MIDLANDS STATE UNIVERSITY

FACULTY OF COMMERCE

DEPARTMENT OF BANKING AND FINANCE

THE IMPACT OF THE ZAR/USD EXCHANGE RATE ON INFLATION RATES IN ZIMBABWE

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This dissertation is submitted in partial fulfilment of the requirements of the Bachelor of Commerce Honours Degree in Banking and Finance in the Department of Banking and Finance at the Midlands State University.

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DEDICATION

To my family, you are all I can have.

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ABSTRACT

The stability of every economy is measured by developments in the general price level of the economy. This depends on a number of factors among which are the exchange rates of a country's currency and that of its major trading partners. This research seeks to establish the impact of the ZAR/USD exchange rates on inflation in Zimbabwe post dollarisation. Other objectives to this research are to determine how exchange rate movements influence import prices and hence inflation. The introduction of the multicurrency regime in 2009 brought about some life in the Zimbabwean economy that was ailing from hyperinflation. Industry had ceased to function to the extent that Zimbabweans depended on imports from the Republic of South Africa. With South Africa as the major trading partner, it would be natural that Zimbabwe adopted the ZAR as its main currency, being complemented by the USD and the BWP. That the government adopted the USD when more trade is conducted with South Africa exposed the economy to some exchange rate risk, which proved to influence the inflation in the country. Literature from various authors suggest that a negative relationship exists between exchange rates and inflation while a positive one is between expectations and inflation. From the findings, inflation in Zimbabwe post dollarisation is mainly influenced by the ZAR/USD exchange rates and expectations of economic agents. As a result, it is recommended that policies that encourage investment in the manufacturing sector be formulated and implemented in order to reduce the competitiveness of imports. It is also recommended that the ZAR be adopted as the main currency in order to reduce the economy's exposure to exchange rate risk.

LIST OF ACRONYMS

ADF	Augmented Dickey-Fuller
BOP	Balance of Payment
BWP	Botswana Pula
CLRA	Classical Linear Regression Assumptions
CMA	Common Monetary Area
CPI	Consumer Price Index
DW	Durbin Watson
ERPT	Exchange Rate Pass Through
EU	European Union
GDP	Gross Domestic Product
IMF	International Monetary Fund
LCP	Local Currency Pricing
OECD	Organisation of Economic Cooperation and Development
OLS	Ordinary Least Squares
PCP	Producer Currency Pricing
PPP	Purchasing Power Parity
PTM	Pricing To Market
RBZ	Reserve Bank of Zimbabwe
UK	United Kingdom
USA	United States of America
USD	United States Dollar
VCP	Vehicle Currency Pricing

YOY	Year on Year
ZAR	South African Rand
ZIMSTAT	Zimbabwe Statistical Agency
ZWD	Zimbabwean Dollar

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

This study is on the impact of the ZAR/USD exchange rate fluctuations on inflation rates in Zimbabwe. The chapter provides a brief overview of the aspects covered in the study and aims at enlightening the reader on the study by highlighting the background of the study, the statement of the problem, the objectives of the study, research questions, assumptions of the study, the scope of the study as well as the limitations of the study.

1.2 Background to the study

The period prior dollarization has seen Zimbabweans relying on imported goods from neighbouring countries, most notably South Africa and Zambia. The economy relying entirely on imported products from South Africa led to Zimbabweans shunning the perennially depreciating Zimbabwean dollar (ZWD) for the South African Rand (ZAR). Gradually, though unofficially, players from different sectors of the economy began to trade in foreign currency as the ZWD had become valueless due to the hyperinflationary pressure. No economic players, individual or corporate could transact in the local currency, to the extent that even some government run institutions were trading in foreign currency. Faced with such an unmanageable situation, the monetary authorities were left with no option but to enhance stability through the introduction of a multicurrency exchange rate regime with the USD, BWP and ZAR as the official currencies in circulation. Of these currencies, the USD was seen as the leading currency.

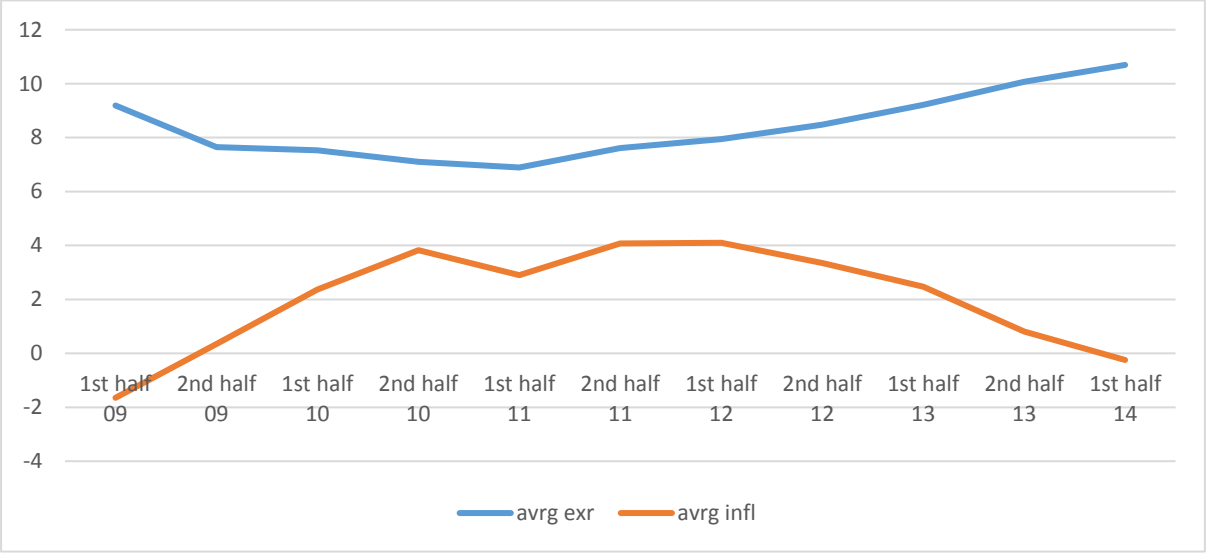
The adoption of the multicurrency regime in January 2009 saw some stability being achieved in the economy. Year-on-Year (Y.O.Y) inflation which had reached the hyperinflationary levels of more than 500m % as of December 2008 fell to as low as an average of -7.7% by December 2009 (ZIMSTAT, 2013). In spite of the stability brought about by the multicurrency exchange rate regime, debate continued on the currency to adopt as the major currency. According to Joko (2011), some analysts were advocating for the adoption of the ZAR as the official currency by virtue of the fact that South Africa is Zimbabwe's major trading partner while others were of the view of retaining the USD as the main currency due to the fact that the South African economy was resting on a shaky ground.

The adoption of the USD as the leading currency was considered as having an influence on the ZAR/USD exchange rate movements as these respond to the levels of imports from South Africa. With the Reserve Bank of Zimbabwe having lost power over the monetary policy instruments, the exchange rates between the two currencies within the Zimbabwean boundaries can be seen as freely floating. The exchange rates have been fluctuating within the range from ZAR6.9003/USD to ZAR10.9601/USD (http://www.x-rates.com). Such movements in exchange rates have been seen as having an effect on the rates of inflation prevailing within the economy. According to ZIMSTAT (2013), inflation rates were moving between -7.7% and 6.1%. This clearly indicates that there are times when the economy could be in a deflation while at times the general price level is seen as increasing.

Inflation rates in Zimbabwe since the adoption of the multicurrency exchange rate regime followed a cyclical trend with the cyclicality being attributed to the to the ZAR/USD exchange rate fluctuations. It can be denoted that the two variables, that is exchange rates and inflation rates in the dollarized Zimbabwean economy were moving against each other, with inflation being seen as being the one dependent on the exchange rate changes.

During the first half of 2009 when the regime had just been introduced, average monthly exchange rate was at ZAR 9.1926/USD. The exchange rate followed a gently downward trend with the minimum being reached in the first half of 2011. During the same period, average inflation was increasing starting with an average of -1.65% during the first half of 2009. This continued to increase up to the second half of 2010 when it fell and then rose again in the first half of 2011 before it fell again from the second half of 2011 to the second half of 2013 when it reached a -0.08% inflation rate. The situation however recovered with the average inflation rate for the first half of 2014 being seen at the chart below.

