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Background

The Harare stock exchange

The Harare Stock Exchange (HSE) was established in 1974 by the then Rhodesian government. Many changes have occurred in Zimbabwe since its independence in April 1980 which have affected the performance of the Stock Exchange. Trading in external shares (those quoted in London, Johannesburg and elsewhere) was suspended in 1984. In that year the Stock Exchange Act was amended to permit corporate membership on the stock exchange. Political instability after independence, the scrapping down of the Apartheid system in South Africa and other recent developments (South Africa is considered as the economic power house of the sub-region by many analysts), weather and various macroeconomic policy changes and improvement of its management like the relaxation of restrictions on FDIs; have all seen to Harare's Stock Exchange recent better performance as investors find it becoming more attractive.

At the HSE, the turnover figures and industrial & mining share price indices are monitored and calculated on a daily basis. Only registered members (individuals or corporate bodies) are permitted to trade on the stock exchange on behalf of the investing public. A client when wishing to invest funds in shares quoted by the stock exchange, instructs a stock broker accordingly who then carries out the required transaction.

Accoding to The Economist (1997), in 1996 the Johannesburg Stock Exchange suffered a fall in the stock market's local gains due to the country's increasing fragile currency, the rand, which fell 22%. Furthermore, a reduction in buyers shares has been on the increase in the Johannesburg's Stock Exchange. For example, Morgan Stanley's Africa Investment Fund holdings in South Africa contracted from 70% in 1994 to just about 44%; the remainder of the fund's assets being spread across to other African countries including Zimbabwe. Harare's stock market turnover in 1996 went up by 66%, with stock prices rising 72% in dollar terms making Harare the third-best-performing market in the world after Venezuela and Hungary for the year 1996.

In the twenty-three years the HSE has performed an important function in helping to mobilise local investible funds and channelling those funds to productive publicly owned concerns. It has also provided a major opportunity for Zimbabwe's insurance companies and pension funds to become involved through portfolio investment (investment in shares) in productive economic areas. Equity markets encourage foreign portfolio investment into the country thereby attracting international capital is attracted in a non-debt creating forms unlike through commercial banks. It

probably has also encouraged savings, tapped foreign savings and know-how on market organisation and technology, helped channel savings into productive investment and encouraged entrepreneurs improve the efficiency of investments. Recent studies by Mullin (1993) and Singh et al (1992) have shown the importance of equity issuance in corporate finance of developing countries. The table below illustrates this:

All Countries: Top 50 listed companies in manufacturing[a]

Financing of Corporate growth: before and after tax retention ratios[b] Internal and external financing of growth[b]

Period	Country	Retention Ratio (A.T.) (%)	Internal Finance (%)	External Finance Equity (%)	External Finance LTD[c](%)
1980-1987	Korea, Rep. of	59.3	12.8	40.3	45.4
1980-1986	Pakistan	46.2	58.3	12.3	16.1
1980-1987	Jordan	32.0	28.1	52.1	0.0
1983-1987	Thailand	46.7	17.3	n.a	n.a
1984-1988	Mexico	n.a	17.1*	76.0	2.9
1980-1988	India	67.7	36.1	11.0	45.6
1982-1987	Turkey	24.4	18.1	60.5	15.5
1983-1987	Malaysia	45.0	42.4	31.4	2.1
1980-1988	Zimbabwe	61.6	58.5	43.0	0.0

Source: Singh and Hamid (1992)

a Number of companies in Jordan is 35 and in Turkey 38.

b Average value for relevant period for each country.

c LTD: long-term debt.

n.a = not available.

* Upper limit

Stock markets in the developing countries

Between 1985 and 1997, the world stock market capitalisation had rose from $4.7 trillion to $15.2 trillion, and emerging market capitalisation jumped from less than 4 to 13 percent of the total world capitalisation. The value of shares traded on emerging markets climbed from less than 3 percent of the $1.6 trillion world total in 1985 to 17 percent of the $9.6 trillion worth of shares traded on all of the world's exchanges in 1994. Since the mid-1970s the financial markets of advanced industrial countries have undergone far-reaching changes and become increasingly integrated. A recent study by Harris and Smith (1996) has shown that the European and the US Stockmarkets have become increasingly integrated with UK having a much stronger/influential/dominant role in the European stockmarkets. Emerging markets have also become more integrated with world capital markets. Portfolio flows of equity investment to emerging markets soared to $39 billion in 1995 from a mere $0.1 billion in 1985 (Demirguc-Kunt and Levine, 1995[a]).

