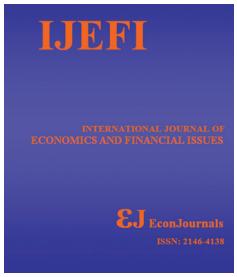

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Financial and Monetary Reforms and the Finance-Growth Relationship in Zimbabwe

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ABSTRACT

The study employs the Granger causality test in a multivariate cointegration and error correction environment to examine the relationship between financial development and economic growth in Zimbabwe. Using annual data from 1980 to 2012, and after controlling for financial and monetary reforms, the study demonstrates a unidirectional causal relationship that runs from financial development to economic growth. The evidence shows that financial development; banking sector development in particular, is not a passive response to economic growth. Instead, it is a critical tool for accelerating economic growth. Policy implications of this evidence are that the banking sector in Zimbabwe must be supported with policies that encourage credit expansion and innovation to support economic growth. The equities market, on the other hand, requires more investor-friendly innovations and policies, especially with regard to trading efficiency and foreign investor participation in the primary market. In combination, these policy interventions should be able to magnify the positive effect of financial development on economic growth.

Keywords: Financial Development, Economic Growth, Financial Reforms, Granger Causality
JEL Classifications: C22, E44, G10, O11, O40

1. INTRODUCTION

The link between financial development and economic growth has been a subject of sustained academic and policy debate throughout the 20th century. Yet no consensus has been reached despite numerous scholarly works hitherto, in both developed and developing economies. Economists maintain that economic growth is propelled by the factors of production (labour, capital and land) and the rate of technological progress. Schumpeter (1912) argues that technological progress is facilitated by a well-functioning financial system.

Linking financial development and economic growth has become an intricate puzzle that requires full appreciation of individual countries' financial nomenclature especially in developing nations like Zimbabwe. Given a plethora of conflicting evidence, scholars stress the need for continuous refinement of estimation and research tools used to analyse the finance growth relationship.

Most of the previous studies have used time series data (Levine, 2005) and cross sectional data (Levine and Zervos, 1998) to model the finance-growth relationship. Time series analysis focuses on single country data while cross sectional data combines a number of countries. Whilst each methodology has pros and cons, cross sectional data methodologies have been questioned on the grounds that they fail to satisfactorily control for cross country heterogeneity (Kemal et al., 2007) and address issues of causality more formally (Levine, 2005). Time series analysis on the other hand has worked well for single country studies making causality tests more formal and easier.

In Zimbabwe, sharply contrasting views on the link between financial development and economic growth exist. The number of studies however, remains very small. Ndlovu (2013) for example, finds unidirectional causality that runs from economic growth to financial development. On the other hand, Zivengwa et al. (2011) document a unidirectional causality from stock market development to economic growth. Qayyum et al. (2012) discover no evidence on Zimbabwe to suggest that finance spurs growth or vice versa. Jecheche (2011) finds evidence of a positive relationship between an efficient stock market and economic growth with no mention of a causal relationship however. It is

important however to note that none of the existing studies control for financial reforms that the country experienced in 1991, which removed directed bank lending, liberalized bank licensing and decontrolled interest rates. Furthermore, Zivengwa et al. (2011) and Jecheche (2011) only focus on stock market development which is only a part of financial development. Chigumira and Masiyandima (2003) find that financial reforms indeed increased domestic savings mobilization due to high deposit rates. However, Makina (2009) reports that reforms failed to address structural causes that hampered financial inclusiveness. Focusing on small to medium enterprises and the unbanked poor (Chigumira and Masiyandima, 2003 and Makina, 2009 respectively) underplays the role that reforms played in the economy. While the magnitude of impact may be debated, neglecting financial reforms in the study of the finance-growth relationship is bound to distort findings in Zimbabwe.

This study examines the causal relationship between financial development and economic growth in Zimbabwe using time series data from 1980 to 2012. The key improvement in this study is that it controls for financial and monetary reforms of 1991 and 2009 respectively, which enhances the quality of evidence on the finance-growth relationship in Zimbabwe. The study is organised as follows: Section 2 covers a critical review of related literature; Section 3 outlines the study methodology; Section 4 documents the empirical results of the study; and Section 5 provides concluding remarks and recommendations.

2. LITERATURE REVIEW

Sharp differences exist among scholars regarding the nature of relationship that exists between financial development and economic growth with the discussion spanning over decades. This section discusses the concepts of financial development and economic growth both theoretically and empirically, articulating the finance-growth debate and how researchers over time have adapted their approaches to improve knowledge and understanding of the subjects. A cursory look at financial liberalization and its implications on financial development and growth is made given that Zimbabwe's financial system experienced key financial reforms during the study window period.

2.1. Economic Growth

Theoretically, economic growth has largely been viewed as a sustained increase in the country's capacity to produce goods and services over a period of time. Driven by such factors of production as capital, land, labour and technology, economic growth has a bearing on the living standards of the people, which all things being equal is the worry of many national governments. Jalil and Ma (2008) define economic growth as a positive change in the level of production of goods and services over time. Whilst economists have coined different definitions of the phrase "economic growth," there seem to be consensus on how it is measured as seen from the convergence on the use of real per capita gross domestic product (GDP) (Ndlovu, 2013; Qayyum et al. 2012; Adusei, 2012; Bittencourt, 2011; Jali and Ma, 2008 and King and Levine, 1993 among many others). The use of real per capita GDP as a proxy of economic growth rests on its ability to account for population differences and the distributional effects it carries. Theoretically the higher the per capita GDP the more income people have to save, in which case more savings play an instrumental role in a country's investment function.

2.2. Financial Development

Levine (2005) submits that financial development occurs when the financial system (instruments, markets and institutions) reduces significantly the effects of information, transaction and enforcement costs arising from market frictions. Adnan (2011) views financial development as a set of policies, factors, and institutions that result in efficient and effective intermediation. Effectively, financial development occurs when information and transaction costs are substantially reduced and efficient intermediation and resource allocation achieved. This is achieved through five ways according to Levine (2005) namely; timely production of investment projects information, investment monitoring and implementation of corporate governance, savings mobilization, risk management and facilitation of exchange of goods and services.

The measurement of financial development is not as straightforward as that of economic growth. This is mainly due to the complex nature of financial development and the architectural differences in financial structures across the world economies. Notwithstanding the complexity of financial development, many studies for instance Beck et al. (2001), Levine and Zervos (1998), Levine (1997) and King and Levine (1993) have used measures of size and activity of both direct and indirect finance to proxy financial development.

