US\$ 1.3 billion in 2006, as a result of the “crush” of the Zimbabwe dollar in 1997, which reduced the foreign exchange buffer. Similar to this, the actual sectors of the economy—agriculture, mining, and manufacturing—saw negative growth due to the nation's ongoing economic turmoil. In the past, Zimbabwe has pursued foreign exchange policies that have slowed the expansion of exports. For instance, the Tradable Foreign Currency Balance Systems (TFCBs), a dual exchange rate system, were implemented in 2005 due to foreign currency shortages. The Reserve Bank of Zimbabwe (RBZ), 2005, reports that the TFCBs framework was combined with a rampant wide money supply rise that increased steadily from 669.9% in May 2006 to 1.438.3% in November 2006. The monetary authorities devalued the currency due to the high speculative demand caused by the expanded money supply.

Exporters were required by the TFCB's framework conditions to retain 70% of their export revenues in foreign currency accounts (FCA) and turn over 30% to the Reserve Bank of Zimbabwe using the foreign currency auction rate set at Z\$26000 to 1 US\$. To increase the export base, the administration placed a particular emphasis on increasing commerce in services. As a result, while the services sector accounted for 50% of GDP, it only generated 10% of foreign exchange revenues (Marire, 2020). The sector comprised tourism, banking, education, health, energy, transport and communications, construction, and related engineering services (Panafrican, 2019).

In order to halt the quantitative easing strategy, the Reserve Bank of Zimbabwe suggested a 25 percentage point hike in interest rates in December 2015 (RBZ, 2016). As a result, changes in long-term interest rates affected capital flows, asset price trends, and exchange rates. Concerns over Zimbabwe's export volumes and trade balance were raised by the US dollar's strengthening versus the currency of its main trading partner, South Africa. Because of this erosion in demand, the prices of precious minerals like gold and platinum fell by 14.6% and 30.9%, respectively, in 2015 (RBZ, 2016). The US dollar's strengthening versus the Rand consequently reduced Zimbabwe's export revenues further. The government undertook a number of methods to encourage the expansion of exports.

For example, export processing zones (EPZs) were created in 1995 to promote foreign direct investments (FDI), which would later lead to an increase in manufactured exports Chimhore and Chivasa (2021). Since 2012, there has been cooperation between the Ministries of Industry and Commerce and Small and Medium Enterprises to enhance policy coordination for SME (SMEs). The ministries attempted to improve and streamline such processes to boost SMEs' access to technology and support services and promote exports (Hamilton, 2018).

In order to foster an export culture within SMEs, the export market training programme for SMEs was also formed. By pursuing new markets and encouraging the purchase of goods made locally, the programme also aimed to diversify and increase Zimbabwe's export base (Karedza & Govender, 2017). Additionally, the government has been streamlining exporting and importing processes by enhancing customs administration and removing customs delays, such as at the Chirundu one-stop border post. In addition, the duty drawback system for imported raw materials used to produce export goods was established as a motivator to boost export growth (Chimhore and Chivasa, 2021). The government took steps to resuscitate the export sector and adopted policy reforms, but over the years, persistent real exchange rate volatility and anomalies in policy undercut these initiatives. Export levels decreased despite implementing the multicurrency regime (Marire, 2020).

2.3. Foreign Exchange Auctions on Foreign Exchange Sale and Purchase

Foreign currency shortages are a significant problem for Zimbabwe's economy and trade, and they have caused acute shortages of fuel, raw materials, and imported energy. This has negatively influenced market distortions, hyperinflation, underutilisation of capacity, and the imbalance of payments. The absence of foreign money also contributes to a lack of financial assistance abroad, further burdening the economy. Zimbabweans' lives have been impacted by the socioeconomic crisis brought on by a lack of foreign money, leading to unemployment and pay degradation. The COVID-19 pandemic has put additional strain on the country's finances and foreign exchange.

The Foreign Exchange Auction Trading regime, which will replace the fixed exchange rate regime, will go into effect on June 23, 2020, according to a statement from the Reserve Bank of Zimbabwe (RBZ). The auction system seeks to reduce the gap between the public and private sectors, restock global reserves, and alleviate pressure from transient foreign currency inflows. The Reuters Forex Trading platform, a real-time electronic trading system, will be used by the auction system to improve efficiency and transparency in foreign exchange trading. On June 23, 2020, a foreign currency auction was held for the first time to guarantee a fair exchange rate with the dollar.

2.4. How the Dutch Auction System Works

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2.5. Small and Medium Scale Enterprises Auction System

Zimbabwe's economy and trade are facing a major issue of foreign cash shortages, which have led to severe shortages of fuel, raw materials, and imported energy. This has resulted in a balance of payments imbalance, underutilisation of capacity, hyperinflation, and market distortions. The lack of foreign currency is also linked to international financial support, further straining the economy. The socioeconomic crisis caused by the lack of foreign currency has also affected the lives of Zimbabweans, causing unemployment and wage erosion. The COVID-19 pandemic has further strained the national budget and foreign currency.

A market-based, official foreign exchange trading system called the Foreign Exchange Auction Trading System will be introduced by the Reserve Bank of Zimbabwe (RBZ) on June 23, 2020. The auction method attempts to reduce the gap between the public and private sectors, restock global reserves, and relieve exchange rates of the pressure from large inflows of short-term foreign currency. The Reserve Bank of Zimbabwe replaced the interbank market with weekly foreign exchange auctions to improve openness and efficiency in foreign exchange trading. Exporters' foreign currency reserves will be auctioned using the Reuters Forex Trading platform, a real-time computerised trading system.