A growing number of developing countries have recognised the useful role that stock markets can play in enhancing the efficiency of domestic financial systems. Stock markets can usefully complement and compete with the banking sector, thereby reducing the cost of capital for borrowers. They also permit a diversification of company ownership, more efficient risk sharing, and a healthier financial structure of corporations by improving their debt/equity ratios. The opportunities which stock markets offer investors for diversifying their portfolios also help lower the risk premium component in the cost of capital. Secondary equity markets also help in matching the long-term horizon of borrowers with the short-term liquidity preference of investors. Through the stock price mechanism, a more effective allocation of investment might also result, as poor management of listed companies may have large effects on the price at which the market values a firm. Furthermore, listing on stock markets implies disclosure of information to investors; this will encourage firms to improve accounting standards and make management more transparent.

The recent history of developing economies adds other objectives that stock markets can usefully serve. Government policies promoting privatisation and debt equity swaps, for example, can hardly be implemented outside the framework of a stock market. In addition, stock markets can become an important channel to raise external finance, as debt finance becomes less available as a consequence of the debt crisis. The establishment of stock-markets in developing countries and the opening of them to foreign security houses as well as foreign portfolio investors can be

viewed as a part of global liberalisation trend. As Cosh et al (1992) observed, the changes in emerging markets have arisen from the operation of a number of interrelated factors:

(a) Progressive deregulation of financial markets both internally and externally in the leading countries;
(b) Internationalisation of these markets;
(c) Introduction of an array of new financial instruments allowing riskier and bigger financial investments; and
(d) Emergence and the increasing role of new players in the markets particularly the institutional investors.

Also, it may be that the emerging markets share prices are relatively insulated from the world's share price swings because they are generally not correlated with stock markets in developed countries; and this can be an attractive incentive for foreign investors as they are able to maximise returns and reduce risks through portfolio diversification.

The African stock markets

African stockmarkets are developing markets. Many emerging market specialists believe that these are the last undiscovered stockmarkets in the world. They also believe that as most African economies have performed so poorly since they gained independence from the European Colonial powers that they are to boom some time.

According to Euroyellowpages (www.euroyellowpages.com/exhibitn/trade/afstex.htm), Ghana's stock market rose 80% in one year, Kenya's doubled, Zimbabwe's stockmarket more than doubled and shares in Mauritius increased their value by more than half while the Nigerian Stockmarket All Share Index rose by 14% in the first half of 1996. Emerging markets specialists believe this is just the beginning of an even greater performance from Africa's fledgling stockmarkets. A recent example is the Southern Africa unit trust, from Save & Prosper, the retail fund arm of the merchant bank, Robert Flemming which raised $10million. Others include Africa Investment fund from US Investment bank Morgan Stanley, which raised $230million. Other active funds include Baring Asset Management, a UK fund manager. Of the few African funds that exist, most invest the majority of their money in South Africa. Yet the spectacular opportunities are more likely to be in other African markets. Great possibilities lie in the small, as yet under-researched countries, which have only set up their stock exchanges since the mid-1980s. S&P's fund is typical, though, putting 85-90% of its cash in South Africa and the remaining 10-15% in Zimbabwe and Botswana. It is also typical in that it will invest in a mix of quoted and unquoted companies as well as some fixed interest securities.

The change in the world politics have created a background of opportunities within African Capital Markets. Most countries are now implementing the World Bank/IMF conditions such as floating exchange rates, cutting government spending especially through privatising state-owned companies, liberalising interest rates, following a tight monetary policy and creating a broader tax base. These are supposedly to be conducive for the private sector capital investment and development and maybe exactly what the potential investors have looked favourably on.