Fig 1.1 : ZAR/USD EXCHANGE RATE AND INFLATION TRENDS.



SOURCE: ZIMSTAT and RBZ Data

From the chart above, it can be depicted that some cyclicality existed in the Zimbabwean economy in terms of exchange rate and inflation.

1.3 Statement of the Problem

Literature has shown that a number of authors have carried out research in terms of how inflation has impacted on exchange rates. Different hypotheses have been developed to ascertain the relationship between inflation movements and exchange rates. Such theories however have proved not to be applicable in the context of a dollarized Zimbabwe. Instead of inflation affecting exchange rates, which is perceived to be normal, the exchange rates are the ones having an impact on inflation. Inflation in Zimbabwe post dollarisation has been moving against the ZAR/USD exchange rate with some appreciation leading to a deflationary situation which is harmful to economic growth and development. This study therefore explores the extent to which exchange rate movements between the United States dollar and the South African rand have impacted on inflation rate trends within the Zimbabwean boundaries.

1.4 Objectives of the study

The main intention of this research is to establish the relationship between exchange rates and inflation in Zimbabwe during the multicurrency regime.

In trying to address the major objective, the research also seeks attain the following sub-objectives:

- To ascertain how foreign exchange rates affect import prices in Zimbabwe during the multicurrency regime.
- To identify how expectations impact on inflation in Zimbabwe during the multicurrency regime through the evaluation of different theories.

1.5 Research hypothesis

The hypothesis of this study can be stated as follows:

- **H_0**: ZAR/USD exchange rates do not have an influence on inflation in Zimbabwe during the multicurrency regime.

- **H_1**: ZAR/USD exchange rates have an influence on inflation in Zimbabwe during the multicurrency regime.

1.6 Scope of the study

This research is confined to the ZARUSD exchange rate movements instead of those between other circulating currencies. This is by virtue of the fact that these are the currencies that are actively being demanded by both the public and corporate traders. The research uses information during the period from March 2009 to June 2014 as this is the period in which foreign exchange rate changes had an impact on local inflation due to the adoption of the multicurrency exchange rate regime. The June 2014 is chosen as it is the latest period for which the required data can be availed for the research.

1.7 Significance of the study

This research can be of importance to various economic and academic stakeholders. It is of importance to economic policy makers as it seeks to establish how exchange rate fluctuations can impact on inflation in a dollarized economy. It is also of importance to the Midlands State University as it can be used as library material from which students who will be researching in related areas will be extracting some information.

1.8 Limitations of the study

The following hindrances were faced during the research process:

- The failure by the Reserve Bank of Zimbabwe to furnish their website with up to date information about exchange rates has compromised the research process though the researcher resorted to use the information on the World Bank website.
- The media discord on when exactly the multicurrency regime began inputted some confusion in the researcher as while some stakeholders state that it began in January 2009, others were saying it was implemented in March 2009. To rectify the discord, the researcher resorted to using the March date as it the period from which the USD began circulating in large volumes.

1.9 Definition of terms

Exchange rate – the rate of exchange between the United States dollar and the South African rand using the indirect quotation system, taking the USD as the home currency.

ZAR/USD– the amount of South African rand per unit of the United states dollar.

Inflation – the change in the general price level – refers to both positive and negative changes.

Exchange rate pass through- the effect of nominal exchange rate movements to the inflation movements of a particular country.

1.10 Organisation of the study

This chapter introduced the topic, highlighted the background of the study, the statement of the problem, and gave the objectives of the study. The chapter further outlined the underlying assumptions, the scope of the research, the importance of carrying out the study, the limitations faced during the study and finally defined key terms used in the study. Studies by other researchers were also considered, forming the literature review of chapter two. Thereafter, relevant research approaches were selected and used to collect necessary data, which included both primary and secondary data. This formed the Research methodology section of chapter three. The data collected in chapter three was further analysed and presented in different forms, constituting chapter four. Research findings were further clearly outlined. Conclusions, recommendations and suggestions for further study formed the chapter five.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

While the previous chapter introduced the study, this chapter reviews literature by different authors about exchange rates and inflation in an attempt to provide answers to attain the

objectives laid down in the previous chapter. The chapter narrates how floating exchange rates were adopted across the world and highlights the factors that lead to the movements. Different theories about exchange rates and inflation are discussed, followed by empirical evidence on how exchange rate fluctuations have proved to be of consequence to the inflation rates of different countries.

2.2 THEORETICAL LITERATURE REVIEW

2.2.1 The origins of floating exchange rates

Baxter and Stockman (1988) found that exchange rates became more volatile after the Bretton Woods period. The collapse of the Bretton Woods system of 1944 in the early 1970s can be seen as a stepping stone towards the origin of floating exchange rates among all members of the International Monetary Fund. One of the main objectives of the Bretton Woods conference was that of avoiding unstable exchange rates and competitive devaluations of pre-World War 2 western economies by instituting fixed exchange rates (Garber, 1993). In the conference, it was agreed that currencies be pegged to gold and that the IMF would intervene whenever an imbalance of payment arose. In 1945, member states agreed to fix their exchange rates by tying their currencies to the USD. However, the system collapsed in August 1971 when the US government suspended the dollar's convertibility to gold, devalued it in December and thereafter opted for a floating exchange rate. This marked the end of the fixed exchange rate system, paving way for the floating exchange rate.

2.2.2 The Monetary Approach to Exchange Rates and the Balance of payments.

The monetary approach to exchange rate determination, developed in the early 1970s sees the exchange rate as the price of foreign money in terms of domestic money, determined in turn by the demand for and supply of money (Griffiths and Wall, 1999). The demand and supply of money is seen as being influenced by the need to export and import respectively.

Beardshaw et al (2001) asserts that behind the demand for money lies the desire for foreigners to buy local exports while the supply of the currency represents the desire to import. Griffiths and Wall (1999) then bring out the proclamation that if people are not willing to hold the existing stock of money there will be a shortfall in the demand for currency, leading to a fall in its price relative to the currencies of other countries. As such the argument that can be drawn

to that effect is that the balance of payment and hence exchange rate movements are reflective of some disequilibria in the foreign exchange market.

An appreciation of the local currency, according to Beardshaw et al (2001) represents an increased demand for exports as more of the local currency will be demanded by foreigners intending to purchase locally produced goods. This can also be as a result of a decrease in the demand for imports. On the other hand, a depreciation makes exports less competitive and imports more attractive. Consequently, an increase in imports and a fall in exports can be realised.

According to Mussa (1976), the monetary approach to the Balance of Payment analysis is built on the assumption that the demand for money is a stable function of a limited number of arguments, not just the desire to export. This money demand function constrains the equilibrium size of the money supply so as to achieve equilibrium in the market. Under a fixed exchange rate regime, where the government can buy or sell foreign exchange to maintain the par value of their currency, the foreign source component of the money supply is endogenous. Any change in one of the arguments of the money demand function is followed by an increase in money demand. If this is not met by an increase in the domestic component of the money supply, the monetary approach predicts a balance of payment surplus. To prevent a currency appreciation the monetary authority will be forced to purchase foreign exchange so as to increase the foreign source component of money supply. As a result, the desired equilibrium exchange rate is reached.

Mussa (1976) further goes on to suggest that under freely flexible exchange rate, there is a fixed foreign source component of money supply. This implies that a change in one of the arguments of the money demand function or in the domestic credit component of the money supply cannot achieve equilibrium if the foreign source component of money supply is adjusted. Nonetheless, it is the exchange rate which adjusts under such circumstances. These exchange rate adjustments will then affect the money demand function variables which include the prices, incomes, expected returns from holding domestic rather than foreign money. Calvo and Reinhart (2000) asserts that these exchange rate adjustments are harmful to an emerging country's exports and imports since they become less competitive due to difficulties in being hedged. As such, exchange rate changes will have effects on inflation, thereby attracting a contractionary devaluation in the absence of perfect capital mobility.

2.2.3 Cost-push approach to inflation

According to Beardshaw et al (2001), cost push inflation occurs when the increasing costs of production push up the general level of prices. The source of these increases in costs include mainly wages, profit margins and import prices.

