The Effect of stock market wealth on private consumption in Zimbabwe

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ABSTRACT

The study seeks to examine stock market wealth effects on private non-durable consumption for Zimbabwean households using quarterly data from 1994(1) to 2008(2). The bounds testing approach to cointegration is employed to test the long run relationship between stock market wealth and consumption. An autoregressive distributed lag model (ARDL) analysis is implemented to examine the relationship among the variables both in the short-run and the long run. The empirical findings suggest significant wealth effects for Zimbabwe, a developing country. This contradicts the commonly held view that LDCs should have insignificant wealth effect since the financial system is still underdeveloped. The dynamic short run error correction model also shows a speedy convergence to long run equilibrium.

Key words: wealth effects, consumption dynamics, income effect, convergence

JEL classification: E21, E44

1. Introduction

The study seeks to determine the extent to which household non durable consumption expenditure is affected by changes in stock market wealth for Zimbabwean households using an autoregressive distributed lag (ARDL) bounds test framework. Most studies on stock market wealth effects have been confined to developed countries which have well established financial markets, while very few are based on less developed countries (LDCs). The argument for underplaying the case for LDCs has been that since most of them have inefficient financial markets, stock market wealth effects cannot be expected to be significant. Above all, most researchers argue that since stock market wealth account for a small percentage of household wealth in LDCs, they are not important (Funke, 2004; Ahumada et al., 2003). However, following the revelation by African Stock Exchanges

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The views expressed here reflect the ideas of the authors and should not by any means taken to be those of Bindura University

Association (ASEA, 2007) that there has been a continuous rise in stock market wealth in household's wealth portfolios for most African countries over the past decade, the study seeks to establish whether we can obtain the same findings for developing countries as those of the developed countries.

Several reasons can be cited why the present study is important. Firstly, to the policymakers an understanding of the relationship between stock market wealth and consumption helps in ascertaining the speed with which shocks to the stock market are transmitted to the real sector through private consumption[1] (Macklem, 1994). In addition, an understanding of this relationship also gives a clearer picture to the policymakers as to the extent to which various stimulating interventions will affect the economy (Poterba, 2000). This is because the relationship between consumption and wealth determines the overall marginal propensity to consume, which in turn determines the value of the multiplier. Thus, ignoring such effects may result in unwanted policy reinforcement or the reversal.

The study of stock market wealth effects on consumption is also important to firms. It is apparent that firms should align their production levels to demand to avoid overproduction or underproductions. When equipped with knowledge of wealth effects, firms that produce consumer goods will be able to infer the corresponding change in their production level following a shock on the stock market (Singh, 1992).

1.1 Stock market wealth effects

Theoretically if households experience an increase in wealth, regardless of the source, they will experience an outward shift in their budget constraint. Such an increase in wealth can either be devoted to immediate consumption or it can be saved. If we assume that households have a finite life and do not leave behind bequest, it is certain that such an increase in wealth will be devoted to consumption at least within the household's lifespan. In such a case our concern will not be about the existence of wealth effects in general but the lag time it would take for changes in wealth to be devoted to consumption. However, when considering a more realistic household that leaves behind some bequest, households might save all or some of the gains in wealth for future generations. Thus wealth effects are concerned with the fraction of wealth increase that is devoted to current consumption.

It is important to note that household's wealth is composed of a wide range of assets. The major forms of household's wealth that are commonly held are stock market and housing wealth and the marginal propensities to consume (MPC) out of these two main types of wealth should be different (Pichette et al., 2003). For developing countries it is argued that stock market wealth is more reflective of household wealth for a number of reasons.

[1] This is because consumption spending of households that would have benefited from capital gains is one way in which such shocks are transmitted.

Firstly, for LDCs, most households do not own marketable houses. For example in Zimbabwe more than 65 percent of the population live in rural areas where houses are not easily traded due to customary laws and tradition (World Bank, 2010). Secondly, housing wealth is less liquid than stock market wealth, and the transaction costs associated with the former are usually higher than for the latter. Moreover, the indivisibility nature of housing wealth reduces its affordability to the general populace and as such households do not normally hold housing wealth for speculative purposes. Above all, households are likely to leave behind houses as bequest and as such do not normally consider housing wealth as redeemable (Singh, 1992). In LDCs stock market wealth is held for speculative purposes and thus gains are realised quickly than is the case for housing wealth.

