An Analysis of the Effects of Hyperinflation on Manufacturing Sector Output.
A Case of Zimbabwe's Manufacturing Firms 2000 – 2013.

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Dedication

To my family, Salome, Lucy, Providence and Precocious

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List of Acronyms

ACF	Autocorrelation Function
ADF	Augmented Dickey-Fuller
AEO	African Economic Outlook
AIC	Akaike Information Criterion
BOP	Balance of Payments

CPI	Consumer Price Index
CSO	Central Statistics Office
CZI	Confederation of Zimbabwe Industries
df	Degrees of Freedom
DF	Dickey Fuller
DiMAF	Distressed Companies and Marginalized Areas Fund
DRC	Democratic Republic of Congo
ESAP	Economic Structural Adjustment Programme
EU	European Union
FPE	Final Prediction Error
GDP	Gross Domestic Product
GNU	Government of National Unity
H_0	Null Hypothesis
H_1	Alternative Hypothesis
HQIC	Hannan-Quinn's Information Criterion
IFI	International Financial Institution
ILO	International Labour Organization
IMF	International Monetary Fund
IRF	Impulse Response Function
ISI	Import-Substitution Industrialization
LIFO	Last In First Out
LR	Likelihood Ratio
NIFO	Next In First Out
NRZ	National Railways of Zimbabwe
PACF	Partial Autocorrelation Function
RBZ	Reserve Bank of Zimbabwe

SAZ	Standards Association of Zimbabwe
SBIC	Schwarz-Bayesian Information Criterion
USA	United States of America
VAR	Vector Autoregressive Regression
VECM	Vector Error Correction Model
VMI	Volume of Manufacturing Index
WB	World Bank
ZDERA	Zimbabwe Democracy and Economic Recovery Act
ZETREF	Zimbabwe Economic Trade and Revival Facility
ZimASSET	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZIMSTAT	Zimbabwe National Statistics Agency

Abstract

This paper seeks to analyse the effects of hyperinflation in Zimbabwe on manufacturing sector output over the period 2000 - 2009. Interviews were carried out to find the challenges that hyperinflation pose on the sector. Regression approach through application of co-integration was also performed to find the relationship between hyperinflation and volume of manufacturing sector output. The study revealed that firms in the sector engaged various techniques to crossover the hyperinflationary turmoil. The Granger causality test is conducted in the unrestricted vector autoregressive model and it shows that in the short run hyperinflation reduces manufacturing sector output since the sector is highly monetized and has depreciating assets.

Relevance to Development Studies

Development studies are not only concerned with economic development but also to a wide range of issues. This study is relevant to development studies since it looks at most sensitive issues of the economy and people's welfare that is manufacturing sector and hyperinflation. Understanding the negative effects of hyperinflation on the economy in general and on manufacturing sector in particular is of paramount importance since it can guide us in bringing stability and sustained growth in the economy. Zimbabwe had low inflation from 1980 to 2004, however by the beginning of 2005 inflation started to increase and later burst into hyperinflation in early 2007. The effects of hyperinflation are cross cutting and can be felt in all sectors of the economy as it can reduce the general citizens into mere beggars, may cause social conflicts as well as disrupting planning and decision making done by companies and individuals. This gives the basis for looking at the effects of hyperinflation by analysing how output was affected along the way.

Chapter 1

1.1 Background

Since the beginning of the new millennium, Zimbabwe's economic performance has been on a downward trend with gross domestic product (GDP) falling to negative figures for the period 2002 to 2008 as illustrated in Figure 1. In early 1999 the government embarked on a fast track land reform program to address colonial imbalances which saw the black majority who were landless benefitting from the program. After accusing the government of violating human rights and not following property rights during the land reform the United States of America (USA) passed an act in 2001, Zimbabwe Democracy and Economic Recovery Act (ZDERA), which prevented the extension of loans and debt relief to Zimbabwe by the USA until human rights, electoral reforms and rule of law were observed. (Grebe, 2010: 9). The International Monetary Fund (IMF) also stopped lending financial credit to the country due to the ballooning debt and this further exacerbated the country's woes. In addition to this, droughts, bad publicity, politically motivated violence, low business confidence and shortage of foreign currency led the country to be isolated by the international and donor community. This further limit the sources of funds and credit support that the country needed for investment purpose.

Following the land reform exercise Britain and her allies imposed sanctions to President Mugabe and his inner circle of which this debilitates the economy. These unfolding events coupled with huge fiscal deficit, deterioration of balance of payment (BOP), deteriorating exchange rate and poor monetary policies led to hyperinflation. The widening disparity between the official exchange rate and the black market rate also aggravated the situation. This compelled the government to resort to printing more money in a bid to finance the budget deficit as its foreign exchange reserves were dry. (Fisher and Easterly, 1990). However this did not yield positive results since real GDP fell by 0.2% while inflation rose above 50%. (Coomer and Gstraunthaler, 2011: 320). The enactment of the Indigenization and Economic Empowerment Act in 2008 which aimed to empower local black people in the country was also a game changer for investment in the country. Companies which were owned by foreigners were required to surrender at least 51% of their shares to local people and this had negative repercussions on investment decisions of foreign owned manufacturing firms. This made foreign investors who were already doing business in the country to delay investing into new machinery and injecting fresh capital due to the fear of what will be the consequences of indigenization.

Over the period 2002 – 2009 Zimbabwe's economy went through uncommon developments when compared with countries in Southern Africa. These developments which include shortage of basic necessities, cash challenges to mention a few almost brought the economy to a halt. As published by the Zimbabwe National Statistics Agency (ZIMSTAT) formerly Central Statistics Office (CSO), inflation rate started from as low as 50.54% month-on-month in March 2007. The rate continued to soar until the officially recorded figure reaches 2 600% per month in July 2008. According to Hanke (2008) the unofficial rate recorded is believed to have reached a monthly level of 7.96 bil-

lion per cent in 2008 mid-November as implied by changes in stock and exchange rate. (Hanke and Kwok 2008: 354). The above published (unofficial) figure made Zimbabwe to escape being the country in the world with the highest inflation rate.

This research investigates the effects of hyperinflation on the output of manufacturing sector firms in Zimbabwe, the challenges these firms faced and what strategies they devised to cope with the hyperinflationary environment that occurred in early 2007 up to 2009. The research will start by looking at what happened to and what is the trend of volume of manufacturing index, value of exports and imports as well as inflation rate for the period January 2000 – December 2013. This will give an insight to the behaviour over time of the strategies and adaptation mechanisms that manufacturing firms took in order to continue their operations during hyperinflationary impasse that occurred between 2007 and 2009. This long period analysis provides an understanding of the long term trend of the manufacturing sector output in Zimbabwe unlike to look at the hyperinflationary period only. The inclusion of exports in my analysis stems from the staple approach which states that exports set the tone and pace for economic growth in an economy. (Watkins 1963: 144). In the same vein the export led growth hypothesis states that even if other sectors in the economy do not perform well some gains can spill over from the export sector to spur growth in other non-export sectors through efficiency and improved production techniques. (Sharma and Panagiotidis 2005: 234).

1.2 Problem Statement

Zimbabwe's manufacturing sector which was considered a giant in Southern Africa started to lose the brilliance it gained since 1980. This was signalled by the decline in Volume of Manufacturing Index (VMI) and GDP growth rate. The sector started to follow a continuous downward trend in 2002. The March 2002 elections might have contributed to this and investors might have hold on to their funds to see the outcome and what the political situation will be. According to a study by Damiyano et al. (2012) Zimbabwe lost close to USD 444 million worth of investment and GDP during the pre-hyperinflation period. This also resulted in close to 90% of the previously employed working age population being jobless and more than 400 companies closing down their operations. (Damiyano et al. 2012: 582). This has retarded economic growth in the country in general and profitability of firms in particular since the sector is the anchor of development and growth in the country. As cited by Conway (2000), McKinnon (1973) argue that lack of financial intermediation between savers and investors slowed down economic growth in the country due to loss of confidence by savers in the financial sector. (Conway 2000: 6). This has an effect of reducing investment funds needed in the economy. The Daily News of 31 October 2013 cited that about 700 companies in the manufacturing sector closed shops since the beginning of hyperinflation up to October 2013 and for those that were still operating majority are failing to withstand the current economic conditions. The problems faced by the sector have resulted in the nation losing jobs, experiencing budget deficit and negative BOP.

During the period of hyperinflation a lot of firms in the manufacturing sector were forced to close down due to the harsh environment while a few

managed to do business as usual. After a decade of economic crisis some of the firms in Zimbabwe have been able to do their operations as usual while others are still struggling to stand on their feet. Following the transition of the economy to multi-currency in 2009 some firms are still finding it difficult since they lack foreign currency reserves and assets to smoothly carry out their operations. According to reserve bank of Zimbabwe (RBZ)'s 2009 monetary policy review the manufacturing sector was well known for its diversity in producing a plethora of goods but during and after hyperinflation things have taken a new twist. (RBZ, 2009). In his interview with senior Daily News editor, President of Confederation of Zimbabwe Industries (CZI) Mr Charles Msipa admitted that the manufacturing sector is in a state of comatose and the problems began during period of hyperinflation when basic consumer goods were imported from neighbouring countries. (Daily News of 31 October 2013). He further argues that this made the local manufacturing firms non-competitive because of high labour cost and the state of machinery is obsolete.

The effects of hyperinflation are still visible even after the government adopted a multi-currency regime and setting up of Distressed Companies and Marginalized Areas Fund (DiMAF) as companies in the sector are currently reeling in problems. It is in the interest of companies during the trying times when hyperinflation is at calamitous levels for firms either to press the government to take essential necessary actions to circumvent or curb it or for them (firms) to be bold and face the challenges on their own in order to survive. Manufacturing sector is also failing to play its leading role in value addition and beneficiation as enshrined in the (2013 – 2018) government policy, Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimASSET). Despite various interventions undertaken by government like DiMAF and Zimbabwe Economic Trade and Revival Facility (ZETREF) to stimulate the performance and productivity of the manufacturing sector some firms are still depressed. Even after announcing the multi-currency initiative the wounds of hyperinflation for the firms are failing to heal while others managed to bounce back. However despite all the above series of harsh conditions which firms faced, some firms in the sector managed to survive. It is against this backdrop that this paper seeks to find what challenges the sector faced.

1.3 Justification

1.3.1 Why Manufacturing Sector is Important?

The importance of the manufacturing sector can be traced from the origin of industrial revolution in Britain where people's lives improved through production of cheap commodities. The manufacturing sector is the backbone of development in any economy because of its linkages to other sectors of the economy. The sector has been seen as the propensity of economic growth in some industrialized countries like Korea, China and Japan to mention a few. As cited by Thirlwall (1983) in Kaldor's laws of growth the manufacturing sector plays a critical role in determining and driving economic growth process of a country. He found that there was a positive correlation between increase in GDP and the country's manufacturing base. Kaldor further argued that the faster the rate of growth of the manufacturing sector the higher the overall growth of the economy. (Thirlwall, 1983: 345). The growth of the sector does

not occur in isolation but other sectors should also perform well. Disturbances in the sector have ripple effects on other sectors like the service and agricultural sectors and this may lead to increased unemployment and reduced BOP in the economy. This strong and powerful bond between growth of the manufacturing sector and overall productivity should exist in the economy as suggested by Verdoorn's Law (1949). This same idea fits well to what befallen Zimbabwe's economy during hyperinflation where capacity utilization fell to levels of 3% from averages of 75% over the years 2006 and 2008 as published by CZI's 2009 annual report. This downfall in the manufacturing sector output negatively affected other downstream and upstream firms in other sectors.

Over the years manufacturing sector has been viewed as the major source of development in many countries. Developments in both regional and international trade agreements have strengthened other countries' manufacturing base at the same time weakening the role of the sector in stimulating economic growth. Zimbabwe's case is in the second category of those countries that have a weak manufacturing sector, as the contribution of the sector to GDP declined in 2007 – 2009. As cited by Chiripanhura, (2010) in Ndlela and Robinson (1995), Zimbabwe's manufacturing strength can be traced back to the colonial era, when the country devised import-substitution industrialization (ISI) strategy to safeguard the economy from punitive sanctions that were imposed on the country. (Chiripanhura, 2010: 154). Sachikonye (1999) also cited from International Labour Organization (ILO) 1993 and World Bank (1995) that by African standards Zimbabwe's manufacturing sector was one of the highly diversified and largest in Sub-Sahara Africa in the late 1970s and early 1980s. (Sachikonye, 1999: 17). Sachikonye emphasized that between 1980 and 1990 the sector was the second largest after agriculture in terms of GDP contribution and employment creation in the country. He further cited that Riddell (1990) found that sector contributed close to 50% of the total share of exports in Zimbabwe. (ibid). Doran (2009: 17) has the same view with Sachikonye to the role played by the sector. The African Economic Outlook (AEO) (2012) also revealed that in 2006 the sector contributed a fair proportion of 28.4% to GDP in comparison with other sectors. (African Economic Outlook 2012: 4). The sanctions imposed on Smith's regime made the country to employ aggressive industrialization which saw the manufacturing sector contributing 25% of GDP in early 1980 from a mere 17% contribution in 1965. (Chiripanhura, 2010: 155).

ZIMSTAT estimated that the sector's contribution was around 20% on average. CZI's 2007 survey on the state of the manufacturing sector highlighted that the sector played a significant role through its contribution to foreign currency earnings, GDP, creation of employment and opening up investment opportunities. It is further argued that the sector was the greatest contributor to export earnings between 1980 and 2006 according to RBZ's annual statistical bulletins. Despite being the main contributor to GDP between 1980 and 1990 the sector has not been given enough priority and support. Since it was the nerve centre of economic growth, when inflation was on the rise in 1999 the sector was the hardest hit and this eroded the gains in the agricultural and the tourism sector through the upward and downward spill over effects. (Coomer and GsTraunThaler, 2011: 320). The sector has been one of the main engines of growth in the economy since the dawn of independence in 1980. It

is therefore imperative to use this sector as the best candidate to reflect survival techniques of companies during hyperinflation period.

1.3.2 Why Studying the Effects of Hyperinflation for Zimbabwe?

Zimbabwe's hyperinflationary episode made it the first country in the second millennium to encounter such a big problem. Hyperinflation shattered people's lives as it turned them into paupers within a short period of time. The country which was once well-known as the jewel of Southern Africa in terms of economic activity was reduced to a continent's mere importer of almost everything. This compelled some of its people to migrate and work in other countries in order to earn a living. Hyperinflation became a prolonged challenge in Zimbabwe from March 2007 to January 2009. The situations that Zimbabwe went through show how the country became a victim of hyperinflation and later led to a loss of its own currency. The hyperinflationary environment that prevailed from 2007 to early 2009 heavily affected companies and it forced them to continuously review their prices and wages. The manufacturing sector was not spared by this harsh inflationary environment as the highest official figure of around 231 million per cent year-on-year inflation rate was recorded in July 2008. (Besada and Moyo, 2008).

