**An Empirical Assessment of the Exchange Rate Pass-through in Zimbabwe (2019-2023).**

**Banda Ignetious Farai: University of Johannesburg (**[bandafari99@gmail.com](mailto:bandafari99@gmail.com)**. 0774187302)**

***Purpose:*** The purpose of this study was to examine exchange rate pass through in Zimbabwe since the re-introduction of the local currency. In particular, the study assess whether ERPT is complete and symmetric in the context of Zimbabwe. There is no study that has compared the US dollar and South African Rand in the Zimbabwean economy. The research questions are posed as what is the nature of ERPT in Zimbabwe since the re-introduction of the local currency? And is ERPT asymmetric in Zimbabwe? Which currency has a significant impact on the domestic prices?

***Methodology:*** The study adopted the Vector Error Correction Model to analyse ERPT in Zimbabwe. In addition, impulse response function and variance decomposition were used to determine ERPT asymmetry in Zimbabwe. VECM was also used to compare the effect of US dollar exchange rate and South African Rand exchange rate on the domestic prices. Monthly data from June 2019 to August 2023 was used.

***Findings:*** The study results showed that ERPT is incomplete as the change in the domestic prices is not proportional to the changes in the exchange rates. A 1% appreciation of the USD Exchange rate and Rand Exchange Rate (depreciation of local currency) is associated with a 7.13% and 7.31% increase in the domestic prices respectively in the long run. In addition, there is ERPT asymmetry such that depreciation of the local currency result in greater changes in the domestic prices compared to appreciations. The study results also show that domestic prices are more responsive to the South African Rand compared to the US dollar exchange rate hence the variations in the domestic prices emanating from the South African Rand are greater than the variations from the United States dollar exchange rate.

***Practical implication:***The study results show the need to ensure local currency appreciation in order to minimise pass through to domestic prices. One potential measure to enhance the official exchange rate is to introduce increased flexibility by implementing a more transparent and market-driven mechanism for price discovery in the RBZ FX auctions. In addition, since the economy adopted monetary targeting, it is prudent to have money based stabilisations. Zimbabwe can continue targeting broad money base with a tight monetary policy that mops up excess liquidity in the economy and reduces exchange rate overshoot hence controlling inflation. Furthermore, it is necessary for the central bank to conduct a survey of inflation expectations as these influence the interaction between exchange rates and inflation.

***Novelty:*** According to the author`s knowledge, this is the first study to focus on ERPT in Zimbabwe after the re-introduction of the local currency

# INTRODUCTION

The exchange rates have significant implications for both the internal and external balance of an economy. The importance of exchange rate dynamics has been recognised from the time of Hume (1742) and his concept of the price-specie flow mechanism. The economy is influenced by exchange rate variations through multiple pathways, including their effects on imports, exports, and capital flows (Parsley, 2010, p. 1). Based on economic theory, it is posited that inflation can be influenced by exchange rate depreciation (Karoro et al., 2009). Monetary policy makers have a particular interest in comprehending the significance of each factor of inflation. An enhanced comprehension of the impact of exchange rate movements on domestic prices, sometimes referred to as exchange rate pass-through, is crucial for selecting the most effective combination of monetary policies to maintain price stability (Choudhri & Hakura, 2016). The rationale for studying exchange rate pass-through analysis is grounded in the necessity to comprehend the impact of economic cycles, trade imbalances, and particularly fluctuations in exchange rates on domestic pricing and monetary policy (Devereux & Yetman, 2014). It has been noticed that incorporating import prices and the exchange rate into inflation forecasting models has a tendency to enhance the accuracy of forecasts, which serve as the foundation for making monetary policy decisions (Caselli & Roitman, 2019). Exchange rate pass-through (ERPT) refers to the extent to which fluctuations in exchange rates are reflected in the pricing of goods and services within a certain nation.

When considering monetary policy, it is crucial to understand the degree to which prices react to changes in currency exchange rates. A low ERPT implies that even a significant devaluation or depreciation of the currency would have minimal inflationary effects (Phuc & Duc, 2021). Conversely, a high ERPT indicates that inflation is more susceptible to currency shocks. Depreciation refers to a decline in purchasing power per unit of currency, which therefore suggests that an inflationary exchange-rate pass-through is likely to lead to a rise in the cost of goods and services in relative terms (Caselli & Roitman, 2019). Nevertheless, there has been a significant amount of discussion surrounding the transmission mechanism and channels by which this hypothetical exchange rate pass-through (ERPT) affects the economy, specifically in relation to inflation (Vo & Nguyen, 2017). According to Forbes (2016), there exists a notable deficiency in the comprehension of the precise impact of exchange rate fluctuations on inflation.

The long-term stability of the exchange rate pass-through (ERPT) has been extensively discussed in the macroeconomic discourse. Numerous scholarly investigations have examined the exchange rate pass-through (ERPT) to import and consumer prices, mostly in industrialised nations, indicating a decline in its magnitude during the 1990s (Phuc & Duc, 2021). In a low inflation environment, the expectation of low future inflation rates has the effect of reducing Exchange Rate Pass-Through (ERPT). This is due to the influence of expectations on the magnitude and length of inflation's divergence from its natural level, as discussed by Taylor (2000). The aforementioned feature plays a significant role in driving higher Exchange Rate Pass-Through (ERPT) in developing economies. In such nations, a heightened inflationary environment contributes to the increased persistence of depreciation shocks (Choudhri & Hakura, 2016).

Research on African economies generally agrees on the primary factors that drive inflation. These factors are primarily related to monetary and exchange rate influences, which are a result of central banks monetizing high fiscal deficits. Additionally, as African economies underwent a gradual process of liberalisation in the 1990s, these influences became more prominent (Chipili, 2021). Moreover, a substantial body of research supports the notion that the exchange rate plays a crucial role in influencing inflation levels across the majority of African nations (Saungweme, 2021). This observation highlights the excessive dependence of African economies on the importation of intermediate and final consumer goods, while maintaining a primary focus on exporting raw commodities and possessing a limited manufacturing sector. As a result, African economies continue to be susceptible to fluctuations in exchange rates and external inflationary pressures.

The Reserve Bank of Zimbabwe is responsible for monetary policy in Zimbabwe with monetary targeting framework in place. In 2009, the Zimbabwean government implemented the multicurrency system after a period of hyperinflation, which resulted in the relinquishment of the country's authority to choose its exchange rate due to the absence of a domestic currency within the currency basket (Matanda, et al., 2018). Despite the recognition of multiple currencies as valid forms of legal cash, the prevalence of the United States Dollar (USD) and the South African Rand (ZAR) was much greater in comparison to other currencies (Pindiriri, 2012; Kavila & Le Roux, 2016). In the year 2019, the government implemented the introduction of a new Zimbabwe Dollar as the official domestic currency. This was accompanied by the establishment of a foreign exchange auction system in 2020 (RBZ, 2019). The primary objectives of these measures were to enhance price stability, transparency within the foreign currency market and to assist the determination of an exchange rate based on market forces. Although the system has to a certain extent supported macroeconomic stability, it is imperative to consistently check its performance in order to effectively achieve the goals of attaining price stability, bolstering the domestic currency and eliminating any potential arbitrage opportunities.

The aim of the study is to the exchange rate pass through in Zimbabwe. According to the author`s knowledge, this is the first study to focus on ERPT in Zimbabwe after the re-introduction of the local currency. In particular, the study assess whether ERPT is complete and symmetric in the context of Zimbabwe. There is no study that has compared the US dollar and South African Rand in the Zimbabwean economy. The research questions are posed as what is the nature of ERPT in Zimbabwe since the re-introduction of the local currency? Is ERPT asymmetric in Zimbabwe? Which currency has a significant impact on the domestic prices? This allows the country to take measures to ensure both exchange rate and price stability, boosting economic performance in line with National Development Strategy (NDS1).