1.2 The Zimbabwe Stock Exchange (ZSE): An Overview

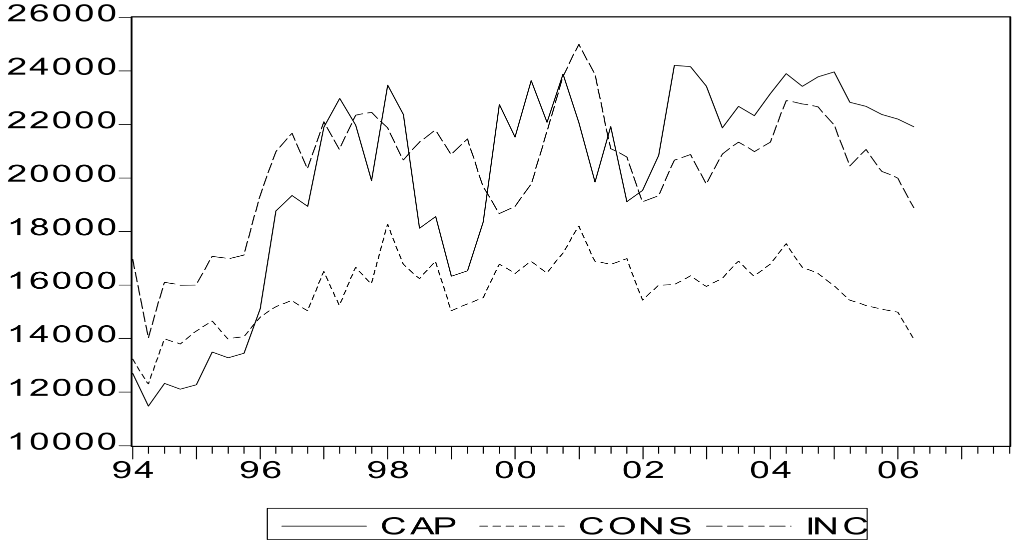
The ZSE has been in existence since 1946. Prior to 1993 the ZSE was highly regulated and its outcomes were not based on market fundamentals. After deregulation the ZSE has helped to mobilise investible funds and also provided an opportunity for insurance companies and pension funds to channel their portfolio investments to productive economic areas. This enabled pension funds to realise more returns on their investments which would ultimately accrue to the households for consumption. In March 1999, the ZSE was ranked sixth out of 33 emerging exchanges in the world (IFC, 1999). It was also ranked the second largest sophisticated stock market in the Southern African region after the Johannesburg Stock Exchange (Jefferis et al., 2000). Thus, compared to other African countries, the ZSE is relatively more efficient and as such provides a good ground for testing wealth effects for LDCs.

The ZSE has two indices, the Zimbabwe Industrial index and the Zimbabwe Mining index. There are 74 stocks listed on the Industrial index and 4 stocks listed on the Mining index. Trading in both indices is open to firms and individuals whether foreign or local. Stockholding across the two indices does not differ significantly and around 60 percent of stocks are owned by domestic households and firms (ZSE, 2008).

1.3 Trends in Zimbabwe stock prices and consumption

In order to give an elaborate analysis of the relationship between stock market wealth and household consumption expenditure on non-durables we shall analyse the trends in consumption and stock prices for the Zimbabwean case from 1994 to 2008. A graphical inspection of figure 1 highlights the likely marriage between the two series.

Figure 1. Trends in Consumption, Income and Stock Market Wealth



From observing figure 1 it can be established that periods of high stock market wealth (CAP) are accompanied by high consumption expenditure (CONS). It is also interesting to observe that income (INC) follow a similar pattern. For example, all the three series drop off after 1994 to reach a minimum in the second quarter of 1994. Stock market capitalisation seems to be the more volatile of the series, increasing and falling more frequently whereas the response of consumption seems to be more stable. The volatility in stock market wealth is because the financial markets are more responsive to external shocks than the goods market.

2. Related Literature

2.1 Theoretical literature

The discussion of wealth effects can either be based on the traditional consumption theories or on modern maximising theories. Following Carroll et al. (2004) who argued that the optimal behaviour of impatient consumers with labour income uncertainty is much better described by Friedman's original statement of the permanent income hypothesis than by the later explicit maximizing version, the study shall adopt the traditional consumption theories.

Keynes (1936) argued that households devote a certain percentage of their current income to consumption and the other percentage is then saved. Keynesian consumption function can be modelled as:

$$C_t = \alpha_0 + \beta Y_t + \varepsilon_t \quad (1)$$

where C_t is consumption and α_0 is autonomous consumption β is the marginal propensity to consume and Y_t is the current income and ε_t is the error term.

This theory is often criticised because it implicitly assumes that households only have human wealth and neglected non-human wealth such as equities and other financial wealth holdings. In addition, the theory overlooks the fact that incomes can be either permanent or transitory.

