THE IMPACT OF BANK AND STOCK MARKET DEVELOPMENTS ON ECONOMIC GROWTH IN ZIMBABWE: 1988 TO 2012

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE MASTER OF SCIENCE DEGREE IN ECONOMICS

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Dedication

This thesis is dedicated to my family.
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I also acknowledge the use of other researchers’ academic work, the World Bank, RBZ and ZIMSTAT for data. This has been referenced in the thesis. Where acknowledgement is not given the author would be glad to make the necessary correction if the works are brought to his attention. The errors in this thesis and the views expressed herein are entirely my own and have nothing to do with the people or institutions mentioned in the thesis.
Abstract

The study examined the long run and short run relationship between bank and stock market developments and economic growth in Zimbabwe using annual data over the period 1988-2012 inclusive. Simple indices for bank development and for stock market development were constructed to measure developments in these sectors. The study used a financially-augmented production growth model and the ARDL approach was applied to test for the existence of the long run relationship while VECM was used to examine the short run dynamics. Granger causality was used to test the direction of the relationship and Microfit 5.0 to run the ARDL model.

The results indicated the existence of a positive and statistically significant long run relationship between bank developments and economic growth which was consistent with other empirical studies. On the other hand stock market developments were found to have a negative and statistically significant impact on economic growth in the long run. In the short run the impact of bank developments were found to be negative but statistically insignificant while that of the stock market was positive and statistically significant. All in all banks were found to have a greater impact on economic growth than stock markets. The research results imply that the government must put in place long run and short run macroeconomic policies that will contain the negative effects of bank and stock market developments and bring about positive developments so as to realise growth. The major policy implication is that the government must seek to promote economic growth through a financially-based economic system than through a stock market based system and a stable economic environment coupled with strong institutions is critical for faster economic growth in Zimbabwe.
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Acronyms

ARDL  Auto Regressive Distributed Lag model
BDI  Bank Sector Development Index
ESAP  Economic Structural Adjustment Program
GDP  Gross Domestic Product
OLS  Ordinary Least Squares
RBZ  Reserve Bank of Zimbabwe
SMDI  Stock Market Development Index
STERP  Short Term Emergency Recovery Program
VAR  Vector Auto Regressive
VECM  Vector Error Correction Model
ZIMPREST  Zimbabwe Program for Economic and Social Transformation
ZSE  Zimbabwe Stock Exchange
ZIMSTAT  Zimbabwe Statistical Agency
Glossary of Key Terms

Auto Regressive Distributed Lag Model: This is a model which “includes one or more lagged values of the dependent variable among its explanatory variables” (Gujarati 2004: 656)

Financial Development: “--the factors, policies, and institutions that lead to effective financial intermediation and markets, as well as deep and broad access to capital and financial services” (WEF 2011: 13)

Bank Development Index (BDI): This is an index used to capture developments in the banking sector. Where the index values are larger (and less negative), they imply better bank developments.

Stock Market Development Index (SMDI): This is an index used to capture stock market developments. Where the index values are larger (and less negative), they imply better stock market developments.

Supply leading: when growth follows bank and stock market developments.

Demand following: When developments in the bank or stock market sector are demand driven.
CHAPTER 1: INTRODUCTION

1.1: Introduction

The role of financial development in the growth process has continued to generate interest among academic researchers and policy makers since the pioneering work of Schumpeter in 1911. Divergent views have arisen and empirical work is full of conflicting evidence. However despite the seemingly unending debate over its role in the development process, consensus among economists now is that finance is core to economic growth and development. Well-developed financial and equity markets increase capital accumulation, productivity and accelerate economic growth (Levine, et al. 2000 and Creane, et al. 2004). In developing countries where financial markets are repressed, economic growth is retarded due to deep rooted inefficiencies in credit and equity markets (Shaw, 1973). Liberalisation of financial and equity markets is thus expected to lead to financial and equity market developments that will eventually accelerate growth than if the financial and equity market were to remain repressed.

This chapter is an introduction to the study and is organised as follows. First is the background to the study followed by the statement of the problem and then objectives of the study and statements of hypotheses. The need for the study is also given and the main assumptions of the study stated. The significance of the study to various interest groups is given and so are the limitations, scope and delimitations of the study. The study scheme is also given and finally the chapter summary.

1.2: Background to the Study

It is the goal of any government to promote economic growth and improve the standard of living of its people. Various ideas have been suggested as to how governments may increase economic growth and wide empirical evidence has been gathered but none have generated greater interest and attracted controversy in recent years than the role that financial development can play in promoting growth and development of a country.
Starting with the pioneering work of Schumpeter (1911), revived in the 1970s by McKinnon and Shaw and recently by many finance-growth proponents like King and Levine (1993a, 1993b) and Greenwood and Jovanovic (1990) it is argued that well developed financial and equity markets enhance economic growth and development. Efficient financial intermediaries are able to mobilise financial resources from low productive areas and channel them efficiently to high productive sectors. The result is increased capital accumulation, technical progress, higher productivity and accelerated economic growth (Levine et al.2000). On the other hand if financial and equity markets are highly suppressed they become dysfunctional and economic growth is decelerated (Shaw, 1973).

Stern (1989) and Lucas (1988) argue that there is no relationship between long term economic growth and financial development. According to Lucas (1988) proponents of finance-driven growth seem to over stress the role that finance plays in promoting economic growth at the expense of other more important growth enhancing factors. Stern (1989) just does not believe that finance has any growth enhancing effects at all.

A decade after gaining independence in 1980, the Government of Zimbabwe introduced the Economic Structural Adjustment Programme (ESAP) in 1991 that included bank system and capital market reforms among others to stimulate economic growth in the country. The main aim of bank system reforms was to break the oligopolistic nature of the sector and make it more market oriented, competitive and efficient. Following deregulation of the sector was a sharp increase in the nominal interest rate and increased banking activities as indigenous players also entered the market for the first time. By December 2012, 71% of the banks were locally owned compared to none at all at independence. They also held about 70% or US$3 billion in total deposits while foreign institutions held the remaining 30% or US$1.3 billion worth of deposits (RBZ, 2013).

However, the rapid expansion in the banking system did not last as the harsh economic environment, coupled with policy reversals and the global recession of 2001-2002 among other factors took their toll on the sector leading to what has now become known as the ‘Zimbabwe Banking Crisis’ of 2003-2004. ESAP, for example, was abandoned in 1994
in favour of the Zimbabwe Program for Economic and Social Transformation (ZIMPREST) which reintroduced some controls in the economy that had been removed under ESAP. Thirteen indigenous banks were liquidated during the banking crisis and the hyperinflationary situation that reached its peak in the last quarter of 2008 saw society losing confidence in the financial sector as they abandoned the local currency in favour of currencies like the United States Dollar, the South African Rand and the Botswana Pula inevitably leading to dollarisation of the economy in February 2009 (RBZ, 2013).

Dollarisation of the economy in early 2009 brought to an end a decade long hyperinflationary situation. The Government of National Unity also helped bring some political stability and fiscal discipline. These among other factors saw the financial sector stabilising. Between 2009 and 2012 the financial sector registered an average growth rate of 13% making it one of the fastest growing sectors in the economy (RBZ, 2013).

Following the adoption of ESAP in 1991 the ZSE was opened up to foreign trading in mid-1993. As a result activity on the local bourse increased as the number of listings increased from 53 firms in 1988 to 82 in 2007. Market capitalisation also increased and by 1997 the Zimbabwe Stock Exchange (ZSE) was rated as one of the best emerging markets in Africa (World Bank, 2013). However, in 1998 the ZSE’s turnover and the value of shares traded declined to 60% and 88% respectively. The poor performance by the ZSE as measured by very little gains on the mining and industrial index continued right through for the next decade culminating with the suspension of trading on the ZSE in late 2009. The relatively weak performance of the ZSE was attributable to poor economic performance, inconsistent policy issues especially with regards to indigenisation and speculative activities (ZSE, 2010). The inflationary pressures from the 1990s, shrinking domestic demand and widespread deindustrialisation in the economy saw industry operating below 30% of its capacity and unemployment was rising. Trading on the ZSE only resumed in early 2009 following dollarization of the economy. However trading remained very thin. With a very low turnover ratio of 14.17 in 2012 the ZSE may have played a very limited role in the growth of the domestic economy. Comparably good emerging markets report turnover ratios in excess of 50% (World Bank, 2013).
The macroeconomic performance of Zimbabwe over the period 1988-2012 has not been impressive either. The economic reforms carried out since the 1990s were all in an attempt to spur economic growth. However the economy experienced an average growth rate of 0.32% annually for the period 1988-2012 with a sustained negative average growth rate of -6.46% between 1999-2008 and averaging 7.55% annually between 2009 - 2012 when the economy dollarised\(^1\). The poor economic performance was attributed to many factors chief among them were recurrent droughts that affected the agricultural sector, instability in the financial market caused by hyperinflation, adverse global developments, political instability and poor macroeconomic management.

In the light of the bank and stock market developments described above and the general poor macroeconomic performance of the economy since 1988, one cannot help but ask what effect these developments have had on economic growth in Zimbabwe? Was there any relationship between bank and stock market developments and growth or the pattern that seems to be there was some mere coincidence? Assuming that there was some relationship, did causality run from growth to financial development or growth followed financial development? Finally which part of the financial sector promoted growth more than the other- banks or stock markets?

With very few studies done on the role that banks and stock markets play in promoting economic growth in Zimbabwe this study sought to re-examine the finance-growth nexus in the light of the developments that have occurred in the financial sector for the period 1988-2012. Specifically it was concerned with the dynamic long and short run interactions between bank and stock market developments and economic growth in Zimbabwe.

1.3: Statement of the Problem

There were widespread international calls in the 1990s by development and finance institutions like the World Bank and the International Monetary Fund (IMF) for

\(^1\)A detailed account of the macroeconomic performance of the economy, bank and stock market developments in Zimbabwe over the period 1988-2012 is given in Chapter 2.
developing countries to end repression and liberalise their financial markets for the attainment of sustained economic growth and reduced poverty levels. However, discretionary finance-induced growth can only be realised if the empirical cause and effect relationship between finance and economic growth is well known with certainty. Unfortunately it is not. Worse still there is paucity for such empirical evidence on Zimbabwe. The existing studies give conflicting evidence and besides none of them simultaneously examined bank and stock market developments and growth in a unified framework.

The previous studies, by using a single indicator of financial development or different indicators separately, might have failed to capture not only some of the developments that have occurred in the financial market but also the effects that financial market developments might have had on economic growth in Zimbabwe. Therefore there is a need to re-examine the dynamic relationship between bank and stock market developments and economic growth in a unified framework so as to understand better the relationship and at the same time establish the contribution of each sector to long run and short run economic growth. This has very important economic implications.

1.4: Objectives of the Study

The main objective of this study was to empirically examine the long run and short run relationship between bank and stock market developments in Zimbabwe over the sample period 1988-2012. The following were the specific objectives of the study:

1. To empirically examine the long run and short run relationship between bank developments and economic growth in Zimbabwe.
2. To empirically examine the long run and short run relationship between stock market developments and economic growth in Zimbabwe.
3. To investigate causality between bank, stock market developments and economic growth in Zimbabwe.

4. To establish which between the two, banks or stock markets, have a stronger influence on economic growth in Zimbabwe
5. To identify finance-growth strategies that may be appropriate for a developing country like Zimbabwe.

1.5: Statements of Hypothesis

Any good research must be grounded in theory. The following long run and short run relationships were therefore hypothesised.

1. Bank sector developments have a positive impact on economic growth.
2. Stock market developments have a positive impact on economic growth.
3. Banks contribute more to economic growth than stock markets.

1.6: Justification of the Study

The main objective of this study was to examine the impact of bank and stock market developments on economic growth in Zimbabwe. Of particular interest was whether bank and stock market developments were a stimulus for economic growth or that developments in the financial market followed economic growth. Over the sample period 1988-2012, Zimbabwe has had to contend with many economic ills including a banking crisis, hyperinflation, deindustrialisation, shrinking domestic demand, high unemployment and a sustained poor macroeconomic performance. Thus studying the relationship between bank and stock market developments and economic growth is vital for it will help the academia and policy makers to better understand the relationship between financial development and economic growth in a new light and help them formulate and implement better policies that will promote growth in the country.

Available time series and panel evidence on finance-growth nexus and cross country or single country case studies in both developed and developing countries have generated more questions than answers. Empirical evidence in Zimbabwe does not give conclusive evidence as to the role that banks and stock markets play in promoting economic growth.
Prior studies on finance and growth in Zimbabwe do not simultaneously examine bank
and stock market developments and growth in a unified framework yet both banks and
stock markets are channels through which physical capital can be accumulated. The
authors also used fewer financial variables. By using fewer financial variables and
studying the effects of bank and stock market developments separately these prior
studies might have failed to capture not only some of the developments that have
occurred in the financial market but also the effects that financial market developments
might have had on economic growth in Zimbabwe. This paper fills this gap by re-
examining the finance-growth nexus in Zimbabwe from 1988-2012.

Furthermore this paper unlike many research studies reviewed in the literature used the
Auto Regressive Distributed Lag (ARDL) approach and the Vector Error Correction
Model (VECM) to establish the impact of bank and stock market developments on
economic growth in Zimbabwe. The choice of the ARDL methodology allowed for
consistent results to be obtained and for both the long run and short run relationships to
be clearly established.

1.7: Assumptions of the Study

The study was based on the following assumptions:
1. Real GDP per capita was a good measure of economic growth.
2. Bank development index (BDI) made up of domestic credit provided by the banking
sector as a ratio of GDP and bank credit to the private sector as a ratio of GDP was a
good measure of bank developments.
3. The stock market development index (SMD) made up of market capitalisation as a
ratio of GDP, value of stock traded as a ratio of GDP and turnover ratio was a good
measure of stock market development.
4. Gross capital formation as a ratio of GDP was a good measure of capital stock.
5. The key macroeconomic data necessary to carry out the study was readily available,
accurate and reliable.
1.8: Significance of the Study

The study of the relationship between bank and stock market developments will be valuable to policy makers as it may help them come up with better policies to promote economic growth.