# STYLISED FACTS ABOUT ZIMBABWE INFLATION AND EXCHANGE RATES

This section reviews inflation and exchange rate developments in Zimbabwe since the re-introduction of the local currency in 2019. Zimbabwe is a country that has faced challenges in maintaining price and exchange rate stability albeit government measures being put in place. In February 2019, a new local currency was established by the authorities, along with the establishment of an interbank foreign exchange market for trading it against the U.S. dollar (RBZ, 2019a). The first designation of the newly introduced national currency was the Real Time Gross Settlement (RTGS) dollar, which was accompanied with a de jure floating exchange rate system, replacing the prior arrangement of "no separate legal tender (IMF, 2019). The authorities officially designated the existing RTGS dollar balances, bond notes, and coins in circulation as RTGS dollars, in accordance with Statutory Instrument (SI) 33 of 2019. This action effectively incorporates RTGS dollar into Zimbabwe's multi-currency system.

In June 2019, the currency known as the RTGS dollar underwent a name change and was henceforth referred to as the Zimbabwean dollar (ZWL$). Authorities put in place a number of policy changes to increase fiscal sustainability, lower inflation, encourage a flexible exchange system, and set the groundwork for a long-term, private sector-led economic development (RBZ, 2019b). The establishment of an inter-bank foreign exchange market aimed to institutionalize the conversion of RTGS dollar balances and bond notes with United States Dollars and other currencies. This market operates on a voluntary basis, with transactions facilitated by banks and bureau de changers. After that, in June 2019, the government made the purposeful and audacious decision to abolish the multiple currency system through Statutory Instrument (SI) 142. With the help of these measures, the government hoped that inflationary pressures would start to ease as the nation overcame the spill-over effects of the ongoing realignment of domestic prices, which includes those for fuel and electricity. This would happen as retailers adjust their prices in line with the relative stability of the interbank market, declining parallel exchange rate premiums, and depressed or subdued effective demand. However, annual inflation increased by approximately 6% in September 2018 to 175.5% in June 2019 (RBZ, 2019b). In particular, the apparent increase in inflation in June 2019 was caused by a continuation of speculative pricing practises, accounting for exchange rate depreciation, implicit benchmarking of prices in US dollars, as well as artificially high and RTGS prices that were ostensibly designed to force consumers to pay for goods and services in foreign currency. Inflation expectations and the lingering pricing rigidities also pushed up inflation. In addition, inflationary pressures came from delayed effects of monetizing past fiscal deficits and mispricing and widespread subsidisation of many goods and services, including foreign currency, fuel, electricity, etc. which resulted in foreign currency shortages, spiralling parallel exchange rate premiums, and speculative pricing were the results (RBZ, 2019b).

In 2020, Zimbabwe similar to other countries around the globe was affected by COVID-19 pandemic. Business entities adopted the strategy of forward pricing as a means to mitigate the risks associated with fluctuations in currency rates. Consequently, a transparent foreign exchange auction system was implemented on 23 June 2020 and a rigorous adherence to the monetary targeting framework was intended to minimise exchange rate pass through and uphold price stability (RBZ, 2020). Annual inflation rate increased to triple digit figures in 2021 despite the measures put in place by the government (World Bank, 2023). There was a notable surge to 60.7 percent in December 2021, which can be attributed to the depreciation of the currency. The implementation of an FX auction mechanism in June 2020 originally contributed to the stabilisation of the official exchange rate. Nevertheless, there has been a notable surge in parallel market premium, rising from approximately 20 percent in August 2020 to approximately 60-90 percent by the end of December 2021 (IMF, 2022).

In the year 2022, the Zimbabwean currency saw a significant depreciation of 521% against the United States dollar (AfDB, 2023). This depreciation was observed as the exchange rate declined from 108 Zimbabwean dollars per US dollar in January 2022 to 671 Zimbabwean dollars per US dollar by December 2022 (AfDB, 2023). This resulted in a notable escalation in inflation, with the rate surging from 60.6% in January 2022 to 285% by June of the same year. The Russia-Ukraine war resulted in heightened economic strain due to the subsequent escalation of fuel and food costs. In December 2022, the rate of inflation experienced a moderation, reaching a level of 243.8% (AfDB, 2023; World Bank, 2023). The implementation of monetary tightening, characterized by significant increases in interest rates, along with the adoption of fiscal policy measures, resulted in a notable reduction in inflation to a level of 230% as of January 2023. In spite of the prevailing high inflation, the Central Bank opted to decrease the interest rate from 200% per annum to 150% in February 2023 (World Bank, 2023).This was attributed to the implementation of several steps by the government aimed at mitigating the rapid depreciation of the currency. These efforts included the sale of gold coins and an increase in the interest rate from 100% to 200% (AfDB, 2023).

During the period between April and June 2023, the nation witnessed a notable decline in its exchange rate value (RBZ, 2023). This depreciation was influenced by several factors related to both demand and supply, resulting in a substantial impact on inflation rates. The primary demand variables mostly indicated a heightened demand for foreign currency for the purpose of storing value. The economy experienced a combination of factors, namely the significant increase in demand for foreign currency and the rapid decrease in demand for local currency (RBZ, 2023). This decrease was mostly driven by speculative activity, such as the adoption of exchange rate indexation at exchange rates that were either overly undervalued or over-depreciated. Furthermore, it is important to consider the contributing elements resulting from a temporary decrease in foreign currency earnings due to the reduction in prices of export commodities, such as the Platinum Group of Metals (PGMs) (RBZ, 2023). Inflationary pressures resurfaced during the period from April to June 2023, primarily attributed to the depreciation of the exchange rate (RBZ, 2023). The inflation rates for the months of May and June in the year 2023 were recorded as 86.5% and 175.8% respectively. In a similar vein, the monthly inflation rate, which had exhibited stability since the commencement of the year, experienced an increase to 15.7% in May, reaching its highest point at 74.5% in June 2023 (RBZ, 2023). This, inflationary pressure may result in reduced competitiveness of exports, thereby hindering efforts to address deficits in the balance of payments and alleviate debt-related challenges. Consequently, the anticipated advantages associated with currency depreciation may prove to be difficult to attain (Chipili et al., 2017; Revelli, 2020). Thus there is need to analyse the effexts of exchange rate on the domestic prices so as to support Vision 2030 which entails achievement of the middle income economy by 2030.

# LITERATURE REVIEW

**Theoretical underpinning**

The topic of exchange rate pass-through (ERPT) has been a subject of enduring interest among economists. The analysis of ERPT can be conducted throughout a distribution chain. The data can be utilised for various purposes, such as import, export, producer, or consumer pricing analysis. According to Menon (1996), the term "pass-through" refers to the extent to which changes in exchange rates affect the prices of marketable products in the country of import. Bonadio et al. (2020) provide definitions of ERPT to domestic pricing, whereby it is described as the measure of the responsiveness of import, production, or consumer prices to changes in the exchange rate. The different definitions of ERPT show that it is concerned about the responsiveness of the domestic prices to changes in the exchange rate. This study exclusively concentrates on estimating the exchange rate pass-through (ERPT) to consumer prices, henceforth domestic pricing. Goldberg and Knetter (1997) have established a formalised and standardised approach for assessing Exchange Rate Pass-Through (ERPT) as follows:

………………………. (1)

Where the change is the import price; is the exchange rate expressed as foreign currency per home currency unit; is the marginal cost in the foreign country and represent a vector of demand controls such as home competition. ERPT can be regarded as complete or incomplete. According to Shakeri and Grey (2013), incomplete ERPT refers to a situation where domestic prices do not respond in a one-to-one manner to a specific change in the exchange rate. Similarly, Aaron et al (2012) acknowledged that an incomplete pass-through phenomenon is observed when changes in the exchange rate result in a less than proportionate change in domestic prices. According to Rogoff (1996), empirical data suggests that the exchange rate pass-through (ERPT) to domestic prices is typically partial or incomplete in the short-run and is complete in the long-run.