Friedman (1957) in his permanent income hypothesis (PIH) argued that the level of consumption depends on current and expected future income stream, that is,

$$C_t = \varphi Yp_t + \mu_t \tag{2}$$

where C_t is private household consumption in period t, Yp_t is household permanent income in period t and μ_t is the error term.

Friedman postulated that transitory income changes do not have an effect on household consumption but rather permanent changes.

The wealth effect on the household consumption expenditure was perhaps explicitly introduced by Ando and Modigliani (1963). They argued that households seek to smoothen their lifetime consumption to avoid large variance in their consumption in periods of high income and low income. Often, this effect has been analysed as the life-cycle hypothesis (LCH) in which private consumption is modelled as,

$$C_t = \eta Y_t + (\sigma - \gamma) A_t + \nu_t \tag{3}$$

Where A_t is the end period private wealth and γ is the rate of return on assets and ν_t is an error term. The rate of interest is important in explaining consumption in so far as it affects the value of wealth held in interest bearing assets. If interest rate goes up, household would expect to get more from their assets and as such may increase consumption.

2.2 The Empirical Literature Review

Early researches on wealth effects were mainly based on developed countries for example Mankiw et al. (1991); Starr-McCluer (1999); Maki et al. (2002); Lugwig et al. (2002). Most of these studies found positive and significant stock market wealth effects of between 2-9 percent. For the US wealth effects were found to be between 4-7 percent. Mankiw and Zeldes (1991) estimated micro level wealth effects for American households using OLS. They found a marginal propensity to consume out of stock market wealth of between 3 and 5 percent. They found the effect to be more pronounced for equity holders than for non-equity holders. Sousa (2008) found stock market wealth to be significantly smaller than non stock market wealth for USA. He also found that indirectly held stock market wealth has greater impact on consumption than direct property.

For Australia, Kohler et al. (2003) found a significant wealth effect of 7-9 percent. Similar to Mankiw et al. (1991), they also found out that in the wake of rising stock market wealth, households that hold stocks in their portfolios would increase their consumption more than those who do not hold equities. Their study, however, found the relationship between consumption and wealth to be unstable over time. Macklem (1994) found wealth effects of around 3.5cents per every dollar in the period of wealth change for Canadian households. He also found the effect to be lasting beyond the period of wealth change.

Very few studies based on emerging economies include Peltonen et al. (2009) who estimated wealth effects for 14 emerging economies. He found that a 10 percent rise in stock prices is associated with 0.29-0.35 percent rise in per capita consumption. Yet, they found that consumption reacts stronger to negative changes than it does to positive changes. Ahumada et al. (2003) also found significant but low wealth effect for Argentina. They used aggregate private consumption, national disposable income and stock market capitalisation macro level data without separating between equity holders from non-equity holders in their estimation of the wealth effects of an emerging country using data from Argentina. This finding was also in line with Funke (2004) who found small but significant wealth effects for 16 emerging economies for the period 1985-2000 ranging from 0.2-0.4 percent.

An important element to consider when studying wealth effects is the marked heterogeneity of stock ownership. Attanasio et al. (2002) used the UK Family Expenditure Survey (FES) data, to develop a method for separating the “likely” stockholders from non-stockholders and divided households into cohorts which depend on the likelihood of owning stocks in their wealth portfolios. They also found the consumption of stockholders was more highly correlated with stock market returns than the consumption of non-stockholders.

One shortcoming of their analysis is that they used a set of observable characteristics to construct a cohort of likely stockholders and likely non-stockholders, and regressed the average stock return against the average change in consumption of the two groups. However, those households who they predicted to own stocks might have other characteristics that are likely to affect their consumption behaviour. This indirect channel makes simple interpretation of the regression results more difficult (Grant et al. 2004).

However, the above studies are micro based in that they consider wealth effects on household level and not economy wide wealth effects. The micro based studies are criticised by macro based groups of researchers which include Bertaut (2002) who felt that not including those agents who do not hold stocks will only concentrate on the direct and immediate wealth effect and thus will estimate part of the effect and thus will misguide policy. Moreover, Paiella et al. (2004) argued that the micro based approach to wealth effects results in endogeneity problems. Endogeniety arises since households that hold stocks are usually those that are wealthier and as such are expected according to economic theory to have a low marginal propensity to consume and as such, it tends to underestimate the wealth effect. He further argued that the effect is further underestimated if the consumption on non-durables only is considered since wealthier households tend to expend even low percentage of their income on non-durables. In this study we shall follow the approach by Ahumada et al., (2003) and Macklem (1994) among others and estimate a stock market wealth effects using aggregate data for Zimbabwe. The approach is the most appropriate to the study because it is useful for policy purposes.

