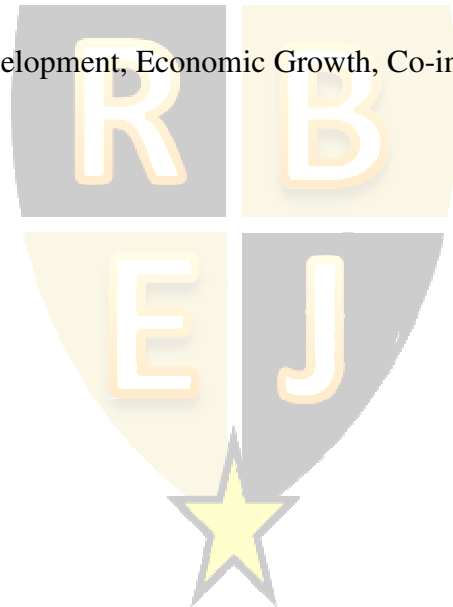# The effect of the stock exchange on economic growth: a case of the Zimbabwe stock exchange.

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Abstract:

This paper provides an empirical analysis of relationship between economic growth and its determinants with special focus on the stock market development in Zimbabwe. Using data for the period from 1991 to 2007 the study employed FMOLS and ARDL bounds-testing for the long run relationship and ECM for the short run dynamics. The findings suggest a positive relationship between efficient stock market and economic growth both in short run and long run. Financial instability and inflation have negative effect, and human capital and foreign direct investment have positive effect on growth. The results are consistent with the theoretical predictions.

Key Words: Stock Market Development, Economic Growth, Co-integration

1.0 Introduction

There exist ample literature on economic growth and its determinants. Recent developments in growth theory have been primarily theoretical although significant progress has also been made in growth empirics. Among the determinants of economic growth, stock market development is increasingly becoming an important factor to impact upon it.

In prospects of overall economy, Ologunde, Elumilade, and Asaolu (2006) mentioned that share market makes it possible for the economy to ensure long-term commitments in real capital. For that reason, level of efficiency measurement of the stock market is very important to investors, policy makers and other major players, who ensure long-term real capital in an economy. Maturity of the stock market efficiency level is perceived across the globe as a barometer of the economic health and prospect of a country as well as a register of the confidence of domestic and global investors.

In principle, the stock market is expected to accelerate economic growth by providing a boost to domestic savings and increasing the quantity and the quality of investment (Singh, 1997). The stock market is expected to encourage savings by providing individuals with an additional financial instrument that may better meet their risk preferences and liquidity needs. Better savings mobilization may increase the savings rate (Levine and Zervos, 1998).

Stock markets also provide an avenue for growing companies to raise capital at lower cost. In addition, companies in countries with developed stock markets are less dependent on bank financing, which can reduce the risk of a credit crunch. Stock markets therefore are able to positively influence economic growth through encouraging savings amongst individuals and providing avenues for firm financing.

The stock market is supposed to ensure through the takeover mechanism that past investments are also most efficiently used. Theoretically, the threat of takeover is expected to provide management with an incentive to maximize firm value. The presumption is that, if management does not maximize firm value, another economic agent may take control of the firm, replace management and reap the gains from the more efficient firm. Thus, a free market in corporate control, by providing financial discipline, is expected to provide the best guarantee of efficiency in the use of assets. Similarly, the ability to effect changes in the management of listed companies is expected to ensure that managerial resources are used efficiently (Kumar, 1984).

Efficient stock markets may also reduce the costs of information. They may do so through the generation and dissemination of firm specific information that efficient stock prices reveal. Reducing the costs of acquiring information is expected to facilitate and improve the acquisition of information about investment opportunities and thereby improves resource allocation. Stock prices determined in exchanges and other publicly available information may help investor make better investment decisions and thereby ensure better allocation of funds among corporations and as a result a higher rate of economic growth.

Stock market liquidity is expected to reduce the downside risk and costs of investing in projects that do not pay off for a long time. With a liquid market, the initial investors do not lose access to their savings for the duration of the investment project because they can easily, quickly, and cheaply, sell their stake in the company (Bencivenga and Smith, 1991). Thus, more liquid stock markets could ease investment in long term, potentially more profitable projects, thereby improving the allocation of capital and enhancing prospects for long-term growth. It is important to point out, however, that, theory is ambiguous about the exact impacts of greater stock market

liquidity on economic growth. By reducing the need for precautionary savings, increased stock market liquidity may have an adverse effect on the rate of economic growth.

Critics of the stock market argue that, stock market prices do not accurately reflect the underlying fundamentals when speculative bubbles emerge in the market (Binswanger, 1999). In such situations, prices on the stock market are not simply determined by discounting the expected future cash flows, which according to the efficient market hypothesis should reflect all currently available information about fundamentals. Under this condition, the stock market develops its own speculative growth dynamics, which may be guided by irrational behavior. This irrationality is expected to adversely affect the real sector of the economy as it is in danger of becoming the by-product of a casino.