Widely accepted and used measures of financial development in the analysis of the finance-growth nexus are; liquid liabilities as a share of GDP (size), stock market capitalization as a share of GDP (depth) and domestic credit to private sector as a share of GDP (activity) (King and Levine, 1993; Lynch, 1996; Levine and Zervos, 1998; Bittencourt, 2011; Qayyum et al. 2012). Increases in any of the measures above indicate some form of financial development.

While the use of domestic credit to private sector as a measure financial development dominates many studies, Uddin et al. (2013), Adusei (2012) and Levine and Zervos (1998) have used domestic credit by the banking sector instead. The justification of this metric is made in light of developing nations where governments are obliged to provide infrastructure for economic development which role may compel them to borrow from financial markets (Adusei, 2012). Hence the use of credit by banks instead of credit to private sector is thought to capture the full degree of financial intermediation in developing countries than credit to private sector only.

2.3. The Relationship between Financial Development and Economic Growth

2.3.1. Theoretical perspective

The theoretical argument connecting financial sector development and economic growth is that a sound, well-functioning and developed financial intermediation system fosters economic growth through efficient allocation of resources across space

and time (Levine, 1997 citing Merton and Zvi, 1995). Levine (1997) uses a diagrammatic illustration of the theoretical linkage between financial development and economic growth similar to the one in Figure 1.

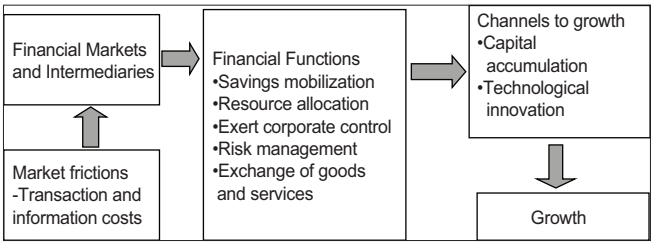
Distinct sets of financial services are a creation of a wide spectrum of types and combinations of information and transaction frictions. As such, financial services, instruments and institutions evolve over time in response to and to deal with a diverse set of frictions in the market. A developed financial system is one where policies, factors and institutions result in efficient resource allocation and effective intermediation (Adnan, 2011; Creane et al., 2004) and where problems caused by information asymmetry and transaction frictions are minimized (Levine, 1997). Efficiency and effectiveness referred to herein relates to reduction in information, transaction and monitoring costs Khan et al. (2005).

Capital accumulation influences economic growth through the savings function, either by affecting the rate at which people save or by reallocation of savings among different capital producing technologies (Levine, 1997). On the other hand, technology based models for instance Aghion and Howitt (1992) show that the financial system affects economic growth, either by altering the rate of technological advancement or by identifying and financing those entrepreneurs whose chances of success are high in initiating new goods and production processes (King and Levine, 1993). Reciting Schumpeter (1912), Levine (2004) recalls that Schumpeter's view of finance in economic growth was that "the banker is not only a middleman but authorizes people in the name of society to innovate." From this perspective, technological innovation has become the fourth factor of production after land, capital and labour, which dominate early studies on economic development.

2.3.2. The finance-growth debate

Whether finance promotes growth, follows growth, hurts growth or is irrelevant remains a fascinating and exciting debate that dates back to the dawn of history. Among the earliest studies were pioneering economists: Smith (1776), Bagehot (1873), Schumpeter (1912), Robinson (1952), Hicks (1969), Goldsmith (1969), McKinnon (1973), Shaw (1973) and Lucas (1988). Their exquisite contributions have remained the cornerstones in modern day debate on the relationship between financial development and economic growth in both developing and developed countries. Recent studies continue to further complicate the debate by providing even more mixed and inconclusive findings from both the developed and developing worlds. However, most of the recent work has found home in one of the four main ideological schools

Figure 1: A Theoretical approach to finance and growth



Source: Adapted from Levine (1997)

of thought on the finance-growth puzzle, confirming the rigor and strength that pioneering studies carried across centuries.

2.3.2.1. Finance promotes economic growth

Pioneered by Bagehot (1873) and supported by Schumpeter (1912), Hicks (1969), King and Levine (1993) and Levine (1997), the first school of thought is of the view that finance plays a critical role in promoting economic growth. It is a considered view of this school of thought that the financial system emerged to minimize problems arising from market frictions. Serving five key functions: information generation, savings mobilization, risk management, facilitation of exchange of goods and services, and corporate governance interventions, the financial system is able to positively impact on economic growth through capital accumulation and technological innovation.

2.3.2.2. Finance follows economic growth

The second school of thought attributed to the works of Robinson (1952), claims that finance follows growth. The growth leads finance theory posits that financial development and innovative products are engineered in a passive response to the demands of a growing economy. As the economy grows, demand for financial services grows and this demand forces the financial system to respond by providing new products and services specifically meant for new needs. The development of derivatives in response to growing demand for risk management solutions is a case in point.

2.3.2.3. Finance hurts economic growth

The third view is that finance hurts growth (Levine, 2003 and Kemal et al., 2007). Kemal et al. (2007) find that financial development may be "harmful" to economic growth in an inflationary environment. According to Levine (2003), banks have played a more damaging role to the "morality, tranquility and wealth" of nations than good. How? By facilitating risk reduction and efficient resource allocation, better finance implies higher returns to savings and lower risk (Kemal et al., 2007). When risk becomes substantially lower, savings may suffocate and this may result in lower growth.

2.3.2.4. Finance has no relevance to economic growth

Lastly, the fourth and more controversial dimension of the debate is the view that finance does not matter. This is attributed to the works of Lucas (1988) who observes that economists "badly overstress" the role of finance in economic growth. Stern (1989) supports this view by arguing that there is no mention of finance in development economics, not even in a section listing omitted topics. Qayyum et al. (2012) also find no relationship between finance and growth in panel data studies involving both high and low income countries.

An examination of the extant literature shows that the "finance promotes growth" and the "growth leads financial development" perspectives offer more plausible explanations of the possible link between the two variables. On the strength of this observation therefore, it is possible for the relationship between financial development and economic growth to be unidirectional or bidirectional depending largely on the structure of the financial markets, stage of economic growth, legal and regulatory policies

that define the operations of the financial system[1], and the degree of market distortions, costs and frictions which the financial system is created to address.