3. Methodology and results

3.1 Theoretical framework

Following Labbard et al. (2005) the aggregate consumption function can be modelled as:

$$C_t = f(Y_t, C_{t-i}, \gamma_t) \tag{4}$$

where C_t is household consumption, Y_t is total household disposable income, γ_t is the rate of interest in period t and C_{t-i} represents past consumption levels. Ideally from the basic Keynesian function (1936), disposable income and consumption are believed to have a positive relationship. Consumption also depends on past levels of itself C_{t-i} this idea was popularised by Friedman (1957) and Ando and Modigliani (1963) in the permanent income and the life cycle hypothesis respectively. γ_t is the rate of interest on savings and it takes into account interest elastic consumption that is mostly consumption of durable consumer goods. Interest rate also affects consumption by increasing the opportunity cost of consuming now thus a negative relationship is expected.

We shall split household income into human income (Y) and non-human income (W). Since the study is limited to non durable consumption which in most LDCs is not financed from borrowed funds we will not include the rate of interest in our analysis. Moreover, with the hyperinflationary environment over the past decade, there has been a negative real interest rate. Given the above mentioned, we shall therefore modify equation 4 to:

$$C_t = f(W_t, Yd_t, C_{t-i}) \tag{5}$$

where W_t is household wealth in period t, Yd_t is disposable income in period t.

3.2 Modelling Techniques

The study used an autoregressive distributed lag (ARDL) cointegration approach as pioneered by Pesaran et al. (1999), which they referred to as the Bounds Test Cointegration (BTC). The ARDL cointegration is more superior to the conventional cointegration approaches[2] in a number of ways.

Firstly, ARDL employs only a single reduced form equation thus avoiding estimation numerous equations some of which might not be important for the study in question (Pesaran et al., 1999). Furthermore, the ARDL approach also avoids stringent order of integration requirements as required by conventional cointegration procedures since it can be applied irrespective of whether the variables are I (0) or I (1) (Pesaran et al., 2001). Above all, given the low testing power of the unit root test, and the cyclical nature of most series, the ARDL is deemed superior to the conventional techniques. This is because the stationarity

[2] For more details on the conventional cointegration techniques see Engle et al. (1987); Johansen (1988).

tests result in biased results at times (Pesaran et al., 2001). However, it should be noted that in cases where some variables are I (2) or beyond, the ARDL will be inconsistent and will thus collapse (Pesaran et al., 2001).

3.2.1 ARDL modelling approach[3]

To illustrate the ARDL modelling approach, we followed the leads of Pesaran et al. (1997, 1999) as summarized in Choong et al. (2005), we apply the bounds test procedure by modelling equation 5 as general autoregressive (VAR) models of order *p* in G_t:

$$G_t = \alpha_0 + \sum_{i=1}^{p} \eta_i G_{t-i} + \varepsilon_t \text{, } t=1, 2, 3\ldots T \tag{6}$$

With α_0 representing a (*k+1*)-vector of intercepts (drift), and G_t is the vector of variables y_t and x_t respectively. Where y_t is the dependant variable consumption, (LCON) and x_t is a vector matrix representing a set of explanatory variables stock market capitalization and household disposable income $x_t = (LCAP_t, LINC_t)$. The short run unrestricted error correction (UECM) version of the ARDL model is given by:

$$DLCON_t = \alpha_0 + \sum_{i=1}^{p} \phi_i DLCON_{t-i} + \sum_{i=0}^{p} \beta_i DLCAP_{t-i} + \sum_{i=0}^{p} \delta_i DLINC_{t-i} + \lambda_1 LCON_{t-1}$$
$$+ \lambda_2 LCAP_{t-1} + \lambda_2 LINC_{t-1} + \varepsilon_t \tag{7}$$

Where D is the first difference operator, $\varphi_t, \beta_t, \delta_t$ are short run elasticities and λ_i are long run multipliers, ε_t is the stochastic error term and *p* is the optimal lag length for each variable which might not necessarily be equal for each variable. The first part of equation 7 with $\varphi_t, \beta_t, \delta_t$ represents short run dynamics of the model while the second part with λ_i represents the long run relationship. In estimating the UECM it is important to determine the optimal lag length *p*, which might as stated earlier be different for every variable depending on how sooner or later the variable applies its effect to the dependant variable.

3.2.2 Selection of optimal lag length

The selection of structural lags *p* is determined by using the SBC[4]. The SBC involves estimating $(p+1)^k$ equations and selecting the one with the largest SBC. Where *p* is the maximum number of lags to be used and *k* is the number of variables in the equation. It our model we take $p = 4$ since we are using quarterly data.[5] Since we have three variables in the model we took $k = 3$. Microfit 4.0 automatically selects the parsimonious equation from a total of 125 equations and found it to be an ARDL (1, 2, 1) model.