For the University of Zimbabwe benefit will be derived from the use of the thesis by other academic researchers and students as the thesis will become part of the institution’s repository resources.

As a researcher no benefit is greater than the increased understanding of the finance-growth nexus and the building of a foundation for my PHD studies.

1.9: Limitations of the Study

No monthly or quarterly data was available so annual time series data was utilised to examine the relationship between bank, stock market developments and economic growth. While bank development data was available prior to 1988, stock market data was not available hence the shorter sample period 1988 – 2012. Moreover World Bank data on bank developments was only available up to 2006 while stock market data had gaps in 2008. To complete the series the researcher had to rely on official estimates from the Reserve bank of Zimbabwe (RBZ) and the Zimbabwe Statistical National Agency (ZIMSTAT).

Over the period 2000 to 2008, Zimbabwe experienced a hyperinflationary situation and in 2009 the economy changed its currency regime giving rising to measurement problems. However data used for the analysis was real data from the World Bank and was denominated in United States dollars (US$).

In finance-growth literature, various indicators are used to measure bank and stock market developments. However, there are several controversies relating to each of the measures of financial development. Thus there is no single aggregate measure that would be sufficient to capture most aspects of financial development (Ang, 2008). The financial
variables chosen for this research are however consistent with financial development literature as reviewed in Chapter 3.

This study was purely quantitative. It did not consider the qualitative variables that may have affected bank and stock market developments. However this did not in any way make the need for the study less important.

1.10: Scope and Delimitations of the Study

The paper did not examine the role played by other financial institutions like pension funds and other secondary credit market institutions nor did it look at the historical evolution of banks and stock markets. Its main focus was on the dynamic relationship between bank and stock market developments and economic growth in Zimbabwe over the period 1988-2012 using the ARDL model.

1.11: Organisation of the Study

Chapter I provided the introduction to the study. Chapter 2 gives a detailed outline of bank, stock markets and growth trends over the period 1988-2012 while Chapter 3 is a review of theoretical and empirical literature on the finance-growth nexus. Chapter 4 describes the methodology. Here the ARDL model is outlined as well as the data that is used for the study. Research results are reported and analysed in Chapter 5 while Chapter 6 gives a summary of the findings, the conclusions and policy recommendations.

1.12: Chapter Summary

Chapter I gave the introduction to the study. It outlined the background to the study, statement of the problem as well as the study objectives and the hypotheses to be tested. Justification of the study, its limitations, scope and delimitations were also given. The next chapter: Chapter 2 is a brief description of the macroeconomic performance of Zimbabwe over the period 1988-2012. It also highlights the major changes that have occurred in the financial sector over the same period.
CHAPTER 2: REAL GDP GROWTH, BANK AND STOCK MARKET DEVELOPMENTS

2.1: Introduction

The main aim of the study was to examine the impact of bank and stock market developments on economic growth in Zimbabwe. This chapter outlines the macroeconomic performance of the economy for the period 1988-2012 inclusive and also describes some of the major developments that have occurred in the banking sector and the capital market over the same period. The ultimate objective was to find out whether there was any pattern between economic growth, bank and stock market developments.

2.2: Real GDP Growth Trend: 1988-2012

Real GDP growth rate over the period 1988-2012 was characterised by considerable volatility. This was largely influenced by weather conditions. For example, since 1980 Zimbabwe experienced about fourteen major droughts with six of them occurring between 1988 and 2010. The policy environment was also poor as policies were abandoned before they reached their full term (Martens, 2012). The adverse global developments coupled with an unstable political climate, hyperinflation and rapid deindustrialisation led to the general lack of investor confidence in the country (RBZ, 2012). The result was deindustrialisation with the Zimbabwean economy performing badly compared to other Southern African countries for the greater part of the period.

During the sample period 1988-2012 the average real growth rate was nearly 0.32% annually weighed down heavily by persistent negative growth in the 10 year period 1999 to 2008. However, Zimbabwe recorded its strongest growth performance between 2009 and 2012 averaging 7.5% annually when the economy dollarised (World Bank, 2013). The trend in GDP growth over the period 1988-2012 is shown in Figure 1.1 below.
As shown in Figure 1.1 above and prior to 1999, Zimbabwe experienced weak but positive growth rates averaging 3.9% per annum between 1988 and 1998 hitting a low of -9.02% in 1992 and a high of 10.36% in 1996 (period 1 in Figure 1.1). The weak performance was largely attributed to poor performance in agriculture because of the severe drought in 1992, low investment and low industrial output due to foreign currency shortages (RBZ, 2010).

Between 1999 and 2008 the Zimbabwean economy was characterised by a sustained decline in real GDP averaging -6.5% per annum reaching a low of -17.67% in 2008 at the height of the hyperinflationary period. This period, now referred to as the ‘lost decade’ (period 2 in Figure 1.1) was characterised by a serious drought in 2003, the banking crisis of 2003-2004 and an astronomical hyperinflationary climate that reached its peak at an officially recorded inflation rate of 231 million per cent by end of 2008. The harsh macroeconomic environment saw unemployment rising to above 90%, and industry capacity utilization falling to below 20% (ZIMSTAT, 2012).
However, dollarization of the economy in March 2009 brought to an end a decade of hyperinflationary environment and with it some stability in the macroeconomic environment (period 3 in Figure 1.1). Renewed confidence in the financial sector, political stability and improved fiscal discipline saw the economy averaging 7.5% growth in the 4 year period from 2009 to 2012. With the economy stabilised and the environment more liberalised, the Short Term Emergency Recovery program (STERP1 and 2) registered some successes with real GDP growing by 5.98% in 2009, 9.62% in 2010 and 9.38% in 2011 before weakening to 4.42% in 2012 (World Bank, 2013).

However, despite the macroeconomic stability achieved when the economy dollarised, a number of challenges still remained and growth began to level off as the economy lost its steam. While a number of challenges still remained, the Zimbabwean economy was expected to grow and become a $10 billion economy by 2015 (RBZ, 2013).

2.3: Banking Sector Developments, 1988-2012

Upon independence in 1980, the Government of Zimbabwe pursued various economic policies that reflected the socio-political and economic conditions of the time. While many sectors experienced change, the government’s policy towards the financial sector was largely conservative during the first ten years of independence. The result was that the financial sector not only remained oligopolistic and stagnant but repressed as elsewhere in Africa.

In 1991, under the Structural Adjustment framework, the government undertook financial market reforms whose main aim was to make the financial market more market oriented, competitive and efficient. The reform process has been gradual and marked by periods of policy reversals. However, each subsequent economic blueprint was designed differently to bring about the desired changes in the financial market that were to foster economic growth in the country. The reform package included a variety of measures such as interest rate liberalisation, removal of credit ceilings, restructuring and privatisation of state owned banks along with other supervisory and regulatory schemes.
The adoption of these financial market reforms led to significant changes in the architecture of the financial sector. From a sector dominated by only a few foreign banks in 1980 and no indigenous bank, 71% or 17 out of a total of 24 banking institutions were locally owned by December 2012 and some had a strong regional presence in Southern Africa. Cumulatively, indigenous banks held about $3 billion (70%) in total deposits while foreign owned institutions held $1.3 billion (30%) of total deposits as at end of 2012 (RBZ, 2013).

Deregulation of the financial market led to a sharp rise in the nominal interest rate, an increase in total advances to the private sector and a significant shift in loan allocations among sectors even though they remained largely and competition has intensified.

Figure 1.2 below shows domestic and private credit trends from 1988-2012 respectively.

![Figure 1.2: Domestic & Private Credit (% of GDP), 1988-2012](image)

Source: Author’s compilation based on data from World Bank and RBZ, 2013

In the mid-1990s, the banking sector faced a harsh macroeconomic environment. Annual gross domestic product (GDP) growth rate averaged -6.5% during the period 1988-2008, and inflation peaked at 231 million per cent at the end of 2008 (ZIMSTAT, 2012). The
harsh economic environment, characterised by chronic market liquidity problems, low savings, volatile deposits and unsound banking practices culminated in the bank crisis of 2003-4 causing 13 indigenous banks to close (RBZ, 2012).

However, following dollarization in early 2009, the hyperinflationary situation ended and the financial sector stabilised. Between 2009 and 2012 the financial services sector was the fastest growing sector in the economy with an average growth rate of 13%. At the same time annual GDP growth rate averaged 7.5% between 2009 and 2012 (RBZ, 2013).

Financial intermediation and inclusion also improved as reflected by the growth in deposits and lending to the productive sectors even though an estimated US$3billion was still said to be circulating outside the formal market (RBZ, 2013). Figure 1.3 below shows the level of deposits and loans from 2009-2012.

**Figure 1.3: Bank Deposits, Loans and Advances (US$M): June 2009-Dec 2012**

*Source: RBZ, 2013*

As shown in Figure 1.3 above, deposits by the public and the loan and advances extended to the private sector increased appreciably since 2009 when the economy dollarised. However, the credit extended remained mostly short term in nature as most of it went towards working capital financing rather than capital investments (RBZ, 2013).
The sectoral distribution of credit on the other hand has been largely skewed against productive sectors. For example, credit to manufacturing declined from 22.2% in 2009 to 18% in 2012 as shown in Table 2.1 below.

Table 2.1: Sectoral Distribution of Credit, 2009-2012

<table>
<thead>
<tr>
<th>Sector</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>22.2%</td>
<td>20.3%</td>
<td>18.1%</td>
<td>18.0%</td>
</tr>
<tr>
<td>Distribution</td>
<td>20.2%</td>
<td>20.0%</td>
<td>16.9%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>19.3%</td>
<td>22.3%</td>
<td>16.3%</td>
<td>19.0%</td>
</tr>
<tr>
<td>Mining</td>
<td>6.8%</td>
<td>6.8%</td>
<td>6.4%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Households</td>
<td>4.8%</td>
<td>7.6%</td>
<td>15.8%</td>
<td>16.0%</td>
</tr>
<tr>
<td>Other</td>
<td>26.8%</td>
<td>23.0%</td>
<td>26.5%</td>
<td>21.0%</td>
</tr>
</tbody>
</table>


Lending to individuals on the other hand grew exponentially from 4.8% in 2009 to 16% in 2012. This rise was at the expense of crucial sectors like agriculture which declined from 22.3% in 2010 to 19% in 2012 and distribution which declined from 20.2% in 2009 to 17% in 2012. With lending on a short term basis and inflows of foreign capital reduced it meant insufficient funds for capital investments which are critical for the growth of the economy (RBZ, 2013).

2.4: Stock Market Developments, 1988-2012

In line with ESAP, the ZSE was opened to foreign players in mid-1993. It has two indices, the mining index (with 4 companies) and the industrial index with more than 75 companies (ZSE, 2013). Opening up of the stock exchange to foreign participation increased trading activity on the exchange. The number of counters, market capitalisation as well as integration with the world financial markets also increased. Due to foreign participation, the number of listed companies increased from 53 in 1988 to 82 in 2007. The number of listed firms has however been declining since 2008 to 76 in 2012 (World Bank, 2013).
Millions of shares worth billions of dollars are traded annually on the ZSE. In 1997, the value of shares traded on the stock exchange more than doubled to around $26.5 billion making the ZSE one of the star emerging market performers. The ZSE’s mean capitalisation for the 25 year period was 78.1% of GDP. Market capitalisation was US$11 816 170 000 or 109.27% of GDP in 2012. This value has fluctuated between 487.82% of GDP in 2006 and 9.3% of GDP in 1992. Stocks traded total value (% of GDP) in Zimbabwe was 14.89% in 2012. Its highest value over the past 25 years was 39.18% in 2002 while its lowest value was 0.30% in 1992 (World Bank, 2013). Figure 1.4 below shows the trend in stock market capitalisation and value of stock traded from 1988-2012 respectively.

![Market Capitalisation and Stock Traded Value](image)

**Figure 1.4: Market Capitalisation and Stock Traded Value(in logs), 1988-2012**

*Source: Author’s compilation based on data from World Bank and ZIMSTAT 2013*

During 1998 the ZSE turnover and value of shares sold declined by 60% and 88% respectively. This was because investing in the money market was now more profitable as it was offering higher interest rates. Besides major sectors of the economy like agriculture, manufacturing and services were also declining.

The high market capitalisation that the ZSE continued to experience up to 2009 might have reflected speculative tendencies as it was not matched by trading. The poor economic performance, rapid deindustrialisation and inconsistent policy issues especially
with regards to indigenisation led to even more speculative activities on the ZSE. The result was the suspension of trading on the ZSE in late 2008. Trading only resumed in early 2009 following dollarisation of the economy. However trading has remained very thin. With a very low turnover ratio of 14.17% in 2012 the ZSE may be playing a very limited role in the growth of the domestic economy. The growth of the stock market however is very important for it provides an important opportunity for integrating Zimbabwe into the global financial market as well as attracting global capital.

2.5: Chapter Summary

The chapter described the macroeconomic performance, bank and stock market developments in Zimbabwe over the period 1988-2012. Of particular importance to note is the weak performance of the economy for the greater part of the period, the bank crisis and the suspension of trading on the ZSE. This pattern may not have been a mere coincidence and thus warranted some investigation. The following chapter is a review of literature on the role of banks and stock markets on economic growth.
CHAPTER 3: THEORETICAL AND EMPIRICAL LITERATURE REVIEW

3.1: Introduction

Studies on the relationship between financial development and economic growth started with Schumpeter (1911) and intensified following the works of Gurley and Shaw (1955) and McKinnon and Shaw (1973). Financial development increases technological progress, physical capital accumulation, productivity and growth (Levine, 1997; King and Levine 1993a; Greenwood and Jovanovic, 1990). Lucas (1988), however, contends that the role of finance in economic growth is overemphasised while Stern (1989) does not recognise the potential role that finance may play in economic development.