Hence from equation 1, ERPT completeness is assessed by β, it is “complete” if β = −1 and “incomplete” if β > −1: a complete ERPT implies that a depreciation has a 1-for-1 effect on increasing inflation.

Economists have historically employed a simplistic assumption that the prices of tradable products, when denominated in a common currency, are harmonised among nations. This assumption is referred to as the purchasing power parity condition (PPP). The concept of purchasing power parity posits that when translated to a single currency, national pricing levels should be equal across different nations (Rogoff, 1996). In the context of an open economy and under the premise of purchasing power parity, conventional macroeconomic models posit that ERPT to import, producer, and consumer prices is characterised by instantaneous and complete (Bache, 2006). However, empirically, the condition does not hold. Dornbusch (1987) provides a comprehensive rationale for the phenomenon of incomplete pass-through, attributing it to firms operating within an imperfectly competitive market structure. The extent of ERPT is influenced by various factors, including the degree of market concentration in the domestic economy and the preference of consumers to consume domestically produced goods over imported ones (Cheikh & Louhichi, 2016). One of the reasons for the incomplete pass-through of currency rates is attributed to the departure of market structures from ideal competition (Menon 1996). These firms, in reaction to an exchange rate shock, not only adjust their pricing but also modify their mark-up. According to the Government of Zimbabwe (2023), retailers are engaging in speculative behaviour and forward pricing. Similarly RBZ (2023) noted that movement in exchange rates and inflation do not emanate from macroeconomic fundamentals but from behaviours of the economic agents. Thus owing to market imperfections, ERPT in the context of Zimbabwe may be incomplete.

The velocity and magnitude of the exchange rate pass-through (ERPT) are also contingent upon the pricing strategies implemented by exporting enterprises. There are primarily two options that enterprises might adopt, namely local currency pricing (LCP) or producer currency pricing (Amiti et al., 2014). The concept of local currency pricing pertains to the situation in which exporting companies opt to set the prices of their products in the currency of the target market (Ghosh et al., 2016). To maintain competitiveness while accommodating fluctuations in exchange rates, producers must adjust their mark-ups in direct proportion to changes in the nominal exchange rate (Cheikh & Louhichi, 2016).). In contrast, producer currency pricing (PCP) refers to a situation in which the prices of exported goods are determined in the domestic currency of the exporting company (Amiti et al., 2014). In this particular scenario, the mark-up of an exporting firm remains unaffected by fluctuations in the exchange rate, indicating a high degree of completeness in the Exchange Rate Pass-Through (ERPT) phenomenon. According to IMF (2022) the backlog in the foreign currency auction system shows that the majority of imports are priced in foreign currency. The assertion by IMF (2022) indicates the possibility of producer currency pricing and the completeness of ERPT.

Exchange rate volatility is identified as a significant factor that influences ERPT (Ghosh et al., 2016). A significant level of volatility implies a higher frequency of fluctuations in the currency rate. The frequent fluctuations in pricing may compel importers to modify their profit margins instead of engaging in constant price adjustments. In such a scenario, it is probable that the ERPT would be comparatively low (Gopinath, 2015). This reaction is also associated with how corporations interpret fluctuations in the currency rate. Firms may opt to mitigate the impact of the currency rate by reducing their profit margins if they anticipate the exchange rate fluctuation to be of a temporary nature (Ghosh & Rajan 2007: 15). However, in cases when there is a perceived permanent change in the exchange rate, it is probable that enterprises will transfer the full burden of increased prices to consumers, resulting in total exchange rate pass-through (ERPT) (Bernoth & Herwartz, 2021). The volatility of the exchange brings into light asymmetry of ERPT. In addition, ERPT can be regarded as asymmetric. The concept of asymmetric pass-through pertains to situations in which the depreciation of a currency results in a distinct level or rate of pass-through compared to the appreciation of the same currency (Aron et al., 2012). The major question is whether depreciation of a currency has a greater effect on domestic pricing compared to currency appreciation, even when the degree of change in the exchange rate remains constant. The study focuses on whether there is asymmetry in the ERPT in Zimbabwe.

The extent of ERPT is also influenced by the inflation and monetary policy environment. According to Taylor's (2000) research, there is a positive relationship between low levels of inflation and a low and complete ERPT under a staggered price setting scheme. A nation that implements a monetary policy characterised by stability and low inflation is more prone to have a reduced pass-through effect (Correa & Minella, 2010). According to Varma (2022) it has been shown that nominal shocks can lead to increased volatility in exchange rates and inflation, particularly in situations when there is instability in monetary policy. An unpredictable monetary policy has the potential to result in a significant association between variations in the nominal exchange rate and domestic inflation. Zimbabwe is one of the countries with high inflation and monetary policy is unstable as indicated by the high number of statutory Instruments put in place to control the market (Chivige & Sheefeni, 2022). This may significantly affect ERPT in the country which may be incomplete.

Montfaucon et al. (2021) argue that the level of economic integration within a nation has significant implications for the extent and rapidity of exchange rate pass-through (ERPT). Countries that have a greater degree of openness to international trade, characterised by significant levels of both exports and imports, are expected to observe a more significant impact resulting from a currency depreciation, in comparison to economies with more restricted trade policies (Varma, 2022). Zimbabwe is considered an open economy and ERPT may be expected to be complete. In their study, Lan et al. (2013) examine the effects of cross-border production sharing on pass-through dynamics. The phenomenon of cross-border production sharing between countries has been facilitated by the rise in economic integration, which is characterised by multilateral trade liberalisations and technical advancements (Ndou, 2022). The adoption of price to market methods is facilitated by cross-border production sharing. According to Lan et al. (2013: 299), the presence of pricing to market for intermediate goods results in a lower degree of pass-through compared to situations where pricing to market is absent.

The analysis of literature shows that different factors in the Zimbabwean economy contradicts whether ERPT will be compete or incomplete. Thus there is need to explore ERPT in the Zimbabwean context to establish whether it is complete or not.

**Empirical review**

Numerous scholarly investigations have examined the Exchange Rate Pass-Through (ERPT) phenomenon primarily in wealthy nations (Taylor, 2000; McCarthy, 2006; Özyurt, 2016), with relatively less attention given to its analysis in developing countries (Akofio-Sowah, 2009; Razafimahefa, 2012; Lariau et al., 2016; Helmy et al., 2018). While several research have examined the pass-through phenomenon in various countries, the findings have exhibited notable variations. According to Rowland (2004) and Menon (1995), the disparity in outcomes can be attributed to variations in variable constructs, techniques, and model specifications. According to Karoro (2007), it is worth noting that the existing body of research mostly focuses on pass-through in developed economies, specifically the United Kingdom (UK) and the United States of America (USA). In their study, Stulz (2007) employs a Vector Autoregressive (VAR) model to analyse the Exchange Rate Pass-Through (ERPT) to domestic prices in Switzerland. The analysis is based on monthly data spanning the years 1976 to 2004. According to Stulz (2007), the level of pass-through to import prices is substantial, although it is milder in the case of consumer prices. According to the findings of Przystupa and Wróbel (2011), the pass-through effect in Poland is observed to be incomplete in both the short and long term. The evidence presented in their study also refutes the notion of exchange rate pass-through (ERPT) asymmetry in relation to currency depreciation and appreciation.