[3] Much of the material in this section follows the leads of Pesaran et al. (1999).

[4] It can also be selected using the general to specific modeling technique as argued by Narayan et al. (2004).

[5] For the rational of using $p = 4$ when using quarterly series see Pesaran et al. (1997).

3.2.3 Testing for stationarity

The Phillip- Peron (PP) test was applied in order to determine stationarity properties for each variable. Variables were first converted to logarithms before carrying out the test for stationarity. Table 1 reports the PP test for all the variables in their levels.

Table 1: Phillips-Peron test statistics for variables in levels and first differences

Variable		Intercept	Intercept and trend	Conclusion
Critical value	5%	-2.9215	-3.5025	
	1 %	-3.5682	-4.154	
LCON		-2.613	-2.0207	Non stationary
LCAP		-2.0622	-2.14295	Non stationary
LINC		-2.2444	-2.0479	Non stationary
DLCON		-10.6970***	-12.2216***	Stationary
DLCAP		-7.31087***	-7.51910***	Stationary
DLINC		-7.64374***	-8.08342***	Stationary

*** means significant at 1 percent level

Since the absolute values of the calculated PP statistic for the variables in levels do not exceed the critical values shown in table 1, we cannot reject the null hypothesis of non-stationarity and it can therefore be concluded that there exists a unit root even at 1 percent significance. We thus proceed to differentiate the series once. After differentiating the variables once, the stationarity test was redone to the first differences. The results of stationarity test in first differences are also reported in Table 1. This implies that all the variables are I (1) and as such the bounds test procedure can be carried out since no variable is I (2) or above. Having established that all the variables are I (1) and are permissible for ARDL cointegration we will proceed to carry out the cointegration test.

3.3 ARDL Cointegration test

After regression of equation 7, the ARDL test for cointegration can now be conducted using the Wald test (*F*-statistic) to discern the long-run relationship between the concerned variables[6]. The F test will be used to determine whether there is some kind of relationship between variables. Under the null hypothesis that there is no long run relationship between the variables, the cointegration test will be conducted.

According to the Pesaran et al. (2001), the lower bound critical values assumed that the explanatory variables are integrated into order zero, or I (0), while the upper bound critical values assumed that they are integrated into order one, or I (1). Therefore, if the

[6] The computed *F*-statistic value will be compared with the critical values tabulated in Pesaran et al. (1999).

computed *F*-statistic is smaller than the lower bound value and all our regressors are I (0), then the null hypothesis is not rejected. Conversely, if the computed *F*-statistic is greater than the upper bound value, then we do not reject the null hypothesis stated earlier. On the other hand, if the computed *F*-statistic falls between the lower and the upper bound then the result is inconclusive and thus the decision has to be based on the significance of the error correction term, (Pesaran et al., 2001). The results reported below show that the hypothesis of no cointegration cannot be accepted at the 5 percent marginal level.

Table 2: Cointegration test results

ARDL (1, 2, 1) selected basing on Schwarz Bayesian criterion

Test statistic	Value	Lags	Significance level	Bounds critical value[7]	
			%	I (0)	I (1)
F-statistic	4.439	2	1 5 10	4.614 3.272 2.676	5.966 4.306 3.586

From Table 2 it can be seen that the calculated F-statistic of F = 4.439 is higher than the critical for I (1) at the 5 percent level of significance using restricted intercept and no trend. This implies that the hypothesis of no cointegration cannot be accepted at the 5 percent marginal level. We therefore conclude that there exists evidence of a cointegrating relationship between the variables. We now proceed to estimate the long run relationship.

3.4 The Long Run Equation

The long run equation can be specified as;

$$LCON = \alpha + \sum_{i=1}^{p} \beta_i LCON_{t-i} + \sum_{t=0}^{q_1} \varphi_i LINC_{t-i} + \sum_{t=0}^{q_2} \delta_i LCAP_{t-i} + \varepsilon_t \tag{8}$$

The results for the parsimonious model ARDL (1, 2, 1) are reported in Table 3.

Table 3: Long run equation results

Dependant variable LCON

Variable	Coefficient	Std. Error	Prob.
C	-0.13308	0.94275	0.888
LCAP	0.048148*	0.02798	0.087
LINC	0.95533***	0.24966	0.000

*** and* denotes significance at the 1 percent and 10 percent level.

R-squared	0.84492	Adjusted R-squared	0.82223
D-W statistic	2.1283	Wald F (6, 41)	37.2310(0.001)

[7] Critical value include restricted intercept and no trend.