The hyperinflation-output nexus is of paramount importance because its effects stretch to other sectors of the economy and it is the general populace who happen to bear the brunt. Researching on the effects of hyperinflation on manufacturing sector is very helpful since it will provide other firms within and outside the sector to take necessary recipe and ingredients to survive future hyperinflation or any other related crisis. This research fills the gap that some researchers like Coomer, and GsTraunThaler (2011), Koech (2011), Makochekanwa (2007) and Pilossof (2009) who looked at hyperinflation without looking at its interaction with VMI, exports and imports in the context of Zimbabwe. The above researchers looked at Zimbabwe's hyperinflation general, its causes and its dynamics. In addition to the above the paper will examine the trend of VMI, exports, imports and inflation rate for the period 2000 – 2013. Unlike Gumbe and Kaseke (2011) who looked only at survival options by manufacturing firms for the period 2005 – 2008 this study has included regression aspect to analyse the relationship between VMI and inflation.

1.4 Research Objectives and Questions

This research seeks to find:

- the relationship between manufacturing sector and hyperinflation using co-integrated vector autoregressive regression (VAR)
- the main challenges that the sector faced during and after hyperinflation
- what strategies were employed by hyperinflationary surviving manufacturing firms

The main research question is:

"To what extent was manufacturing sector output affected by hyperinflation"

The sub-questions are:

What is the relationship between manufacturing sector output and hyperinflation in Zimbabwe for the period January 2000 – January 2009?

How firms survived through hyperinflation?

Having looked at the introduction, problem statement, justification and research objectives the rest of the research will proceed as follows; Chapter 2 presents literature review, while Chapter 3 explores the historical overview of hyperinflation in general starting with a brief world overview before dwelling on Zimbabwe's hyperinflationary circumstance. Chapter 4 will look at data collection and methodology, Chapter 5 performs tests, analyses and interprets research findings and finally a conclusion will be wrapped up in Chapter 6.

Chapter 2

2.1 Literature Review

While there is a lot of literature which talk about the effects of hyperinflation on output growth for countries in general little has been said in the context of developing countries like Zimbabwe. It is interesting that the effects of hyperinflation on output growth of the manufacturing sector are an extension of the effects of high inflation. Hyperinflation and high inflation are closely related and the study of their effects on macroeconomic variables is fascinating since they partly take into account effects of inflation in general. What make them different are their magnitude, variation and severity as hyperinflation is highly unpredictable while both high and normal inflation may be predictable.

2.1.1 Theories of inflation, saving and investment

The theory of inflation and investment can be best explained from three directions which look at how inflation affects investment through savings, how increase in money supply retards investment and finally the effects of inflation on the tax system. (Temple, 2000: 397). Vast literature like Gylfason (1991) looked at the relationship between inflation and savings and his work found that high inflation negatively affects real deposits and saving ratios which in turn affect investment. However Gylfason (1998) and Honohan (1999) suggested that the above ideology may not hold since investment funds are not from savings but from profits. (Temple, 2000: 397). The other general phenomenon which was developed by Tobin (1965) is the monetary growth model which states that hyperinflation affects the level of capital stock by forcing people not to invest in money denominated assets but they would rather invest in interest bearing assets. This is based on the idea that hyperinflation causes uncertainty hence it distorts efficient operation of the price mechanism.

As opposed to the general belief that high inflation is bad for growth, Hartman (1979) explored the relationship between inflation and tax system and he found that for developing countries there is a tendency of capital to move to those countries that are in high inflation. The extent to which hyperinflation is detrimental to wealth distribution depends on whether it is anticipated or unanticipated. The problem with hyperinflation is that unlike normal inflation it is highly unanticipated hence distorting the planning process of both investors and consumers. As cited by Fountas et al (2006), Friedman (1977) argues that the higher the degree of inflation uncertainty the greater its effects on the level of output. (Fountas et al, 2006: 321). The above theory can be linked to a model in which De Gregorio suggested that inflation negatively affects growth by decreasing estimated profitability on investment. (De Gregorio, 1993: 273).

2.1.2 Theory of the Firm

The theory of the firm concept is sometimes linked to the theory of a firm which mainly focus on the capabilities and skills that a firm has in transforming its resources into usable commodities. The former theory looks at why firms

exist and why they are interested and emphasise in minimising transaction costs. Madhok argue that in order to accomplish its objectives of doing investment in a fashionable manner a firm should make sure that alignment and consistence of its transactional costs, resources or capabilities as well as its governance structure prevail in the triangulation. (Madhok, 2002: 543). The author also reasoned that instead of firms competing for space in the use of their resources and market share they can form strategic alliances that harmonize and complement their knowledge and skills. This can augment and strengthen their capabilities and competitiveness rather than competing for the same market share. The use of capabilities approach may not be applicable in a dynamic environment that is characterized by hyperinflation and this may mean that the firm will be end up worrying about its costs and governance skills. (ibid). The reason for firms to co-operate is to share responsibilities and overcome challenges that each firm may face in its operations when operating on an individual basis. One firm maybe constrained in transaction costs while the other maybe facing hardships in resource based skills and if they co-operate they can conquer and succeed. As cited by Madhok (2002), Madhok and Tallman (1998) found that partnerships are a good technique to manoeuvre because this can help an organization to realize the goals it could not have accomplished if it was operating individually. (Madhok, 2002: 544).

Conversely to the above Poppo and Zenger (1998) argue that firms should be well acquainted with how markets operate vis-a-vis their internal operations so that managers of these firms can be able to minimize both their production and transaction costs. (Poppo and Zenger, 1998: 854). They further stated that it is through having the knowledge to single the difference between production costs and transaction costs that managers can decide to produce on their own or to source from the market. The make or buy decision is based on the fact that if firm performance is greater than market performance then a firm may resort to produce internally and if market performance is greater than firm performance it will outsource that is buy from the market instead of producing internally. The rationale behind this technique is that it looks at cost effectiveness, cost minimization and efficient of the system. In the wake of hyperinflation all decisions are premised on the currency in use so if firms do not have confidence in the domestic currency it means their decisions are affected as well. The reason maybe that firms may anticipate an increase in price inflation in national currency hence rational firms will decrease their exposure to that currency and resort to barter or using a more stable currency.

2.1.3 Model of Hyperinflation

Although many scholars have different definitions for hyperinflation but the commonly adopted and borrowed definition is that of Cagan (1956). His definition states,

hyperinflation as beginning in the month the rise in price exceeds 50 per cent and as ending in the month before the monthly rise in prices drops below that amount and stays below for at least a year. (Cagan 1956: 25).

Another definition by Dornbusch and Fischer (1993) defines hyperinflation as a period in which year-on-year inflation rate exceeds 100 per cent. Professor Watkins of San Jose State University defines hyperinflation as inflation that is out of control, highly unpredictable and extremely at high percentages. As cit-

ed in Vázquez (1998) other scholars like Buiter (1987), Dornbusch et al. (1990) to mention a few are of the view that hyperinflation can be described as an unsteady dynamic process where inflation rapidly rises within a short period of time. (Vázquez 1998: 434). Kalecki (1962) suggested that the model of hyperinflation is characterized by a rapid increase in general price level and a tendency for people to buy assets rather than keeping money which they cannot have confidence in due to its weakening buying power. (Kalecki 1962: 275). This usually happens when people anticipate that the increase in prices is not temporary. If people's anticipations about hyperinflation are high it means they will not be willing to engage into long term contracts but they would rather hoard goods instead of holding money which in turn cause a spark in price to rise again. This continuous rise in price will in turn lead to a fall in real wages thereby igniting a price bubble. This bubble may end up resulting in a price-wage spiral which can explode into hyperinflation.

Kalecki (1962) further argue that the theory of hyperinflation explains that hyperinflation result in erosion of income and wealth of the general populace. The theory of hyperinflation is directly linked to the quantity theory of money which states that under abnormal conditions an increase in money supply will lead to an increase in prices. In a hyperinflationary environment people do not have a motive to save but they would rather dispose cash as quickly as they can to avoid losing their wealth. The same situation happened in Zimbabwe as people lost hope in the Zimbabwean dollar. This forced both prices and velocity of circulation to increase as more money was being printed. Kalecki (1962) states that the equation of the quantity theory of money is $M*V = P*T$, where M is money supply, V is the velocity of circulation, P is price level and T is volume of transaction. (Kalecki 1962: 276). The positive correlation between money supply and price level during hyperinflation resulted in a spike of the velocity of circulation as people were trying by all means to minimise the use of the national currency.

Due to anticipation people started to lose faith in the Zimbabwean dollar early before hyperinflation as it was now worthless to use. Some different scholars like Cagan (1956), Siklos (2000) and Clment (2005) attribute the causes of hyperinflation arising from a monetary phenomenon and huge government deficit. The same principle of printing money by RBZ to meet the cash demand by the public was cited by Makochekanwa (2007) as the driving factor behind Zimbabwe's hyperinflation. (Makochekanwa 2007: 3). This printing of money was not channelled to productive sectors of the economy but it was mainly used for quasi fiscal expenditures. This is envisaged in the case study done by Clment (2005) on Democratic Republic of Congo (DRC) where he found a strong positive relationship between fiscal deficit and inflation. (Clment 2005: 226).

Applying the definition of hyperinflation in the context of Cagan (1956) and Dornbusch and Fischer (1993) Zimbabwe became part of the hyperinflationary league when the rate was 50.5 per cent per month in March 2007 and 103.8 per cent per annum in November 2002 respectively. The Dornbusch and Fischer (1993) definition conforms well to Zimbabwe's scenario because the negative effects of hyperinflation were immediately seen when GDP was contracting. Although there was a small increase in GDP in 2007, as depicted by Figure 1 in Appendix 1, it started to decline in 2002 until it reached its worst level in 2008. The loss in output due to supply shocks had calamitous effects

on the economy as a whole. This negative growth in GDP was the least to be recorded in the history of Zimbabwe and it coincided with the highest official recorded hyperinflation rate. The level of GDP started to deteriorate in 2002 when the white minority commercial farmers lost land to black majority in early 2000. This was a government directive so that local black people could benefit from their land which was the cause and reason for the liberation struggle in the 1970s. (Chiimba, 2005 in Coomer, and GsTraunThaler 2011: 312). This resulted in economic gains which were accumulated since independence dwindled significantly within a short space of time.

2.1.4 Causes of Hyperinflation

A number of literatures associated the causes of hyperinflation with war and political conflicts which lead to government budget deficits. Bernholz (2003) in Hanke and Kwok (2009) revealed that out of 28 hyperinflationary scenarios that occurred in the 20th century the bulk of them were associated with monetary phenomenon and that of Zimbabwe which transpired in the 21st century is not an exception as it follows the bandwagon of printing money as its root cause. (Hanke and Kwok (2009: 354). Although a number of authors such as those above are of the idea that hyperinflation is as a result of printing too much money Grossman and Horváth (2000) however argue that supply shocks instigate the problem. The above authors correctly put it as follows,

> *The initial supply shock should be regarded as the origin of the hyperinflation. Although we think of hyperinflation (if not all inflation) as a monetary phenomenon, where the government prints too much money, our textbooks remind us that an inflation can occur as well from a significant supply disruption, and clearly did in this case; indeed, the government could not even print money at first." (Grossman and Horváth 2000: 411). The root cause as noted by Hanke and Krus is that, "Hyperinflation is an economic malady that arises under extreme conditions: war, political mismanagement, and the transition from a command to market-based economy—to name a few. (Hanke and Krus, 2012: 11).*

According to Makochekanwa (2007) Zimbabwe's hyperinflationary mess was brought about by a persistent political crunch which forced the government through the central bank to entirely depend on printing more money which was not properly injected into productive sectors of the economy but into non-productive quasi fiscal activities. (Makochekanwa 2007: 3). The quasi-fiscal expenditures included farm mechanization and payment of civil servants to mention a few caused an explosion in the country's budget. This was a result of lack of monitoring mechanisms to find out if the money and inputs bought were used for their intended purposes. The central bank in most cases would feel like the amount of money in circulation was not enough as prices continued to rise. This is evidenced in Mhlanga and Sibanda (2013) where they found that the growth in broad money supply increased by 1 393% between January 2007 and October 2007. (Mhlanga and Sibanda, 2013: 611). Under hyperinflation people are unlikely to keep money for a long period of time hence the velocity of circulation will be very high while the quantity of physical goods will be constant if not declining. This is evidenced by Figure 4 which shows that the growth in inflation was in tandem with growth in money supply for most of the period between 1994 and 2008. The graph also shows how the amount of Zimbabwean dollars in circulation fuelled inflation.

An extensive study by Cagan found that expectations by consumers and industrialists played a significant role in causing hyperinflation. As I quote from Fischer et al. (2002: 3),

Since 1956, the formal analysis of hyperinflations has advanced in a number of directions, each of which brought in its train a large literature. First, with the development of the theory of rational expectations, the notion that expectations alone could have caused hyperinflation became more difficult to sustain, except if there were multiple equilibria, some of them hyperinflationary and others not. Such an outcome is possible, for instance, if the inflation tax is subject to the Laffer curve, as is implied by the demand for money function assumed by Cagan (Bruno and Fischer, 1990).

Another cause of hyperinflation as viewed by Bailey (1956) is that government can get revenue using money-driven inflationary means through tax up to a certain point and beyond that level it will terminate the gains from inflation hence leading to a high government budget deficit through the Keynes-Tanzi effect. Using regression techniques Fischer et al. also found that there was a strong correlation between hyperinflation and fiscal deficit which supports the standard notion that high fiscal deficits triggers hyperinflation.

The movement in inflation was in line with changes in exchange rate of the Zimbabwean dollar and the United States dollar. Like the Peruvian case Zimbabwe's hyperinflation was mainly driven by populist policies which saw the government printing money to finance its quasi fiscal activities. The closure of doors for assistance by the International Financial Institution (IFI), and European Union (EU) limited the room for borrowing by the country. It left the country with printing money as the only option to finance the crippled economy. This led to the deterioration of the fiscal account and increased collapse of the financial sector. Quoting direct from Siklos, 'a looming election puts pressure on elected officials to influence economic performance (higher GDP growth or lower unemployment) to enhance their re-election prospects'. (Siklos 2000: 4).