Critics further argue that stock market liquidity may negatively influence corporate governance because very liquid stock market may encourage investor myopia. Since investors can easily sell their shares, more liquid stock markets may weaken investors' commitment and incentive to exert corporate control. In other words, instant stock market liquidity may discourage investors from having long-term commitment with firms whose shares they own and therefore create potential corporate governance problem with serious ramifications for economic growth (Bhide, 1994).

Critics also point out that the actual operation of the pricing and takeover mechanism in well functioning stock markets lead to short term and lower rates of long term investment. It also generates perverse incentives, rewarding managers for their success in financial engineering rather than creating new wealth through organic growth (Singh, 1997). This is because prices react very quickly to a variety of information influencing expectations on financial markets. Therefore, prices on the stock market tend to be highly volatile and enable profits within short periods.

Moreover, because the stock market undervalues long-term investment, managers are not encouraged to undertake long-term investments since their activities are judged by the performance of a company's financial assets, which may harm long run prospects of companies (Binswanger, 1999). In addition, empirical evidence shows that the takeover mechanism does not perform a disciplinary function and that competitive selection in the market for corporate control takes place much more on the basis of size rather than performance (Singh, 1971). Therefore, a large inefficient firm has a higher chance of survival than a small relatively efficient firm.

These problems are further magnified in developing countries especially sub-Saharan African economies with their weaker regulatory institutions and greater macroeconomic volatility.

The higher degree of price volatility on stock markets in developing countries reduces the efficiency of the price signals in allocating investment resources. These serious limitations of the stock market have led many analysts to question the importance of the system in promoting economic growth in African countries.

The phenomenal growth of equity markets during recent past along with the staggering growth in emerging equity markets have turned the focus of new literature towards the linkage between stock market performance and growth of an economy. However, there exists very little empirical evidence on the relationship between stock market development and long run economic growth. In the developing and emerging markets like Zimbabwe such evidence is almost zero with the exception of one study by Madzivanyika (2008). Hence the importance of this study is justified.

The objective of this paper is to examine the effects of various determinants on economic growth with special focus on the effect of stock market development on it in Zimbabwe both in the short run and the long run. The ARDL-bounds testing (Autoregressive Distributive Lag Model) is applied utilizing the small time series data covering the period from 1991-2007. The rest of the paper is organized as follows; section 2 reviews the literature, section 3 explains the model, data and methodological framework, section 4 presents the results and interpretations; and section 5 deals with conclusions and policy implications.

Literature Review

2.1 Stock Market and Economic Growth: Channels of Linkage

In recent times there was a growing concern on the role of stock market in economic growth (Levine and Zervos, 1996; Demirguc-Kunt and Levine, 1996; Oyejide, 1994; Nyong, 1997; Obadan, 1998; Onosode, 1998; Emenuga, 1998; Osinubi, 1998). The stock market is in the focus of the economist and policy makers because of the perceived benefits it provides for the economy. The stock market provides the fulcrum for capital market activities and it is often cited as a barometer of business direction. An active stock market may be relied upon to measure changes in the general economic activities using the stock market index (Obadan, 1995).

The stock market is viewed as a complex institution imbued with inherent mechanism through which long-term funds of the major sectors of the economy comprising households, firms, and government are mobilized, harnessed and made available to various sectors of the economy (Nyong, 1997). The development of the capital market, and apparently the stock market, provides opportunities for greater funds mobilization, improved efficiency in resource allocation and provision of relevant information for appraisal (Inanga and Emenuga, 1997).

Stock market contributes to economic growth through the specific services it performs either directly or indirectly. Notable among the functions of the stock market are mobilization of savings, creation of liquidity, risk diversification, improved dissemination and acquisition of information, and enhanced incentive for corporate control. Improving the efficiency and effectiveness of these functions, through prompt delivery of their services can augment the rate of economic growth.

At any stage of a nation's development, both the government and the private sectors would require long-term capital. For instance, companies would need to build new factories, expand existing ones, or buy new machinery. Government would also require funds for the provision of infrastructures. All these activities require long-term capital, which is provided by a well functioning stock market.

Stock market may also affect economic activities through the creation of liquidity. Liquid equity market makes available savings for profitable investment that requires long-term commitment of capital. Hitherto, investors are often reluctant to relinquish control of their savings for long periods. As asserted by Bencivenga, Smith and Starr (1996), without liquid capital market there would be no industrial revolution. This is because savers would be less willing to invest in large, long-term projects that characterized the early phase of industrial revolution.

Closely related to liquidity is the function of risk diversification. Stock markets can affect economic growth when they are internationally integrated. This enables greater economic risk sharing. Because high return projects also tend to be comparatively risky, stock markets that facilitate risk diversification encourages a shift to higher-return projects (Obstfeld, 1994). The resultant effect is a boost in the economy leading to growth through the shifting of society's savings to higher-return investments.