Despite the increasing body of material about exchange rate pass-through (ERPT) in developing economies, Hyder and Shah (2014) contend that the existing literature remains predominantly focused on studies conducted in developed economies. In contrast to industrialised economies, the examination of exchange rate pass-through (ERPT) in developing economies has only begun to garner attention in recent years. Aron et al. (2014) have noted an increase in the empirical literature about exchange rate pass-through (ERPT) in developing nations in recent times. In their study, Mihaljek and Klau (2001) examine the extent of exchange rate pass-through (ERPT) in a sample of 13 emerging economies, which includes South Africa. An ordinary least squares (OLS) model is employed to evaluate the pass-through effect on import and consumer prices. According to Mihaljek and Klau (2001), the researchers observe a strong and simultaneous correlation between fluctuations in exchange rates and domestic inflation, as opposed to changes in import prices. Rowland (2018) employs an unrestricted vector autoregressive (VAR) model to examine the extent of exchange rate pass-through (ERPT) to domestic inflation in Colombia. The analysis is conducted using monthly data spanning the period from 1983 to 2002. The findings of the study indicate a robust transmission of changes in exchange rates to import prices. Approximately 80 percent of the fluctuation in the exchange rate is expected to be reflected in import prices within a one-year period. Conversely, only 28 percent and 20 percent of this variation are anticipated to be transferred to producer and consumer prices, respectively.

The study conducted by Razafimahefa (2012) offers a thorough examination of ERPT phenomenon specifically within the sub-Saharan African region. The findings indicate that the mean level of Economic Rent from Petroleum and Gas (ERPT) in the sub-Saharan Africa region is 10 percent. However, it has been found that the magnitude is comparatively lower in nations that adhere to flexible exchange rate regimes. According to Razafimahefa (2012), there has been a decrease of around 50 percent in pass-through rates since the mid-1990s. The drop in pass-through is attributed by the author to changes in political and macroeconomic conditions in sub-Saharan Africa. In a manner analogous to the study conducted by Omisakin (2019) employ McCarthy's (2006) methodology, specifically utilising a vector autoregression (VAR) model that incorporates pricing dynamics across the distribution chain. Their objective is to quantify the extent of exchange rate pass-through (ERPT) to consumer prices within the context of Maldives. The findings indicate that there is a 79 percent pass-through rate to consumer prices within a one-year timeframe. For Mozambique, Aisen (2021) found that ERPT to consumer prices was 0.53% Empirical studies show that different levels of ERPT are realised in different countries.

# METHODOLOGY

The research methodology contains the tools and techniques that are utilised in conducting an empirical study. This section presents the methodology that was applied in the analysis of ERPT in Zimbabwe.

**Model specification**

Over time, the method of choice for estimating ERPT has seen continuous changes. The methodology of Ordinary Least Squares (OLS) regressions was very prevalent prior to the 1980s. The criticism levelled against OLS have prompted the development of alternative techniques such the Vector Autoregression (VAR) method introduced by Sims in the 1980s, as well as the Bayesian Vector Autoregression (BVAR) and Dynamic Stochastic General Equilibrium (DSGE) models. According to Mwase (2006), many economic strategies are commonly employed to estimate Exchange Rate Pass-Through (ERPT). These techniques include single equation econometric models, Vector Autoregressive (VAR) models, Vector Error Correction Models (VECMs), structural macroeconomic models, and Dynamic Stochastic General Equilibrium (DSGE) models. The study utilises VECM to analyse the nature of ERPT in Zimbabwe. According to Zeugner (2002), Vector Error Correction Models (VECMs) are a type of Vector Autoregressive Models (VARs) that were developed to handle nonstationary variables that exhibit cointegration. According to Hill et al. (2011), a Vector Error Correction Model (VECM) is a multivariate dynamic model that allows for the inclusion of cointegrated interactions across variables. Similar to vector autoregressions (VARs), vector error correction models (VECMs) are likewise a valuable tool in the field of economic forecasting (Lastrapes 2001). In contrast to vector autoregressions (VARs), vector error correction models (VECMs) provide the ability to incorporate the examination of both short-term and long-term relationships among variables in cases where these variables exhibit cointegration. This suggests that a Vector Error Correction Model (VECM) possesses the ability to circumvent the issue of losing long-term information, which is a concern in Vector Autoregressive Models (VARs) (Brooks, 2008: 293). The study estimates VECM as follows

= +……+ + …………..***Model 1***

Where idd (0,)

= (

The exchange rates are expressed as 1 unit of foreign currency per domestic currency such that the appreciation of the USD exchange rate and Rand Exchange rates represent depreciation of the local currency hence a positive relationship with CPI is expected. The study utilised Oil prices to represent global shocks which may have an impact on the domestic prices and interest rates to represent domestic economic conditions. The study analyses the impulse responses and variance decomposition from the VECM. To test whether ERPT is complete the study analyses such that ERPT is incomplete if the coefficients are greater than 1 since exchange rates are expressed as one unit of foreign currency to domestic currency.

To test for asymmetry of ERPT, the partial sums of the exchange rate are utilised such that

These partial sums are substituted in ***Model 1*** and form ***Model 2.*** Thus asymmetry of ERPT is tested from the direction than the size perspective. That is whether there are differences in the CPI changes due to different directions of the exchange rates (appreciation or depreciation).

The study utilises cointegration prior to estimation of VECM. Cointegration refers to the phenomenon where variables exhibit a long-term relationship, even if they may temporarily deviate from each other in the short term (Gujarati, 2008). Variables are said to be cointegrated when they exhibit varying levels of integration, but their residual or linear relationship remains fixed at levels (Gujarati, 2004). Several often used cointegration tests are the Pedroni test, the Johansen test, and the Auto Regressive Distributed Lag (ARDL) test (Paparas & Stoian, 2016). The ARDL and Johansen cointegration approaches employ different estimation strategies (Gujarati, 2008). The Johansen cointegration strategy employs the maximum likelihood estimation technique, whereas the ARDL cointegration procedure utilises the ordinary least squares method (Nkoro & Uko, 2016). The cointegration test, as described by Olorogun (2021), relies on eigenvalues and trace statistics, making it a method that aligns more closely with theoretical principles compared to alternative procedures. The study estimates the cointegration as follows:

=+…+

Where t= 1, 2…….T idd (0,)

The lag length is reflected by p. The cointegration condition is that so that the model is dynamically stable.

**Diagnostic tests**

In order to obtain accurate estimations, it is necessary to conduct diagnostic examinations that detect the presence of econometric concerns (Oktayer & Oktayer, 2013). The execution of the Granger Causality test involves doing unit root tests, normality tests, assessing multi-collinearity, and determining the best lag duration. The unit root test is employed to ascertain the stationarity of a variable (Creswell, 2009). According to Oktayer and Oktayer (2013), the presence of unit roots has implications on the accuracy of the coefficients and the dependability of the study's results. The unit root test is conducted in order to ascertain the level of integration of the variables in a model (Gujarati, 2004). The ADF Fisher unit root test is employed to evaluate the presence of unit roots in the variables. The duration of the lag has a substantial influence on the Granger causality test. The Akaike Information Criterion (AIC) and the Schwarz (Bayesian) Information Criterion (SIC) are commonly employed for the purpose of determining the optimal lag length in a model (Dzingirai & Tambudzai, 2014). According to Dzingirai and Tambudzai (2014), the SIC is suitable for small sample sizes consisting of fewer than 30 observations, while the AIC is employed for larger sample sizes comprising more than 30 observations. The AIC is considered to be an unbiased estimator for calculating the optimal lag length, mostly due to its utilisation of a substantial sample size (Portet, 2020). Hence, the Akaike Information Criterion (AIC) is employed to ascertain the suitable lag length in this study.

**Data**

The collection of credible data is important as it improves the quality and credibility of the study. The data on exchange rates, interest rates and CPI was collected from RBZ. The data on oil prices was collected from WTI. The monthly data was collected from June 2020 to August 2023 giving 51 observations. According to the Central Limits Theorem, observations which are greater than 30 are consider adequate to result in statistically significant and credible results.

# STUDY RESULTS

This section of the study presents the finds of the study based on the VECM. The utilisation of descriptive statistics is vital as it provides a comprehensive representation of the attributes and properties of the variables under investigation in a study. Table 1 below presents the descriptive statistics.