The trend of inflation can be seen on Figure 2 in Appendix 1. From Figure 2 it can be observed that hyperinflationary figures started in early 2007 and the highest official amount was 2 600.2 % per month in 2008. Consumer prices continued to increase at incredible rates during the hyperinflationary era as this was supported by the fact that the prices which the consumers saw on shelves were different from what appeared at the till check point. It was now a common thing for the prices of most basic commodities were always increasing from the time when one takes them from shelves up to the time they pay for them. As cited by Swason (1989) the South American saying which states that taking a cab is cheaper as compared to a bus since for the case of a bus one can make payment at the beginning of the journey while for the tax or cab one has to pay for it at the end of the ride and by then, the money will be worthless. (Swason 1989:1). The above saying was also applicable in Zimbabwe as the weakening buying power of money was tremendous. Credit was abandoned as people were being obligated by the situation to pay cash only. Between the period April 2008 and early 2009 there were no official figures that were reported and to get the statistics for that period IMF used exchange rate to reflect the movement in consumer prices. The movement in exchange rate was used to mirror the missing values for inflation during the period August 2008 and early 2009. A close look between inflation figures in Figure 2

and exchange rate fluctuations in Figure 3 can reveal that the two variables were moving in the same direction and same rate. The Zimbabwean dollar was depreciating against the United States dollar during the period of hyperinflation. Besada and Moyo (2008) also stated that the 2008 disputed harmonized elections brought about political instability which negatively affected the economy and influenced the continual increase in consumer prices.

Chapter 3

3.1 Earlier History about Hyperinflation

Fischer et al. (2002) in Coomer and GsTraunThaler (2011) noted that hyperinflation became a topical issue in the academic circles and this can be traced back during the period of the end of the First World War. The most well-known hyperinflationary cases are those of Germany, Austria, Hungary, Poland and the former Soviet Union. (Coomer and GsTraunThaler 2011: 313). The first hyperinflation case to be recorded in history was that linked to the French revolution and it supports the latest phenomenon that hyperinflation is associated with printing of money to finance government deficit. (Fischer et al. 2002: 2). They argue that in all the earlier cases of hyperinflation most of them were associated with monetary phenomenon, wars, change of political situation and establishment of new governments which were as a result of huge government deficits. (Fischer et al. 2002: 2). Bresciani-Turroni, (1937) and Graham (1930) are of the view that inter-war controversies especially in some parts of Europe and former Soviet Union countries were the driving factors to printing of money and high BOP deficits of which the latter was assumed to be associated with movements in exchange rates.

There are many episodes of hyperinflation that occurred in other countries like Germany, Hungary, Yugoslavia, Greece and China as shown in Figure 7 in Appendix 1 below and Zimbabwe's case was the first of its kind and it is the second highest after Hungary. It is an interesting topic to study since it marked a turning point for the economic history of Zimbabwe. Hyperinflation in Zimbabwe is also fascinating since it led to the total abandonment of the local currency and adoption of multi-currency of which this is the second thing to ever happen in all hyperinflationary cases after El Salvador. Despite the fact that the above mentioned countries experienced hyperinflation it is interesting that majority of Zimbabwean manufacturing firms did not take hid of the lessons learnt in those countries but they rather developed a wait and see approach towards hyperinflation crisis.

3.2 Beginning of Zimbabwe's Hyperinflationary Crisis

3.2.1 The Period 2000 – 2006

Zimbabwe's hyperinflationary crisis originated in early 2000 when the country embarked on the fast track land reform program which was aimed at redistributing the land from white minority to black majority. Scholars like Moyo and Kinyenze have a strong view that the problem started when the Economic Structural Adjustment Programme (ESAP) was introduced in 1991. Bond (2007) cited that Kinyenze expressed that ESAP failed to correct and address the inherent economic imbalances and inequalities that existed in Zimbabwe since 1980. Majority of the people were economically constrained and this resulted in them failing to take advantage of the opportunities presented by the programme. (Bond 2007: 151). However Wines (2006) is of the

view that the problems started when the country embarked on the 2000 fast track land reform. (Wines 2006: 2). Coomer and GsTraunThaler (2011) are of the sentiment that the country's problems began when the government disbursed unbudgeted compensation for war veterans in 1997, its involvement in DRC war adventure in 1998 and the fast track land reform in 2000. (Coomer and GsTraunThaler, 2011:318).

Some few months down the line after the war veterans received their gratuities the Zimbabwean dollar lost its value by 75 per cent against the US dollar in November 1997. The 2002 drought spell contributed immensely to the decline of agricultural output which in overall affected the operations of the manufacturing sector in the economy. As cited by Coomer and GsTraunThaler (2011) the IMF Staff Report (2000: 11) revealed that the Zimbabwean government gave a green light to 150 000 families to occupy 5 million hectares in June 2000 of which a further 1.3 million hectares were acquired despite an interdict by the Supreme Court of the country.

The imposition of sanctions by Britain, USA and their allies worsened the situation as the donor and international community ceased their aid to Zimbabwe on economic affairs except for humanitarian purpose. This almost put the agriculture, manufacturing and other sectors of the economy to a standstill. The deterioration of the manufacturing sector output started to be visible after the country implemented ESAP. The advent of ESAP was mainly focusing on trade openness, removal of price controls, currency reform, financial and labour reforms and this saw the sector being exposed to stiff competition from other firms in the region. (Chiripanhura, 2010: 155). Financial and currency reforms made it hard for firms to borrow money from banks as the exorbitant interest rates deterred investment. These arrays of reforms were aimed at making sure that the sector become competitive and efficient in producing goods for both domestic and international consumption but it did not happen as anticipated.

The 2000, 2002 and 2005 elections which were a bit marred by political violence also caused skepticism to investors in the country in general and within the sector in particular. Since then the country's economic growth and manufacturing output have been on a downward trend. The 2005 program dubbed 'Operation Murambatsvina' a clean-up exercise which was meant to destroy illegal housing structures affected the low income earners who happen to work in factories. This resulted in a housing backlog and it was a huge blow to the manufacturing sector as majority of workers could not afford to rent well established houses. This culminated into the withdrawal of assistance by the international and donor community. In a bid to improve its foreign currency reserves the central bank embarked on enforcing exchange controls on all exporters. The IMF Staff Report of 2000 as cited by Coomer and GsTraunThaler (2011) testified that tobacco exporters were forced to surrender 75% of their export proceeds so that the state could use the foreign currency to import fuel and other priority commodities. The above measure by the central bank created panic to investors as they were left with a limited scope to operate but only to use the Zimbabwean dollar. These series of events opened the floodgates for the problems that led to the collapse of the manufacturing sector in particular since it is highly monetized as compared to agricultural and mining sectors.

3.2.2 The Period of Hyperinflationary Crisis (2007 – 2009)

In March 2007 Zimbabwe formally became a member of the hyperinfla-
tion league when its month-on-month inflation rate rose above the 50% mini-
mum threshold as contextualized by Cagan's definition. Inflation increased in
the two months that followed before it calmed in July, August and September
2007. From there onwards it started to surge and never stopped until the high-
est official recorded rate reached 231 million per cent per year in July 2008.
(RBZ, 2008a). The problems continued to mount in the economy and this re-
sulted in a further decline of manufacturing sector output which was already
trembling. It is in this period when GDP nose-dived to its lowest level of -
17.7% on average in the economic history of Zimbabwe since independence.
The contentious harmonized elections which were held in 2008 worsened the
situation in the sense that investors developed a wait and see attitude in choos-
ing Zimbabwe as their preference. This also put the country at risk as it was
now considered an unsafe investment destination. (Chiripanhura, 2010: 156).
Severe shortages of fuel, imported raw materials, power outages, brain drain
and the collapse of the agricultural sector (which used to supply around 45%
of its output to the manufacturing sector) ignited the problems which negative-
ly affected the manufacturing sector. The fall in agriculture output can be seen
in Figure 5 through the contraction of tobacco output. The economy was on
its knees and by February 2009 the Zimbabwean dollar ceased to be used as a
medium of exchange. The July 2008 hyperinflation rate made a reverse of for-
tune as Z$500 trillion could only buy one US$1 at the black market in 2008 as
compared to a one US$1 which was officially exchanged for Z$0.647 shortly
after independence in 1980. (Koech 2011: 4).

RBZ was faced with a mammoth task of controlling the galloping inflation
and at the same time making sure that the Zimbabwean dollar remains the cur-
rency in circulation. This could not yield intended objectives since there was
little support that the bank was getting from the ruling party which was now
prioritizing political survival at the expense of economic revival. (Pilossof,
2009: 295). Despite numerous efforts employed by the central bank to curb
hyperinflation such as removing zeros on its currency in 2006, 2008 and 2009
this did not stop the country from being the second country with a largest de-
nomination with most zeros after Hungary. Under normal circumstances the
central bank is supposed to announce the features of the new note issued but
during hyperinflation there was no time to make such public awareness as by
the time such pronouncement was done the note would be worthless. The cut-
ting of zeros to bring price stability did not alleviate problems that were reeling
the economy from the shock of hyperinflation. Prices continued to soar until
the disbandment of the Zimbabwean dollar in early 2009. The country's gal-
loping hyperinflation led to the demise of the local currency since it was now
failing to meet its fundamental functions of being a medium of exchange, store
of value and unit of account.

During this period commercial activity was marred and slowed down by
unavailability of credit support, power black outs, supply bottle necks and
brain-drain to mention a few. There was collapse of domestic aggregate de-
mand for local goods and services as consumers' preferences were no longer
driven by quality but by price motive and their desire for goods moved from
domestic to low-cost foreign products. Hyperinflation affected operations of
many firms in the manufacturing sector to the extent that some of them closed

down. This made life difficult for firms to access lines of credit from banks as they (banks) were facing liquidity challenges. The pace at which prices were increasing was way above that of wages and this ended up forcing people to lose confidence in the local currency but only to stockpile goods. A decade long of political and economic crisis combined with lack of implementing well-coordinated and credible policies stole the limelight of Zimbabwe's manufacturing sector. The sector has been characterized by low capacity utilization and low productivity because of the challenges cited above.

3.2.3 The Period of Recovery (2010 – 2013)

Hyperinflation stopped in 2009 when the government announced that the country was now adopting other strong currencies among them the US dollar, British pound, Botswana pula and South African rand. The move was done in order to ameliorate the economy which was now in doldrums. The formation of government of national unity (GNU) by Zimbabwe's 3 main political parties in February 2009 brought relief to the economy as domestic goods started to emerge few months after its formation. In most countries which faced hyperinflation like Argentina, Bolivia and Ecuador, they only adopted the United States dollar not multiple currency. The adoption of multi-currency is any interesting sensation in the economic history of Zimbabwe. It made the country to resurface on the international arena in 2011 and this time it was in the positive side as Zimbabwe was among the fastest growing economies in the world.

The introduction of the multi-currency in the country in March 2009 brought a new economic dispensation as VMI started to increase with single digit inflation rates being realized. This period marked some improvements in economic activity but still the manufacturing sector's recovery was sluggish. The AEO (2012) also highlighted that Zimbabwe's growth rate for the year 2011 was 10.6% and it surpassed that of Africa and Southern Africa which were 3.3% and 3.9% respectively. In addition to this it also put the troubled economy on a recovery path. Since the adoption of the multi-currency in 2009 inflation rate has been averaging single digit with cases of deflation in 2013 and 2014. This resulted in significant progress in the sector as CZI recorded a remarkable improvement in capacity utilization ranging from 30% – 50% between 2010 and 2012. Despite some notable improvements in the agricultural and mining sectors the manufacturing sector is still in dire need of fresh capital in order to be competitive and scale-up its operations.

3.2.4 Impact of Hyperinflation

Hyperinflation is an abnormal phenomenon and in most cases it leads to a complete melt down of the economy and loss of national currency. Guerrero and Parker (2006) suggest that in most of their frequent cases hyperinflations usually leave permanent marks in people's minds and memories because of the hardships they suffer. (Guerrero and Parker, 2006: 2). The wounds caused by hyperinflation result in people losing total confidence in the local currency as well as monetary policies adopted by the central bank. During times of extremely unstable economic environments firms' normal planning is disrupted and they are forced to devise stringent strategies in order to survive. Williamson (1981) argues that these harsh conditions that maybe as a result of hyperinflation increase the transaction cost of doing business for firms. This in turn

compels firms to make bilateral contractual arrangements with others instead of relying on the market for supply of raw materials and exchange of products. Continual increase of price can discourage firms from investing in new machinery as they will be caught unaware on what policy the government will take to stop the galloping inflation. On the other hand consumers will be willing to spend in order to get value out of their incomes.

Hyperinflation is disruptive in nature as it makes things to get out of control. In support of the above Swanson (1989)'s findings on Argentina, Bolivia and Brazil's hyperinflationary cases attested that a lot of companies' executives and managers were forced to reinvent and revamp their business focuses and planning processes due to shrinking supplies and daily skyrocketing prices. (Swanson 1989: iii). As cited by Nyanga et al. (2013), Manalastas (2009) argues that during times of economic pandemonium entrepreneurs in general should be well acquainted with the business' political, economic, social and technological environments so that they can be able to turn threats into opportunities in order to be competitive. (Nyanga et al. 2013: 143). They further cited that Corno (1994) was of the idea that in harsh economic conditions, managers should have the power to make their own decisions and to have focus towards achieving desired goals despite potential distractions. Wines (2006) stated that majority of people in Zimbabwe who had money were forced to buy gilt-edged investments and store them rather than keeping cash. (Wines 2006: 2). Walker and Weber (1984) further argue that it is in the interest of the firm to buy or to make after comparing the cost of producing internally with that of procuring from a supplier. (Walker and Weber 1984). Market problems arise especially in finding reliable suppliers of raw materials and other inputs needed for the daily operations of the business. Firms may face supply constraints through increasing production costs in order to meet unanticipated increase in demand since people will buy goods in large quantities and stock them.

The main problem comes from the fact that during hyperinflation capital markets do not perform well. Although some sections of the population like borrowers who may find it easy to pay-off loans if the interest rate is not changing fast the majority especially pensioners and creditors who maybe on fixed contracts are worse off. Grossman and Horváth (2000) are of the idea that hyperinflation has a tendency of reducing investment since no creditor will be willing to provide loans and if so the interest rate will be exorbitant to cover a positive real return. This has an effect of lowering capital base rather than expanding it since there will be no taker to borrow at such weird astronomic rates. (Grossman and Horváth 2000: 415). Hyperinflation puts pressure on investors to the extent that they can end up reducing their demand for labour hence decreasing the wage rates as shown by Figure 6. For Zimbabwe's scenario lenders were not allowed to hike their interest because the government through the central bank was controlling the rates in order to preserve the hyperinflationary pressure. As cited by Damiyano et al (2012), Karim (2009) said that 'there are unprecedented pressures on companies to improve their operational efficiency for enhanced competitiveness and overall business performance'. (Damiyano et al. 2012: 582). They further argued that under similar circumstances that Zimbabwe's manufacturing sector faced there is need for firms to produce and deliver reliable commodities as well as being internationally competitive in order to survive.