This chapter reviews the theoretical and empirical literature on finance and growth. Theoretically a positive relationship is postulated between financial development and growth. Recent empirical studies on the other hand have produced mixed results.

3.2: Theoretical Literature Review

Numerous theories have been put forward by growth theorists to explain economic growth and development. It is beyond the scope of this study to explain all of them and hence only the Solow-Swan model, Romer’s endogenous growth theory and the finance-growth theory are briefly described in line with the objectives of this study.

3.2.1: Exogenous Growth Theory

In the traditional neoclassical growth models independently developed by Solow (1956) and Swan (1956) the output of an economy grows in response to larger inputs of physical capital and labour. Non-economic variables such as human capital and financial institutions are excluded in these models. The standard Solow Cobb-Douglas production function is thus written as: \( Y = AK^aL^\beta \)
where Y is the output and depends on capital (K), Labour (L) as well as productivity (A) and \( \alpha \) and \( \beta \) are production elasticities with \( \alpha + \beta = 1 \).

The Solow-Swan growth model assumes that as capital stock increases, growth of the economy slows down since capital is subject to diminishing returns. The model also assumes that there is no technological progress. This implies that, because of diminishing returns, at some point the amount of new capital produced would just be enough to make up for capital consumption. When this point is reached the economy will cease to grow or the economy will converge to a constant steady state rate of growth. In the long run the economy will only grow if there is technological progress. The model, however, treats technology as exogenous.

3.2.2: Endogenous Growth Theory

In the neoclassical growth model long run growth is only possible if there is technological progress which however is treated as exogenous. On the other hand endogenous growth theory as put forward by Romer (1986), for example, treats technological progress as endogenous. According to this theory there are a number of endogenous variables that drive technological progress and hence spur economic growth. Romer’s model, for example, includes human capital as a driver of growth and thus growth can be expressed as \( Y = A (K, L, H) \) where H is human capital and A, K and L are defined as before.

Endogenous growth theory allows for the inclusion of many endogenous variables as independent factors. This is the basis for finance-growth theory. Financial variables enter the growth equations through their effects on capital accumulation, technological progress and productivity growth. The financial variables are thus endogenous to growth.

3.2.3: Finance Growth Theory

According to finance growth theory financial development affects long run growth through its impact on capital accumulation and on the rate of technological progress. The
financial sector promotes growth by intermediating between savers and investors. It mobilises savings for investment, facilitates and encourages inflows of foreign capital, and channels capital to its most productive uses (Levine et al. 2000).

Proponents of finance growth theory like Schumpeter (1911), Patrick (1966), McKinnon and Shaw (1973) and recently Greenwood and Jovanovic (1990) and King and Levine (1993a, 1993b) argue that financial market development is endogenous to economic growth and the two are positively correlated. Growth in this case can be modeled as \( Y = A(K, L, H, FMD) \) where the variable \( A \) is a function of financial market development (FMD).

Schumpeter (1911) argues that financial development will make savers receive higher rates of return and thus financial intermediaries are able to raise more financial resources. On the other hand entrepreneurs will have improved access to these financial resources at an even lower cost. Thus Schumpeter regards credit as an engine of innovation, entrepreneurship and growth.

McKinnon and Shaw (1973) argue that financial repression in developing countries reduces the size and efficiency of the financial system making the financial system dysfunctional in extreme cases. McKinnon and Shaw assume that banks allocate credit according to transaction costs and risks of default among other factors but not according to potential returns. This reduces physical capital accumulation but promotes labour intensive activities. The capital intensive investments will also be of lower quality. The result is reduced real economic growth. Thus according to McKinnon and Shaw financial liberalisation and development is growth enhancing.

3.2.4: Supply -Leading and Demand-Following Hypotheses

According to Patrick (1966) causality between financial development and economic growth can either be supply-leading or demand-following. The supply-leading hypothesis postulates that financial development has a positive impact on growth and causality runs
from financial development to growth while the demand-following hypothesis postulates that causality runs from growth to financial development.

The growth in financial institutions allows for the mobilization and transfer of financial resources from traditional low productive sectors to modern high productive sectors where there are innovative entrepreneurs. Capital to entrepreneurs is allocated on the basis of the return on capital with capital going where it will receive the highest rate of return. The result is increased capital accumulation, productivity and growth. Thus the supply-leading hypothesis leads to an efficient allocation of capital among many alternative uses.

McKinnon’s Outside-Money Model and Shaw’s Inside-Money Model supports Patrick’s supply-leading argument. McKinnon (1973) argues that financial markets in developing countries are underdeveloped and external financing is very limited. Entrepreneurs therefore have to rely on self-financing. This requires that potential investors must first accumulate huge savings to allow them to undertake lumpy investment expenditures. On the other hand, Shaw (1973) in his Inside-Money Model argues that investors need not necessarily save before they can invest but can borrow from financial institutions (debt intermediation view). With financial institutions offering high interest rates, this will attract saving. As saving increase, the supply of credit rises allowing financial institutions to promote investment and hence growth through lending and borrowing.

The demand-following hypothesis postulates that causality in the finance growth-nexus runs from growth to finance unlike the supply-leading hypothesis which postulates that causality runs from finance to growth. According to Patrick (1966), as the economy grows and becomes sophisticated, the demand for financial services to support economic activities also rises. In other words, the creation of financial institutions and their growth is demand driven. This view is also supported by Gurley and Shaw (1967), Goldsmith (1969) and Jung (1986). According to Robinson (1952) where ever there is increased entrepreneurial activities, there will be creation of financial services to support such activities. Thus growth and financial development are positively correlated.
3.2.5: Banks, Stock Markets and Growth

Banks and stock markets have a significant role to play in the growth and development of an economy. These financial intermediaries undertake the costly process of researching investment possibilities on behalf of individual investors. With reduced information costs, capital will flow to its highest value use thus improving capital resource allocation leading to accelerated growth. Allen (1993) and Allen and Gale (1999) in their model propose that banks and stock markets are essential for productivity growth with more innovative projects receiving financing from stock markets.

Similarly Beck and Levine (2004) show that stock markets and banks enhance economic growth as they lead to greater physical capital accumulation and greater productivity growth. Banks, for example, by monitoring the behaviour of managers and improving corporate governance ensure that capital borrowed is put to good use and thus help raise productivity (Bhide, 1993).

Levine (1991) argues that liquid stock markets reduce liquidity risks making investors more willing to commit their funds to high return capital investments. Stock markets also allow investors to diversify their portfolios and thus reduce idiosyncratic productivity risks thus raising investment as well. If stock markets are internationally integrated, firms are able to diversify their risk and thus more willing to invest in risky higher return projects (Saint-Paul, 1992 and Obstfeld, 1994). However, Obstfeld also warns about the possible negative effects of greater risk sharing, that is, depressing saving rates and slowing down economic growth.

Stock markets also help mitigate the principal-agent problem and thus exert corporate control and good governance (Scharfstein, 1988). In contrast Bhide (1993) argues that companies listed on the stock exchange have no single owner and such diffuse shareholder ownership structure impedes effective corporate governance.
3.3: Empirical Literature Review

Several cross country and individual country case studies have been carried out to assess the effects of financial development on economic growth. Largely results have pointed to a positive correlation between financial development and growth. While some studies have found a unidirectional relationship and others a bi-directional relationship some have found no relationship at all.

3.3.1 Cross-Country Studies

Goldsmith (1969) pioneered a study to assess the influence that finance has on growth. Using data for 35 countries from 1860 to 1963 Goldsmith found that financial development was demand driven and the two were positively correlated. Goldsmith’s study, however, did not control for other factors and causality was not investigated. The sample used was also relatively small.

King and Levine (1993b) carried out a cross-section analysis of 80 countries for the period 1960-1989. Their results indicate that economic growth was strongly predicted by the level of financial development. This study is supported by Levine (1997) who includes in his study 77 countries over the same period. Levine used the amount of liquid liabilities, claims on the non-financial sector, claims on the private sector and bank domestic credit to measure the size and activity of the financial sector. Levine also used a number of control variables. His findings indicate that the financial sector has a substantial role to play in economic growth. Levine concludes that where countries have large and efficient financial systems, growth occurs at a faster rate than in countries where the financial system is inefficient.

Allen and Ndikumana (2000) investigated the role of financial intermediaries in promoting economic growth in Southern Africa. They found a positive relationship between financial development and economic growth with liquidity liabilities having a greater positive influence on growth. However, like Goldsmith’s study, Allen and Ndikumana’s study includes only a few countries casting doubt on the generalisability of the results when a broader selection of countries is included. Moreover, like King and
Levine (1993b), Allen and Ndikumana study does not formally investigate the issue of causality and focuses only on the effect of bank developments on growth.

Levine and Zervos (1998) studied 42 countries from 1976 to 1993. They used a number of variables to measure stock and bank developments. Levine and Zervos conclude that there is a positive correlation between stock market, bank developments and future rates of economic growth. Levine and Zervos also found that stock markets and banks play a complementary role in an economy with both banks and stock markets entering the growth regressions significantly. They also found the link between stock markets, banks and growth running significantly through productivity rather than physical capital accumulation.

Jung (1986) studied 56 countries including 19 industrialised countries for the period 1951-1980 and found a bi-directional relationship with causality running from finance to growth. Similarly Demetriades and Hussein (1996) studied 16 countries for the period 1960 -1990. Their results, like Jung, found a bi-directional relationship between financial development and economic growth but very little support for finance leading to growth.

Zang and Kim (2007) studied 74 countries for the period 1961-1995 using panel data analysis. Their study found that economic growth precedes subsequent financial development. These results are also supported by Guryay et al. (2007) who found out that for Northern Cyprus, financial development does not cause economic growth and causality runs from economic growth to the development of financial markets.

Rioja and Valev (2011) studied stock markets, banks and the sources of economic growth using a large cross country panel of low and high income countries (62 in total) for the period 1980-2009. Using a number of financial variables to measure stock and bank developments and applying dynamic panel generalised-method-of-moments (GMM) techniques, they found banks to have a sizable positive effect on capital accumulation in low income countries. Stock markets were found not to have contributed anything towards capital accumulation or productivity growth in these countries. In high income countries, however, stock markets were found to play a significant role affecting both productivity and capital growth with banks affecting capital accumulation only.
3.3.2: Country Case Studies

McKinnon and Shaw (1973) country studies on Argentina, Brazil, Chile, Germany, Korea, Indonesia and Taiwan can be considered as classic studies on the relationship between financial market system repression and economic development. McKinnon and Shaw challenge the case for financial repression in developing countries advocating instead for financial liberalisation and development to speed up growth in these countries. Financial repression, McKinnon and Shaw argue, reduces physical capital accumulation as well as its productivity and hence negatively affects growth. Their conclusion therefore is that an end to financial repression in developing countries will accelerate growth through increases in capital accumulation and productivity.

Choe and Moosa (1999) studied the role of finance in Korea for the period 1970-1992. While they found that financial development leads to real economic growth, they also concluded that financial intermediaries are more important than capital markets in promoting growth. Similarly, Demetriades and Luintel (2000) using time series data to study bank and stock market developments in five developed countries, concluded that while developments in both the banking sector and stock markets foster economic growth, the influence of bank developments were much more pronounced than stock market developments.

Kargbo and Adamu (2009) studied financial development and economic growth in Sierra Leone from 1970-2008. A financial sector development index was used to measure developments in the sector. The researchers applied an ARDL approach and found that real GDP, financial development, investment and real deposit rate are uniquely co-integrated. They found a statistically significant positive relationship between financial development and growth. Investment was also found to be an important channel through which financial development feeds economic growth. The financial sector index used however did not capture developments on the stock markets.

Khan et al. (2005) used an ARDL approach to study the relationship between financial development and economic growth in Pakistan from 1971-2004. The study found that the relationship between financial depth, real deposit rate and economic growth was only
significant in the long run and not in the short run. This led them to conclude that for long run growth, policy makers needed to create modern banking and stock market institutions.

Sanusi and Sallah (2007) investigated the relationship between financial development and economic growth in Malaysia from the period 1960-2002. The authors used ratio of broad money to GDP, bank credit and ratio of bank deposits to GDP to measure financial development. Like Kargbo and Adamu they used an ARDL approach and found a positive and statistically significant long run relationship between bank system development and economic growth.

Hondroyiannis, Lolos and Papapetrou (2004) assessed empirically the relationship between bank system development and the stock market and economic growth in Greece for the period 1986-1999. Using the VAR model to analyse the relationship, they found a bi-directional causality between finance and growth in the long run. Both bank and stock market financing were found to promote economic growth when the error-correction model was used even though their effect was small. The contribution of stock market finance on growth was found to be substantially smaller compared to that of bank financing.

Hamdi, Hakimi and Sbia (2013) examined the causality between financial development, investment and economic growth in Tunisia for the period 1961-2010. They used a multivariate framework based on Vector Error Correction Model and cointegration techniques. Their short run estimates revealed that finance does not lead to economic growth while the long run results showed the opposite conclusion. They also found out that investment was the main engine for economic growth both in the short and long run.

Zivengwa et al. (2011) studied stock market development in Zimbabwe for the period 1980-2008. Using two variables to measure stock market development and applying Vector Autoregressive (VAR) and Granger causality tests to explore the relationship, the authors found a uni-directional relationship running from stock market development to economic growth. The study however does not look at developments in the banking sector.
Jecheche (2010) examined the relationship between financial development and economic growth in Zimbabwe for the period 1990 - 2008. Three financial development indicators were combined to come up with a financial sector development index. Applying the ARDL approach, the study found a unique co-integrating relationship among real GDP, financial development and other control variables. Investment was also found to be an important channel through which financial development promotes growth. The study however, only focuses on developments in the banking sector and does not look at the stock market. It also uses a shorter time period and causality between financial development and economic growth is not investigated.