2.6. SMES Development and Growth

SMEs are essential to most economies, especially those in emerging nations. Most businesses worldwide are small and medium-sized organisations, supporting job growth and advancing the world economy (Naidoo, 2021). Over 50% of all jobs worldwide and almost 90% of businesses are owned by them. According to Dai et al. (2021) and other researchers, formal SMEs in emerging economies account for up to 40% of the GDP. These numbers are far greater when one accounts for informal SMEs. According to our predictions, 600 million new jobs will be needed by 2030 to accommodate the growing global labour force, making the growth of SMEs a key worldwide policy concern for many nations. Seven out of ten employment in emerging markets is attributable to small and medium-sized businesses (SMEs).

Access to capital, a significant barrier to SME expansion, is the second most frequently mentioned barrier to SMEs expanding their activities in emerging markets and developing countries (Muriithi, 2021). SMEs are less likely than large businesses to be able to get bank loans; thus, they must rely on internal funds or funding from friends and family to start and run their businesses in the beginning (Agesan, 2020). IFC estimates that 65 million businesses, or 40% of formal micro, small, and medium-sized enterprises (MSMEs)

in developing countries, have an annual unmet financing need of \$5.2 trillion, which is equal to 1.4 times the amount of global MSME lending at the moment (Aidoo et al., 2021).

East Asia and the Pacific account for 46% of the global finance gap, while the remaining 16% is split between Central Asia (15%), Europe, Latin America, and the Caribbean. From area to region, gap volumes differ greatly. With estimated financial deficits and potential demand of 87% and 88%, respectively, Latin America, the Caribbean, the Middle East, and North Africa have the highest levels of both.

A large percentage of officially recognised SMEs are credit-deficient. When microbusinesses and unofficial enterprises are considered, the financial difference is far more acute (Naidoo, 2021).

The main driver of an economy's rapid and sustainable growth is generally acknowledged to be industrial growth (Agesan, 2020). The industrial sector continues to be the focal point of most of those economies' growth and development initiatives, according to the World Development Indicators (WDI) (2020) report, accounting for around 60% of most advanced countries' overall growth and development. The factors determining successful SMEs in Africa are crucial for creating policies for small and medium-sized firms (SMEs) (Ezenekwe et al., 2020). Aidoo et al. (2021) state that small and medium-sized businesses (SMEs) are the backbone and driving force behind quick industrial development. Unfortunately, various obstacles, such as a lack of access to financing, have weakened the ability of SMEs to speed up industrialisation in Africa.

Because of the increased economic activity following the Covid-19 lockdowns, our highly formalised economy has seen a rise in the demand from SMEs for foreign money. As a result, implementing a foreign currency auction system is predicted to bring order to the foreign exchange market, notably by ensuring transparency, accountability, and efficiency in Zimbabwe's foreign exchange transactions. It is commendable that the monetary policy is now in accordance with reality and that accountability and transparency are at the core of the foreign exchange market, where the auction results will be revealed and published on auction day.

2.7. Empirical Literature

Marire (2020) looked at how the parallel real estate and foreign exchange markets impacted Zimbabwe's monetary policy nexus and inflation dynamics. Although the central bank governor presided over hyperinflation from 2004 to 2008, this paper evaluates his claim that speculation and shadow printing by the financial sector were the main causes of inflation. Prior to and throughout his presidency, the dynamics of hyperinflation were fueled by corporate incest that manifested itself in the banking industry, real estate market, parallel foreign exchange market, and Zimbabwe stock exchange. Numerous problems with Marire (2020)'s study need to be resolved. The study first examines the relationship between the parallel exchange rate, inflation, money supply, and real estate prices. Some studies focused on the exchange rate-inflation nexus, parallel exchange rate-inflation

nexus, and money supply inflation nexus separately, omitting the last link in the chain of dynamic interactions. Studies have categorically disproved his theory without putting it to the test, contending that the central bank's lax monetary policy led to hyperinflation. Second, by incorporating the real estate sector in the analysis, the research is the first to evaluate Gono's assertion explicitly. Research in the field has refuted his argument, arguing that hyperinflation was a product of the central bank's lax monetary policies instead. An Autoregressive Distributed Lag modelling framework was used to construct the long-run relationships between the building materials price index, consumer price index, parallel exchange rate, and broad money supply. Within this framework, a cointegration analysis was carried out. Marire (2020) discovered a bidirectional causal relationship between the money supply, consumer price index, and the cost of building materials. The consumer price index and the building materials index, the parallel exchange rate and the consumer price index, and the wide money and parallel exchange rate all had a causal relationship.

Chimhore and Chivasa (2021) also examined how currency rates impacted Zimbabwean exports. The study aimed to use data from the multicurrency era to analyse how the exchange rate affected export growth in Zimbabwe. Currency rates greatly influence the creation and execution of policies. The study's importance lies in its ability to shed light on the effect of exchange rates on export, which aids policymakers in formulating the ideal set of policies to encourage exports. The robust regression results using the Ordinary Least Squares (OLS) approach demonstrated that imports (DDIMP) were crucial to Zimbabwe's export growth at a 1% significance level. In South Africa, the broad money supply (SAM2) was marginally significant at 10% and significant at 5%.