The nature and economic significance of the relationship between stock market development and growth vary according to a country's level of economic development with a larger impact in less developed economies (Filler, Hanousek and Campos, 1999). The proponents of positive relationships between stock market development and economic growth hinged their argument on the fact that the stock market aids economic growth and development through the mobilization and allocation of savings, risk diversification, liquidity creating ability and corporate governance improvement among others.

Nyong (1997) reported that as far back as 1969 Goldsmith Raymond observed that the emergence of equity markets and its rapid development indicate the level of economic growth and development. Using the liquidity argument, Bencivenga, Smith and Starr (1996) reasoned that the level of economic activities is affected by the stock market through its liquidity creating ability. The logic of this reasoning is that profitable investment requires long-term capital commitment; often investors are not willing or are reluctant to trade their savings for a long gestation period.

However, an alternative view on stock market and long term economic growth by Demirgüç-Kunt and Levine (1996) observed that there are some channels through which liquidity can deter growth: Firstly, savings rate may be reduced, this happens when there is increasing returns on investment through income and substitution effect. As savings rate falls and with the existence of externality attached to capital accumulation, greater stock market liquidity could slow down economic growth.

Secondly, reducing uncertainty associated with investment may impact on savings rate, but the extent and the direction remain ambiguous. This is because it is a function of the degree of risk-averseness of economic agents. Thirdly, effective corporate governance often touted as an advantage of liquidity of stock market may be adversely affected. The ease with which equity can be disposed off may weaken investors' commitment and serves as a disincentive to corporate control and vigilance on the part of investors thereby negating their role of monitoring firm's performance. This often culminates in stalling economic growth.

Edo (1995) asserts that securities investment is a veritable medium of transforming savings into economic growth and development and that a notable feature of economic development in Africa since independence is the expansion of the stock market thereby facilitating the trading in stock and shares. Osinubi (1998) reported that Harry Johnson in 1990 recognized that one of the conditions of being developed pertains to having a large stock of capital per head, which must always be replaced and replenished when used up. Where this is lacking the condition of being under developed prevails.

2.2 Empirical Studies on the Impact of Stock Market on Economic Growth

Levine and Zervos (1996) examines whether there is a strong empirical association between stock market development and long-run economic growth. The study used pooled cross-country time-series regression of forty-one countries from 1976 to 1993 to evaluate this

association. The study tow the line of Demirgüç-Kunt and Levine (1996) by conglomerating measures such as stock market size, liquidity, and integration with world markets, into index of stock market development.

The growth rate of Gross Domestic Product (GDP) per capita was regressed on a variety of variables designed to control for initial conditions, political stability, investment in human capital, and macroeconomic conditions; and then include the conglomerated index of stock market development. The finding was that a strong correlation between overall stock market development and long-run economic growth exist. This means that the result is consistent with the theories that imply a positive relationship between stock market development and economic growth.

Efforts were also made by Nyong (1997) to develop an aggregate index of capital market development and use it to determine its relationship with long-run economic growth in Nigeria. The study employed a time series data from 1970 to 1994. For measures of capital market development the ratio of market capitalization to GDP (in percentage), the ratio of total value of transactions on the main stock exchange to GDP (in percentage), the value of equities transaction relative to GDP and listings were used. The four measures were combined into one overall composite index of capital market development using principal component analysis. A measure of financial market depth (which is the ratio of broad money to stock of money to GDP) was also included as control. The result of the study was that capital market development is negatively and significantly correlated with long-run growth in Nigeria. The result also showed that there exists bi-directional causality between capital market development and economic growth.

Review of developments in Zimbabwe's Stock Exchange.

Trading of stocks and shares in Zimbabwe goes back to 1891, when the first stock-broking firm was opened. The first Stock Exchanges were set up a few years later in 1894 in Salisbury (now Harare) and Bulawayo. Later, two other exchanges emerged in Gwelo (now Gweru) and Umtali (now Mutare) around 1898. These exchanges were intended to meet the capital needs of the gold mining industry, whose rapid expansion was fuelled by rumours of a 'Second Rand' in Southern Rhodesia.

The Zimbabwe Stock Exchange Act reached the statute book in January 1974. The members of the Exchange continued to trade as before, but it became necessary for legal reasons to bring into being a new Exchange coincidental with the passing of the legislation.
During the late 1970s, the hope of independence and the end of sanctions led to a brief rise in share prices. By 1980, the RSE was a highly specialized market, which was likely to prove useful in the economy if a capitalist oriented development strategy was adopted. On achieving independence from Britain in 1980, the exchange changed its name from the Rhodesia to the Zimbabwe Stock Exchange.

In the 1990s the Zimbabwe Stock Exchange (ZSE) was the second largest in sub-Saharan Africa after the Johannesburg Stock Exchange. The fastest growth of the ZSE occurred between 1994 and 1996, with capitalization rising at an average annual rate of 36% in US dollar terms.