Ndlovu (2013) investigated the causal relation between financial system development and economic growth in Zimbabwe from 1980-2006. Applying a multivariate Granger causality test the study finds a unidirectional relationship between financial development and economic growth with growth in financial systems following economic growth. The author concludes that since financial system development in Zimbabwe is a passive reaction to economic growth, policy makers must seek to promote growth through trade rather than through financial sector development. The author however only uses three variables to measure financial sector development with stock market capitalisation used as a proxy for stock market development.

3.4: Chapter Summary

Theoretical and empirical literature as discussed above gives no conclusive result about the relationship between financial market developments and economic growth. While a positive relationship is generally postulated, some studies have found causality between financial development and economic growth as supply leading while others have found it as demand following and others have found no relationship at all. For developed countries, stock markets have been found to contribute more to economic growth than banks whereas in developing countries it is banks and not stock markets which contribute more to growth.
CHAPTER 4: METHODOLOGY

4.1: Introduction

This chapter explains in detail the Auto Regressive Distributed Lag (ARDL) model as put forward by Pesaran et al. (2001). The use of this methodology to test for the existence of a long run relationship between bank, stock market developments and economic growth is also justified. The econometric model is specified and the bounds test procedure outlined as well. The chapter also explains and justifies the variables used in the study and an illustration of how bank and stock market indices were constructed is given. Tests for unit root are also briefly described as well as the various diagnostic tests that were used to examine the robustness of the model. Finally the chapter looks at data sources and limitations of the data.

4.2: Econometric Methods

Choosing an appropriate econometric method is crucial in any regression analysis. Several econometric methodologies have been used by researchers to test the relationship between financial development and economic growth. The Ordinary Least Squares (OLS) method has been the most widely used method although it has been found to have some limitations when studying long run relationships between economic variables. Other methodologies like the Johansen technique require that the economic variables under study be of the same order of integration. The ARDL technique on the other hand does not require pretesting of the series to determine their order of integration. This is because the bounds test can be conducted even if the series are integrated of order zero I(0), integrated of order 1 I(1) or mutually integrated (Pesaran and Pesaran, 1997).

The basic empirical investigation of this study was to examine first the long run relationship between bank, stock market developments and economic growth and
secondly to examine the short run dynamics. Section 4.3 below is a justification of the use of the ARDL technique to study these relationships.

4.3: Justification of the ARDL Approach

It is traditional practice in economic research to use cointegration to study long run relationships between economic variables. However, like has been mentioned earlier, many econometric methods require the time series data to have the same order of integration to establish such a relationship. This makes it necessary to carry out unit root tests to establish the order of integration. However some unit root tests like the Dickey Fuller test may have low predictive powers leading to failure to reject the null of stationarity (Gujarati, 2004). The ARDL approach overcomes this problem by using the bounds test procedure. This procedure can establish a long run relationship whether the variables are I(0) or I(1) or whether the order of integration is mixed. However the ARDL technique collapses if any variable is I(2) (Pesaran and Pesaran, 1997).

Where the sample is small bounds test has been found to yield better results than Johansen (1991), Phillips and Hansen (1990) and Engel and Granger (1987) cointegration tests. The ARDL approach also eliminates the problem of serial correlation and endogeneity if appropriate lags are used (Jalil et al. 2008 and Pesaran and Shin, 1999).

The problem of endogeneity arises in most cases because causal relationships cannot be ascertained beforehand. However, the ARDL method treats all the variables as endogenous and the long run and short run parameters of the model are estimated simultaneously hence the choice of the ARDL technique. Simultaneously estimating the long run and short run relationships also corrects for the problem of variable omission and autocorrelation (Khan et al. 2005).

According to Narayan (2004) using the ARDL approach generates estimates that are unbiased making the methodology very suitable for this study for it uses a very small sample. The method also has the added advantage that it can easily distinguish between the regressand and the regressor.
4.4: Econometric Model Specification

Endogenous finance-growth theory uses a finance-augmented aggregate neoclassical production function to model the growth enhancing effects of finance. Financial sector development is assumed to affect long run growth through its impact on capital accumulation and on the rate of technological progress. The use of the neoclassical production function to model growth relationships is common in economics having been used by Frimpong and Oteng-Abayie (2006) and Sultan (2012) and many other researchers. Following Sultan (2012) the neoclassical aggregate production function can be expressed as:

\[ GDP_t = f(A_t, K_t, L_t) \]  \hspace{1cm} (1)

where GDP\(_t\) is real GDP in time period \(t\), \(A_t\) is total factor productivity (TFP), \(K_t\) is capital stock and \(L_t\) is labour respectively.

Financial development is expected to contribute to output growth through its effects on TFP. Thus in this case TFP is a function of developments in the banking (BDI) and stock market (SMDI) sectors respectively. This can be expressed as:

\[ A_t = f(BDI_t, SMDI_t) \]  \hspace{1cm} (2)

Substituting equation (2) into equation (1) we have:

\[ GDP_t = f(BDI_t, SMDI_t, K_t, L_t) \]  \hspace{1cm} (3)

In its intensity form equation 3 can be written as:

\[ gdp_t = f(bdi_t, smdi_t, k_t) \]  \hspace{1cm} (4)

where \( gdp_t = \frac{GDP_t}{k_t} \), \( bdi_t = \frac{BDI_t}{k_t} \), \( smdi_t = \frac{SMDI_t}{k_t} \) and \( k_t = \frac{K_t}{L_t} \) respectively.

Expressed in its natural logarithmic form\(^3\) equation (4) can be written as:

\[ \ln gdp_t = \delta_0 + \beta_1 \ln bdi_t + \beta_2 \ln smdi_t + \beta_3 \ln k_t + \epsilon_t \]  \hspace{1cm} (5)

\(^3\)bdi and smdi were not converted into logs because of the negative numbers in the series.
where $\beta_1$, $\beta_2$ and $\beta_3$ are the elasticity coefficients of real GDP per capita with respect to bank and stock market developments and the stock of capital respectively and $\varepsilon_t$ is the error term.

Equation (5) is the long run equilibrium equation to be estimated and the coefficients are all expected to be positive. According to Wang et al. (2011) equation (4) indicates that real GDP per capita, stock market and bank developments and capital stock may have a long run relationship. In this case cointegration techniques and Granger causality tests may be used to analyse such a relationship.

In the short run production can be varied by changing factor inputs. This means that the historical analysis of past changes in bank and stock market developments as well as changes in capital stock may help accurately predict future growth trends in real GDP per capita. According to the Granger Representation Theorem, where there is a stable equilibrium relationship formed out of two series which may be non-stationary an error correction representation is said to exist (Wang et al. 2011). Thus in this case, the error correction method was used not only to examine the short run dynamics but also the transmission mechanism between the short run and the long run. The following section specifies the ARDL model.

### 4.5: ARDL Model Specification

The choice of the ARDL model was based on the assumption that there was a unique relationship between bank, stock market developments and economic growth. Following Pesaran et al. (2001) the model is thus specified as:

$$
\Delta \ln gd_p_t = \delta_0 + \varphi_1 \Delta \ln gd_{p_t-1} + \varphi_2 \Delta bdi_{t-1} + \varphi_3 \Delta smd_{i_t-1} + \varphi_4 k_{t-1} \\
+ \alpha_1 \Delta \ln gd_{p_t-1} + \alpha_2 \Delta bdi_t + \alpha_3 \Delta smd_{i_t} + \alpha_4 \Delta \ln k_{t} + \varepsilon_t
$$

(6)

where the other variables are as defined before, $\Delta$ is the difference operator, $\delta_0$ is the drift and $\varphi_1$, $\varphi_2$, $\varphi_3$ and $\varphi_4$ are the long run multipliers respectively. The Schwartz-Bayesian Criterion(SBC) was used to determine the structural lags. According to Bardsen
(1989) the long run bank or stock market development elasticities (multiplied by -1) for example will be \((\varphi_2 / \varphi_1)\) and \((\varphi_3 / \varphi_1)\) respectively. The coefficients \(\alpha_i\) measure the short run effects. The long run coefficients are expected to have a positive sign each. The coefficients show how strongly the regressors influence economic growth respectively. High coefficients signal an important influence that the regressors have on the regressand.

4.6: Estimation Procedure: the Bounds Test

According to Narayan (2004), assuming that there is a long run relationship between real GDP per capita and the other variables, equation (6) represents the unrestricted error correction. The ARDL estimation involves testing the null hypothesis of no cointegration relationship against the alternative hypothesis of the existence of a cointegration relationship. The null and alternate hypotheses were therefore stated as:

\[
H_0: \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = 0
\]

\[
H_1: \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq 0
\]

The F statistic is used to decide whether the variables are cointegrated or not.

“The statistic underlying the procedure is the Wald or F-statistic in a generalised Dickey-Fuller regression, which is used to test the significance of lagged levels of the variables in a conditional unrestricted equilibrium correction model (ECM)”.


In this case assuming that real GDP per capita, and bank and stock market development indices are cointegrated the F test can be denoted as:

\[
F_{\text{lngdp}} (\text{lngdp} | \text{bdi}, \text{smdi}, \text{lnk}) .
\]

Taking each variable in turn as a regressand the F tests are denoted as

\[
F_{\text{bdi}} (\text{bdi} | \text{lngdp}, \text{smdi}, \text{lnk}),
\]

\[
F_{\text{smdi}} (\text{smdi} | \text{lngdp}, \text{bdi}, \text{lnk})
\]

and

\[
F_{\text{lnk}} (\text{lnk} | \text{lngdp}, \text{bdi}, \text{smdi})
\]

respectively.

According to Narayan (2004: 12) “The F-test has a non-standard distribution which depends upon (i) whether variables included in the ARDL model are I(0) or I(1), (ii) the
number of regressors, and (iii) whether the ARDL model contains an intercept and/or a trend”. The F-test also depends on the sample size.

When the F test has been calculated it is then compared with the critical values tabulated by Pesaran et al. (2001) for very large samples or by Narayan (2004) for small samples. The lower critical bound assumes that all variables are I(0) meaning that there is no cointegration among the variables. The upper bound assumes that all the variables are I(1).

**Decision rule:**

- If F-test statistic calculated is greater than upper bound critical value then we reject the null hypothesis whether variables are I(0) or I(1) suggesting that there exists a cointegration relationship among the variables.
- If F-test statistic calculated is less than the lower bound critical value, the null hypothesis cannot be rejected implying that there is no cointegration relationship.
- If F-test falls between the upper and lower bounds the result is inconclusive and the unit root tests should be conducted to ascertain the order of integration and the decision is made on the significance of the error correction term.
- If all the variables are found to be I(1) the decision is taken on the basis of the upper critical value and if they are all I(0) the decision is made on the basis of the lower critical bound.

Having established a cointegration relationship equation (5) can be estimated using the ARDL model shown in equation (6).

Using Microfit 5.0, the order of the ARDL model was automatically selected using the SBC. The SBC is known as the parsimonious model because it uses the smallest possible lag length. For this study the order of the ARDL was ARDL(1,0,2,2) obtained after 125 regressions with a lag length of 2 as recommended by Pesaran and Shin (1999). Finally the short run relationships were captured through error correction.
4.7: Error Correction Model (ECM)

According to the Granger Representation Theorem, where there is a cointegration relationship among variables, there exist an error representation and thus error correction was done to capture the short run dynamics (Pesaran, Shin and Smith, 2001). Since the study was about the relationship between real GDP per capita and bank and stock market developments and capital stock the error correction representation of the series was specified as follows:

$$\Delta \ln \text{gdp}_t = \alpha_0 + \alpha_1 \Delta \ln \text{gdp}_{t-1} + \alpha_2 \Delta bdi_t + \alpha_3 \Delta smdi_t + \alpha_4 \Delta \ln K_t + \xi \text{ecm}_{t-1} + \varepsilon_t$$

where $\xi$ is the speed of adjustment parameter and $\text{ecm}$ is the error correction term. The coefficient of the lagged error correction term ($\xi$) is expected to be negative and statistically significant to further confirm the existence of a cointegration relationship. The coefficients of the lagged terms on the other hand show causality in the short run (Sultan, 2012).

4.8: Definition and Justification of Variables

Researchers have attempted to explain the relationship between economic growth and financial development in terms of a number of economic and financial variables. The variables used in this study are the most commonly used variables as was reviewed in Chapter 3.

Economic growth is the dependent variable and annual real GDP per capita was used to measure economic growth over the period 1988-2012 inclusive. This study used real GDP per capita as a proxy for economic growth. The choice of this proxy is consistent with other empirical studies reviewed in the literature like Sultan (2012) and Frimpong and Oteng-Abayie (2006) among others.

The bank development variables chosen measure the size and activity in the sector as reviewed in the literature. The study used bank credit to the private sector and domestic credit provided by the banking sector to measure bank developments. An increase in
these variables improves capital accumulation and productivity and thereby economic growth (Levine and Zervos, 1998). A bank development index (BDI) was constructed from these two to capture developments in the sector. A high index shows how strong developments in the banking sector influence growth.

Bank credit to the private sector was used to represent the general level of development in the banking sector. It is expressed as a percentage of annual GDP. It measures the ability of the banking system to provide finance-led growth. A positive relationship between bank credit and real GDP per capita was expected (Levine and Zervos, 1998).

Domestic credit provided by the banking sector was also used to measure developments in the sector. Domestic credit includes all credit to various sectors on a gross basis. It is expressed as a percentage of annual GDP. A positive relationship between bank credit and output growth was expected.

Three stock market development variables measuring the size, activity and efficiency of the stock market were used. An increase in these variables improves capital accumulation and productivity and thereby economic growth. A stock market development index (SMDI) was constructed from these three to capture developments in the sector. A high index shows how strong developments in the stock market influence output growth.