Institutions to help the development of African Stockmarkets are/have been set up including the African Stock Exchanges Association (ASEA) incorporated in 1993 in the Republic of Kenya. The main aim of ASEA is to provide a formal framework for the mutual co-operation of stock exchanges in the African region through various processes encompassing the exchange of information and assistance in the development of member exchanges (JSE, www.jse.co.za/thejse/asea.htm). There is a strong body of opinion which believes that to get the best returns investors must get into African stocks soonest and go for markets other than South Africa.

Modelling and data analysis

Theory

Theory suggests that Stock market development is related to:

i. Level of financial intermediaries development
ii. The fundamentals development
iii. Political situations
iv. Level of international integration and macroeconomic policies.

Dermirguc-Kunt and Levine (1995[b])[1] used a broader array of empirical indicators of stock market development which included stock market size (proxied by market capitalisation), market liquidity, market concentration, market volatility, institutional development, and integration with world capital markets.

Market concentration affects the liquidity of the market and is measured in terms of the share of market capitalisation accounted for by the ten largest stocks. High concentration is not desirable because it may adversely affect the liquidity of the market. International integration (e.g. privatisation and liberalisation) is as given by the pricing error measurements provided by the International Capital Asset Pricing Model (ICAPM) while level of financial system development is shown by the number and kind of financial intermediaries, quasi-liquid liabilities per GDP, domestic credit to private firms per GDP, etc.

This study uses the hypothesis that the market size or value is positively correlated with the ability to mobilise capital and diversify risk.

General econometric model

As outlined above, a number of factors could potentially affect the market capitalisatiuon of the HSE. The data used in this study was obtained from the Datastream International Limited which provides access to a wide variety of different types of on-line financial and economic data. The data was quarterly data and covered the period 1976-1996. The source of the data was the International Finance Corporation (IFC). However the only data that was available for this study was exchange rate, share price and total stock return. Accordingly a general econometric model was suggested on the basis of available data and the hypothesis behind market capitalisation.

[1] They used 1986-1993 data from forty-four developing and industrial countries to compare a broader array of empirical indicators of stock market development.

The general econometric model suggested:

$$MV = f(ER, PI, RI)$$

Where:

MV = Market Capitalisation/Value (in US$)

ER = Exchange Rate (in Z$/US$)

PI = Share Price (in US$) - a proxy for liquidity with expected positive sign,

RI = Total Stock Return (in US$) – a proxy for market return volatility with expected negative sign.

The general econometric model above was then changed to a logarithmic model as we are interested in growth rate (elasticity) of the stock market as shown below:

$$MV_t = API_t^{\beta 2} RI_t^{\beta 3} ER_t^{\beta 4} e^{\mu t} \qquad \text{where A is a constant}$$

By taking the logarithms, the model becomes:

$$\log MV_t = \log A + \beta_2 \log PI_t + \beta_3 \log RI_t + \beta_4 \log ER_t + \mu_t$$

$$\text{where } \mu_t \sim NID(0, \sigma^2)$$

Let

$\log MV = LMV$

$\log A = \beta_1$

$\log PI = LPI$

$\log RI = LRI$

$\log ER = LER$

Thus the general econometric model turns into:

$$LMV_t = \beta_1 + \beta_2 LPI_t + \beta_3 LRI_t + \beta_4 LER_t + \mu_t \quad \text{.....(i)}$$

Data analysis

The data analysis was done using the Microfit statistical package. The following simple graphs of the general econometric variables (in logs) against time were produced:

Market capitalisation (MV)

The LMV graph showed that in 1976-1979 there was small decline in MV followed by a sharp increase that continued up to the second quarter of 1981. From then on MV declined to 1985 where there was a sharp increase in MV up to the third quarter of 1986 follwed by gradual increases then onwards with a few declines in 1992. In general, the trend was upwards. Explanations of sharp MV increases from 1985 onwards could be because trading in external shares quoted in London, Johannesburg and elsewhere was suspended and also it was in that very year corporate membership on the stock exchange was permitted.