**Table 1: Descriptive statistics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **CPI** | **Interest rates** | **Oil prices** | **USD Exchange rate** | **Rand Exchange rate** |
| Mean | 2.0619 | 1.5664 | 1.8005 | 0.9007 | 2.1070 |
| Median | 2.0850 | 1.4420 | 1.8466 | 0.7710 | 1.9327 |
| Std. Dev. | 0.3772 | 0.3397 | 0.1636 | 0.6995 | 0.7246 |
| Skewness | -0.5588 | 0.3117 | -1.0994 | 0.4042 | 0.4434 |
| Kurtosis | 2.8427 | 2.1295 | 4.8064 | 2.6263 | 2.6450 |

Table 1 shows that the standard deviation of all the variables is close between zero and one. This is necessitated by the use of logarithms in the models to cater for outliers. The descriptive statistics also show that all the variables are moderately skewed as they do not significantly deviate from the from the normal skewness value of zero. The measures of domestic prices, CPI and Oil prices are negatively skewed whilst interest rates, USD Exchange rate and Rand Exchange rates are positively skewed. The normal value for kurtosis is 3; variables with kurtosis of greater than 3 are leptokurtic whilst variables with a kurtosis value of less than 3 are platykurtic (Gujarati, 2008). Table 1 shows that all variables except Oil prices are platykurtic.

Prior to estimating VECM it is important to determine the order of integration of the variables in the model. Table 2 below shows the ADF unit root test results

**Table 2: ADF unit root test results**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **t-statistic** | **Critical value (5%)** | **Probability** | **Order of integration** |
| CPI | -4.498314 | -1.947665 | 0.0000 | I(1) |
| Interest rates | -1.995069 | -1.949097 | 0.0452 | I(1) |
| Oil Prices | -5.46217 | -1.947665 | 0.0000 | I(1) |
| USD Exchange rate | -4.652913 | -1.947665 | 0.0000 | I(1) |
| Rand Exchange rate | -2.466339 | -1.947975 | 0.0147 | I(1) |

Table 2 shows that all the variables in the model are integrated of order 1 that is they are not stationary at levels and contain at least one unit root. Since the variables are integrated of order 1, VECM can be applied to estimate ERPT in Zimbabwe.

The Vector Error Correction model is heavily dependent on the number of lags in the model hence the need to specify the lag length. Based on the lag length determination the following tables present the lag length for the models. Table 3 below shows the lag length determination in the two models

**Table 3: Lag length determination**

|  |  |  |
| --- | --- | --- |
| **Model** | **AIC** | **Number of lags** |
| Model 1 | -15.62810\* | 2 |
| Model 2 | -32.01926\* | 4 |

Table 3 shows that the models that have partial sums of exchange rates (models 2.1; 2.2 & 2.3) have higher order lags. This implies that these models may have limited degrees of freedom and statistically insignificant coefficients compared to the models that have aggregated exchange rates.

The Johannsen test was to determine the presence of cointegration in the two models. Table 4 below shows the cointegration test results.

**Table 4: Cointegration test results**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model** | **Hypothesized No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Probability\*\*** |
| Model 1 | At most 1 | 0.379582 | 41.31033 | 47.85613 | 0.179 |
| Model 2 | At most 3 | 0.339344 | 45.70016 | 47.85613 | 0.0786 |

Based on the Johansen test, there is one cointegrating equation in Model 1 and three cointegrating equations in Model 2. This implies that the variables move together in the long run although short run deviations may be observed. Since cointegration was established, the VEC model are used to estimate ERPT in Zimbabwe.

To test the completeness of ERPT, impulse response function are used to show how the prices respond to changes in the exchange rates. Table 5 below shows the impulse response of CPI to the variables in the model.

**Table 5: Impulse responses of CPI**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Period** | **CPI** | **Oil Prices** | **Interest rates** | **Rand Exchange Rate** | **USD Exchange Rate** |
| 1 | 0.0397 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2 | 0.0489 | -0.0023 | -0.0023 | 0.0215 | -0.0039 |
| 3 | 0.0486 | 0.0020 | 0.0104 | 0.0218 | -0.0092 |
| 4 | 0.0484 | 0.0031 | 0.0134 | 0.0180 | -0.0031 |
| 5 | 0.0496 | 0.0011 | 0.0150 | 0.0165 | -0.0009 |
| 6 | 0.0504 | -0.0006 | 0.0161 | 0.0169 | -0.0002 |
| 7 | 0.0507 | -0.0015 | 0.0176 | 0.0170 | 0.0001 |
| 8 | 0.0508 | -0.0021 | 0.0187 | 0.0166 | 0.0008 |
| 9 | 0.0511 | -0.0027 | 0.0195 | 0.0164 | 0.0013 |
| 10 | 0.0512 | -0.0032 | 0.0201 | 0.0163 | 0.0017 |

Table 5 shows that domestic prices are more responsive to shocks emanating from the South African Rand Exchange rate and interest rates. The interest of the study is on the responsiveness of the domestic prices to the exchange rates. Domestic prices are more responsive to the South African exchange rate compared to the United States Dollar exchange rate. Figure 1 below shows the ERPT impulse responses of domestic prices.

**Figure 1: VECM Time profile of ERPT Impulse Response Functions of Domestic Prices**

Figure 1 show that domestic prices are more responsive to changes in the South African Rand Exchange rate compared to the USD dollar Exchange rate. The responses are relatively low as the peak response to USD dollar exchange rate and Rand Exchange rate stands at -0.0039 and 0.0218 respectively. The high pass through to domestic prices from the South African Rand Exchange rate than the US dollar exchange rate may indicate that effect of the South African Rand on the Zimbabwean economy. According to Chipili et al. (2017) the majority of Zimbabwean imports goods from South Africa for consumption or resale such that changes in rand are quickly reflected in the prices of the economy. The closeness of the trade between the countries may explain why domestic prices are more responsive to the South African Rand exchange rate.

The variance decomposition quantifies the extent to which each variable contributes to the information contained in the other variables within the autoregressive model. The analysis aims to ascertain the extent to which exogenous shocks to one variable can account for the variance in forecast errors of other variables. Table 6 below shows the variance decomposition of CPI to the variables in the model.

**Table 6: Variance decomposition of CPI**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Period** | **S.E.** | **Oil Prices** | **Interest rates** | **Rand Exchange Rate** | **USD Exchange Rate** |
| 1 | 0.0397 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2 | 0.0668 | 0.1161 | 0.1170 | 10.4177 | 0.3371 |
| 3 | 0.0865 | 0.1230 | 1.5035 | 12.5765 | 1.3270 |
| 4 | 0.1017 | 0.1792 | 2.8213 | 12.2141 | 1.0507 |
| 5 | 0.1154 | 0.1488 | 3.8882 | 11.5415 | 0.8223 |
| 6 | 0.1281 | 0.1228 | 4.7312 | 11.1163 | 0.6679 |
| 7 | 0.1399 | 0.1137 | 5.5418 | 10.7866 | 0.5599 |
| 8 | 0.1509 | 0.1165 | 6.2920 | 10.4802 | 0.4834 |
| 9 | 0.1614 | 0.1292 | 6.9631 | 10.1990 | 0.4296 |
| 10 | 0.1713 | 0.1489 | 7.5577 | 9.9524 | 0.3912 |

Table 6 shows South African Rand exchange rate is significant in explaining more variation in the exchange rate compared to the US Dollar exchange rate. No more than 12.58% and 1.32% variation in domestic prices emanate from South African Rand exchange rate and US dollar respectively. Thus the South African Rand accounts for much of the variation in the domestic prices. Owing to the close trade relations between Zimbabwe and South Africa, developments in South African economy have a significant impact on the Zimbabwean economy (Sharara, 2014). The assertion by Sharara (2014) is supported by the study results as they show that the changes in the South African Rand exchange rate have a larger variation in the domestic prices compared to the US dollar exchange rate.

The completeness of EPT is important as it guides the implementation of monetary policy in order to curb inflation in the economy. Table 7 below present the long run estimates of the model.