Profit margins can also be a source of cost push inflation in an economy as many industrial giants fix their prices on a unit cost plus profit basis. This situation, according to Beardshaw et al (2001) makes prices more sensitive to supply than they are to demand influences and can mean that they tend to go up automatically with rising costs, whatever the state of the economy can be. The question that needs to be answered then is, "Can this be a possibility in an economy faced with massive company closures and a collapsing manufacturing industry, and relying heavily on imported commodities?"

Griffiths and Wall (1999) suggests that an increase in imported material costs can be a factor towards cost-push inflation, leading to what can be termed imported inflation. This was further elaborated by Beardshaw et al when he referred that a huge rise in commodity prices, especially oil in the 1970s undoubtedly contributed to inflation. From the experiences of the oil bubble, it should be remembered that inflation is a worldwide phenomenon and a nation can thus not completely cut itself from rising prices in the rest of the world.

2.2.4 The Purchasing Power Parity Theory

According to Taylor and Taylor (2004), the Purchasing Power Parity is a simple theory which holds that the nominal exchange rate between two countries should be equal to the ratio of aggregate prices between two countries so that a unit of currency of one country will have the same purchasing power in a foreign country. Griffiths and Wall (1999) concurs that under this theory, the equilibrium exchange rate will be such as to enable people to buy the same amount of goods in any country for a given amount of money. The PPP theory then can be seen as consistent with the Law of One Price. For this to be the case exchange rates must therefore be at the correct level in relation to prices in the different countries.

It is important to note that the PPP theory is anchored on a number of assumptions for it to have a rigorous meaning. The theory assumes that goods are homogenous, that is, there is only

one good. Also the theory assumes that there are no transaction costs involved ipn moving goods between countries and that there is internal price flexibility (Griffiths and Wall, 1999). Against these assumptions the law of one price will then ensure that the price of a good will be equalised in both domestic and foreign terms. If the law of one price holds the price of a basket of goods in, say the UK in sterling must be equal to the price of the same basket of goods in the USD adjusted for the exchange rate. In the event that the exchange rate is too high or too low it will adjust if exchange rates are flexible. In the case of fixed exchange rates, however, internal prices will adjust as there will be an excess of demand in one country and a shortfall in the other.

According to Griffiths and Wall (1999), the absolute version of the PPP theory predicts that the exchange rates will equalise the purchasing power of a given income in any two countries so that:

$$\boldsymbol{E = \frac{P(H)}{P(F)}}$$

Where;

E = Exchange rate between two countries' currencies,

P (H) = Prices of a basket of goods in the home country,

P (F) = Prices of the same basket of goods in the foreign country.

From the above identity, the prices of one of the two trading countries can be said to depend on the exchange rate and the prices in the other country. This can be achieved by rearranging the PPP equation such that:

$$\boldsymbol{P\ (H) = E(PF)}$$

The above equation entails that a change in the exchange rate will have an impact on the local prices. A depreciation of the exchange rate means locally produced goods become cheaper, signalling a disinflation. On the other hand an appreciation of the currency has an effect of increasing local prices, thereby leading to inflationary pressures.

Engel and Rogers (1996) however argues that the presence of transactions costs, perhaps arising from transport costs, taxes, tariffs, duties, and non-tariff barriers would induce a violation of the law of one price. They suggest that the volatility of the price differential tends to be larger the greater the distance between the cities concerned. Taylor and Taylor (2004)

also rejects the PPP theory in the sense that not all goods are traded between all countries and the weights attached to similar goods in aggregate price indices will differ across countries. In addition they argue that different countries tend to produce different goods that are differentiated rather than perfectly substitutable as assumed by the PPP.

The PPP is further questioned by Frankel and Rose (1995) in that its assumptions are based on traded goods, which makes it more usefully applicable with the Producer Price Index that tend to contain prices of manufactured tradables. This makes it less applicable to the Consumer Price Index which tend to reflect the prices of relatively more non-tradables such as many services. As such, the PPP is seen as a theory which has some short run deviations from reality though it can be retained for use in the long run.

2.2.5 The Expectations Theory

The expectations theory to inflation is built on the pretext that current inflation rates are a reflection of information that is available about past rates of inflation. According to Mlambo (2012), past values of any macroeconomic variable are embodied in the current expectations. As much as Gertchev (2007) suggests that economic agents are more sensitive to all historical prices when setting current prices, Mlambo states that it is impossible for the agent to be sensitive to all the past prices individually but rather it is that the past prices are already embodied in the current prices through previous expectations. To this effect, a model for adaptive expectations propounded by Gujarati (1988) can be adopted that:

$$\pi^{e}_{t} = \alpha + \lambda\pi_{(t-1)} + \mu_{t}$$

Where π^{e} are expected future inflation rate, λ represents coefficient of expectations, $\pi_{(t-1)}$ represents the lagged price changes which are a proxy of what current prices are and μ_{t} is the error term. This is concurred to by Bogdanski et al (2000) when they put it that future inflation is a function of current rates so that the model almost similar to the one above is developed. The model is stated below:

$$\pi^{e}_{t} = \pi_{(t-1)} + v_{t}$$

The rationale behind stating the left hand side as π^{e}_{t} is that inflation at time **t** is not known in that period, hence making use of the expected rate. Agents are therefore seen to consider the information available in period **t,** which is $\pi_{(t-1)}$ when making their expectations for future rates

of inflation. Flood and Rose (1995) further suggest that there is no trade-off between exchange rates and inflation but rather price variations are a function of expected inflation and the output gap.

Some criticism for the adaptive expectations hypothesis gave rise to the rational expectations theory which postulates that individuals will form future inflation expectations based on all available information about all other variables. If inflation was higher than normal in the past, people will take that into consideration, along with current economic indicators to anticipate future rates of inflation. Chow (2011) concurs that the expected value of a variable, say inflation will not only depend on past values but also on present and future values of other related variables. It is clearly shown that all past expectations and past rates of inflation are embodied in present values, but does not imply that the agent is sensitive to them individually as suggested by Sargent (2011). Critics have regarded expectations as a process of influencing rather than of estimating the future.

2.2.6 The Pricing to Market Theory

According to Krugman (1987), the micro foundation of the theoretical framework of the effects of exchange rate changes on inflation lies on the mark up pricing behaviour of exporters. The theory suggests that monopolistic exporters make adjustments to their destination specific mark ups as a way of reacting to exchange rate shocks. To this, Khalaf (2000) agrees by asserting that the price adjustment will then limit changes in the overall prices of their exports. In other words, the theory suggests that exchange rate changes could be passed through to the prices of traded goods or could be absorbed in the profit margins of the producers.

Klau and Mihaljek (2012) asserts that the effect of exchange rate changes on domestic prices depends to a large extent on the pricing behaviour of exporting and importing firms. Under the PTM theory, exporting firms and/or their importers fix the import prices in the local currency of the market they are exporting to. Under such circumstances, exchange rate movements therefore will not be reflected in local currency prices, implying, in an extreme case a zero exchange rate pass through. This case, however is perhaps more relevant for large industrial economies and emerging market economies.

Krugman (1987) further asserted that a depreciation of the importer's currency, which according to economic theory would raise the cost of imported goods can be followed by a cut in the export price in order to achieve price stability in the importing country's market. This strategy, however can be treated as a temporary measure, which in the long term can enable the exporter to maintain his market share. On the other hand, he suggests that since mark-up rates are industry specific and depend on the exporter's demand curve, treatment of any exchange rate changes should depend on those two phenomena. Thus for exporters with highly elastic demand curves for their products and facing a number of competitors, reducing their mark up in the event of the importer's currency depreciation helps achieve price stability and preserve market share. On the other hand, an exporter facing a few competitors and with an inelastic demand curve might transfer the burden of exchange rate changes to the importer, thereby maintaining high profit margins. Accordingly, the reaction of prices to exchange rate fluctuations can be viewed as dependant on the structure of demand and competition facing the exporter's industry.