Share price (PI)

The LPI graphs showed a sharp decline in PI in 1980 until 1984 when PI started to pick up. Zimbabwe got its independence in April 1980. The drop in PI could reflect the uncertainty among the investors about the future of the HSE while the increase from 1984 onwrad could reflect the new financial procedures introduced as described in the MV pattern above, possibly showing confidence returning to investors about political stability in Zimbabwe. There was a decline in PI from 1990 to 1992 which then picked-up again in 1993 possibly because of changes in macroeconomic policies introduced in 1993. In this study PI was used as a proxy of liquidity - the easeness by which selling and buying of securities occur. Liquidity is an important attribute of stock market development because theoretically liquid markets improve the allocation of capital and enhance prospects of long-term economic growth and therefore this study expected HSE to not to react fast enough (less liquid) to changes in stock prices due to information imperfections and the nature of stocks being traded there.

Total stockreturn (RI)

The LRI graph had similar pattern to that of LPI, possibly because in a way, PI reflects the RI. It may be that PI explains RI, but RI has nevertheless been included in the general econometric model because it acts as a proxy to the market return volatility. Volatility of stock returns is not necessarily a sign of less stock market development because it could be indicative of a well-functioning market in terms of accurate and reliable information about the market being timely available. However, this paper treated high volatility as a sign of lower stock market development due to the fact that the HSE was a developing market.

Exchange rate (ER)

The exchange rate was negative from 1976 to 1983 i.e. it was overvalued in relation to the US$. However, attempts were being made by the Zimbabwean government to reduce the overvaluation of its currency (Z$) with marked rates of change in 1983 and 1990. The devaluation of the Zimbabwean dollar was done in order to reflect its real value to US$. This was obviously an attractive incentive for investors, especially those interested in shares in the industrial and mining sector, as exports were becoming cheaper in relation to world market prices. The ER was considered to affect the decision and willingness of foreigners to invest into the country and as such devaluation of Zimbabwean dollar might have encouraged foreigners to invest in Zimbabwe as they would now have more US dollars to spend there.

Ordinary least squares (OLS) regression

OLS regression analysis for the general econometric model equation (i) was run and residuals saved. The output from this analysis showed the following:

- LRI was not significant at 5% level of significance while LPI and LER were significant.
- The diagnostic tests showed that there was serial correlation while the equation was normal and homoscedastic.
- R^2 was 99.2%
- Durbin-Watson (DW) statistic 0.63697. The low DW-statistic could be suggesting that the regression is spurious. This could be because of the time series data being I(1) with the residuals being I(1) as well. Since OLS assumes the disturbances are white noise, the implication that the residuals are I(1) is inconsistent.

Cointegration in time series data

From theory, for time series to be cointegrated they must be of the same order but not stationary [i.e. become stationary after taking the first difference - I(1)] but with the residuals being I(0). Occasionally one may find I(2) series but for this study it was expected that the time series would be I(1).

A check for the cointegration conditions

The following steps were taken to check for cointegration in the data. Graphs of variables LMV, LPI and LRI were generated and these looked like random walks. A random walk is generated by the process:

$$X_t = X_{t-1} + \varepsilon_t$$

$$\text{where } \varepsilon_t \sim IID(0, \sigma^2)$$

This therefore meant that the data was I(1).

However, the graph for LER looked like a random walk with a drift I(1) generated by the process:

$$X_t = a_0 + X_{t-1} + \varepsilon_t$$

$$\text{where } \varepsilon_t \sim IID(0, \sigma^2)$$

Correlograms for DLMV, DLPI, DLRI, and DLER (where D = First difference) and for LMV, LPI, LRI and LER were also produced. All the correlograms looked like random walks with the exception of LER which looked like a random walk with a drift. In addition, simple graphs for MV, RI, PI and ER also looked I(1).
Whilst correlograms are useful, they can be misleading since the correlograms for a random walk and a random walk with a drift are quite similar and are difficult to distinguish.