During 1998, Zimbabwe's stock market, once regarded as one of the most promising emerging markets in the region, saw a decline in turnover to 60% of the previous year's volumes and 88% of its value of shares sold. 1998's fall was attributed to high interest rates which attracted investors to the higher yielding money market and to a loss of confidence caused by a

number of factors such as social unrest (including food protests and mass stay-aways) and the government's stated intention to acquire commercial farms for resettlement.

With the decline of the Zimbabwean economy, hyperinflation rendered the Zimbabwean dollar useless and the US-Dollar was adopted as the legal tender for trading on the exchange in February 2009. As of March 2009, trade has been very thin, with very few foreign investors willing to risk trading on the market. Most stocks trade in the US-cent range, with at least 26 different stocks not trading at all.

3. Model, Data and Methodological Framework

To assess the relationship between stock markets' development, and economic growth in a small developing economy like Zimbabwe, the study utilizes log-linear model as follows:

$$LGNPPC = \alpha_{\circ} + \beta_1 MC + \beta_2 LFD + \beta_3 LFNFD + \beta_4 LINF + \beta_5 LFDI + \beta_6 LLTR + \varphi_i \qquad (1)$$

Where;

$LGNPPC$ =Log of real GNP per capita, MC = Market Capitalization (the amount of capital as share of GDP proxied by stock market development) LFD = Log of Financial Development (proxied by credit to private sector as share of GDP), $LFNFD$ = Log of Financial Instability (measured by standard deviation of the inflation rates), $LINF$ = Log of Inflation Rate, $LFDI$ = Log of Foreign Direct Investment (in millions of dollars) as share of GDP, $LLTR$ = Log of Literacy Rate (the ratio of the number of people completing primary education to total population). The reason for taking log is that taking the natural logarithm of a series effectively linearizes the exponential trend (if any) in the time series data since the log function is the inverse of an exponential function (Asteriou and Price, 2007).

Table-1
Theory Intuition and Expected Signs

Variable	Theory intuition	Expected sign
Market Capitalization	Improvement in the efficiency and size of stock markets will circulate as cholesterol in the process of economic growth positively.	+
Financial Development	The expected sign of increase in credit to private sector spurs the economic activity in the economy through their causal channels.	+
Financial Instability	Financial instability induces to decline the investment activities directly and indirectly that deters the economic growth	-
Inflation Rate	Inflation measures the monetary instability that affects the economic performance through its detrimental impacts.	-

Foreign Direct Investment	Economic growth is expected to be influenced positively by FDI along with spillover effects through employment generating process.		+
Literacy Rate	Higher literacy rate improves the efficiency of an economy by providing more productive labor force.		+

Annual data of all variables have been collected from World Development Indicators database (WDI, 2006), World Bank, Economic Survey of Zimbabwe (2009), and International Financial Statistics (IFS, 2009).

Descriptive statistics and correlation matrix of the variables of our selected model are expressed in Table 2a and 2b respectively.

Table-2a
Descriptive Statistics

Variables	Real GNP Per Capita	Market Capitalization	Credit-Private	FDI	Financial Instability	Inflation	Literacy Rate
Observations	17	17	17	17	17	17	17
Std. Dev.	0.356	4.226	0.128	0.942	1.264	0.549	0.236
Skewness	-0.150	2.684	-0.559	-0.649	-0.319	0.192	-0.188
Kurtosis	3.259	10.697	3.687	2.605	2.308	2.653	1.912
Sum	332.880	88.462	115.192	-32.151	-131.818	71.733	123.360
Sum Sq. Dev.	4.319	607.466	0.562	30.179	54.395	10.250	1.901

Table 2b
Correlation matrix

Real GNP per capita	**1.000**						
Market Capitalization	0.7303	**1.000**					
Credit-Private	0.7718	0.4207	**1.000**				
FDI	0.8397	0.5518	0.6083	**1.000**			
Financial Instability	-0.5058	-0.3936	-0.3458	-0.4959	**1.000**		
Inflation	-0.5194	-0.1804	-0.5228	-0.2538	0.1444	**1.000**	
Literacy Rate	0.9252	0.6873	0.7100	0.8673	-0.3781	-0.4090	**1.000**

Methodological Background

Unit Root Tests

Three unit root tests namely, the augmented Dickey Fuller (ADF), Phillips-Peron (PP) and Kwiatkowski, Philips, Schmidt and Shin (KPSS) tests will be conducted. The difference between the ADF and the KPSS test is that while the former obtains the test statistic under the null of non stationarity, the latter assumes the null of stationarity to run the test. Literature

reveals that ADF and P-P tests do have low explaining power especially in small sample data set. Shift has been focused to Kwiatkowski, Philips, Schmidt and Shin (1992)[1] to investigate the order of integration for concerned actors in the model.