Devereux et al (2004) suggests that the PTM depends on the elasticity of demand faced by foreign firms, exporters' market share in the importing countries, substitutability of the importing goods and transportation, marketing and distribution costs. As much as exchange rate changes do have an impact on inflation in an economy, Burstein et al (2002) concurs that since imported goods reach consumers through wholesale and retail networks, their prices accumulate a substantial local input of services which include transportation, marketing and advertising. Therefore, to attribute local price changes solely to exchange rate changes will be inappropriate as there is always a local input on prices prevailing on the local markets.

2.2.7 Currency Invoicing Theory

A phenomenon closely related to the principle of PTM is the Local Currency Pricing (LCP). Jabara (2009) explains the LCP as a pricing approach in which an exporter can invoice exported goods in the currency of the importer. She further suggests that in addition to the LCP, exporters can consider invoicing in their home currency, known as Producer Currency Pricing (PCP) or in a third party currency under what is known as Vehicle Currency Pricing (VCP).

According to Jabara (2009), import prices will stay the same despite changes in exchange rate if they are priced in local currency at least in the short run. As such LCP invoicing can be viewed as having a reducing effect on the exchange rate pass through but at least in the short

run. However, foreign producers could resist increasing the local- currency denominated prices of their goods in the long term in order to maintain a competitive advantage. Kamps (2006) comes in and suggests that while using the LCP approach keeps prices stable in the importing market, exporters however face uncertainty in the actual price they receive denominated in their own currency. In theory, if exporters who use the LCP adjust the importer's price to an exchange rate change in the long run, there should be no differences in the exchange rate pass through using PCP or LCP and the pass through should be equal to one(1).

Klau and Mihaljek (2012) affirms that there are situations where exporters sell goods to their importers at prices quoted in foreign currency, that is the PCP, and distributors then re-sell these goods in the local market at prices quoted in the local currency. In the event that the market is competitive, distributors would partly absorb any effects of exchange rate changes by varying their mark-ups so the pass through would be incomplete. However, where import prices are quoted in foreign currency and sold to consumers for local currency at the going market exchange rate, a change in exchange rates will be automatically transmitted to the consumer prices of the importing country, implying a complete exchange rate pass through. This normally applies to highly inflationary environments and highly dollarized economies. Engel (2002) however suggests that imports are mainly intermediate goods to which foreign currency pricing applies, so the exchange rate pass through is complete for "prices on the docks." By contrast, retail prices as a combination of both imported and local goods prices, are set in local currency and are adjusted only periodically due to tariff costs. As such, movements in exchange rates could thus be incorporated in retail prices but only periodically, blurring the direct link between exchange rate changes and domestic inflation.

2.3 EMPIRICAL LITERATURE REVIEW

This section examines the extent to which exchange rates have impacted on inflation in a number of economies, dollarized and not. The main thrust behind such an empirical review is to establish the extent to which exchange rate movements in different countries have impacted on their inflation rates. The findings will then be related to what has been happening back home in terms of exchange rates and inflation and how best the monetary authorities can address issues within the study. The countries reviewed in the study include Chile, Ecuador, Japan, Korea, China and Macao

2.3.1 The exchange rate pass through in Macao

Studies carried out in Macao indicate that the rate at which exchange rate changes are passed on to import prices is fairly high in the long run. Campa and Goldberg (2006), through the use of a panel regression model found out that the Macao exchange rate pass through into import prices was estimated to be 0.42 in the USA and 0.64 for OECD countries. These results were attributed to the openness of the Macao economy and the lack of capacity for import substitution from domestic sources. The elasticity of the exchange rate pass through into the domestic prices was estimated at about 0.11. These findings imply that ceteris paribus, a one percent depreciation of the MOP would lead to 0.11% increase in domestic prices over a period of one year. Choy however emphasises that the coefficient only measures the direct effect on inflation owing to exchange rate changes while indirectly exchange rate changes also affect domestic prices through other channels such as inflation expectations.

2.3.2 The exchange rate pass through in Ecuador

Ecuador's national currency, the Sucre which was first launched in 1884 was replaced by the USD as the legal tender in 2000 as a means to restore economic and financial activity in the economy. Following the dollarization of Ecuador, GDP rose by 2.3 % in 2000 and increased by 5.4% in 2001. Studies carried out by Lorena et al (2012) indicate that only real effective exchange rate shocks significantly increase inflation in the long run in Ecuador. In the short run, only oil price shocks were believed to significantly increase the real effective exchange rate. The results, according to Lorena et al (2012) are consistent with the assumption that the real effective exchange rate involves both demand and foreign price shocks. Money supply is said not to cause inflation significantly in Ecuador. The real effective exchange rate depreciation increased inflation for about twenty periods, with a maximal response period of two years.

The conclusions drawn therefore indicate that the real effective exchange rate followed oil prices after dollarization. As an oil exporter, an increase in oil prices in Ecuador implies that oil importing countries suffer from some imported inflation as a result of an increase in the costs of production. Since these countries are Ecuador's main trading partners, Ecuador then imports the inflation from its main trading partners through these currency appreciations.

Even though the United States was Ecuador's major trading partner, emerging countries like South Korea and Brazil increased their participation in trading with Ecuador. This implies that the currencies of these countries appeared to be of importance than the USD in the Ecuadorian balance sheet. Thus the higher the real effective exchange rate rises, the greater the inflationary pressures attributable to the higher pass through in Ecuador.

2.3.3 The exchange rate pass through effect in Chile

In determining the impact of exchange rates to inflation in the republic of Chile, Garcia and Restrepo (2001) used an imperfect competition model and the findings were such that labour productivity reduced labour costs in Chile, thereby reducing overall production costs and hence inflation. On the other hand, expectations were seen as a significant variable in determining inflation in Chile. Wages and foreign prices were also found to be positively affecting inflation rates. It was also noted that there was a direct relationship between output gap and inflation in Chile from the period 1994 to 2000.

In terms of the findings on the impact of exchange rate movements on inflation in Chile, it was noted that nominal changes in exchange rates had real effects that disappeared in the long run. A negative output gap was seen as compensating the inflationary effect of exchange rate depreciation since the exchange rate pass through depends positively on economic activity. Under such circumstances, the effect of a depreciation is not passed on to prices in the short run. However, with time, the output gap disappeared, prompting the pass-through to approach towards 100%.

If the Chile peso depreciation was permanent, it could be concluded that the pass through would increase as soon as aggregate demand started improving. This would nevertheless be possible only in the event of monetary authorities taking no action.

2.3.4 Exchange rate pass through in China

Bernard (2008) examined the role of exchange rates on Chinese firms, especially textile and apparel exporters receive the majority of their revenues in dollars (USD) while the USD accounted for a small portion of sales. The findings were such that intense competition in the textile industry markets makes the dollar an attractive vehicle currency but combined with low margins of exports, many Chinese firms were exposed to exchange rate risk. As such, in the

event of an appreciation of the Chinese Yuan, exporters would only respond by increasing prices due to lack of alternatives to minimise exchange rate risk.

2.3.5 Currency invoicing on Japanese exports.

Parsons and Sato (2008) carried out a research the results of which showed how exchange rate changes impacted on prices of Japanese exports to the US, the EU and in East Asia. The findings were such that exchange rate pass through was influenced mostly by the currencies used by Japanese exporters for invoicing. Exports to the US were entirely invoiced in the LCP while those to the EU were invoiced in the Euros (LCP) and partly in the Yen (PCP) and the US (VCP). Almost half the exports to East Asia were invoiced in the Yen (PCP) but USD denominated exports were also common (VCP).

Jabara (2009) asserts that the pricing-to-market behaviour was more common in Japanese exports to the United States and to a lesser extent to the European Union. In contrast, exchange rates were found to be impacting more on import prices in the East Asia. Parsons and Sato (2008) hypothesised that while PTM was not occurring in destination currency invoiced exports, USD denominated exports became popular with Japanese exporters. Pricing-to-market was found to exist in automobiles, transportation and related parts exports both in the EU and in the US as well as steel in the US, EU and East Asian markets.

These findings can be attributed to the level of competition the Japanese exporters were facing in the destination markets. The absence of competition in the US made it possible for the exporters to transfer any exchange rate shocks on automobiles and spares to the US, EU and Asian importers.