The Dutch Auction System (RDAS) in Nigeria, according to Umar (2010), shows persistent volatility in both the demand for foreign currency and the exchange rate. The study found a long-term relationship between the demand for foreign money, the marginal exchange rate, and the probability that bids will be approved under RDAS. As a result, both the short- and long-term demand for the exchange rate in Nigeria is highly influenced by the exchange rate and the impact of RDAS. The study uses 354 biweekly data points from the Retail Dutch Auction System (RDAS) sessions period (from July 22, 2002 to March 27, 2006), using GARCH, while the long-term relationship is modelled using the ARDL. Additionally, the proxy of the auction's influence has a favourable impact on the demand for foreign exchange, whereas the marginal rate of exchange has a negative relationship with that demand.

Kubo (2017) looked into how foreign exchange auctions affected the price of the illicit market. The probe follows the removal of the official peg and implementation of a controlled float in April 2012. The Central Bank of Myanmar has held daily two-way auctions of foreign currency to lessen fluctuations in exchange rates. The informal foreign currency market is still very common despite the modifications to the foreign exchange law. According to the analysis, neither the daily unofficial exchange rate nor the Central Bank auction data showed any reduction in conditional variance due to the auctions. Overall, the auctions have very little impact on the unofficial exchange rate. They ran a VAR analysis on a time series

model and determined that the informal rate was not the primary driver of the official rate. The study's empirical results indicate that the effectiveness of auctions as an intervention strategy has been relatively low. On the contrary, they have significantly hurt the CBM by lowering the official foreign reserves. Therefore, it is important to recognise that foreign exchange auctions are a short-term solution that should only be employed while the interbank foreign exchange market is developing.

3. METHODOLOGY

The study uses a quantitative methodology, and the Reserve Bank of Zimbabwe, the ZIMSTATS database, and World Bank economic indicators are the only primary sources of secondary data used in the analysis. A quantitative strategy allows for measuring the phenomena at several grades, which can then be validated and reliably assessed scientifically (Chappelow, 2019). The data set contains a collection of time series, and STATA statistical computer package software was used to estimate the associations between the variables. According to Prabha et al. (2014), the current study's time series model and nature make it appropriate for a well-structured explanatory research design.

3.1. Vector Autoregressive (VAR) Model

Gujarati and Porter (1999) claim that a vector of two or more variables in the system and a lagged dependent variable on the right-hand side of the equation characterise autoregressive models. A vector in the system indicates a vector with at least two variables. The VAR model is only capable of integrating variables; as a result, it can only be constructed if the series is stationary after the first difference and the variables are integrated to order one (Engle, 2002).

Therefore, if the variables are cointegrated, create a restricted VAR (VECM) model. Only the VAR model for the short term is built if there is no cointegration. There are no exogenous variables in the system; all of the variables used in the estimation process for the VAR model are endogenous (Roodman, 2009).

The dependent variable depends on its lagged values and the lagged values of the other variables in the model (Odhiambo and Tsurai, 2012). The amount of lags, k , used to estimate the model, not individual lags for each variable, is the same for all variables; there are k lags across all the variables. The VAR model is also defined in terms of levels; therefore, defining it in terms of differences would be incorrect. To estimate the VAR model, ordinary least squares (OLS) are used (Gujarati, 2009).

According to Wooldridge (2016), the VAR model is mostly utilised for estimations if the system's variables do not exhibit cointegration, and a causal connection between them needs to be established. A quantitative forecasting technique, the VAR model, is frequently used with multivariate time series data. This model explains the connection between one-time observations of a variable and the observer's earlier observations of the same variable.

3.2. Estimation of VAR

The performance of SMEs (SME) and the forex auction system (FRX), which serve as the major variables in the models

below, are examples of variables whose equations should have k lag values when estimating the VAR model. Following a straightforward equation regression, OLS estimates the equations in this situation.

$$SME_t = \alpha + \sum_{i=1}^k \beta_i SME_{t-i} + \sum_{i=1}^k \gamma_i FRX_{t-i} + \mu_{1t} \quad (1)$$

$$FRX_t = \alpha + \sum_{i=1}^k \beta_i SME_{t-i} + \sum_{i=1}^k \gamma_i FRX_{t-i} + \mu_{2t} \quad (2)$$

Where the k lag length, $\pm \alpha$ intercept, and γ_i and β_i are the short-run coefficients, the μ_{2t} are the stochastic error factors, often known as impulses, innovations, or shocks in VAR systems.

Prior to performing the model estimates in VAR estimations, the maximum number of delays, k , must be chosen. A degree of freedom will be lost if numerous lags are involved, and model specification errors will result if few lags are used (Prabha et al., 2014). As a result, Akaike and Schwarz's techniques choose the greatest number of delays.

VAR has proven to be a useful technique for forecasting and characterising the dynamic behaviour of time series in the financial and economic sectors (Gujarati, 2009). Forecasts from the VAR model can be built in various ways since the expected future courses of some model variables can be conditional (Vo et al. 2019).

3.3. Stationarity Test

Gujarati (2009) states that a stochastic process is stationary if its mean and variance remain unchanged. Instead of the computation time itself, the covariance value between the two time periods is determined by the distance, lag, or gap between them. Since the study used time series data, the stationarity of the series must first be tested before the VAR model can be performed.

The regression findings cannot be used for inference if the data are not stationary since they are erroneous and do not indicate mean reversions (Nielsen, 2005). It follows that the series' data generation method did not entail creating data from about zero. The variables must be steady to use the VAR model. In econometrics, stationarity is tested because the regression findings are unreliable if the series are nonstationary. Therefore, the data's behaviour may be studied over the period under consideration. It won't be simple to extrapolate the series to other eras. If the data is nonstationary, forecasting cannot be performed on it, and it will be of little service to anyone.

