

## STOCK MARKET DEVELOPMENT, FOREIGN CAPITAL INFLOWS AND ECONOMIC GROWTH IN ZIMBABWE: A MULTIVARIATE CAUSALITY TEST

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### Abstract

In this study we examine the dynamic nexus between stock market development and economic growth – using time-series data from Zimbabwe. The causal relationship between stock market development and economic growth has been a subject of extensive debate in recent years. In an attempt to address the omission-of-variable bias, which has not been addressed by many previous studies, we have incorporated savings as a third variable in the bivariate setting between stock market development and economic growth – thereby creating a multivariate simulation. The study uses the Johansen–Juselius (Johansen and Juselius, 1990) (maximum likelihood) and a dynamic specification model to examine this linkage. The empirical results reveal that there is a distinct causal flow from stock market development to economic growth – without any feedback in Zimbabwe. The results also show that there is a unidirectional causal flow from savings to economic growth, and from stock market development to savings.

**Keywords:** Africa, Zimbabwe, Stock Market Development, Economic Growth

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### 1. Introduction

The causal relationship between stock market development and economic growth has been a subject of extensive debate in finance and economics by various authors – with divergent and convergent views. The International Finance Corporation (IFC) 1998 concluded that the proliferation of stock exchanges in Africa indicates that a number of countries now consider them as a necessary strategy to develop national and regional economies. On the contrary, Joan and Robinson (1952) pointed out that economic growth is the one that creates a demand for various types of financial products to which the financial system responds. Schumpeter (1912) concurred but went on further to argue that technological innovation is the force underlying long-run economic growth apart from financial markets influence.

According to Neuser and Kugler (1998), the establishment of stock markets in Africa has boosted domestic savings and provided access to global capital markets. Kyerematen (1998) concurred with the above opinion, but further pointed out that stock markets promote private enterprise expansion, and thus stronger national economic growth. The developments in the world financial markets that include increased securitization, liberalization and

integration are thought to have possibly promoted the growth of stock markets in African countries in recent years (Allen and Gale, 1995).

The large amount of academic and policy research interest shown over the past decade in promoting stock market development in African countries is an indicator of this untapped contribution to economic growth potential. It is against this background that this study attempts to investigate the causal linkage between the stock market development and economic growth in the Zimbabwean context, using the newly developed ARDL-Bounds testing approach.

The results from this empirical investigation will be valuable, not only to policy makers through strengthening their policy decisions to attract more investors, but also to academics – by providing them with empirical evidence on the relationship between stock market development and economic growth. The findings of this study will also open up a new area of empirical research for investigation. The study uses stock market capitalisation as a proxy for stock market development, which is expressed as a ratio of gross domestic product (GDP).

The economic growth is, however, proxied by real GDP per capita. The rest of the paper is structured as follows: Section 2 gives an overview of the stock market development and economic growth

in Zimbabwe. Section 3 presents the theoretical and empirical literature review, while section 4 deals with the empirical model specification, the estimation technique and the empirical analysis of the regression results. Section 5 concludes the study.

## 2. Stock Market Development and Economic Growth in Zimbabwe

The Zimbabwe Stock Exchange (ZSE) comprised of 57 listed companies by the end of 1990, with a total market capitalization of US\$2,4 billion, and it was ranked 6<sup>th</sup> in 1999 out of the 33 emerging capital markets in the world, by the IFC<sup>1</sup>. Foreign participation at the ZSE trading, which was introduced in mid-1993, following the partial lifting of exchange control regulations<sup>2</sup>, saw annual turnover<sup>3</sup> going up from US\$53 million in 1990 to US\$150 million in 1995, representing an increase of 184.61%.

The listing of Ashanti Goldfields in 1996 brought a major excitement in the economy that saw the industrial index going up and further pushing up market capitalisation to US\$3,64 billion by December 1996. This was a significant jump from US\$2,04 billion by the end of 1995.

In response to the liberalisation of the Zimbabwe economy, the number of new listings that took place during 1996 increased, bringing the total number of listed companies to 64 by the end of 1996. The ZSE market capitalisation increased by 240% in US dollar terms between 1989 to 1996, the boost partially coming as a result of the relaxation of controls on foreign investment. This increased activity led to a 528% rise in annual turnover – from US\$39 million in 1989 to US\$245 million in 1996.