2.3.3. Empirical perspective

Empirical studies on the finance-growth nexus include panel and time series studies, cross country regression studies, country cases, and firm level studies. Despite the methodological diversity in terms of type, period and measurement across studies, the balance of empirical evidence shows some inclination towards the finance leads growth proposition with some isolated cases in favour of the growth leads financial development proposition as discussed below.

2.3.3.1. Cross-country evidence

One of the earliest studies to empirically establish the link between finance and growth was Goldsmith (1969). Using the value of intermediary assets to proxy financial development, Goldsmith graphically documented a positive correlation between financial development and the level of economic activity using data spanning from 1860 to 1963 on 35 countries. Goldsmith met criticism on the grounds of small sample size, failure to control for country heterogeneity, inadequacy of the measure used to gauge financial development and the failure of the study to establish the direction of causality despite having asserted his unwillingness to draw causal interpretation from his graphical solution (Levine, 2005).

Years after Goldsmith (1969), King and Levine (1993) studied 77 countries over the period 1960 to 1989. Notable improvements from this work were the use of multiple measures of financial development that include liquid liabilities as a share of GDP (depth), bank credit as a share of bank credit plus central bank domestic assets (bank), and credit to private sector as a share of GDP (privy). Using real per capita GDP growth rate, average rate of growth in the capital stock and total productivity growth as dependent variables and proxies for economic growth, King and Levine (1993) employed a regression model of the following form:-

$$G_{(j)}=\alpha + \beta F(i) + \gamma X + \varepsilon \quad (2.1)$$

Their study findings show a strong positive relationship between measures of financial development $F(i)$ and the three economic growth measures $G(j)$. In their model, X represents a matrix of control variables, while α is the fixed effects parameter and ε is a stochastic error term. Despite the tremendous improvements as noted above, King and Levine (1993) failed to resolve the issue of causality. Nonetheless, their work became a reference point for methodological improvements and variable selection. For instance Demetriades and Andrianova (2003), Jalil et al. (2010), Qayyum et al. (2012), Ndlovu (2013) and Kemal et al. (2007) all constantly refer methodological specifications to King and Levine (1993).

While King and Levine (1993) use measures of financial depth and breadth to measure financial development, Levine (2005) contends that there is some good reason for studying the link between growth and the operation of stock markets. Notably, Levine and Zervos (1998) document that stock market development and bank development foster growth. However, their study fails to formally address the issue of causality.

2.3.3.2. Time series and panel evidence

Time series, panel data and case study methodologies try to address statistical problems inherent in cross-country studies (Levine, 2005). By addressing formally issues of causality, time series and panel data analyses have gained popularity over time. Using the dynamic panel methodological model specification, Levine et al. (2000) find that exogenous components of financial intermediary development positively impact on economic growth, productivity and capital growth, while legal and accounting systems that strengthen creditor rights and contract enforcement boost financial development and in turn foster economic growth. Further empirical work shows that exogenous components (both stock market and bank development) can be used to predict growth and have a statistically significant impact on economic growth (Rousseau and Wachtel, 2001 and Beck and Levine, 2004).

Time series studies employing very powerful econometric methods to examine individual countries in detail (Levine, 2005). The most common tools used include Granger non-causality tests, which can be performed in vector auto regressive (VAR) or vector error correction model (VECM) frameworks depending on the characteristics of the time series data. One of the attractions of time series models is that they have made it easier to formally test for causality, a major limitation in earlier studies.

Time series studies emphasize accuracy of measures of financial development. The more precise the measures, the more inclined results would be to "growth enhancing effect of financial development" (Levine, 2005). For instance Rousseau and Wachtel (1998), Al-Jarrah et al. (2012) and Adusei (2012) all document a unidirectional causality that runs from financial development to economic growth. On the contrary, Demetriades and Hussein (1996) and Sunde (2012) report bidirectional causality between finance and growth while Ndlovu (2013) finds a unidirectional causality running from economic development to financial development.

Despite the seemingly straight forward methodological navigation using time series data, Christopoulos and Tsionas (2004) raise reservations on the reliability and quality of time series results in view of the short time spans typical of data arrays. To deal with this challenge, they analyze the finance-growth nexus using panel unit root tests and panel cointegration in ten developing countries. Their results show strong evidence in favour of the long run finance to growth unidirectional causality. Jalil et al. (2010) confirm this positive link using principal component analysis and also document a unidirectional causality from financial development to economic growth using Granger non causality tests and auto regressive distributed lag models.

While the finance-growth debate remains alive in theory, oscillating within the bounds of four main schools of thought

1 See Levine (2004) for a full discussion on factors that determines financial development.

alluded to in earlier sections of this discussion, empirical evidence suggests that the finance promotes economic growth proposition dominates, receiving support from cross-country, panel and time series studies notwithstanding isolated cases where results support other dimensions of the debate.

2.4. Financial Liberalization and Economic Growth

The discussion on financial development and economic growth cannot be complete without a mention of financial reforms. Financial reforms across the world have played an instrumental role; either positively by fuelling financial development or negatively by propagating financial crises.

Financial liberalization is a term used to explain the transition from a heavily controlled financial system to an open and market based system. Major aspects of heavy controls and government interventions include directed lending schemes, interest rate ceilings and high reserve ratios (Demetriades and Andrianova, 2003). Also dubbed financial repression, these controls have been blamed as a major source of financial sector under-development, which in turn hinders growth through depressed savings (McKinnon, 1973 and Shaw, 1973). McKinnon (1973) and Shaw (1973) show that government restrictions on the banking system restrain both the quantity and quality of investment while Ayadi et al. (2013) report that financially repressed financial systems result in credit allocation deficiencies. Keynes (1930) as cited in Arestis (2005), describes credit as a path along which production travels, thus suggesting that bankers should facilitate the travel in order for nations to realize full production capacity.

The success or failure of financial reforms however depends on a variety of issues. McKinnon (1991) bemoans incorrect sequencing of reforms as a major source of failure and suggests that financial reforms should follow real sector reforms that include privatization of state entities, removal of price distortions among others. Stiglitz (2000) on the other hand blames premature financial and capital liberalization as the root cause of financial crises and suggests that an effective regulatory framework must be put in place first.

In Zimbabwe, financial reforms began in 1991 and the financial sector witnessed some changes. Objectives of financial liberalization were to decontrol credit allocation by banks, to establish positive real interest rates and to liberalize the licensing of new financial institutions as a way of increasing competition and improving the quality of banking services (Harvey, 1998). The argument for reforms both from the theoretical and empirical viewpoints was that by allowing market forces to direct lending, resource allocation and pricing would be competitive and in turn propel economic growth.