Chapter 4

4.1 Data and Methodology

The data used was collected from interviewed firms in the manufacturing sector. The methodology was a two-way process which involved the use of interviews through questionnaires and the other one used regression approach. First and foremost questionnaires were circulated to a sample of 15 firms in the manufacturing sector in Harare to gather their views on how they operated during hyperinflation and how they managed to survive while others collapsed. This provides living experiences on the challenges that survived firms went through as they narrated their ordeals. Questionnaires were self-administered in order to create good rapport with respondents and to have a high response rate. In other few instances one-on-one interviews were carried out to get a closer analysis on the thoughts and perceptions of the interviewee. Profiles of key informants comprise human resource, senior production and operation managers in privately owned manufacturing sector firms within Harare. The questionnaires were structured in a way that Shahajan (2009) proposed so that the respondents could freely express their views and opinions through the use of open and closed questions. For ethical reasons a letter which requested the co-operation and consent of the respondents, explained aspect of confidentiality, purpose of the research and sharing of the findings on request accompanied each questionnaire.

For the part of the research where regression was used data was collected from ZIMSTAT, World Bank (WB) and RBZ reports. The data collected was for monthly time series on inflation rate, VMI, exports and imports for the period January 2000 to December 2013. The series for inflation are in percentage, while those for exports, imports and VMI are in United States dollars and index respectively. Descriptive statistics was used to analyse the trend of the four variables. The regression part only looked at inflation rate and VMI and the period of analysis is January 2000 to January 2009 since this period analyses the trend of VMI before and during hyperinflation. The emphasis to use regression technique in the analysis was to find a relationship between hyperinflation and VMI for Zimbabwe. The study used co-integrated VAR model in order to control for the bi-directional effects between inflation and VMI. This allows one to analyse the Granger causality of hyperinflation on VMI and find if there is a causal relationship between the two variables.

4.2 Model Specification

The correct specifications that explain the relationship between the above variables is of paramount importance since it guide us on how the model will look like. Some of the figures for inflation rate are so huge and in order to minimize the outlier effect I use natural logarithm. The estimation of VMI is in linear form. The equation which explains the relationship between the two variables is shown below.

$$VMI_i = \beta_0 + \beta_1 lnINFL_i + \beta_2 D_{07} + \varepsilon \text{ where;}$$

VMI_i is volume of manufacturing index which was used to reflect manufacturing sector output

$lnINFL_i$ is natural logarithm of inflation rate and the reason was to make the variable a bit stationary since it contained some outliers; using natural logarithm also dampened the effect of extreme values as well as stabilizing the variance of inflation rate. Also after carrying out the Augmented Dickey Fuller (ADF) test on inflation without log the coefficient of L.1 was positive meaning that the model that excludes natural logarithm on inflation is invalid hence the choice of inflation in logarithm is justified.

D_{07} is a dummy variable that takes 0 for the period before hyperinflation (January 2000 – December 2006) and 1 for hyperinflation period (January 2007 – January 2009)

The expectation is that β_1 is negative as inflation rises and VMI is assumed to decrease.

The VAR Model for the above variables can be represented by the equation below.

$$VMI_t = \alpha + x_t.\beta + \sum_{i=1}^{p} A_i\, VMI_{t-i} + \varepsilon_t$$

The above equation is explained below:

- VMI_t represents an (n X 1) vector of independent time series variable.
- α is a vector of constant with n elements.
- A_i is an (n X n) autoregressive matrix with p autoregressive matrices.
- ε_t is an (n X 1) vector of serially uncorrelated error terms, vectors of length.
- x_t is an (n X r) matrix of exogenous variables that is $lnINFL_i$ and D_{07}
- β represents an (r X 1) constant vector of regression coefficients.

Volume of manufacturing index (VMI), 'is an index used to measure changes in the volume of production on a monthly basis, with its base year set at 1990 (i.e. 1990 = 100)'. (ZIMSTAT VMI summary 2010: 1). VMI is generated by calculating the weights of physical quantities, quantity of material used, value of output produced and/ or sales deflated to real values of the consumer price index (CPI) from the eleven sub-sectors in the manufacturing sector which include food, drink, textiles, clothing, wood, paper, chemicals, non-metals, metals, transport and others. Questionnaires are sent to firms' managers of these sub-sectors and they give their monthly production figures which are then weighted and aggregated to come up with the index for the whole sector. Since the outputs in the different sectors are measured in different units VMI is indexed to put them in the same units. VMI figures are based on data collected from respondents of which there is high likelihood of them (respondents) to give wrong information or they may regard their output volumes as confidential hence this compromise the quality of statistics generated. The Laspeyres formula is used to calculate VMI and is shown below.

$$I = \frac{\sum W_{i,0} \, x Q_{i,t}}{\sum W_{i,0} \, x Q_{i,0}} \quad \text{where;}$$

I is VMI and $W_{i,0}$ is weighting coefficient of the base year and in this case ZIMSTAT use (1990 = 100) as the base year.

Q_i is product quantity in each sub-sector.

Inflation is defined as 'a sustained increase in general price level of commodities measured by the Consumer Price Index (CPI)'. (Scott and Nigro, 1982: 778). The two authors further argued that in order for the definition to be valid, prices should continue to go up in a self-perpetuating behaviour not a one-time increase. ZIMSTAT uses CPI to measure inflation rate which looks at changes in prices of a basket of consumer goods which include bread, cooking oil, gasoline, alcoholic items to mention a few.

Inflation rate $= \frac{(B - A)}{A} * 100$, where **B** is the CPI on the latter month and **A** is the CPI on the earlier month.

4.3 Limitations

The major challenge was to get inflation rate figures for the period August 2008 – January 2009 except November 2008 as they were missing. In order to overcome this I had to use estimates through calculating the changes in the percentages. Collection of data was also a challenge for ZIMSTAT as prices of consumer goods and services were changing within a short period of time and also that the organization had little resources to effectively carry out surveys as well as gathering data during hyperinflation. (Nyoni 2008: 1). Some firms might have underestimated their production volumes especially during hyperinflation period. The credibility and accuracy of data from the national statistical office raises a lot of questions than answers. The quality of data generated by ZIMSTAT needs to be scrutinized hence relying on this data only can compromise the standards and quality of results. I used the data as it was the only source available but this does not warrant the accuracy and reliability of the data especially during period of hyperinflation.

Chapter 5

5.1 An Analysis of the Pattern of Variables over time

The movement of the four variables over time can be explained in figure 8 below. The vertical axis on the left hand side is calibration for exports and imports while the other one on the right is for VMI and natural logarithm of inflation. The units of measurements for exports and imports are in US dollars while that of VMI and natural log of inflation are in index and percentage respectively. From the graph below it can be seen that when the rate of inflation was increasing VMI was slowly decreasing over time until end of 2005. Contrary to this exports and imports were almost moving in the same direction until 2005 and from there onwards they started to part ways that is when one variable was increasing the other was decreasing. In 2006 VMI was on a rebound as it had a remarkable increment of resting at 80 from levels of around 50 indices. This increase in VMI coincided with the increase in exports. Increase in exports is suggested to be the main push factor behind the rise of VMI as firms were able to reinvest their ploughed back profits from exports proceeds. The increase in exports was short lived as the central bank introduced export surrender requirements to make sure that the bank had enough foreign currency for the government to buy fuels and hospital drugs. This also had a negative impact on VMI as firms were demotivated to produce more and VMI declined further to levels of around 30. Having realized that the domestic currency was now losing value rational firms started to illegally use multi-currency and those that were less rational went out of business.

Figure 8: Trend of Variables (01/2000 – 12/2013)
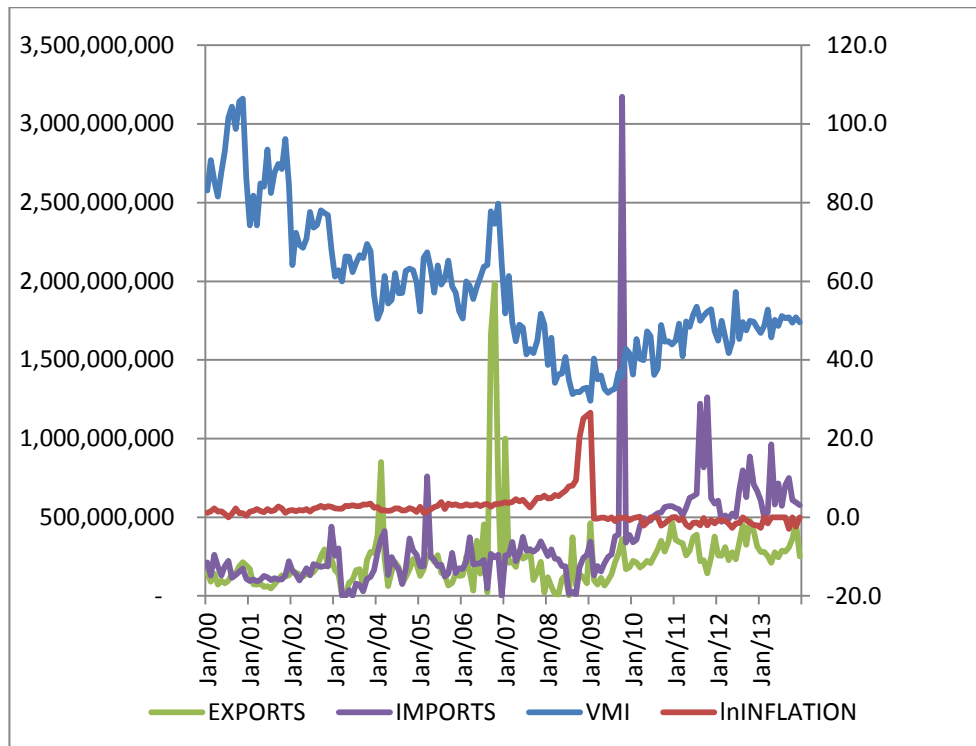
Source: Author, computed based data from ZIMSTAT Data.

As many firms opted out of business this mean that VMI was also affected. The other thing might be that firms were underreporting their output levels during hyperinflation as they fear accountability of the source of foreign and coming 2009 they resurfaced giving their correct output as it was now legal to transact in foreign currency. The fall in VMI was exacerbated by chronic inflation which reached a record of 7.96 billion per cent per month in November 2008 as measured by IMF. During the period 2007 and 2008 the graph depicts that VMI, exports and imports were falling as the rate of inflation was continuous rising.

People and firms started to lose confidence in policies which the central bank announced and this led to rampant increase and mushrooming of foreign currency black markets in the country as firms were now circumventing the stern measures which the bank introduced. These restrictive policies also resulted in a sharp decline of imports as firms were in desperate need of foreign currency to import raw materials for their production requirements. This created enmity between the central bank and investors as anyone who was caught in possession of foreign currency was liable for its source. Firms continued to resist the move by the central bank and the bank realized that it was fighting a winless battle and it started to issue licenses that allowed firms to sell their wares in foreign currency. Majority of firms and consumers embarked on a massive importation of consumer goods and machinery as a way to resuscitate their industries following the liberalization of imports and removal of price controls in March 2009.

5.2 Research Findings and Analysis of Results

The research first analysed the relationship between VMI and inflation using co-integrated unrestricted VAR approach. The regression part informs us of the trend and relationship between the two variables over time. The second part of the research looked at the challenges that firms in the sector faced during hyperinflation and what were their responses in mitigating them.

5.2.1 Vector Auto Regression (VAR) Analysis

The use of co-integrated VAR model provides a good analysis on how the interaction and relationship between inflation rate and VMI look like and how they behave in the short and long-run. In addition to this VAR framework is also used to predict systems of interconnected time series variables. It is used as a toolkit to analyse how changes in one variable affect another variable. The period of analysis using co-integrated VAR is January 2000 to January 2009 since this including the time when problems started. This period is useful since the trend of VMI and inflation can be traced as from when things took a new twist until when things get out of control during hyperinflation. The analysis left out the period after January 2009 because this will distort the findings because the inflation rate was more stable and it is not possible to take natural logarithm of negative numbers. Choleski decomposition restriction was imposed since it is very critical in scrutinizing dynamic movements of macroeconomic variables (VMI and inflation). The first thing is to test whether the two variables are stationary or not and this is done through plotting the series of the variables and then check out both autocorrelation function (ACF) and partial autocorrelation function (PACF).

5.2.2 Series at Level

As Graph 1 in Appendix 2 illustrates it can be seen that the series for VMI show evidence of a downward trend while that of inflation rate is upward but it is unclear whether the two series show a deterministic or a stochastic trend but they are non-stationary because there is reversion of their means and their variances change over time. The graph also illustrates that the series for VMI started by increasing from levels of around 80 in the beginning of 2000 until it reaches around 100 in November 2000 and from there onwards it started to slowly decline to 30 in January 2009. Inflation series continued to follow an upward trend in early 2007 and it slightly lowered down in March 2007 and from there it sharply rose to bizarre monthly level of 7.96 billion per cent in November 2008.

5.2.3 Series at First Differences

Having seen that series at levels are non-stationary it is therefore imperative to check their first difference behaviours. This is useful especially when one is estimating series that are integrated of order 1, I(1). Since economic theory suggests that macroeconomic variables in most cases have long-run equilibrium connections then using co-integration method is the good way to run the regression if series are I(1). From Graph 2 in Appendix 1 it is evident that the first differences of VMI and log inflation seem to be stationary but this is not sufficient to rely on as this need to be ascertained and substantiated

by carrying out formal tests. The study makes use of the Dickey Fuller (DF) and the Augmented Dickey Fuller (ADF) to check for the existence of unit root in all series. After carrying out the ADF test the series in first difference are not stationary as shown in Table 3 below under the heading unit root test. Only the second difference of the series are stationary which means that the two variables are integrated of order 2, I(2).

5.2.4 Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF)

From the ACFs and PACFs in Appendix 3 it can be realized that both VMI and log inflation are not stationary. This is because the first order ACFs of both VMI and natural log of inflation start from values close to 1 and they gradually drop to zero as the number of lags increases. For monthly time series the maximum number of lags is set at 12 or 6, and for annually and quarterly series the maximum lag are 1 and 4 respectively. The next step is to choose the appropriate lag length for the variables. Based on the optimal values of the Akaike Information Criterion (AIC), the Final Prediction Error (FPE) and the Likelihood Ratio (LR) the appropriate lag length is lag 3 since the 3 criteria are suggesting that despite the fact that the Hannan-Quinn's Information Criterion (HQIC) and the Schwarz-Bayesian Information Criterion (SBIC) are proposing lag 1. The above criteria are used on the assumption that the smaller the value the better the model is all the time. Lütkepohl (2009: 24) suggests that SBIC and HQIC criteria provide consistent estimates in choosing optimal lags. This is not the case when these two criteria are differing with other criteria and one should choose the lag that is supported by majority of the criteria and for this research lag 3 is the most appropriate one. On another note if considering the second difference the appropriate lag length is 2 as shown in Table 1a below.