The number of listed companies at the ZSE increased from 64 in 1995 to 69 in 2000, whilst stock market capitalization went up from US\$2.04 million to US\$2.4 million during the same period. This represented a growth of 19.35% in percentage terms (World Bank<sup>4</sup>). Despite an increase by 14.49% in the total number of companies listed on the ZSE from 2000 to 2005; stock market capitalization decreased by 1.26% during the same period. According to Makina (2009), the ZSE offered investors the highest returns in Africa in 2005 – and for most of 2006, despite a deep economic recession in Zimbabwe. The author also noted that the ZSE was a relatively well

developed stock, with 80 trading firms, which achieved a market capitalization of over 40 percent of GDP in 2005.

There was a marginal increase of 2.53% in the total number of companies listed on the ZSE, from 79 at the end of 2005 to 81 at the end of 2010. During the same period, stock market capitalization<sup>5</sup> went up by 61.74%, to reach a US\$3.89 billion mark by the end of 2010; whilst the annual turnover went up 19%, from US\$329 million to US\$392 million.

The trends of economic growth in Zimbabwe, on the other hand, can be divided into three different phases, namely: i) A positive economic growth phase recorded from 1985 to 1990; ii) a negative economic growth phase from 1991 to 2008; and iii) a recovery phase, during the period 2009 to 2010. While the period from 1985 to 1990 was largely characterised by positive growth, the period from 1990 to 1995 saw the GDP shrinking from US\$8.7 billion to US\$7.1 billion. The decline in the economy continued during the period 1995 to 2000, which saw the GDP being characterized by a further drop of 7.1%, whilst the GDP per capita went down by 13.22% during the same period.

The period from 2000 to 2005 further recorded both a negative growth in GDP, as well as a decline in GDP per capita. The GDP went down from US\$6.6 billion in 2000 to US\$5.6 billion in 2005, whilst the GDP per capita shrunk from US\$528 to US\$444 during the same period. However, since 2009 Zimbabwe has, on the whole, maintained a remarkably positive growth rate in both GDP volume and GDP per capita. According to the Ministry of Finance<sup>6</sup> of Zimbabwe, positive GDP growth was 5.7% and 8.1% in 2009 and 2010, respectively. This positive growth was anchored by improved policies, a favourable external environment and off-budget donor support. This economic recovery pushed up GDP by 33.86%, and that of GDP per capita by 33.85%, from 2005 to 2010. Figures 1 and 2 show the trends of stock market development and economic growth in Zimbabwe during the period 1988-2010.

## 3. Stock Market Development and Economic Growth: A theoretical and empirical overview

There are four views on the theoretical front that explain the relationship between stock market development and economic growth. The first view maintains that stock market development spur economic growth.

Studies consistent with this view include those undertaken by Schumpeter (1912), Levine (1997), Hicks (1969), Schwert (1989), Osinubi (1998), Bencivenga, Smith and Starr (1996), (Kyle 1984),

<sup>1</sup> Kingdom Stockbrokers Zimbabwe (Pvt. Ltd) publication (1999)

<sup>2</sup>Foreign investors may hold up to 10% of any listed company without recourse to Exchange control. Collectively, foreign ownership in a listed company may not exceed 40% of the issued share capital. These rulings exclude holdings which were acquired before June 1993.

<sup>3</sup> World Bank Global Statistical Indicators 2011.

<sup>4</sup> Standard & Poor's, Global Stock Markets Factbook and supplemental S&P data.