Stock market capitalisation (as a % of GDP) was used to measures the size of the stock market. It is the share price times the number of shares outstanding. A highly capitalised stock market reflects its ability to mobilise capital and diversify risk. Stock market capitalisation is thus expected to be positively correlated to economic growth.

Stock market total value traded (as a % of GDP) is the total value of shares traded during the period. It was also used as a measure of stock market development. It complements the market capitalisation ratio by showing whether market size is matched by trading. It is a measure of liquidity. Where stock markets are liquid capital investment increases. Total value of shares traded ratio is thus expected to be positively correlated to economic growth.
Stock market turnover measures stock market efficiency. It is the total value of shares traded during the period divided by the average market capitalisation for the period. An efficient stock market leads to better resource allocation and thus spurs economic growth. Taken together, the three measures of stock market development provide more information about a nation’s stock markets than if one uses a single indicator.

Gross capital formation (as a % of GDP) was used to measure the increase in capital stock and is one of the major determinants of economic growth according to Keynesian growth theory. A positive relationship between investment and economic growth was expected.

4.9: Construction of Bank and Stock Market Development Indices

Following Naceur and Ghazouani (2006) and Levine and Zervos (1996) a simple index of stock market development (SMDI) was constructed by subtracting the mean of each series from each series value and then dividing by the mean series. The final index was obtained by averaging the means-removed values of the three stock market series. Where the index values are larger (and less negative), they imply better stock market development. The same procedure was done to obtain BDI4.

Formally let \( X(j,t) \) equal the average value (over the relevant period) of variable \( j \) for year \( t \). Let \( X(t) \) equal the average value of variable \( j \) across all the years. Define the means-removed value of \( X(j,t) \) as \( x(j,t) \), where

\[
x(j,t) = \frac{X(j,t) - X(t)}{X(t)}
\]

Then SMDI for year \( t \) is \( SMDI(t) = \sum s(j,t) \)

where we take the average across all the variables for year \( t \).

\(^4\)see Appendix A for calculated BDI and SMDI
4.10: Diagnostic Tests

Diagnostic tests were done to test the reliability and robustness of the model and are shown in Appendix C. To avoid spurious results the time series was tested for unit root and the model was tested for misspecification, heteroscedasticity, and stability. Failure to carry such tests may lead one to get a relationship between variables where there might be none or conversely fail to get a relationship where there is one leading to wrong interpretations and conclusions.

4.10.1: Augmented Dickey Fuller (ADF) Test

Even though pretesting the time series for stationarity is not a prerequisite under the ARDL model unit root tests were done to make sure that no series was integrated of an order higher than one as the ARDL technique collapses when a series is I(2). Thus the time series was first tested for unit root using the ADF and PP tests. The data was linearised to help eliminate problem of serial and multicollinearity (Gujarati, 2004).

According to Phillips and Peron (1988) the ADF test’s power may be lower especially where the distribution of disturbances is heterogeneous. The Phillips Peron (PP) test is a non-parametrically adjusted test to raise the power of the test. The test also has the ability to correct for autocorrelation and heterogeneity. Therefore this study utilised both the ADF and PP unit root tests and the results are reported in Table 5.3.3 in Chapter 5.

The ADF and the PP test assume non-stationarity of the time series. The decision rule is that if the ADF calculated statistic is lower than the $\tau$ (tau) critical values, we accept the null hypothesis for the presence of unit root at the chosen level of significance. This would mean that the variable tested is non-stationary. If the variable is found to be non-stationary in levels then differencing becomes necessary until it becomes stationary.

The ADF test is also done to check the order of integration of the variables. If a variable is found stationary in level at a given level of significance, then that variable is said to be I(0) at that level. If found stationary at first difference then it is said to be I(1).
Establishing the order of integration paves way for the test for the existence of a long-run relationship between the variables.

### 4.10.2: Heteroscedasticity Test

One of the assumptions of the OLS is that the variance of each of the disturbance term \( u_i \) must be equal. This is denoted as \( \text{var}(u_i|X_i) = \sigma^2 \) meaning that there is homoscedasticity. The null hypothesis under the heteroscedasticity test is that there is heteroscedasticity meaning that variances are not equal. This is denoted by \( \text{var}(u_i|X_i) = \sigma_i^2 \).

The heteroscedasticity test was based on the regression of squared residuals on squared fitted values. The results of this test are reported in Table 5.3.5 in Chapter 5. The null hypothesis of heteroscedasticity is rejected if the p-value is statistically insignificant.

### 4.10.3: Auto-correlation/ Serial Correlation Test

Under this test the null hypothesis is that there is serial correlation in the residuals or that the covariance is not equal to zero. This is denoted by \( \text{cov}(u_i, u_j|X_i, X_j) \neq 0 \). Serial correlation may be caused by non stationarity of the regressand or regressor or incorrect functional form or misspecification of the model.

The Lagrange multiplier test of residual serial correlation was used to test for the presence of serial correlation. The results are reported in Table 5.3.5 in Chapter 5. The decision rule is that if the LM statistic is insignificant we reject the null hypothesis and conclude that there is no serial correlation. The DW statistic, though not an efficient statistic to measure autocorrelation should also be around 2.
4.10.4: Normality Test

One of the assumptions of OLS is that disturbances are normally and independently distributed, that is, $U_i \sim NID(0, \sigma^2)$. In this study normality was tested using the Jarque-Bera statistic. The decision rule is if the p-value is statistically insignificant we reject the null hypothesis and conclude that the variables are normally distributed.

4.10.5: Misspecification Test

Regression analysis also requires that the model to be estimated be correctly specified that is the model must have just the right variables and the correct functional form for example. In this study the Ramsey's RESET test using the square of the fitted values was used. The results are reported in Table 5.3.5 in Chapter 5. The decision rule is that if the test statistic is insignificant then the empirical model is correctly specified and has the correct functional form.

4.10.6: Stability Test

Following Pesaran and Pesaran (1997) the model was tested for stability using the cumulative sum (CUSUM) and cumulative sum of squared (CUSUM Q) tests. The decision rule is that if the short run movements for the model are within the upper and lower critical values at a given level of significance then the model exhibit long run parameter stability. The results of the stability tests are reported in Figures 5.3.9A and B respectively.

4.11: Data Sources and Limitations

The empirical analysis was carried out using annual data for Zimbabwe from the period 1988 through to 2012. The year 1988 was chosen as the initial year as this was the first year with a sufficient number of observations for all the variables. The time span also gave 25 annual observations allowing for an econometric analysis to be carried out.
The variables used in the study were real GDP per capita, domestic credit provided by the banking sector, credit provided to the private sector and gross capital formation. For the stock exchange market capitalisation as a % of GDP, stock traded value as a % of GDP and turnover ratio were used. The data series were obtained from the World Bank (2013) supplemented by data from ZIMSTAT and various RBZ publications and monetary policy statements respectively. Real GDP per capita and gross capital formation were measure in US$ and were transformed into logs to reduce the problem of heteroscedasticity (Gujarati 2004). The reviewed literature has also shown that there is no single adequate variable that can be used to measure developments either in the financial sector or equity markets. However the variables used in the study are consistent with the reviewed literature.

4.12: Chapter Summary

The chapter gave an outline of the econometric model used to test the null hypothesis that there is no cointegration relationship between bank and stock market developments and economic growth as outlined in chapter 1. The ARDL technique was outlined and the variables chosen were justified. The diagnostic tests to test the robustness of the model were also briefly described. Data sources and limitations were also discussed. The next chapter: Chapter 5 is a presentation and analysis of results.
CHAPTER 5: PRESENTATION AND ANALYSIS OF RESULTS

5.1: Introduction

The main objective of this chapter was to estimate the econometric model developed in the previous chapter as well as to test the hypotheses of the study as outlined in Chapter 1. A statistical analysis of the time series data was carried out and the empirical results of the study were then presented and interpreted. The time series data was examined first for the presence of unit root using the ADF and PP unit root tests after which cointegration analysis was carried out to establish the long run relationship between economic growth and bank and stock market developments. Error correction modelling was then carried out to examine the short run dynamics. Various diagnostic tests were also carried out to test the robustness of the model. Granger causality tests were done to establish the direction of the relationship between bank and stock market developments and growth.

The chapter is organised as follows. In Section 5.2 the econometric model to be estimated is restated and Section 5.3 reports on the estimated model and gives the interpretation of the results. This is then followed by an analysis of the results both in the long run and short run in Section 5.4 and then finally the chapter summary in Section 5.5.

5.2: Econometric Model

The main aim of this study was to examine the impact of bank and stock market developments on economic growth in Zimbabwe over the period 1988-2012 using annual time series data. As presented in Chapter 4 the bank and stock market developments-growth nexus was modelled as:

\[ \ln gdp_t = \delta_0 + \beta_1 \ln bdi_t + \beta_2 \ln smdi_t + \beta_3 \ln k_t + \epsilon_t \]  

(Equation 5)
Where \( gdp \) is real GDP per capita, \( bdi \) is bank development index, \( smdi \) is stock market development index and \( k \) is gross capital formation (capital stock) respectively. \( \beta_1 \), \( \beta_2 \) and \( \beta_3 \) were the long run coefficients to be estimated respectively. Increases in the capital stock, bank and stock market developments were expected to promote economic growth. Therefore all the coefficients were expected to be positive. The above model was estimated using the ARDL framework and the ECM was used to capture the short run dynamics.

5.3: Model Estimation and Interpretation

Section 5.3 is divided into several subsections. First are summary statistics of the time series data in Subsection 5.3.1 followed by the correlation matrix in Subsection 5.3.2. Cointegration analysis requires that the time series data used for regression be stationary and results for stationarity tests are examined and reported in Subsection 5.3.3. This is then followed by the ARDL estimated results in Subsection 5.3.4 and the diagnostic test results for robustness of the model in Subsection 5.3.5. Bounds test results are presented in Subsection 5.3.6 followed by the estimated long run coefficients of the model in Subsection 5.3.7. Results of the ECM are reported in Subsection 5.3.8. Stability test results are reported in Subsection 5.3.9 while Granger causality tests are reported in Subsection 5.3.10.

5.3.1: Descriptive Statistics

The study utilised annual time series data over the sample period 1988-2012 to examine the impact of bank and stock market developments on economic growth. As reported in Table 5.3.1 below the descriptive statistics show a wide variation of the means especially between real GDP per capita, capital stock and bank & stock market development indices respectively. This wide variation in means implies that any attempt to carry out regression estimates in levels will produce biased results. The Jacque-Bera statistic on the other hand shows that the variables are normally distributed.
### Table 5.3.1: Descriptive Statistics: Sample Period 1988-2012

<table>
<thead>
<tr>
<th>Variable(s)</th>
<th>Log Real GDP per Capita</th>
<th>Log Capital Stock</th>
<th>Bank Development Index</th>
<th>Stock Market Development Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.320346</td>
<td>2.488199</td>
<td>-0.399214</td>
<td>-0.330902</td>
</tr>
<tr>
<td>Median</td>
<td>6.430860</td>
<td>2.855144</td>
<td>3.232437</td>
<td>2.201607</td>
</tr>
<tr>
<td>Maximum</td>
<td>6.577052</td>
<td>3.243343</td>
<td>8.636629</td>
<td>3.535362</td>
</tr>
<tr>
<td>Minimum</td>
<td>5.842797</td>
<td>0.422110</td>
<td>-0.944671</td>
<td>-0.886829</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.242899</td>
<td>0.807640</td>
<td>0.632940</td>
<td>0.850671</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.602365</td>
<td>-1.386140</td>
<td>1.890125</td>
<td>1.187167</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>1.820923</td>
<td>3.997699</td>
<td>8.636629</td>
<td>3.535362</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>2.959998</td>
<td>9.042643</td>
<td>47.98112</td>
<td>6.170913</td>
</tr>
<tr>
<td>Probability</td>
<td>0.227638</td>
<td>0.010875</td>
<td>0.00000000</td>
<td>0.045709</td>
</tr>
<tr>
<td>Sum</td>
<td>158.0086</td>
<td>62.20497</td>
<td>-0.000000248</td>
<td>0.00000214</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>1.416004</td>
<td>15.65478</td>
<td>9.614698</td>
<td>17.36738</td>
</tr>
<tr>
<td>Observations</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: Author Computations by Eviews 7

### 5.3.2: Correlation Matrix

Table 5.3.2 below shows the estimated correlation matrix of real GDP per capita, capital stock, bank and stock market development indices respectively.

### Table 5.3.2: Estimated Correlation Matrix of Variables

<table>
<thead>
<tr>
<th></th>
<th>lngdp</th>
<th>lnk</th>
<th>bdi</th>
<th>Smdi</th>
</tr>
</thead>
<tbody>
<tr>
<td>lngdp</td>
<td><strong>1.0000</strong></td>
<td>.37817</td>
<td>.41636</td>
<td>-.34733</td>
</tr>
<tr>
<td>lnk</td>
<td>.37817</td>
<td><strong>1.0000</strong></td>
<td>-.17843</td>
<td>-.42416</td>
</tr>
<tr>
<td>bdi</td>
<td>.41636</td>
<td>-.17843</td>
<td><strong>1.0000</strong></td>
<td>.49419</td>
</tr>
<tr>
<td>Smdi</td>
<td>-.34733</td>
<td>-.42416</td>
<td>.49419</td>
<td><strong>1.0000</strong></td>
</tr>
</tbody>
</table>

Source: Author Computations by Microfit 5.0

The results in Table 5.3.2 above show that there is a positive relationship between capital stock, bank development index and real GDP per capita while the relationship between stock market development index and real GDP per capita is negative. There is also negative correlation between the capital stock and bank and stock market development indices.
5.3.3: Unit Root Test Results

One of the advantages of the bounds test technique is that pre-testing the variables to establish their order of integration is not required since it can be carried out whether the order of integration is the same or not. Nevertheless, the ADF and the PP unit root tests were carried out to make sure that no variable was integrated of an order higher than 1. According to Pesaran et al. (2001) when variables are I(2) the ARDL process breaks down and results will be spurious. Table 5.3.3 below reports the ADF and the PP unit root test results.