5.2.5 Unit Root Testing

As Leon (1986) argued that there is no co-integration between inflation and output growth, the above tests was carried out to find out how valid is this argument during the period of hyperinflation in Zimbabwe. Studies by Cameron et al. (1996) and Davis and Kanago (1996) also found that there was no relationship between growth in output and inflation. The above findings were premised on analysing normal inflation not hyperinflation. To find out whether there exist a long-run relationship between hyperinflation and VMI a test for stationarity and co-integration was performed. Hossain (2013) explained that if the absolute value of the t-statistic at 5% level of significance is less than the absolute critical value then the null hypothesis (H_0) can be rejected meaning that there is existence of unit root or the series are non-stationary.

Table 1: Selection – order Criteria (Sample: 2005m5 – 2009m1)

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-736.135				4376.32	14.0597	14.0802	14.1103
1	-515.524	441.22	4	0.000	70.6727	9.93378	9.99524*	10.0854*
2	-512.578	5.8911	4	0.207	72.1146	9.95387	10.0563	10.2066
3	-505.695	13.766*	4	0.008	68.2782*	9.89895*	10.0423	10.2528
4	-501.992	7.4054	4	0.116	68.6967	9.90461	10.089	10.3596

Source: Author, computed based data from ZIMSTAT Data

Table 1a: Selection – order Criteria for second differences (Sample: 2005m5 – 2009m1)

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-583.81				240.454	11.1583	11.1788	11.2088
1	-562.406	42.808	4	0.000	172.613	10.8268	10.8882	10.9784
2	-541.818	41.175*	4	0.000	125.865*	10.5108*	10.6132*	10.7636*

Source: Author, computed based data from ZIMSTAT Data

Table 2: ADF Test for Series in Levels

Var	Lag	t-stat	Critical	values		p-value
			1%	5 %	10 %	
VMI	0	-1.584	-3.507	-2.889	-2.579	0.4918
lnINF	0	2.391	-4.037	-3.449	-3.149	1.0000
D_{07}	0	-0.533	-3.507	-2.889	-2.579	0.8855

Source: Author, computed based data from ZIMSTAT Data.

Table 3: ADF Test for Series in First Difference

Var	Lag	t-stat	Critical	values	p-value
			1%	5 %	10 %	
dVMI	12	-2.740	-3.517	-2.894	-2.582	0.0674
dlnINFL	12	2.666	-3.517	-2.894	-2.582	0.9991

Source: Author, computed based data from ZIMSTAT Data.

Table 4: ADF Test for Series in Second Difference

Var	Lag	t-stat	Critical	values		p-value
			1%	5 %	10 %	
ddVMI	6	-6.397	-3.510	-2.890	-2.580	0.0000
ddlnINFL	6	-4.552	-3.510	-2.890	-2.580	0.0002

Source: Author, computed based data from ZIMSTAT Data.

The procedure is as follows; H_0 states that the variable(s) has unit root or is non-stationary while alternative hypothesis (H_1) states that variable(s) is stationary. The choice is normally a 5% critical value and is compared with the t-statistic in absolute terms. The 3 models should reach the same conclusion that is model with no constant and trend, model with constant only and model with trend only. Hint, the coefficient of the lagged value of the variable being analysed (L.1) should be always negative for the model to be valid; if it is positive then the model is invalid. The second difference satisfies the above requirements. All the t-statistics for both the first difference and the levels are less than their 5% critical values hence one cannot reject H_0. The conclusion is therefore that inflation and VMI series are non-stationary since their p-values are insignificant. The second differences of the variables are stationary and highly significant as shown in Table 4 above.

5.2.6 Test for Co-integration

After noticing that the series at levels are non-stationary the next step is to check whether the variables are co-integrated or not. By this we want to find if the variables have a long-run relationship or not. Co-integration provides a framework to analyze and predict coefficients of variables that do not have stationary covariance. The assumption is that VMI and log inflation should not be stationary at levels but their first difference must be stationary. The basis is to compare the trace statistic values and their 5% critical values and if the trace statistic is greater than the critical value then H_0 which states that the variables are not co-integrated in the long-run can be rejected. Both the trace statistics and the max statistics should reach the same consensus in either rejecting or failing to reject H_0.

Table 5: Johansen Test.

```
. vecrank VMI lnINFLATION D07, trend(constant) max

                      Johansen tests for cointegration
Trend: constant                                    Number of obs =     107
Sample:  2000m3 - 2009m1                                     Lags =       2

                                                     5%
maximum                                 trace    critical
  rank    parms      LL      eigenvalue statistic  value
    0      12    -421.10452       .       16.4532*  29.68
    1      17     -416.8582    0.07630     7.9606   15.41
    2      20    -413.14464    0.06706     0.5335    3.76
    3      21    -412.87789    0.00497

                                                     5%
maximum                                  max     critical
  rank    parms      LL      eigenvalue statistic  value
    0      12    -421.10452       .        8.4926   20.97
    1      17     -416.8582    0.07630     7.4271   14.07
    2      20    -413.14464    0.06706     0.5335    3.76
    3      21    -412.87789    0.00497
```

Source: Author, computed based data from ZIMSTAT Data.

The assumption is H_0 states that there are no co-integrating equations between VMI and hyperinflation at all maximum ranks. From Table 5 above it can be noted that there are zero co-integrating equations. The Johansen test therefore tells us that there is no long-run relationship between the variables that is they do not move together in the long-run. The conclusion is H_0 cannot be rejected in favor of H_1 because there is double confirmation from both the trace and max statistics which are all less than their 5% critical values. The variables have proven to be unco-integrated and vector error correction model (VECM) cannot be performed but instead unrestricted VAR is used.

5.2.7 Unrestricted VAR Model

Since the Johansen test has confirmed that the two economic variables have no long-run relationship it is therefore essential to conduct the unrestricted VAR model to check for Granger causality. Lütkepohl (2009:36) argues that causality is of paramount importance since it explains the link between economic variables. The results show that the first lag of VMI (VMI L1) is significant in explaining VMI. In the same vein the first lag of inflation is also significant in explaining inflation rate. The next step is to find short-run Granger causality between the two variables.

Table 6: Short-run Relationship/ Granger Causality Wald Tests (var-granger)

Equation	Excluded	Chi2	df	Prob > chi2
VMI	lnINFLATION	9.1167	3	0.028
VMI	VMI_1	1.7641	3	0.623
VMI	ALL	13.239	6	0.039
lnINFLATION	VMI	.73651	1	0.391
lnINFLATION	VMI_1	2.3887	3	0.496
lnINFLATION	ALL	2.6544	4	0.617
VMI_1	VMI	1.5e+15	1	0.000
VMI_1	lnINFLATION	6.4529	3	0.092
VMI_1	ALL	1.6e+15	4	0.000

Source: Author, computed based data from ZIMSTAT Data.

From Table 6 above the results explain that there is short-run causality running from all the lagged variables of the natural logarithm of inflation to VMI and also from all lagged values of VMI to its own lag. H_0 suggest that all the coefficients associated with independent variable lnINFLATION are equal to zero meaning that lnINFLATION does not Granger cause VMI. Since the probability value (Prob > chi2) of lnINFLATION (2.8%) is less than 5% H_0 is rejected in favor of H_1. There is strong evidence suggesting Granger causality running from lnINFLATION to VMI. This is not the case with all the lagged variables of VMI on lnINFLATION because 39.1% is greater than 5%. When the dummy variable (D_{07}) is included it is statistically insignificant and we can see that it did not make much impact on VMI, VMI_1 and inflation. Since D_{07} = 1 represent hyperinflationary period we cannot conclude that hyperinflation

contributed to the decline of VMI despite the fact that hyperinflationary period is statistically significant at 10%. This can be seen in Figure 10 and 11 in Appendix 1 below.

Having found that there is short-run Granger causality running from all lagged variables of lnINFLATION to VMI when D_{07} is excluded the next step is to perform diagnostic tests to check if the whole model is correctly specified or not. The results in Table 7 below prove that there is no serial correlation in the whole VAR model which implies that the model is well specified since 17% and 30% are greater than 5%. Next is to check if the residuals of the two variables are normally distributed or not. Table 8 below informs us that only the residuals of VMI are normally distributed while those of lnINFLATION and VMI_1 are not because their probability values are greater and less than 5% respectively. This means that the VAR model has passed the diagnostic testing.

Table 7: Test for autocorrelation (LM test) (valmar)

lag	Chi2	df	Prob > chi2
1	6.4174	4	0.17007
2	4.8711	4	0.30078

Source: Author, computed based data from ZIMSTAT Data.

Table 8: Jarque – Bera test (varnorm, jbera) varlmar

Equation	Chi2	df	Prob > chi2
VMI	0.933	2	0.62725
lnINFLATION	6200.723	2	0.00000
VMI_1	6.530	2	0.03820
ALL	6208.186	6	0.00000

Source: Author, computed based data from ZIMSTAT Data

5.2.8 Stability Test

The model also passed stability test since all the eigenvalues lie inside the unit circle as shown in Figure 9 in Appendix 1 and Table 9 below. This is a confirmation that the model is correctly specified.

Table 9: Eigenvalue Stability Condition (varstable, graph)

Eigenvalue		Modulus
-.3848027	+ .5819322i	.697652
-.3848027	- .5819322i	.697652
-.1867032	+ .5514375i	.582187
-.1867032	- .5514375i	.582187

Source: Author, computed based data from ZIMSTAT Data

5.2.9 Forecasting in VAR

The graph in Figure 10 in Appendix 1 reveals that after January 2009 in the next six months VMI will continue to decrease at an increasing rate while lnINFLATION will be increasing at an increasing but both widens in June 2009 assuming that the Zimbabwean dollar continued to be used. This means that hyperinflation was going to worsen while VMI would be falling.

5.2.10 Impulse Response Function (IRF)

Impulse response functions (IRFs) measure how a shock from one variable affects the same variable or other variables within the system in the current or future period. IRF is a conceptual experiment which analyses the occurrence of a shock to the system and examines how variables react to the shock. In this case IRF analysis shows how a shock coming from either VMI or lnINFLATION affects the same variable or the other variable. From Figure 11 in Appendix 1 we can see that a shock arising from VMI lead to a decline of VMI in the first 2 months and an increase which will stabilize after 6 periods. Contrary to this a positive shock coming from lnINFLATION slightly increases VMI in the first 2 periods, decreases it and then stabilizes after 6 months. This means that increase in prices at first increase VMI but later affects it in the long-run.

5.3 Analysis of Regression Results

The regression results have informed us that the fall in VMI was not linked to hyperinflation since before hyperinflation one can see a downward trend in VMI. Although the Granger causality test when a dummy is excluded shows that inflation in general causes a decline in VMI this is not the case when a dummy is included. The inclusion of a dummy of which this captures hyperinflation period proves that hyperinflation does not lead to a decrease in VMI in the short-run.

5.4 Results and Findings from Interviews

Doing business under hyperinflation sometimes it is a challenge especially if things are operating in an abnormal way. The strategies used by management may appear to be common during incidences of stable economic environment but if encountering hyperinflation those very same decisions are key for the success of an organization. Quoting from Quinn (1980:5) Seth and Thomas (1994) define a strategy as 'a pattern or plan that integrates an organization's major goals, policies and action sequences into a cohesive whole'. (Seth and Thomas, 1994: 166 - 167). They further emphasized that if well-formulated strategies play a critical role in making sure that the resources of an organization are allocated in such a way that can take it to greater heights. The same authors argue that the theory of the firm is a neoclassical economic approach which was designed to explain how price affect the amount of goods produced by the firm. Challenges arise because of unstable environment, continual rise of both prices of inputs and wages on almost daily basis. Seth and Thomas

(1994) also say that the behaviour of firms depends on the actions taken by other players in the industry. Since the aim of doing business usually is to maximize profits, game theory suggests that firms usually consider moves or decisions taken by either government or other competitors before they make their own moves as far as resource allocation and production is concerned. This works on the assumption that managers are rational human beings and they work in the interest of firms to maximize profits. During times of hardships like in hyperinflationary environment managers' decisions maybe limited by constraints and unforeseeable circumstances hence instead of them wanting to maximize profits they might be interested on satisfactory profits.

Good management and leadership qualities are a basic requirement in order to survive but in hyperinflationary environments they are a must and should be constantly reviewed because this can separate prosperous from unsuccessful firms. Those companies that can withstand the situation can survive while those that cannot collapse immediately due to bankruptcy. A small error or a one day delay in planning can cost a lot to companies. As directly cited by Swanson (1989) that,

> *The key to operating in a hyperinflationary economy is to stay ever mindful that the real value of money erodes significantly over very short periods of time. Any aspect of management that involves cash transactions takes on added urgency, which gives the chief financial officer a major role in almost all day-to-day decisions. Cash management becomes the most critical component of business operation, and the difference between profitability and bankruptcy is often simply a matter of how well a firm handles its cash. (Swanson 1989: 8).*

The research noted that there was prevalent consensus among many of the managers especially on prioritizing survival through speculation on currency movement rather than production. This led to many firms investing their money on assets or buying stable currencies like the United States dollar or the rand. If they produced goods they would rather stockpile them so that they could sell them later in speculation of higher prices but the problem was that government regulated the prices. All companies needed payments to be done in cash using the black market exchange rate that prevailed at that moment due to unavailability of fixed contracts. Most manufacturers had to resort to importing raw materials since domestic supplies were no longer reliable, efficient and consistent. These firms had a torrid time in accessing the much needed raw materials as exchange rates were unpredictable and varying almost on daily basis.

Of the 15 firms that were interviewed 4 were drawn from food processing, 1 from beverages, 2 chemicals, 1 clothing, 2 textile, 1 leather while 4 came from timber and furniture sub-sector. The profiles of respondents composed of 10 operations managers, 1 human resource and 2 procurement and production managers. The response rate was 53.3% as only 8 firms managed to share out their views and thoughts on the research topic.

5.5 Challenges Faced by Manufacturing Firms

The challenges that most firms cited were mainly caused by the weakening in value of the currency. Firms were much cautious about transacting in the national currency which was now a liability to them.

5.5.1 Lack of Access to Credit and Foreign Currency Shortages

Majority of firms which constituted about 75% of the respondents concurred with the challenge of facing limited access to credit which was needed to finance their operations. The rating for the above problem was very high. The challenge arose from the fact that Zimbabwe's financial system at that time was crippling due to cash shortages. In addition to the above access to proper information was not readily available for firms so that they could borrow. Banks' lending rates which were very high by nature worsened the situation for firms which wanted to borrow. This constrained a lot of firms as they failed to buy the capital which they needed their operation and expansion their business empire. At the peak of hyperinflation the local currency was no longer in use and this resulted in an increase in trading of foreign currency at the black market. With hyperinflation it means the local currency gets weaker against other currencies as more of domestic currency was needed to buy a unit of foreign currency.