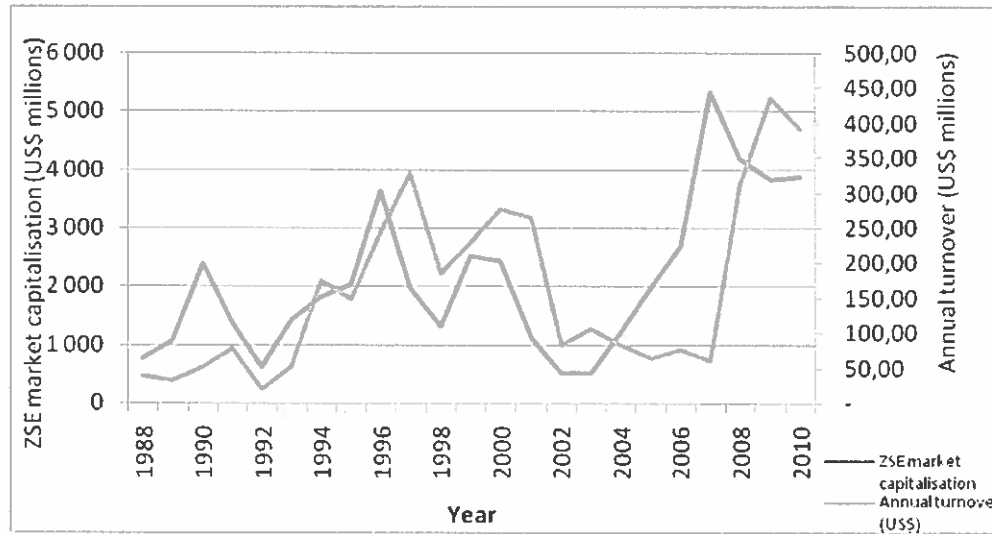
<sup>5</sup> World Bank Global Statistical Indicators (2011).

<sup>6</sup>According to the 2012 budget statement presented by Minister of Finance of Zimbabwe in November 2011.

Edo (1995), Samuelson (1997), Grossman and Stiglitz, (1980), Greenspan (1999), Demircuc-Kunt and Levine (1996) and Grossman (1976), among others. Schumpeter (1912) and Levine (1997) both concurred that the existence of sound stock markets in

channelling the limited resources from non-growth sectors to productive and innovative sectors would provide efficient resource allocation, thereby leading other sectors of the economy in the growth process.

**Figure 1.** The Trends of Stock Market Capitalisation and Annual Turnover in Zimbabwe during the period 1988-2010



Source: Derived from World Bank Global Statistical Indicators (2011), Zimbabwe Stock Exchange and Zimbabwe Statistics Agency.

This argument was supported by Hicks (1969) and Schumpeter (1969), who both asserted that financial securities investment is a veritable medium of channelling savings to the entrepreneur, thereby acting as an engine for economic growth. Schwert (1989), in agreement with the above authors, asserted that stock market volatility is positively related to volatility in economic variables, such as inflation, industrial production, and debt levels in the corporate sector.

Edo (1995) argued that investment in securities is a way of channelling savings to productive sectors of the economy. Samuelson (1997) called this, "the dichotomy of savings and investments". The stock market acts as a conduit through which savings can be mobilized and allocated efficiently to competing productive sectors through the signaling effect of stock prices (Grossman, 1976, Grossman and Stiglitz, 1980). Greenspan (1999) added that emerging stock markets are crucial to developing countries, because they augment bank finance by providing equity capital to the disadvantaged sectors of the economy.

Demircuc-Kunt and Maksomovic (1995) clearly argued that emerging markets need not be fearful of stock market development, since the functioning of stock markets results in higher debt-to-equity ratios – and thus more business for the banks, thereby boosting economic growth. Furthermore, Cho (1986) stressed that banks need to be complemented by well-functioning stock markets, in order to reduce the inefficiencies associated with developing countries'

weak credit markets – if economic growth is to be accelerated.

Through the finance-led hypothesis, Levine (1997) argued that stock markets play a leading role in promoting economic growth, by ensuring the liquidity of real innovative investments. Osinubi (1998) added that the liquidity of the stock market facilitates profitable interaction between the stock market and the money market (banks), in that shares become easily acceptable as collateral for bank lending; thereby, boosting credit, investment and economic growth.

Liquid stock markets increase the incentive to obtain information on firms and to improve corporate governance, thereby facilitating economic growth (Kyle 1984). Bencivenga, Smith and Starr (1996), as well as Peterson (2002), further stressed that there would be no industrial revolution without liquid stock markets.

The second view states that economic growth promotes stock market development. Studies consistent with this view include those undertaken by Romer (1990), Robinson (1952) and Rybcynski (1984). According to Romer (1990), stock markets take a passive and permissive role, since their development is responsive to economic growth, rather than being responsible for growth. Moreover, Robinson (1952) declared that economic growth boosts GDP per capita. It ensures that consumers have excess money to invest in stock market development, as one of the investment vehicle options.