When a dataset contains two or more nonstationary time series, the regression analysis results are fictional or nonsense (Gujarati and Porter, 1999). The findings are unreliable and cannot be used for structural inference or policy analysis. Testing for stationarity in the time series is essential for the abovementioned causes.

The empirical Dickey-Fuller (DF), augmented Dickey-Fuller (ADF), and Phillip Perron (PP) tests are used to find the unit roots in the dataset.

The augmented Dickey-Fuller test ought to be utilised, according to Elliott et al. (1996). The following is how the premise is laid down in ADF unit root tests:

H0: There is no stationary trend or unit root in the variables.

(H1): The variables are stationary.

In order to make the variables stationary for ADF, the variables must normally be differencing initially. The null hypothesis is rejected, and the alternative hypothesis—that the variables are stationary—is accepted if the test statistic is higher than the key value of 5%. The absolute value is what the ADF test employs. The variables, however, become nonstationary if the ADF test statistics fall below the critical value, making it impossible to evaluate the causality between the instruments.

3.4. Cointegration Test

In econometrics, cointegration measures and tests stationarity linear linkages or cointegration links between nonstationary time series variables. If two or more nonstationary series have the same order of integration and their linear combination is stationary, cointegration exists between them. A long-run equilibrium relationship between two or more variables is called cointegration. The Eagle Granger, Augmented Eagle Granger, and Johansen cointegration tests detect if two or more time series are integrated (Gujarati, 2009). The empirical literature often uses the Johansen and Eagle Granger cointegration tests.

Assume the variables in the first difference (integrated of order one) are stationary. In that situation, a cointegration test between the variables is required to determine whether they have a long-term relationship. In this research, STATA 15 was used to conduct Johansen tests for the cointegration technique. The cointegration test in STATA assumes that the variables should be in level form rather than their first difference form, or if in log transformation of their raw form, Johansen suggests that it is still preferable to the first difference form.

As stated in the hypothesis:

H0: No cointegration equation

H1: Cointegration equation exists.

The Johansen cointegration test's decision criterion is invalid at a value of 5%. If the Max and Tracy statistics are more significant than the 5% critical value (Max and Tracy > 5% critical value), the null hypothesis is rejected; if not, it is not.

Cointegration suggests that the variables have a long-term relationship; the series are connected and can be combined linearly. Additionally, it means that even if there are short-term shocks that may impact the movement of the individual variables, they will eventually converge over time. As a result, in econometrics, we estimate both short-run and long-run models. If so, vector autoregressive (VAR) and vector error correction model (VECM) cointegration estimates are computed (Gujarati, 2009). Additionally, only VAR is computed in the absence of cointegration.

3.5. Data Sources And Issues

The study examined monthly time series data from June 2020 to April 2022, primarily to test for the time frame during which the auction mechanism was first implemented. The study considers four variables: the growth of SMEs, price index, foreign exchange rate, and SMEs loan growth.

This study focuses on SMEs' loans rather than the size of the asset base or deposit liabilities. However, it can be tough to ignore the size of SMEs because certain institutions might have a sizable clientele while others might not. The study will only look at the total loans overall and SMEs loans; it will not look at who has benefited from the services, such as women or young people, or what industry they operate in. Zimbabwe has a sizable informal sector; thus, measuring access to these services is impossible, which is another study's weakness. As a result, the analysis depends on publicly accessible data, mostly loans made to SMEs from the Reserve Bank of Zimbabwe and ZIMSTATS.

3.6. Dependent Variable

The performance of small and medium-sized enterprises (SMEs) is the dependent variable in this model; information was gathered via the SME auction system. By accepting their weekly allotment of the manufacturing budget under the auction system, SMEs are used as a proxy for changes in SME growth. Because more SMEs participated in the SMEs auction system than in the main auction, more than 80% of Zimbabwe's economy is made up of small enterprises, according to the report. The manufacturing allotment was thus employed in this study to gauge the performance of SMEs. to evaluate the effect of the auction mechanism on the expansion and effectiveness of SMEs.

3.7. Independent Variables

The interbank currency exchange rate (FRX), which the RBZ determines through a weekly auction mechanism, was utilised in the study as a proxy for the formal exchange rate, which served as the primary independent variable. The Auction system was established to offer access to forex and increase the distribution efficiency of the scarce forex; hence the variable measures the access to financial resources each SMEs has. The information was gathered from Reserve Bank of Zimbabwe auction results, released every Tuesday.

Growth of SMEs loans, The second independent variable tracks the expansion of loans made to small and medium-sized businesses. Business bank loans to SMEs serve as a stand-in for it. Growth in lending to SMEs was selected since it has frequently been used as a control variable in studies like this (Bae et al., 2012). It positively correlates with income creation and welfare and has a demonstrated favourable impact on the development and performance of SMEs (Awan et al., 2019). The chance of SMEs failing decreases as loan quantities to SMEs increase. Statistics for 2020-2022 on the Reserve Bank of Zimbabwe website were used to determine the SME loan variable data.

Data was gathered from the ZIMSTAT and RBZ statistics to measure the stability of market pricing using the Consumer Price Index. The consumer price index depicts the typical price

change consumers spend overtime on a selection of products and services. This is how experts in the fields of economics and finance recognise and calculate inflation. The aggregate pricing levels of the economy can also be used to gauge the cost of living throughout an entire nation or in a particular region. As a result, it gauges the total change in consumer prices over time using a sample of goods and services.