The removal of repressive policies spurs financial development which in turn ignites economic growth (Zhang et al., 2012). For instance, Zimbabwe financial reforms introduced in 1991 improved domestic savings and mobilization due to high interest rates and increased number of players (Chigumira and Masiyandima, 2003). Confirming this positive development, Zimbabwe's stock market capitalization to GDP ratio rose from 16.09% in 1991 to 42.50% in 1996 while domestic credit by banking sector to GDP ratio grew from 39.29% in 1991 to 52.28% in 1995[2].

Levine (2005) posits that one of the key reasons for the creation of financial markets is to ameliorate problems associated with market distortions, one of which is heavy government control. Financial liberalization is therefore taken in good light as a means of stimulating financial development and thus promoting economic growth through savings mobilization (Chigumira and Masiyandima, 2003; Levine, 1997), risk management, resource allocation, and addressing negative effects of government ownership of banks (La Porta et al., 2002). On this basis, financial reforms remain vital in the analysis of the finance-growth relationship and their omission may lead to incorrect causal inferences.

3. MODEL, DATA AND ECONOMETRIC METHODOLOGY

The study examines the causal relationship between financial development and economic growth in Zimbabwe after controlling for financial and monetary reforms that the country experienced in 1991 and 2009 respectively. The study employs the Granger causality test in a multivariate cointegration and error correction environment to examine the relationship between financial development and economic growth in Zimbabwe. The model, data and variables specification are discussed below.

3.1. Model Specification

The study employs a logarithmic linear model specification of the following functional form following King and Levine (1993):

$$G = \alpha + \beta F + \gamma X + e \tag{3.1}$$

Where:-
G - represents economic growth proxy;
F - is the proxy for financial development and
X - is a set of control factors affecting economic growth.

The last term, e is the white noise error term, while α represents the fixed term effect. The log transformation of variables in view of wide variations in variables partially eliminates any asymmetries in the data. Recognizing that financial development is measured by a number of proxies and that there are other control factors affecting economic growth represented by X in Equation 3.1, the model is further expanded to take the following log linear form:

$$LGDPPC = \beta_0 + \frac{FD\ measures}{\beta_1 LSMC + \beta_2 LBSC + \beta_3 LLLS} + \frac{Control\ variables}{\gamma_1 LINF + \gamma_2 LRINT + \gamma_3 LOPEN + \gamma_4 LGEXP + \gamma_5 FRM + \gamma_6 MRF + \eta_t} \tag{3.2}$$

2 World Bank Development Indicators (Zimbabwe) extracted on 19 April 2014.

Where:
LGDPPC – log of real per capita GDP
LSMC – Log of stock market capitalization as a share of GDP
LBSC – Log of domestic credit by banking sector as a share of GDP
LLLS – Log of liquid liabilities (M3) as a share of GDP
LINF – Log of rate of inflation
LRINT – Log of real interest rate
LOPEN – Log of trade ratio of trade openness as a share of GDP. Trade openness is the sum of imports and exports expressed as a share of GDP
LGEXP – Log of government expenditure as a share of GDP
FRM – dummy variable for financial reforms (reforms that took place in 1991)
MRF – dummy variable for monetary reforms (adoption of the multi-currency in 2009)
FD – financial development
η_t – stochastic white noise error term
β_{0-3}/γ_{1-6} – estimation parameters (coefficients)

In examining the finance-growth relationship, we use model coefficients' signs to indicate the direction of effect and the size to show the strength of the relationship of each independent variable. We also use the *F* test to evaluate the joint significance of model parameters and the coefficient of determination to assess model fitness, in which case a coefficient of more than 60% is preferred (Gujarati, 2003). Lastly, we also perform residual tests of serial correlation, normality and heteroscedasticity to assess model robustness.

3.2. Data

The study uses annual time series data obtained mainly from World Bank Development Indicators on line, ZIMSTAT and RBZ Monthly Economic Reviews. Financial sector development measures, government size and trade ratio are expressed as ratios of the GDP. All study variables are transformed into natural logarithms to partially eliminate any data asymmetries according to Sarel (1996) cited by Adusei (2012).

The selection of appropriate proxies of financial development and economic growth is one of the vital issues in the analysis of the finance-growth relationship (King and Levine, 1993). Economic growth is primarily measured by real per capita GDP and there appears to be convergence among scholars on its use (King and Levine, 1993; Ndlovu, 2013; Adusei, 2012; Jalil and Ma, 2008). The main reasons for using real per capita GDP are that the measure captures income distribution effects and also allows for cross country comparisons.

While the measurement of economic growth is rather straight forward, the same does not apply to financial development largely because there is no single accepted definition of the financial development construct Beck et al. (2001). A number of indicators such as financial intermediation, stock market size and activity, direct and indirect finance activity have been used to proxy financial development in previous studies Qayyum et al. (2012). The selection of a particular set of variables depends mainly on the availability of data, the structure of the financial system within which the study is conducted and also the purpose for which the measures are required by individual researchers. This is notwithstanding the fact that constant reference is made to widely accepted and used measures of financial depth and breadth put forward by pioneering studies such as King and Levine (1993) among many others.

In this study, three measures of financial development are used and these are stock market capitalization, domestic credit and liquid liabilities, all expressed as a share of GDP. These measures capture the size of financial intermediary services, activity of indirect finance and the size of direct finance as discussed below.

3.2.1. Financial intermediation

Currency in circulation, demand deposits, interest bearing liabilities for both banks and other financial intermediaries are used to measure the size of financial intermediaries Qayyum et al. (2012). These liquid liabilities constitute the monetary aggregate commonly referred to as M3. Expressed as a percentage of GDP, this is the broadest indicator of financial intermediation. In studies that also use principal component analysis in developing a financial development index, liquid liabilities feature as one of the critical components (Creane et al., 2003 and Jalil et al., 2010). In theory, the higher the level of liquid liabilities (money supply), the higher the degree of financial intermediation.