Rybcynski (1984) asserted that economic growth contributes to greater wealth, which in a stable economy can mean an increase in the supply of funds seeking profitable securities investments; hence, economic growth leads to financial innovation and stock market development. The third view maintains that both stock market development and economic growth promote each other. Studies consistent with this view include those undertaken by Schumpeter (1912), Levine (1997), Robinson (1952), Luintel and Khan (1999) and Rybcynski (1984), among others.

The proponents of the feedback theory<sup>7</sup> argued that a country with well-developed financial markets could promote high economic growth through technological changes, product and service innovation (see Schumpeter, 1912). The hive of economic activity then creates high demand on financial arrangement and services (Levine, 1997; Robinson J, 1952; Rybcynski, 1984). These changes further stimulates higher economic growth, as the financial markets respond to these demands (Luintel and Khan, 1999).

The fourth view maintains that there is no relationship whatsoever between stock market development and economic growth; and this was proffered by Keynes (1936). It is not necessarily the case that a perfect capital market would lead to an optimal allocation of investment, according to Keynes (1936). The Keynesian perspective on the role of finance in economic growth pretends that the level of confidence and the expected demand of the private sector investors will primarily determine investment decisions. The disequilibria approach within the context of the Keynesian tradition implies that investment depends on prospects for profits and the binding constraints on firm's sales, but not on the efficiency of the emerging stock markets, which suffer from speculative tendencies. Keynes (1936) also differed with Schwert (1989) on stock market volatility being positively related to volatility in economic variables. He argued that high volatility in stock returns – especially when speculative bubbles are driving returns in defiance to economic fundamentals, may lead to the misallocation of scarce resources.

Unfortunately, the empirical studies on the link between stock market development and economic growth, especially in developing countries, are very scant. Studies that explain the relationship between stock market development and economic growth are divided into four views<sup>8</sup> (see footnotes). The first

view maintains that stock market development spurs economic growth.

Studies consistent with this view include those undertaken by N'Zue (2006), Ezeoha (2009), Mohtadi and Argawal (2004), Caporale, Howells and Soliman (2004), Liu and Sinclair (2008 pp 507), Nowbutsing (2009), Yu, Hassan and Sanchez (2011), Dan (2006), Agrawalla and Tujeka (2007), Erdem, Gozbasi, Ilgun and Nazlioglu (2010), Nazir, Nawaz and Gilani (2010), Jin and Boubakari (2010), Choong, Baharumshah, Yusop and Habibullah (2010), Tachiwou (2010), Caporale, Howells and Soliman (2005), Levine and Zervos (1998), (Azzam, 1999) and Nevin (1997), among others.

N'Zue (2006) found a unidirectional causality relationship running from stock market development to economic growth, but not the other way round, in his study on Ivory Coast. The study further discovered that stock market development alone cannot promote economic growth, but a combination of a well-performing stock market, increased public investment and increased public expenditures is required. Ezeoha (2009) also found that the Nigerian stock market development was over the years able to spur growth in both domestic private investment flows and foreign private investment.

This finding confirms the empirical positions of Mohtadi and Argawal (2004), who in their survey discovered a significant positive relationship that existed between stock market development and long-run economic growth. According to a research project by Caporale, Howells and Soliman (2004), it was found that a well developed stock market can foster economic growth in the long run. These results were in agreement with the findings of Liu and Sinclair (2008 pp 507). The above results also provide support to theories, according to which well functioning stock markets can promote economic development by fuelling the engine of growth through faster capital accumulation and by tuning it through better resource allocation.

A robust positive relationship between stock market development and economic growth was revealed by Caporale, Howells and Soliman (2004). The findings of a research project by Nowbutsing (2009) found that stock market development had a positive effect on economic growth in Mauritius – both in the short run and in the long run. The study employed time-series analysis over the period 1989 to 2006.

Yu, Hassan and Sanchez (2011), using Granger causality tests in their research, also found a distinct direction, timing and strength of the positive causal link between stock market development and economic growth. Dan (2006), in a study on the effect of stock market development on capital accumulation, using

relationship between stock market development and economic growth.

<sup>7</sup> The feedback theory states that there is a bi-directional or two-way causal relationship between stock market growth and economic performance.