Of the firms under this study majority survived by purchasing foreign currency from the black market although they did not reveal it for the sake of fearing to be prosecuted. The reason for them purchasing on the black market was that the financial sector had no foreign currency since the rates that the central bank pegged were far below the market rate. Companies argued that acute shortages of capital hindered them to attain full capacity utilization. Local banks had no capacity to copy with the increase in demand by consumer for daily cash withdrawals and this resulted in a number of them (banks) going under curatorship as they were failing to meet their capital requirements. Shortage of finance further crippled the sector as it was not worth to inject fresh capital and technology under the circumstances of hyperinflation. This made the sector to be non-competitive. Lack of credit and foreign currency shortage also meant that the firms could not buy raw materials and other inputs. The black market played a significant role in supplying foreign currency which came as remittances from people with relatives in the diaspora which did not find its way in the formal channel due to some of the reason mentioned above. The shortage of foreign currency also meant that imports were now expensive and this had a negative impact on firms that relied on foreign imports as their main source of raw materials.

5.5.2 High Levels of Corruption

Due to high levels of corruption that were prevailing during hyperinflation many firms employed trustworthy staff or their relatives in areas that involved cash handling. The reason was that if untrustworthy persons were given access in handling cash they would rather convert it into foreign currency and buy themselves assets which they later sale at the expense of running the business. The other problem of employing outsiders in strategic positions was that the

employees usually diverted cash to speculative tendencies instead of using it for production purposes.

5.5.3 Price Controls

Many companies in the sector admitted that due to price regulations by government it was difficult for them to keep pace and cover their cost of production as one had to first seek approval from Ministry of Industry and Commerce to increase price of certain products especially basic commodities. The period in which the bulk of firms in the sector faced more complications was from September 2008 to January 2009. Usually what happens was that by the time firms got approvals it was too late for them to set the approved prices. This means that they would need another request to copy with the galloping inflation as prices were changing quickly before the approval ink gets dry. The government through police forces and sometimes army were seen all over as they wanted to make sure that firms were adhering to government gazetted prices. Sometimes the police could ration the amount of goods which an individual consumer was supposed to buy. As observed by Seth and Thomas (1994) managers have to use adaptive rational to deal with crisis based on their expectations, choices and other firms' actions. (Seth and Thomas 1994: 173). Given the high increase in inflation rate capacity utilization in most companies dropped as they were struggling to produce.

5.5.4 Brain Drain

Highly qualified and experienced workforce left the country as things were not friendly during the period of hyperinflation. The salaries they were getting did not commensurate with the cost of living. This resulted in acute shortage of experienced manpower which was needed to do the manufacturing of commodities. The bulk of skilled staff went to South Africa and the United Kingdom to look for greener pastures as the conditions of work were no longer favourable. This presented negative ramifications on the sector as it was not getting enough skilled labour force to turnaround the fortunes of the sector. The firms are still failing to attract back the skilled manpower that is needed to revivify the sector as well as getting the economy moving again. More than 50% of the respondents confirmed that as a way to keep their operations intact they resorted to poaching skilled personnel from other firms in order to fill in gaps created by those workers who left to seek better opportunities in other countries.

5.5.5 Shortage of Raw Materials

The bulk of firms expressed great concern over the way price controls affected the availability and supply of raw materials in the domestic market. The local companies which were supposed to supply the domestic were also affected in the same manner the manufacturing firms were affected. The problems that were encountered by suppliers starved the manufacturing sector of the much needed raw materials for production to take place. This was further worsened by shortage of foreign currency which was needed to purchase the raw materials.

5.5.6 Poor Infrastructure and Obsolete Machinery

Most respondents argued that the state is failing to put a new face on major road networks and this pose a death risk to human life. In addition to this the volume of traffic in the roads is so high to the extent of causing delays in moving consignment from one point to another. Power black outs, acute water shortages and poor state of other economic enablers hamper production and companies usually resort to use of generators which have the effect of increasing the cost of production. The other challenge is that some of the machinery that the firms are still using has passed their life span and they are no longer efficient. This makes the firms to be less competitive to other firms in the region. The National Railways of Zimbabwe (NRZ) was not operating efficiently and this was cited by majority of the firms as posing an insurmountable challenge as goods were now ferried using road transport which is very expensive as compare to rail. Government failure in provision of basic infrastructure was not limited to road, rail only but it extended to failure of making sure the citizens have access to clean water and health. This saw at least 3000 people dying in 2008 because of the cholera epidemic. The manufacturing sector was also a scapegoat of the situation as most workers in the sector were also affected.

5.5.7 Competition from Imports

Of the firms that were interviewed the majority of them cited influx of cheap imports from China as a threat to their operations. Although majority of Chinese products are inferior as compared to local products, consumers still find it reasonable to buy them as their paltry salaries and wages cannot make them afford the domestic ones. This means that local firms especially those in the food and clothing sectors find it difficult to compete with Chinese goods given the plight of consumers. High levels of corruption and a weak institution that regulates standards, Standards Association of Zimbabwe (SAZ), at ports of entry made it easier for these inferior goods to find their way in the domestic market. The end result was closure of some companies especially those that were not highly sophisticated as they could not cope with the level of competition.

5.6 What Measures Were Taken to Overcome the Above Challenges

Seth and Thomas (1994) argue that in order for firms to succeed their managers should have to apply concrete decisive actions which determine their profits and output based on their investment and input combinations. They further state that only firms that appropriately use the above operating approaches during times of crisis like hyperinflation can survive through withstand the harsh circumstances. A firm's success is based on the amount of resources and managerial skills it has and how it uses these two in a competitive and economic way. Madhok (2002) also argue that a firm's success story does not only lie on the efficiency of the market only but it is because of the way it organizes its economic activities. He further argue that the strength of the firm lies in producing goods or services which other firms cannot be able to compete and this

better explains why the firm itself as entity is important than the market it operates. It is during periods of instability when the firm is caught in a hard rock of whether to prioritize management of its resources in a competitive manner or why it should organize its operations in that manner. In addition to the above Madhok also emphasized that the success of any organization is pinned on the way its resources, transactions and governance structure are aligned to one another. The adoption of the strategies was meant to seal a defensive mechanism against the deteriorating local currency.

5.6.1 Efficient Management Techniques

A lot of changes took place especially in the managerial and reporting arrangements of many manufacturing firms during hyperinflation. There was minimum room for bureaucratic tendencies and delays in decision making processes as verbal type of communication was more preferable to written ones. Information gathering becomes a crucial asset in surviving as Swanson argues that firms should constantly and closely monitor actions taken by competitors, government and financial institutions in anticipation of any possible immediate changes. (Swanson 1989: 11). Finance managers should not let cash lie idle for many days but they should understand the value of money and quickly convert and store it into a stable currency or other valuable assets. They should as well deal in cash payments instead of credit terms as money constantly lose value. Good cash management is of chief importance as this yield the much needed profit to survive the turmoil that the economy faced.

Most managers revealed that in terms of their planning process they had to adjust it to a weekly or daily basis as opposed to monthly or yearly to capture variations in prices and interest rates. Another added advantage to the firms that followed the above criteria is that they applied general knowledge in tackling problems rather than being specialist otherwise they could get stuck if the crisis persisted. The main argument that most managers put across was that they were now putting more emphasis on surviving rather than expanding their business empires. Others revealed that they were not producing at all but opening their premises in order to keep their names recognized until things normalized. They would rather get involved in other businesses outside their scope like selling fuels only for the sake of survival.

5.6.2 Motivation of Workforce

In most cases many firms confirmed that they managed to keep their employees motivated so that they were able come for duty. Majority of firms under the survey revealed that they devised various mechanisms so as to retain and induce the workforce and this was a way of encouraging them to report for work and make them to produce more goods. Other employers stepped up efforts in motivating their workforce through providing them with transport to and fro work since stories that have to do with absenteeism were very high. In some instances firms could even pay their workers with groceries during time of hyperinflation so that they could sell them or swap to others to get other basic commodities. Of the 8 firms interviewed nearly 75% of the firms boldly said that they rewarded workers for meeting their daily and monthly output targets. Given the situation that the local currency was worthless and the cost

of living was increasing almost on daily basis most firms especially those in the food and beverages could even sell their goods to their workers at reduced prices as a way of easing the life. Provision of private transport was critical since it eased movement of workers because public transport was sometimes unreliable due to fuel shortages. Some companies went to the extent of providing free lunch to their employees as a way of making them less concentrate on how to get food but in order for them to be more productive. The above measures were done in order to incentivize, retain and to put a smiling face on the employees so that they could report for work. Most firms found it wise to use the above techniques since the rate at which prices of basic commodities were increasing was way above the increase in wages and salaries of ordinary workers.

5.6.3 Direct Purchase of Inputs

The firms that were dealing in clothing, food and beverages for instance had to stop using the services of middlemen in acquiring raw materials but had to source them directly from suppliers. Middlemen would increase the waiting period as the value of money was depreciating. Another alternative for firms was to do barter trade in accessing raw materials that is they could develop a network with other firms that were able to supply them with raw materials in exchange for their products. Due to complications that firms may face in keeping track of financial records during hyperinflation as money deteriorates fast Swanson (1989) stresses that valuation of inventory should be applied on the concept of Next In First Out (NIFO) as opposed to Last In First Out (LIFO). (Swanson 1989: 30). Having accurate information about price movements of goods becomes a key asset for firms to survive hyperinflation. (Swanson 1989: 44).

Purchasing and Financing managers should be given room to make decisions independently and quickly as delay in buying raw materials and using money can harm the progress of the firm. In a nutshell the networking process should involve managers at all levels so that they should always work together closely, circulate and relay information to each other as soon as possible. Other firms especially those in the textile and clothing sector mentioned that they had to create some kind of collaborations and synergies in order to lessen the burden of doing everything under one roof. Given the extent and gravity of the difficulties the firms encountered during hyperinflation some firms had to integrate their operations with buyers and suppliers so as to minimize their costs. The bulk of the linkages and synergies that the majority of the firms were doing involved informal sector as this gave them an advantage as far as easing foreign currency shortages was concerned.

5.6.4 Producing Less Controlled or Uncontrolled Products

Firms which were known for producing basic commodities had to shift their focus to produce non-basic commodities which had no price restrictions from the state. The government made sure that companies could not willingly raise their prices without approval from the relevant authority. This idea of monitoring prices was to protect the consumers from unscrupulous companies who wanted to profiteer from the situation. The consequence was a shortage

of the basic commodities as firms avoided the full wrath of the law by diverting to production of unrestricted commodities because government regulated price increases was not in tandem with increase in production costs. The regulation led to disappearance of controlled goods like milk, sugar, maize meal, wheat flour, cooking oil from the supermarkets' shelves. Chiripanhura (2002) also confirmed that some firms who were engaging in exporting finished products at one point in time had to lie that they were exporting samples not real orders so as to avoid the stringent measures which the government was doing in controlling foreign currency. (Chiripanhura, 2002: 165). This is self-evident that firms were ready to do anything they found possible to survive the crisis.

5.6.5 Reliance on Foreign Supply of Raw Materials

The bulk of firms in the sector revealed that due to the comatose that the country was facing they had to get orders of raw materials from South Africa and other neighbouring countries as the local supplies were dry. The Zimbabwean case was different from what Swanson (1989) suggested when a country is gripped by hyperinflation. Despite the fact that there were some complications in importing due to regulations and costs companies still saw it viable to import as they had no other options. Some firms that had sister companies in countries like South Africa, Zambia managed to get supply of goods and raw materials without much hassles of first finding foreign currency. Other firms went on to an extent of outsourcing as a way of getting rid of some of the activities which brought inefficiencies.

5.7 Analysis of Firms' Response

In a nutshell most company executives and managers admitted that some of the techniques they used to operate under hyperinflation were against the laws and regulations of the country. For example tax evasion, misrepresentation of sales of goods and tempering with the quality of the product. Firms did the above unethical actions out of desperation as a way to survive the macroeconomic instability posed by hyperinflation. This is reinforced by Swanson (1989) who quoted one of the South American bank officers saying that, 'inflation is an immoral tax that leads to immoral values'. (Swanson, 1989: 61).

The whole story why firms take the above strategies was that when they realized that the structural challenges that originated in 2000 were affecting them they minimized the use of local currency. Adopting the quantity theory of money as the most rational firms were trying to reduce exposure to hyperinflation it means M, V and P increased while T for the local currency decreased. This meant that rational firms reduce the use of national currency and P rises as a result of firms' decision making which reduced T in domestic currency triggering government to lose revenue thereby increasing M. People start to panic and further reduce T in domestic currency and increase V in domestic currency and all the strain of equating M*T with P*V falls on P and the process becomes cumulative. ALL the above responses taken by managers were aimed at reducing the volume of doing their transactions in Zimbabwean dol-

lars. In simple terms they were shunning to trade in the national currency and this further turned into hyperinflation.

Chapter 6

6.1 Conclusion

The main focus of this research was to examine whether hyperinflation cause a decline in VMI or not, to look at the challenges presented by hyperinflation to Zimbabwe's manufacturing firms and how the surviving firms managed to proffer solutions to these challenges. Unlike other papers which looked at hyperinflation using either qualitative or quantitative approach only this research used both. Applying co-integrated unrestricted VAR approach the research found that the relationship between lnINFLATION and VMI for the period January 2007 - January 2009 was negative though insignificant. The research further found that there is a short run Granger causality running from all lagged values of lnINFLATION to VMI. The negative association is also supported by IRF results where a shock introduced from lnINFLATION lowers VMI in the long-run. This negative short-run relationship between hyperinflation and VMI could have been driven by firms' expectations about the weakening of the Zimbabwean dollar in the wake of hyperinflation. Majority of firms reduced the need to transact in Zimbabwean dollar in order to strengthen their operations. This fits well to the rational expectations where firms make their current and future decisions based on previous hyperinflation. The study found that expectations resulted in firms losing confidence in using the local currency as it was becoming worthless on daily basis and they had to illegally trade in foreign currency to maintain their operations. The hyperinflationary period just exacerbated the fall in VMI but the regression analysis cannot conclude that it solely caused the decline in VMI as there may be structural factors that may have caused this.