For this reason, a second check was done using the Augmented Dickey Fuller(ADF) tests that which allows for autocorrelation for trended and non-trended time series to check for the order of integration of the series to see whether they are all I(1) - a necessary but not sufficient condition for cointegration. It was found out that the time series were all I(1). The results of the ADF tests are summarised below:

The ADF tests for trended series

Trended series	**T- ratios**	**Critical values (n = 82)**	**Ho: α = 0, Random walk with a drift I(1) H1: α< 0, Trend stationary I(0)**	**Order of integration**
DLMV	-2.1396	-3.4645	Do not reject Ho.	I(1)
DLPI	-2.1920	-3.4645	Do not reject Ho.	I(1)
DLER	-2.1907	-3.4645	Do not reject Ho.	I(1)
DLRI	-2.3140	-3.4645	Do not reject Ho.	I(1)

The ADF tests for non-trended series

Non-trended series	T- ratios	Critical values (n = 82)	Ho: α=0, Random walk (1) H1: $\alpha < 0$, AR(1) I(0)	Order of integration
DLMV	-0.92299	-2.8967	Do not reject Ho.	I(1)
DLPI	-2.1016	-2.8967	Do not reject Ho.	I(1)
DLER	0.92483	-2.8967	Do not reject Ho.	I(1)
DLRI	-1.0115	-2.8967	Do not reject Ho.	I(1)

For the regression not to be spurious, the linear combination of I(1) time series should generate residuals which are I(0) - a necessary and sufficient condition for cointegration. If this is true, then, the series are cointegrated and as such there exists a causal linear relationship between the time series which is not a result of an existence of a trend but due to causal relationship. This means then, even though the series are increasing through time, they tend not to drift apart from each other i.e. there is long-run equilibrium (a stable relationship) between the time series as represented by the disequilibrium error.

A third test for cointegration was done on residuals using the Cointegrating Regression Augmented Dickey Fuller (CRADF) test in order to check for autocorrelation. The test was done starting from the fourth lag of the residuals (because the study used quarterly data) and reducing the lags down to just the lag of the residuals which effectively is the Cointegrating Regression Dickey Fulller Test (CRDF). The results of the tests are shown below:

CRADF Test of the Residuals from the Original Cointegrating Regression:

Lags	T-ratio	n	Critical value v = 4	Ho: α = 0, Random walk I(1) H1: $\alpha < 0$, AR(1) I(0)
(-4)	-4.4366	79	-4.2395	Reject Ho. Residuals are I(0)
(-3)	-3.9905	80	-4.2377	Accept Ho. Residuals are I(1)
(-2)	-4.5615	81	-4.2359	Reject Ho. Residuals are I(0)
(-1)	-4.2138	82	-4.2342	Accept Ho. Residuals are I(1)
CRDF	-4.5423	83	-4.2326	Reject Ho. Residuals are I(0)

It is worth noting that Smith (1997) points out that these tests lack power as they frequently fail to reject Ho., when it is false and therefore the cointegration tests should be viewed with caution.

Since the above results show that there were contradictions in the order of integration of the residuals at different levels of lags, it was necessary to check whether the coefficients of the first difference were significant at m = 1, 2, 3, and 4 (since quarterly data); i.e.

$\Delta et = \alpha e_{t-1} + \delta_1 \Delta e_{t-1} + \delta_2 \Delta e_{t-2} + ... + \delta_m \Delta e_{t-m}$ where m = 1, 2, ...

It was found out that the coefficients of $\delta_m \Delta e_{t-m}$ were all not significant at 5% level of significance, while the coefficient for αe_{t-m} was significant all the time. Since with CRDF there was no autocorrelation and the residuals were I(0), it therefore meant that the time series were cointegrated and accordingly the results of the CRDF test were accepted.

Error correction models (ECMs)

From the Granger representation theorem, if the time series variables are all I(1) and they are cointegrated , then they are generated by the Error Correction Models (ECMs) shown below:

$\Delta x_t = -\lambda_1 Z_{t-1} + \text{lagged}(\Delta x_s, \Delta y_s) + \varepsilon_{1t}$ $\quad o<\lambda_1< 1$

And

$\Delta y_t = -\lambda_2 Z_{t-1} + \text{lagged}(\Delta x_s, \Delta y_s) + \varepsilon_{2t}$ $\quad o<\lambda_2< 1$

Where,

$Z_t = y_t - \gamma_1 - \gamma_2 x_t$ and at least one of λ_1, λ_2 is not zero.