<sup>8</sup> First view is that stock market development spurs economic growth, second view is that economic growth promotes stock market development, third view is that both stock market development and economic growth promotes each other and the fourth view is that there is no

panel data from 31 provinces of China from 1993 to 2006, found that stock market development is more significant in influencing capital accumulation and economic growth.

Agrawalla and Tujeka (2007), while investigating the relationship between stock market development and economic growth in India by using co-integration testing, found a positive and stable long-run equilibrium relationship running from stock market development to economic growth. This result suggests that policies relating to the stock market should be directed towards the creation of transparent and mature stock exchanges that have the capacity to sustain economic growth. The research used a composite index as a proxy of stock market development; and real GDP as a proxy for economic growth.

Erdem et al. (2010), while examining the relationships between stock market performance and economic growth for six emerging countries (Malaysia, Turkey, Mexico, Korea, India and Brazil) found stock market development to be an impetus for economic growth – both in the short run and in the long run. The study also revealed that the relationship between stock market performance and economic growth is sensitive to the size of the stock market. That is to say, the larger the size of the stock market, the stronger the relationship. These findings concurred with those of Nowbutsing (2009), whose studies also disclosed that stock market development is indeed an important ingredient for economic growth in Mauritius – since the stock market gives a general idea of the health of an economy.

They also seemed to agree with findings by Bevin (1997), whose study revealed that the contribution of Kuala Lumpur Stock Exchange (KLSE) to resource mobilization between 1985 and 1990 was just 10%, rising to 35% between 1990 and 1996 following the government's efforts to encourage the private sector to use the country's stock market.

While investigating the relationship between economic growth and stock market development in Pakistan for the period 1986 to 2008, Nazir et al. (2010) found that the size and liquidity of the stock market positively affects economic growth in Pakistan. This finding seems to have been supported by Levine and Zervos (1998), who, while carrying out an empirical test on the linkages between stock markets and long-run economic growth, using data on 41 countries from 1976 to 1993, found that stock market liquidity is positively and significantly correlated with the current and future rates of economic growth, capital accumulation, and productivity improvements, even after controlling for economic and political factors.

Jin and Boubakari (2010) ask whether stock markets are really key to economic growth; or whether they are merely burgeoning casinos. In their empirical investigation on the role of stock market development in economic growth in five European

countries (Belgium, France, Portugal, Netherlands and United Kingdom) for the period 1995 to 2008 using quarterly data. Their study found that stock market development significantly Granger-causes economic growth in countries with high levels of liquidity (total traded value) and huge size of the stock market.

Choong et al. (2010), in a comparative analysis study on stock market and economic growth in developed and developing countries, found a significant positive relationship between stock market capitalization to the GDP ratio and economic growth in developed countries, whilst a weak positive relationship was revealed in developing countries, suggesting that the bigger the size of the stock market, the better the economic performance. This finding seems to have been supported by Caporale, Howells and Soliman (2005), who, while using data from Chile, Korea, Malaysia and Philippines for the period 1979 to 1998, found that stock market development measured by the capitalization ratio and the share value-traded ratio had a positive impact in economic growth for all the four countries (strength of the relationship varying depending on the size of the stock market).

Tachiwou (2010), in a study on the influence of stock market development<sup>9</sup> on economic growth<sup>10</sup> in the West African Monetary Union, using a time-series econometric investigation over a period 1995 to 2006, also found that stock market development had positively affected economic growth, both in the short run and in the long run.

The second view maintains that economic growth promotes stock market development. Studies consistent with this view include those undertaken by Liu and Sinclair (2008 pp 507), Feng and Tu (2010) and Hsing (2011), among others. Liu and Sinclair (2008 pp 507) found a unidirectional causal link running from economic growth to stock market development in the long run in China. This suggested that movements in stock prices in the short run may be affected by non-economic factors, such as government policies and political views, which are disseminated throughout the markets and incorporated in share prices.

This finding was supported by Feng and Tu (2010), who in their study found that China's stock market volatility was influenced by domestic macro-economic factors to a greater extent, and that the influence of the co-movement effect of the stock market was still very limited. Hsing (2011), whilst investigating the impact of selected macro-economic variables on the stock market index of South Africa, found that not all macro-economic variables influenced the stock market in the same way.

<sup>9</sup> Stock market capitalization ratio (a measure of stock market size) and value traded ratio (a measure of liquidity) were used as proxies of stock market development.