In trying to figure out how the use of a dominant vehicle currency (USD) for invoicing of Korean exports, Fukuda and Ono (2004) found that export prices in Korea have high correlation to the vehicle currency and modest correlation to the destination currencies. Their results show that LCP reduces the impact of exchange rate changes to prices of imports.

2.4 Literature Gap

Literature has shown that a number of studies have been carried out in the field of exchange rate pass through. In their studies, different scholars were concerned more with the impact of

exchange rates on inflation in those economies which were using their own currencies. No much work has been done pertaining to exchange rate pass through in dollarized economies. It is this gap that this research seeks to fill by studying exchange rate and inflation relationships in a dollarised economy.

2.5 Summary

This chapter focussed on literature and empirical studies concerning the impact of exchange rates on inflation. The review of different theories has shown that there is a negative relationship between exchange rates and inflation. Exchange rates have been seen as affecting the inflation rates of a particular country through import prices as these move along with exchange rates. Expectations also have been seen as an influencing factor towards inflation of a particular country. The impact of these are centered on the currency used in invoicing by the exporters of a particular country. The next chapter will concentrate on the methodology used to collect data for analysis.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The ultimate goal of this research is to establish the relationship between the ZAR/USD exchange rates and inflation in Zimbabwe during the multicurrency regime. For that purpose, this chapter describes elements with regard to data collection, research design, specifications of models used and selection of input variables. The chapter also specifies the estimation procedure used as well as data types and sources used.

3.2 Research Design

Since the main objective of the study is to establish the relationship between exchange rates and inflation in Zimbabwe during the multicurrency regime, an explanatory research design was adopted. The design was adopted as according to Tobias and Themba (2011), it controls individual heterogeneity, less co-linearity variables and tracks trends in the data. A quantitative approach was considered, with some Ordinary Least Squares regression analysis to determine the magnitude of effect exchange rates have on inflation rates in Zimbabwe. The co-relational research study that was chosen by the author in this study was the time series analysis where selected factors, which are exchange rates and inflation rates, together with some independent variables were studied from March 2009 to June 2014.

3.3 Model specification

Inflation can be defined as the change in the general price level over a period of time. In the case of a dollarized Zimbabwe, the rates of inflation are fluctuating within deflationary and inflationary levels. This is believed to emanate mainly from the changes in the nominal exchange rates between the USD and the ZAR. Lagged inflation rates also are believed to be a factor towards the magnitude of exchange rate pass through in Zimbabwe. By merely considering different models by different authors such as Krugman (1987), and Gujarati (1988), a suitable model for the Zimbabwean situation was developed by combining the relevant inputs to the different models. The model which was adopted can be stated as below:

$$\Pi = \beta_0 + \beta_1 Exr + \beta_2 Infl_{(t-1)} + \varepsilon_i$$

Where:

Π = inflation

EXR = exchange rates between the USD and ZAR using the indirect quotation system.

Infl $_{(t-1)}$ = inflation rate for the preceding period as a proxy for expectations.

Ɛi = error term.

B_0, β_1, β_2 = estimated parameters.

3.4 Justification of variables

The variables inputted in the model above are each justified as below:

3.4.1 Exchange rates

For the purpose of the research, the researcher considered the ZAR/USD exchange rate as the most significant explanatory variable in determining inflation. A research carries out by Campa and Goldberg (2005) indicates that exchange rates are a main determinant of inflation in any economy that conducts some international trade transactions. In their research, Campa and Goldberg noted that a negative relationship exists between the exchange rates and the inflation rates of a particular economy. A depreciation of the currency is likely going to lead to an inflationary situation while a currency appreciation will lead to a disinflationary to the extent that if not managed, a deflationary situation looms. It is in this view that the researcher expects to get the results that show a negative relationship between exchange rates and inflation.

3.4.2 Lagged inflation rates

In his research, Taylor (2000) observed that the extent to which local prices are affected by exchange rates can be influenced by macroeconomic activity in an economy, particularly inflation rate variability as measured by the rates preceding the period in question. This prompted the inclusion of the lagged inflation rates in the model. In the research by Taylor, a positive relationship was noted, implying that the current inflation rates move together with the rates of the previous period. In this research therefore, a positive relationship is expected.

3.5 Data types and sources

The fact that the research is quantitative in nature has prompted the researcher to make use of average monthly time series data on year on year inflation, lagged inflation and exchange rates. The data, which was extracted from publications by the Reserve Bank of Zimbabwe and the Zimbabwe Statistical Agency (ZIMSTATS) was for the period March 2009 to June 2014. This gave a sample size of sixty two observations, a size which can be considered reasonable enough to give reliable results. The sample can be justified as it is in line with the variables among which the researcher wishes to establish the relationship during the period under consideration. The most appropriate method of establishing the extent to which exchange rates impact on inflation under dollarized conditions was the use of secondary data. This was due to the fact that all the data required for the purpose of the research could be readily found on online databases of the Central Bank and the ZIMSTAT.

3.6 Diagnostic Tests

In order to test the reliability of the stated model, the researcher carried out the following diagnostic tests.

3.6.1 Unit Root tests

Unit root tests are a formal way of testing for stationarity of a time series. The main objective of carrying out unit root tests was to establish whether the time series variables are stationary or not. The tests were conducted by applying the Augmented Dickey-Fuller tests, also known as the τ *(tau)* tests (Gujarati and Porter, 2010). Stationarity is often tested to establish whether a time series has a constant mean and variance. Once this is met, the results that are obtained will be free from some spurious regression. According to Gujarati (2004), a computed ADF test statistic which is greater than the critical value at 5% level of significance is an indication that the time series is stationary, hence there is no unit root problem. Stationarity will be tested in order to establish whether exchange rates and inflation are stationary, thereby ensuring that the regression results are not dubious.

3.6.2 Cointegration Tests

Even though there might be no equilibrium in the short run, two variables are said to be cointegrated if there is a long run equilibrium relationship between them (Gujarati, 2004). Brooks (2008) states that for there to be cointegration among the explanatory variables, the

residual must be I (0). The researcher therefore found it necessary to test the residual of the model to see whether they are stationary or non-stationary. The hypothesis to be tested will be stated as follows:

$H_{0:}$ The variables are not cointegrated
$H_{1:}$ The variables are cointegrated.

The decision rule that follows cointegration tests is that if the ADF test Statistic for the residual is greater than the 5% critical value, we reject the null hypothesis as the variables will be cointegrated. Cointegration will thus be tested to establish whether a long run relationship exists between inflation, exchange rates and the lag of inflation rates. If cointegration is found to exist, it implies that shocks to exchange rates and lagged inflation have permanent effects on the inflation rates in an economy

3.6.3 Multicollinearity Tests

One of the assumptions of the Classical Linear Regression Assumptions is that the explanatory variables are independent, that is, there is no multicollinearity. According to Maddala (1992), when two or more variables are highly intercorrelated there is the existence of severe multicollinearity. It is important to note that multicollinearity is a matter of degree not of kind. The researcher therefore was not interested in figuring out the presence or absence of multicollinearity but in estimating the magnitude of multicollinearity. To achieve this, the researcher will make use of the correlation matrix which will indicate the relationship between the explanatory variables. Any values greater than 0.8 across two variables in the matrix indicate the presence of severe multicollinearity, a condition which requires the variables to be dropped from the model. The hypothesis that will be tested is that:

H_0: Multicollinearity among explanatory variables exist.

$H_{1:}$ No multicollinearity exists among explanatory variables.

3.6.4 Autocorrelation Tests

Gujarati (2004) defines autocorrelation as the correlation that exists between members of a series of observations ordered in time. Econometric principle states that autocorrelation emanates from the violation of the CLRA that the disturbance terms must not be correlated. For the purpose of this research, the Durbin Watson Test is used to test for the presence of autocorrelation. The hypothesis will be tested as follows:

$H_{0:}$ There is autocorrelation

$H_{1:}$ Autocorrelation is not present

The decision rule will be that if the D-W Statistic is within the zone of no autocorrelation, we drop the null hypothesis and conclude that autocorrelation does not exist. The absence of autocorrelation signifies that there is no relationship between the current errors and the error terms for the previous period.