3.2.2. The activity of indirect finance

Previous studies have noted that measures of size do not accurately measure the functioning of the financial system Qayyum et al. (2012). As an alternative, measures of activity of indirect finance are used. In this regard, domestic credit to private sector and domestic credit by the banking sector have been widely used. This study uses domestic credit by the banking sector instead of domestic credit to the private sector. This is because domestic credit by the banking sector captures the full degree of intermediation especially in developing countries where governments borrow from banks to finance development (Adusei, 2012). Nonetheless, domestic credit to the private sector is used in a separate model to check for possible variations and/or model consistencies.

3.2.3. The size of direct finance

Direct finance constitutes one of the most important determinants of financial development. In theory, the bigger the size of direct finance, the more developed the financial system ought to be. Stock market capitalization has been widely used as a good measure of direct finance. Following Qayyum et al. (2012), this study uses stock market capitalization as a ratio of GDP to measure the size of direct finance.

3.2.4. Control variables

The study controls the model for inflation, real interest rates, government size and trade ratio. Inflation exerts a negative impact on economic growth as it erodes the purchasing power of money over time. It is therefore expected that the model coefficient of inflation is negative. Real interest on the other hand has a positive impact on growth as it promotes higher rates of saving. The higher the real rate of interest, the more savings a country can mobilize

and the higher the expected rate of growth in investment and output.

Given the bureaucratic nature of government, the bigger the size of government the lower is the expected rate of growth. Therefore, the coefficient of government size ought to be negative as intimated by Barro (1997) cited by Qayyum et al. (2012). Lastly, greater trade openness implies greater level of competition and exposure to new ideas and technology, which exerts a positive effect on economic growth. On this basis, the coefficient of trade openness ought to be positive.

3.3. Econometric Estimation

3.3.1. Unit root tests

The initial step is the calculation of individual time series unit root to check for stationarity. Stationarity checks are necessary because if time series data are not stationary, econometric model estimation results may lead to spurious relationships. Using the augmented Dickey–Fuller (ADF) test, this entails estimating the following regression equations:

$$\Delta Y_t = (\rho - 1)\, Y_{t-1} + u_t \tag{3.3}$$

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-i} + \varepsilon_t \tag{3.4}$$

Where ε_t is a white noise error term and $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, m is the number of lagged difference terms. The null hypothesis tested under ADF is: H_0: $\delta=0$ against H_1: $\delta\neq0$. If $\delta=0$, then $\rho=1$ and the variable has a unit root, meaning that the time series is non-stationary. The accept/reject decision is based on ADF t-statistic as follows:

- If ADF statistic > t-statistic at chosen level of significance (LOS) – reject the null and conclude that the series has no unit root (i.e. series is stationary)
- If ADF statistic < t-statistic at chosen LOS – do not reject the null and conclude that the series has unit root (i.e. non stationary).

3.3.2. Co-integration tests

It is possible that time series variables may be level non stationary but become stationary after first differencing. If all the variables are first difference stationary, they are integrated to the first order (i.e. I[1]). In such a case, variables are tested for cointegration to establish the existence of long run relationships between indicators of financial development and economic growth. Cointegration tests are performed using Johansen's cointegration test under the null hypothesis that there are *N* cointegrating equations. Using the trace statistic and maximum Eigen values, the null hypothesis is rejected if these values are greater than the critical value at 5% LOS. In addition, the null hypothesis will also be rejected if the MacKinnon–Haug–Michelis (1999) *P* values are <5%. If variables are found to be cointegrated, Granger causality tests are performed in a multivariate vector error correction environment.

3.3.3. Ordinary least squares (OLS) estimation

The OLS model is employed to investigate the effect of financial and monetary reforms on the relationship between financial development measures and economic growth. This is achieved by running OLS regressions systematically by introducing reforms in stages, before running a complete model of the form in Equation 3.2 with all controls. Particular interest in the OLS regressions is on the explanatory power of the model as measured by the coefficient of determination (R^2). In view of the fact that financial reforms are deemed vital in this analysis, R^2 is expected to improve with the introduction of reforms.

3.3.3.1. Granger causality tests

Testing for Granger causality among variables depends on whether the variables are stationary or not, cointegrated or not. Firstly, if variables are level stationary, a simple bivariate pair-wise Granger causality test of the following form is used:

$$GDP_t = \sum_{i=1}^{n} \alpha_i\, FD_{t-i} + \sum_{j=1}^{n} \beta_j GDP_{t-j} + u_{1t} \tag{3.5}$$

$$FD_t = \sum_{i=1}^{n} \lambda_i FD_{t-i} + \sum_{j=1}^{n} \delta_j GDP_{t-j} + u_{2t} \tag{3.6}$$

It is assumed that the white noise disturbances u_{1t} and u_{2t} are uncorrelated (Gujarati, 2003). If the estimated coefficients of the lagged FD in equation 3.5 are jointly and significantly different from zero (i.e. $\sum\alpha_i \neq 0$) and the coefficients of the lagged GDP in equation 3.6 are not significantly different from zero (i.e. $\sum\delta_i = 0$), there is unidirectional causality running from FD to economic growth (i.e. FD→GDP). To test the null hypothesis that financial development does not Granger cause economic growth (i.e. H_o: $\sum\alpha_i = 0$), the F test is applied, where:

$$F = \frac{(RSS_R - RSS_{UR})/m}{RSS_{UR}/(n-k)} \tag{3.7}$$

RSS_R is the residual sum of squares of the restricted regression; RSS_{UR} is the residual sum of squares of the unrestricted regression; m is the number of lagged FD terms, n is the number of observations and k is the number or regressors. If the calculated F is greater than the critical F at selected LOS, the null hypothesis is rejected in which case FD belongs to the regression and it is concluded that financial development causes economic growth.

Secondly, if variables are not level stationary (first difference stationary) but not cointegrated, VAR models can be used to check for Granger causality in multivariate time series data. Thirdly, if variables are first difference stationary and cointegrated, there exists long run association between variables and Granger causality can be analyzed using vector error correction of the form shown in Equation 3.8.

$$\Delta GDP_t = \phi + \delta t + \lambda e_{t-1} + \gamma_1 \Delta GDP_{t-1} + \ldots + \gamma_p \Delta GDP_{t-p} + \omega_1 \Delta FD_{t-1} + \ldots + \omega_q \Delta FD_{t-q} + \varepsilon_t \tag{3.8}$$

In theory, FD Granger causes GDP if past values of FD have explanatory power for current values of GDP. Applying this theory to the ECM, it is noted that the past values of FD appear in the terms $\Delta FD_{t-1}\ldots\ldots$, ΔFD_{t-q} and e_{t-1}. Using specification tests such as t-statistic, *P* values and F-statistic, the Granger non causality

null hypothesis is stated thus; Ho: $\omega_1 = \omega_q = \lambda = 0$. This means that FD does not Granger cause GDP. If the null is rejected, it leads to the conclusion that FD Granger causes GDP.