<sup>10</sup> GDP was used as a proxy of economic growth.

The third view maintains that both stock market development and economic growth promote each other. Studies consistent with this view include those undertaken by Nieuwerburgh, Buelens and Cuyvers (2006), Odhiambo(2011), Ajide and Salisu (2010), Ibrahim (2011), Hou and Cheng (2010), Chang and Caudill (2005), Enisan and Olufisayo (2009) and Oskooe (2010), among others. The research done by Nieuwerburgh, Buelens and Cuyvers (2006) revealed a bidirectional relationship, with the growth in stock market capitalization found to have Granger-caused GDP growth in the pre-1914 era, whilst GDP growth was found to have Granger-caused stock market development post-1914 in Belgium.

Odhiambo (2011), in his investigation, found economic growth to have Granger-caused stock market development when capitalization ratio was used as a proxy for stock market development in South Africa. The stock market development was found to have Granger-caused economic growth, when the traded value ratio and the turnover ratio were used as proxies for stock market development.

Ajide and Salisu (2010), in their studies of stock market and economic growth in Nigeria concurred with Odhiambo (2011) on the fact that the proxy used for stock market development determines the causality relationship between the two variables. Ajide and Salisu (2010) found out a bidirectional causality between the turnover ratio and economic growth, a unidirectional relationship from stock market capitalization to economic growth; and no causal linkage between the total value traded ratio and economic growth.

Ibrahim (2011), in his study, discovered a bidirectional causal relation between GDP and stock market capitalization in Thailand. The GDP was found to have positively reacted to stock market capitalization, whilst more than 40% of GDP forecast error variance was attributable to stock market capitalization. At the same time, roughly 20% of the variations in stock market capitalization was found to be explained by GDP shocks over the same horizon. An increase in economic growth was found to induce expansion for firms and therefore strengthens the stock market. Hou and Cheng (2010) also found a bidirectional causal relationship between the stock market and economic growth in Taiwan, suggesting the simultaneous interaction of supply-leading and demand-following phenomena.

This finding contradicted that of Chang and Caudill (2005), who contend that there is a unidirectional causality – running from stock market development to economic growth in Taiwan. Hou and Cheng (2010) used quarterly data from 1971 to 2007 to investigate the issue of finance-growth nexus in Taiwan.

Moreover, Oskooe (2010), while investigating causality between the stock prices and economic growth by conducting Granger causality tests within the Vector Error Correlation Model (VECM)

framework, found a bilateral causality relationship in Iran. The real economic activity was discovered to be the main factor in the movement of stock prices in the long run, whilst the stock market was found to be the leading economic indicator of future economic growth in Iran in the short run.

This finding was supported by Enisan and Olufisayo (2009), who revealed evidence of a bidirectional relationship between stock market development and economic growth in Ivory Coast, Kenya, Morocco and Zimbabwe. This bidirectional causality evidence showed that economic growth demands greater stock market development; and that greater stock market activity induces economic growth. Stock market activity was found to have stimulated economic growth; and in turn, stock market development was found to have been stimulated by economic growth, investment and other efficiency measures that induce greater liquidity.

The fourth view maintains that there is no relationship whatsoever between stock market development and economic growth. Studies consistent with this view include those undertaken by Laureceson (2002), Ajide and Salisu (2010), Enisan and Olufisayo (2009) and Mookerje and Yu (1999), among others. Laureceson (2002), in his research, revealed that it is useful to consider the savings mobilization performance of China's stock markets compared with other domestic securities markets and financial institutions. The research concluded that despite impressive growth, the volume of funds raised by the stock market continued to remain well behind these other channels of savings mobilization. Researchers, including the People's Bank of China, revealed that stock prices were excessively volatile, in the sense that they often reflected speculative activities, rather than the economic fundamentals of listed firms (Spencer, 1995, Mookerjee and Yu, 1999).

Ajide and Salisu (2010) found no causal linkage between the total value traded ratio and economic growth in Nigeria. This finding seems to have been supported by Enisan and Olufisayo (2009), who, while examining the long-run relationship between stock market development and economic growth in sub-Saharan African countries, found a very weak relationship between stock market development<sup>11</sup> and economic growth in Nigeria.