The study noted that challenges which were prevalent to most firms include unavailability of credit, shortage of skilled personnel, lack of raw materials, too much wage and price controls by government, influx of cheap imports and obsolete machinery. These challenges in turn hindered progress in the sector as this saw VMI surging down. The challenges pushed firms to be innovative and they applied various strategies which include efficient management, staff motivation, shortening pay periods, outsourcing raw materials and producing less controlled or uncontrolled commodities. The research also established that hyperinflation forced firms to deviate from their traditional way of planning into taking suicidal decisions as a way of survival.

However the research cannot conclude that hyperinflation caused a decline in VMI because the deterioration of VMI started earlier before hyperinflation. If hyperinflation was the main factor then one could expect a deep plunge in VMI when hyperinflation was at its peak. The other reason is that even after hyperinflation when the government formally introduced multi-currency the sector is still comatose as VMI is not increasing to expected levels. When firms realised that the structural challenges that emerged in early 2000 were starting to affect them the firms began to make rational decisions among them reducing the use of Zimbabwean dollar to safeguard themselves. This means that they positioned themselves before hyperinflation started. This

further pushed up velocity of circulation for the domestic currency which increased inflation rate as firms were no longer having confidence in the domestic currency. The rational decisions taken by firms as reactions to structural challenges are assumed to have caused a spark in hyperinflation because almost everyone was quickly converting the domestic currency for either goods or stable currency. As a conclusion hyperinflation was as a result of expectations about more inflation in the future as people in general had lost faith in the Zimbabwean dollar.

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Appendix 1: List of Figures

Figure 1: Zimbabwe's Real GDP from 1980 to 2010
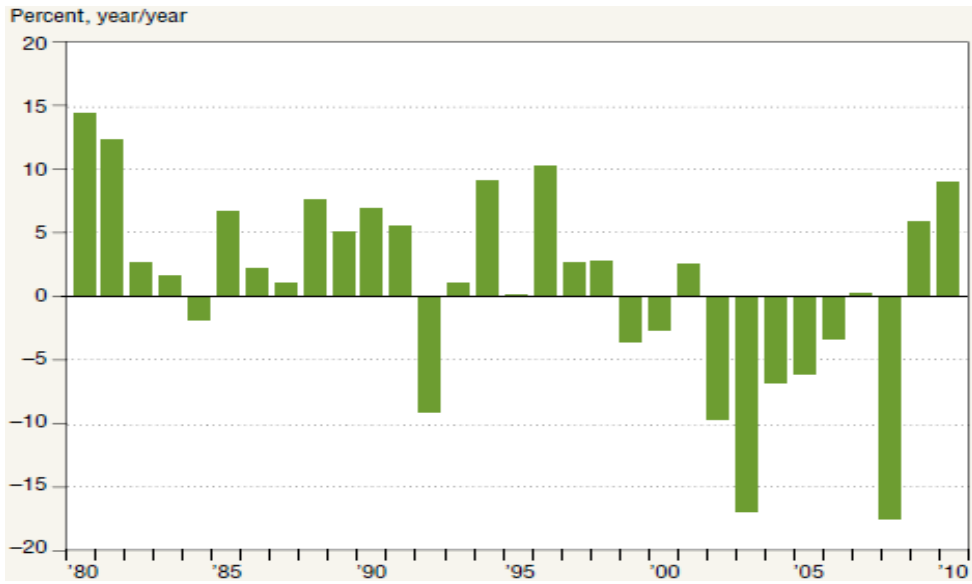
Source: World Bank's World Development Indicators database, cited in Koech. J (2011). NOTE: GDP growth rates are in constant 2000 U.S$. prices.

Figure 2: Zimbabwe's Inflation for the period 1980 – 2010
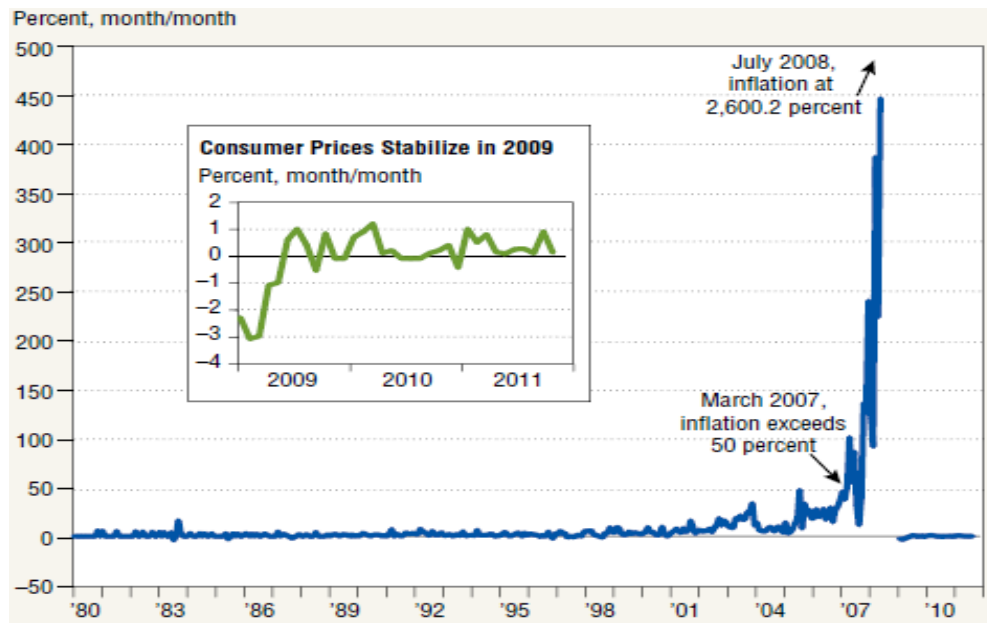
Sources: International Monetary Fund's International Financial Statistics database; Reserve Bank of Zimbabwe's Monthly Economic Reviews, cited in Koech. J (2011).

Figure 3: Zimbabwe's Exchange Rate (Z$/US$)

Figure 4: Zimbabwe's Inflation and Money Supply for the period 1994-2008

Figure 5: Zimbabwe's Tobacco Production

Figure 6: Demand and Supply of Labour
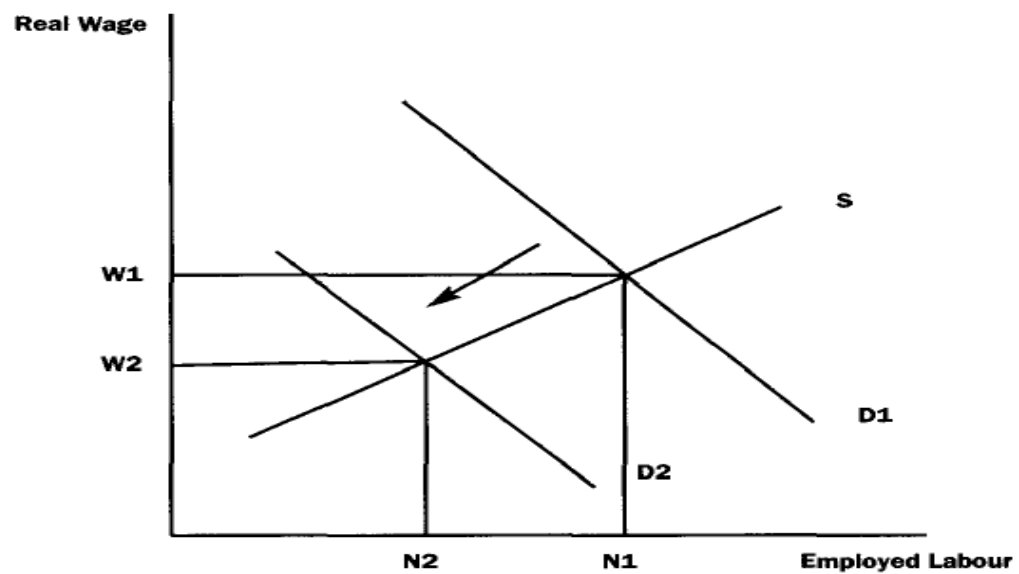
Figure 7: Highest Inflation Rates in History

HIGHEST MONTHLY INFLATION RATES IN HISTORY

Country	Month with highest inflation rate	Highest monthly inflation rate	Equivalent daily inflation rate	Time required for prices to double
Hungary	July 1946	$4.19 \times 10^{16}\%$	207%	15.0 hours
Zimbabwe	Mid-November 2008	79,600,000,000%	98.0%	24.7 hours
Yugoslavia	January 1994	313,000,000%	64.6%	1.4 days
Germany	October 1923	29,500%	20.9%	3.7 days
Greece	October 1944	13,800%	17.9%	4.3 days
China	May 1949	2,178%	11.0%	6.7 days

Sources: Hungary (Nogaro 1948); Zimbabwe (authors' calculations); Yugoslavia (Petrović, Bogetić, and Vujošević 1999); Germany (Sargent 1986); Greece (Makinen 1986); China (Chou 1963), cited in Hanke and Kwok (2009). Note: The authors calculated "equivalent daily inflation rate" and "time required for prices to double."

Figure 9: Stability Test.
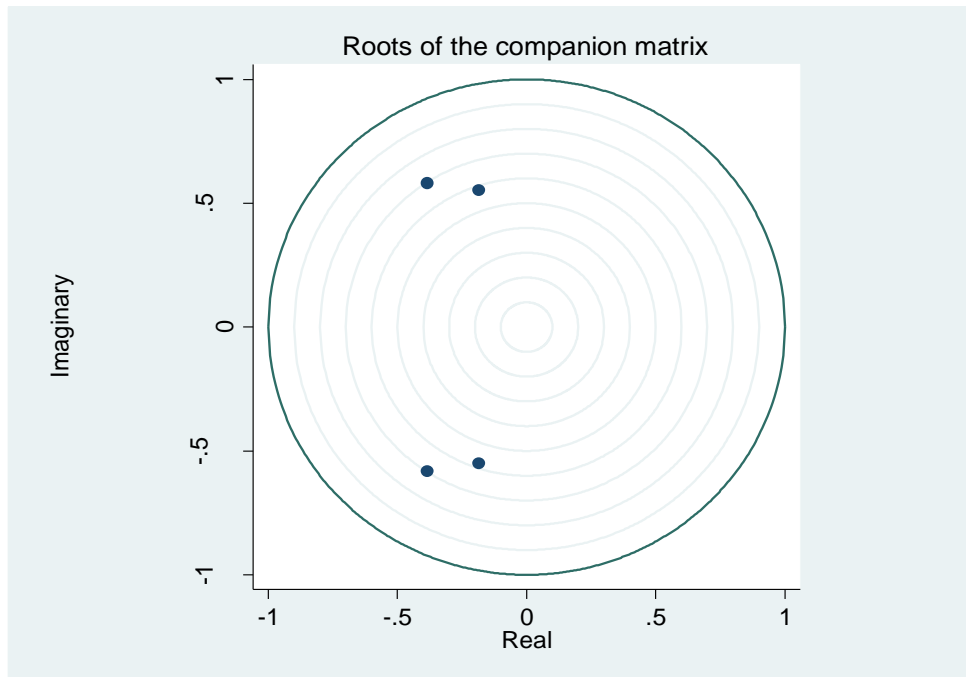
Source: Author, computed based data from ZIMSTAT Data.

Figure 10: Short-run relationship/ Granger Causality Wald Tests (var-granger)

Equation	Excluded	Chi2	df	Prob > chi2
VMI	lnINFLATION	0.50159	2	0.778
VMI	VMI_1	1.4447	2	0.486
VMI	D_{07}	5.081	2	0.079
VMI	ALL	10.453	6	0.107
lnINFLATION	VMI	.63407	1	0.426
lnINFLATION	VMI_1	1.9294	2	0.381
lnINFLATION	D_{07}	1.4834	2	0.476
lnINFLATION	ALL	5.6136	5	0.346
VMI_1	VMI	1.5e+15	1	0 .000
VMI_1	lnINFLATION	3.4259	2	0.180
VMI_1	D_{07}	.77634	2	0.678
VMI_1	ALL	.6e+15	5	0.000
D_{07}	VMI	4.9671	1	0.026
D_{07}	lnINFLATION	.43037	2	0.806
D_{07}	VMI_1	5.961	2	0.051
D_{07}	ALL	6.36	5	0.273

Source: Author, computed based data from ZIMSTAT Data.

Figure 11: Long-run Relationship between Variables.

		Coef	Std. Err.	χ	P> $|\chi|$	(95% Conf.	Intval)
VMI	VMI						
	L1.	.7992891	.097916	8.16	0.000	0.6073772	.991201
	L2.	0	omitted				
	lnINF						
	L1.	.2220211	.5043593	0.44	0.660	-.766505	1.210547
	L2.	-0.3865255	.6165626	-0.63	0.531	-1.594966	.821915
	VMI_1						
	L1.	-.0324619	.1217756	-0.27	0.790	-.2711377	.206214
	L2.	.1067983	.097827	1.09	0.275	-.0849392	.2985357
	D_{07}						
	L1.	5.22254	6.586207	0.79	0.428	-7.68619	18.13127
	L2.	-9.558753	6.71105	-1.42	0.154	-22.71217	3.594664

	_Cons	8.864059	3.973657	2.23	0.026	1.075834	16.65228
lnINF	VMI						
	L1.	.0149923	.0188278	0.80	0.426	-.0219094	.051894
	L2.	0	omitted				
	lnINF						
	L1.	1.233713	.0969806	12.72	0.000	1.043635	1.423792
	L2.	-.2155344	.1185555	-1.82	0.069	-.44789	.0168302
	VMI_1						
	L1.	-.0312623	.0234156	-1.34	0.182	-.077156	.0146314
	L2.	.0095885	.0188106	0.51	0.610	-.0272797	.0464566
	D_{07}						
	L1.	-.2845778	1.266427	-0.22	0.822	-2.766728	2.197573
	L2.	.7673499	1.290432	0.59	0.552	-1.76185	3.29655
	_Cons	.4527196	.7640732	0.59	0.554	-1.044836	1.950275
VMI_1	VMI						
	L1.	1	2.61e-08	3.8e+07	0.000	.9999999	1
	L2.	0	omitted				
	lnINF						
	L1.	4.37e-08	1.35e-07	-0.33	0.745	-3.07e-07	2.20e-07
	L2.	-7.22e-08	1.64e-07	-0.44	0.661	-3.95e-07	2.50e-07
	VMI_1						
	L1.	-1.37e-08	3.25e-08	-0.42	0.673	-7.74e-08	5.00e-08
	L2.	-2.32e-08	2.61e-08	-0.89	0.373	-7.44e-08	2.79e-08
	D_{07}						
	L1.	-8.81e-07	1.76e-06	-0.50	0.616	-4.32e-06	2.56e-06
	L2.	4.37e-07	1.79e-0	0.24	0.807	-3.07e-06	3.95e-06
	_Cons	3.10e-06	1.06e-06	2.93	0.003	1.02e-06	5.18e-06
D_{07}	VMI						
	L1.	-.0032967	.0014792	-2.23	0.026	-.0061959	-.0003975
	L2.	0	omitted				
	lnINF						
	L1.	-.0018567	.0076193	-0.24	0.807	-.0167902	.0130768
	L2.	.0043693	.0093143	0.47	0.639	-.0138864	.022625
	VMI_1						
	L1.	.0038926	.0018396	2.12	0.034	.000287	.0074982
	L2.	-.0004784	.0014779	-0.32	0.746	-.0033749	.0024182
	D_{07}						
	L1.	.9526166	.0994967	9.57	0.000	.7576067	1.147627

L2.	.0281095	.1013827	0.28	0.782	-.1705969	.2268158
_Cons	-.0027295	.0600293	-0.05	0.964	-.1203848	.1149259

Source: Author, computed based data from ZIMSTAT Data.