While both VAR and VECM are used to test for causality, Fukuda (2012) notes that VECM is much better in that it shows a definite direction through the sign of each underlying variable's coefficient in the cointegration equation. Another attraction of VECM is that it imposes a strict condition that all underlying must be I(1) making the model more robust.

3.3.4. Model robustness tests

While it is relatively easy to run any model, the quality of results depends largely on model fitness and robustness. Before interpretation and analysis, OLS regression and VEC models are checked for fitness based on R-squared, F statistic, normality, heteroscedasticity and serial correlation. Heteroscedasticity is tested using the Breusch-Pagan-Godfrey test (under *Ho*: residuals are not heteroscedastic), serial correlation is tested using the Breusch-Godfrey LM test (under *Ho*: residuals are not serially correlated) while the normality test is performed using the Jarque–Bera test (under *Ho*: residuals are normally distributed).The best case scenario of a good model is where the null hypothesis is not rejected in all the three tests (i.e. $P > 0.05$) and R-squared is more than 0.60 with the *P* value of the F-statistic below 0.05 (Gujarati, 2003).

4. EMPIRICAL RESULTS

4.1. Statistical Properties of Data

4.1.1. Descriptive statistics

Table 1 provides a summary of the statistical properties of the data after log transformation. Statistics show that the variables closely follow the normal distribution, a condition that is important in econometric modeling of time series data. This is derived from the fact that the mean and the median of each data series are very close to each other.

The log transformation helps to remove data asymmetries given wide variations characterizing some of the variables like money supply and inflation for instance. On this background therefore, the data was deemed fit for econometric estimation.

4.1.2. Unit root tests – First difference

Table 2 shows the ADF stationarity tests results for the data.

All the variables were found to be stationary after first differencing. This means that all the variables were integrated to the first order (I[1]) making the data suitable for Granger causality analysis in VEC environment.

4.1.3. Cointegration test results

Cointegration test results are shown in Table 3. Using Johansen cointegration test method, the variables were found to be cointegrated at 5% LOS. On this basis therefore, the causal nature and direction of the long run relationship between financial development and economic growth were investigated using the VECM.

4.2. Stock Market Development and Economic Growth

Stock market development has a long run positive impact on economic growth; although in absolute terms the coefficients are small (Tables 4 and 5). This confirms Levine and Zervos (1998) findings that stock market size is not robustly linked to growth although it enters growth regressions significantly (Beck and Levine, 2002) and exerts a positive impact on growth (Zivengwa et al., 2011; Wong and Zhou, 2011 and Edame and Uchenna, 2013). The small but significant positive effect of stock market development can be explained in two-ways. Firstly, while new listings took place during the review period, the listings were not very significant in terms of dollar value to stimulate growth on the back of mounting inflationary pressures. Secondly, ZSE activity had become more of speculative and gambling activity than a representation of real activity because of the unwelcome noise brought into the market by galloping inflation. The end result was that the hot money that changed hands on the stock exchange did very little to change the direction of the nation's real economy.

4.3. Money Supply and Economic Growth

Money supply impacted negatively on economic growth as reflected in both the OLS and VECM coefficients (Tables 4 and 5). This is contrary to theory as documented by Ogunmuyiwa and Ekone (2010), where money supply ought to have a positive influence on growth. The results are not surprising in the Zimbabwean context because the manipulation of money supply in the country since 1997 has not been growth driven. Instead, money supply was meant to achieve other socio and political objectives. For instance, unbudgeted expenditure on war veterans in 1997 saw on 14 November 1997, the Zimbabwe dollar losing about 71.5% of its value against the US$ and the stock market losing 46% of its value[3]. Further money supply distortions came from the fast track land reform program in 2000, which compelled the government to increase money supply to support the activities, the printing

3 Source: "A moment of silence for Black Friday", by Lance Mambondiani: Zimbabwe Independent, 2 November 2007.

Table 1: Descriptive statistics

	LGDPPC	LSMC	LBSC	LCPVT	LLLS	LINF	LRINT	LOPEN	LGEXP
Mean	1.959292	3.773889	3.920535	3.217299	3.844699	4.011537	3.426454	4.176749	2.785753
Median	1.962253	3.551600	3.956264	3.282207	3.806459	3.110149	3.610837	4.236468	2.888603
Maximum	2.560787	6.189955	5.103269	4.640849	5.145449	19.25793	5.529887	5.007872	3.313716
Minimum	1.226773	2.230194	3.098602	1.932970	3.289157	1.068153	1.448498	3.581207	0.716434
Standard deviation	0.337968	1.029391	0.427271	0.596801	0.387309	3.331981	1.200636	0.363217	0.552230
Skewness	−0.463391	0.575292	0.053448	−0.391974	1.210938	3.279243	0.078222	0.342170	−2.642923
Kurtosis	2.871948	2.596500	3.723814	3.474879	5.130300	15.07201	2.205562	2.449781	9.497601

of Z$20,000 bearer cheque to ease cash shortages in 2003 and manage inflation that had become the nation's number one enemy.

Empirical studies for instance Kemal et al. (2007) have shown that financial development may even be harmful to economic growth in a hyper-inflationary environment consistent with the present study results. In addition, Bittencourt (2011) shows that macroeconomic stability – low inflation in particular and institutional framework are preconditions for financial development and consequently for sustained growth. This explains why in Zimbabwe, money supply driven by inflation has impacted negatively on growth.

Table 2: Unit root test results

Variables	Constant	Constant and trend
	ADF statistic	ADF statistic
LGDPPC	−3.021593**	−4.194283**
LSMC	−7.186670***	−6.983690***
LBSC	−4.744806***	−4.870758***
LCPVT	−4.949681***	−5.044071***
LGEXP	−3.822318***	−3.779400**
LINF	−5.115189***	−5.106711***
LRINT	−4.892685***	−3.768285**
LOPEN	−3.715800***	−3.446160*

***,**,* rejection of the null hypothesis that the series has unit root at 1%, 5%, 10% LOS. LOS: Level of significance, ADF: Augmented Dickey–Fuller

The macro economic situation had deteriorated to unprecedented levels with institutional framework full of distortions all in the name of the big fight against inflation. All these distortions lend credence to the unusual relationship between money supply and growth documented in this study.