ARDL Approach for Co-integration

This paper applies recently developed the autoregressive distributed lag model (ARDL) approach introduced in Pesaran *et al*. (2001) in order to investigate long run relationship between stock market development and economic growth in Zimbabwe. Traditionally, the cointegration approach has widely been used to establish long–run relationship among certain variables. The method of cointegration requires that variables be integrated of the same order. If the order of integration among variables is not the same, then long–run relationship among them can not be established. The order of integration is, however, established by using unit root tests which might suffer from low powers failing to reject the null of non stationarity. Moreover, the results of these tests largely depend on the choice of optimal lag length, which can not be conclusively determined. The ARDL model overcomes this problem by introducing bounds testing procedure to establish long run relationship among variables. It does not require, as such, that variables of interest have the same order of integration to model long run relationship.

The first advantage of ARDL is that it can be applied irrespective of whether underlying regressors are purely *I(0)*, purely *I(1)* or mutually co-integrated (Pesaran and Shin, 1999). The second advantage of using the bounds testing approach to Co-integration is that it performs better than Engle and Granger (1987), Johansen (1991) and Philips and Hansen (1990) co-integration test in small samples. The third advantage of this approach is that, the model takes sufficient number of lags to capture the data generating process in a general-to-specific modeling framework. Finally, ARDL is also having the information about the structural break in time series data.

Under certain environment, Pesaran and Smith (1995) later PSS (Pesaran, Shin and Smith, 2001)[2] established that long run association among macroeconomic variables may be investigated by employing the ARDL Model. After the lag order for ARDL procedure, Ordinary Least Squares (OLS) may be utilized for estimation and identification. Valid estimation and inference can be drawn through presence of unique long run alliance that is crucial. Such inferences may be made not only on the long run but also on the short run coefficients which imply that the ARDL model is correctly augmented to account for contemporaneous correlations between the stochastic terms of the data generating process (DGP). It is concluded that ARDL estimation is possible even where explanatory variables are endogenous. Moreover, ARDL remains valid irrespective of the order of integration of the explanatory variables. But ARDL procedure will collapse if any variable is integrated at *I(2)*. After the completion of ARDL estimation, the next step is to construct Error Correction Model (ECM) suggested by PSS (Pesaran, Shin and Smith, 2001).

Firstly, the study tries to find out the direction of relationship between stock markets development and economic growth in the case of Zimbabwe by analyzing the PSS F-test statistics. The calculated *F-statistic* is compared with the critical value tabulated by Pesaran and Pesaran (1997) or Pesaran *et al*. (2001). If the *F*-test statistic exceeds the upper critical value, the

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[1] Theoretical form of KPSS test is based on Bahmani-Oskooee and Glean, 2007, pp:2497.
[2] This theoretical formation ARDL technique is based on Chandana, (2001)

null hypothesis of no long-run relationship can be rejected regardless of whether the underlying orders of integration of the variables are $I(0)$ or $I(1)$. Similarly, if the F-test statistic falls below the lower critical value, the null hypothesis is not rejected. However, if the sample F-test statistic falls between these two bounds, the result is inconclusive. When the order of integration of the variables is known and all the variables are $I(1)$, the decision is made based on upper bounds. Similarly, if all the variables are $I(0)$, then the decision is made based on lower bounds.

The ARDL method estimates $(p+1)^k$ number of regressions in order to obtain optimal lag length for each variable, where p is the maximum number of lags to be used and k is the number of variables in the equation. The model can be selected using the model selection criteria like Schwartz-Bayesian Criteria (SBC)[3] and Akaike's Information Criteria (AIC). SBC is known as the parsimonious model: selecting the smallest possible lag length, whereas AIC is known for selecting the maximum relevant lag length. In the second step, the long run relationship is estimated using the selected ARDL model. When there is a long run relationship between variables, there should exist an error correction representation.

To establish the stability of the **ARDL** model, sensitivity analysis is conducted to make sure that there is no serial correlation among the regressors, the model is properly specified, the residuals are normally distributed and that it is free from heteroskedasticity. The stability test is conducted by employing the cumulative sum of squares of recursive residuals (**CUSUMsq**) confirmed that the model is stable. Examining the prediction error of the model is another way of ascertaining the reliability of the **ARDL** model.

4. Empirical Results

Since, present study appears to be initial attempt to identify the links between different variables and economic growth with special emphasis on the relationship between the stock market development and economic growth in the case of a small developing economy like Zimbabwe, it has empirically estimated whether a statistically significant relationship exists between economic growth and its determinants in the long-run as well as in the short-run. The preliminary step in this analysis is concerned with establishing the order of integration of each variable. For this purpose, to get reliable results of equation 1, the implicit assumption is that variables in equation 1 are $I(1)$ and co-integrated. The study employed the test for the existence of a unit root in the level and first difference of each of the variables in our sample using the Augmented Dickey Fuller (ADF) and Philip-Perron (P-P) tests. ADF and P-P tests statistics check the stationarity of series. The results in Table 3 show that the Real GNP per Capita, Financial Development, Financial Insatiability, Market capitalization, Inflation Rate, Foreign Direct Investment and Literacy Rate are $I(1)$. Both tests confirm the stationarity of variables at 1st difference.