3.8. Empirical Model Specification

The forex auction mechanism's relationship with SME performance is examined using the empirical model. The study used time series econometrics, namely the vector autoregressive (VAR) model, which looks at the relationships between various factors and the performance of SMEs throughout a single country.

Four dependent variables are included in the VAR model: price index (PIX), SMEs performance (SME), SMEs performance loans (SMLG), and forex auction system (FRX). In a VAR system, the dependent variable is dependent on its own lagged values and the lagged values of the other variables in the model, according to Gujarati (2009). In addition, Anderson and Hsiao (1982) note that the model is presented in levels rather than differences to avoid misspecification. Every variable in the VAR system is expressed as a function of an identical number of lags (k) of the variable and every other variable in the system (Gujarati and Porter, 1999). Four variables call for the estimate of four endogenous, or system-derived, VAR models, each of which has four independent components. For this reason, testing the statistical relationships between the variables in econometrics requires four main steps: first, specifying the model, then determining whether the variables are stationary, checking the cointegration or determining the long-run relationship, and finally, running the VAR model (or VECM if the variables are cointegrated). A general description of the model is as follows in light of the discussion above:

$$Y_{i,t} = \delta + \sum_{i=1}^k \beta_i Y_{i,t-1} + \sum_{j=1}^k \phi_j X_{j,t} + \sum_{m=1}^k \theta_m R_{m,t} + \sum_{r=1}^k \lambda_r W_{r,t} + \mu_t \tag{3}$$

Were,

Y_t dependent variable, Y_{t-1} lagged dependent variable ($X_{t-j}, R_{t-m}, W_{t-r}$) lagged independent variables, δ intercept, $\beta_i, \phi_j, \theta_m, \lambda_r$ short-run coefficients, μ_t residuals, k number of lags

Following VAR specified, the initial vector implication is captured in the following system of the model with specific variables to be tested; since there are four variables, it means also the are four equations, each being a dependent variable of the other as given below,

$$InSME_t = \phi + \sum_{i=1}^k \beta_i InSME_{t-1} + \sum_{j=1}^k \lambda_j InFRX_{t-j} + \sum_{m=1}^k \theta_m InSMLG_{t-m} + \sum_{r=1}^k \phi_r InPIX_{t-r} + \mu_{1t} \tag{4}$$

$$InSMLG_t = \alpha + \sum_{i=1}^k \beta_i InSMLG_{t-1} + \sum_{j=1}^k \lambda_j InFRX_{t-j} + \sum_{m=1}^k \theta_m InSMLG_{t-m} + \sum_{r=1}^k \phi_r InPIX_{t-r} + \mu_{2t} \tag{5}$$

$$InPIX_t = b + \sum_{i=1}^k \beta_i InPIX_{t-1} + \sum_{j=1}^k \lambda_j InFRX_{t-j} + \sum_{m=1}^k \theta_m InSMLG_{t-m} + \sum_{r=1}^k \phi_r InPIX_{t-r} + \mu_{3t} \tag{6}$$

$$InFRX_t = \lambda + \sum_{i=1}^k \beta_i InFRX_{t-1} + \sum_{j=1}^k \lambda_j InFRX_{t-j} + \sum_{m=1}^k \theta_m InSMLG_{t-m} + \sum_{r=1}^k \phi_r InPIX_{t-r} + \mu_{4t} \tag{7}$$

Where $InSME$ is the SMEs performance, $InFRX$ is the measure of the formal forex exchange rate, $InSMLG$ is the measure of SMEs loan growth, $InPIX$ is the measure of price index, k is lag length, and $\beta_i, \phi_j, \theta_m, \lambda_r$ are short-run dynamic coefficients of the model, $\mu_{1,2,3,4}$ residuals (stochastic error terms often called impulses, innovations, or shocks).

3.9. Post-Estimation Diagnostics Tests

The diagnostic tests are essential components of the VAR system because they monitor the model's dependability, confirm that the model is stable, establish that the errors are not serially connected, and verify that residuals are normally distributed. These tests also confirm that the model is liable and stable. The diagnostic procedures include performing normality tests, autocorrelation testing, stability tests, impulse response function tests, and heteroscedasticity tests.

4. RESULTS AND DISCUSSION

4.1. Stationarity Test Results

Before the scientific testing of the stationarity of the variables, the data were subjected to virtualise their movement by performing spurious regression and observing the value of R-squared and Durbin-Watson d-statistics as shown in Table 1, as suggested by (Engle, 2002; Engle and Granger, 1987).

In Table 1 above, since the R-squared value exceeds the Durbin-Watson d-statistic, the erroneous regression results demonstrate that the series is not stationary. According to the general rule, a series is nonstationary, and regression is spurious when the R-squared is higher than the Durbin-Watson d-statistics. Regression results cannot be used to generate hypotheses, make predictions, or make forecasts. The dataset's stationarity was therefore tested. Dickey-Fuller and Phillips-Perron tests in this study enhanced the unit root tests for robustness to verify stationarity within series. Because the Augmented Dickey-Fuller test examines higher-order autoregression, Baumohl and Lyocsa (2009) suggested that it is preferable to the standard Dickey-Fuller test.

For unit root, the augmented Dickey-Fuller test (ADF) was employed. Data were not stationary in level I (0); variables had to

be changed to level I (1) of the first difference for them to become stationary. The ADF test statistics for levels I (0) and the first difference I (1) of the four model variables are shown in Table 2. Because the test statistics for all variables were below the 5% threshold value, the results for both levels were not rejected. The variables are thus nonstationary.