Z_t is the disequilibrium errror.

Therefore, using the Granger representation theorem if one is modelling cointegrated variables using general to specific approach, one can focus on ECMs when testing down from general model to the preferred specific model. ECMs are useful since the short-run and long-run effects are separated and clearly distinguished and can be readily estimated. The models are balanced because the variables are cointegrated and therefore the problems of spurious regressions are avoided.

Since the time series were found to be I(1) and cointegrated, ECMs were therefore used in the data analysis.

The general cointegrating regression model (derived from the general econometric model) used was as follows:

$$LMV_t = \beta_1 + \beta_2 LPI_t + \beta_3 LRI_t + \beta_4 LER_t + \mu_t$$

The first order ECMs for the above model were:

(a) The Restricted First Order ECM:

$$DLMV_t = \beta_6 + \beta_2 DLPI_t + \beta_3 DLER_t + \beta_4 DLRI_t + \beta_5 RES_{t-1} + \varepsilon_t$$

(b) The Unrestricted First Order ECM:

$$DLMV_t = \beta_1 + \beta_2 DLPI_t + \beta_3 DLER_t + \beta_4 DLRI_t + \beta_5 LMV_{t-1} - \beta_7 LPI_{t-1} - \beta_8 LER_{t-1} - \beta_9 LRI_{t-1} + \varepsilon_t$$

OLS for both restricted and unrestricted ECMs were then run and the results were as follows:

Restricted first order ECM:

Restricted ECM	**Description**	**Level of statistical siginificance (5%)**
DLMV	Dependent variable	
Intercept	Constant	0.0079335
DLPI	Short-run elasticity	1.0978*
DLER	Short-run elasticity	0.46482*
DLRI	Short-run elasticity	0.93365
Residuals(-1)	Speed of adjustment**	-0.39962*
R^2		0.91776
DW-statistic		1.8957

*Indicates statistically significant

** The negative sign for speed of adjustment indicate that MV was fluactuating around its equilibrium value (The diagnostic tests indicated no presence of serial correlation).

Unrestricted First Order ECM

The long-run elasticity for PI was:

$$PI = -LPI(-1)/LMV(-1)$$
$$= -[0.46532/-0.39541]$$
$$= 1.17680$$

The long-run elasticity for RI was:

$$RI = -LRI(-1)/LMV(-1)$$
$$= -[-0.19880/-0.39541]$$
$$= -0.05028$$

The long-run elasticity for ER was given by:

$$ER = -LER(-1)/LMV(-1)$$
$$= -[0.28642/-.0.39541]$$
$$= 0.72436$$

Unrestricted ECM	**Description**	**Level of statistical siginificance (5%)**
DLMV	Dependent variable	
Intercept	Constant	-0.56367
DLPI	Short-run elasticity	1.1897*
DLER	Short-run elasticity	0.49901*
DLRI	Short-run elasticity	-0.0003094
LMV(-1)	Speed of adjustment**	-0.39541*
LPI(-1)	Long-run coefficients	0.46532*
LER(-1)	Long-run coefficients	0.28642*
LRI(-1)	Long-run coefficients	-0.1988
R^2		0.91921
DW-statistic		1.9352

*Indicates statistically significant

**The speed of adjustment of MV to the disequilibrium error

(The diagnostic tests indicated no presence of serial correlation).

Since RI was found not to be statistically significant both in the short-run and long-run in the first order ECMs of the general cointegrating regression model, it was dropped out of the general cointegrating regression model.