4.4. Domestic Credit and Economic Growth

Findings show a significant positive impact of domestic credit on economic growth. While the positive impact of domestic credit confirms findings from King and Levine (1993), Beck and Levine (2002) and also Ayadi et al. (2013), Adu et al. (2013) note that the growth effect of financial development exhibits sensitivity to the choice of proxy. This observation is reinforced by the differences in size of coefficients for domestic credit by banks (+0.6) and credit to private sector (+0.295) detailed in Table 5.

Apparently, domestic credit has the greatest positive impact on growth when compared to other measures of financial development. This stands to imply that any policies that constrain credit underwriting capacity of banks, makes it expensive to underwrite loans or jeopardize lending innovation are likely to hurt economic growth. This is because, where credit allocation is inefficient, non-performing loans preventing financial development from significantly contributing to economic growth.

Table 3: Johansen cointegration test results

Hypothesized number of CE(s)	Eigenvalue	Trace statistic	0.05 critical value	*P***
Unrestricted cointegration rank test (trace):				
LGDPPC, LSMC, LBSC and LLLS				
None*	0.756632	66.19067	47.85613	0.0004
At most 1*	0.676578	35.10074	29.79707	0.0111
At most 2	0.372479	10.26723	15.49471	0.2607
At most 3	0.000713	0.015697	3.841466	0.9001
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
Maximum Eigenvalue test				
None*	0.756632	31.08993	27.58434	0.0170
At most 1*	0.676578	24.83351	21.13162	0.0144
At most 2	0.372479	10.25153	14.26460	0.1959
At most 3	0.000713	0.015697	3.841466	0.9001

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level, *Rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) *P* values

Table 4: OLS regression results

FD measures	Dependent variable: LGDPPC coefficients				
	Regressors	Restricted	Intermediate		Final models
	LSMC	0.03031[4]	0.0031	0.0828	0.0652	0.0606
	LBSC	1.4149***	1.2324***	0.4575	0.4472	Na
	LCPVT	Na[5]	Na	Na	Na	0.0740
	LLLS	−1.3097***	−1.0929**	−0.5466	−0.5035	−0.1787
Reforms	FRM	Na	0.4450*	Na	0.2176	0.1830
	MRF	Na	Na	−1.6680	−1.5304***	−1.7511***
	R^2	0.71	0.76	0.878	0.889	0.879
	F-statistic	5.68	6.03	13.53	12.48	11.28
	P (F-statistic)	0.002	0.001	0.000	0.000	0.000
Normality	Jarque-Bera test	1.02 (0.60)‡	1.43 (0.49)‡	0.644 (0.72)‡	0.674 (0.71)‡	1.29 (0.53)‡
Serial correlation	Breusch-Godfrey LM test	11.96 (0.025)	9.30 (0.0095)	4.69 (0.096)‡	5.33 (0.0697)‡	10.63 (0.0049)
Heteroscedasticity	Breusch-Pagan-Godfrey test	9.99 (0.189)‡	6.86 (0.55)‡	8.39 (0.396)‡	10.43 (0.317)‡	9.92 (0.356)‡

‡Non rejection of null hypothesis, ( ) indicates *P* values for indicated tests on residuals. ***,**,* Indicates significance at 1%, 5%, 10% LOS. LOS: Level of significance, OLS: Ordinary least squares

4 The model was estimated with controls for LINF, LRINT, LOPEN and LGEXP.

5 Na means that the particular variable was not included in the estimated model.

Table 5: Vector error correction estimates

Dependent variable: LGDPPC
Standard error ( ) and t-statistic [ ]
Cointegrating Eq

Vector error correction	D (LGDPPC)	Error correction	D (LGDPPC)
Coint Eq1	0.458189	Coint Eq1	0.089317
	(0.21957)		(0.05044)
	[2.08675]		[1.77071]
D (LGDPPC(−1))	−0.236982	D (LGDPPC (−1))	−0.129013
	(0.34902)		(0.32619)
	[−0.67900]		[−0.39551]
D (LSMC(−1))	0.056215	D (LSMC(−1))	0.048411
	(0.03804)		(0.03830)
	[1.47766]		[1.26403]
D (LBSC(−1))	0.600157	D (LCPVT(−1))	0.295599
	(0.30546)		(0.17165)
	[1.96479]*		[1.72210]
D (LLLS(−1))	−0.616899	D (LLLS(−1))	−0.408546
	(0.29593)		(0.20380)

‡Non rejection of null hypothesis, { } P values of indicated tests on residuals. ***,**,* Significance at 1%, 5%, 10%, LOS. LOS: Level of significance

4.5. Reforms and Economic Growth

The log linear OLS results in Table 4 document a negative effect of monetary reforms on per capita and a positive effect of financial reforms on per capita. In addition, results show that the introduction of reforms both individually and jointly did not alter the general effect of financial development measures on per capita. In fact the R-squared improved significantly from 71% to 89% with the introduction of reforms confirming the importance of reforms in the finance-growth analysis in Zimbabwe. These results suggest that reforms improve the model's explanatory power and thus, omitting them may lead to incorrect inferences about the relationship between financial development and economic growth in Zimbabwe.

According to Stiglitz (2000), premature financial and capital liberalization may result in financial crises suggesting that an effective regulatory framework should come first. In Zimbabwe, the legal and regulatory framework governing the financial sector has lagged behind and this saw a rapid growth of financial institutions which were later closed on viability grounds. McKinnon (1991) bemoans incorrect sequencing of reforms as a major source of failure suggesting that financial reforms should follow real sector reforms that include privatization of state entities, removal of price distortions among others. The Zimbabwean experience is that the government has failed so far to privatize a number of state owned firms among them National Railways of Zimbabwe, Air Zimbabwe, Agribank and Cold Storage Commission among many others. In light of McKinnon (1991)'s view, this continues to limit the impact of financial reforms on growth.

Despite the issues of premature implementation (Stiglitz, 2000) and sequencing challenges (McKinnon, 1991), financial reforms in Zimbabwe indeed reduced government control of banks and promoted innovation, while monetary reforms brought price stability and monetary discipline. In combination, these reforms became an active tool for promoting economic growth through increased credit underwriting capacity by banks, development of primary equities market, product innovation and competitive funds mobilization. Other studies for instance Harvey (1998) maintain that the impact of financial reforms in Zimbabwe was limited while Makina (2009) reports that financial reforms did not address structural factors that hindered financial inclusion. Whether the impact was limited or not, the truth is that financial reforms indeed positively impacted on Zimbabwe's financial development and consequently growth.