Additionally, ****yardsticks are used to denote the testing results for the first difference. The first difference results demonstrate that the logs of SME performance, formal exchange rate (FRX), SME loan growth, and price index (PIX) are stationary. At the 5% significant level, the nonstationary null hypothesis of the first difference is rejected. The variable was steady; hence the initial difference results were applied. If the test statistics fall below the 5% critical value, the ADF test decision criterion rejects the alternative hypothesis; if they exceed the 5% critical value, the alternative hypothesis is accepted. According to Table 3's results, all test statistics at first difference are higher than the 5% critical threshold, showing that the variables are stationary and the null hypothesis is rejected. The following step tests the long-term relationship between the variables in the equations.

4.2. Cointegration Relationship Test Results

The time series data were not stationary in levels I (0), according to the findings of the stationarity test. The outcome turned stationary when the investigation tested for stationarity at the first difference. The variables, therefore, become stationary at the first difference

or I (1), which denotes that the series are of order one integration. To determine whether a long-term relationship exists in that case, cointegration was crucial. Johansen's cointegration test was applied, and according to its decision criteria, the null hypothesis should be accepted if the trace and maximum statistics are higher than the 5% cutoff. As a result, the following can be said about the null and alternate hypotheses:

Maximum rank of 0

H0: 0 means that there are no cointegration equations among the variables; and

H1: H0 is not true.

Maximum rank of 1

H0: There is one cointegration equation.

H1: There are no cointegration equations.

Cointegration suggests evidence of a long-term relationship among the variables; in this case, there is a long-term relationship between the performance of SMEs, the forex auction rate, the growth of SMEs loans, and the price index. The results of the Johansen cointegration test are shown in Table 4 below, and they indicate that the variables are integrated over the long run, indicating that the VECM model must be employed to determine whether the variables are cointegrated over the long run.

As can be seen from the results of the cointegration tests in Table 4 above, at a maximum rank of 0, the trace and max statistics are greater than the 5% critical values. As a result, the null hypothesis—according to which there are no cointegration equations—was rejected, and the alternative hypothesis—according to which there is cointegration among the

Table 1: Spurious regression test-checking stationarity

R-Squared (R2)	Durbin-Watson d-statistics
0.8769	0.6235

Source: STATA author permutations

Table 2: Augmented dicker fuller test results

Model 1-ADF	ADF test Z (t)	1% critical value	5% critical value	10% critical value
H0: The level of the variable is nonstationary				
InSMEs	1.913	4.110	3.482	3.169
InFRX	1.228	3.534	2.904	2.587
InSMLG	1.626	3.534	2.904	2.587
InPIX	1.190	3.621	2.947	2.607
H0: The first difference of the variable is nonstationary				
InSMEs****	3.188	3.535	2.904	2.587
InFRX****	7.099	3.535	2.904	2.587
InSMLG****	2.904	3.535	2.661	2.587
InPIX****	4.821	3.634	2.952	2.610

****indicates the first difference of the variables

Table 3: Phillips-Perron test for unit root

Model 2: PPT	PP test statistics Z (t)	1% critical value	5% critical value	10% critical value
H0: The level of the variable is nonstationary				
InSMEs	2.534	4.380	3.600	3.240
InFRX	3.201	4.380	3.600	3.240
InSMLG	2.133	4.380	3.600	3.240
InPIX	2.518	4.380	3.600	3.240
H0: The first difference of the variable is nonstationary				
InSMEs****	6.220	4.380	3.600	3.240
InFRX****	6.466	4.380	3.600	3.240
InSMLG****	5.959	4.380	3.600	3.240
InPIX****	5.783	4.380	3.600	3.240

Note. **** indicates the first difference of the variables

variables—was accepted. The results indicate that trace statistics is smaller than the crucial value at 5% and accept the null hypothesis that cointegration exists among the variables. The null hypothesis is that a single cointegrating equation exists among the variables at a maximum rank of 1. The variables are cointegrated at their highest ranks of 2 and 3, indicating a long-term association. The same conclusions are drawn from these data.

The null hypothesis indicates whether there is cointegration when the maximum rank is 0, one when the maximum rank is one, and two when the highest rank is two. These findings led the researchers to conclude that there was a long-term cointegration relationship between the variables of SMEs loan growth, price index, FX auction rates, and SMEs growth.

Given that the variables have a long-term correlation, as determined by the Johansen cointegration test, the study will employ VECM estimation to examine the causal relationships between the variables. With the long-run model (VECM model), the next subsection discusses how the auction system affects the performance of SMEs.

5. EMPIRICAL RESULTS

The first step of the study was to specify the model, followed by testing the stationarity of the dataset and cointegration test to establish the long-run relationship; the second step was to determine the relationship between the auction system and SMEs performance variables by using SMEs loan growth and price index in the short and long run; the third step was to determine the relationship between SMEs performance variables and the auction system. The cointegration test and the long-run link between the

variables were revealed because the series was stationary after the first difference. After the variables were found to have a long-term relationship with one another using the Johansen cointegration test, the VECM model was used to assess the influence that the FRX auction system would have on the growth of SMEs.

According to the findings above in Table 5, the VECM model automatically converts the estimated model's dependent variables, SMEs converted to D_SMEs, SMEs loaned to D_SMEs, and price index to D_price index, from their log form to the first difference.