The empirical results, reported in Table 3, show that all the determinants of consumption used in this study are statistically significant at least at the 10 percent marginal level. The diagnostic tests show that the model is correctly specified and has the correct functional form. The diagnostics also indicate that the model does not have problems of serial correlation, multicolinearity and heteroscedasticity. The summary of diagnostics is reported in Appendix B.

The coefficient of stock market wealth (LCAP) of (0.0481) is positive and statistically significant at the 10 percent marginal level. This suggests that in the long run, an increase of one dollar in the value of stock market capitalization is associated with an increase of 4.8 cents in household consumption. On the other hand, the coefficient on LINC is 0.95533 that is positive and statistically significant. The coefficient also carries the expected positive sign. This implies that a change in household disposable income of 1 percent results in a 0.955 percent change in consumption.

The marginal propensity to consume out of stock market wealth of 0.048 tends to be consistent with findings of studies from the developed world. This MPC out of stock market wealth implies that there exists a long run relationship between consumption and stock market wealth in Zimbabwe. The finding might have been fostered by the fact that since households have fewer assets in their portfolios they pay particular attention to changes in stock wealth. Another reason is that given the falling incomes in Zimbabwe since 1999 to present day households are constrained by low-income levels and thus will expend any increase in income that will come their way.

It is also important to note that other determinants of consumption like income are also significant. A dollar increase in disposable income increases consumption by around 95cents and this relationship is statistically significant even at the 1 percent marginal level. This coefficient also carries a positive sign as expected which conforms to the simple Keynesian consumption function (1936) where current income is the major determinant of consumption. However, the marginal propensity to consume from income tends to be very large compared to other studies. The finding implies that households consume nearly 96 percent of the increase in income that they obtain. Most studies find an MPC of less than 60 percent. The falling incomes facing Zimbabwean households might be the reason for such a high MPC since households are not obtaining enough incomes to cover the basics.

3.5 The short run Error correction model

Though variables exhibit long run trend, it is possible that they might be in short run disequilibria. The short run equilibrium error correction term (ECM) is used to estimate how long it takes for the variables to converge to the long run equilibrium once they are in short run disequilibria. The ARDL short run error correction model is given below;

$$DLCON_t = a_0 + \sum_{t=1}^{p} b_i DLCON_{t-i} + \sum_{i=0}^{p} d_i DLINC_{t-i} + \sum_{i=0}^{p} f_i DLCAP_{t-i} + \eta ECM_{t-i} + \mu_t \qquad (9)$$

Where

$$ECM = LCON - \alpha - \sum_{i=1}^{p} \beta_i LCON_{t-i} - \sum_{i=o}^{p} \phi_i LINC_{t-i} - \sum_{i=0}^{p} \delta_i LCAP_{t-i} = \varepsilon_t$$

The results of the error correction model are reported in Table 4.

Table 4: Short run ECM results

Dependant variable DLCON

Regressor	Coefficient	Std. Error	Prob.
DLCON	-0.042913	0.29619	0.885
DLINC	0.56388***	0.097091	0.000
DLINC1	-0.30652**	0.095137	0.002
DLCAP	0.27429***	0.060432	0.000
ECM(-1)	-0.32247**	0.10579	0.004

, * Denotes significance at 5 percent and 1 percent marginal level respectively

R-squared	0.64952	Adj R-squared	0.59825
D-W statistic	2.1283	F (4, 43)	18.9959(0.000)

The dynamic error correction result shown above shows that the coefficient of DLCAP, DLINC and DLINC1 are statistically significant at the 5 percent marginal level. This means that changes in these variables are related to changes in consumption. From Table 4 it can be seen that a change in the value of capitalisation (DLCAP) has a statistically significant and positive effect of 0.27429 on the change in consumption (DLCON). It can also be seen from the table that a change in the household income (DLINC) has a significant effect on the change in consumption (DLCON).

The coefficient of ECM*t-1* is found to be reasonably large in magnitude and is statistically significant. It confirms a long run relationship between the variables. The coefficient of ECM term is -0.32247, which suggests a speedy adjustment process. More than 32 percent of the disequilibria of the previous quarter's shock adjust back to the long run equilibrium in the current quarter. The error correction term also carries a negative sign as expected. The negative sign confirms that the adjustment will be in the opposite direction of the disequilibria. This means that there is convergence to the equilibrium relationship, otherwise the series would diverge away from their long run equilibrium.