4.6. Causality Analysis

Causality tests show evidence of unidirectional Granger causality from domestic credit to economic growth and also from money supply to economic growth (Table 6). There is however no evidence at 5% level to suggest that stock market capitalization causes economic growth notwithstanding the positive effect it exerts on growth.

The unidirectional causal relationship from financial development to economic growth suggested by this study sharply contrast findings by Ndlovu (2013) who demonstrated that financial development has been a passive response to growth in support of the growth leads financial development proposition.

Ndlovu (2013)'s model does not control for financial reforms and the data sample period ranged from 1980 to 2006. By extending the sample period to include the years 2007-2012, and further controlling for financial and monetary reforms of 1991 and 2009 respectively, this study demonstrates that the causal relation runs from financial development to economic growth, in conformity with the finance-leads-growth proposition. Based on the VECM (Table 7), there is sufficient evidence to suggest that the findings in Ndlovu (2013) are incorrect on account of the omission of financial reforms from the model.

Evidence from this study demonstrates two things: Firstly, financial reforms are vital in the analysis of the finance-growth relation in Zimbabwe; Secondly, the omission of financial and monetary reforms in any study of the finance-growth relation in Zimbabwe significantly distorts the direction of causality.

5. CONCLUSIONS

The study sought to empirically examine the causal relationship between financial development and economic growth in Zimbabwe after controlling for financial and monetary reforms. Results suggest that financial development promotes economic growth and the two exhibit a positive long run relationship running from financial development to economic growth. There is sufficient evidence from this study to suggest that financial development; banking sector development in particular, is not a passive response to economic growth. Instead, it is a critical tool for speeding up economic growth. The evidence also reflects the practical reality that the Zimbabwean banking sector has played a much more important role in economic growth than the equities market. This is naturally so because Zimbabwe is a bank-based economy owing to its historical development. The study therefore concludes that any policy framework that constrains credit underwriting and distribution capacity of banks or makes it very expensive to underwrite loans is likely to hurt economic growth. The study

Table 6: VEC granger causality results

Null hypothesis	Chi-square	df	*P*	Null Hypothesis	Chi-square	df	*P*
Dependent variable: D (LGDPPC)							
D (LSMC)	2.183482	1	0.1395	D (LSMC)	1.597774	1	0.2062
D (LBSC)	3.860386	1	0.0494**	D (LCPVT)	2.965629	1	0.0851*
D (LLLS)	4.345611	1	0.0371**	D (LLLS)	4.018766	1	0.0450**
Dependent variable: D (LSMC)							
D (LGDPPC)	0.858279	1	0.3542	D (LGDPPC)	2.630214	1	0.1048
D (LBSC)	2.600681	1	0.1068	D (LCPVT)	7.347586	1	0.0067
D (LLLS)	3.684059	1	0.0549	D (LLLS)	10.16594	1	0.0014
Dependent variable: D (LBSC)				D (LCPVT)			
D (LGDPPC)	0.306592	1	0.5798	D (LGDPPC)	0.081111	1	0.7758
D (LSMC)	2.905098	1	0.0883	D (LSMC)	6.735459	1	0.0095
D (LLLS)	1.452991	1	0.2280	D (LLLS)	0.930352	1	0.3348
Dependent variable: D (LLLS)							
D (LGDPPC)	0.046458	1	0.8293	D (LGDPPC)	0.447633	1	0.5035
D (LSMC)	0.241159	1	0.6234	D (LSMC)	0.009041	1	0.9242
D (LBSC)	0.053587	1	0.8169	D (LCPVT)	1.246131	1	0.2643

***,**,* rejection of the null hypothesis at 1%, 5%, 10% LOS. LOS: Level of significance

Table 7: VEC Granger causality results for the rerun models

Null hypothesis	1980-2012: Original model with extended period			1980-2012: Controlled for GEXP, FRM and MRF			1980-2012: Controlled for FRM and MRF		
	Chi-square	df	*P*	Chi-square	df	*P*	Chi-square	df	*P*
Dependent variable: D (LGDPPC)									
D (LSMC)	2.613761	1	0.1059	1.597774	1	0.2062	4.076794	1	0.0435**
D (LCPVT)	0.807172	1	0.3690	2.965629	1	0.0851*	5.868538	1	0.0154**
D (LLLS)	1.594866	1	0.2066	4.018766	1	0.0450**	6.978094	1	0.0083***
Dependent variable: D (LSMC)									
D (LGDPPC)	0.086902	1	0.7682	2.630214	1	0.1048	0.310857	1	0.5772
D (LCPVT)	0.773636	1	0.3791	7.347586	1	0.0067	0.020966	1	0.8849
D (LLLS)	1.311323	1	0.2522	10.16594	1	0.0014	0.399471	1	0.5274
Dependent variable: D (LCPVT)									
D (LGDPPC)	3.717517	1	0.0538*	0.081111	1	0.7758	0.355358	1	0.5511
D (LSMC)	0.355700	1	0.5509	6.735459	1	0.0095	8.842652	1	0.0029
D (LLLS)	5.433895	1	0.0197	0.930352	1	0.3348	2.208964	1	0.1372
Dependent variable: D (LLLS)									
D (LGDPPC)	7.883914	1	0.0050***	0.447633	1	0.5035	0.101562	1	0.7500
D (LSMC)	8.413351	1	0.0037	0.009041	1	0.9242	0.281443	1	0.5958
D (LCPVT)	20.54467	1	0.0000	1.246131	1	0.2643	0.105733	1	0.7451

***,**,* Rejection of the null hypothesis at 1%, 5%, 10% LOS. LOS: Level of significance

also concludes that over reliance on money supply as a growth stimulant in a hyper-inflationary environment hurts economic growth. Lastly, neglecting financial reforms in the study of the relationship between financial development and economic growth in Zimbabwe lead to incorrect causal inferences.

Policy implications of this evidence are that the banking sector in Zimbabwe must be supported with policies that encourage and enhance credit underwriting capacity and innovation in support of economic growth. The equities market, on the other hand, requires more investor-friendly innovations and policies, especially with regard to trading efficiency and foreign investor participation in the primary market. In combination, these policy interventions should be able to magnify the positive effect of financial development on economic growth.

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