**Table 7: ERPT completeness**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Timeframe | Constant | CPI | Interest rates | Oil Price | USD exchange rate | Rand Exchange rate |
| Long run | -11.3393 | 1.0000 | -1.2349 | 1.5451 | 7.129 | 7.3139 |
| Short run |  | -0.07177 | 0.116945 | 0.004175 | 0.0554 | 0.072 |

The results in Table 7 show that a 1% appreciation of the USD Exchange rate and Rand Exchange Rate (depreciation of local currency) is associated with a 7.13% and 7.31% increase in the domestic prices respectively in the long run. In the short run a 1% appreciation of the USD Exchange rate and Rand Exchange Rate (depreciation of local currency) is associated with a 0.055% and 0.072% increase in the domestic prices respectively. This implies that ERPT is incomplete as the change in the change in the domestic prices is not proportional to the changes in the exchange rates The ERPT in the Zimbabwean context is inflationary as it leads to increases in domestic prices.. The study results are aligned to the study by Mihaljek and Klau (2001) which found a 6% ERPT for Czech Republic. In addition, María-Dolores (2010) found 11% for Czech Republic and Aisen et al. (2021) found 0.53% for Mozambique. ERPT is usually complete in countries which are dependent on imports. According to Whitten (2016), in instances when a significant portion of a nation's commerce is conducted using foreign currencies, such as in the situation observed in Zimbabwe, the country's inflation rate is more susceptible to the impacts of swings in exchange rates. Zimbabwe is a net importing country since the value of the imports is always exceeding the value derived from exports (Bonga, 2018). The anticipated pass-through of exchange rates is significant due to Zimbabwe's reliance on imports (Matanda, et al., 2018). The findings contradict the study by Whitten (2016) and Bonga (2018) as they show that despite being considered a small open economy, ERPT is incomplete. One of the reasons brought forward is that incomplete ERPT is as a result of irrational behaviour of economic agents particularly producers. The presence of robust macroeconomic fundamentals inside the economy indicates that the fluctuations in the exchange rate observed over the period of May and June 2023 were not primarily influenced by monetary variables (RBZ, 2023). Instead, they may be attributed to unfavourable behavioural characteristics such as forward pricing and an insatiable need for foreign money exhibited by economic agents (RBZ, 2023). Thus the openness

**Asymmetry of ERPT**

The study aimed to ascertain whether ERPT is asymmetry in the Zimbabwean economy. Impulse response functions and variance decompositions were used to establish whether ERPT is asymmetry. Tables 8 and 9 show impulse response and variance decomposition of partial sums of the exchange rates.

**Table 8: CPI impulse response to partial sums of exchange rates**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Period** | **Oil prices** | **Interest rates** | **USD Depreciation** | **USD Appreciation** | **Rand Depreciation** | **Rand Appreciation** |
| 1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2 | 0.0039 | -0.0096 | 0.0016 | 0.0321 | 0.0154 | 0.0219 |
| 3 | -0.0102 | -0.0171 | -0.0295 | 0.0340 | 0.0009 | 0.0407 |
| 4 | -0.0163 | -0.0372 | -0.0488 | 0.0134 | -0.0190 | 0.0237 |
| 5 | -0.0107 | -0.0575 | -0.0425 | 0.0449 | -0.0082 | 0.0419 |
| 6 | -0.0030 | -0.0501 | -0.0316 | 0.0725 | 0.0134 | 0.0774 |
| 7 | -0.0041 | -0.0260 | -0.0017 | 0.0623 | 0.0340 | 0.0864 |
| 8 | -0.0216 | -0.0110 | -0.0089 | 0.0392 | 0.0071 | 0.0755 |
| 9 | -0.0196 | -0.0026 | -0.0219 | -0.0049 | -0.0413 | 0.0368 |
| 10 | 0.0044 | 0.0081 | 0.0489 | 0.0320 | 0.0060 | 0.0399 |

Table 8 shows that domestic prices are more responsive to appreciation of the exchange rates compared to their depreciation. A 1% appreciation of the South African Rand and US dollar against the local currency (local currency depreciation), the domestic consumer prices immediately increase by 0.0219% and 0.0312% respectively. The prices show an upward trend till the 10th period where a 1% appreciation of the South African Rand results in a 0.04% increase in the domestic prices. The largest response of the domestic prices is in period 7 where a 1% appreciation of the South African Rand results in 0.09% increase in the domestic prices

**Table 9: CPI variance decomposition to partial sums of exchange rates**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Period** | **S.E.** | **Oil prices** | **Interest rates** | **USD Depreciation** | **USD Appreciation** | **Rand Depreciation** | **Rand Appreciation** |
| 1 | 0.0309 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2 | 0.0605 | 0.4187 | 2.4966 | 0.0713 | 28.0664 | 6.4422 | 13.1336 |
| 3 | 0.0881 | 1.5518 | 4.9559 | 11.2784 | 28.1846 | 3.0552 | 27.5631 |
| 4 | 0.1161 | 2.8733 | 13.1142 | 24.1598 | 17.5560 | 4.4334 | 20.0262 |
| 5 | 0.1608 | 1.9386 | 19.5981 | 19.5757 | 16.9344 | 2.5678 | 17.2371 |
| 6 | 0.2098 | 1.1599 | 17.2283 | 13.7743 | 21.8867 | 1.9168 | 23.7444 |
| 7 | 0.2403 | 0.9132 | 14.3071 | 10.5052 | 23.4005 | 3.4666 | 31.0427 |
| 8 | 0.2621 | 1.4439 | 12.2012 | 8.9443 | 21.9033 | 2.9864 | 34.3889 |
| 9 | 0.2698 | 1.8923 | 11.5201 | 9.0996 | 20.6974 | 5.1630 | 34.2993 |
| 10 | 0.2936 | 1.6209 | 9.8067 | 10.4597 | 18.6698 | 4.4034 | 30.8222 |

Table 9 shows that the largest variations in the domestic prices emanate from positive movements of other currencies relative to the local currency. Specifically, the largest the variation (34.39%) in the domestic prices emanate from the appreciation of the South African Rand than other variables ***ceteris paribus***. The variations in the domestic prices emanating from the positive changes in the US dollar against the local currency gradually lowers from 28.07% in period 2 to 18.7% in period 10. Conversely, the variations in the domestic prices emanating from appreciations of the South African Rand increase from 13.13% in period 2 to 30.82% in period 10.

The study results from the impulse responses and variance decomposition show that there is ERPT asymmetry in the Zimbabwe context where the changes in the prices are greater owing to appreciation of US dollar and Rand exchange rates (depreciation of local currency) compared to their depreciation (appreciation of the local currency). This is in line with economic theory which predicts that the depreciation of a currency against others is associated with domestic price increases. In general, the domestic prices are more responsive to appreciation of other currencies than their depreciation. This is in line with the study by Caselli and Roitman (2019) which showed that ERPT is more pronounced when the other currencies appreciate against the local currency. These results imply that there is need to safeguard against local currency depreciation as it has a pronounced pass through compared to appreciation.

# POLICY IMPLICATIONS

The study results showed that ERPT is incomplete as the change in the domestic prices is not proportional to the changes in the exchange rates. In addition, there is ERPT asymmetry such that depreciation of the local currency result in greater changes in the domestic prices compared to appreciations. The study results also show that domestic prices are more responsive to the South African Rand compared to the US dollar exchange rate hence the variations in the domestic prices emanating from the South African Rand are greater than the variations from the United States dollar exchange rate. The study results show the need to ensure local currency appreciation in order to minimise pass through to domestic prices. One potential measure to enhance the official exchange rate is to introduce increased flexibility by implementing a more transparent and market-driven mechanism for price discovery in the RBZ FX auctions. Distortions have been greatly decreased as a result of the establishment of the new Zimbabwean currency and an interbank FX market. The disparity between the rates on the parallel market and the interbank market will continue because capital controls are in place. However, the premium is still too high, and the authorities are urged to gradually relax the margin requirements for trading in the interbank foreign exchange market as well as gradually removing exchange controls and surrender requirements to allow the exchange rate to be freely determined by supply and demand. This will minimise speculative behaviours and forward pricing especially by formal retailers.