Figure 12: VAR Forecasting
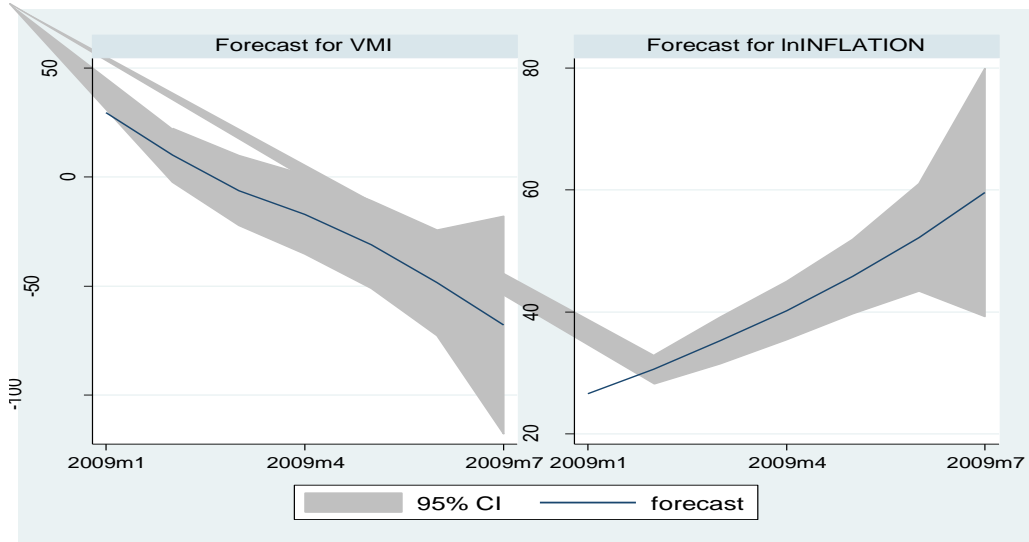
Source: Author, computed based data from ZIMSTAT Data.

Figure 13: IRF
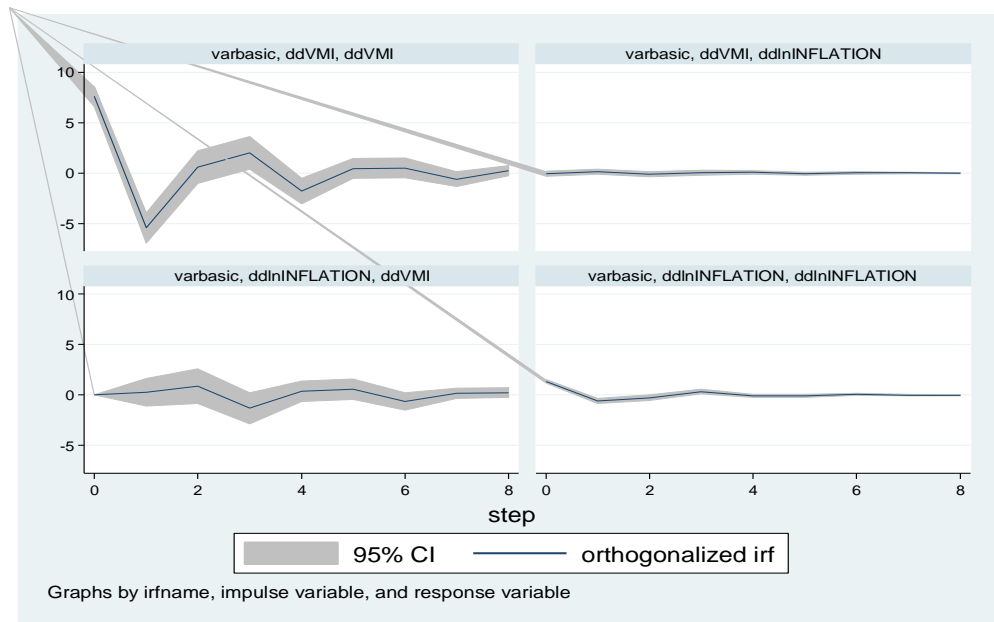
Source: Author, computed based data from ZIMSTAT Data.

Appendix 2: Series of VMI and lnInflation

Graph 1: Trends in VMI and lnInflation Rate (01/2000 - 01/2009)
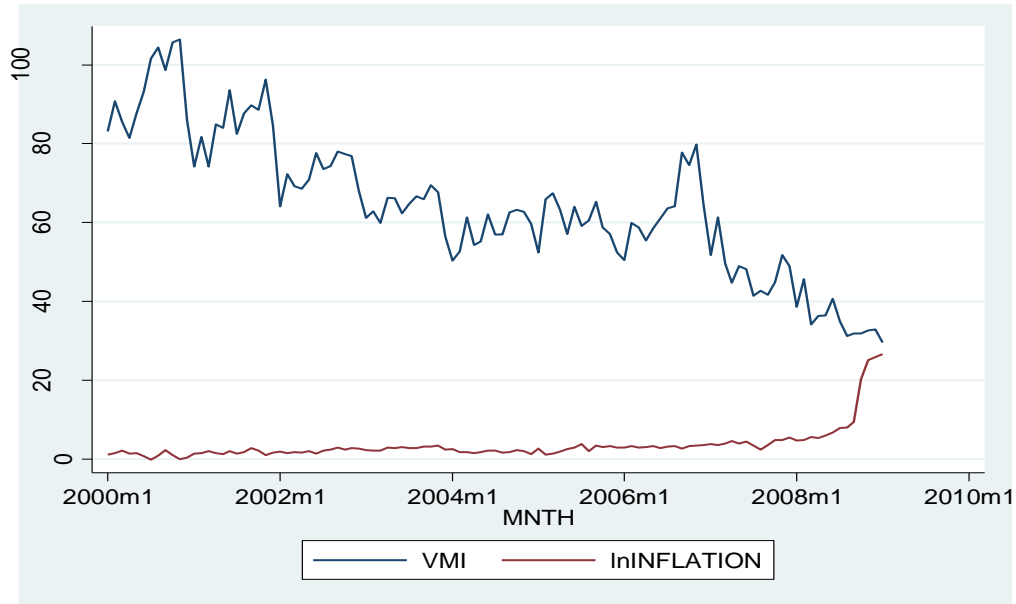
Source: Author, computed based data from ZIMSTAT Data.

Graph 2: Trends in First Differences of VMI and lnInflation Rate (01/2000 - 01/2009)

Source: Author, computed based data from ZIMSTAT Data.

Graph 3: Trends in Second Differences of VMI and lnInflation Rate (01/2000 - 01/2009)

Source: Author, computed based data from ZIMSTAT Data.

Appendix 3: ACF and PACF Diagrams

Diagram 1: Corrgram for VMI

```
. corrgram  VMI

                                         -1       0       1 -1       0       1
   LAG      AC        PAC       Q       Prob>Q  [Autocorrelation]  [Partial Autocor]
───────────────────────────────────────────────────────────────────────────────────
   1      0.9105    0.9434    92.866    0.0000
   2      0.8387    0.1150    172.4     0.0000
   3      0.7877    0.1450    243.22    0.0000
   4      0.7278   -0.0456    304.25    0.0000
   5      0.6759    0.0835    357.4     0.0000
   6      0.6356    0.1315    404.86    0.0000
   7      0.5873    0.0195    445.77    0.0000
   8      0.5537    0.1210    482.5     0.0000
   9      0.5275    0.1148    516.17    0.0000
   10     0.4968    0.1167    546.33    0.0000
   11     0.4788    0.2448    574.64    0.0000
   12     0.4920    0.2611    604.82    0.0000
   13     0.4457   -0.3328    629.86    0.0000
   14     0.4028   -0.1679    650.53    0.0000
   15     0.3824    0.0324    669.35    0.0000
   16     0.3413    0.0691    684.51    0.0000
   17     0.2977    0.0175    696.16    0.0000
   18     0.2494   -0.1419    704.43    0.0000
   19     0.2204    0.1884    710.96    0.0000
   20     0.1974    0.0917    716.26    0.0000
   21     0.1752    0.0699    720.48    0.0000
   22     0.1466   -0.1467    723.47    0.0000
   23     0.1301   -0.0618    725.85    0.0000
   24     0.1258   -0.0505    728.1     0.0000
   25     0.0865   -0.2320    729.18    0.0000
   26     0.0651    0.0365    729.8     0.0000
   27     0.0754    0.1363    730.64    0.0000
   28     0.0738    0.0736    731.45    0.0000
   29     0.0710   -0.1076    732.21    0.0000
   30     0.0580    0.1277    732.73    0.0000
   31     0.0479    0.0441    733.09    0.0000
   32     0.0485    0.1875    733.46    0.0000
   33     0.0464    0.1278    733.8     0.0000
   34     0.0363   -0.0319    734.01    0.0000
   35     0.0405    0.0643    734.28    0.0000
   36     0.0496    0.2352    734.69    0.0000
   37     0.0195    0.1091    734.75    0.0000
   38     0.0001   -0.0222    734.75    0.0000
   39    -0.0016   -0.0990    734.75    0.0000
   40    -0.0130    0.1960    734.78    0.0000
```

Source: Author, computed based data from ZIMSTAT Data.

Diagram 2: Corrgram for lnInflation

```
. corrgram lnINFLATION

                                          -1       0      1 -1       0      1
     LAG      AC       PAC      Q      Prob>Q  [Autocorrelation]  [Partial Autocor]
    ─────────────────────────────────────────────────────────────────────────────
     1      0.8273    1.1113  76.669   0.0000
     2      0.6339   -0.1654  122.11   0.0000
     3      0.4416    0.3551  144.37   0.0000
     4      0.2894    0.2962  154.02   0.0000
     5      0.2508    0.1224  161.34   0.0000
     6      0.2214    0.0117  167.09   0.0000
     7      0.1875   -0.0972  171.26   0.0000
     8      0.1654    0.0529  174.54   0.0000
     9      0.1493   -0.0829  177.23   0.0000
     10     0.1427    0.2728  179.72   0.0000
     11     0.1311    0.1621  181.84   0.0000
     12     0.1262    0.1113  183.83   0.0000
     13     0.1143   -0.4104  185.47   0.0000
     14     0.0858   -0.6300  186.41   0.0000
     15     0.0684    0.0554  187.01   0.0000
     16     0.0572    0.3498  187.44   0.0000
     17     0.0575    0.0563  187.87   0.0000
     18     0.0770    0.6397  188.66   0.0000
     19     0.0813    0.0133  189.55   0.0000
     20     0.0706    0.0011  190.23   0.0000
     21     0.0661   -0.0461  190.83   0.0000
     22     0.0537   -0.2263  191.23   0.0000
     23     0.0459   -0.1480  191.52   0.0000
     24     0.0412   -0.1213  191.77   0.0000
     25     0.0303    0.0508   191.9   0.0000
     26     0.0236    0.4420  191.98   0.0000
     27     0.0206    0.2754  192.04   0.0000
     28     0.0146   -0.3433  192.07   0.0000
     29     0.0199    0.1041  192.13   0.0000
     30     0.0142   -0.4175  192.17   0.0000
     31     0.0094   -0.2984  192.18   0.0000
     32     0.0127    0.4893   192.2   0.0000
     33     0.0080    0.0582  192.21   0.0000
     34     0.0050    0.2784  192.22   0.0000
     35     0.0046    0.3179  192.22   0.0000
     36     0.0023    0.4846  192.22   0.0000
     37     0.0039    0.1929  192.23   0.0000
     38    -0.0001   -0.8137  192.23   0.0000
     39    -0.0040    0.2915  192.23   0.0000
     40    -0.0053   -0.1538  192.23   0.0000
```

Source: Author, computed based data from ZIMSTAT Data.

Diagram 3: Autocorrelation of VMI

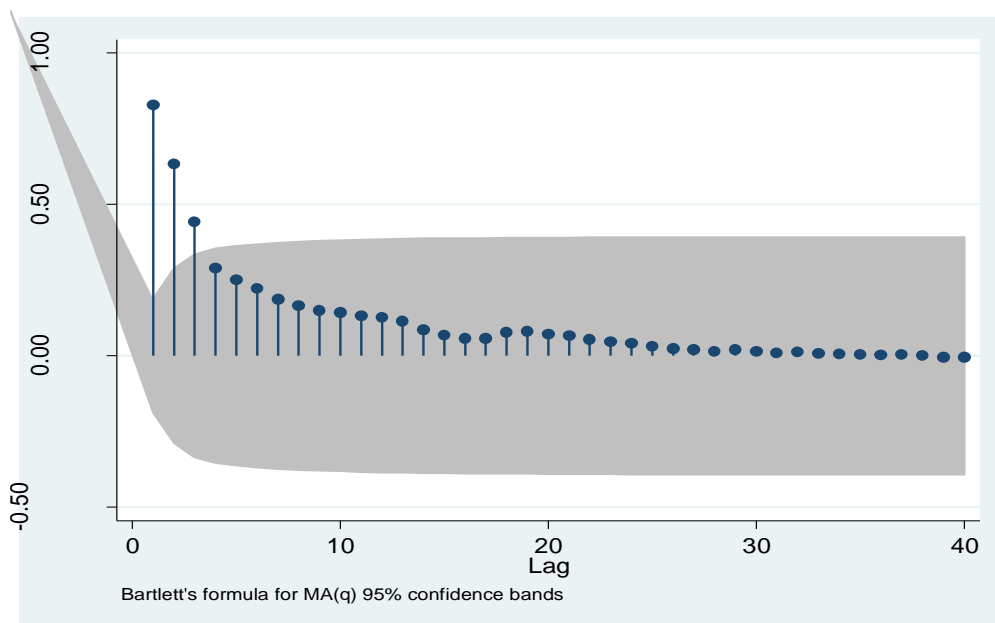Source: Author, computed based data from ZIMSTAT Data.

Diagram 4: Autocorrelation of lnINFLATION

Source: Author, computed based data from ZIMSTAT Data.