Table 5.3.3: Unit Root Test Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Augmented Dickey Fuller (ADF) Test</th>
<th>Phillips –Peron (PP) Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Log Level</td>
<td>First Difference</td>
</tr>
<tr>
<td>Lngdp</td>
<td>-1.079789</td>
<td>-3.408760***</td>
</tr>
<tr>
<td>LnK</td>
<td>-0.350862</td>
<td>-4.77544***</td>
</tr>
<tr>
<td>Bdi</td>
<td>-3.216423***</td>
<td>I(0)</td>
</tr>
<tr>
<td>Smdi</td>
<td>-2.716104***</td>
<td>I(0)</td>
</tr>
</tbody>
</table>

Source: Author’s computations using Eviews 7.

Notes: The ADF and PP tests are based on McKinnon critical values and the lag length on SBC criterion. *** shows rejection of the null hypothesis at 1%.

As shown in Table 5.3.3 above the ADF unit root test results show that the bank and the stock market development indices were stationary in levels and therefore the null of unit root was rejected. The two indices were therefore I(0) at 1% level of significance respectively. On the other hand real GDP per capita and the capital stock were found not to be stationary in levels. They however became stationary when first differenced and thus were I(1) at 1% level of significance. The PP test like the ADF unit root test, gave similar results with bank and stock market development indices stationary in levels and real GDP per capita and the capital stock stationary at first difference respectively.

The use of the ARDL approach was thus justified since the order of integration of the variables was mixed and also not more than 1. Having established the order of
integration, bounds test was carried out to determine the existence of a long run relationship among the variables.

5.3.4: ARDL Model Estimation Results

The estimated ARDL model for the Zimbabwe growth function as represented by equation 5 in Chapter 4 is reported in Table 5.3.4 below.

Table 5.3.4: Autoregressive Distributed Lag Estimates

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio</th>
<th>[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>lngdp(-1)</td>
<td>.72391</td>
<td>.094478</td>
<td>7.6622***</td>
<td>.000</td>
</tr>
<tr>
<td>lnk</td>
<td>.076142</td>
<td>.019825</td>
<td>3.8408 ***</td>
<td>.002</td>
</tr>
<tr>
<td>bdi</td>
<td>-.024582</td>
<td>.033227</td>
<td>-.73984</td>
<td>.472</td>
</tr>
<tr>
<td>bdi(-1)</td>
<td>.037853</td>
<td>.027804</td>
<td>1.3614</td>
<td>.195</td>
</tr>
<tr>
<td>bdi(-2)</td>
<td>.092460</td>
<td>.034570</td>
<td>2.6746**</td>
<td>.018</td>
</tr>
<tr>
<td>smdi</td>
<td>.061414</td>
<td>.029726</td>
<td>2.0660*</td>
<td>.058</td>
</tr>
<tr>
<td>smdi(-1)</td>
<td>-.049886</td>
<td>.024625</td>
<td>-2.0259*</td>
<td>.062</td>
</tr>
<tr>
<td>smdi(-2)</td>
<td>-.075552</td>
<td>.024146</td>
<td>-3.1290***</td>
<td>.007</td>
</tr>
<tr>
<td>C</td>
<td>1.5295</td>
<td>.58756</td>
<td>2.6031**</td>
<td>.021</td>
</tr>
</tbody>
</table>

R-Squared          | .97686      | R-Bar-Squared  | .96364      |
S.E. of Regression | .047518     | F-stat.        | F( 8, 14) 73.8875*** [.000] |
Mean of Dependent Variable | 6.3072 | S.D. of Dependent Variable | 24921 |
Residual Sum of Squares     | .031612 | Equation Log-likelihood | 43.1462 |
Akaike Info. Criterion      | 34.1462 | Schwarz Bayesian Criterion | 29.0365 |
DW-statistic          | 1.9190     | Durbin's h-statistic | .21779 [.828] |

Source: Author Computations by Microfit 5.0

Notes: *, ** and *** denotes significance at 10%, 5% and 1% respectively.

As reported in Table 5.3.4 above, with an $R^2$ of about 0.98 and an adjusted $R^2$ of 0.96 the model was a very good fit. This meant that about 98% of variations in real GDP per capita were explained by the regressors used in the study. The DW-statistic even though it cannot be relied upon to test for serial correlation was around 2 and the overall goodness of the model is shown by the F-statistic which is highly significant at 1% level of significance. The diagnostic tests are reported in Subsection 5.3.5 below.
5.3.5 Diagnostic Test Results

The robustness of the estimated model was tested using various diagnostic tests and the results are reported in Table 5.3.5 below.

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Serial Correlation</td>
<td>CHSQ (1) = .046624</td>
<td>F (1, 13) = .026406</td>
</tr>
<tr>
<td></td>
<td>[.829]</td>
<td>[.873]</td>
</tr>
<tr>
<td>B: Functional Form</td>
<td>CHSQ (1) = .0059311</td>
<td>F (1, 13) = .0033532</td>
</tr>
<tr>
<td></td>
<td>[.939]</td>
<td>[.955]</td>
</tr>
<tr>
<td>C: Normality</td>
<td>CHSQ (2) = .096942</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>[.953]</td>
<td></td>
</tr>
<tr>
<td>D: Heteroscedasticity</td>
<td>CHSQ (1) = .15757</td>
<td>F (1, 21) = .14486</td>
</tr>
<tr>
<td></td>
<td>[.691]</td>
<td>[.707]</td>
</tr>
</tbody>
</table>

Source: Author Computations by Microfit 5.0

Notes: A: Lagrange multiplier test of residual serial correlation  
B: Ramsey’s RESET test using the square of the fitted values  
C: Based on a test of skewness and kurtosis of residuals  
D: Based on the regression of squared residuals on squared fitted values

The model was tested for serial correlation using the Breusch-Godfrey serial correlation Lagrange Multiplier Test and the result show an insignificant p-value of 0.829. The null hypothesis of serial correlation was therefore rejected at 5% level of significance. The F version also confirmed the result of no serial correlation.

The Ramsey’s RESET test results show an insignificant p-value and thus the null of misspecification was rejected at the 5% level of significance. In other words the model was correctly specified.

The model was also tested for normality of the residuals. The p-value was found to be insignificant and the plot of residuals in figure 5.3.5 below also confirms that the residuals were normally distributed.
The model was also tested for heteroscedasticity. The P-value was found to be insignificant and thus the null of heteroscedasticity was rejected at 5% level of significance.

The results in Table 5.3.5 have shown that the model passed all the diagnostic tests and with an F statistic of 73.8875[.000] as reported in Table 5.3.4 it meant that the estimated results could be relied upon for interpretation.

5.3.6: Bounds Test Results

The use of the Bounds test technique was justified by the fact that variables in the study were not integrated of the same order. The Bounds test involves calculating the F-statistic to show the joint significance of the coefficients of the lagged variables and then compare the calculated F-statistic with the upper and lower critical bound values.
The F-statistic tests the null hypothesis that the coefficients of the lagged variables are equal to zero that is $H_0: \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = 0$ meaning that there is no long run relationship. The alternative hypothesis of the existence of a long run relationship is $(H_1: \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq 0)$.

As was explained in Chapter 4 when the F-statistic calculated is above the upper bound critical value, then the null of no cointegration is rejected. However if the F-statistic calculated is below the lower critical bound value the null of no cointegration cannot be rejected.

The upper and lower bound critical values were extracted from Narayan (2004) as these are more suitable for smaller samples than from Pesaran and Pesaran (1997) or Pesaran et al. (2001) which were calculated for very large samples of 500 and 1000 respectively. Since the sample size was small and data was annual a lag length of 2 was used as recommended by Pesaran and Shin 1994 and Narayan (2004).

The Bounds test results with each variable treated as the explained variable are reported in Table 5.3.6 below.

**Table 5.3.6: Bounds Test Results**

<table>
<thead>
<tr>
<th>Critical Value Bounds</th>
<th>Dependent variable</th>
<th>Estimated F-statistic</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>I(0)</td>
<td>$F_{\text{lngdp}}(\text{lngdp}</td>
<td>\text{lnk}, \text{bdi}, \text{smdi})$</td>
<td>7.7447***</td>
</tr>
<tr>
<td>1%</td>
<td>4.614</td>
<td>5.966</td>
<td></td>
</tr>
<tr>
<td>5%</td>
<td>3.272</td>
<td>4.306</td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>2.676</td>
<td>3.586</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author Computations by Microfit 5.0

Notes: Critical values\(^5\) were extracted from Narayan (2004) Appendix A1, A2 and A3 for a case II model.

---

\(^5\) There were no lagged dependent variables for the model so F-statistic could not be calculated. Instead the Wald Test was used and a p-value of 0.761 proved presence of cointegration.

\(^6\) Critical values are for 30 observations since no critical values are reported for 25 observations.
The results in the table show that when real GDP per capita is treated as the regressand, $F_{\text{lngdp}}(\text{lngdp} | \ln k, \text{bdi}, \text{smdi})$, the $F$ calculated statistic of 7.7447 was greater than the upper critical bound value of 5.966 at 1% level of significance. The null hypothesis of no cointegration was thus rejected. The conclusion was therefore that there was a long run relationship between real GDP per capita, capital stock and bank and stock market development indices.

When capital stock was treated as the regressand, $F_{\text{lnk}}(\ln k | \text{lngdp}, \text{bdi}, \text{smdi})$, a cointegration relationship was also found at 1% level of significance.

Of interest to note was that no long run relationship was found at 1% level of significance when stock market development index, ($F_{\text{smdi}}(\text{smdi} | \text{lngdp}, \ln k, \text{bdi})$, was regressed on other variables and the result was inconclusive at 5% level of significance. A cointegration relationship was only found at 10% level of significance.

When bank development index was treated as the regressand ($F_{\text{bdi}}(\text{bdi} | \text{lngdp}, \ln k, \text{smdi})$, no cointegration relationship was found. However the fact that two other cointegration relationships were found show that there was no unique cointegration relationship between real income per capita and the regressors in the study.

5.3.7 Estimated Long run Model

The bounds test results reported in Table 5.3.6 indicated that there was a long run relationship between real GDP per capita, capital stock and bank and stock market development indices. Basing on this evidence, the estimated long run coefficients are reported in Table 5.3.7.

The estimated long run results in Table 5.3.7 below show a positive and a statistically significant relationship between capital stock to GDP ratio and real GDP per capita at 5% level of significance. Since the long run coefficients are long run elasticities, this means that real GDP per capita in Zimbabwe increases by about 0.28% following a 1% increase in capital stock to GDP ratio. This result was consistent with the theoretical model.
Table 5.3.7: Estimated Long Run Coefficients.

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio</th>
<th>[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>lnk</td>
<td>.27578</td>
<td>.10332</td>
<td>2.6692**</td>
<td>.018</td>
</tr>
<tr>
<td>bdi</td>
<td>.38295</td>
<td>.098066</td>
<td>3.9050***</td>
<td>.002</td>
</tr>
<tr>
<td>smdi</td>
<td>-.23189</td>
<td>.080664</td>
<td>-2.8748**</td>
<td>.012</td>
</tr>
<tr>
<td>C</td>
<td>5.5399</td>
<td>.28879</td>
<td>19.1830</td>
<td>.000</td>
</tr>
</tbody>
</table>

Source: Author Computations by Microfit 5.0

Notes: ** and *** indicates the rejection of the null hypothesis at 5% and 1% level of significance respectively.

The results also show a positive and highly significant relationship between bank development index and real GDP per capita. This means that a 1% increase in the bank development index leads to a 0.383% increase in real GDP per capita. The bank development index at 0.38295 is the highest showing that the banking sector is the major driver of growth in Zimbabwe. This result was consistent with the theoretical model.

An inverse relationship between stock market development index and real GDP per capita was found. The results show that a 1% increase in the stock market development index led to a decline in real GDP per capita of about 0.232% per annum. This result was not consistent with the theoretical model.

5.3.8: Error Correction Results

In the previous section results established a long run relationship between real GDP per capita and the explanatory variables used in the study. Error correction was done to investigate the short run dynamics. The results are obtained from the ECM equation (9) in Chapter 4 and are reported in Table 5.3.8 below.
Table 5.3.8: Error Correction Representation Results

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio</th>
<th>[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>dlnk</td>
<td>.076142</td>
<td>.019825</td>
<td>3.8408***</td>
<td>.001</td>
</tr>
<tr>
<td>dbdi</td>
<td>-.024582</td>
<td>.033227</td>
<td>-.73984</td>
<td>.470</td>
</tr>
<tr>
<td>dbdi1</td>
<td>-.092460</td>
<td>.034570</td>
<td>-2.6746**</td>
<td>.017</td>
</tr>
<tr>
<td>dsmdi</td>
<td>.061414</td>
<td>.029726</td>
<td>2.0660*</td>
<td>.055</td>
</tr>
<tr>
<td>dsmdi1</td>
<td>.075552</td>
<td>.024146</td>
<td>3.1290***</td>
<td>.006</td>
</tr>
<tr>
<td>dC</td>
<td>1.5295</td>
<td>.58756</td>
<td>2.6031**</td>
<td>.019</td>
</tr>
<tr>
<td>ecm(-1)</td>
<td>-.27609</td>
<td>.094478</td>
<td>-2.9223**</td>
<td>.010</td>
</tr>
</tbody>
</table>

**ecm = lnY -.27578lnK -.38295BD + .23189SMD -5.5399C**

<table>
<thead>
<tr>
<th></th>
<th>R-Squared</th>
<th>R-Bar-Squared</th>
<th>S.E. of Regression</th>
<th>F-stat. F( 6, 16)</th>
<th>7.4231[.001]</th>
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</thead>
<tbody>
<tr>
<td>R-Squared</td>
<td>.76084</td>
<td>.62418</td>
<td>.047518</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.E. of Regression</td>
<td>.047518</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean of Dependent Variable</td>
<td>-.018068</td>
<td>S.D. of Dependent Variable</td>
<td>.077512</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual Sum of Squares</td>
<td>.031612</td>
<td>Equation Log-likelihood</td>
<td>43.1462</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Akaike Info. Criterion</td>
<td>34.1462</td>
<td>Schwarz Bayesian Criterion</td>
<td>29.0365</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DW-statistic</td>
<td>1.9190</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Author Computations by Microfit 5*

**Notes: *, ** and *** show significance at 10%, 5% and 1% level of significance respectively.**

The error correction term (-.27609) was not only negative but also statistically significant. This also confirmed the existence of a long run relationship between real GDP per capita and its regressors. The ECM measures the speed of adjustment back to equilibrium following a shock in the system. In this case approximately 28% of the disequilibria caused by shocks in the previous year got corrected in the current year. This was a moderate speed of adjustment. The high $R^2$ and the F statistic which was significant at 1% show that the short run model was a good fit.