The long-term connection between the variables is calculated using L_cel, the error correction term (ECT) produced from the regression findings. It represents the residuals' lagged value that resulted from the cointegrating regression of the dependent variables on the regressors. The ECT includes long-term data gathered from the cointegrating interactions over an extended period. An appropriate model for ECT should have a negative indication. The models used for this investigation confirm that all coefficients are negative, proving that all estimates were accurate. These models have the following coefficients: -0.175 equation 1 with D_SMEs as the dependent variable, -29.81 equation 2 with D_Forex as the dependent variable, -0.0537 equation 3 with D_SMEs loan as the dependent variable, and -0.590 equation 4 with D_price index.

The model's estimation results from the error correction model (ECM) as depicted in Table 5 are represented by the system as (1-ec). According to cointegration equation 1, the model included a single error term. The model determined the long- and short-term causal linkages among the FX auction rates, SME growth, SME loans, and price index. The coefficients of ECM, the cointegration equation one, which are -0.175 , -29.81 , -0.0537 , and -0.590 , respectively, in the four estimated models, demonstrate long-run causality.

Equation 4 describes the regression model. The dependent variable is the log of SMEs, ECT represents long-run causality in the model, and LD.SMEs, LD FOREX, LD.SMEs loan and LD. are all included. The PRICE INDEX is an independent factor. When all other variables are held constant, the coefficient of ECT (-0.175) is statistically significant at the 1% level, showing a long-term

Table 4: Johansen Cointegration Test Results

Maximum rank	Trace statistics	Max statistics	5% critical value (trace)	5% critical value (max)
0	58.0917	35.4411	47.21	27.07
1	22.6506	18.7014	29.68	20.97
2	3.9491	3.8874	15.41	14.07
3	0.0642	0.0642	3.76	3.76
4	-	-	-	-

Table 5: Vector error correction model estimates

Variables	D_SMEs (Economic growth)	D_Forex (Tobin'Q)	D_SMEs loan Derivatives	D_Price index (Bank lending)
L_cel	-0.175^{***} (0.0435)	-0.590^{***} (0.156)	-29.81 (92.98)	0.0537 (0.0615)
LD.SMEs	0.230^{**} (0.0989)	0.0858 (0.354)	74.03 (211.3)	-0.133 (0.14)
L.D. Forex	0.0455 (0.0299)	-0.349^{***} (0.107)	4.936 (63.89)	0.0159 (0.0423)
LD. SMEs loan	-0.0000 (0.0000)	0.0000 (0.0000)	0.0231 (0.114)	0.0000 (0.0000)
LD. Price index	0.0501^{**} (0.0767)	0.241 (0.275)	-57.37 (163.9)	0.234^{**} (0.108)
Constant	-1.586^{***} (0.393)	-5.306^{***} (1.409)	0.115 (840.2)	0.593 (0.556)
Observations	86	86	86	86

Standard errors are in parentheses *** , ** , * indicating significant at $P < 0.01$, $P < 0.05$, $P < 0.1$ respectively

relationship between the performance of SMEs as a measure of economic activity and forex auction rates, SMEs' loan growth, and the price index. The error correction term calculates the influence of long-term causality. The evolution of the FX auction system, SMEs loans, and price index affect a country's overall economic activity over the long run, as evidenced by a statistically negative link in the model, according to Equation 3.4.

Equation 4.5, which uses the main variable of the interest forex auction system as the independent variable and the dependent variable as the forex auction, demonstrates that the ECT, the long-term influence of the exchange rate, and the expansion of SMEs do not adequately illustrate the importance of the forex auction in the economy. The lack of statistical significance of the ECT suggests that currency auction rates are not impacting the growth of SMEs.

Additionally, although it was not statistically significant, SME loans had a beneficial short-term influence on SME growth. It is theorised that banks lend money to businesses so they can finance investments that stimulate economic growth. The business value impacted Long-run economic activity, as shown by the long-run equation's negative correlation, which is statistically significant at the 1% level. The independent variables of equation 4 show the short-run, where there is a unidirectional causal relationship between the log of real SMEs and the log of SMEs loans. As a result, short-term SMEs growth results from SMEs loan operations. In the near run, the expansion of SMEs and the price index are unrelated and do not influence one another.

The results of equation 6's model regression, which used the log of SMEs loans as the dependent variable, demonstrated that SMEs loans are not statistically significant over the long term with an ECT coefficient of -0.0537 . The SMEs loans and growth variables were associated over a short period of time by unidirectional causality. This means that as the economy grows, banks can lend to SMEs more frequently, promoting increased productivity. As a result, in the short term, there is a one-way causal relationship between bank lending activity and SME growth. Due to the increased demand for financing brought on by the expanding economic activity, banks are channelling more funding in the short term. A short-run, unidirectional causal association between bank lending and price index also exists and is substantial at a 10% level. It runs from price index to SMES loans. According to the economic implication, banks are the main force behind SME growth, and corporate lenders fund short-term investment opportunities and expansion.

The results summary shows that for the estimated model made using Stata 15, the ECT equations are statistically significant at 1% over the long term. The data show that a 1% unit increase in forex, SMEs loans, and price index growth led to a 0.175% increase in SMEs growth at the 99% confidence level and that a 1% unit increase in SMEs loan growth enabled a 0.590% growth in economic activity at the 99% confidence level. Finally, the data show that forex and SMEs loans as dependent variables were not statistically significant.

According to the results, the predicted availability of foreign exchange has minimal bearing on SMEs' long- or short-term

growth. This may mean that Zimbabwe's currency auctions are not sufficiently developed to contribute to the growth and development of SMEs and that the expansion of SMEs is not driven by foreign exchange. The transmission of long-run information in the equations is described in the following table:

As shown in Table 6, the long-run equation was analysed using the Johansen normalisation constraint, with the restriction being applied to SMEs, the study's goal variable. The results in Table 6 reflect the ECT cointegration equation, which is the source of the error correction term. The signs of the coefficients are switched around, turning the negative SMEs loans -0.063 into a positive 0.063 . The forex and price index adversely impact the long-term growth of SMEs. The impact of the exchange on SMEs was favourable.