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[3] The mean prediction error of AIC based model is 0.0005 while that of SBC based model is 0.0063 (Min B. Shrestha, 2003).

Table 3

Unit-Root Estimation

Variables	ADF test at 1st Difference			Philip-Perron test at 1st Difference			KPSS test at 1st Difference	
	Intercept and trend	Prob-value	Lags	Intercept and trend	Prob-value*	Lags	Intercept and trend	Lags
LGNPC	-5.4412	0.0005	**0**	-5.4889	0.0004	**5**	0.0952	**5**
MC	-3.2718	0.0903	**4**	-3.7901	0.0295	**2**	0.0528	**3**
LFD	-5.4461	0.0005	**0**	-5.4068	0.0005	**2**	0.0802	**3**
LFNFD	-4.0445	0.0178	**3**	-7.0639	**0.000**	**0**	0.0673	**3**
LINF	-5.3166	0.0007	**0**	-5.3044	0.0007	**2**	0.0962	**6**
LFDI	-3.2084	0.1008	**2**	-10.8134	**0.000**	**0**	0.0820	**3**
LLTR	-5.3681	0.0006	**1**	-10.9699	**0.000**	**5**	0.0501	**0**

Lag Length Criteria

Lags Order	Akaike Information Criterion	Schwarz Bayesian Criterion	Log likelihood	Determinant resid covariance	Determinant resid covariance (dof adj.)
1	-0.397956	2.116049	62.76526	5.88E-11	3.84E-10
2	-4.921927	-0.160312	186.2118	2.96E-14	2.06E-12

Notes: *McKinnon (1996) one-sided p-values.

To observe the partial impact of independent variable on dependent one in long run relationship, the study turned to ARDL for long run relationships as mentioned in Table 4. The main assumption of ARDL is that included variables in model are having co-integrating order *I(0)* or *I(1)* or mutually. This lends support for the implementation of bounds testing, which is a three step procedure, in the first step we selected lag order on the basis of SBC because computation of F-statistics for co-integration is very much sensitive with lag length, so lag order of 2 is selected on lowest value of SBC[4]. The total number of regressions estimated following the ARDL method in equation 1 is $(2+1)^7 = 2187$. Given the existence of a long run relationship, in the next we used the ARDL co-integration method to estimate the parameters of equation (1) with a maximum order of 2 to minimize the loss of degrees of freedom.

The results of bounds testing approach for long run relationship represent that the calculated *F- statistic* is 4.68(table 4) which are higher than the upper level of bounds critical value of 4.61 and lower bounds value of 3.88, implying that the null hypothesis of no Co-integration cannot be accepted indicating that there is indeed a co-integration relationship among the variables at 5% level of significance.

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[4] At lower value of SBC, value of AIC is also low as shown in Table 6 in second row. The value of F-stat is very much sensitive with lag length, so choose the value of F-stat to check co-integration at lower value of AIC.

Table-4

Lag Length and ARDL Results

Test-statistic	Calculated-Value (Wald-Test)[5]	Lag-order	Significance level	Bound Critical Values (restricted intercept and restricted trend)	
				I(0)	I(1)
F-statistic	8.654 (**7.355**)	1	1%	4.99	5.85
	4.681	2	5%	3.88	4.61
	(**3.241**)		10%	3.82	4.02
Short Run Diagnostic Tests					
Serial Correlation LM Test = <u>0.325</u>(0.574)					
ARCH Test = 0.276(0.603)					
White Heteroskedasticity Test = 0.797 (0.679)					
Normality J-B Value = 1.688(0.528)					
Ramsey RESET Test = <u>1.413 (0.247)</u>					

Sensitivity analysis includes some diagnostic tests (results shown at the lower part of table- 4 where figures in the parenthesis show t values) which confirm that there is no serial correlation, the model is properly specified, the regressors are normally distributed and that there is no conditional heteroskedasticity in the distribution of residuals. Both models in Table-5 (model 1a without the error term and model 1b with the error term) indicate that, economic growth is positively and significantly associated with an improvement in the performance of stock markets in the country. This highlights the importance and contribution of stock market development to economic growth through its direct and indirect channels. Enhancement in financial intermediation and quality of financial institutions also improves economic activities through causal channels as clearly evident from literature. Financial instability weakens the stock market-growth and finance-growth nexus through detrimental impacts that decelerate economic growth directly.

Table-5
Estimated Long Run Coefficients ARDL Approach

Dependent Variable: LGNPPC				
Variables	**Co-efficient**	**Prob-value**	**Co-efficient**	**Prob-value**
Constant	6.1902 (**7.656**)	**0.0000**	7.1602 (**10.929**)	**0.0000**
MC	0.0192 (**3.427**)	**0.0019**	0.0228 (**4.621**)	**0.0001**
LFD	0.4679 (**2.437**)	**0.0214**	0.7578 (**4.177**)	**0.0003**
LFNFD	-0.0263 (**-1.699**)	**0.1003**	-0.0240 (**-1.589**)	**0.1232**

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[5] We base on calculation of F-statistics but not on the estimates of Wald-Test.