Results in Table 5.3.8 also show that capital stock’s contribution to real GDP per capita was still positive as it was in the long run. However, its contribution to short run real GDP per capita was now less but significant at 1% level of significance up from 5% level of significance in the long run.
On the other hand the bank development index which was positive and significant at 1% was now negative and insignificant. Its lag however was significant at 5%. This means that bank developments contributed more to growth in the long run than in the short run. However, stock market development index which was negative and significant at 5% in the long run was now positive and significant at 10%. In short banks contributed more to growth in the long run than stock markets while stock markets contributed more in the short run than banks.

5.3.9: Stability Test Results

The ECM model was tested for stability using the CUSUM and CUSUMSQ techniques. The plots which are based on the ECM equation (9) in chapter 4 are shown in figure 5.3.9A and 5.3.9B respectively. Since the coefficients of the estimated model fall within the critical bounds at 5% level of significance this meant that the model was stable over the sample period.

Figure 5.3.9A: Stability Test: CUSUM Plot
To confirm the goodness of fit of the model Figure 5.3.9C below shows a residual graph for the actual and fitted observations (see also Appendix F).

The residuals graph shows that the fitted observations are very close to the actual observed values and they move together.
5.3.10: Granger Causality Test Results

The bounds test results have shown the existence of a cointegration relationship when real GDP per capita was used as the regressand. According to Engel and Granger (1987) whenever there is a cointegration relationship between variables, there exists among these variables Granger causality in at least one way. Table 5.3.10 below reports the Granger causality test results.

Table 5.3.10: Granger Causality Test Results: Sample 1988-2012

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Obs</th>
<th>F-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lnk does not Granger Cause lngdp</td>
<td>24</td>
<td>7.44062**</td>
<td>0.0126</td>
</tr>
<tr>
<td>lngdp does not Granger Cause lnk</td>
<td></td>
<td>1.46238</td>
<td>0.2400</td>
</tr>
<tr>
<td>bdi does not Granger Cause lngdp</td>
<td>24</td>
<td>2.73701</td>
<td>0.1129</td>
</tr>
<tr>
<td>lngdp does not Granger Cause bdi</td>
<td></td>
<td>3.74996*</td>
<td>0.0664</td>
</tr>
<tr>
<td>smdi does not Granger Cause lngdp</td>
<td>24</td>
<td>6.54344**</td>
<td>0.0183</td>
</tr>
<tr>
<td>lngdp does not Granger Cause smdi</td>
<td></td>
<td>0.53461</td>
<td>0.4728</td>
</tr>
</tbody>
</table>

Source: Author Computations by EViews 7

Notes: * and ** denotes Granger Causality at 10% and 5% respectively.

The results in Table 5.3.10 above show that the null that bank development index does not Granger cause real GDP per capita cannot be rejected and similarly the null that real GDP per capita does not Granger cause stock market development index also cannot be rejected. However the null that real GDP per capita does not Granger cause bank development index can be rejected at 10% level of significance. This means that as growth in the economy occurs the demand for financial services also increases to support the economic activities. This lends support to the demand following hypothesis. On the other hand the hypothesis that stock market development index does not Granger cause real GDP per capita can be rejected at 5% level of significance. This means that an increase in the stock market index led to a decline in growth. Even though the contribution was negative, this pointed to the supply leading hypothesis.
With regards to the capital stock, the null that capital stock does not Granger Cause real GDP per capita can be rejected at 5% level of significance. This meant that as developments in the financial sector increased they helped raise capital which in turn led to growth in the economy.

5.4 Analysis of Results

Section 5.3 above reported on the statistical properties of the time series data and results of the study. This section analyses the results in line with the hypotheses stated in Chapter 1. The section is divided into two subsections, long run and short run results analysis.

5.4.1: Long run Results Analysis.

The bounds test results as reported in Table 5.3.6 show the existence of a steady long run relationship between real GDP per capita and its regressors. Two other relationships were also found when the stock market index and investment were treated as regressands respectively. No long run relationship was however found when bank development index was used as a regressor. The existence of more than one long run relationship shows that there was no unique relationship between real GDP per capita and the regressors used in the study.

5.4.1.1: Economic Growth and Bank Development Index

The long run results show a positive relationship between real GDP per capita and bank development index at 1% level of significance with a 1% increase in the bank development index leading to about a 0.383 % increase in real GDP per capita. This made the financial sector as represented by the banking sector a major driver of growth in Zimbabwe compared to stock market development and investment. This finding confirms the theoretical model developed in Chapter 4. This result is supported by Rioja and Valev (2011) who found that the financial sector had a substantial role to play in promoting economic growth in low income countries between 1980-2009. Allen and Ndikumana
(2000) also found that financial intermediaries had a greater positive effect on growth in Southern Africa.

5.4.1.2: Stock Markets and Growth

An inverse relationship between stock market development index and real GDP per capita was found. The results show that a 1% increase in the stock market development index led to a decline in real GDP per capita of about 0.232% per annum. This was an unexpected finding and was inconsistent with the theoretical model. When stock markets are liquid and efficient more capital is raised and productivity in the economy increases leading to economic growth (Beck and Levine 2004, Levine and Zervos 1998).

However this result is supported by Rioja and Valev (2011) who found stock markets not to have contributed anything towards capital accumulation or productivity growth in low income countries for the period 1980-2009. Obstfeld (1994) and Bhide (1993) also warn about the possible negative effects that developments in the stock market might have on economic growth.

This weak association between the stock market and economic growth may be reflective of the very high market capitalisation to GDP ratio not supported by trading. It may also be reflective of the general liquidity challenges in the economy as shown by low turnover ratio of less than 50%. It also reflects the speculative nature of investment on the ZSE and the low industrial output.

5.4.1.3: Growth and Capital Stock

The estimated long run results in Table 5.3.7 above show a positive and a statistically significant relationship between capital stock to GDP ratio and real GDP per capita at 5% level of significance. Since the long run coefficients are long run elasticities, this means that real GDP per capita in Zimbabwe increases by about 0.276% following a 1%
increase in capital stock to GDP ratio. This finding confirms the theoretical model and supported by Jecheche (2010) and Kargbo and Adam (2009).

5.4.2: Short Run Results Analysis

Error correction modelling was utilised to analyse the short run dynamics. The coefficient of the error correction term was found to be negative and significant at 5% level of significance. This also confirmed the existence of a long run relationship between real GDP per capita and its regressors. The speed of adjustment at approximately 28% can be considered as moderate. This result is supported by Hondroyiannis, Lolos and Papapetrou (2004) as reviewed in the literature.

5.4.2.1: Short run real GDP per capita and Bank Development

An insignificant and negative relationship was found between real GDP per capita and bank development index with a 1% increase in the bank development index leading to a decline of about 0.02% in real GDP per capita per annum. Its lag was however significant at 5%. Compared to the long run, bank developments contributed more to long run growth than they did in the short run. This result is supported by Hamdi, Hakimi and Sbia (2013) who found that for the period 1961-2010 finance did not lead to growth in Tunisia in the short run but in the long run. Khan et al. (2005) also found the relationship between finance and growth significant in the long run and not in the short run in the case of Pakistan between 1971-2004.

5.4.2.2: Short run real GDP per capita and Stock Market Development

The short run relationship between real GDP per capita and stock market development index was found to be positive and significant at 10% level of significance with a 1% increase in the stock market development index leading to about 0.06% increase in real GDP per capita. In the long run this relationship was negative and with a long run coefficient of -0.232 stock markets subtracted more from real GDP per capita than they
added to short run real GDP per capita. These results are supported by Hondroyiannis, Lolos and Papapetrou (2004).

5.4.2.3: Short run real GDP per capita and Capital Stock.

The relationship between investment and real GDP per capita remained positive but significant at 1% level of significance. In the short run a 1% increase in capital stock led to approximately a 0.076% increase in real GDP per capita. Capital stock in this case contributed less in the short run than in the long run where it was contributing about 0.276% to real GDP per capita.

5.4.3: Direction of Relationship

Granger causality results as reported in Table 5.3.10 show evidence of both demand following and supply leading hypotheses in Zimbabwe. These are analysed for each variable in the following subsections.

5.4.3.1: Real GDP per capita and Bank Development Index

Granger causality test results show that bank development index did not Granger cause real GDP per capita while real GDP per capita Granger caused bank development index. This lends support to demand following hypothesis. It is important however to note that causality between bank development index and real GDP per capita was significant at about 12% showing a very weak association between bank development index and economic growth thus the relationship is strongly in favour of real per capita leading to bank developments. This result is supported by Guryay et al. (2007) who also found that in Northern Cyprus causality runs from economic growth to the development of financial markets.
5.4.3.2: Real GDP per capita and Stock Market Development Index

The results show that stock market development index Granger caused real GDP per capita but real GDP per capita did not Granger cause stock market development index. This points to supply leading hypothesis and the relationship is unidirectional. Similar Zivengwa et al. (2011) also found a similar result but however they found the stock markets contribution positive and not negative.

5.4.3.3: Real GDP per Capita and Capital Stock.

Results show that the capital stock Granger caused real GDP per capita but real GDP per capita did not Granger cause capital stock. The relationship was thus unidirectional and pointed to supply leading hypothesis.

5.4.3.4: Bank Developments vs. Stock Market Developments

The results show that bank developments contributed more to economic growth than stock markets both in the long run and short run. These results are supported by Choe and Moosa (1999), Demetriades and Luintel (2000), Hondroyiannis, Lolos and Papapetrou (2004), who found out that the influence of financial development on economic growth, was much more pronounced than that of stock market developments.

For Zimbabwe this could be because for many people whose income is very low investing on the stock exchange is out of the question and moreover they may not be in the know of how one goes about when he or she wants to invest through the stock exchange. This leaves banks as the only organised financial markets through which financial resources from the resource poor communities are raised as banks run deposits accounts for as low as $1. Moreover banks are found all over the country thus they have a very wide base from which they can mobilise funds for investment purposes.
5.5: Chapter Summary

The chapter presented the results of the ARDL model and also tested the hypotheses of the study. A long run relationship though not unique was found between real GDP per capita and its explanatory variables. In the long run bank developments and investment’s contribution to real GDP per capita were found to be both positive and statistically significant. Stock markets contribution on the other hand was found to be negative but statistically significant. In the short run capital’s contribution remained positive and significant while that of banks became negative and insignificant. Stock market’s contribution which was negative in the long run became negative in the short run. All in all banks were found to contribute more to growth than stock markets. The error correction term was found to be significant giving a speed of adjustment to long run equilibrium, of about 28%. These findings have significant policy implications to Zimbabwe which are discussed in the following chapter: Chapter 6.
CHAPTER 6: FINDINGS, CONCLUSIONS AND POLICY RECOMMENDATIONS

6.1: Introduction

This chapter presents the major findings of the study on the impact of bank and stock market developments and economic growth in Zimbabwe over the sample period 1988-2012 inclusive. It also gives the conclusion to the study and the policy recommendations arising from the findings. Suggestions for further research are also given.

The chapter, however, presents first a summary of each of the previous five chapters in Section 6.2 followed by the major findings of the study in Section 6.3. The conclusions of the study are given in Section 6.4 and in Section 6.5 are the policy implications. Lastly areas for further study are suggested in Section 6.6.

6.2: Chapter Summaries

Chapter 1 was the introduction of the whole study. The background to the study was outlined and the objectives and research hypotheses stated. The chapter also provided the justification of the study, its limitations, scope and delimitations.

Chapter 2 was a description of the macroeconomic performance of the economy over the period 1988-2012. It was seen that economic growth was volatile and persistently negative for about a decade and only began to recover after dollarization in 2009. The major factors to have had affected economic growth during this period was drought, inflation, a poor policy environment, political instability and adverse global developments. Of worth to note was that during this period, the country experienced a banking crisis and trading on the stock exchange was briefly suspended to bring sanity in the equity market.

The financial sector also witnessed significant architectural changes as indigenous banks entered the market. But the indigenous banks were heavily affected by the banking crisis
of 2003-2004 and at the height of the inflationary period in 2008 many banks had to close down. The sector continued to rile under the problem of liquidity crunch and corporate governance issues among others.

The opening up of the stock exchange to foreign players witnessed an increase in the stock market activity but the harsh economic environment saw widespread deindustrialisation as companies faced dwindling demand of their output due to low incomes and general investor scepticism about investing in Zimbabwe.

Chapter 3 reviewed both the theoretical and empirical literature on financial development and economic growth. A broad literature was reviewed with the aim of getting a better understanding of the relationship between finance and growth as well as current research trends on this area. Though empirical evidence on the relationship between financial development and economic growth gives inconclusive results the researcher was able to come with the appropriate methodology to examine the finance-growth nexus in Zimbabwe.