3.6 Data Sources and Problems

The study uses quarterly time series data covering the period from 1994(1) to 2007(2). The choice of the period is because the ZSE was deregulated in 1993; in order to maintain consistence and avoid unnecessary break in data the study shall start from 1994 after the ZSE was deregulated. However, for time series data the period is long enough to establish whether there exists the relationship between the variables. The study is based on secondary data extracted from existing publications and the data were obtained from the Central Statistical Office (CSO) and the Reserve Bank of Zimbabwe (RBZ).

Due to the hyperinflationary environment that characterised the economy during the period under study we converted the data to US dollars using the parallel market exchange rate obtained from Old Mutual Financial Holdings and Imara Asset Management. The parallel market exchange rate was preferred because we felt that it could mirror the value of the Zimbabwean dollar more accurately than official figures which tend to overvalue the local currency. We further deflated the US denominated data to constant 1990 US prices using the US consumer price index as reported in the Bureau of Labour Statistics. To obtain quarterly series for household income we used the Lisman and Sandee (1964) method which is discussed in Appendix A. Whilst every care was taken to maintain accuracy in manipulating the data, the possibility of errors and omissions cannot be completely rejected.

4. Conclusions and policy recommendations

Form the empirical results it can be concluded that stock market wealth has a long run relationship with household consumption. Thus, basing on these results the hypothesis that a change in stock market wealth has a positive effect on household, non durable consumption cannot be rejected. A change in stock market wealth of one dollar will result in a change in consumption of 4.8 cents. The marginal propensity to consume out of wealth has been found to be around 0.048. The results tend to be in line with the economic theory which postulates that a change in household permanent income has a positive effect on income. The dynamic error correction also validates the long run relationship since it is statistically significant there exists a positive and statistically significant relationship between consumption and stock market wealth. The dynamic error correction results indicate that there is a speedy error correction process implying that when variables are in short run disequilibria the system quickly corrects itself.

4.1 Policy Implications

The findings of this study imply that interventionist policies like monetary policy need to consider the agent's reactions as they experience a monetary shock before setting targets. In this case the wealth effects tend to reinforce the initial policy position and thus may produce unwanted results such as inflation and excessive unemployment of resources. The results of this study imply that discretionary policies in Zimbabwe need to provide for the effect of the stock market wealth before setting the level of intervention that is needed to achieve a certain specified target. For example, expansionary monetary policy aimed at increasing employment during recessions normally involves increasing money supply by a certain percentage so as to hit the intended target. The increase in money supply will see households holding excessive money balances above their requirements for transaction purposes. The households tend to offload the excess in the money market by way of buying bonds, thus, increasing their demand and pushing up their price. According to Keynes (1936) there exists a negative relation between bond prices and interest rates; therefore, interest rates tend to fall. The fall in rate of interest will in turn reduce the returns in the money market. Agents thus substitute away from the money market to the stock market; this will increase demand of equities and thus pushes up the price of equities. For agents who already hold stocks the increase in stock prices means increase in household's wealth and thus with the significant wealth effect that we have found empirically, agents increase consumption which further aggravates the initial stimuli.

The increased aggregated demand would see inventories falling and calls forth for producers to produce more, in the wake of near full employment this might be inflationary. In light of the foregoing, policymakers should consider the effect of stock market wealth effect on employment and output before they can calculate the necessary changes in their instruments required to hit the intended target, otherwise they will not realise the employment or inflation levels that they would want to achieve from economic models.

For contractionary monetary policy the initial effect will be to increase interest rates, the rising interest rates from initial policy stimuli attract agents in the money market away from the stock market. This substitution will exert a downward pressure on stock prices and thus reduce household wealth. The significant wealth effects that we have obtained mean agents will reduce consumption accordingly. This fall in consumption thus reduces aggregate demand resulting in accumulation of inventories, reduced production levels and a general deflation in the economy. In light of the policy reinforcement discussed above, it is important for policy makers to make adequate and correct calculation of the effect otherwise they will end up surpassing their targets thus causing unnecessary deflation or inflation.

4.2 Suggestions for Future Researches

Future researches can consider disaggregated wealth effects on non-durable consumption. Inclusion of housing wealth to the analysis of wealth effects in developing countries can help broaden the concepts discussed in this study.

There is also need to consider wealth effects in the VAR framework where we could include more than one cointegrating vector and run causality test to see whether there are multidirectional feedbacks in the model. Future studies could also consider wealth effects in the micro level excluding non-equity holders and see whether we can reach the same conclusion as we have obtained in this study.