3.7 Data Presentation and Analysis plan

The researcher collected quantitative data which will be used in chapter four. The researcher chose those data presentation tools which were suitable for establishing trends and relationships between the exchange rates and the inflation rates in Zimbabwe. The collected data will be analysed through the use of the Ordinary Least Squares regression model using the E-Views statistical package. Tables are going to be the main means through which the regression results are going to be presented and analysed.

3.8 Summary

Chapter three focused on the research design, the model specification followed by the justification of variables, diagnostic tests and the data sources used. An explanatory research design was adopted for the purpose of establishing the relationship between the ZAR/USD and inflation in Zimbabwe. A model for inflation was specified, with inflation being considered a function of exchange rates and a control variable, expectations. Diagnostic tests to be carried out were also stated, with the data analysis and presentation plan being put forward. The next chapter will disclose the research findings, data presentation and analysis of the results.

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter is concerned with the presentation and analysis of the research findings from chapter three. The results include summaries of original results from E-Views in testing for the statistical relationship between exchange rates and inflation in Zimbabwe during the multicurrency regime. The use of tables will also be adopted to complement and summarise some of the results obtained from the E-Views package.

4.2 Diagnostic test results

After carrying out some diagnostic tests, the researcher obtained the results that are presented below. The diagnostic tests carried out are stationarity tests, cointegration tests, multicollinearity tests and autocorrelation tests.

4.2.1 Unit root test results

Stationarity was tested using the Augmented Dickey-Fuller tests. A summary of the stationarity results are presented in the table below.

Table 4.1: Summary of Unit Root Test Results

Variable	**ADF Statistic**	**Critical Values**	**Order of Integration**
Infl	-8.218215	1% (-3.5380) 5% (-2.9084) 10% (-2.5915)	I(1)
Exr	-6.100331	1% (-3.5380) 5% (-2.9084) 10% (-2.5915)	I(1)
$Infl_{(t-1)}$	-8.040781	1% (-3.5380) 5% (-2.9084) 10% (-2.5915)	I(1)

Source: Secondary Data

The researcher separately tested for stationarity on each variable using the Augmented Dickey-Fuller (ADF) test. The null hypothesis of a unit root is rejected if the ADF statistic is greater

than the 5% critical value. The results obtained are such that no variable is stationary at level, but they are stationary after first differencing. This shows that exchange rates, inflation and lagged inflation rates do not on their own have a constant mean and variance but their differences are the ones which bear the characteristics. By stationarising the variables, the problem of some spurious regression was avoided, making the results reliable. The detailed results of the unit root tests are presented in Appendix 2.

4.2.2 Cointegration tests

In the event that two or more variables in a time series have a long run relationship between them, cointegration is said to exist (Gujarati, 2004). If the residual is stationary and at 5% significance level it is found that the ADF statistic is greater than the critical value, it implies that there is no unit root and hence the variables are cointegrated. In testing for cointegration, the residual was tested for stationarity and it was found out that there is no unit root on the residual, leading to the conclusion that the variables are cointegrated. That cointegration was found to exist among the variables is indicative of the fact that there exists a long run relationship between inflation and exchange rates. The cointegration test results are presented below.

Table 4.2: Summary of Unit Root on Residual

Variable	**ADF Statistic**	**Critical Values**	**Order of Integration**
Residual	-2.940754	1% (-3.5362) 5% (-2.9077) 10% (-2.5911)	I(0)

Source: Secondary Data

4.2.3 Multicollinearity tests

In testing for multicollinearity, the researcher used the correlation matrix approach and the results are presented in the table below.

Table 4.3: Correlation Matrix

	Exr	**Infl$_{(t-1)}$**
Exr	1.000000	-0.422638
Infl$_{(t-1)}$	-0.422638	1.000000

Source: Secondary Data

The results on the table above are such that the coefficients for both variables are less than 0.8. Econometric principle states that a coefficient greater than 0.8 is indicative of severe correlation among the independent variables, a condition that is not acceptable in accepting the null hypothesis. From the results on the table above, the researcher can therefore conclude that there is no severe multicollinearity among the variables included in the model as no variable was found with a coefficient exceeding 0.8. To this effect, it can be concluded that the inflation and exchange rates in Zimbabwe are not highly correlated, thus dropping either exchange rates or lagged inflation rates would not cause the coefficients of the remaining variable to change significantly. Thus the relationship that exists between exchange rates and lagged inflation rates will not cause too much loss of precision in the model.

4.2.4 Autocorrelation tests

The most adopted test for autocorrelation is the Durbin-Watson (DW) test. According to Gujarati (2004), in time series regression, it is possible to obtain spurious regression results in the sense that superficially, the results may look good but further probing makes them appear suspicious. As such, in Ordinary Least Squares regression, the presence of autocorrelation results in underestimating the Variance, overestimating the R-Squared, and also the t and F tests of significance will not be valid and likely to give misleading conclusions about the statistical significance of the estimated regression coefficients. The autocorrelation results are presented in the table below.

Table 4.4: The Durbin Watson test

Zone of positive autocorrelation	Zone of indecision	Zone of no autocorrelation	Zone of indecision	Zone of negative autocorrelation

0 dl du 4-du 4-dl 4

1.536 1.662 2.338 2.464

1.980112

Source: Secondary Data

From the regression results, a D-W Statistic of 1.980112 shows that the model was not suffering from autocorrelation as it is within the prescribed boundaries of 1.662 and 2.338. This implies that the D-W Statistic falls within the region of acceptance for there to be no serial correlation in the model. The principle is that in the event that the coefficient of determination, that is the R-Squared is greater than the Durbin Watson statistic, it is a good indicator that the model suffers from spurious regression. The fact that the D-W Statistic in the regression results is greater than the R-Squared rules out the possibility of spurious regression. As such, the relationship so established between inflation, exchange rates and some lagged inflation rates can be considered reliable as there is no serial correlation between the errors of different periods.

4.3 Regression results

After carrying out the OLS regression between the endogenous and exogenous variables, the results were presented in the table below.

Table 4.5: Presentation of Regression Results

Variable	**Coefficient**	**Std Error**	**t-Statistic**	**Prob**
Exr	-0.244827	0.122021	-2.006424	0.0492
Infl$_{(t-1)}$	0.766794	0.068041	11.26950	0.0000

C	2.588560	1.096675	2.360371	0.0215

R-Squared- 0.749786
Adjusted R-Squared- 0.741582
Durbin Watson statistic- 1.980112
F-Statistic- 91.39552
P Value (F statistic) - 0.000000
Source: Secondary Data

After running the Ordinary Least Squares regression, the model can now be specified as:

$$\mathbf{\Pi = 2.588560 - 0.244827Exr + 0.766794Infl_{(t-1)}}$$

4.4 Interpretation of Regression Results

The model specified above is an estimation of inflation in Zimbabwe, a measure of price changes and an indicator of economic activity as well. The results shall be interpreted based on the coefficients of the independent variables. The model was arrived at by carrying out an OLS regression on time series data collected from January 2009 to June 2014. The results show that lagged inflation has a positive sign while exchange rates have negative signs.

4.4.1 R-Squared

The R-Squared is a measure of how well the variation in the dependant variable, in this case inflation in Zimbabwe is influenced by the explanatory variables included in the model. From the results so obtained, about 74.97% of total variations in the Zimbabwean inflation rates are explained by the explanatory variables whereas about 25.03% are explained by the error term, that is, by other variables which affect inflation but not included in the model.

The R-Squared so obtained proves the strength of the independent variables, that is, exchange rates and expectations in determining the rates of inflation in Zimbabwe. The liquidity crunch in the economy very well rules out the fact that Zimbabwean inflation is influenced by demand pull factors but rather it is a cost push phenomenon. Also, that there is not much activity taking place in the manufacturing industry suggests that Zimbabwean inflation is more imported than it is being pressured from the local market. This therefore led to the exchange rates being

considered strong in influencing inflation rates in Zimbabwe as evidenced by a high R-squared of 0.749786.