#### 4. Empirical Model Specification and Estimation Techniques

This paper employs a dynamic Granger causality test to examine the causal relationship between stock market development, capital inflows and economic growth in Zimbabwe. The trivariate Granger causality

<sup>11</sup> Stock market size was used as a proxy for stock market development.

test, based on the error-correction model, can be expressed as follows:

$$\begin{aligned}
 (1) \quad y/N_t &= \lambda_0 + \sum_{i=1}^m \lambda_{1i} y/N_{t-i} + \sum_{i=1}^n \lambda_{2i} SCAP_{t-i} + \sum_{i=1}^n \lambda_{3i} S/Y_{t-i} + \lambda_4 ECT_{t-1} + \mu_t \\
 (2) \quad SCAP_t &= \varphi_0 + \sum_{i=1}^m \varphi_{1i} y/N_{t-i} + \sum_{i=1}^n \varphi_{2i} SCAP_{t-i} + \sum_{i=1}^n \varphi_{3i} S/Y_{t-i} + \varphi_4 ECT_{t-1} + \varepsilon_t \\
 (3) \quad S/Y_t &= \delta_0 + \sum_{i=1}^m \delta_{1i} y/N_{t-i} + \sum_{i=1}^n \delta_{2i} SCAP_{t-i} + \sum_{i=1}^n \delta_{3i} S/Y_{t-i} + \delta_4 ECT_{t-1} + \nu_t
 \end{aligned}$$

Where

SCAP = Stock market capitalization ratio

S/Y<sub>t</sub> = savings variable (a third important variable affecting finance-growth relationship).

ECT<sub>t-1</sub> = error correction term lagged one period.

μ, ε and ν = mutually uncorrelated white noise residuals.

Although co-integration indicates the presence of Granger causality, at least in one direction, it does not indicate the direction of causality between variables. The direction of the Granger causality in this case can only be detected through the error-correction model (ECM) – as highlighted in equations (1) – (3) above. Apart from indicating the direction of causality amongst variables, the error-correction mechanism also helps to distinguish between the short-run and the long-run Granger causality (see Odhiambo 2009). While the F-test and the explanatory variables indicate the “short-run” causal effects, a negative and significant lagged error-

correction term (ECM) indicates the “long-run” causal relationship amongst the variables.

#### 4.1 Stationarity Tests

The results of the stationarity tests at level (not reported here) show that all variables are non-stationary at level. Consequently, the variables are differenced one in order to perform stationary tests on differenced variables. The results of the stationarity tests on differenced variables are presented in Tables 1 and 2.

**Table 1.** Stationarity Tests of Variables on first Difference - Phillips-Perron (PP) Test

Variable	NO TREND	TREND	Stationarity Status
Phillips-Perron (PP)			
DLy/N	-4.754205***	-4.505642***	Stationary
DLSCAP	-7.949162***	-7.871451***	Stationary
DGDS/GDP	-3.922625**	-4.684944**	Stationary

Note: \*\*\*denotes 1% level of significance.

**Table 2.** Stationarity Tests of Variables on first Difference – Dickey-Fuller - GLS Test

Variable	NO TREND	TREND	Stationarity Status
DLy/N	-3.334637***	-3.772519***	Stationary
DLSCAP	-5.708585***	-5.700336***	Stationary
DGDS/GDP	-3.987749***	-4.674924***	Stationary

Note: 1) Critical values for Dickey-Fuller GLS test are based on Elliot-Rothenberg-Stock (1996, Table 1).

2) \*\*\* denotes 1% level of significance.

As shown in Tables 1 and 2, all the variables are now confirmed to be stationary after being differenced once – which clearly shows that all the variables are integrated of order one.

#### 4.2 Cointegration Analysis

The cointegration test used in this study to examine the existence of a long-run relationship between stock market development, capital inflows and economic growth is based on the Johansen-Juselius (maximum likelihood) cointegration test procedure. The results of the cointegration tests are presented in Table 3.