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Appendix

Appendix A: Lisman and Sandee (1964)

This method is employed to generate quarterly data from annual totals. The method assumes that the quarterly series of a variable Y_j depends linearly on three successive annual figures Y^*_{i-1}, Y^*_i, Y^*_{i+1} such that: $Y^*_j = a_{j,-1} Y^*_{i-1} + a_{j,0} Y_{1+a} + a_{j,+1} Y^*_{i+1}$. The twelve constants a_{jk} (j=1, 2, 3, 4: k=-1, 0, 1) are obtained by imposing twelve restrictions on the matrix of a_{jk}. In detail the method involves the following steps

Step 1

Starting from the first data point, group the observations in column vectors of order three for all successive years. For example if Y1, Y2 and Y3 are annual totals for a variable Y where 1,2and 3 are successive years the vector would be

$$Z=\begin{bmatrix} Y_1 \\ Y_2 \\ Y_3 \end{bmatrix}, \quad L=\begin{bmatrix} 0.729 & 0.1982 & -0.0211 \\ -0.0103 & 0.3018 & -0.0415 \\ -0.0415 & 0.3018 & -0.0103 \\ -0.0211 & 0.1982 & 0.729 \end{bmatrix}$$

Step 2

The Lisman and Sandee interpretation matrix is given by matrix L above

The quarterly data for the year whose annual totals is in the middle position of the vector Z in step 1 is obtained by pre-multiplying the L matrix as in the example below:

$$\begin{bmatrix} Q_{12} \\ Q_{22} \\ Q_{32} \\ Q_{42} \end{bmatrix} = L.\begin{bmatrix} Y_1 \\ Y_2 \\ Y_3 \end{bmatrix}$$

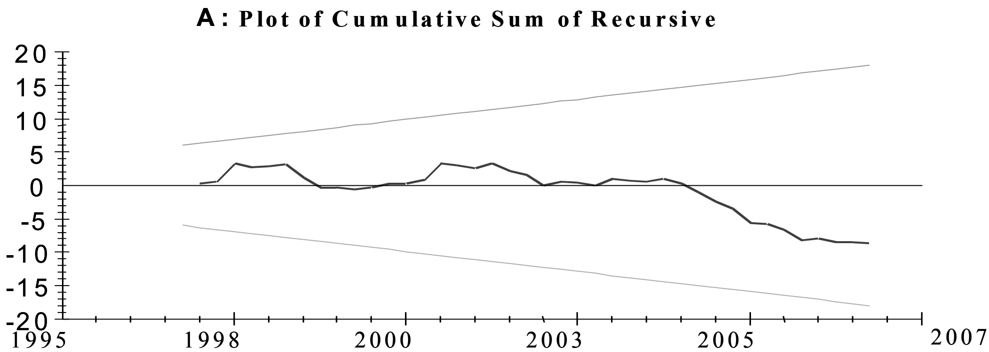
Where Q_{ij} is the ith quarter observation for year j (here j=2). This method has the nice property that the quarterly data it generates sum to exactly the annual total. The weakness however is that by the nature of the generation of the Z matrices, the method may introduce variability in the date generated which may not be present in the original series.

Appendix B:

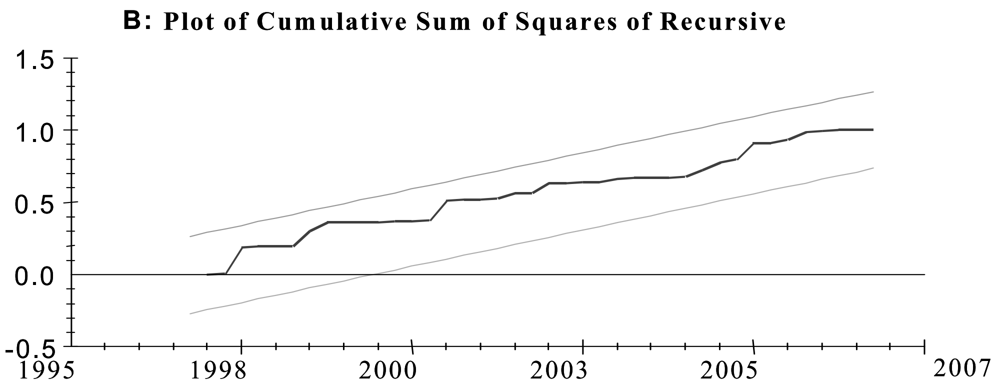
Table A1: Summary of diagnostics

Test	F-statistic	Probability
Specification error:		
Ramsey RESET test	0.39769	0.5321
Serial correlation:		
Breusch-Godfrey correlation LM test	0.32157	0.862
AR Cond. Heteroscedasticity:		
ARCH LM test	2.5824	0.1156

Stability Tests



The straight lines represent critical bounds at 5% significance



The straight lines represent critical bounds at 5% significance