4.4.2 F-Statistic

Econometric principle requires that the F-Statistic, which is a measure of the significance of the whole model be greater than five. The model for this research is therefore significant as it satisfies the econometric rule of thumb on the F-Statistic, with an F-Statistic of 91.39552 which is greater than five. Also in the research, a Durbin Watson Statistic of 1.980112, greater than the R-Squared of 0.749786 is evident of the absence of dubious or spurious regression.

4.4.3 Exchange rates

The ZAR/USD exchange was found to be statistically significant in determining the rates of inflation in Zimbabwe during the multicurrency regime since it has a t-Statistic value of -2.006424, which is above the prescribed 2.000000. A negative relationship was obtained between the dependant variable, inflation, and the exchange rate as shown by the negative sign on the coefficient of -0.244827. These results explains the variation in inflation and exchange rates in such a way that an appreciation of the USD against the ZAR leads to a disinflation while a depreciation in the exchange rate causes inflation.

The relationship so observed indicates that movements in exchange rates between the USD and the ZAR were the main drivers of inflation in Zimbabwe since 2009. This might have been necessitated by the fact that as much as Zimbabwe adopted the USD as its main currency, more than 70% of tradable consumer and consumer durable goods in Zimbabwe originate from South Africa. The collapse of the Zimbabwean manufacturing sector has made Zimbabweans depend on goods from South Africa, raising demand for the ZAR such that ZAR/USD exchange rate has become so sensitive to any mismatches in the demand for the ZAR and its supply. Evidence to this assertion is from RBZ (2014) when it put it that in the medium to long term, developments in the ZAR/USD exchange rates, among other minor factors in the economy will continue to influence inflation developments. Devereux et al (2004)'s assertion that competition is among one of the factors that influence the pricing to market can thus be endorsed in the Zimbabwean situation as the absence of a vibrant manufacturing industry has given the exporters the liberty to transfer any exchange rate adjustment burdens to the local importers.

The relationship therefore indicates that a depreciation of the USD against the ZAR will lead to an increase in local prices since imports would have become expensive. Local prices become sensitive to import price changes due to the fact that local substitutes are insufficient enough to meet demand, hence the impact of import price changes is passed through with ease to local prices. Against this background, it can therefore be noted that inflation in Zimbabwe tends to be reflective of the changes in the prices of imports from the Republic of South Africa.

4.4.4 Lagged inflation rates

Lagged inflation rates, a proxy for expectations, proved to be statistically significant in determining future inflation rates in Zimbabwe as it had a t-Statistic of 11.26950 which is greater than the econometrically acceptable ±2.000000. A probability of 0.000000 also indicated that the variable is significant since it is less than the 0.05 rule of thumb. The significance conforms to Taylor (2000)'s assertion that lagged inflation rates have an impact on passing through import prices in the local market.

With Zimbabweans having a history of hyperinflation, economic agents have proved to be sensitive to some inflationary trends that prevail in the economy to the extent that any direction that inflation follows is allowed to influence the future rates. This is evidenced by the significance of the lagged inflation rates in determining inflation in Zimbabwe. This conforms to Bogdanski et al (2000)'s assertion that future inflation is a function of current rates of inflation. The line of thinking that may further be considered is that if exchange rates are being the main factor towards inflation, then there is no doubt that the lagged inflation rates have an exchange rate component in them. To this reasoning, we can be driven to the conclusion that lagged inflation rates represent an indirect long run impact of exchange rates on current inflation. Thus we come to the justification that Zimbabwean inflation post dollarization is mostly determined by the ZAR/USD exchange rates.

4.5 Summary

In this chapter presentation and analysis of the results is done. The results were arrived at using the Ordinary Least Squares (OLS) regression model. The results show that inflation in Zimbabwe post dollarisation is influenced by exchange rates with the two having a negative relationship. Expectations were also seen as having a positive influence on the level of inflation in an economy as economic agents are believed to have a sensitive memory. Having presented

and analysed the results, the next chapter is going to summarise the whole research, give conclusions and highlight recommendations on what can be done to correct the problem raised.

CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter constitutes a suitable conclusion and provides an overview of all research activities and present major conclusions drawn from the findings of the study. An evaluation of the practical importance of the results was done with a view to develop feasible recommendations. Results from data analysis have enabled the researcher to reach to the conclusions that he is going to present in this chapter.

5.2 Summary of the study

Following the hyperinflationary situation that characterised the Zimbabwean economy from around 2000, the introduction of the multicurrency regime was the way towards the culmination of the crisis. Yes, economic stability was enhanced but the problem of economic stagnation during some periods of the regime was noted. This problem led to the question, "Is the US dollar the most appropriate currency that Zimbabwe can continue to use in the period of demonetisation of its currency?"

The purpose of this study was to determine whether exchange rates between the USD and the ZAR have any implication on inflation rates through import prices in Zimbabwe, to identify other factors that impact on inflation in Zimbabwe and to determine if there are any alternative currency regimes available for the Zimbabwean government to adopt.

Some studies have shown that inflation, in the case of imported products in the CPI basket is a function of exchange rate changes while others have suggested that inflation is a function of expectations among economic agents about the future. Other writers have argued that these factors do not have an implication on inflation of any given economy but considered inflation as a purely monetary phenomenon. As such, a study to determine whether exchange rates are the source of inflation trends in Zimbabwe was carried out.

In carrying out the study, an explanatory research design was adopted with the use of quantitative data have been obtained from the RBZ and ZIMSTATS. Quantitative analysis was conducted through the use of the Ordinary Least Squares regression on data obtained through some desk research.

The findings so obtained revealed that inflation rates prevailing in Zimbabwe are mainly a function of exchange rates and economic expectations of economic agents. With almost all of the products in Zimbabwe's CPI basket being imports from South Africa, there is no doubt that the inflation in Zimbabwe is close to entirely imported inflation. The fact that there is no sufficient and competitive local supply to outcompete the imports in the event of exchange rate shocks has made it easier for local prices to move with import prices. That the manufacturing industry in Zimbabwe is dilapidated has led Zimbabwean wholesalers and retailers filling their outlets with imports from South Africa. This implies the absence of competition for imports from the local markets, making it easy to pass through import prices to the local market.

The expectations of the Zimbabwean economic agents about the future also were found to be a significant factor in influencing inflation rates in Zimbabwe. The economic agents' perceptions about the future could not be ruled out as a factor towards inflation trends in Zimbabwe post dollarization. It is rational to base the future on the present or to base the present on what happened previously. Individuals' predictions about the future inflation have a tendency of driving the prices up inflation in the future though the magnitude of the increase or decrease cannot be estimated.

What needs to be noted is that the impact of expectations on inflation can be taken as a lagged impact of exchange rates on inflation. Since previous inflation rates have an exchange rate component in them, it thus can be justified that inflation in Zimbabwe is mainly a function of exchange rates. It therefore can be put that the impact of exchange rates which is contained in preceding inflation rates helps create expectations which then drive current inflation rates. As such, exchange rates can be viewed as a source of expectations through their impact on previous rates of inflation. This justifies the view that exchange rates can be taken as the major determinant of inflation in Zimbabwe during the multicurrency regime besides other minor aspects such as international oil prices and utility costs.

5.3 Conclusions.

The research concludes that:

- The ZAR/USD exchange rate is the main driver of inflation rates in Zimbabwe through its influence on import prices from South Africa.

- Expectations are a function of exchange rates, hence their effect on inflation can as well be attributable to previous exchange rates.
- The demand for the ZAR against its supply in Zimbabwe has influences on the exchange rates in Zimbabwe.

5.4 Recommendations

From the findings in the study, the researcher give the following recommendations:

- That the government reviews its Indigenisation and Economic Empowerment Act in order to attract foreign direct investment. This will aid in boosting the manufacturing industry, thereby creating some competition for the imports. Competition will help insulate local inflation from imported inflation, thereby resulting in inflation rates that are consistent with economic growth.

- Zimbabwean importers should negotiate for invoicing in the USD to avoid the tendency of exchange rate shocks being passed-through to the local prices in Zimbabwe.

- The government should consider switching to using the ZAR as the main currency for the simple reason that Zimbabwe conducts most of its trade with South Africa and receive funds from expatriate Zimbabweans residing in South Africa. This will also prove not only natural but also strategic as Zimbabwean will be able to negotiate its entry into the Common Monetary Area with greater tranquillity. Entry into the CMA will help reduce the impact of ZAR/USD exchange rates on inflation in Zimbabwe.