In Chapter 4 the ARDL methodology was outlined. The ECM to capture the short run dynamics was also discussed. The estimation method was also explained and the diagnostic tests were briefly described.

Chapter 5 reported on the results of the study and analysed them. The macroeconomic model was estimated using Microfit 5. Both short run and long run results were analysed. The model was tested for robustness by various tests and it passed all the tests. The results reported show that real GDP per capita was cointegrated with bank and stock market indices and stock of capital. These results have very important implications with regards to economic policy in Zimbabwe. This is discussed in the following section.

6.3: Major Findings of the Study

The major findings of the study are presented below in line with the hypothesis of the study.
(1) Bank developments were found to positively and significantly contribute to economic growth in the long run while stock market developments’ contributions were negative but significant. Capital stock was also found to positively and significantly contribute to economic growth.

(2) Bank developments were found to negatively and insignificantly contribute to economic growth in the short run. Stock market’s contribution however remained significant but negative. Capital stock’s contribution to economic growth remained significant and positive.

(3) Banks were found to contribute more to economic growth in the long run than stock markets and capital stock. Stock markets on the other hand were found to contribute more to growth in the short run than banks.

(4) The $ecm$ was found negative and significant showing that economic growth and its regressors were cointegrated. However the relationship was not found to be unique.

(5) Economic growth was found to lead to financial development while stock markets were found to lead to economic growth. Thus there was evidence of both demand following and supply leading hypothesis.

6.4: Conclusions

From the findings, the following conclusions were made:

1. There was a steady long run relationship between bank and stock market developments and growth in Zimbabwe.

2. Banks positively and significantly influenced economic growth in the long run and negatively but insignificantly in the short run.
3. Stock markets negatively and significantly influenced economic growth in the long run but positively and significantly in the short run.

4. Economic growth caused bank developments while stock market developments caused economic growth.

6.4: Policy Implications

The results established a steady long run relationship between bank and stock market developments and economic growth. Banks had a positive impact on economic growth in the long run while stock markets had a negative impact. This point to the need for long run macroeconomic policies that will promote the well-functioning of the financial system and equity markets so that more financial resources are mobilised to boost economic growth in the country.

The positive impact of bank developments to economic growth is evidence of supply leading hypothesis and an indication of the important role that financial institutions can play in the economy. No doubt therefore there is need to improve access to credit and its allocation must be efficient. Zimbabwe has a large unbanked informal and rural sector. More than US$3 billion dollars was said to be circulating outside the formal financial system. Thus it is critical for government to formulate policies that will help the financial system harness these huge resources and channel them to more productive use. Banks must be encouraged to establish a wider branch network especially in rural areas and they must also be encouraged to provide tailor made financial products that suit even the small investor. Government must help establish and promote supporting financial institutions like credit unions, insurance and pension funds. More financial institutions should be opened up to increase competition and improve financial intermediation and inclusion so as to cater for the unbanked informal and rural sectors.
The negative contribution of the stock market to economic growth may have been due to deindustrialisation as firms grappled with reduced industry capacity in the face of weakened domestic demand due to low incomes and increased competition from imports. General lack of investor confidence and speculation may also have impacted negatively on economic growth. The stock market is an important channel through which long term capital can be raised. Its role in promoting growth can be increased by relaxing the listing rules on the local bourse and promote fair trading. The regulatory environment should also be enabling but stringent enough to curb speculation. Sound macroeconomic policies will help attract investors to the local bourse and a stable environment will see industrial capacity going up. Dual listing must also be promoted to increase integration with the world financial market. Currently there is only one stock exchange. There is thus need to open up an exchange for the small investor and other secondary exchanges like market for derivatives. A good industrial policy is also critical to the growth and development of the stock exchange.

The negative impact of banks in the short run though insignificant is a cause for concern as this transmits to long run economic growth. This calls for immediate short run policies and strategies to remove any impediments to the efficient functioning of the sector. A strong regulatory environment and supervision by the Central Bank is thus necessary to ensure sound banking practices. A stable financial market is important to reduce financial disintermediation.

The impact of capital investment was found positive and significant both in the short run and long run. Thus there is need for policies that will further increase productive investment and attract foreign investor in the country as thus would greatly increase economic growth.

More importantly banks were found to positively contribute significantly and more to economic growth in the long run than stock markets which contributed negatively. The main policy implication is that the government must seek to promote growth through a financially-based system rather than through stock exchange promotion. What is needed is to extend the means and put in place measures that will incentivise banks to tap into the
huge financial resources being held by the large unbanked informal and rural market in Zimbabwe. This again calls for proper regulation and supervision from the central bank.

This however does not mean that government must turn a blind eye on the stock exchange as the negative effects must be contained. The negative contribution is only an indication of the need to put in place measures that will force companies to seek expansion through organic growth as this will promote economic development. Wide spread mergers and takeovers in industry do not promote growth. No doubt there is need to reduce share turnover, improve corporate control and governance and the regulatory environment for a more organised trading environment on the stock exchange.

Given a choice, the results seem to suggest that a bank-based system for Zimbabwe is the first channel of choice for the promotion of economic growth. However, with the rapid expansion of stock exchanges in developing countries, one would expect them to play a more leading role in promoting economic growth as they grow and mature. Finally A stable enabling macroeconomic environment is critical for finance-led growth in Zimbabwe.

6.4: Suggestions for Further Research

Research output is largely influenced by the choice of methodology and the choice of variables used. This study used the ARDL model. A comparison with other cointegration techniques may yield interesting results. Performance in the financial market is also heavily influenced by qualitative factors. Inclusion of these factors is suggested for future researchers.

6.5: Summary of the Study

The study highlighted the importance of bank and stock market developments to the growth of the Zimbabwean economy. These two are the main channels through which scarce resources are mobilised and channelled to the productive sectors of the economy.
to enhance growth. Thus the growth and development of the financial sector must be accorded key priority. A healthy and efficient financial sector is necessary for sustained economic growth. With a large unbanked market and billions of dollars circulating in the informal financial market, the potential for finance led growth is there but is impeded by many factors. A strong regulatory framework and substantial financial market reforms coupled with a stable macroeconomic environment that will reduce disintermediation are thus critical for the development of the country. The negative effects of the stock market to economic growth need to be contained at all costs. Thus well-crafted policies must be put in place to insulate the economy from these negative effects for the stock markets are here to stay. With the right policies they will contribute positively to economic growth.
References


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Appendices

Appendix A: Transformed Variables

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<th>YEAR</th>
<th>lnGDP</th>
<th>lnK</th>
<th>SMDI</th>
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<td>2.928616</td>
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<td>0.057062</td>
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<td>-0.80562</td>
<td>0.606783</td>
</tr>
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<td>6.519962</td>
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<td>6.065395</td>
<td>3.210117</td>
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</tbody>
</table>
Appendix B: Autoregressive Distributed Lag Estimates

ARDL(1,0,2,2) selected based on Schwarz Bayesian Criterion

Dependent variable is LNGDP
23 observations used for estimation from 1990 to 2012

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNGDP(-1)</td>
<td>.72391</td>
<td>.094478</td>
<td>7.6622[.000]</td>
</tr>
<tr>
<td>LNK</td>
<td>.076142</td>
<td>.019825</td>
<td>3.8408[.002]</td>
</tr>
<tr>
<td>BDI</td>
<td>-.024582</td>
<td>.033227</td>
<td>-.73984[.472]</td>
</tr>
<tr>
<td>BDI(-1)</td>
<td>.037853</td>
<td>.027804</td>
<td>1.3614[.195]</td>
</tr>
<tr>
<td>BDI(-2)</td>
<td>.092460</td>
<td>.034570</td>
<td>2.6746[.018]</td>
</tr>
<tr>
<td>SMDI</td>
<td>.061414</td>
<td>.029726</td>
<td>2.0660[.058]</td>
</tr>
<tr>
<td>SMDI(-1)</td>
<td>-.049886</td>
<td>.024625</td>
<td>-2.0259[.062]</td>
</tr>
<tr>
<td>SMDI(-2)</td>
<td>-.075552</td>
<td>.024146</td>
<td>-3.1290[.007]</td>
</tr>
<tr>
<td>C</td>
<td>1.5295</td>
<td>.58756</td>
<td>2.6031[.021]</td>
</tr>
</tbody>
</table>

R-Squared         .97686   R-Bar-Squared   .96364
S.E. of Regression .047518   F-Stat.   F(8,14) 73.8875[.000]
Mean of Dependent Variable 6.3072   S.D. of Dependent Variable .24921
Residual Sum of Squares .031612   Equation Log-likelihood 43.1462
Akaike Info. Criterion 34.1462   Schwarz Bayesian Criterion 29.0365
DW-statistic     1.9190   Durbin's h-statistic .21779[.828]

Testing for existence of a level relationship among the variables in the ARDL model

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>95% Lower Bound</th>
<th>95% Upper Bound</th>
<th>90% Lower Bound</th>
<th>90% Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.7447</td>
<td>3.9767</td>
<td>5.4112</td>
<td>3.1786</td>
<td>4.3782</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W-statistic</th>
<th>95% Lower Bound</th>
<th>95% Upper Bound</th>
<th>90% Lower Bound</th>
<th>90% Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.9789</td>
<td>15.9070</td>
<td>21.6446</td>
<td>12.7146</td>
<td>17.5128</td>
</tr>
</tbody>
</table>

If the statistic lies between the bounds, the test is inconclusive. If it is above the upper bound, the null hypothesis of no level effect is rejected. If it is below the lower bound, the null hypothesis of no level effect can't be rejected. The critical value bounds are computed by stochastic simulations using 20000 replications.

NB: the critical bounds here as generated by Microfit are from Pesaran et al.(2001). In the Model Critical bounds used were from Narayan (2004).
Appendix C: Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Serial Correlation</td>
<td>CHSQ(1) = .046624[.829]</td>
<td><em>F(1,13) = .026406[.873]</em></td>
</tr>
<tr>
<td>B: Functional Form</td>
<td>CHSQ(1) = .0059311[.939]</td>
<td><em>F(1,13) = .0033533[.955]</em></td>
</tr>
<tr>
<td>C: Normality</td>
<td>CHSQ(2) = .096942[.953]</td>
<td>Not applicable</td>
</tr>
<tr>
<td>D: Heteroscedasticity</td>
<td>CHSQ(1) = .15757[.691]</td>
<td><em>F(1,21) = .14486[.707]</em></td>
</tr>
</tbody>
</table>

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Appendix D: Error Correction Model

Error Correction Representation for the Selected ARDL Model
ARDL(1,0,2,2) selected based on Schwarz Bayesian Criterion

Dependent variable is dLNGDP: 23 observations used for estimation from 1990 to 2012

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>dLNK</td>
<td>.076142</td>
<td>.0198</td>
<td>3.8408 [.001]</td>
</tr>
<tr>
<td>dBDI</td>
<td>-.024582</td>
<td>.03322</td>
<td>-.73984 [.470]</td>
</tr>
<tr>
<td>dBDI1</td>
<td>-.092460</td>
<td>.0345</td>
<td>-2.6746 [.017]</td>
</tr>
<tr>
<td>dSMDI</td>
<td>.061414</td>
<td>.0297</td>
<td>2.0660 [.055]</td>
</tr>
<tr>
<td>dSMDI1</td>
<td>.075552</td>
<td>.0241</td>
<td>3.1290 [.006]</td>
</tr>
<tr>
<td>ecm(-1)</td>
<td>-.27609</td>
<td>.0944</td>
<td>-2.9223 [.010]</td>
</tr>
</tbody>
</table>

List of additional temporary variables created:
dLNGDP = LNGDP-LNGDP(-1)
dLNK = LNK-LNK(-1)
dBDI = BDI-BDI(-1)
dBDI1 = BDI(-1)-BDI(-2)
dSMDI = SMDI-SMDI(-1)
dSMDI1 = SMDI(-1)-SMDI(-2)
ecm = LNGDP -.27578*LNK -.38295*BDI + .23189*SMDI -5.5399*C

R-Squared                   .76084      R-Bar-Squared                   .62418
S.E. of Regression           .047518     F-Stat.    F(6,16)      7.4231 [.001]
Mean of Dependent Variable  -.018068     S.D. of Dependent Variable     .077512
Residual Sum of Squares      .031612     Equation Log-likelihood        43.1462
Akaike Info. Criterion       34.1462     Schwarz Bayesian Criterion     29.0365
DW-statistic                  1.9190

R-Squared and R-Bar-Squared measures refer to the dependent variable
dLNGDP and in cases where the error correction model is highly
restricted, these measures could become negative.

Testing for existence of a level relationship among the variables in the ARDL model

F-statistic  95% Lower Bound  95% Upper Bound  90% Lower Bound  90% Upper Bound
7.7447       3.9767             5.4112            3.1786            4.3782

W-statistic  95% Lower Bound  95% Upper Bound  90% Lower Bound  90% Upper Bound
30.9789      15.9070            21.6446           12.7146           17.5128

If the statistic lies between the bounds, the test is inconclusive. If it is above the upper bound, the null
hypothesis of no level effect is rejected. If it is below the lower bound, the null hypothesis of no level
effect can't be rejected. The critical value bounds are computed by stochastic simulations using 20000
replications.
Appendix E: Plot of Residuals

Plot of Residuals and Two Standard Error Bands
Appendix F: Residuals and Fitted Values of Regression

Based on ARDL regression of LNGDP on:
LNGDP(-1)  LNK  BDI  BDI(-1)  BDI(-2)  SMDI  SMDI(-1)  SMDI(-2)  C
23 observations used for estimation from 1990 to 2012

<table>
<thead>
<tr>
<th>Observation</th>
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<th>Fitted</th>
<th>Residual</th>
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