LFDI	0.0773 (1.986)	**0.0569**	0.0929 (2.715)	**0.0112**
LINF	-0.1139 (-3.2020)	**0.0034**	-0.1393 (-4.096)	**0.0003**
LLTR	0.5498 (2.858)	**0.0079**		
ER			0.1634 (2.949)	**0.0064**
R^2 = 0.94385 F-Statistics =78.452(0.00) AIC = -1.734 Durbin-Watson =1.570			**R^2 = 0.9446 F-Statistics = 79.67(0.00) AIC = -1.748 Durbin-Watson =1.78**	

Note: t-values are given in parentheses.

Foreign direct investment is appeared to be associated positively and significantly with economic growth. This indicates that foreign direct investment stimulates the economic activities and also improves the quality of human capital through spillover effects. Inflation reduces the economic growth through its detrimental impacts significantly. Improvement in human capital also enhances the potential of the economy as explained in steady-state phenomenon in economic development, which indirectly and directly increases economic growth. We also see that economic reforms improve the long run growth. The study excluded human capital from the model due to specification problem. Having found a long run relationship, the study applied the ARDL-ECM version to investigate the short run dynamic relationships. After investigating the long run impact of concerned variables in the basic model, we turned to short run dynamic model as follows;

$$\Delta LGNPPC = \alpha_{\circ} + \sum_{j=0}^{n} \beta_1 \Delta LMC + \sum_{J=0}^{n} \beta_2 \Delta LFD + \sum_{j=0}^{n} \beta_3 \Delta LFNFD + \sum_{j=0}^{n} \beta_4 \Delta LIFL + \sum_{j=0}^{n} \beta_5 \Delta LINV +$$

$$\sum_{j=0}^{n} \beta_6 \Delta LLTR + \eta CE_{t-1} + \varepsilon_t$$

The ECM results are reported in Table 6. The results indicate that, market capitalization, improvement in the efficiency of financial sector's performance promote the economic growth positively and significantly at 10 % and 5% significant level and impact of lag of differenced term of FD is having negative association with economic but enhances the economic growth in future period. Financial instability and literacy rate do not have any significant effect on growth while inflation influences the growth negatively and significantly at 5 percent level of significance. Foreign direct investment is positively correlated with economic activity also in the short span of time in Zimbabwe indicating the evidence of improving the economic growth by attracting more foreign direct investment in the country.

The error correction term CE_{t-1}, which measures the speed of adjustment to restore equilibrium in the dynamic model, appear with negative sign and is statistically significant at 1 percent level ensuring that long run equilibrium can be attained. The coefficient of *CE(-1)* is equal to 0.801 for short run model implying that the deviation from the long-term inequality is corrected by 80.1 % percent over each year. The lag length of short run model is selected on the basis of AIC and SBC.

Table-6
ECM Short Run Dynamic Version

Dependent variable = ΔLGNPC		
Regressors	**Co-efficient**	**Prob-value**
Constant	0.0290 **(1.053)**	0.3027
ΔMC	0.0092 **(1.943)**	0.0638
ΔLFD	0.7798 **(4.049)**	0.0005
ΔLFD(-1)	-0.4549 **(-2.335)**	0.0283
ΔLFNFD	-0.0061 **(-0.596)**	0.5566
ΔLINF	-0.0653 **(-2.167)**	0.0404
ΔLFDI	0.0764 **(2.824)**	0.0094
ΔLFDI(-1)	-0.0270 **(-1.119)**	0.2739
ΔLLTR	-0.5986 **(-0.615)**	0.5446
CR(-1)	-0.801 **(-4.713)**	0.0001
R^2 =0.787302 **Adjusted R^2 =0.707540**		
AIC =-2.207044 **Schwarz criterion =**-1.758114		
Durbin-Watson=2.10 **F-statistic=**9.870659 (0.00)		

Note: ARDL (1, 1, 2, 1, 1, 2, 1) selected on the basis of AIC and SBC.

Finally, we examine the stability of the long run parameters together with the short run movements for the equation**.** To this end, we rely on cumulative sum (CUSUM) and cumulative sum squares (CUSUMSQ) tests. The same procedure has been utilized by Pesaran and Pesaran (1997), and Mohsen *et., al*. (2002) to test the stability of the long run coefficients**.** The tests applied to the residuals of the ECM model (Table 6) along with the critical bounds graphed in Appendix 1**.** As can be seen in the figures, the plot of CUSUM and CUSUMsq statistics stay within the critical 5% bounds for all equations [Appendix 1].