Given that it hinders the expansion of SMEs, forex availability is also not statistically significant. A 1% statistical significance level for SMEs loans and price index coefficients is reached. The long-term data from the ECT extract demonstrates that a 1% change in the growth of derivatives will result in a 0.00% decrease in the growth of SMEs; the rate is negligible. A 1% change in SMEs loans also has a 0.63% negative impacts on SMEs' growth. A 1% rise in the pricing index will boost SMEs' growth by 3.13%. In conclusion, the rising exchange rate indirectly harms Zimbabwe's SMEs, contrary to emerging countries' ideas.

5.1. Granger Causality Test

The Granger causality test was used to determine the direction of causation between the variables to comprehend the causal link between them better. The Granger causality Wald test was computed to determine the direction of the causal association between the expansion of SMEs and currency auction rates. First, there is no short-run causal effect because the Chi-squared values for the forex auction, price stability, and SMEs loan growth are more than 0.05. This explains why there were no short-term causal relationships between the variables. The Chi-squared and the findings in Table 7 are all >0.05 .

5.2. Post-Estimation Diagnostic Tests

After estimation and testing of the dynamic model with VECM, the results were diagnostically tested for the models' autocorrelation, stability and reliability and are presented in Table 8 below.

5.3. Autocorrelation Test

The null hypothesis establishes the absence of lag order autocorrelation. To test for autocorrelation, two lags were

Table 6: Extract of ECT from Stata (error correction equation)

Beta	Coefficient	SE	Z	p> z	95% conf.
ECT					
SMEs	1				
Forex	0.001	0.000	1.20	0.231	-0.000
SMEs loans	-0.063	0.032	-1.95	0.052	-0.126
Price index	0.313	0.108	2.90	0.004	0.101
Constant	-6.030				

Source: Extract from Stata estimations

Table 7: Granger/Wald causality test

Null hypothesis	Chi 2
FRX does not granger cause SMEs	0.3273
SMEs loans do not granger cause SMEs	0.5137
Price index does not granger cause SMEs	0.1282
SMEs do not granger cause FRX	0.7261
SMEs loans do not granger cause FRX	0.0.7264
The price index does not granger cause FRX	0.9384
SMEs do not granger cause SMEs loans	0.3406
FRX does not granger cause SMEs loans	0.9906
The price index does not granger cause SMEs loans	0.7064
SMEs do not cause Price index	0.8086
FRX does not granger cause Price index	0.9566
SMEs loans do not granger cause the Price index	0.3813

Standard errors in parentheses ***P<0.01, **P<0.05, *P<0.1

Table 8: Autocorrelation testing: Lagrange-multiplier test

Lag	Chi-square	Df	Prob >Chi-square
1	32.468	16	0.524
2	20.133	16	0.214

H0: No autocorrelation at lag order

Table 9: Normality testing: Jarque-Bera test of normality

Equations	Chi-square	Df	Prob >Chi-square
D.SMEs	2.260	2	0.323
D_FOREX	1.355	2	0.508
D.SMEs loans	0.462	2	0.793
D.Price index	1.230	2	0.541
ALL	12.265	8	0.140

Table 10: Eigenvalue stability condition

Eigen value	Modulus
1	1
1	1
1	1
0.5439	0.5439
0.4199	0.4199
0.2666	0.3268

The VECM specification imposes 3-unit moduli, reflecting that the model is stable

utilised. The P-value at lag one is 0.524, which is higher than the threshold criterion of 5%. Since there is no autocorrelation, the null hypothesis (H0) is accepted. Lag 2 has a P=0.214, which is greater than 5%. Once more, because there is no autocorrelation, the null hypothesis (H0) is accepted. The model is useful and the right one to employ.

5.4. Residual Normality Test

To assess if residuals are regularly dispersed, the Jarque-Bera test was utilised Jarque and Bera, 1987) depicted in Table 9. The P-value of the target variable, SMEs, is 0.323, which is higher than the threshold of 5%. So, it is recognised that the null hypothesis is true (H0). Because the residual is regularly distributed, the model is desirable. The distribution of all the variables is normal. The model is therefore approved and utilised to examine SME growth utilising price indexes, SMEs loans, and currency auction rates.

5.5. Stability Tests

The VECM states that the model will have (K-r) unit moduli, thus the k represents the number of endogenous variables in the model

and r is the cointegrating vectors. Thus the VECM model in this study had four endogenous variables and one cointegrating vector, therefore Table 10 illustrates the results of the model stability.

6. CONCLUSION

The findings on the growth of SMEs and the use of forex auctions do not support either a long-run or a short-run association; rather, they hint at a one-way causal relationship between the use of forex auctions and the growth of SMEs. In the short run, there is a unidirectional causation influence between the log of real SMEs as a measure of economic activity and the log of SMEs' loans as a measure of loans to SMEs. This indicates that lending activities and SMEs' growth have a causal effect flowing from bank lending. Long-term data from the ECT extract demonstrates that a 1% change in SME loans will lead to a 0.063% yearly gain in SME numbers, whereas a 1% change in firm value will result in a reduction in SME numbers expanding by 3.13% over time. These findings are based on the relationship between the two variables.

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