Specific cointegrating regression model

Another OLS was then run of the specific cointegrating regression model – whose equation did not include the dropped variable RI. This model is shown as below:

$$LMV_t = \beta_1 + \beta_2 LPI_t + \beta_3 LER_t + \mu_t \quad \text{..... (ii)}$$

Residuals were obtained and saved and CRADF used starting from the fourth lag of the first difference of the residuals with the lags reduced down to just the lag of the residuals (i.e. CRDF) since there was no serial correlation at all these different lag levels. The CRADF test revealed that the residuals were I(0) which was also the case with CRDF which showed that the residuals were I(0)and therefore the time series were cointegrated. The CRADF test results are summarised below:

CRADF test of the residuals from the specific cointegrating regression Model

Lags	**T-ratio**	**n**	**Critical value v = 3**	**Ho: $\alpha = 0$, Random walk I(1) H1: $\alpha < 0$, AR(1) I(0)**
(-4)	-4.4962	79	-3.8508	Reject Ho. Residuals are I(0)
(-3)	-4.0440	80	-3.8494	Reject Ho. Residuals are I(0)
(-2)	-4.6445	81	-3.8481	Reject Ho. Residuals are I(0)
(-1)	-4.2586	82	-3.8467	Reject Ho. Residuals are I(0)
CRDF	-4.5813	83	-3.8455	Reject Ho. Residuals are I(0)

ECM for the specific econometric cointegrating regression model

Similar to the general cointegrating regression model, ECMs were also used for the specific cointegrating regression model. This was because the residuals obtained from the specific cointegrating regression model were also found to be I(0) by the CRADF test. The results are given below:

Restricted first order ECM

Restricted ECM	**Description**	**Level of statistical siginificance (5%)**
DLMV	Dependent Variable	DLMV
Intercept	Constant	0.0095884*****
DLPI	Short-run elasticity	1.1901*
DLER	Short-run elasticity	0.47839*
Residuals(-1)	Speed of adjustment**	-0.40134*
R^2		0.9181
DW-statistic		1.9067

* Indicates statistically significant

** The negative sign for speed of adjustment indicate that MV was fluactuating around its equilibrium value (The diagnostic tests indicated no presence of serial correlation).

Unrestricted first order ECM

The long-run elasticity for PI was:

$$PI = LPI(-1)/LMV(-1)$$

$$PI = -[0.44872/-0.39778]$$

$$= 1.12806$$

The long-run elasticity for ER was:

$$ER = LER(-1)/LMV(-1)$$

$$= -[0.27596/-0.039778]$$

$$= 0.69375$$

Unrestricted ECM	**Description**	**Level of statistical siginificance (5%)**
Dependent Variable	DLMV	
Intercept	Constant	-0.56379
DLPI	Short-run elasticity	1.1871*
DLER	Short-run elasticity	0.47628*
LMV(-1)	Speed of adjustment	-0.39778*
LPI(-1)	Long-run coefficients	0.44872*
LER(-1)	Long-run coefficients	0.27596*
R^2		0.91895
DW-statistic		1.9311

* Indicates statistically significant

** The speed of adjustment of MV to the disequilibrium error.

(The diagnostic tests indicated no presence of serial correlation).

Since the coefficients for PI and ER were all found to be statistically significant both in the short-run and long-run in the first order ECMs of the specific cointegrating regression model (one without RI) and there was no serial correlation, the new ECMs obtained from the specific cointegrating regression model were adopted for the study.

Thus the new specific cointergrating regression regression model was as below:

$$LMV_t = \beta_1 + \beta_2 LPI_t + \beta_3 LER_t + \mu_t$$

The ECMs for the above model were:

(i) Restricted ECM:

$$DLMV_t = \beta_5 + \beta_2 DLPI_t + \beta_3 DLER_t + \beta_4 RES_{t-1} + \varepsilon_t$$

(ii) Unrestricted ECM:

$$DLMV_t = \beta_1 + \beta_2 DLPI_t + \beta_3 DLER_t + \beta_4 LMV_{t-1} - \beta_6 LPI_{t-1} - \beta_7 LER_{t-1} + \varepsilon_t$$

Checks for possible long-run effects

Additionally, the general ECM was run from the eighth order so as to see whether RI, PI and ER had long-run effects