5. Conclusions and Policy Implications

This paper employs FMOLS and ARDL bounds testing approach to examine the relationship between various factors and economic growth with special attention to the relationship between stock market development and economic growth both in the short run and in the long run using time series data for Zimbabwe for the period from 1991 to 2007. Our findings suggest that there exist significant positive relationship between stock market development and economic growth. The results are consistent with theoretical predictions. The implications of the present study are that although there have been some developments in the

stock markets of Zimbabwe in the recent past, yet, a strong need for implementation of effective regulations that contribute to transparency and effectiveness exists.

Finally, this study considers both public and private investment as complimentary (crowding-in) and emphasizes on the role of government to improve the efficiency of financial sector of the economy along with its direct role in enhancing human and physical capital in boosting economic growth.
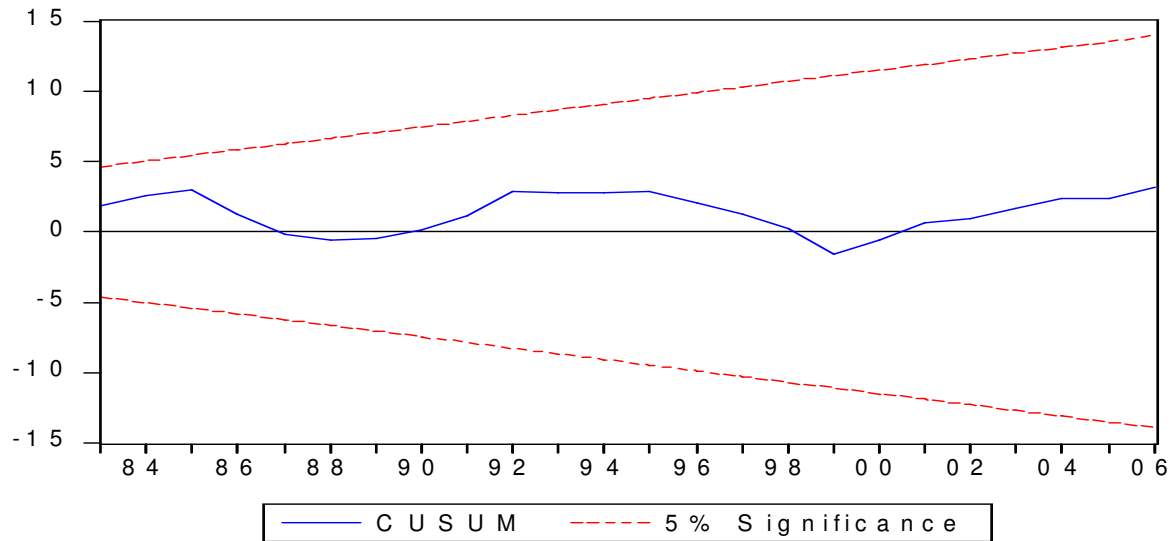
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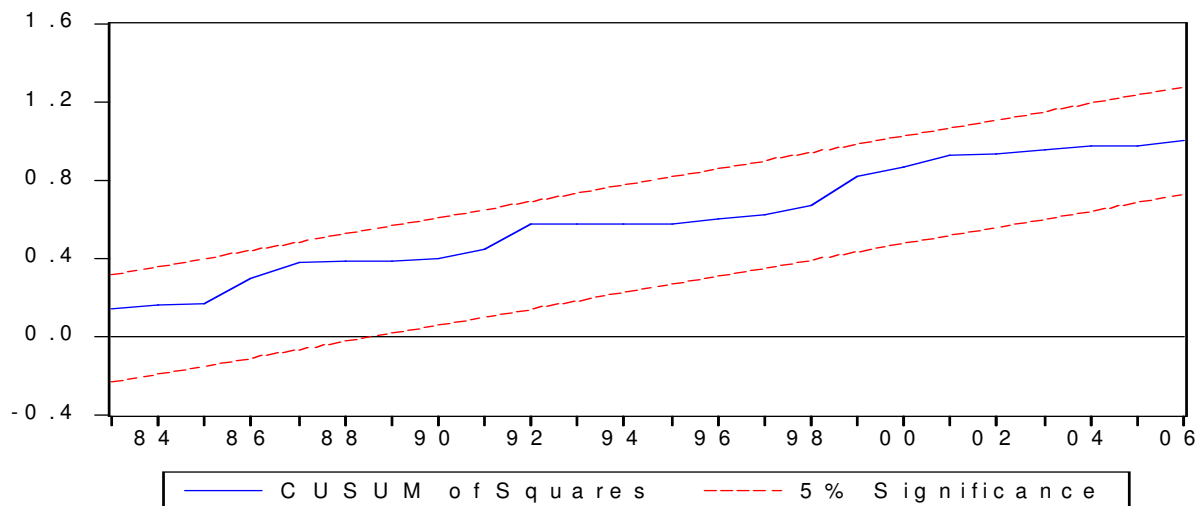**Appendix 1**

Figure 1
Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level.

Figure 2
Plot of Cumulative Sum of Squares of Recursive Residuals

The straight lines represent critical bounds at 5% significance level.