In addition, since the economy adopted monetary targeting, it is prudent to have money based stabilisations. Zimbabwe can continue targeting broad money base with a tight monetary policy that mops up excess liquidity in the economy and reduces exchange rate overshoot hence controlling inflation. As noted by Berg (2003), Peru adopted monetary targeting in a tight monetary policy and managed to control exchange rate fluctuations and reduce inflation. Although money targets can offer a distinct nominal anchor for inflation, it can be challenging to achieve them in practice due to changes in money demand and shaky relationships between base money and larger monetary aggregates. Therefore, achieving money goals does not automatically mean having an effective monetary policy. Practice has also demonstrated that, even when financial goals are achieved, currency rates and interest rates frequently exhibit significant fluctuations. Then, due to balance sheet impacts and wage-price setting dynamics, exchange rate swings run the risk of feeding expectations and validating them (Berg et al. 2003). For these reasons, monetary targets have typically been implemented relatively flexibly in both emerging market and industrialized countries. In Germany during the 1970s and 1980s, for instance, the monetary aims were only successfully achieved in providing low inflation about half of the time (Mishkin 2008).

Furthermore, it is necessary for the central bank to conduct a survey of inflation expectations as these influence the interaction between exchange rates and inflation. This will allow the central bank to take proactive measures to stabilise the exchange rate and inflation. Moreover, a floating exchange rate regime consistent with a credible interest rate-based forward looking monetary policy regime could prove effective in anchoring inflation expectations

# CONCLUSIONS

The exchange rate is one of the significant factors that influence economic variables in the economy. The study aimed to analyse ERPT in Zimbabwe. The study found a significant pass-through effects for the two main bilateral exchange rates in Zimbabwe with respect to the US Dollar (USD/ZWL) and South Africa’s Rand (ZAR/ZWL). In the long-run, each 1 percent depreciation of the ZWL dollar vis-à-vis the US Dollar and the Rand leads, respectively, to 7.13 percent and 7.31 percent increase in domestic prices, all else equal. Thus the study found that ERPT is incomplete and asymmetrical hence the South African rand exchange rate has a significant impact on domestic prices compared to United States dollar exchange rate. The results are plausible since South Africa is Zimbabwe’s major trading partner. The study concludes that authorities need to put in place measures to minimse local currency deprecation in order to achieve stable inflation.

# REFERENCES

African Development Bank. 2023. Zimbabwe Economic Outlook. <https://www.afdb.org/en/countries/southern-africa/zimbabwe/zimbabwe-economic-outlook#:~:text=The%20Zimbabwe%20dollar%20depreciated%20521,to%20285%25%20in%20June%202022>. (Accessed 20 August 2023)

Aisen, A., Manguinhane, E. and Félix F. Simione, F.F. 2021. An Empirical Assessment of the Exchange Rate Passthrough in Mozambique. IMF Working Paper No 20/132

Akofio-Sowah, N. 2009. Is There a Link Between Exchange Rate Pass-Through and the Monetary Regime: Evidence from Sub-Saharan Africa and Latin America. International Advances in Economic Research, 15, pp.296–309.

Amiti, M., Itskhoki, O. and Konings, J., 2014. Importers, exporters, and exchange rate disconnect. *American Economic Review*, *104*(7), pp.1942-1978.

Aron, J., Creamer, K., Muellbauer, J. and Rankin, N. 2014. Exchange Rate PassThrough to Consumer Prices in South Africa: Evidence from Micro-Data. The Journal of Development Studies, 50(1): 1 – 21.

Aron, J., Farrell, G., Muellbauer, J. and Sinclair, P. 2012. Exchange Rate PassThrough to Import Prices, and Monetary Policy in South Africa. SARB Working Paper WP/08/12, Pretoria, South African Reserve Bank.

Bache, I. 2006. Econometrics of exchange rate pass-through. Norges Bank Doctoral Dissertations in Economics No 6.

Berg, A., Hagan, S., Jarvis, C.J., Steinki, B., Stone, M.R. and Zanello, A., 2003. IV Reestablishing a Credible Nominal Anchor After a Financial Crisis. In *Managing Financial Crises*. International Monetary Fund.

Bernoth, K. and Herwartz, H., 2021. Exchange rates, foreign currency exposure and sovereign risk. *Journal of International Money and Finance*, *117*, p.102454.

Bonadio, B., Fischer, A.M. and Sauré, P., 2020. The speed of exchange rate pass-through. *Journal of the European Economic Association*, *18*(1), pp.506-538.

Caselli, F.G. and Roitman, A., 2019. Nonlinear exchange‐rate pass‐through in emerging markets. *International Finance*, *22*(3), pp.279-306.

Cheikh, N.B. and Louhichi, W., 2016. Revisiting the role of inflation environment in exchange rate pass-through: A panel threshold approach. *Economic Modelling*, *52*, pp.233-238.

Chivige, T. and Sheefeni, J.P., 2022. Foreign Exchange Rate and Inflation in Zimbabwe: 2009–2019. *FORCE: Focus on Research in Contemporary Economics*, *3*(2), pp.414-438.

Choudhri, E.U. and Hakura, D.S., 2016. Exchange rate pass-through to domestic prices: does the inflationary environment matter?. *Journal of international Money and Finance*, *25*(4), pp.614-639.

Chipili, J.M., 2021. Inflation Dynamics in Zambia-Research Report. <https://www.africaportal.org/publications/inflation-dynamics-zambia-research-report/>.

Chipili, J.M., Chisha, K. and Longa, K., 2017. Bank of Zambia Working Paper Series Effect of South African Inflation on Other SADC Countries’ Inflation. <https://www.researchgate.net/profile/Keegan-Chisha/publication/350726463_Effect_of_South_African_Inflation_on_other_SADC_Countries'_Inflation/links/606ed7204585150fe990711e/Effect-of-South-African-Inflation-on-other-SADC-Countries-Inflation.pdf>. (Accessed 25 August 2023)

Correa, A.D.S. and Minella, A., 2010. Nonlinear mechanisms of the exchange rate pass-through: A Phillips curve model with threshold for Brazil. *Revista Brasileira de Economia*, *64*, pp.231-243.

Devereux, M.B. and Yetman, J., 2014. Globalisation, pass-through and the optimal policy response to exchange rates. *Journal of International Money and Finance*, *49*, pp.104-128.

Dzingirai C. and Tambudzai, .Z. 2014. Causal relationship between government tax revenue growth and economic growth: a case of Zimbabwe (1980-2012). *Journal of economics and sustainable development*, pp.13-15.

Forbes, K., 2016. Much ado about something important: How do exchange rate movements affect inflation?. *The Manchester School*, *84*(S1), pp.15-41.

Ghosh, A.R., Ostry, J.D. and Chamon, M., 2016. Two targets, two instruments: Monetary and exchange rate policies in emerging market economies. *Journal of International Money and Finance*, *60*, pp.172-196.

Gopinath, G., 2015. *The international price system* (No. w21646). National Bureau of Economic Research.

Government of Zimbabwe. 2023. 34th Post Cabinet Briefing. <https://www.veritaszim.net/sites/veritas_d/files/14TH%20POST%20CABINET%20PRESS%20BRIEFING.pdf>. (Accessed 1 September 2023)

Gujarati, D., 2008. Basic Econometrics. *New York: MeGraw-Hill*, pp.363-369.

Helmy, O., Fayed, M., and Hussien, K. 2018. Exchange rate pass-through to inflation in Egypt: a structural VAR approach. Review of Economics and Political Science, 3(2),pp 2-19

Hill, R. C., Griffiths, W. E. and Lim, G. C. 2011. Principles of Econometrics. 4th edition. New York, John Wiley & Sons, Inc.