- RI dropped earlier on was found that RI was only significant at the third order of ECM and and not significant at any other level (higher or lower orders)
- PI was found to be significant at most levels
- ER only seemed to have significance in the first order ECM

The above findings were interpreted to mean that the effects of RI on the HSE market capitalisation emerge only in the third quarter, while PI affects the market capitalisation almost after every quarter. The implication of PI was that PI has a significant effect on liquidity of the HSE dictating the ease of selling and buying securities there. The effects of ER were interpreted to mean that ER only affects the HSE market capitalisation after the first quarter such that the investors quickly adjust to changes in ER once and for all and could be a reflection of credibility and trust that investors put on the exchange rate management policies as well as the other macroeconomic policies of Zimbabwe.

Given the complexities of interpretating ECMs at higher orders, it seemed sensible to restrict the findings of the new specific cointegrating regression model and the first order ECMs.

Checks were also made as regards to possible structural breaks, for example, those caused by

1. Suspension in 1984 of HSE trading in external shares quoted in foreign stockmarkets and the permission for corporate membership on the stock exchange in that very year. There appeared to be not structural break.

2. Implementation of structural adjustment programme (SAP) in the 1990s. There appeared to be no such effects. Indeed these findings were in line with predictions by Riddell (1992) that initially SAP were unlikely to bring much structural changes but changes likely to have taken place from 1996 onwards.

Conclusions and policy implications

Conclusions

Using the assumption that market size is positively correlated with the ability to mobilise capital and diversify risk, the study findings suggest that share price (PI) and the exchange rate (ER) are the most important determinants of the HSE market capitalisation.

Upward moving share prices are likely to attract new investors (both local and foreign) into the market. Where foreign investors are involved more Foreign Portfolio Equity Investment (FPEI) is likely to flow to Zimbabwe via managed macroeconomic policies such as those aimed at managing the exchange rate which this study finds to be an important variable for the HSE market capitalisation. Proper exchange rate management is likely to attract capital inflows, especially the FPEI, without the detrimental macroeconomic effects arising through the appreciation of the real exchange rates. The increase in foreign demand for local stocks will push up equity prices, which will lower the cost of capital and encourage new equity issues. FPEI is likely to bring benefits to the local economy through the mobilisation of additional finance, a reduction of capital costs for domestic firms and an improvement in the standards of local stock markets. The increased wealth of local investors is likely to induce an expansion of their consumption, encourage domestic production and investmen. Foreign sellers of stocks might also decide to use part of their wealth to finance local investments. The FPEI may also help in the further development of domestic stock markets - foreign investors would instil confidence among local investors to demand timely and quality information, and require adequate market and trading regulations. FPEI would also encourage the development of new institutions and services, transfer of technology and training of local personnel. Thus, the current market weaknesses related to small market size, high concentration of trading in a few major stocks, liquidity problems, limited number of active traders, high volatility and small number and size of listed companies could be reduced.

The relationship between market capitalisation and economic growth may vary from country to country. Certain and different types of financial systems and sectors may be in a better position than others to enhance the growth process. Institutional structures (both at international and local level) may affect the effectiveness of different governments to act. Therefore emerging markets need to take into account their specific country conditions in formulating appropriate policies for their stock market development and economic growth. Political instabilities/uncertainities and

failing economic sectors (due to nature or government policies) are also likely to affect the confidence of investors in trading in the emerging stock markets.

Further in-depth research into the determinants of market capitalisation for the African and other emerging stock markets is required to identify best ways of developing these markets within the global financial system while at the same time promoting local economic growth.

Policy implications

The Zimbabwean government

- Continues to encourage important economic and structural changes that encourage FPEI flows - policies aiming towards greater market-oriented economic reforms. These may include increased focus on the exchange rate, privatisation and liberalisation of domestic financial systems; increased relaxation of restrictions on international capital transactions & flows and entry of foreign banks and other financial intermediaries.

- Assists the market increase its ability to have its share prices reflect the fundamentals and new information more fully and quickly.

- Ensures adequate market regulations are in place and that there is the capacity to enforce any such regulations.

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