5.5 Suggestions for future research

The study concentrated on the impact of ZAR/USD exchange rates on inflation in Zimbabwe during the multicurrency regime. Further research is recommended on the impact of adopting the South African rand instead of the US dollar as the main currency in Zimbabwe so as to cushion the economy from the exchange rate effects on inflation, which shows the direction to which the economy is heading.

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APPENDICES

APENDIX 1: DATA SET

Date	Infl	Exr	Infl $_{(t-1)}$
2009.03	-3	9.9526	-3.1
2009.04	-1.1	8.9638	-3
2009.05	-1	8.3588	-1.1
2009.06	0.6	8.0295	-1
2009.07	1	7.9603	0.6
2009.08	0.4	7.9276	1
2009.09	-0.5	7.5049	0.4
2009.10	0.8	7.4832	-0.5
2009.11	-0.1	7.5144	0.8
2009.12	0.5	7.4926	-0.1
2010.01	-4.8	7.4638	0.5
2010.02	-0.7	7.6847	-4.8
2010.03	3.5	7.4028	-0.7
2010.04	4.8	7.3447	3.5
2010.05	6.1	7.6441	4.8
2010.06	5.3	7.6417	6.1
2010.07	4.1	7.5384	5.3
2010.08	3.6	7.2896	4.1
2010.09	4.2	7.123	3.6
2010.10	3.6	6.9064	4.2
2010.11	4.2	6.9753	3.6
2010.12	3.2	6.8148	4.2
2011.01	3.5	6.9185	3.2
2011.02	3.1	7.1782	3.5
2011.03	2.7	6.9003	3.1
2011.04	2.7	6.7144	2.7
2011.05	2.5	6.8571	2.7
2011.06	2.9	6.7875	2.5
2011.07	3.3	6.7743	2.9
2011.08	3.5	7.0929	3.3
2011.09	4.3	7.5377	3.5
2011.10	4.2	7.9429	4.3
2011.11	4.2	8.1484	4.2
2011.12	4.9	8.1879	4.2
2012.01	4.3	8.0139	4.9
2012.02	4.3	7.6449	4.3
2012.03	4	7.6028	4.3
2012.04	4.03	7.8319	4
2012.05	4.02	8.1631	4.03
2012.06	3.97	8.3905	4.02

2012.07	3.94	8.2459	3.97
2012.08	3.63	8.2571	3.94
2012.09	3.24	8.267	3.63
2012.10	3.38	8.667	3.24
2012.11	2.99	8.8058	3.38
2012.12	2.91	8.6224	2.99
2013.01	2.51	8.7925	2.91
2013.02	2.98	8.8747	2.51
2013.03	2.76	9.1863	2.98
2013.04	2.49	9.0987	2.76
2013.05	2.2	9.3334	2.49
2013.06	1.87	10.0047	2.2
2013.07	1.25	9.9321	1.87
2013.08	1.28	10.0596	1.25
2013.09	0.86	9.9876	1.28
2013.10	0.59	9.8963	0.86
2013.11	0.54	10.2064	0.59
2013.12	0.33	10.3636	0.54
2014.01	0.41	10.86	0.33
2014.02	-0.49	10.9601	0.41
2014.03	-0.91	10.7416	-0.49
2014.04	-0.26	10.5442	-0.91
2014.05	-0.19	10.4067	-0.26
2014.06	-0.08	10.6616	-0.19

APENDIX 2: UNIT ROOT TEST RESULTS

Unit Root Test Results on Inflation (Infl)

ADF Test Statistic	-8.218215	1% Critical Value*	-3.5380
		5% Critical Value	-2.9084
		10% Critical Value	-2.5915

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFL,2)
Method: Least Squares
Date: 10/10/14 Time: 15:17
Sample(adjusted): 2009:05 2014:06
Included observations: 62 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFL(-1))	-1.038482	0.126363	-8.218215	0.0000
C	0.018196	0.149108	0.122031	0.9033

R-squared	0.529556	Mean dependent var	-0.028871
Adjusted R-squared	0.521715	S.D. dependent var	1.696413
S.E. of regression	1.173208	Akaike info criterion	3.189087
Sum squared resid	82.58497	Schwarz criterion	3.257704
Log likelihood	-96.86168	F-statistic	67.53906
Durbin-Watson stat	2.008608	Prob(F-statistic)	0.000000

Unit Root Test Results on Exchange Rates (Exr).

ADF Test Statistic	-6.100331	1% Critical Value*	-3.5380
		5% Critical Value	-2.9084
		10% Critical Value	-2.5915

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR,2)
Method: Least Squares
Date: 10/10/14 Time: 15:18
Sample(adjusted): 2009:05 2014:06
Included observations: 62 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1))	-0.639527	0.104835	-6.100331	0.0000
C	0.024744	0.028373	0.872079	0.3866

R-squared	0.382805	Mean dependent var	0.020060
Adjusted R-squared	0.372519	S.D. dependent var	0.281933
S.E. of regression	0.223329	Akaike info criterion	-0.128613
Sum squared resid	2.992557	Schwarz criterion	-0.059996
Log likelihood	5.987000	F-statistic	37.21404
Durbin-Watson stat	2.067353	Prob(F-statistic)	0.000000

Unit Root Test Results on Lagged Inflation ($lnfl_{(t-1)}$)

ADF Test Statistic	-8.040781	1% Critical Value*	-3.5380
		5% Critical Value	-2.9084
		10% Critical Value	-2.5915

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LAGINFL,2)
Method: Least Squares
Date: 10/10/14 Time: 15:20
Sample(adjusted): 2009:05 2014:06
Included observations: 62 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LAGINFL(-1))	-1.037323	0.129008	-8.040781	0.0000
C	0.047032	0.152232	0.308950	0.7584

R-squared	0.518668	Mean dependent var	-0.000484
Adjusted R-squared	0.510646	S.D. dependent var	1.712236
S.E. of regression	1.197775	Akaike info criterion	3.230534
Sum squared resid	86.07986	Schwarz criterion	3.299152
Log likelihood	-98.14656	F-statistic	64.65416
Durbin-Watson stat	1.964114	Prob(F-statistic)	0.000000

APENDIX 3: COINTEGRATION TEST RESULTS

Unit Root Test Results on Residual (Resid01)

ADF Test Statistic	-3.603566	1% Critical Value*	-3.5362
		5% Critical Value	-2.9077
		10% Critical Value	-2.5911

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID01)
Method: Least Squares
Date: 10/10/14 Time: 15:24
Sample(adjusted): 2009:04 2014:06
Included observations: 63 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID01(-1)	-0.157297	0.060416	-2.603566	0.0116
C	-0.762014	0.346771	-2.197459	0.0318

R-squared	0.100010	Mean dependent var	-0.065327
Adjusted R-squared	0.085256	S.D. dependent var	1.830384
S.E. of regression	1.750620	Akaike info criterion	3.989049
Sum squared resid	186.9449	Schwarz criterion	4.057085
Log likelihood	-123.6550	F-statistic	6.778558
Durbin-Watson stat	1.964434	Prob(F-statistic)	0.011569

APENDIX 4: MULTICOLLINEARITY TEST RESULTS

	EXR	LAGINFL
EXR	1.000000	-0.422638
LAGINFL	-0.422638	1.000000

APENDIX 5: REGRESSION RESULTS

Dependent Variable: INFL
Method: Least Squares
Date: 10/10/14 Time: 15:14
Sample: 2009:03 2014:06
Included observations: 64

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	-0.244827	0.122021	-2.006424	0.0492
LAGINFL	0.766794	0.068041	11.26950	0.0000
C	2.588560	1.096675	2.360371	0.0215

R-squared	0.749786	Mean dependent var	2.177344
Adjusted R-squared	0.741582	S.D. dependent var	2.135864
S.E. of regression	1.085763	Akaike info criterion	3.048184
Sum squared resid	71.91175	Schwarz criterion	3.149381
Log likelihood	-94.54187	F-statistic	91.39552
Durbin-Watson stat	1.980112	Prob(F-statistic)	0.000000