**Table 3.** Maximum Likelihood Cointegration Test

Trace Test				Maximum Eigenvalue Test			
Null	Alternative	Statistics	5 Percent Critical value	Null	Alternative	Statistics	5 Percent Critical value
$r = 0$	$r \geq 1$	67.445	29.68	$r = 0$	$r = 1$	56.933	20.97
$r \leq 1$	$r \geq 2$	10.512	15.41	$r \leq 1$	$r = 2$	10.511	14.07
$r \leq 2$	$r = 3$	0.0014	3.76	$r \leq 2$	$r = 3$	0.0014	3.76

Notes:

1)  $r$  stands for the number of cointegrating vectors

2) The lag structure of VAR is determined by the highest values of the Akaike information criterion and Schwartz Bayesian Criterion.

The results reported in Table 3 shows that there is a unique cointegrating vector between the stock market development, savings and economic growth in Zimbabwe. Both the trace test and the maximum eigenvalue statistics reject the null hypothesis of no cointegration at the 5 percent level of significance.

#### 4.3 Analysis of Granger-Causality Test Based on Error-Correction Model

The results parsimonious model, which were derived from the overparameterised model are displayed in Table 4 below.

**Table 4.** Causality Test between  $\Delta Ly/N$ ,  $\Delta SCAP/GDP$  and  $\Delta S/Y$ 

Independent Variables	Dependent Variables		
	$\Delta Ly/N$	$\Delta LSCAP/GDP$	$\Delta S/Y$
$\Delta Ly/N-1$	0.750443(2.750640)**		
$\Delta Ly/N-3$		2.075358(0.808872)	14.310(1.259)
$\Delta Ly/N-4$		-1.718584(0.634269)	18.534(1.345)
$\Delta LSCAP/GDP-1$	0.060413(2.280179)**		6.2011(3.100)***
$\Delta LSCAP/GDP-2$		-0.442238(-1.024727)	2.3057(1.131)
$\Delta LSCAP/GDP-3$	0.088134(3.212923)***	-0.448763(-1.701146)	3.6336(1.656)
$\Delta LSCAP/GDP-4$	0.035610(1.172055)	0.277570(0.587551)	7.5617(3.103)***
$\Delta S/Y$	0.006562(1.616648)	-0.062656(-1.247020)	
$\Delta S/Y-2$		0.072797(1.461649)	
$\Delta S/Y-3$	0.011578(3.034180)***	0.065655(1.357152)	0.41572(1.609)
$\Delta S/Y-4$		-0.107905(-1.452399)	
ECM <sub>-1</sub>	-0.942735(-3.780974)***	0.065994(0.016257)	-0.46533(-2.460)**
F-Test	5.039713	1.782345	4.0628
R <sup>2</sup>	0.779142	0.718009	0.81133

Notes: \*, \*\* and \*\*\* denote 1%, 5% and 10% level of significance respectively. The numbers in parentheses represent t-statistics.

As reported in Table 4, there is a distinct causal flow from stock market development to economic growth, without any feedback, in Zimbabwe. This finding applies irrespective of whether the causality test is conducted in the short run or in the long run. The short-run causality is supported by the coefficients of the lagged values of the stock market development and F-statistic in the economic growth function, which have been found to be statistically significant. The long-run causality, on the other hand, is supported by the lagged value of the error-correction term, which is negative and statistically significant in the economic growth equation, but not in the stock market development equation.

The results also show that there is a unidirectional causal flow from savings to economic growth and from stock market development to savings. The causality from savings to economic growth is depicted by the coefficient of the lagged value of saving in the economic growth equation, which is positive and statistically significant. The causality from stock market development to savings is supported by the coefficients of the lagged values of the stock market development in the savings equation, which are positive and statistically significant.



## 5. Conclusion

This study has examined the dynamic relationship between stock market development and economic growth in Zimbabwe – using a time-series data. The causal relationship between stock market and economic growth has been a subject of extensive debate in recent years. While some studies maintain that it is the development of the stock market that drives the real sector development, others argue that it is the real sector of the economy that causes the development in the stock market. Unlike the previous studies, the current study has used a multivariate simulation to assess the linkage between stock market development and economic growth. Specifically, the study incorporates saving as a third important variable, affecting both stock market development and economic growth – thereby, creating a trivariate model. Using the Johansen–Juselius (Johansen and Juselius, 1990) (maximum likelihood) and error-correction based causality model, the results show that there is a distinct causal flow from stock market development to economic growth, without any feedback in Zimbabwe. The results also show that there is a unidirectional causal flow from savings to economic growth, and from stock market development to savings. The results apply both in the long run and in the short run.

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