Hyder, Z. and Shah, S. 2004. Exchange Rate Pass-Through to Domestic Prices in Pakistan. State Bank of Pakistan Working Paper No. 5, Karachi, State Bank of Pakistan.

International Monetary Fund. 2022. Directors report , Zimbabwe.

International Monetary Fund. 2020. Elusive Quest for Macro Stability in Zimbabwe. <https://www.elibrary.imf.org/view/journals/002/2020/082/article-A004-en.xml>. (Accessed 5 September 2023)

Karoro, T.D., Aziakpono, M.J. and Cattaneo, N., 2009. Exchange rate pass‐through to import prices in South Africa: is there asymmetry? 1. *South African Journal of Economics*, *77*(3), pp.380-398.

Kavila, W. and Le Roux, P., 2016. Inflation dynamics in a dollarised economy: The case of Zimbabwe. *Southern African Business Review*, *20*(1), pp.94-117.

Lan, L., Lin, L., Lin, W. and Chuang, S., 2013. Theoretical and Empirical Evidence for the Impact of Cross-Border Production Sharing on Exchange Rate Pass-Through. *Emerging Markets Finance and Trade*, *49*(sup4), pp.280-300.

Lariau, A., El Said, M., and Takebe, M. 2016. An Assessment of the Exchange Rate PassThrough in Angola and Nigeria. IMF Working Paper No 16/191.

Lastrapes, W. D. 2001. A Vector Error Correction Forecasting Model of the U.S. Economy: A Comment. Department of Economics. Terry College of Business. Athens, University of Georgia.

Matanda, E., Dube, H. & Madzokere, N. 2018. “Blessing or Curse”? Introduction of Bond Notes as an Antidote to Zimbabwe’s Liquidity Crises. Journal of Modern Accounting and Auditing, 14(5), 252-264

McCarthy, J. 2006. A Revision on Pass-through of Exchange Rate and Import Prices to Domestic Inflation in Some Industrialised Economies. New York: Federal Reserve Bank of New York.

Menon, J., 1995. Exchange rate pass‐through. *Journal of Economic Surveys*, *9*(2), pp.197-231.

Mihaljek, D. and Klau, M. 2001. A Note on the Pass-Through from Exchange Rate and Foreign Price Changes to Inflation in Selected Emerging Market Economies. BIS Working paper No. 8, Basel: Bank of International Settlements.

Mishkin, F.S., 2008. Challenges for inflation targeting in emerging market countries. *Emerging Markets Finance and Trade*, *44*(6), pp.5-16.

Montfaucon, A.F., Sato, K., Shrestha, N. and Parsons, C., 2021. Exchange rate pass-through and invoicing currency choice between fixed and floating exchange rate regimes: Evidence from Malawi’s transaction-level data. *Economic Analysis and Policy*, *72*, pp.562-577.

Mwase, N. 2006. An Empirical Investigation of the Exchange Rate Pass-Through to Inflation in Tanzania. IMF Working Paper WP/06/150, Washington D.C.: International Monetary Fund.

Ndou, E., 2022. The exchange rate passthrough to consumer price inflation in South Africa: has the inflation target band induced a structural change in the size of passthrough?. *SN Business & Economics*, *2*(6), p.51.

Nkoro, E. and Uko, A.K., 2016. Autoregressive Distributed Lag (ARDL) cointegration technique: application and interpretation. *Journal of Statistical and Econometric methods*, *5*(4), pp.63-91.

Oktayer, A. and Oktayer, N., 2013. Testing Wagner’s law for Turkey: Evidence from a trivariate causality analysis. *Prague Economic Papers*, *2*, pp.284-301.

Olorogun, L.A., 2021. Revisiting the nexus of FDI-led growth hypothesis and economic development in Rwanda: A Johansen-ARDL approach to cointegration. *Journal of the Knowledge Economy*, pp.1-23.

Omisakin, A. O. 2009. Exchange Rate Pass Through to Domestic Prices and Output in Nigeria. International Business Management, 3(3), pp.38 – 42.

Özyurt, S., 2016. Has the exchange rate pass through recently declined in the euro area?.

Paparas, D. and Stoian, A., 2016. The validity of Wagner’s Law in Romania during 1995-2015. <https://mpra.ub.uni-muenchen.de/74378/>. (Accessed 7 August 2023)

Parsley, D.C., 2012. Exchange rate pass-through in South Africa: Panel evidence from individual goods and services. *Journal of Development Studies*, *48*(7), pp.832-846.

Phuc, N.V. and Duc, V.H., 2021. Macroeconomics determinants of exchange rate pass-through: new evidence from the Asia-Pacific region. *Emerging Markets Finance and Trade*, *57*(1), pp.5-20.

Pindiriri, C. and Nhavira, J., 2011. Modeling Zimbabwe's inflation process. *Journal of Strategic Studies: A Journal of the Southern Bureau of Strategic Studies Trust*, *2*(1), pp.32-49.

Portet, S., 2020. A primer on model selection using the Akaike Information Criterion. *Infectious Disease Modelling*, *5*, pp.111-128.

Przystupa, J. and Wróbel, E. 2011. Asymmetry of the Exchange Rate Pass-Through. Eastern European Economics, 49(1), pp.30 – 51.

Razafimahefa, I. 2012. Exchange Rate Pass-Through in Sub-Saharan African Economies and its Determinants. IMF Working Papers 12/141.

Revelli, D.N.P., 2020. The Exchange Rate Pass-Through to Inflation and its Implications for Monetary Policy in Cameroon and Kenya, African Economic Research Consortium.

Rowland, P. 2018. Exchange Rate Pass-Through to Domestic Prices: The Case of Colombia. <http://ideas.repec.org/p/col/000094/0026831.html>. (Accessed 11 September 2023)

Vo, X.V. and Nguyen, P.C., 2017. Monetary policy transmission in Vietnam: Evidence from a VAR approach. *Australian Economic Papers*, *56*(1), pp.27-38.

Reserve Bank of Zimbabwe. 2023. Mid-Term Monetary Policy Statement.

Reserve Bank of Zimbabwe. 2022. Quarterly Economic Review.

Reserve Bank of Zimbabwe. 2020. Mid-Term Monetary Policy Statement.

Reserve Bank of Zimbabwe. 2019a. Monetary Policy Statement.

Reserve Bank of Zimbabwe. 2019b. Mid-Term Monetary Policy Statement.

Rogoff, K. 1996. The Purchasing Power Parity Puzzle. Journal of Economic Literature, 34(2): pp. 647 – 668

Saungweme, T., 2021. Inflation and economic growth in Kenya: An empirical examination.

Shakeri, M. and Gray, R. S. 2013. The Industry Determinants of Exchange Rate PassThrough into Canadian Producer Prices. International Journal of the Economics of Business, 20(1), pp. 15 – 38

Sharara, M. 2014. Falling rand weighs on Zim companies. <https://www.news24.com/fin24/falling-rand-weighs-on-zim-companies-20140306>. (Accessed 14 September 2023)

Stulz, J. 2007. Exchange Rate Pass-Through in Switzerland: Evidence from Vector Autoregressions. Swiss National Bank Economic Studies No. 4, Zurich: Swiss National Bank.

Taylor, J. 2000. Low Inflation, Pass-Through, and Pricing Power of Firms. European Economic Review, 44(7), pp.1389–408.

Varma, P., 2022. Asymmetric Exchange Rate Pass-Through, Market Share and Import Pricing. In *Pulses for Food and Nutritional Security of India: Production, Markets and Trade* (pp. 97-114). Singapore: Springer Nature Singapore.

Zeugner, S. 2002. Evaluation of Vector Error Correction Models in Comparison with Simkins: Forecasting with Vector Autoregressive (VAR) Models Subject to Business Cycle Restrictions. Seminar Paper for: A. Geyer: Seminar aus Operations Research 3622